



RIDGE

**SCOPING REQUEST FOR NEW
STADIUM DEVELOPMENT**

**ON BEHALF OF OXFORD UNITED
FOOTBALL CLUB**

AUGUST 2023

SCOPING REQUEST FOR NEW STADIUM DEVELOPMENT

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Prepared for

Oxford United Football Club

Prepared by

Ridge and Partners LLP
3rd Floor, Regent House
65 Rodney Road
Cheltenham
GL50 1HX

Tel: 01242 230066

Contact

Jenny Henderson
Principal Planner
jhenderson@ridge.co.uk

Giles Brockbank
Partner
gbrockbank@ridge.co.uk

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1. INTRODUCTION

- 1.1. This Scoping Report has been prepared on behalf of Oxford United Football Club (OUFC: 'the Applicant') in respect of an emerging planning application for a new stadium development at Land East of Stratfield Brake, Kidlington ('the Site'). It is anticipated that a full planning application will be submitted for the following development:

'Erection of 16,000 capacity stadium, incorporating flexible commercial and community facilities for conferences, exhibitions, educational spaces or other events (including public restaurant and bar, café, Health and Wellbeing facilities/clinic facility, shop and gym), a 200-bed hotel, and multi-functional plaza, and associated parking, landscaping and other supporting infrastructure'

The Requirement for an Environmental Statement

- 1.2. The aim of an Environmental Impact Assessment (EIA) is to protect the environment by ensuring that the Local Planning Authority (LPA) grants planning permission for a project in full knowledge of the likely significant effects on the environment¹. As set out in Regulation 4(1) of the The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 ('the EIA Regulations'), an EIA is a process comprising three parts:

- (a) *"The preparation of an environmental statement;*
- (b) *Any consultation, publication and notification required by, or by virtue of, these Regulations or any other enactment in respect of EIA development; and*
- (c) *The steps required under regulation 26."*

- 1.3. Regulation 4(2) states an EIA must identify, describe and assess in an appropriate manner, in light of each individual case, the direct and indirect significant effects of the Proposed Development on the following factors:

- (a) *Population and human health;*
- (b) *biodiversity, with particular attention to species and habitats protected under [any law that implemented] Directive 92/43/EEC and Directive 2009/147/EC;*
- (c) *Land, soil, water, air and climate;*
- (d) *Material assets, cultural heritage and the landscape; and*
- (e) *The interaction between the factors referred to in sub-paragraphs (a) to (d).*

¹ PPG: Paragraph: 002 Reference ID: 4-002-20140306.

- 1.4. The EIA Regulations categorise proposed developments into two types. Schedule 1 of the EIA Regulations lists developments that always require EIA, and Schedule 2 of the EIA Regulations lists developments that may require EIA if it is considered that they could give rise to significant environmental effects.
- 1.5. The application qualifies as EIA development under Schedule 2, Category 10 (b) which relates to 'Infrastructure Projects' of which the proposal would fall under the category of *'urban development projects, including the construction of shopping centres and car parks, sports stadiums, leisure centres and multiplex cinemas'*. Category 10 (b) sets the threshold as follows:
- i. The development includes more than 1 hectare of urban development which is not dwellinghouse development; or
 - ii. the development includes more than 150 dwellings; or
 - iii. the overall area of the development exceeds 5 hectares.
- 1.6. Regulation 6 of the EIA Regulations makes provision for a developer to request a 'Screening Opinion' from the LPA to ascertain whether an EIA is required if the development meets the above thresholds. The decision is based on the likelihood of significant environmental effects arising from the development proposals. The more environmentally sensitive the location, the more likely it is that the effects on the environment will be significant and will require an EIA. The Planning Practice Guidance (PPG) includes an Annex showing 'indicative screening thresholds', which are intended to help determine whether significant effects are likely. However, it does caveat that when considering the thresholds, it is important to also consider the location of the Proposed Development. In respect of 'urban development projects' it highlights that:
- 'Environmental Impact Assessment is unlikely to be required for the redevelopment of land unless the new development is on a significantly greater scale than the previous use, or the types of impact are of a markedly different nature or there is a high level of contamination. Sites which have not previously been intensively developed:*
- *area of the scheme is more than 5 hectares; or*
 - *it would provide a total of more than 10,000 m² of new commercial floorspace; or*
 - *the development would have significant urbanising effects in a previously non-urbanised area (e.g. a new development of more than 1,000 dwellings).'*
- 1.7. It identifies that the key issues to consider are the scale of such developments, potential increase in traffic, emissions and noise.
- 1.8. Whilst the Site does not fall within a 'sensitive area', as defined by Regulation 2(1) of the EIA Regulations, due to the scale and nature of the proposals, a Screening Opinion has not been

requested from Cherwell District Council and an Environmental Statement (ES) will be submitted with the application.

1.9. In accordance with Regulation 15(1) of the EIA Regulations, 'a person who is minded to make an EIA application may ask the relevant planning authority to state in writing their opinion as to the scope and level of detail to be provided in the Environmental Statement (a 'scoping opinion')'. This Scoping Report provides the necessary background to the development in accordance with the EIA Regulations, in order to assist Cherwell District Council in forming their scoping opinion.

1.10. This Scoping Report provides the necessary information to accompany the Scoping Request as set out in Regulation 15(2) of the EIA Regulations. This includes:

- a plan sufficient to identify the land (**Appendix 1**);
- 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.

1.11. In this case, the scoping exercise has been informed by desk-based research, professional judgement, and other information available. In respect of each topic, a judgement has been made whether it should be 'scoped in' or 'scoped out' of the ES.

Project Team

1.12. This Scoping Report has been co-ordinated by Ridge and Partners LLP with input from the following competent experts (**Table 1.1**):

Table 1.1: Technical Experts

Organisation	Project Role/EIA Input
Ridge and Partners LLP	EIA Co-ordination
	Planning
	Transport and Access
Ecology Solutions	Biodiversity
Fabrik	Landscape and Visual Impact
Cotswold Archaeology	Heritage and Archaeology
Mott MacDonald	Ground Conditions
	Flood Risk and Drainage
	Noise
	Air Quality
	Lighting
	Waste
	Climate Change

Eksogen	Socio-Economics
	Human Health
LUC	Major Accidents and Disasters

- 1.14. The Project Team will be responsible for the preparation of the ES Chapters and Supporting Technical Reports that will accompany the planning application.

Report Structure

- 1.15. In terms of the structure of this report, the site context is provided at **Chapter 2** which also includes a brief description of the nature and purpose of development. **Chapter 3** sets out the general, approach, scope and methodology that the EIA will undertake. **Chapters 4 to 15** outlines the topics with the potential for likely significant effects, which are scoped in for inclusion within the ES. **Chapter 16** highlights those topics where significant effects are unlikely and are proposed to be scoped out of the ES. **Chapter 17** outlines the proposed structure of the ES including its technical chapters.

2. SITE DESCRIPTION

- 2.1. The Site is approximately 7.3 ha and comprises primarily of inaccessible scrub and commercial willow plantation situated 6 km to the north of Oxford and at the gateway of Kidlington. The location of the Site can be found at **Appendix 1**.
- 2.2. The Site is bound by Kidlington Roundabout to the north, Oxford Road to the north-east, Frieze Way A4260 to the west and a block of woodland to the south, with further agricultural land beyond. To the east of the Site is Oxford Parkway Railway Station and the Park and Ride, and to the west of the Site is Stratfield Brake Sports Ground. The Site is also bound by a number of site allocations within the adopted Local Plan, namely Allocated Site PR6b (residential development of 690 dwellings) to the south-east, Allocated Site PR6c (for the potential construction of a golf course should this be required as a result of site PR6b) to the south-east, and Site Allocation PR7a (for 430 dwellings, an extension to Kidlington Cemetery and 11 hectares of land to provide formal sports/green infrastructure for the development and for the wider community) to the north-east.
- 2.3. The Site comprises of greenfield land with vegetated boundaries and a strip of woodland along the Site's southern boundary. Surveys have identified a number of low-moderate quality trees around the outskirts of the woodland area. The Site exhibits a varied topography, with a relatively flat gentle gradient of 1:150 –1:200 falling East to West.
- 2.4. The Site is located in Flood Zone 1 and therefore is not considered at risk of fluvial flooding. The north of the Site indicates a risk of surface water flooding due to its topography. There are field ditches found on the western boundary and to the northern edge of the woodland. The north of the Site contains a Gas Main and Overhead Power Cable.
- 2.5. The Site is not in or adjacent to an environmentally sensitive area, as defined by Regulation 2(1) of the EIA Regulations (i.e. sites designated as Sites of Specific Scientific Interest (SSSI), National Parks, World Heritage Sites, Scheduled Ancient Monuments, Area of Outstanding Natural Beauty and sites covered by international conservation designations).
- 2.6. The Site is washed over by the Oxfordshire Green Belt but there are no other landscape, environmental, or historic designations covering the site. No Scheduled Monuments, Registered Parks and Gardens or Registered Battlefields are present within or in the vicinity of the Site. Whilst there are no Listed Buildings within the Site, there are a number of Listed Buildings within its proximity.
- 2.7. The Site is well related to existing and proposed development and is in a highly accessible location, adjacent to the strategic highway network as well as Oxford Parkway Railway Station and Park and Ride. It is therefore accessible by a range of transport modes.

2.8. The Agricultural Land Classification mapping service identifies that the land comprises Grade 3 Agricultural Land.

2.9. The key environmental baseline conditions are set out under the relevant receptor headings within the following sections of this Scoping Report.

Planning History

2.10. There is no planning history of relevance on site.

3. THE PROPOSED DEVELOPMENT

The Proposed Development

3.1. At present, it is anticipated that a full planning application will be submitted for the following development ('the Proposed Development'):

'Erection of 16,000 capacity stadium, incorporating flexible commercial and community facilities for conferences, exhibitions, educational spaces or other events (including public restaurant and bar, café, Health and Wellbeing facilities/clinic facility, shop and gym), a 200-bed hotel, and multi-functional plaza, and associated parking, landscaping and other supporting infrastructure'

3.2. The application is at the early stages of design and will continue to be developed through consultation and engagement. An initial masterplan has been prepared (**Appendix 2**) which shows the potential distribution of land uses; however, this will be developed further.

3.3. Key elements of the Proposed Development include:

- 16,000 capacity stadium (including Sky Boxes and flexible lounge spaces for match and non-match day uses including corporate, community, education and other events)
- 200-bed hotel for visitors
- A variety of commercial spaces opening out onto a new plaza and community park, such as:
 - Public Restaurant & Bar
 - Cafe
 - Health and Wellbeing/Clinic facilities
 - OUFC Shop
 - Gym

3.4. In terms scale, the height of the stadium will vary from approximately 16m at its lowest rising to approximately 25m at its highest point.

3.5. One of the project drivers to is incorporate native species and local prominence landscaping elements into the design. The vision is to incorporate flexible multi-functional spaces that can be enjoyed whether it be a match day or not. The project aims to connect the stadium to the wider countryside, woodlands, canal walks, and nearby towns in a way that is attractive, safe, and enjoyable for walkers and cyclists, while also promoting environmental and cultural stewardship.

3.6. As part of the project, a detailed Biodiversity Net Gain assessment will be undertaken with the aim to achieve a minimum 10% net gain. Any trees which are displaced by the Proposed Development will be replaced in accordance with the local guidance and advice.

- 3.7. The main vehicular access to the site will be from Frieze Way (A4260). This would enable connections to the wider highway network including the A34 while keeping match day traffic to a minimum on Oxford Road. The existing site access on Oxford Road would be a secondary or emergency access only.
- 3.8. Car parking will be provided for approximately 175 cars, and cycle parking will also be provided. Transport proposals also include improvements in the connectivity of Oxford Parkway Railway Station and Park and Ride to the Site, investment in EV charging and bike storage areas for fans and the community, and development of a sustainable Match Day Travel Plan which will provide enhanced access to the site by public transport on match days.

Construction Programme

- 3.9. Construction phasing and programme assumptions are uncertain at this stage, although it is expected that the Proposed Development would be built out over a period of approximately 2 years, although this could be subject to change. At this stage, the following construction programme is anticipated:
- Enabling works – Autumn 2024
 - Construction – Winter 2024 to Winter 2025
 - Commissioning/Handover – Winter 2025 to Spring/Summer 2026
 - Expected O&M period – Spring/Summer 2026 to Spring/Summer 2027
- 3.10. The ES will include a breakdown on anticipated construction activities, construction methods, construction traffic and management, and proposed environmental controls.

4. GENERAL APPROACH TO THE EIA ASSESSMENT

4.1. This Chapter sets out the proposed general approach to the EIA and the scope and methodology for assessment.

Content of the Environmental Statement

4.2. In accordance with Regulation 18(1) of the EIA Regulations, subject to Regulation 9, an EIA application must be accompanied by an ES for the purposes of those Regulations.

4.3. Regulation 18(3) of the EIA Regulations defines an ES as a statement that at least includes:

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

4.4. Regulation 18(4) of the EIA Regulations states an ES must be in accordance with the most recent Scoping Opinion or direction issued that complies with Regulation 15 or 16 of the EIA Regulations (albeit that the Proposed Development remains materially the same as the Proposed Development that was subject to that scoping opinion or direction). Additionally, that ES should include information required for reaching a conclusion on the significant effects of the development on the environment and be prepared to take into account results of any relevant UK environmental assessment.

4.5. Regulation 18(5) of the EIA Regulations states an ES must be prepared by competent experts and accompanied by a statement outlining their relevant expertise or qualifications.

Consideration of Alternatives

- 4.6. Under Paragraph: 041 Reference ID: 4-041-20170728 of the National Planning Practice Guidance (PPG) it states *“the 2017 Regulations do not require an applicant to consider alternatives. However, where alternatives have been considered, Paragraph 2 of Schedule 4 requires the applicant to include in their Environmental Statement a description of the reasonable alternatives studied (for example in terms of development design, technology, location, size and scale) and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.*
- 4.7. The ES will present a description of the main alternatives that were considered by the Applicant prior to selection of the final development. This includes the following:
- ‘Alternative sites’ – the rationale behind choosing the application site.
 - ‘Alternative designs’ – a description of the design alternatives considered as part of the design process.
 - ‘Do nothing scenario’ – the consequence of no development taking place.
- 4.8. The Applicant respectfully asks the LPA to consider the above and to confirm that the approach to ‘alternatives’ is acceptable. Should the LPA require changes to the approach, it is requested that those changes are identified as part of the Scoping process.

Significance Criteria

- 4.9. The main focus of the EIA process is the identification and evaluation of impacts and the assessment of ‘significance of effects’ of the project on the environment.
- 4.10. The approach to identifying whether any predicted environmental effects are significant relies on standards or codes of practice, professional judgement and the views of other agencies and organisations. Broadly, the level of effect contains a number of parameters including:
- Magnitude (size of effect);
 - Spatial extent (size of the area affected);
 - Duration (short, medium or long term);
 - Nature of the effect (direct or indirect, secondary, cumulative, permanent or temporary);
 - Number and sensitivity of the receptors;
 - International, national or local standards; and
 - Relevant planning policy.

4.11. In terms of significance, the terms negligible, minor, moderate or major are typically used to identify the level of effect. Effects are also described according to whether they are considered to be adverse, neutral or beneficial. The applicability of these criteria is specific to each individual topic and is explained in detail in the Technical Chapters. Where possible, this will be based upon quantitative and accepted criteria, but where no such standards exist, valued judgement and professional interpretation will be utilised. Unless otherwise specified, each of the Technical Chapters will use the following criteria to determine the magnitude of change and the sensitivity of the receptor/receiving environment.

Value/Sensitivity of Receptor

4.12. The sensitivity of receptors is based on the relative importance of the receptor using the scale below.

Table 4.1: Criteria for Assessing Sensitivity

Sensitivity	Criteria for Assessing Sensitivity
High	The receptor has little ability to absorb change without fundamentally altering its present character, is of high environmental value, or is of international or national importance (e.g. SPA, AONB).
Medium	The receptor has moderate capacity to absorb change without significantly altering its present character, has some environmental value, or is of regional importance.
Low	The receptor is tolerant of change without detriment to its character, is of low environmental value or is of low or local importance.
Negligible	The receptor is resistant to change or is of little environmental value

Magnitude of Effect

4.13. The methodology for assessing magnitude/scale of impact of effect is set out below.

Table 4.2: Criteria for Assessing Magnitude

Magnitude of Impact	Criteria for assessing impact
High	Total loss or major alteration to key elements or features of the baseline (pre-development) conditions such that the post development character/composition will be fundamentally changed.
Medium	Loss or alteration to one or more key elements or features of the baseline conditions such that post development character/composition of the baseline will be materially changed.
Low	A minor shift away from the baseline conditions. Change arising will be detectable but not material. The underlying character/composition of the baseline condition will be similar to the baseline conditions.
Negligible	Very little change from the baseline conditions. Change barely distinguishable, approximating to a 'no change' situation.

4.14. The overall effect of significance will be calculated based on the interaction between magnitude and sensitivity, whereby the effects can be beneficial (positive), adverse (negative) or negligible (neutral). The significance matrix is set out below:

Table 4.3: Significance Matrix

Magnitude	Sensitivity of Receptor			
	High	Medium	Low	Negligible
High	Major	Major/Moderate	Moderate/Minor	Negligible
Medium	Major/Moderate	Moderate	Minor	Negligible
Low	Moderate/Minor	Minor	Minor/Negligible	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

4.15. In terms of significance, the terms negligible, minor, moderate or major are typically used to identify the level of effect. The terms outlined in **Table 4.3** have been defined as the following:

- **Major (adverse or beneficial)** – where the development would cause considerable deterioration (or improvement) of the existing environment;
- **Moderate (adverse or beneficial)** – where the development would cause noticeable deterioration (or improvement) to the existing environment;
- **Minor (adverse or beneficial)** – where the development would cause perceptible deterioration (or improvement) to the existing environment;
- **Negligible** – no discernible improvement or deterioration to the existing environment

4.16. Unless stated otherwise within a Technical Chapter, effects of moderate significance or above are considered to be significant in EIA terms and effects that are minor are not significant in EIA terms. Professional judgement is used to determine whether a Moderate/Minor effect is significant or not.

4.17. In line with Schedule 4 of the EIA Regulations, the description of the likely significant effects should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the development. Definitions for the purposes of this assessment are follows:

- Direct – Effects that arise from the effect of the project itself;
- Indirect – Effects that arise which are not a direct result of the project but are closely linked;
- Secondary – Effects that arise as a consequence of an initial effect of the scheme; and
- Cumulative – Effects that can arise from a combination of different effects;
- Transboundary – Effects that are distinguished based on geographic level, or cross boundary i.e. effects that can arise beyond a district-level.
- Short term – Effects that arise within 1 year;
- Medium term – Effects that arise between 1-10 years;
- Long term – Effects that arise over a greater period of 10 years;
- Permanent – Effects that result from an irreversible change to the baseline environment or which will persist for the foreseeable future;
- Temporary – Effects that persist for a limited period only.

Mitigation Measures and Residual Effects

- 4.18. If adverse effects are identified, either during the construction or operational phases of development, mitigation measures to reduce and avoid these effects will be identified and detailed. These measures may relate to design, construction or operational management activities.
- 4.19. Any residual effects following the implementation of mitigation measures will be determined accordingly, and will then be re-examined against the established significance criteria scale.

Cumulative Effects

- 4.20. Schedule 4 (5)(e) of the EIA regulations requires a description of the likely significant effects of the development on the environment resulting from *'the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources'*. The PPG, under Paragraph: 024 Reference ID: 4-024-20170728, states each application 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.
- 4.21. There is no widely accepted methodology or best practice for the assessment of cumulative effects, although various guidance documents exist.
- 4.22. In assessing the cumulative impacts, all technical assessments will consider 'inter-project effects' and 'intra-project effects'.
- 4.23. Inter-project effects are those effects of the Proposed Development and other committed developments in the vicinity of the Site. Intra-project effects relate to the inter-relationship between topics and those effects of the Proposed Development which, when considered together, may have a combined effect on a receptor.
- 4.24. In terms of inter-project effects, we would seek to agree the list of cumulative schemes to be considered as part of the ES with the Council. Given the EIA Regulations require an assessment of existing and approved developments, it is intended that the assessment would be limited to committed developments, allocated sites, and other developments that are reasonably foreseeable. This includes those with planning applications that have been submitted but not yet determined, but only where there is a likelihood that the application may be granted planning permission before this application is determined.

4.25. A set of screening criteria has been developed to identify which cumulative schemes in the area should be subject to assessment, as follows:

- Committed developments, allocated sites, and other developments that are reasonably foreseeable; and
- Spatially linked to the development (within 2km of the site boundary); and
- The development includes more than 1 hectare (site area) of urban development which is not dwellinghouse development, the development includes more than 150 dwellings or the overall area of the development exceeds 5 hectares²; or
- Other EIA development or major expansion projects (allocated sites) within 5km.

4.26. Those sites identified are set out in **Table 4.4** below. In respect of the allocated sites, it is important to note that the Council would have considered cumulative impacts of this site in relation to other strategic allocations in the preparation of the adopted Cherwell Local Plan 2011-2031 (Part 1) Partial Review

4.27. Only those sites that are considered to have likely significant cumulative effects in combination with the Proposed Development should be assessed within the ES. The following schemes have been identified in the vicinity of the Site which have the potential to generate significant cumulative effects during the construction or operational phase. We would welcome the LPAs views on this list of sites to be considered.

Table 4.4: Cumulative Sites

Site Address and LPA	Allocation Reference	Application Reference	Description	Status
OS Parcel 4347 East Of Pipal Cottage Oxford Road Kidlington Cherwell District Council	Policy PR6a - Land East of Oxford Road (690 dwellings and other associated uses)	23/01233/OUT	Outline application (with all matters except access reserved for future consideration) for the demolition of existing buildings and the erection of up to 800 dwellings (Class C3); a two form entry primary school; a local centre (comprising convenience retailing (not less than 350sqm and up to 500sqm (Class E(a))), business uses (Class E(g)(i)) and/or financial and professional uses (Class E(c)) up to 500sqm, café or restaurant use (Class E(b)) up to 200sqm; community building (Class E and F2); car and cycle parking); associated play areas, allotments, public open green space and landscaping; new vehicular, pedestrian and cycle access points; internal roads, paths and communal parking	Allocated for residential development Application pending decision

² Schedule 2 developments – threshold for screening.

			infrastructure; associated works, infrastructure (including Sustainable Urban Drainage, services and utilities) and ancillary development. Works to the Oxford Road in the vicinity of the site to include, pedestrian and cycle infrastructure, drainage, bus stops, landscaping and ancillary development.	
North Oxford Golf Club, Land west of Oxford Road Cherwell District Council	PR6b – Land West of Oxford Road (670 dwellings)	N/A	N/A	Allocated for residential development.
Frieze Farm, Kidlington Cherwell District Council	Policy PR6c - Land at Frieze Farm (30 hectares will be reserved for the potential construction of a golf course should this be required as a result of the development of Land to the West of Oxford Road under Policy PR6b).	N/A	N/A	Reserved for a potential golf course, unless demonstrated it is not required.
Land At Bicester Road Kidlington Cherwell District Council	PR7a - Land South East of Kidlington (430 dwellings, extension to cemetery and sports facilities)	22/00747/OUT	Outline planning application for the development of up to 370 homes, public open space (including play areas and woodland planting), sports pitches and pavilion, drainage and engineering works, with all matters reserved (appearance, landscaping, layout and scale) except for vehicular and emergency accesses to Bicester Road.	Allocated for residential development Application pending decision
Land North Of 66 And Adjacent Water Eaton Lane Gosford Cherwell District Council	PR7a Land South East of Kidlington (430 dwellings, extension to cemetery and sports facilities)	22/03883/F	Full Application for Development of 96 Dwellings (50% affordable housing), extension to Bicester Road Cemetery with associated access (from Bicester Road), open space, landscaping and infrastructure	Allocated for residential development Application pending decision
Stratfield Farm 374 Oxford Road Kidlington OX5 1DL	Policy PR7b – Land at Stratfield Farm	22/01611/OUT	Outline planning application for up to 118 no dwellings (all matters reserved except for access) with vehicular access from Oxford Road	Allocated for residential development

Cherwell District Council	(120 dwellings, and creation of a nature conservation area)			Application pending decision
Former Piggery And Land North Of Woodstock Road Yarnton Cherwell District Council	Policy PR8 - Land East of the A44 (1,950 dwellings, expansion land for Begbroke Science Park and associated community uses).	21/00758/SCOP	Scoping Opinion - Up to 300 Residential Units, access from A44 and Open Space/infrastructure. Covers the southern parcel of the wider site allocation.	Allocated for residential development Scoping request issued in 2021.
Begbroke Science Park Begbroke Hill Begbroke Kidlington OX5 1PF Cherwell District Council	Policy PR8 - Land East of the A44 (1,950 dwellings, expansion land for Begbroke Science Park and associated community uses).	22/03763/SCOP	Scoping Opinion with respect to the scope and methodology of the Environmental Impact Assessment (EIA) in relation to re-development proposals of approximately 170 hectares (Ha) land at the existing Begbroke Science Park and surrounding land. The findings of the EIA will be reported in an Environmental Statement (ES) which will accompany the planning application	Allocated for development Scoping request issued in 2023.
OS Parcel 3673 Adjoining And West Of 161 Rutten Lane Yarnton OX5 1LT Cherwell District Council	Policy PR9 - Land West of Yarnton	21/03522/OUT	The erection of up to 540 dwellings (Class C3), up to 9,000sqm GEA of elderly/extra care residential floorspace (Class C2), a Community Home Work Hub (up to 200sqm)(Class E), alongside the creation of two locally equipped areas for play, one NEAP, up to 1.8 hectares of playing pitches and amenity space for the William Fletcher Primary School, two vehicular access points, green infrastructure, areas of public open space, two community woodland areas, a local nature reserve, footpaths, tree planting, restoration of historic hedgerow, and associated works. All matters are reserved, save for the principal access points.	Allocated for residential development Application pending decision
Northern Gateway, Oxford City Council	Northern Gateway/ Oxford North Allocation	18/02065/OUTF UL	Hybrid planning application comprising: (i) Outline application (with all matters reserved save for "access"), for the erection of up to 87,300 sqm (GIA) of employment space (Use Class B1), up to 550 sqm (GIA) of community space (Use Class D1), up to 2,500 sqm (GIA)	Application approved in September 2021. Conditions have been/ are being

			of Use Classes A1, A2, A3, A4 and A5 floorspace, up to a 180 bedroom hotel (Use Class C1) and up to 480 residential units (Use Class C3), installation of an energy sharing loop, main vehicle access points from A40 and A44, link road between A40 and A44 through the site, pedestrian and cycle access points and routes, car and cycle parking, open space, landscaping and associated infrastructure works. Works to the A40 and A44 in the vicinity of the site. (ii) Full application for part of Phase 1A comprising 15,850 sqm (GIA) of employment space (Use Class B1), installation of an energy sharing loop, access junctions from the A40 and A44 (temporary junction design on A44), construction of a link road between the A40 and A44, open space, landscaping, temporary car parking (for limited period), installation of cycle parking (some temporary for limited period), foul and surface water drainage, pedestrian and cycle links (some temporary for limited period) along with associated infrastructure works. Works to the A40 and A44 in the vicinity of the site. (Amended plans and additional information received 19.06.2019)	discharged. It is understood that development commenced in January 2023.
Land South West Of St Frideswide Farm Banbury Road Oxford Oxfordshire OX2 8EH Oxford City Council	SP24 (St Frideswide Farm)	21/01449/FUL	Full planning permission for 134 dwellings (use class C3), informal open space including community pavilion, seating and children's play areas, hard and soft landscape and sustainable drainage areas, access, associated roads and infrastructure, car and cycle parking, bin storage, pumping station, substation and associated engineering works.	Allocated for residential development Application has been approved and subsequent conditions has been discharged. Application is currently being built out

5. LANDSCAPE AND VISUAL IMPACT

Introduction

- 5.1. fabrik Chartered Landscape Architects have been appointed to carry out a Landscape and Visual Impact Assessment (LVIA) of the Site and its surrounding area, in order to consider the likely physical and visual impacts arising as a result of the Proposed Development.
- 5.2. The methodology for the LVIA is based on the 'Guidelines for Landscape and Visual Impact Assessment' (third edition) by the Landscape Institute and Institute of Environmental Management and Assessment (Routledge, 2013). A full methodology is set out at **Appendix 3**.
- 5.3. The purpose of this document is to agree the extent of the study area, the key landscape and visual receptors to be assessed, the locations of the key representative viewpoints and the methodology with CDC Officers as part of the EIA scoping process. The proposed study area and key representative viewpoints are set out on Figures 1.1 – 1.4 (**Appendix 4**).

Baseline Conditions

Proposed Study Area

- 5.4. The location of the Site, proposed extent of the study area and the existing landscape policies and designations are shown on Figure 1.1 (**Appendix 4**). The Site is located to the north of Oxford and south of Kidlington. The red line area extends to approximately 7.3 ha. The proposed study area extends to approximately 6km from the Site boundary to the east and north, 8km to the west and 6.5km to the south. The extent of the study area is considered to allow for full consideration of the Site's relationship to Oxford and its city centre, as well as Kidlington to the north and the wider landscape to the east and west.

Summary of Landscape and Visual Considerations

- 5.5. The initial step is to identify the existing landscape and visual resource in the vicinity of the Proposed Development – the baseline landscape and visual conditions. The purpose of the baseline study is to record and analyse the existing landscape in terms of its constituent elements, features, characteristics, geographic extent, historical and cultural associations, condition, the way the landscape is experienced and the value / importance of that particular landscape. The baseline assessment will also identify any potential changes likely to occur in the local landscape or townscape which would alter the characteristics of the Site or its setting. Details of what is to be included within the analysis of the baseline conditions is set out in the LVIA Methodology at **Appendix 3**.

5.6. Figure 1.2 (**Appendix 4**) identifies the relevant landscape policies and designations within the study area. The Site is not subject to any landscape related designations or policies of international or national significance. The Site lies within the Oxford Green Belt under CDC Policy PR3. Stratfield Brake to the west of the Site includes existing sports pitches and an area of deciduous woodland designated under the Natural Environment and Rural Communities Act (2006) Section 41 - Habitats of Principal Importance. Part of the woodland along the southern boundary of the Site is also designated. The A4260 Frieze Way severs connectivity between these woodlands.

5.7. At the national level, the Site is located within National Character Area (NCA) 108: Upper Thames Clay Vales. NCA 109: Midvale Ridge is also relevant to the study area. At the county level, the Site is located within Landscape Character Type 17: Vale Farmland and Landscape Character Area F: Peartree Hill (Cherwell DC: Landscape Character, Sensitivity and Capacity Assessment (WYG, 2017)). The relevant key characteristics are described as:

“This area, between Oxford and Kidlington, is largely characterised by medium to large-sized arable fields and pastureland. The hawthorn and elm hedges are generally in poor condition and often gappy and fragmented. The main structural landscape elements are the thinly-distributed hedgerow trees of oak, dead elm and ash, as well as some tree belts surrounding farmhouses. Stratfield Brake is a significant block of semi-natural deciduous woodland to the south of Kidlington.”

5.8. The Site is not publicly accessible and is visually well enclosed by its boundary vegetation, which broadly follow the existing transport corridors that define the Site boundaries. There are open views of the Site boundary vegetation from Oxford Road, Bicester Road and the A4260 Frieze Way. This vegetation contributes visually to the experience of road users travelling between Oxford and Kidlington. There are partial views of the western boundary vegetation from Stratfield Brake sports ground to the west and open views of the eastern boundary vegetation from PRoW 229 within the allocated site to the east. There are potential views from the wider landscape to the east, west and north. The anticipated visual receptors are identified in **Table 5.2**.

Key Issues and Requirement for Assessment

Anticipated Landscape Receptors to be Assessed

5.9. The LVIA will assess the contextual landscape receptors and landscape receptors within the Site. These will include but not be limited to:

Table 5.1: Summary of Landscape Receptors

Contextual Landscape Receptors	Landscape Receptors within the Site
Natural Geology and soils Landform and Drainage Vegetation Cover	Natural Geology and soils Landform and Drainage Vegetation Cover
Cultural / social Land Use Settlement Enclosure Land ownership Time depth	Cultural / social Land Use Settlement Enclosure Land ownership Time depth
Perceptual and aesthetic Memories Preferences Sensory Forms Pattern Texture Colour Sense of enclosure Remoteness Natural beauty	Perceptual and aesthetic Memories Preferences Sensory Forms Pattern Texture Colour Sense of enclosure Remoteness Natural beauty
National - NCA 108 Upper Thames Clay Vales	Site Character
County/District - LCA F: Peartree Hill	Night-time character
Contextual Townscape elements Historical Development Movement and Connectivity Urban Structure and Built form Green Infrastructure and public realm Tranquillity	

Anticipated Visual Receptors to be Assessed

- 5.10. The extent to which the Site is currently visible from the surrounding landscape and townscape is based on grading of degrees of visibility. It is determined from a visual inspection of the Site and its context from roads, Public Rights of Way and properties.
- 5.11. Seasonal change in existing evergreen and deciduous plant material will affect the available views. Typically views will be different through the seasons with a greater sense of enclosure in the summer months when deciduous trees are in leaf. An initial site visit was carried out on 07 March 2023 to capture photographs whilst vegetation was not in leaf and in order to demonstrate the winter or “worst case” visual scenario from local receptors in close proximity to the Site. Photographs have been taken in line with the Landscape Institute’s Technical Guidance Note 6/19 Visual Representation of Development Proposals (Landscape Institute, 2019). Further Site work will be carried out during the baseline stage, representing the summer visual scenario.
- 5.12. The Site is naturally well contained by virtue of the existing boundary vegetation and vegetation associated with the surrounding road and rail corridors. The Site also benefits from the broadly flat topography of the landscape within its immediate surroundings, meaning the existing built form and

vegetation within the surrounding landscape are effective at limiting the visual envelope of the Site. The desktop analysis completed so far has identified areas of potential visibility from the higher ground surrounding Oxford and Kidlington. The study area extent has been established in order to capture any publicly accessible long distance views of the Site from these areas of higher ground.

Key representative viewpoints within the site

5.13. The Site is currently in commercial use for growing Willow and is broadly triangular in shape. The eastern and western boundaries of the willow plantation are defined by the existing tree belts along the A4165 Oxford Road and A4260 Frieze Way corridors respectively. The southern boundary is defined by a mature deciduous woodland block, that is part designated under the Natural Environment and Rural Communities Act (2006) Section 41 as a Habitat of Principal Importance. There are no publicly accessible locations or Public Rights of Way within the Site.

Key representative viewpoints within the immediate surroundings of the site and within the wider study area

5.14. Figure 1.3 (**Appendix 4**) illustrates the key representative viewpoints immediately surrounding the Site and within the local area that are proposed to be assessed within the LVIA. Figure 1.4 (**Appendix 4**) illustrates the anticipated viewpoints within the wider study area. These viewpoints have been identified through desktop analysis and will be verified during the field based assessment. Any anticipated viewpoints that are found to not have views of the Site during the field based assessment will be scoped out of the assessment with justification provided.

5.15. Photographs will be taken in line with the Landscape Institute’s Technical Guidance Note 6/19 Visual Representation of Development Proposals (Landscape Institute, 2019). The anticipated visual receptors are set out in **Table 5.2** below.

Table 5.2: Summary of Visual Receptors

Visual Receptor Type	Key Viewpoint Reference
Residential Residents of Properties on South Ave and Croxford Gardens, Kidlington, residents of properties on Couling Close, Woodstock Road	2, 31, 36
Transient from Transport Corridors (Road and Rail) A4165/A4260 Oxford Road, A4260 Frieze Way, Bicester Road, South Ave, Hampden Drive, Cromwell Way, Almond Ave, B4027 Oxford - Bicester Railway Line	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 19, 20, 21, 32, 36, 38, 44, 45, 46, 47, 58
Transient from Public Rights of Way (Foot, bike and horseback, including dedicated cycle routes, Open Access Land and Registered Common Land, Public Open Space etc.) PRoW footpaths 123, 134, 152, 201, 229, 237, 265/Oxford Canal Walk, 309, 412, 419, 420/Shakespeare’s Way,	16, 17, 18, 24, 25, 26, 27, 28, 29, 30, 31, 33, 34, 35, 39, 40, 41, 42, 43, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 59

PRoW Bridleways 201, 229/Oxford Greenbelt Way Stratfield Brake Stratfield Brake Sports Ground Ron Groves Community Park North Oxford Golf Club	
Places of Employment Oxford Parkway Station Sainsbury's superstore, Kidlington	37

Approach to Assessment

Summary of LVIA Methodology

- 5.16. Landscape and visual assessments are separate, although linked, procedures. For example, often the assemblage of landscape elements contributes to informing the Zone of Theoretical Visibility and the degree of visibility from the range of visual receptors.
- 5.17. The baseline assessment describes:
- Each of the landscape elements which then collectively inform landscape character for the site and its context;
 - The character, amenity and degree of openness of the view from a range of visual receptors (either transient, serial or static views);
 - The current and future baseline scenarios; and
 - The value of each of the landscape and visual receptors.
- 5.18. Landscape effects derive from either direct or in-direct changes to the physical landscape which may give rise to changes to the individual landscape components. This in turn effects the landscape character and potentially changes how the landscape is experienced and valued.
- 5.19. Visual effects relate to the changes that arise in the composition, character and amenity of the view as a result of changes to the landscape elements.
- 5.20. The assessment of effects therefore systematically:
- Combines the value of the receptor with the susceptibility to the proposed change to determine the sensitivity of the receptor;
 - Combines the size, scale, geographic extent, duration of the proposals and its reversibility in order to understand the magnitude of the proposal;
 - Combines the sensitivity of the each of the receptors and the magnitude of effect to determine the significance of the effect;
 - Presents the landscape and visual effects in a factual logical, well-reasoned and objective fashion;

- Indicates the measures proposed over and above those designed into the scheme to prevent/avoid, reduce, offset, remedy, compensate for the effects (mitigation measures) or which provide an overall landscape and visual enhancement;
- Sets out any assumptions considered throughout the assessment of effects; and
- Sets out residual effects.

5.21. Effects may be positive (beneficial) or negative (adverse) direct or indirect, residual, permanent or temporary short, medium or long term. They can also arise at different scales (national, regional, local or site level) and have different levels of significance (major, moderate, low, negligible or neutral / no change). Residual effects are those at year 15 considering any additional mitigation measures in place over and above those designed into the scheme.

5.22. The combination of the above factors influences the professional judgement and opinion on the significance of the landscape and visual effects.

5.23. The emphasis is placed on the narrative text describing the landscape and visual effects, and the judgements made about their significance, with tables and matrices used to support and summarise the descriptive text. The criteria and thresholds set out in the methodology are used to inform the assessment of effects. Ranges of criteria and thresholds are used in the assessment where appropriate. Whilst every possible range is not defined in the methodology, each of the thresholds and criteria are clearly explained, and therefore the logic to each range can be traced.

5.24. Cumulative effects of all other known development will also be considered as set out in **Chapter 4**.

5.25. A detailed LVIA methodology is included in **Appendix 3**.

Conclusion

5.26. The topic of Landscape and Visual Impact will be scoped into the ES on the basis that there is potential for significant effects.

6. ECOLOGY AND NATURE CONSERVATION

Introduction

- 6.1. A scoping exercise in regard to ecology and biodiversity has been prepared by Ecology Solutions, as the Applicant considers that the Proposed Development meets the criteria for EIA development under EIA Regulations.

Baseline Conditions

Ecological Assessment

- 6.2. The ecology and biodiversity assessment will be based on baseline conditions derived from a range of sources including a detailed desk study and review of existing information, combined with surveys of a range of ecological receptors within the Site, identified as being potentially affected by the Proposed Development.
- 6.3. In order to compile background information on the Site and the surrounding area, Ecology Solutions contacted the Thames Valley Environmental Records Centre (TVERC) in October 2022. Further information on designated sites from a wider search area was obtained from the online Multi-Agency Geographic Information for the Countryside (MAGIC) database.
- 6.4. An extended Phase 1 habitat survey was carried out in October 2022 in order to ascertain the general ecological value of the Site and to identify the main habitats and associated plant species. The findings of this survey are detailed below.
- 6.5. Specific surveys for bats, Badgers *Meles meles* and reptiles have been undertaken between August and October 2022. Further ongoing surveys for bats, and specific surveys for breeding birds, are outlined below.

Statutory Designated Sites

- 6.6. Internationally important designations include Special Areas of Conservation (SAC), Special Protection Areas (SPA), Wetlands of International Importance (Ramsar Sites) and Biosphere Reserves.
- 6.7. Nationally important designations, include Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR) and Local Nature Reserves (LNR).

- 6.8. The Zone of Influence (ZOI) relevant to nationally designated statutory sites has been specified as a 5km search area.
- 6.9. The closest statutory site is Pixey and Yarnton Meads SSSI (also part of Oxford Meadows SAC) (1.9km southwest), while other statutory sites within 5km include Port Meadow with Wolvercote Common and Green SSSI (2km south), Wolvercotes Meadows SSSI (2.3km southwest), Rushy Meadows SSSI (2.4km northwest), Hook Meadow and The Trap Grounds SSSI (2.8km south), Wytham Ditches and Flushes SSSI (3.2km southwest), Woodeaton Quarry SSSI (3.3km east), Cassington Meadows SSSI (3.7km southwest), Woodeaton Wood SSSI (3.9km east), New Marston Meadows SSSI (4km southeast), Wytham Woods SSSI (4.1km southwest).
- 6.10. The ZOI relevant to European designated statutory sites has been specified as 10km search area. As above, Oxford Meadows SAC lies approximately 1.9km southwest.
- 6.11. The Proposed Development lies within multiple SSSI Impact Risk Zones (IRZ). The guidance from Natural England states that the Proposed Development may be assessed for likely impacts on the surrounding SSSIs:

“Pipelines and underground cables, pylons and overhead cables. Any transport proposal including road, rail and by water (excluding routine maintenance). Airports, helipads and other aviation proposals.

Any industrial/agricultural development that could cause AIR POLLUTION (incl: industrial processes, livestock & poultry units with floorspace > 500m², slurry lagoons & digestate stores > 750m², manure stores > 3500t).

Any discharge of water or liquid waste of more than 5m³/day to ground (ie to seep away) or to surface water, such as a beck or stream.

Large infrastructure such as warehousing / industry where total net additional gross internal floorspace following development is 1,000m² or more.”

Non-Statutory Designated Sites

- 6.12. Non-statutory designated sites featured within a 2km search area of the Site boundaries will be assessed.
- 6.13. The Stratfield Brake Woodland Trust Reserve, also a Priority Deciduous Woodland, shares the southern boundary of the Proposed Development. This reserve also forms part of the Stratfield

Brake Cherwell District Wildlife Site (CDWS) which lies adjacent to the western boundary of the Site, however the Site is separated from the CDWS by the Frieze Way road.

- 6.14. The Meadows West of the Oxford Canal, which is an Oxfordshire Local Wildlife Site (LWS), lies approximately 0.65km west of the Site. Other non-statutory sites that lie within 2.5km of the Site include Wet Wood and Swamp near Yarnton LWS (1.3km southwest), Dukes Lock Pond LWS (1.3km southwest), Loop Farm Flood Meadows LWS (1.3km southeast), Wolvercote Meadow LWS (1.6km southwest) Linkside Lake Oxford City Wildlife Site (OCWS) (1.3km south), Oxey Mead BBOWT Reserve (1.9km southwest) and Pixey Mead BBOWT Reserve (1.9km southwest).

Habitats

- 6.15. The majority of the Proposed Development comprises a Willow *Salix* sp. plantation bounded by hedgerows and trees, with a strip of species-poor, semi-improved grassland located between the boundaries and plantation. An area of scrub is present within the northern section of the Site.
- 6.16. The majority of the habitats across the Site, such as the willow plantation, are considered to be of little intrinsic ecological value. The areas of semi-improved grassland and scrub is also considered to be of low ecological value in terms of its species content, comprising only common and widespread species. The habitats that are of relatively greater ecological importance include the boundary features – hedgerows, trees, and the Priority Deciduous Woodland offsite and sharing the southern boundary of the Site.

Protected Species

Bats

- 6.17. Bat activity and automated detector surveys were conducted in August, September and October 2022. A specific survey to assess the trees onsite for the potential of roosting bats was undertaken in October 2022. Further bat activity and automated detector surveys are ongoing between June and July 2023.
- 6.18. It is considered that the hedgerows and trees within the Site likely provide existing opportunities for foraging and commuting bats. A total of two trees have been identified within the Site as having potential to support roosting bats.
- 6.19. The TVERC returned no records of bats from within the Site itself. Common species were returned from within the search radius, including Soprano Pipistrelle *Pipistrellus pygmaeus* approximately 0.64km north of the Site in 2010, and Common Pipistrelle *Pipistrellus pipistrellus* and Noctule *Nyctalus noctula* approximately 0.86km southwest of the Site in 2015.

Badgers

- 6.20. Specific surveys for Badgers were undertaken within and adjacent to the Site, to search for evidence of Badgers, between August and October 2022. Further Badger surveys are to be undertaken in June and July 2023.
- 6.21. The TVERC returned a record of a Badger sett from within a 2km grid square overlapping the Site in 2017, and one individual recorded within the same grid square in 2016.
- 6.22. No evidence of Badgers was recorded from within the Site.

Birds

- 6.23. It is considered that the hedgerows, trees, willow plantation and scrub within the Site offer suitable nesting and foraging habitat for birds, while the semi-improved grassland offer some limited foraging opportunities for birds.
- 6.24. The TVERC returned a record of the Priority and Red Listed House Sparrow *Passer domesticus* within the Site in 2015. In addition, the Red Listed Linnet *Linaria cannabina* was recorded 0.03km northwest of the Site in 2013, Red Listed Redwing *Turdus iliacus* was recorded 0.64km north of the Site and Red Listed Mistle Thrush *Turdus viscivorus* was recorded 0.69km northeast of the Site in 2013. Other Protected, Notable and / or Red Listed birds, including Starling *Sturnus vulgaris* and Dunnock *Prunella modularis* were recorded within 1km of the Site in 2020.
- 6.25. Three breeding bird surveys have been proposed and will be conducted between June and July 2023.

Great Crested Newts

- 6.26. OS maps indicate that there are a total of four ponds located within 500m of the Site boundary, however all four ponds are separated from the Site by main roads (Frieze Way and A34) which are considered to represent a significant dispersal barrier to Great Crested Newts *Triturus cristatus*.
- 6.27. The TVERC returned no records of Great Crested Newts from within the Site itself. The closest record returned was 0.37km southeast of the Site in 2014.
- 6.28. Although it is known that Great Crested Newts can disperse up to 500 metres through suitable terrestrial habitat from their breeding pond, it is widely accepted that they tend to utilise suitable terrestrial habitat within a much closer distance. Activity is usually concentrated within 100 metres

of breeding ponds and key habitat is located within 50 metres (termed by Natural England as core habitat).

- 6.29. Indeed, English Nature Research Report Number 576 (An assessment of the efficiency of capture techniques and the value of different habitats for the Great Crested Newt *Triturus cristatus* by Warren Cresswell and Rhiannon Whitworth) states:

“The most comprehensive mitigation, in relation to avoiding disturbance, killing or injury is appropriate within 50m of a breeding pond. It will also almost always be necessary to actively capture newts 50-100m away. However, at distances greater than 100m, there should be careful consideration as to whether attempts to capture newts are necessary or the most effective option to avoid incidental mortality. At distances greater than 200-250m, capture operations will hardly ever be appropriate.”

Reptiles

- 6.30. The semi-improved grassland is considered to offer some suitable opportunities for reptiles given its lack of management, while the hedgerows are considered to offer shelter/resting opportunities for this faunal group.
- 6.31. The TVERC returned a record of Grass Snake *Natrix Helvetica* from approximately 0.17km southeast of the Site in 2020. Two juvenile Slow Worms *Anguis fragilis* were recorded approximately 0.54km north of the Site in 2021.
- 6.32. Reptile surveys were conducted within the Site and within the adjacent Stratfield Brake Sports Ground, which is separated from the Site by Frieze Way, between August and October 2022. No reptiles were found within the Site, however one Grass Snake was recorded within the Stratfield Brake Sports Ground.

Key Issues and Requirement for Assessment

Scoping in

- 6.33. Important ecological features/receptors are likely to include, but not limited to the following:

Non-statutory Designated Sites

- 6.34. The Stratfield Brake Woodland Trust Reserve, also a Priority Deciduous Woodland, is located adjacent to the southern boundary of the Proposed Development. This reserve also forms part of

the Stratfield Brake CDWS which is located adjacent to the western boundary of the Site (albeit separated by Frieze Way).

- 6.35. Potential impacts to the Stratfield Brake Reserve and Wildlife Site could include potential damage to the woodland, discharge of water or liquid waste and dust deposition (and potentially other pollution) from construction activities. Potential impacts during operation include damage to the woodland from increased recreation.

Habitats

- 6.36. The Proposed Development involves losses to arable (willow plantation), semi-improved grassland and scrub, existing hedgerows and trees in order to facilitate the Proposed Development.
- 6.37. The majority of the habitats within the Site are considered to be of low intrinsic ecological value. The boundary features, which include the hedgerows and trees, are of relatively greater ecological value. The hedgerows and trees offer suitable foraging and nesting opportunities for birds and foraging and dispersal/ navigational opportunities for wildlife, e.g. bats. There are also two mature trees on site which are considered to offer potential for roosting bats. The habitats, especially the hedgerows (a Priority Habitat) and trees, are to be scoped into the assessment as impacts are anticipated as part of the Proposed Development.

Protected Species

- 6.38. The Proposed Development is an isolated area of land as it is surrounded by main roads, thus protected species are limited to more mobile species, such as bats and breeding birds, as the roads hinder movements by non-flying fauna.
- 6.39. The hedgerows offer suitable foraging and navigational opportunities for bats, while two trees on site were identified as having developed features to support roosting bats. Losses to these habitats are proposed and thus impacts to the foraging and navigational opportunities for bats within the Site are anticipated. Impacts during the construction phase include potential impacts to roosting bats.
- 6.40. Similarly to bats, the habitats of ecological value to birds (i.e. hedgerows and trees) will be affected, with losses to hedgerows and trees to facilitate the development. Impacts during the construction phase include potential impacts to nesting birds during vegetation clearance.
- 6.41. Reptiles have not been recorded on site during specific surveys conducted in 2022, however a Grass Snake was recorded nearby in the adjacent Stratfield Brake Sports Ground. It is considered that there is a low likelihood that reptiles could be impacted during the construction phase, and as such, precautionary measures to prevent death or injury to this protected species will be outlined.

6.42. Badgers have not been recorded on site during specific surveys conducted in 2022, however this protected species is known to the local area. It is considered that there is a low likelihood that Badgers may be impacted, and as such, precautionary measures during the construction phase will be outlined.

Scoping out

6.43. The Proposed Development is not considered to have any detrimental ecological effects on the following:

Statutory Designated Sites

6.44. There are multiple statutory designated sites located within the Site search radius (5km for SSSI, 10km for SAC), with the closest statutory site being Pixey and Yarnton Meads SSSI (1.9km southwest). This SSSI also forms part of Oxford Meadows SAC. The SSSI/SAC is well separated from the Site by main roads (i.e. A44, A34), open countryside and a railway. Moreover, it is considered that the proposals of a commercial development (football stadium) is unlikely to lead to an increase in recreational pressures at the SAC.

6.45. On this basis, it is not considered that any detrimental effects (direct or indirect) will arise as a result of the proposals at the Site to any statutory site of nature conservation interest.

Non-Statutory Designated Sites

6.46. There are multiple non-statutory sites located within the Site search radius, of which Stratfield Brake Woodland Trust Reserve / CDWS, located adjacent to the site, has been scoped in (see above). The next closest non - statutory site is Meadows West of the Oxford Canal, LWS (0.65km west), which is separated from the Site by Frieze Way, Stratfield Brake Sports Ground and Stratfield Brake Cherwell District Wildlife Site. As such, no detrimental impacts are anticipated from the Proposed Development's construction activities.

6.47. The Proposed Development is not considered to have any detrimental effects (direct or indirect) on any other statutory and non-statutory site of nature conservation interest.

Protected Species

6.48. Great Crested Newts are not believed to be a constraint on the Proposed Development due to the Site being isolated from ponds due to significant dispersal barriers surrounding the Site, and the

ponds being over 250m from the Site boundary. In addition, no records were returned from TVERC of this species from within the Site or within 250m of the Site boundary.

Approach to Assessment

Scoping In / Scoping Out

6.49. All ecological receptors that are anticipated to be impacted by either the construction or operational phase of the Proposed Development will be scoped into the assessment.

Identifying the Zone of Influence

6.50. The potential ecological impacts of the Proposed Development are largely confined to the application site itself but given the continuity of agricultural land and woodland outside the application site boundaries, consideration has also been given to the following likely significant effects, which may spread beyond the Application Site:

- Disturbance to populations within hearing range during the construction phase;
- Fragmentation of 'dispersal corridors' utilised by adjacent populations;
- Disruption to habitats / populations within receiving range of dust etc during the construction phase;
- Disturbance to habitats / populations within walking distance during the operation phase; and
- Pollution to watercourses during the construction and operation phases.

Impact Assessment Methodology

6.51. The evaluation and impact assessment method has been undertaken with due regard to the guidelines produced by the Chartered Institute of Ecology and Environmental Management³, which avoids the provision of definitions as to how to assign habitats and species different levels of value and relies on an approach that involves professional judgement and the use of available guidance and information.

6.52. The value of each resource is determined within a defined geographical context:

- International;
- UK;
- National (England/Northern Ireland/Scotland/Wales);
- Regional;

³ CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management, Winchester

- County (or Metropolitan – e.g. in London);
- District (or Unitary Authority, City or Borough);
- Local or Parish; or
- Within Zone of Influence only

6.53. A number of other key considerations include:

- Designated Sites and Features (e.g. Special Protection Areas, Sites of Special Scientific Interest, important hedgerows etc.);
- Biodiversity Value (Use of Biodiversity Action Plans, development plans and other published documents);
- Potential Value;
- Secondary or Supporting Value;
- Social or Economic Value; and
- Legal Issues

6.54. For example, the Cherwell and Oxfordshire Biodiversity Action Plans are useful tools that has been used to assist in valuing features and developing mitigation strategies, where necessary. Consideration has also been given to policies contained within the Local Plans.

6.55. Having identified the ecologically important features likely to be affected by the development, the current guidance promotes a transparent approach in which an impact is determined to be significant or not on the basis of a discussion of the factors that categorise it. This includes characterising the nature of the likely impacts on each important feature in terms of ecological structure and function, by considering the following parameters:

- Positive or negative / beneficial or adverse;
- Extent;
- Magnitude
- Duration;
- Reversibility; and
- Timing and frequency.

6.56. Where it is concluded that there would be an impact (positive or negative and including cumulative impacts) on a defined site or ecosystem(s) and / or the conservation status of habitats or species within a given geographical area, it is described as significant in the following terms; major, moderate, minor, negligible and none.

Conclusions

6.57. Previous ecological surveys were undertaken in 2022, including an extended habitat survey and a desk study in October 2022. Specific faunal surveys for bats, Badgers and reptiles were undertaken

between August and October 2022. Further surveys for bats and breeding birds will be conducted throughout 2023.

- 6.58. The Stratfield Brake Woodland Trust Reserve, also a Priority Deciduous Woodland, which is located adjacent to the southern boundary of the Proposed Development, has been scoped into the assessment as potential pollution and recreational impacts are anticipated.
- 6.59. The hedgerows (also a Priority Habitat) and trees located along the boundaries of the Proposed Development are deemed to be of relatively good ecological value and have been scoped into the assessment. Indeed, it is considered that the hedgerows and trees are likely to provide existing opportunities for foraging and commuting bats, and foraging and breeding opportunities for birds.
- 6.60. Reptiles and Badgers have not been recorded on site, however these species are known to the local area. As such, reptiles and Badgers have been scoped in as a constraint as to provide precautionary measures in order to prevent any impacts during construction.

7. CULTURAL HERITAGE AND ARCHAEOLOGY

Introduction

7.1. This section of the ES will present an assessment of the potential effects of the Proposed Development upon the cultural heritage resource in the vicinity of the Site, comprising archaeological remains, historic landscape features, and built heritage assets. This resource will be identified through desk-based research, site surveys and consultation with key stakeholders. The assessment will be undertaken by Cotswold Archaeology.

Baseline Conditions

Archaeology and Historic Landscape

7.2. The Site is not subject to any statutory heritage designations relating to archaeological remains, and Desk-Based Assessment is proposed to identify any potential archaeological constraints to the Proposed Development. A recent archaeological evaluation (Land at Gosford, East of Kidlington, Oxfordshire: Archaeological Evaluation Report, OA 2022) immediately to the north-east of the Site (in support of Application: 22/00747/OUT) identified the remains of an enclosure complex, which likely comprised a Roman rural farmstead. There is the potential for currently unrecorded archaeological remains to occur within the Site, which would likely be considered non-designated heritage assets of archaeological interest.

Built Heritage

7.3. The Site is not subject to any statutory heritage designations. There are no World Heritage Sites, Scheduled Monuments, Registered Parks and Gardens or Registered Battlefields within or in proximity to the Site. There are also no Conservation Areas within the Site or adjacent, although Oxford Canal Conservation Area is c.600m to the west of the Site. There are several Listed Buildings in the vicinity of the Site that are potentially sensitive to changes to their setting, identified as follows:

- Grade II Listed Stratfield Farmhouse (NHLE: 1220260)
- Grade II Listed Frieze Farmhouse (NHLE: 1045789)
- Grade II Listed Middle Farmhouse (NHLE: 1046567)
- Grade I Listed Chapel at Water Eaton Manor House (NHLE: 1046563)
- Grade II* Listed Water Eaton Manor House (NHLE: 1046562)
- Grade II* Listed St Frideswides Farmhouse (NHLE: 1286525)

Key Issues and Requirement for Assessment

Archaeology and Historic Landscape

- 7.4. There is the potential that currently unrecorded archaeological remains occur within the Site. A Desk-Based Assessment is proposed in the first instance. In accordance with the NPPF, the Assessment will seek to identify any archaeological remains within and in proximity to the Site and will attempt to determine, where possible, based on the information available, the value of such assets. Regional Research Frameworks and Historic England guidance will be utilised to inform this assessment, where appropriate. An assessment of the likely impact of the Proposed Development upon the known and potential buried archaeological resource will also be included.
- 7.5. Consultation with the Archaeological Advisor to CDC will be undertaken to agree an approach to the archaeological assessment. Specifically, consultation will be undertaken to establish whether the Desk-Based Assessment provides sufficient information to inform determination of the planning application, in accordance with paragraph 194 of the NPPF and local policy.

Built Heritage

- 7.6. The Proposed Development may alter the setting of heritage assets in the surrounding landscape, which could potentially result in harm to their value. A Settings Assessment will be undertaken in relation to nearby designated heritage assets in accordance with Historic England guidelines (The Setting of Heritage Assets, HE 2017) and will be informed by the results of the Landscape and Visual assessment. The Assessment will also include any non-designated heritage assets identified during consultation. Once impacts have been identified, the means by which they can be avoided through design will be explored. Where these are possible, designed-in mitigation measures will be clearly identified and incorporated into the development plans.
- 7.7. Consultation with the Conservation/Heritage Officer at CDC will be undertaken to agree an approach to the built heritage assessment. The assessment will comprise analysis of the setting of designated heritage assets in the vicinity of the Site, undertaken in accordance with appropriate guidance.

Approach to Assessment

Archaeology and Historic Landscape

- 7.8. A Desk-Based Assessment will be produced in accordance with professional guidance including the Chartered Institute for Archaeologists Standard and Guidance for Historic Environment Desk-Based Assessment (2020). A 1km study area is considered sufficient, measured from the boundaries of the Site, to capture the relevant HER data, and provide the necessary context for understanding

archaeological potential and heritage value in respect of the Site. All of the spatial data held by the HER – the primary historic data repository – for the land within the study area, will be requested. The records will be analysed and further refined in order to narrow the research focus onto those of relevance to the present assessment.

- 7.9. Once impacts have been identified, the means by which they can be avoided through design will be explored. Where these are possible, designed-in mitigation measures will be clearly identified and incorporated into the development plans. If impacts cannot be avoided through design, then alternative strategies would be proposed and secured through planning conditions.
- 7.10. The assessment will identify and evaluate the nature and likelihood of the impacts of the development on archaeological heritage assets against clearly defined criteria (including in both the short and long term), informed by the guidance contained in Managing Significance in Decision-Taking in the Historic Environment Historic Environment Good Practice Advice in Planning: 2 (Historic England 2015) and Planning and Archaeology: Historic England Advice Note 17 (HEAN 17) (Historic England 2022). Significance will be assigned to impacts relative to the sensitivity/value of the resource and the magnitude of impact in accordance with best practice. The residual impacts following the implementation of these measures will then be defined and significance criteria applied.

Built Heritage

- 7.11. A Settings Assessment will be undertaken in accordance with Historic England guidance contained in The Setting of Heritage Assets: Historic Environment Good Practice Advice in Planning Note 3 (Second Edition). The study area utilised for the Assessment will be informed by a site visit and field survey. Those heritage assets identified as potentially susceptible to non-physical impacts, and thus subject to more detailed assessment, will be selected for detailed settings assessment in accordance with Step 1 ('identify which heritage assets and their settings are affected') of the guidance.
- 7.12. A number of heritage assets are likely to be identified as part of Step 1, as potentially susceptible to impact as a result of changes to their setting. These assets will be identified using a combination of GIS analysis and field examination, which will consider the surrounding topographic and environmental conditions, built form, vegetation cover, and lines of sight, within the context of the assets' heritage value. Sensitive heritage assets will progress to a full settings assessment, in accordance with Steps 2 to 5 of the guidance. Once potential impacts have been identified in accordance with Step 3 of the settings guidance (The Setting of Heritage Assets: Historic Environment Good Practice Advice in Planning Note 3), the means by which they can be avoided through design will be explored. Where these are possible, designed-in mitigation measures will be clearly identified and incorporated into the development plans. If impacts cannot be avoided, then

the extent of any potential harm to heritage value will be clearly reported, in the context of legislation and national and local policy.

Conclusions

- 7.13. There is the potential for currently unrecorded archaeological remains to occur within the Site. The Proposed Development has the potential to result in a significant adverse effect upon any such remains, prior to the identification of suitable mitigation measures. A Desk-Based Assessment is proposed to establish the likely value of the archaeological resource within the Site and identify appropriate mitigation measures.
- 7.14. The Proposed Development is likely to alter the setting of a number of designated heritage assets, potentially resulting in harm to their heritage value. The nature of this potential harm and the significance of effect will be determined by the results of a Heritage Settings Assessment.

8. HIGHWAYS AND ACCESS

Introduction

- 8.1. This chapter has been prepared by Ridge and Partners LLP and sets out the proposed scope and the principles of the methodology for the assessment of the significant transport and movement environmental effects of the Proposed Development, and the way in which this will be reported on in the ES.

Baseline Conditions

Current Conditions

- 8.2. The Proposed Development site is located 6km north of Oxford and at the gateway to Kidlington adjacent to the A4260 and Oxford Road. The Site is immediately to the northwest of Oxford Parkway between Frieze Way and Oxford Road.
- 8.3. Currently the Site is a willow plantation with only a field gate access on Oxford Road which connects to the local highway network.

Walking and Cycling Review

- 8.4. A review of the local walking and cycling links in the vicinity of the Site will be undertaken within the Transport Assessment.
- 8.5. This will include an analysis of facilities and amenities that are accessible within a 1.6km walk of the Site and 6.4km cycle, in line with the Institution of Highways and Transport (IHT) guidance document 'Planning for Walking' (April 2015) and The Institution of Highways and Transport (IHT) guidance document 'Planning for Cycling' and National Travel Survey.
- 8.6. The public rights of way route 229/4/2 runs from the eastern side north of Water Eaton Bridge following the A34 on the northern boundary towards Water Eaton Lane. There is also a historic but disused footway that traverses the southern boundary of the Site through Stratfield Brake, now severed by the A4260.
- 8.7. The OXR4 cycle route runs along Oxford Road adjacent to the Site. OXR3 runs along A44 south of the Site. These routes are identified within the Oxford Walking and Cycling network for the LCWIP and connects the Site to Oxford, Kidlington and Woodstock. Oxford City Centre is approximately 7km south of the Site and so approximately 25-minute cycle ride.

Initial Public Transport Review

Bus Services

8.8. The nearest bus stops to the Site are located on Oxford Road (Oxford Parkway Stop E (NB) and Oxford Parkway Stop D (SB), Oxford Parkway and Bicester Road NB and SB) which are within 500 meters of the Site or within a 6-minute walk.

8.9. These are served by the following services as summarised in **Table 8.1**.

Table 8.1: Bus Services

Bus Stop	Service	Route	Approximate Frequency	Bus Operator
Oxford Road	2/2A/N2	Kidlington - Oxford	10min Weekdays and Sat, 15min on Sunday and Night	Stagecoach
	700	Kidlington – Thornhill P&R	30min Weekdays	Stagecoach
	7 Gold	Woodstock- Oxford	30min Weekdays and Sat	Stagecoach
	S4/H4	Oxford - Banbury	Hourly Weekdays and Sat	Stagecoach
Bicester Road	250	Oxford - Bicester	Hourly Weekdays and weekend	Diamond Bus
	S5/NS5	Oxford - Bicester	20min Weekdays and Sat, 30min on Sunday and hourly weekday Night	Stagecoach

Timetables correct as of June 2023

National Rail Services

8.10. The closest national rail station is Oxford Parkway Station, 500m from the Site. The station is on Oxford-Bicester line and run by Chiltern Railways.

8.11. The station provides access to regular services to Oxford (6 minute journey), London Marylebone (60 minute journey) and Birmingham (90 minute journey). Adjacent to the station is Oxford Parkway Park and Ride, which has 758 spaces. From the Park and Ride, the 700 and 7 buses can be caught, providing access to Oxford City Centre, Woodstock and Kidlington.

Policy and Guidance

8.12. The proposed methodology has been determined from best practice and guidance consisting of 'The Guidelines for the Environmental Assessment of Road Traffic'. This was published in 1993 by the Institute of Environmental Assessment, which is now the Institute of Environmental Management and Assessment (IEMA).

- 8.13. Reference will also be made to Volume 11 of the DMRB, Section 3, Part 8, Chapter 6 of the Design Manual for Roads and Bridges (DMRB) entitled 'Pedestrians, Cyclists, Equestrians and Community Effects' which provided further guidance on assessing a scheme's impact on the journeys which people make in its locality. This covered the stages in assessment and possible mitigation measures for changes in amenity and community severance.
- 8.14. In March 2022, Volume 11 of DMRB was superseded with the new Highways Standards including section LA112 Population and Human Health. This updates the requirements for assessing and reporting the environmental effects on population and health from the construction, operation and maintenance of projects. In particular, the standards set out new significance criteria that aid consistent and proportionate assessment to support the reporting of significant effects of population and human health.

Key Issues and Requirement for Assessment

- 8.15. The assessment of environmental effects of the new stadium considers both the construction phase and the operational phase. The methodology to determine the significance of environmental effects is typically derived from a function of receptor sensitivity to a change in traffic conditions and the magnitude of change of the impact.
- 8.16. Within the IEMA guidelines (1993), groups, locations, and special interests, have been identified as factors which may be sensitive to changes in traffic and transport conditions. These consist of the following:
- People at home
 - People in workplaces
 - Sensitive groups including children, the elderly, and / or disabled
 - Sensitive locations e.g., hospitals, churches (and other religious buildings / places of worship), schools, historical buildings
 - People walking and cycling
 - Open spaces, recreational sites, shopping areas
 - Sites of ecological / nature conservation value
 - Sites of tourist / visitor attraction

Construction Traffic

- 8.17. The impact of construction during the development phases will be considered, including the transportation of construction materials and plant to understand the potential short term environmental considerations during the construction phases.

8.18. Further information regarding how to mitigate against any impact is provided within the Approach to Assessment section.

Operational Traffic

8.19. The environmental impact assessment will further consider the impact during the operational phases of the Proposed Development including the ancillary uses of the stadium.

Embedded Mitigation

8.20. The mitigation has been considered for both the construction and the operational periods, including:

Construction:

- A Construction Environmental Management Plan (CEMP) will be prepared to avoid, minimise or mitigate construction effects on the environment. It will include details of the control measures that will be in place during construction, such as working operation hours, location of construction compound and phasing, construction vehicle access routes, and details of the pollution prevention measures that will be put in place.
- A Construction Traffic Management Plan (CTMP) will be prepared to minimise any inconvenience to the public using the highway caused during construction. It will define how traffic, transport and travel issues affecting the highway during the works are undertaken, managed and amended. They will detail how Traffic Management Schemes will control temporary closures and diversions required to construct the scheme.
- A Construction Travel Plan (CTP) will be prepared if considered appropriate following completion of the assessment, to manage and influence workforce travel during construction to reduce effects on traffic from site personnel. For example, promoting travel by public transport and active travel, providing supporting facilities on site (e.g. cycle parking, lockers, showers), or encouraging car sharing.

Operational Period

- Travel Plan
- Retention and connections to the Public Right of Way;
- Pedestrian access and egress and link to Oxford Parkway;
- Supporter bus provision between key locations surrounding Oxford (Park and Ride Sites) to Oxford Parkway;
- Supporter rail special services potentially between Banbury, Didcot, Oxford or Cowley (when operational), and;
- Formal highway connections for ancillary use accessibility and car parking provision at the A4260.

Approach to Assessment

Baseline Data Collection

8.21. Baseline data relating to the Site and its surroundings has been compiled using the following sources and these sources will be used to expand on this in the preparation of the detailed Transport Assessment:

- Site Visits, to include:
 - Observation of existing conditions on-site
 - View the public rights of way in the vicinity of the Site.
- Desktop studies, including collation of:
 - Public transport routes and timetables, from operator websites;
 - Routes of surrounding public rights of way, from Oxfordshire County Council's definitive map, available online;
 - Local cycle routes, available from the OCC and Sustrans documents (LCWIP) and websites;
 - Local planning policy documents, available from Cherwell District Council and OCC websites;
 - Committed scheme details, available from Cherwell District Council's planning portal;
 - Relevant Planning applications from the LA or adjacent LA portals;
 - Traffic survey information;
 - TEMPRO growth factors; and
 - Crashmap data for the most-recent available five-year period.
- Traffic Surveys.
 - Any traffic survey data collected for the development of North Oxford VISSIM Model and other transport models in the area;
 - Weekend traffic surveys if available, alternative would be any permanent traffic data held by OCC or NH;
 - Further surveys may be required to be commissioned, however, as we are approaching non-neutral survey months, the next suitable period would be September, October, November 2023.

Construction Traffic

8.22. Peak construction traffic predicted to be generated by the Proposed Development will be calculated using first-principles approach. This will be based on the likely worst-case construction scenario, which is expected to be during the delivery of the development.

8.23. As discussed previously, the development construction traffic flows, along with 2023 (or factored 2018) baseline traffic flows will be used to determine the environmental impacts of the development in terms of transport during the construction phase.

Operational Traffic

8.24. Peak hour traffic flows that will be generated by the Proposed Development once fully occupied will be calculated.

8.25. Daily vehicle trip profiles will be extracted for each land use from the TRICS database, for both weekdays and weekends where available, and the calculated peak hour operational traffic flows will be factored to 18 hour AAWT and 24 hour AADT.

8.26. As discussed previously, the development operational traffic flows, along with 2023 (or factored 2018) baseline traffic flows will be used to determine the environmental impacts of the development in terms of transport during the operational phase.

8.27. Trips associated with the ancillary uses of the football stadium will have the most impact on the highway network as they are not constrained to match day periods. This includes the Hotel, Gym, Health and Wellbeing Facilities, Café/Restaurant, Shops. Additionally, a Hospitality venue will be provided as part of the football stadium.

8.28. Prior to any further detailed assessment, the trip rates will be agreed with OCC via a scoping exercise.

Study Area

8.29. The IMEA guidance sets out that from a traffic and transport standpoint, the scale and extent of the adopted study area for assessment should consider the highway links which fall within two rules:

- Rule 1: include highway links where traffic flows will increase by more than 30% (or the number of heavy goods vehicles will increase by more than 30%)
- Rule 2: include any other specifically sensitive areas where traffic flows have increased by 10% or more.

8.30. It is anticipated that there will be changes in traffic flow at:

- A4260/Oxford Road Roundabout
- A4260/A44 Roundabout
- A34/A44 Roundabout

8.31. Traffic surveys and data extracted from the transport model will determine the current traffic levels, and if the traffic increases do not fall into these rules, the assessment will be assumed to be scoped out, otherwise the following methodology will be applied.

Assessment Criteria

8.32. The definitions of each of the potential effects identified are set out below with an explanation of each assessment criterion which have derived from the IEMA Guidance (1993). It is on this basis; this chapter considers the following environmental effect categories:

- Severance;
- Driver Delay;
- Pedestrian Delay;
- Pedestrian Amenity;
- Fear and Intimidation;
- Accidents and Safety; and
- Hazardous Loads.

Severance

8.33. According to the IEMA Guidelines (1993), *'severance is the perceived division that can occur within a community when it becomes separated by a major traffic artery'* which may result from difficulty in crossing a road with a heavy traffic flow or physical barrier. Furthermore, *'changes in traffic flow of 30%, 60% and 90% are regarded as producing 'slight', 'moderate' and 'substantial' changes in severance respectively'*. However, it is acknowledged within the guidelines that severance relatively subjective as it is difficult to measure. Thus, it is likely to vary between different groups within a single community, i.e., different age groups may be more sensitive to differing road characteristics.

8.34. Severance is influenced by the volume, composition and speed of traffic, in addition to the geometric characteristics of a road including the provision of pedestrian crossing facilities, the demand for movement across a road and the variety of land uses and extent of community located on either side of a road. All of these factors are considered when determining the likely severance effect.

8.35. **Table 8.2** summarises these thresholds which aim to prevent minor changes on links with low baseline flows from being considered disproportionately significant. A potentially significant effect is therefore only considered to occur if the baseline traffic flow is increased to any of the levels shown below. This also includes the DMRB guidance 113 thresholds.

Table 8.2: Severance Thresholds

Magnitude	Description of Change in Traffic Flow
High	Links subject to a 90+% traffic flow increase per day or AADT in excess of 16,000
Medium	Links subject to a 60% to 89% traffic flow increase per day or AADT between 8,000 and 16,000
Low	Links subject to a 30% - 59% traffic flow increase per day or AADT below 8,000
Negligible	Links with daily traffic flow increases 29% and below

Driver Delay

- 8.36. Driver delay typically occurs either at junctions where vehicles are undertaking various manoeuvres and are delayed due to signals or giving priority to another vehicle, or when there is construction activity taking place. The IEMA Guidelines (1993) state how computer modelling programs can be used to assess the changes in driver delay on the network as a result of a development.
- 8.37. The guidelines do not provide the thresholds for the magnitude of change to driver delay, though it does state '*delays are only likely to be significant when the traffic on the network surrounding the development is already at, or close to, the capacity of the system.*' This has been informed by the findings of the modelling from the reports provided from Atkins.
- 8.38. Though the guidelines do not set specific thresholds, **Table 8.3** shows the scale of magnitude of driver delay which is to be applied.

Table 8.3: Driver Delay Magnitude Scale

Magnitude	Description
High	Average vehicle delay changes of more than 1 minute as a result of the Proposed Development during the peak hour periods
Medium	Average vehicle delay changes are between 30 and 60 seconds as a result of the Proposed Development during the peak hour periods
Low	Average vehicle delay changes are between 20 and 30 seconds as a result of the Proposed Development during the peak hour periods
Negligible	Average vehicle delay changes are less than 20 seconds as a result of the Proposed Development during the peak hour periods

Pedestrian Delay and Amenity

- 8.39. Pedestrian delay refers to how people may be affected by changes in the volume, composition, or speed of traffic in relation to crossing a road. Typically, the greater the volume of traffic results in an increased pedestrian delay, though other elements such as the level of pedestrian activity, visibility, and the general physical conditions of a site and crossing points for pedestrian use can also impact pedestrian delay.
- 8.40. In addition to the factors which may impact pedestrian delay, it is important to consider the general 'pleasantness of a journey' of which the guidance refers to as pedestrian amenity. This can be affected by traffic flow, traffic composition and footway width and the separation from traffic. The definition of pedestrian amenity also includes pedestrian fear and intimidation (see below) in addition to the overall association between pedestrians and traffic.
- 8.41. Due to the wide range of aspects that can impact this, the guidance does not suggest any thresholds in relation to scoring the significance of absolute or actual changes in the level of pedestrian delay, and assessors are to apply their own judgement, as set out within **Table 8.4** below.

Table 8.4: Pedestrian Delay Magnitude Scale

Magnitude	Description
High	Change in traffic flow of >50%
Medium	Change in traffic flow of 40%-50%
Low	Change in traffic flow of 30%-40%
Negligible	Change in traffic flow of <30% or Traffic flow less than 800 vehicles per hour*

**This threshold is based upon the Manual for Streets (2007) threshold of 10,000 vehicles per day for traffic flow and road safety for streets with direct frontage access. Peak hour flow is estimated at approximately 8.5% of daily flow (850 vehicles), although this has been reduced to 8% (800 vehicles) in order to provide a robust assessment threshold.*

Fear and Intimidation

- 8.42. As indicated above, pedestrians can experience fear and intimidation from traffic which is dependent of the volume of traffic, the volume of HGVs, and proximity between the carriageway and a footway, in addition to whether there is a barrier between traffic and pedestrians. Similarly, to pedestrian delay and amenity, there are no commonly agreed thresholds for determining the magnitude of this impact, with appraisal based on the judgement of the assessor.
- 8.43. Nonetheless, the guidance suggests the thresholds set out within **Table 8.5** which are based upon research.

Table 8.5 Fear and Intimidation Thresholds

Degree of Hazard	Average Traffic Flow over 18-hour Day (Vehicles / Hour)	Total 18-hour Heavy Duty Vehicle Flow	Average Vehicle Speed over 18-hour Period (mph)
Extreme	1,800	>3,000	>20
Moderate	1,200-1,800	2,000 – 3,000	15 – 20
Slight	600 – 1,200	1,200 – 2,000	10-15

8.44. Notwithstanding the thresholds set out above, the guidance suggests that they should be approached with a certain level of caution as the individual factors could be weighted by local circumstances to decide on the overall value of intimidation. For example, a road may show higher speeds but lower flows making crossing easier or high flows but congested and constant traffic, therefore reducing total fear of passing vehicles but increasing crossing difficulties.

8.45. For the purposes of this assessment, the thresholds which will be applied for this category are set out below in **Table 8.6**.

Table 8.6: Fear and Intimidation Thresholds

Magnitude	Description
High	Change in average traffic flow over 18 hours of >1500 vehicles/hr; An average 18-hour HGV flow of >2500; or change in average speed over 18 hours of >17 mph
Medium	Change in average traffic flow over 18 hours of 1200-1500 vehicles/hr; An average 18-hour HGV flow of 2000-2500; or change in average speed over 18 hours of 15-17 mph
Low	Change in average traffic flow over 18 hours of 600-1200 vehicles/hr; An average 18-hour HGV flow of 1000-2000; or change in average speed over 18 hours of 10-15 mph
Negligible	Change in average traffic flow over 18 hours of <600 vehicles/hr; An average 18-hour HGV flow of <1000; change in average speed over 18 hours of <10 mph

Accident and Safety

8.46. The guidelines state that the overall changes in vehicle kilometres along different classes of road within the network can be the basis of understanding the change in the number of accidents. However, specific criteria have not been set out within the guidelines regarding how to identify impact and magnitude. *‘Professional judgement will be needed to assess the implications of local circumstances or factors, which may elevate or lessen risks of accidents, for example, junction conflicts’.*

8.47. A review of past Personal Injury Collision (PIC) data has been undertaken and summarised within this chapter, with a more detailed assessment provided within the TA report. This has been used to assess the potential impact of the construction and operational phase of the development on accidents and safety of the local highway network within the study area.

Hazardous Loads

8.48. This development is not expected to generate any hazardous loads and therefore the impact has not been tested within this section for either the construction or operational phases.

Sensitivity Criteria

8.49. **Table 8.7** sets out how the sensitivity of each receptor is determined.

Table 8.7: Sensitivity and Value of Receptors

Sensitivity / Value of Receptor	Receptor
High	Schools, colleges, and other educational institutions; retirement / care homes for the elderly or infirm; roads used by pedestrians with no footways; high pedestrian activity; accident black spots.
Medium	Hospitals, surgeries, and clinics; parks and recreation areas; shopping areas; roads used by pedestrians with narrow footways.
Low	Open space; tourist/visitor attractions; historical buildings; churches, other places of worship

Significance Criteria

8.50. The two principal criteria for determine the significance of an environmental effect are the sensitivity of the receptor and magnitude of effect. These aspects have been set out within the subsequent tables below. **Table 8.8** shows the significance matrix used to determine the significance of environmental transport effects.

Table 8.8: Transport and Access – Significance Criteria

Magnitude	Sensitivity of Receptor			
	High	Medium	Low	Negligible
High	Major	Major/Moderate	Moderate/Minor	Negligible
Medium	Major/Moderate	Moderate	Minor	Negligible
Low	Moderate/Minor	Minor	Minor/Negligible	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

8.51. Further to the level of significance, environmental effects will also be determined by whether effects are temporary or permanent, and whether they are beneficial or adverse.

8.52. A description of criteria for each level of significance can be found in **Table 8.9**.

Table 8.9: Significance Criteria

Significance Level	Criteria
High	These effects are likely to be important considerations at a local or borough scale but, if adverse, are potential concerns to the project and may become key factors in the decision-making process.
Medium	These effects, if adverse, while important at a local scale, 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 a particular area or on a particular resource.
Low	These effects may be raised as local issues but are unlikely to be of importance in the decision-making process.
Negligible	No effect or effect which is beneath the level of perception, within normal bounds of variation or within the margin of forecasting error.

Anticipated Effects

8.53. The football stadium is likely to be at capacity two days per week, one weekday and one weekend, outside of the peak highway periods and only for a limited time prior to kick off and at the end of the match.

8.54. It is envisaged that supporters will arrive via public transport or specific match day buses from key locations around Oxford.

8.55. The largest impacts will be pedestrian movements from Oxford Parkway.

8.56. Limited onsite parking will be available, with a large proportion of that being available for disabled supporters. No general supporter parking will be made available on site.

Conclusions

- 8.57. The ES will include an assessment of traffic and transportation effects, with reference to the findings of a Transport Assessment and a proposed Framework Travel Plan.

9. NOISE AND VIBRATION

Introduction

- 9.1. This chapter has been prepared by Mott Macdonald and sets out the proposed scope of the assessment of the potential effects of the Proposed Development with respect to noise and vibration. It identifies the types of impacts that are expected to arise, describes how the effects of the impacts will be assessed including the identification of significant effects, and what generic mitigation measures will be considered during the preparation of the specialist noise and vibration chapter of the ES. It also identifies those effects which can be scoped out of the ES.
- 9.2. The scoping report has been informed by desktop studies, any work that has been undertaken to date, review of relevant websites, review of standards and guidance including planning policy and EIA assessment guidance, and experience of similar infrastructure projects.

Study Area

- 9.3. The Site is situated north of Oxford and at the gateway of Kidlington, approximately 50m east of the A34 road, between Frieze Way and Oxford Road. The landscape between the Proposed Development and Kidlington is designated as part of the Oxford Green Belt. The Proposed Development is one of several developments that is proposed for the area. The Site is in close proximity to a number of site allocations identified in the Development Plan; however, the other sites are not developed yet.
- 9.4. The Proposed Development comprises: a Stadium Building, which includes flexible commercial and community facilities for conferences, exhibitions, educational or other events (including restaurant and bar, café, health and wellbeing facilities/clinic facility, shop and gym), a 200-bed hotel, outdoor community and multi-functional plaza, club shop, on-site car parking, enhanced crossing infrastructure, preserved woodland, enhanced tree planting and buffer, enhanced green space with community access, and enhancements to Oxford Parkway access.
- 9.5. The study area for noise and vibration encompasses the Development Footprint and adjacent land in the direction of nearby noise-sensitive receptors. Consideration is given to sensitive receptors up to 300m from the scheme boundary, although the spatial extents of the assessment will be extended to include all receptors where assessment criteria are expected to be exceeded.

Consultation

- 9.6. In order to ensure an appropriate and accurate assessment method for the Site, it is crucial to engage in a consultation with the Oxfordshire County Council and Cherwell District Environmental Protection

Department. This consultation process will provide an opportunity to gather valuable insights and expertise from the department, allowing for the identification of specific considerations and requirements related to environmental protection within the region. By involving the Environmental Protection Department in the decision-making process, it will be possible to address any potential concerns and align the assessment method with local regulations and guidelines. Furthermore, consultation with relevant stakeholders may aid in identifying additional sources of information that can contribute to establishing accurate baseline noise and vibration conditions for the areas of interest.

Baseline Conditions

Baseline conditions

9.7. The methodology for determining and evaluating baseline conditions will be aligned with the best practice guidance recommended for EIA. This will involve both desk study and survey work. Sources examined in the desk study will include Defra noise mapping, project details, drawings, aerial imagery and Ordnance Survey (OS) mapping, traffic flows, and any previous surveys and assessments conducted in the area or for a similar scheme.

- Potential sensitive receptors in proximity of the scheme that are sensitive to adverse noise and vibration impacts include:
- Residential properties such as those located along Oxford Road, South Cl, Road, South Ave, in Kidlington
- Users of outdoor amenity areas used for recreation such as Kidlington Cricket Club and North Oxford Golf Club
- Commercial properties such as local shops on Oxford Road in Kidlington
- The Hotel which is part of the new stadium development
- The noise-sensitive receptors close to the new development are at risk of being affected by the noise generated from traffic diversions caused by match-day traffic disruption associated with the project
- Users of external amenity areas used for recreation such as footpaths and cycle routes.

Baseline noise climate

9.8. The Site is surrounded by single and dual carriageway roads and the railway between Oxford to Bicester located on the east of the Site.

9.9. Existing weekday noise levels will therefore be dominated by traffic noise, both local and more distant, train noise and agricultural farming activity. On match days, background noise levels would also be affected by road traffic noise associated with spectator patronage, the public address and voice alarm (PAVA) system, and the general movement of people in the vicinity of the stadium. As

the football club forms the focus of the surrounding community, and is a significant employer and contributor to the local economy, there is likely to be some contribution to the background noise from associated activities on days other than match days.

Baseline noise levels

- 9.10. A desktop study of the available background noise data assumed for current and recent development in the area. Depending on the recency and location of available noise data, baseline noise survey will be conducted.
- 9.11. The Environmental Health team at Cherwell District Council and Oxfordshire Council will be consulted to discuss, and prior agreement sought on the approach of the baseline noise survey, the selection of measurement locations and assessment methodology.
- 9.12. It is anticipated that continuous noise monitoring will be carried for a period of up to one week at representative locations for the noise sensitive receptors. Attended short-term noise measurements will be also taken at key sensitive receptors including both human and biodiversity receptors. The baseline noise survey will be undertaken in accordance with BS7445: 2003 (British Standards Institution, 2003) and it will include logging of weather conditions to remove potential periods of heavy rain or high wind speeds.
- 9.13. Noise surveys typically involve conducting measurements at locations where a notable change in noise levels could occur, both during the construction phase and after the completion of the project. These measurements would be taken at representative locations, especially residential dwellings, that serve as sensitive receptors for noise impacts.
- 9.14. As a minimum, baseline noise measurements will record key parameters including the equivalent continuous noise level (L_{Aeq}), maximum level (L_{Amax}), and statistical indices including the L_{A10} and L_{A90} parameters. The recordings will be conducted over appropriate intervals and at specific periods based on the nature of the impact under consideration.
- 9.15. The results from the survey will support the development of the noise model and assessment.

Key Issues and Requirement for Assessment

- 9.16. The assessment of the effects of noise and vibration impacts will comprise some or all the following elements: identification of potential sources and prediction of noise and vibration impacts likely to be generated at nearby sensitive receptors including dwellings, comparison of impacts with the baseline conditions and appropriate criteria for acceptability, evaluation of the effects, and

consideration of possible additional mitigation measures and review of effects if appropriate and an assessment of any residual effects.

9.17. In completion of the assessment reference will be made to the following key documents:

- National Planning Policy Framework (DCLG 2012 as updated 2021);
- Noise Policy Statement for England (DEFRA 2010);
- Planning Practice Guidance (PPG, 2019);
- Professional Practice Guidance on Planning and Noise (ProPG 2017);
- British Standard (BS) 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise & Part 2: Vibration;
- World Health Organisation: Guidelines for Community Noise (WHO 1999);
- WHO Night Noise Guidelines for Europe (WHO 2009)
- WHO Environmental Noise Guidelines for the European Region (WHO 2018);
- BS 8233 Guidance on Sound insulation and noise reduction for buildings (BSI 2014);
- BS4142 Method for Rating Industrial Sound Affecting Mixed Residential and Industrial Areas (BSI 2014+A1 2019)
- BS7827 Code of practice for designing, specifying, maintaining and operating emergency sound systems at sports venues (BSI 2011);
- Guide to Safety at Sports Grounds (Sixth edition) (DCMS 2018).
- Sections 60 and 61 of The Control of Pollution Act, 1974;
- Design Manual for Roads and Bridges (DMRB) LA111 Noise and vibration Revision 2, 2020;
- Calculation of Road Traffic Noise (CRTN), 1988;
- IEMA Guidelines for Environmental Noise Impact Assessment (IEMA 2014)

9.18. The above list is not exhaustive, and in addition relevant local planning policy and guidance would be consulted.

9.19. An 'impact' is considered to be a physical change (e.g. in the level of noise or vibration) that is expected to occur in the implementation of any aspect of the scheme. An 'effect' is considered to be the observed result of an impact with respect to the sensitivity of identified receptors.

Construction Phase

9.20. Potential temporary noise and vibration impacts arising from the construction works include:

- impacts arising from construction of the scheme;
- impacts arising from site traffic using the public highways and accessing the Site and contractor's compounds;
- activities within the contractors compounds; and
- impacts from diverted road traffic.

- 9.21. As the specific construction methodology for the development has not been determined at this stage, and the construction site is not in close proximity to existing receptors, a qualitative assessment of the impacts associated with the construction of the scheme and activities within the contractors compounds will be undertaken. The quantitative assessment would only be feasible where there is sufficiently detailed information to inform it and the subsequent consideration of specific mitigation measures.
- 9.22. Traffic noise associated with construction, including noise from diverted road traffic, will be considered. Traffic changes of less than +/-10% will not be significant for noise and vibration and will be scoped out of the assessment. Construction Traffic changes between 10% and 30% will be assessed qualitatively. Construction traffic changes in excess of +/-30% will be calculated in accordance with the Calculation of Road Traffic Noise (CRTN). DMRB LA 111 provides a methodology to assess the impact of construction traffic on public highways in terms of the change in road traffic noise as a result of additional vehicle movements associated with the scheme. The methodology is based on the magnitude of the change in the Basic Noise Level (BNL) defined as the calculated noise level at 10m from the nearest carriageway edge accounting for, as a minimum, the volume of traffic, percentage of vehicles and speed.
- 9.23. The extent of possible adverse effects and significance is dependent on the magnitude of impact and the sensitivity of the recipient, which can be influenced by: the type of receptor, time of day that the noise impact occurs, attitude of the receptor towards the source, adequacy of public relations.
- 9.24. The reduction of construction-related noise and vibration effects can be achieved through the application of Best Practicable Means, as outlined in Section 72 of the Control of Pollution Act 1974. These measures encompass the careful selection of suitable construction methods and the restriction of working hours for activities generating high noise levels.
- 9.25. A Construction Environmental Management Plan (CEMP) should be produced. This would include specific measures to mitigate construction noise and vibration, which will be implemented during the construction activities. The CEMP should incorporate local construction noise and vibration control policies and recommended practices.

Operation Phase

- 9.26. The assessment will take into account three operational scenarios: noise from fixed plant associated with the Proposed Development, vehicle noise from the use of the carpark and road traffic noise resulting from vehicles utilising the existing highway network.

- 9.27. A noise model will be prepared to assess the potential noise effects resulting from the operation of the scheme. This model will incorporate relevant data from the design phase, such as the location-based coordinates of equipment, their heights, and corresponding sound power levels. The propagation of noise will be calculated according to ISO 9613 Part 2 (International Organization for Standardization guidelines and evaluated based on the recommendations provided in BS4142:2014+A1:2019, (British Standards Institute, 2014). Operational noise impacts from fixed plant will be assessed in accordance with BS 4142. The BS 4142 methodology is based on a comparison of the received noise levels from the source, including corrections to account for acoustic features (referred to in the standard as the 'rating level') with the typical baseline background noise level (L_{A90} dB) to determine the likelihood of complaint.
- 9.28. The design will address noise generated by PAVA systems and the crowd within the stadium. However, these aspects are not within the scope of BS 4142 and will be assessed qualitatively.
- 9.29. In relation to the operation of the Proposed Development, the suitability of the Site's noise environment for residential purposes, including hotel premises within the stadium, will be assessed based on both internal and external noise levels.
- 9.30. The evaluation of internal and external noise levels within habitable areas will adhere to the guidelines provided in the World Health Organization (WHO) 'Guidelines for Community Noise' and the British Standard 8233: 2014 'Sound insulation and noise reduction for buildings - Code of practice'.
- 9.31. The noise prediction from road traffic associated with the stadium development will be undertaken following the methodology in 'Calculation of Road Traffic Noise' (CRTN) with the reference to the Transport Research Laboratory (TRL) 'Method for Converting the UK Road Traffic Noise Index $L_{A10,18h}$ to the EU Noise Indices for Road Noise'.
- 9.32. The noise from additional transport associated with the stadium development, such as coaches and associated parking, will be assessed qualitatively.
- 9.33. Potential operational noise impacts will generally be limited to airborne noise only.
- 9.34. The noise and vibration chapter within EIAR will identify and report on the appropriate mitigation measures as outlined.

Approach to Assessment

9.35. The general methodology will be adopted within the assessment, the overall significance will be defined as Major, Moderate, Minor or Negligible, with effects being described as adverse, neutral or beneficial.

Sensitivity

9.36. Noise affects people in a number of different ways. This may include factors such as annoyance and sleep disturbance, enjoyment of quiet spaces, ability to communicate with others, ability to concentrate at home or at work, participation in social and community activities. As a consequence, it is not appropriate to consider a single criterion when assessing the value of an existing noise environment.

9.37. **Table 9.1** below sets out criteria for assessing sensitivity and **Table 9.2** below sets out criteria for assessing magnitude of impact. It should be noted that, generally, the variation in the sensitivity of receptors in terms of noise impact is taken into account by applying different scales to classify magnitude of impact (e.g. by using different scales for daytime and night-time) rather than by varying the assignment of sensitivity to specific types of receptors.

Table 9.1. Criteria for assessing the sensitivity of the receptor

Sensitivity	Description	Examples of receptors
High	Receptors where occupants or activities are particularly susceptible to noise	Residential Quiet outdoor areas used for recreation Conference facilities Auditoria/studios Schools in daytime Hospitals/residential care homes Religious institutions e.g. churches or mosques
Medium	Receptors moderately sensitive to noise, where it may cause some distraction or disturbance	Offices Restaurants Sports grounds where spectator noise is not a normal part of the event and where quiet conditions are necessary (e.g. golf or tennis)
Low	Receptors where distraction or disturbance from noise is minimal	Residences and other buildings not occupied during match/working hours Factories and working environments with existing high noise levels Sports grounds where spectator noise is a normal part of the event
Negligible	No discernible effect on the receptor	N/A

Source: Adopted from IEMA Guidelines for Environmental Noise Impact Assessment (IEMA, 2014) and the Planning Practice Guidance (PPG, 2019)

Table 9.2. Criteria for assessing the magnitude of impact

Magnitude of Impact	Criteria for assessing the impact
High	Increase in noise levels is likely to be clearly perceptible and could have a significant effect on the continued use of a building and other premises. Disruptive, causes a material change in behaviour and/or attitude. Potential for sleep disturbance. Quality of life diminished due to change in character of the area.
Medium	Increase in noise levels is likely to be noticeable in affected buildings and outdoor recreational areas. Intrusive, noise can be heard and causes small changes in behaviour and/or attitude. Potential for non-awakening sleep disturbance. Affects the character of an area such that there is a perceived change in the quality of life.
Low	A slight increase in noise levels may be perceived in affected buildings and outdoor recreational areas. Can slightly affect the character of an area but not such that there is a perceived change in the quality of life. Non-intrusive noise can be heard but does not cause any change in behaviour or attitude.
Negligible	Noise increase is unlikely to be discernible, very little change to noise from the baseline conditions.

Source: Adopted from IEMA Guidelines for Environmental Noise Impact Assessment (IEMA, 2014)

Significance

9.38. The significance of the effect of any noise and vibration impact is determined as a function of the sensitivity of the receptor and the magnitude of the impact that it is exposed to. Using the definition of receptor sensitivity and the magnitudes of impact (defined below), the significance of any effects are identified using the matrix presented in **Table 9.3**.

Table 9.3. Matrix for determining the significance of the effect

	Sensitivity			
Magnitude	High	Medium	Low	Negligible
High	Major	Major/Moderate	Moderate/Minor	Negligible
Medium	Major/Moderate	Moderate	Minor	Negligible
Low	Moderate/Minor	Minor	Minor/Negligible	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

Source: Adapted from OUFC Scoping Request (Ridge, 2023)

9.39. The terms outlined in the above table have been defined as follows:

- Major (adverse or beneficial) – where the development would cause significant deterioration (or improvement) of the existing environment;
- Moderate (adverse or beneficial) – where the development would cause noticeable deterioration (or improvement) to the existing environment;
- Minor (adverse or beneficial) – where the development would cause perceptible deterioration (or improvement) to the existing environment;
- Negligible – no discernible improvement or deterioration to the existing environment.

Construction

9.40. Where a quantitative assessment is necessary and feasible, evaluation of predicted construction noise level should follow BS5228-1 Annex E.3.3 Example method 2 “The 5 dB(A) change method”, stating that noise levels generated by construction activities will be deemed to be potentially significant if the total noise (pre-construction ambient plus construction noise) exceeds the pre-construction ambient noise by 5 dB or more, subject to lower cut-off values of 65 dB, 55 dB and 45 dB L_{Aeq} from construction noise alone, for the daytime, evening and night-time periods respectively; and a duration of one month or more, unless works of a shorter duration are likely to result in significant impact. Furthermore, Table E.2 from Annex E of BS 5228-1 will be utilised to define the criteria for the significant adverse effect, where the thresholds are as follow, 75 dB, 65 dB and 55 dB L_{Aeq} for the daytime, evening and night-time periods respectively.

Operation

9.41. For short-term changes in road traffic noise the smallest change in road traffic noise level that is considered perceptible is 1 dB $L_{A10,18hr}$. In the long-term a 3 dB $L_{A10,18hr}$ change in road traffic noise is considered to the smallest perceptible change. For this reason, the magnitude of short-term and long-term impacts are expressed differently as shown in **Tables 9.4 and 9.5** below. The magnitude of change shall be defined in accordance with criteria set in Design Manual for Roads and Bridges (DMRB) “LA 111 Noise and vibration” table 3.54a and 3.54b. For the purpose of this assessment, the short term and long term magnitude of impact is adopted from the project significance of the effect matrix for vocabulary consistency.

Table 9.4. Magnitude of road traffic noise impacts in the short term

Short term magnitude	Short term noise change (dB $L_{A10,18hr}$ or L_{night})
High	Greater than or equal to 5.0
Medium	3.0 to 4.9
Low	1.0 to 2.9
Negligible	less than 1.0

Source: Adopted from DMRB LA 111 Noise and vibration Table 3.54a (DMRB, 2020),

Table 9.5. The magnitude of road traffic ne impacts in the long term

Long term magnitude	Long term noise change (dB $L_{A10,18hr}$ or L_{night})
High	Greater than or equal to 10.0
Medium	5.0 to 9.9
Low	3.0 to 4.9
Negligible	less than 3.0

Source: Adopted from DMRB LA 111 Noise and vibration Table 3.54b (DMRB, 2020)

9.42. For evaluation of fixed plant, the criteria given by BS 4142 for assessing significance are based on the difference between background noise and the rating level. The differences correspond with a likelihood of complaint i.e. where:

- the rating level is around 10 dB or more below background: complaints are unlikely;

- the rating level is around 5 dB above background level: the noise has marginal significance; and
- the rating level is around 10 dB or more above background: complaints are likely.

9.43. These criteria have been adapted, as presented in **Table 9.6**, in order to describe the significance of effects in a way that is consistent with the approach of the EIA. The effect of impact is on residential receptors only, which are high sensitivity.

Table 9.6. Criteria for determining the significance of effect and magnitude of the impact of noise impacts of fixed plant

	Difference between rating noise level L_{Aeq} dB and typical background noise level L_{A90} dB	Magnitude of impact	Significance of effect
Environmental value	<-10 dB	None	Neutral
	≥ -10 and <0	Negligible	Negligible
	≥ 0 and <5 dB	Low	Moderate/Minor
	≥ 5 and <10	Medium	Major/Moderate
	≥ 10 dB	High	Major

Source: Adopted from BS4142 Method for Rating Industrial Sound Affecting Mixed Residential and Industrial Areas (BSI 2014+A1 2019).

Mitigation and significant residual effects

9.44. If significant construction noise and vibration effects are predicted, measures will be identified that are expected to minimise impacts to avoid significant effects. Amongst others, this may include the erection of temporary noise barriers around working areas or alternative methods of working. The contractor may additionally be required to seek prior consent under Section 61 of the Control of Pollution Act 1974 for its works in advance of commencing works, which will require 'best practicable means' to be adopted at all times.

9.45. Operational mitigation could include such measures as:

- Appropriate routing of traffic;
- The specification of limits on noise emissions in the selection of fixed plant; and
- Screening of noisy equipment.

Scope of assessment

9.46. It is proposed that the following aspects are scoped into the noise and vibration assessment:

- Permanent noise impacts generated by spectators and the stadium PAVA to be assessed qualitatively;
- Permanent noise impacts due to fixed plant to be installed (such as air handling plant) and to be assessed quantitatively;
- Temporary noise and vibration impacts due to construction activities to be assessed qualitatively unless sufficiently detailed information is available during the preparation of the EIA, in which case a quantitative assessment will be undertaken where possible; and
- Changes in road traffic noise due to temporary additional traffic movements associated with construction, temporary diversions of road traffic during some stages of construction and permanent changes in road traffic due to the attendance of patrons and staff to proposed development. These are to be assessed quantitatively. Permanent noise impacts due to the use of car and coach parking will be assessed qualitatively.

9.47. It is proposed that the following aspects are scoped out of the noise and vibration assessment:

- Quantitative assessment of noise generated by the crowd and stadium PA;
- Operational vibration impacts – on basis of no proximity to external receptors and appropriate design for the hotel if contained within stadium building;
- Permanent noise impacts from non-football events held within the stadium bowl (for example music concerts) as this does not form part of the proposals and would be subject to separate planning/licensing applications;
- Traffic changes not exceeding +/-10%; and
- Noise impacts on sensitive parts of the Proposed Development e.g. the impact of spectator noise during football matches on the proposed hotel – as any effects will be mitigated by the design within the proposed scheme under the “agent of change” principal.

Assumptions and limitations

9.48. Consultation with the local planning authority and the Environmental Health Officer (EHO) has not taken place as of the writing of this scoping report. During the preparation of the noise and vibration assessment the EHO will be consulted to obtain the most up to date monitoring data.

Conclusions

9.49. The Proposed Development has the potential to result in temporary and permanent noise and vibration impacts due to a variety of sources during the construction and operational phases. There are various residential and non-residential sensitive receptors in the area surrounding the Proposed Development. Therefore, there is potential for adverse effects to arise and a requirement for these to be assessed to identify potential significant effects so that the scope to mitigate them can be considered. On this basis, it is recommended that the assessment of noise and vibration is scoped into the EIA and that the aspects identified above as ‘scoped in’ are assessed as described here.

The prediction of potential noise and vibration impacts may also inform the assessments of other disciplines such as biodiversity. The approach to the assessment shall be agreed in consultation with the Environmental Health teams of CDC and Oxfordshire County Council.

10. AIR QUALITY

Introduction

- 10.1. This section of the ES has been prepared by Mott Macdonald and assesses the potential effects of the Proposed Development upon air quality in the vicinity of the Site.
- 10.2. The Proposed Development will require site preparation and construction works, and will generate additional traffic on the local road network. In operation the Proposed Development will generate additional traffic in particular during match days and during other large events that may occur at the stadium as well as traffic associated with the hotel and wellbeing facilities amongst others. Therefore, there is the potential for significant air quality effects to occur, and the ES will include an assessment of air quality effects. The assessment will consider:
- the impacts of dust soiling and effects on concentrations of particulate matter (PM₁₀⁴) during the construction period
 - the impacts of emissions from road traffic generated by the development on concentrations of nitrogen dioxide (NO₂), PM₁₀ and PM_{2.5}⁵ at sensitive receptors along the local road network during both construction and operation, and
 - whether any additional mitigation measures will be required to address any significant air quality effects.
- 10.3. The assessment of air quality impacts will be carried out in accordance with best practice guidance issued by the Institute of Air Quality Management (IAQM) and DEFRA. The assessment will support other disciplines such as biodiversity, climate change and human health by providing information to inform their assessments.

Study area

- 10.4. The study area for the assessment of construction phase impacts, will consider receptors within 350m of the Site boundary, and 50m from roads used to access the Site for a distance of 500m either side of the Site entrance. This is in accordance with best practice guidance for the assessment of impacts from construction dust issued by the IAQM⁶.
- 10.5. The study area for the assessment of road traffic impacts will be defined following receipt of the traffic data generated from the Proposed Development's Transport Assessment. The air quality assessment will include all roads where there is relevant human or ecological exposure and where the predicted changes in Light Duty Vehicles (LDVs) and Heavy Duty Vehicles (HDVs) exceed the

4 Particulate matter with an aerodynamic diameter less than 10 microns

5 Particulate matter with an aerodynamic diameter less than 2.5 microns

6 IAQM Guidance on the assessment of dust from demolition and construction (2014)

screening criteria set out in best practice guidance published by Environment Protection UK (EPUK) and IAQM in the document Land-use Planning and Development Control: Planning for Air Quality v1.2⁷. The screening criteria is defined as:

- a change of Light Duty Vehicles (LDV) flows of more than 100 Annual Average Daily Traffic (AADT) in an air quality management area (AQMA) or 500 AADT outside an AQMA and/or
- a change of Heavy-Duty Vehicles (HDV)⁸ flows of more than 25 AADT within an AQMA or 100 AADT outside an AQMA.

10.6. These roads are hereafter referred to as 'affected' roads. Where the above criteria are met, sensitive human and ecological receptors, at worst-case⁹ locations up to 200m from the kerb of an affected road have been considered.

Baseline Conditions

10.7. The Proposed Development is located in CDC adjacent to Oxford City Council (OCC). Whilst the Site is not located within an AQMA, CDC has declared an AQMA as a result of exceedances of the annual mean NO₂ objective approximately 1.4km north of the Site. The AQMA incorporates a section of Bicester Road to the east of Kidlington and contains three properties.

10.8. OCC has declared an AQMA across its entire administrative area. The AQMA has been declared as a result of exceedances of the annual mean NO₂ objective as is approximately 900m from the Proposed Development at its closest point to the south.

10.9. CDC and OCC undertaken air quality monitoring within their respective districts. CDC undertake monitoring of NO₂ at 42 sites using diffusion tubes. OCC undertake monitoring at 3 automatic sites (all three undertake NO₂ monitoring whilst only two monitor PM₁₀ and PM_{2.5}) and 126 diffusion locations to monitor NO₂ concentrations.

10.10. Both CDC and OCC undertake monitoring in the vicinity of the Proposed Development. Monitoring at these locations, such as the junctions at the Cutteslowe Roundabout and Wolvercote roundabout are below the air quality objective of 40µg/m³. In addition, monitoring is also undertaken in the nearby Bicester Road AQMA located within CDC. Recent monitoring at this location also shows annual mean NO₂ concentrations to be below the air quality objective and CDC is considering an application to revoke the AQMA.

⁷ IAQM and Environmental Protection UK Land-Use Planning & Development Control: Planning for Air Quality (2017)

⁸ A HDV is any vehicle with a gross weight greater than 3.5 tonnes. This typically includes heavy goods vehicles (HGVs), buses and coaches

⁹ Worst case refers to locations that are closest to the road, roads with the largest flows, where the Scheme causes the greatest change in traffic and where ambient air quality is known to be poor.

10.11. Monitoring of PM₁₀ and PM_{2.5} within OCC demonstrates that existing concentrations meet the relevant air quality objectives for both of these pollutants.

Key Issues and Requirement for Assessment

10.12. The potential significant construction and operation effects that can arise from changes to air quality as a result of the Proposed Development are summarised below.

Construction

10.13. Potential effects during the construction phase could include:

- On-site dust emissions arising from construction activities and vehicle movements
- Emissions associated with on-site plant and vehicles used in the construction of the proposed scheme, and
- Emissions associated with construction traffic on the local road network

10.14. Air quality effects associated with construction dust emissions could result in loss of amenity and/or nuisance caused by, for example, soiling of buildings and washing, and reduced visibility.

Operation

10.15. Potential effects during the operational phase will include changes in emissions associated with changes in traffic flows as a result of match days and other large events as well as traffic generated through other associated infrastructure such as the hotel and wellbeing facilities.

10.16. As such, assessment of operational phase local air quality impacts is required. The key pollutants for consideration are:

- Nitrogen oxides (NO_x), including NO₂;
- Particulate matter (PM₁₀) defined as those less than 10 microns in diameter; and
- Particulate matter (PM_{2.5}) defined as those less than 2.5 microns in diameter.

10.17. No assessment is considered necessary for emissions of any pollutants other than those identified above, as no significant emission sources of these pollutants are introduced or affected by the proposed scheme or because concentrations are expected to be well below air quality objectives within the study area.

10.18. No assessment of onsite energy plant has been assumed as it would be expected that all energy requirements would be met by other means and any onsite boilers would meet strict emission requirements and have suitable located stacks to avoid air quality impacts.

Approach to Assessment

Legislation and Policy

10.19. The following legislation, policy and guidance document will inform the air quality assessment of the Proposed Development:

- The Air Quality Standards Regulations, 2010
- The Air Quality Standards (Amendment) Regulation, 2016
- The Air Quality (amendment of Domestic Regulations) (EU Exit) Regulations, 2019
- Part IV of the Environment Act, 1995, as amended 2021
- Air Quality (England) Regulations, 2000 (as amended)
- The Clean Air Strategy, 2019.
- National Planning Policy Framework 2021
- National Planning Practice Guidance, 2019
- Air quality strategy: framework for local authority delivery (2023)
- IAQM and Environmental Protection UK Land-Use Planning & Development Control: Planning for Air Quality
- IAQM Guidance on the assessment of dust from demolition and construction (2014)
- Defra's Local Air Quality Management Technical Guidance (LAQM TG22)
- CDC Local Plan 2011-2031
- OCC Local Plan 2016-2036

Scope of assessment

Baseline assessment

10.20. The baseline conditions for the study area will be described using existing monitoring data available from CDC, OCC and DEFRA.

Sensitive receptors

10.21. Individual receptor identification will be coordinated with additional disciplines such as biodiversity, and population and human health. Sensitive receptors in relation to air quality are likely to include, but are not limited to, the following:

- Human residential based receptors, and
- Biodiversity receptors, for example designated sites

Impact assessment method

Construction

- 10.22. Construction activities can result in temporary effects from dust. 'Dust' is a generic term which usually refers to particulate matter in the size range 1-75 microns in diameter; the most common impacts from dust emissions are soiling and increased ambient PM₁₀ concentrations. Dust can be mechanically transported either by wind or re-suspension by vehicles. It can also arise from wind erosion of material stockpiles and earth moving activities.
- 10.23. The assessment methodology will follow that set out in the IAQM Guidance on the Assessment of Dust from Demolition and Construction. It will identify the potential for dust to be generated and the sensitivity of the surrounding area and will combine these to determine the risk of dust impacts without any mitigation. This information will then be used to determine the appropriate level of mitigation required to ensure that there are no significant effects.
- 10.24. If the construction works are anticipated to generate sufficient traffic on the local roads that exceed EPUK/IAQM screening criteria, then road traffic emissions dispersion modelling will be undertaken to determine the impacts of the construction traffic in the first full year of the construction works. The same approach as described in operation below would be used.

Operation

- 10.25. The incremental change to traffic flows will be screened against the criteria set out in EPUK/IAQM guidance to determine the need for an assessment. Where necessary, roadside pollutant concentrations, and the impacts of the development-generated traffic will be predicted using the ADMS-Roads dispersion model. Modelling will be undertaken in accordance with DEFRA LAQM TG22 guidance and where possible the model will be verified against existing local monitoring data.
- 10.26. Impacts will be predicted at a number of locations close to the Proposed Development. Receptors will be selected to represent the potential worst-case exposure. This will be at the roadside façade of properties along the local road network where the development-generated traffic increases will be greatest, and at locations where concentrations are expected to be highest, such as near to junctions.
- 10.27. There are existing designated sites located along the A34 approximately 2km to the south of the Proposed Development. When traffic data is available changes will be screened and if required air quality effects on these designated sites will be assessed in accordance with best practice.

- 10.28. The model will be used to predict baseline pollutant concentrations and the likely concentrations in the first year of operation, without and with the development and will take account of the latest set of emission factors developed and published by DEFRA along with other tools made available for air quality assessments. The assessment will consider changes in the opening year of the Proposed Development as this will represent the worst case in terms of air quality as emissions from vehicles are predicted to improve in future years.
- 10.29. A number of approaches can be used to determine whether the potential air quality effects of a development are significant. However, there remains no universally recognised definition of what constitutes 'significance' for air quality effects. The approach adopted for the air quality assessment will apply best practice guidance and is a departure to the approach of the whole assessment.
- 10.30. Guidance is available from a range of regulatory authorities and advisory bodies on how best to determine and present the significance of effects within an air quality assessment. It is generally considered good practice that, where possible, an assessment should communicate effects both numerically and descriptively.
- 10.31. Any description of an effect of a development is informed by numerical results, however, an element of professional judgement will also be involved. To ensure that the descriptions of effects used within the assessment are clear, consistent and in accordance with the latest guidance, definitions for the assessment of air quality concentration changes at individual human health receptors have been adapted from the EPUK/IAQM guidance. Effect descriptors for changes in pollutant concentrations as a result of the Proposed Development are provided in **Table 10.1**.
- 10.32. The sensitivity of the receptors is determined via the existing pollutant concentrations whilst the magnitude is determined via the change in pollutant concentrations as a result of the Proposed Development. The concentration change identified will be considered in relation to the Air Quality Assessment Level (AQAL), which may be an air quality objective, EU limit or target value. The most important aspects to consider are the percentage of long-term average concentrations at the individual receptor in the assessment year in relation to the AQAL (which defines the receptors sensitivity to air quality) and the percentage of change in concentration in relation to the AQAL (which defines the magnitude of change).
- 10.33. EPUK/IAQM recognises that professional judgement is required in the interpretation of air quality assessment significance as a major adverse impact at one receptor does not necessarily mean the effects are described as significant. The descriptions in **Table 10.1** are intended as a tool to help interpret the results to the air quality assessment and will therefore be employed in conjunction with professional judgement. For the purposes of this assessment, impacts of Moderate Adverse or Moderate Beneficial and above would be further considered using professional judgement to

determine if the Scheme has caused a significant effect. The application of professional judgement would consider:

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

Table 10.1: Impact descriptors for individual receptors

Sensitivity (Long term average concentration at receptor in assessment year)	% Magnitude of change in concentration relative to Air Quality Assessment Level (AQAL)			
	1	2-5	6-10	>10
75% or less of AQAL	Negligible	Negligible	Minor	Moderate
76%-94% of AQAL	Negligible	Minor	Moderate	Moderate
95%-102% of AQAL	Minor	Moderate	Moderate	Major
103%-109% of AQAL	Moderate	Moderate	Major	Major
110% or more of AQAL	Moderate	Major	Major	Major

Notes:^(a) AQAL = Air Quality Assessment Level i.e. $40\mu\text{g}/\text{m}^3$ for annual mean NO_2 . The table is only designed to be used with annual mean concentrations

^(b) Percentage pollutant concentrations are intended to be rounded to whole numbers. For example, the '<1%' category in this table includes all changes from 0.5% to 1.4% (equivalent to an annual mean NO_2 absolute concentration change of between $0.2\mu\text{g}/\text{m}^3$ and $0.6\mu\text{g}/\text{m}^3$). Changes of 0% (i.e. less than 0.5%) are described as negligible.

^(c) When defining the concentration as a percentage of the AQAL, use the 'do minimum' concentrations where there is a decrease in pollutant concentration and the 'do something' concentration for an increase.

Assumptions and limitations

10.34. Consultation with the local planning authority and the Environmental Health Officer (EHO) has not taken place as of the writing of this scoping report. During the preparation of the air quality assessment the EHO will be consulted to obtain the most up to date monitoring data.

10.35. This scoping exercise has assumed that it is likely that the EPUK/IAQM indicative assessment criteria presented above would be exceeded based on the current information, and an assessment of local air quality during the operation phase would be required. However, the scoping in of this topic may be revised when more detailed construction traffic information is available.

Conclusions

10.36. The Proposed Development has the potential to affect air quality during both the construction and operation. Whilst a review of existing air quality demonstrates concentrations are below the air quality objectives in the area surrounding the development site, potential changes in road traffic emissions will be assessed using dispersion modelling should the exceed the thresholds requiring assessment.

References

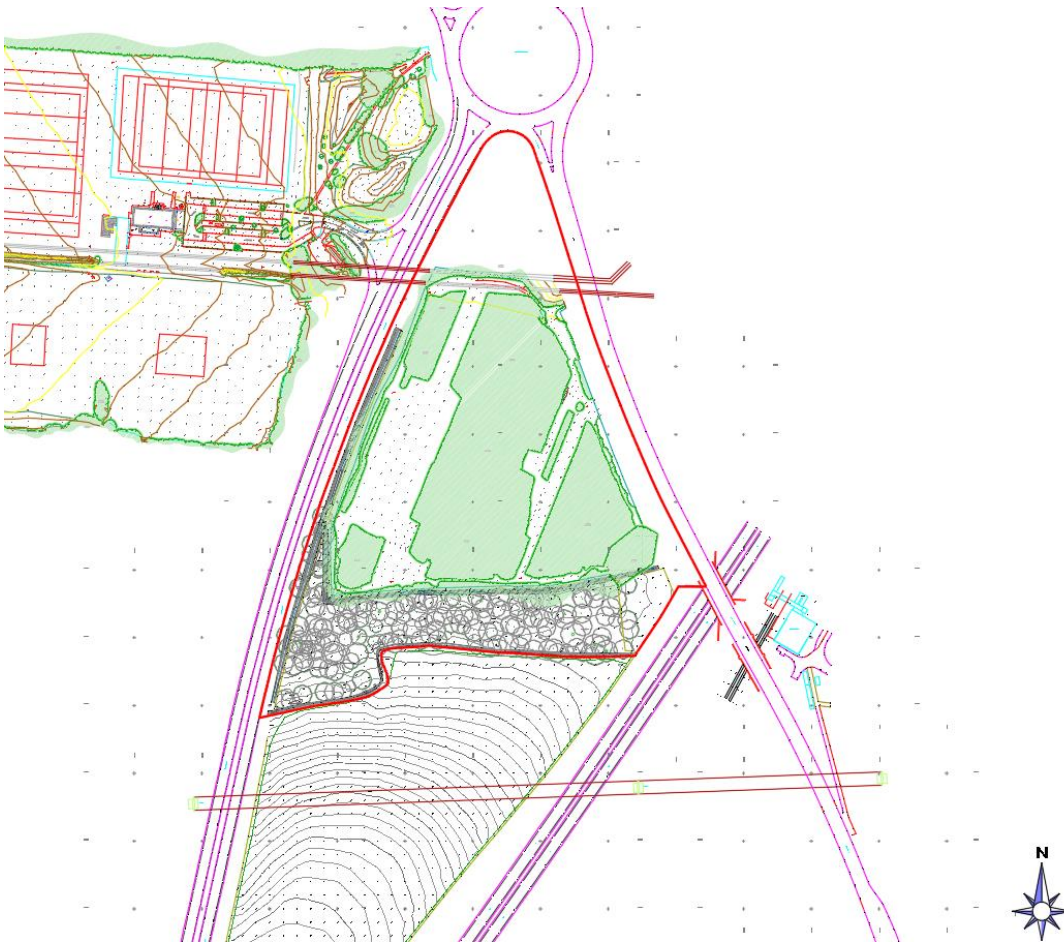
- IAQM Guidance on the assessment of dust from demolition and construction (2014)
- IAQM and Environmental Protection UK Land-Use Planning & Development Control: Planning for Air Quality (2017)
- Defra Local Air Quality Management Technical Guidance (LAQM TG22)

11. LIGHTING

Introduction

- 11.1. This Chapter has been prepared by Mott Macdonald and assesses the potential lighting effects of the Proposed Development.
- 11.2. The Proposed Development will include changes to current lighting levels and additional lighting provisions during both the construction and operation phases; these additional lighting elements have the potential to increase obtrusive light levels. Therefore, an Environmental Lighting Impact Assessment (ELIA) will be required for the Proposed Development. The ELIA will be provided as a technical appendix to the ES and will present information to enable statutory consultees, members of the public and stakeholders to understand, identify and assess the likely significant effects of obtrusive light from the Proposed Development on human receptors.
- 11.3. The Site (described in **Chapter 2** of this report) is located north of Summertown and south of Kidlington between the A4260 and Oxford Road on land known as Triangle (**Figure 11.1**).

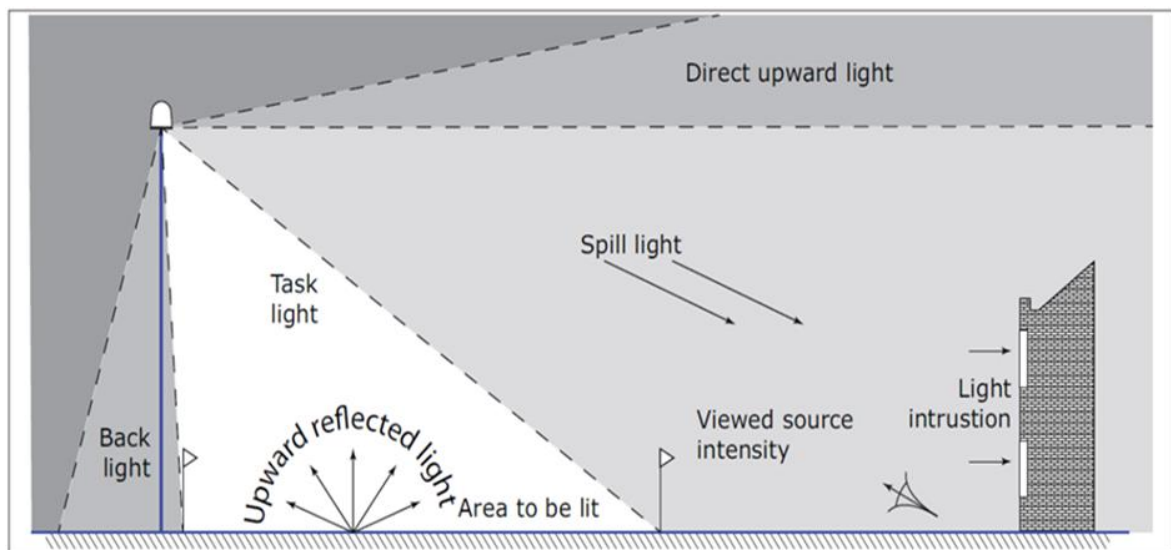
Figure 11.1: Site Boundary



Source: Ridge and Partners LLP (2023)

- 11.4. The ELIA will be carried out in accordance with Institution of Lighting Professionals (ILP) PLG04 Professional Lighting Guide 04, Guidance on Undertaking Environmental Lighting Impact Assessments (2013). The ELIA will support other disciplines such as biodiversity, landscape visual, heritage and population and human health by providing information to inform their assessments.
- 11.5. The ELIA will consider each identified receptor and the potential impacts from the lighting associated with the Proposed Development and will evaluate whether the limitations visualised in **Figure 11.2** will be exceeded in terms of the following:
- Sky Glow – The illumination of the sky at night by artificial light sources including light emitted directly upward from the light source and reflected from the ground or surface,
 - Light Intrusion – Light that falls beyond the boundary of the area being lit,
 - Luminaire Intensity – The measure of the amount of light that a source radiates in a given direction,
 - Building luminance – The illumination of buildings as a night-time feature, and;
 - Discomfort/Disability Glare – The measure of the amount of glare for highway users.

Figure 11.2: Types of Obtrusive Light



Source: ILP GN01:2021

Baseline Conditions

Policy, Legislation and Guidance

- 11.6. The following legislation, policy and guidance document will inform the ELIA and the lighting design for the Proposed Development:
- The Clean Neighbourhoods and Environmental Act (CNEA) 2005 (amendment to Section 79 of the Environment Protection Act 1990), Section 103;

- The National Planning Policy Framework, July 2021, Section 15;
- The Department for Communities and Local Government Planning Practice Guidance, 2019;
- UK Government, "Guidance on Artificial light nuisances: how councils deal with complaints"¹⁰, 2015;
- Cherwell District Council North Oxfordshire – The Cherwell Local Plan 2011 – 2031 Part 1 (adopted 20 July 2015);
- BS 5489-1:2020, Code of practice for the design of road lighting Part 1: Lighting of roads and public amenity areas (2020);
- BS EN 13201-2:2015, Road lighting – Part 2: Performance requirements (2015);
- BS EN 12464-1:2011, Light and Lighting – Lighting of work places Part 1: Indoor work places (2021);
- BS EN 12464-2:2014, Light and Lighting – Lighting of work places Part 2: Outdoor work places (2014);
- BS EN 12193:2018, Lighting and Lighting – Sports Lighting (2018);
- BS 8300-1:2018, Design of an accessible and inclusive built environment – Part 1: External environment – Code of practice (2018);
- CIE 150:2017 International Commission on Illumination, Guide on the Limitation of the Effects of Obtrusive Light from Outdoor Lighting Installations, 2nd Edition (2017);
- ILP – Guidance Notes for the Reduction of Obtrusive Light, GN01 (2021);
- ILP PLG04 Professional Lighting Guide 04, Guidance on Undertaking Environmental Lighting Impact Assessments (2013);
- ILP PLG05 Professional Lighting Guide 05, the Brightness of Illuminated Advertisements (2014);
- ILP and Bat Conservation Trust Guidance Note 08/18 Bats and Artificial Lighting in the UK, Bats and the Built Environment series (2018);
- Bats and Lighting – Overview of Current Evidence and Mitigation. Stone, Emma (2014);
- Chartered Institution of Building Service Engineers (CIBSE), LG06 Lighting Guide 6: The exterior environment (2016);
- CIBSE, LG04 Lighting Guide 4: Sports Lighting (2006),
- The Society of Light and Lighting (SLL) Code for Lighting (2022),
- Premier League Stadium Fund – LED Floodlighting Specification (2023);
- Sport England Design Guidance Note: Artificial Sport Lighting (2012), and;
- The Football Association – The FA Guide to Floodlighting (2013).

11.7. Prior to carrying out design work these documents should be verified as current and, if superseded, the standards and lighting levels discussed in this report must be reassessed.

¹⁰ Guidance on Artificial light nuisances: how councils deal with complaints, Defra, 2015. Available online at: <https://www.gov.uk/guidance/artificial-light-nuisances-how-councils-deal-with-complaints>

Baseline Conditions

11.8. At this stage in the ELIA process lighting baseline surveys have not been undertaken.

11.9. An initial desktop assessment has been carried out and the following has been noted:

Table 11.1 Designated Areas Identified using the Cherwell Planning Conservation Map

Designation of Area	Distance from Site (approximate)	Direction from Site
Green Belt	0m	The Site is located within Green Belt land
Conservation Areas	1,7km	North of the Site boundary
Site of Special Scientific Interest (SSIS)	1,9km	Southwest of the Site Boundary
Special Areas of Conservation (SAC)	1,9km	Southwest of the Site boundary
Cotswolds Area of Outstanding Natural Beauty (AONB)	6,6km	Northwest of the Site boundary

Source: Cherwell District Council North Oxford – Cherwell Planning Conservation – Adopted Polices Map

Notes to Table 11.1:

1. The list shown in Table 1.1 includes areas of that designation that are closest to the Site. This list is not exhaustive, and other areas may also be identified in the ELIA.

11.10. The Site is in proximity to the following existing lit areas:

- Oxford Parkway Station and the associated infrastructure (approximately 86m southeast of the Site boundary),
- The suburban area of Gosford and Killington (adjacent to the north boundary of the Site), and;
- The suburban area of Cutteslowe and Sunnymead (approximately 900m south of the Site boundary).

11.11. Additionally, of the three adopted highways surrounding the Site only one is lit along its length, that being Oxford Road to the east. The A34 (to the south) contains existing lighting on the approaches/exit slip roads for the Peartree Roundabout, and the A4260 - Frieze Way (to the west) contains existing lighting on the approach exits from the Kidlington Roundabout and Loop Farm Roundabout. Both the A34 and the A4260 roads are not lit along their lengths.

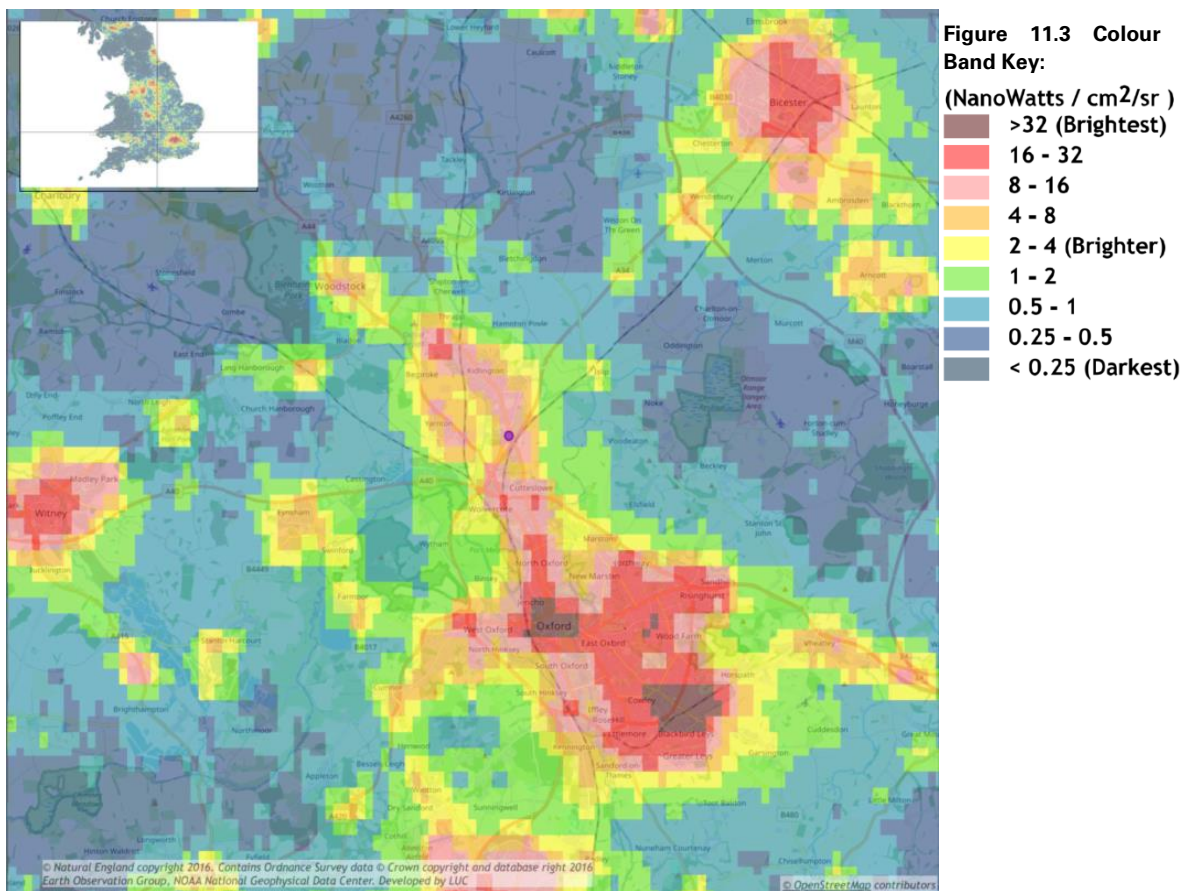
11.12. An assessment of the existing sky conditions surrounding the Site has also been carried out.

11.13. The Campaign to Protect Rural England (CPRE) and the Land Use Consultants (LUC) have created an interactive map of Britain's light pollution and dark skies, this map is overlaid with 'Open Street

Map', which allows information such as road types and labels to be seen to add context to the mapping data.

- 11.14. The lighting data supplied within this Night Blight interactive map has been split into nine categories as can be seen within **Figure 11.3**. Each category has a defined colour from dark blues (darker areas) to dark reds (brighter areas). The mapping data is supplied based upon 400m x 400m pixels that shows the amount of light shining up into the night sky from each area. This measure is provided in Skyward Radiance in nanowatts/cm²/steradian (nw/cm²/sr). Which, in simple terms, this a calculation of how the satellite instruments measures the light on the ground, taking account of the distance between the light sources and measurement instrument.

Figure 11.3: CPRE and LUC Light Pollution Map for the Area Surrounding the Site



Source: CPRE and LUC 2016 – England's Light Pollution and Dark Skies

Notes to Figure 11.3

The Site location is highlighted by the purple dot in the centre of the light pollution map.

- 11.15. **Figure 11.3** shows that the Site is located within a medium / high brightness area. This indicates that the area surrounding the Site experiences significant levels of sky glow and contains a large presence of existing lighting. Due to the resolution of the light pollution map (400 x 400m per pixel) this does not mean the Site itself or the immediate surrounding area is brightly lit, or that there are many existing luminaires within the Site. This, however, does indicate that the wider area the Site

is located within (yellow – red) contains a larger presence of existing lighting than the areas to the east, west and north (blue / green).

- 11.16. Day and night baseline assessments will be carried out during the ELIA as outlined in below to confirm and record the existing baseline conditions.

Sensitive Receptors

- 11.17. Individual receptor identification will be coordinated with additional disciplines such as biodiversity, landscape visual, heritage, and population and human health, and will also include consultation with external stakeholders, such as the local planning authority. Sensitive receptors in relation to lighting are likely to include, but are not limited to, the following:
- Human residential based receptors,
 - Human safety receptors (for example highway and rail users); and
 - Biodiversity receptors, for example bats and other nocturnal species.

Key Issues and Requirement for Assessment

- 11.18. The potential significant construction and operation effects that can arise from obtrusive light associated with the Proposed Development are summarised below:
- Sky Glow – The illumination of the sky at night by artificial light sources including light emitted directly upward from the light source and reflected from the ground or surface,
 - Light Intrusion – Light that falls beyond the boundary of the area being lit,
 - Luminaire Intensity – The measure of the amount of light that a source radiates in a given direction,
 - Building luminance – The illumination of buildings as a night-time feature, and;
 - Discomfort/Disability Glare – The measure of the amount of glare for highway users.

Construction

- 11.19. During construction works, the following temporary effects may be experienced:
- Excessive obtrusive light experienced from the perspective of human receptors associated with local residential properties and highway use,
 - Excessive obtrusive light experienced from the perspective of sky quality, and;
 - Excessive obtrusive light experienced from the perspective of biodiversity related receptors.

Operation

- 11.20. During the operational phase, the following effects may be experienced:

- Excessive obtrusive light experienced from the perspective of human receptors associated with local residential properties and highway use,
- Excessive obtrusive light experienced from the perspective of sky quality, and;
- Excessive obtrusive light experienced from the perspective of biodiversity related receptors

Approach to Assessment

11.21. The ELIA approach will follow guidance published by the ILP on the undertaking of ELIAs (PLG04:2013).

Scope of assessment

11.22. It is recommended that lighting should be scoped into the ES due to the risk of significant adverse effects from obtrusive light on the receptors. The ELIA will be provided as a technical appendix to the ES.

11.23. The Proposed Development will incorporate various elements of electric lighting. The ELIA will evaluate the impacts of the proposed lighting installation and will:

- Identify and describe the artificial light currently affecting the Site and surrounding identified lighting receptors,
- Provide a description of the proposed lighting standards and associated lighting design information that will be utilised to inform the assessment of obtrusive light (sometimes referred to as light pollution),
- Provide the limitations of obtrusive light for the environmental zone in accordance with the guidance provided in ILP GN01 Guidance Note - The Reduction of Obtrusive Light (2021),
- Identify design interventions and provide guidance on mitigation measures, with a view to reducing potential impacts to a negligible magnitude,
- Identify predicted impacts of obtrusive light using a combination of qualitative and quantitative assessment techniques (dependant on the level of design development),
- The guidance provided in the ILP PLG04:2013 will be used to undertake the lighting assessment in conjunction with ILP GN01:2021, and;
- Liaison with stakeholders to inform the design measure adopted to mitigate the adverse effect of light pollution on railway assets.

11.24. The assessment of the overall effects on bats and other species, landscape and cultural heritage do not form part of the ELIA. These will be assessed by other relevant specialists as required, with the assessment detailed within the relevant Chapter or technical appendix.

11.25. There are no matters which are specifically scoped out of the lighting assessment.

Baseline assessment

- 11.26. At this stage in the ELIA process, lighting baseline surveys have not been undertaken. The location of each representative lighting receptor will be agreed with local planning authority. Receptor sites will be chosen to allow the identification of baseline conditions, and an assessment of potential impacts on people and the environment in which they live.
- 11.27. An assessment of each receptor location will be undertaken during the day and at night. These will be evaluated in terms of their direct and intermittent views towards the Proposed Development, and whether existing screening is likely to prevent spill light, views of luminaire intensity or sky glow.
- 11.28. Day and night-time photographs will be taken from each location at a height of 1.5-1.7m (representative of adult eye height).
- 11.29. At each receptor location, four vertical readings of illuminance will be taken with the sensor of the light meter pointed north, south, east, and west at a height of 1.5-1.7m. One horizontal reading will be taken at ground level. This provides information on the levels of ambient light at each receptor location to inform the baseline assessment.
- 11.30. All baseline survey working will be undertaken by at least two suitably qualified and/or experienced lighting professionals.
- 11.31. Daytime working will be undertaken during suitable day light hours for the work being undertaken. Night-time work will take place after the onset of astronomical twilight¹¹. This is to ensure that no daylight or sunlight affects the illuminance results, or the photography recorded during the night-time phase of the survey.
- 11.32. The assessment will consider the baseline lighting conditions at each identified receptor and review these against the potential lighting impacts from the Proposed Development as a whole.

Impact assessment method

- 11.33. In preparation for the assessment at ES stage and to define the maximum permissible levels of obtrusive light, an appraisal has been carried out to classify the Site in terms of its environmental zones, which equates to the district brightness of the surroundings. The objective assessment of the environmental zones is based on the nature of the area in general and not the presence of various types and levels of lighting within it. Definitions of environmental zones are detailed in **Table 11.2**

¹¹ <https://www.timeanddate.com/astronomy/astronomical-twilight.html> - <https://www.timeanddate.com/sun/uk/oxford>

Table 11.2: Environment Zones

Zone	Surrounding	Lighting Environment	Examples
E0	Protected	Dark (*SQM 20.5+)	Astronomical Observed dark skies, UNESCO starlight reserves, IDA dark sky places
E1	Natural	Dark (*SQM 20 to 20.5)	Relatively uninhabited rural areas, National Parks, Areas of Outstanding Natural Beauty, IDA buffer zones etc
E2	Rural	Low district brightness (*SQM ~15 to 20)	Sparsely inhabited rural areas, village, or relatively dark outer suburban locations
E3	Suburban	Medium district brightness	Well inhabited rural and urban settlements, small town centres or suburban locations
E4	Urban	High district brightness	Town/city centres with high levels of night-time activity

Source: ILP GN01:2021

Notes to Table 11.2:

*SQM (Sky Quality Measurements) reference by the International Dark-Sky Association (IDA) and used by astronomers to assess the quality of a sky for views of stars and other solar objects.

11.34. In the case of a Site being between two possible environmental zones, ILP guidance recommends that the most stringent of the environmental zones options is assigned for assessment purposes.

11.35. In this case it could be argued that the environmental zone is either E2 or an E3 zone (as outlined in **Table 11.2**), therefore in line with ILP guidance, the E2 zone should be assigned for assessment purposes.

11.36. This environmental zone assessment is based on several factors:

- The Site is located within a medium / high brightness area that is surrounded by low brightness areas (**Figure 11.2**),
- The Site is located within Green Belt Land.
- During the consultation process the local planning authority will be consultant on the environmental zone applicable to the Site, and once agreed this will be carried forward into the ELIA.

11.37. A lighting installation located in an area deemed to be more sensitive will understandably equate to greater constraints with regards to obtrusive light as detailed within ILP GN01:2021 and ILP PLG05:2014. Therefore, it is essential that the environmental zone is agreed and set in the early stages of design development to ensure the most appropriate limits of obtrusive light inform the design development. It should be noted that the limits of obtrusive light provided within ILP GN01:2021 are the summation of all lighting installations. Therefore, this includes the current baseline conditions and the future obtrusive light contributions associated with the Proposed Development.

- 11.38. The study area and temporal scope will be developed and agreed with the local planning authority and stakeholders during the consultation process.
- 11.39. The impacts of artificial lighting for the Proposed Development will have varying levels of significance and will be assessed based on the changes in obtrusive light experienced by each identified receptor. The level of effect is presented on a scale of minor, moderate, major, or none/negligible. The resulting overall effect can be described as positive, neutral, or negative.
- 11.40. The effects of lighting evaluated from the criteria detailed within GN01:2021 and PLG05:2014 is assessed using the effects table provided within ILP PLG04:2013, as shown in **Table 11.6**. This guidance provides no methodology for assessing the environmental value (or sensitivity) of receptors in terms of lighting, or the magnitude of change experienced by such receptors. Therefore, a standard EIA method has been adapted for lighting (**Table 11.3** and **Table 11.4**) and professional judgement will be used to assess receptor sensitivity and magnitude of change.
- 11.41. The local planning authority will be consulted on the descriptors detailed within **Table 11.3** and **Table 11.4**. Once the approach is confirmed this will form the approach to assessing receptor sensitivity and the magnitude of change within the ELIA.
- 11.42. Additionally, the ILP will be consulted methodology for assessing the environmental value (sensitivity) of receptors and magnitude of change, as well as on the suitability of the descriptors within **Table 11.3** and **Table 11.4** and any comments they have may be considered within the ELIA.
- 11.43. The sensitivity of a receptor is based on the environmental zone the receptor is located within, the baseline lighting conditions experienced by the receptor, and the likelihood of the receptor experiencing changes from the Proposed Development (**Table 11.3**)

Table 11.3: Value/Sensitivity of Receptor

Sensitivity	Criteria for Assessing Sensitivity
High	The receptor has little ability to absorb change without fundamentally altering its present character, is of high environmental value, or is of international or national importance (e.g. SPA, AONB). For example: Receptors which are sensitive to a change in lighting such that the quality of life would be affected, or receptors where a change in the lighting has the potential to either dramatically improve or reduce safety. This could be a receptor located within a E0/1 environmental zone, and/or with a baseline that is assessed as being close to the limits of obtrusive light for the identified environmental zone, and that is in close proximity to the proposed lighting and has unobstructed views.
Medium	The receptor has moderate capacity to absorb change without significantly altering its present character, has some environmental value, or is of regional importance. For example: receptors which are sensitive to a change in lighting however not such that the quality of life would be affected, or receptors where a change in the lighting has the potential to either improve or reduce safety. This could be a

	receptor located within a E2 environmental zone, and/or with a baseline that is assessed as being moderately close to the limits of obtrusive light for the identified environmental zone, and has semi obstructed views of the proposed lighting.
Low	The receptor is tolerant of change without detriment to its character, is of low environmental value or is of low or local importance. For example: receptors which would not noticeably be aware of a change in lighting. (i.e., in areas of medium to high luminance) or the lighting has limited potential to affect safety. This could be a receptor located within a E3 environmental zone, or with a baseline that is assessed as being noticeably below the limits of obtrusive light for the identified environmental zone, and has largely obstructed views of the proposed lighting.
Negligible	The receptor is resistant to change or is of little environmental value. For example: Receptor has little or no night-time activity. This could be a receptor located within a E3/4 environmental zone, or with a baseline that is assessed as being significantly below to the limits of obtrusive light for the identified environmental zone, and has obstructed views of the proposed lighting.

Source: Mott MacDonald Ltd 2023 and Ridge and Partners LLP 2023 – Proposed New Stadium - OUFC Scoping Request – Brief for Consultants

11.44. The effects of lighting are evaluated based on the limitations (for each environmental zone) provided within ILP – Guidance Notes for the Reduction of Obtrusive Light, GN01:2021 which will result in a magnitude of effect assessment as detailed within **Table 11.4**. The assessment of magnitude of effect will include mitigation that is embedded into the lighting design and is informed by the baseline conditions of the receptor.

Table 11.4: Magnitude of Effect

Magnitude of Effect	Criteria of assessing the Magnitude of Effect
High	Total loss or major alteration to key elements or features of the baseline (pre-development) conditions such that the post development character/composition will be fundamentally changed. For example: A clear breach of obtrusive lighting limits and/or lighting standards may occur. Levels of obtrusive light in the form of sky glow, spill light or glare towards a receptor which exceeds the limits set within the ILP guidance for a less stringent Environmental Zone may classify as a high magnitude of change in combination with the baseline.
Medium	Loss or alteration to one or more key elements or features of the baseline conditions such that post development character/composition of the baseline will be materially changed. For example: May be a breach of obtrusive lighting limits and/or lighting standards. In terms of the limits set in the ILP guidance this may equate to exceeding the limit of the environmental but in a way that is only just within the limits set for the next least stringent environmental zone in combination with the baseline.
Low	A minor shift away from the baseline conditions. Change arising will be detectable but not material. The underlying character/composition of the baseline condition will be similar to the baseline conditions. For example: Levels of obtrusive light are within the requirements of the environmental zone and will not result in an exceedance of the environmental zone in combination with the baseline, but is resulting in a change.
Negligible	Very little change from the baseline conditions. Change barely distinguishable, approximating to a 'no change' situation.

	For example: Levels of obtrusive light experience by a receptor are below the requirements for the next most stringent environmental zone, as to be barely distinguishable from the baseline conditions.
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Source: Mott MacDonald Ltd 2023 and Ridge and Partners LLP 2023 – Proposed New Stadium -OUFC Scoping Request – Brief for Consultants

11.45. The sensitivity of a receptor combined with the magnitude of the effect upon the receptor is then compared within the significance of effect matrix to define the overall effect (**Table 11.5**).

Table 11.5: Significance of Effect Matrix

Magnitude of Effect	Sensitivity of Receptor			
	High	Medium	Low	Negligible
High	Major	Major/Moderate	Moderate/Minor	Negligible
Medium	Major/Moderate	Moderate	Minor	Negligible
Low	Moderate/Minor	Minor	Minor/Negligible	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

Source: Ridge and Partners LLP 2023 – Proposed New Stadium -OUFC Scoping Request – Brief for Consultants

11.46. Where an effect is classified as falling into one of two levels of significance (Major/Moderate, Moderate/Minor or Minor/Negligible) professional judgement is used to define which of the levels of significance is most applicable.

11.47. Effects classified as Moderate or above are considered to be significant effects, and secondary mitigation may be required to reduce these effects. Effects classified as Minor are not considered significant, but it may be prudent to implement secondary mitigation. Negligible effects equate to no perceptible change and secondary mitigation will have no measurable or perceptible effect.

11.48. Once the significance of an effect is defined using the matrix in **Table 11.5** taking account of embedded and secondary mitigation the nature of the effect is then confirmed using **Table 11.6**.

Table 11.6: Effects Table

Nature	Ref	Level	Description	Remedial Needs
Positive	1	Major / substantial beneficial effects	Significant improvements in night environment and/or reductions in glare, spill light and sky glow etc.	No remedial/mitigation measures required.
	2	Moderate beneficial effects	Noticeable improvements in night environment and/or reductions in glare, spill light and sky glow etc.	
	3	Minor beneficial effects	Slight improvements in night environment and/or reductions in glare, spill light and sky glow etc.	

Neutral	4	None / negligible	No significant impact or overall impacts balancing out.	No remedial/mitigation measures required.
Negative	5	Minor adverse effects	Slight increase in visibility of site, glare, and sky glow etc.	Develop appropriate levels and types of mitigation
	6	Moderate adverse effects	Noticeable increase in visibility of site, glare, and sky glow etc.	
	7	Major adverse effects	Significant problems with increase in visibility of site, glare, and sky glow etc.	

Source: ILP PLG04:2013 Table 12

Assumptions and limitations

- 11.49. Consultation with the Local Planning Authority and the Environmental Health Officer on lighting has not taken place as of the writing of this report. Before the ELIA is finalised stakeholders will be approached regarding consultation on lighting.
- 11.50. It is anticipated that lighting designs may not be able to be developed for all elements of the Proposed Development to a level to enable a quantitative assessment for all aspects of the Proposed Development to be undertaken for the ELIA. This will depend on the level of design carried forward for each aspect of the Proposed Development. Where this is the case, a qualitative assessment will be carried out and professional judgement will be used to predict the likely levels of obtrusive light, whether the obtrusive light limitations provided within GN01:2021 exceeded. Principles of design development will then be suggested for those areas of development based on those results.
- 11.51. Where lighting designs are developed to a suitable level to enable a quantitative assessment to be undertaken, calculations will be undertaken to understand levels of obtrusive light at each receptor location and calculated in accordance with International Commission on Illumination, Guide on the Limitation of the Effects of Obtrusive Light from Outdoor Lighting Installations, 2nd Edition CIE 150:2017.
- 11.52. It is assumed that a competent lighting designer will be appointed to develop the design to inform the ELIA process.
- 11.53. At this stage limited lighting design information is available, and therefore the lighting requirements of the development have been assumed based on professional judgement and experience. It is assumed that further information will be available to inform the ELIA.
- 11.54. All lighting baseline information compiled thus far has been obtain from a desktop assessment using third party sources. Further assessment will be carried out during the lighting baseline survey and the baseline information will be updated as required based on the findings.

Conclusion

- 11.55. It is recommended that lighting is scoped into the ES and that the ELIA forms a technical appendix to the ES. This is due to there being a risk of significant effects from obtrusive light on receptors that surround the Site, and the need for the ELIA to support other specialist assessments.

12. FLOOD RISK

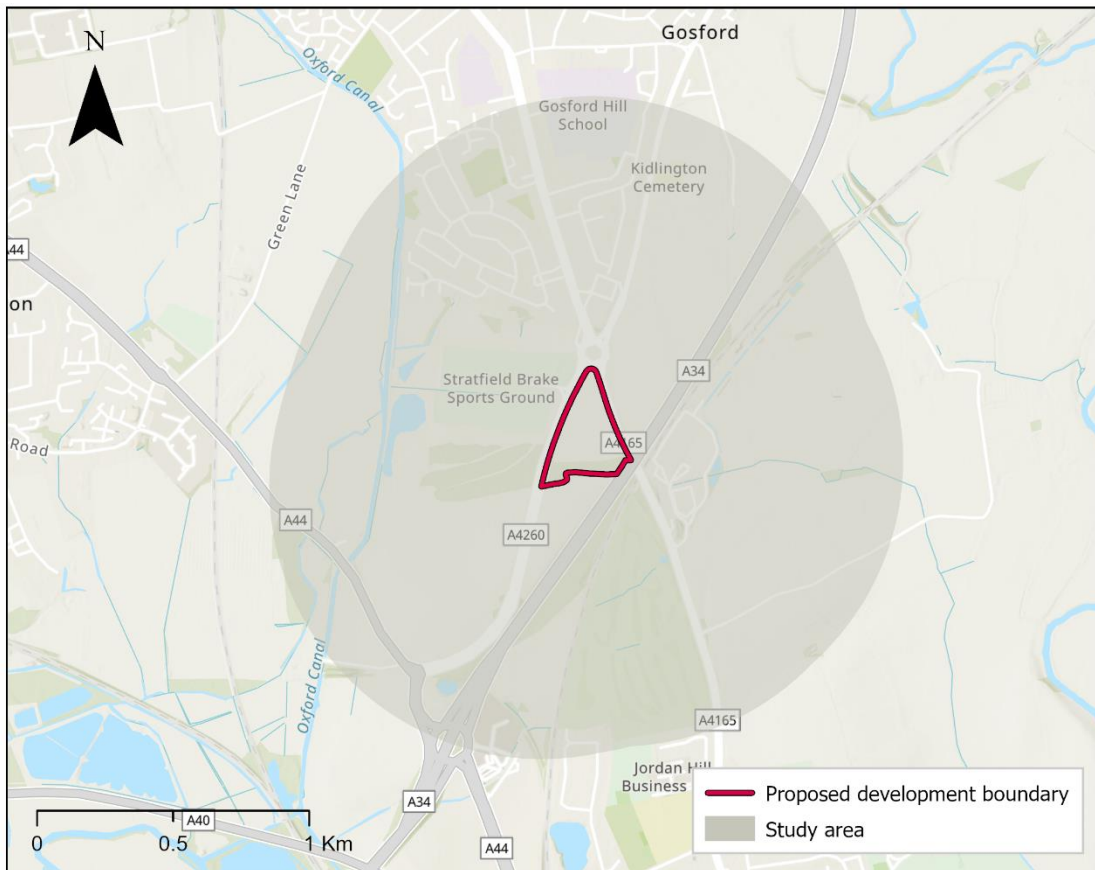
Introduction

- 12.1. This Chapter has been prepared by Mott Macdonald and presents an assessment of the potential effects of the Proposed Development upon the flood risk in the vicinity of the Site. The ES Chapter will include an assessment of the potential changes due to the Proposed Development in fluvial, pluvial, groundwater and artificial sources of flood risk, including consideration of climate change. These will be identified through predominantly desk-based research and information gathered from site surveys/visits.
- 12.2. The Proposed Development will require site preparation and construction works which will have the potential to change flood risk in the vicinity of the Site through temporary works, landform / topographical changes and changes to existing watercourses and drainage paths. In operation, the Proposed Development will have the potential to change flood risk in the vicinity of the Site through permanent topographical changes and changes to the existing drainage paths.
- 12.3. The assessment of flood risk impacts will be undertaken in accordance with best practice guidance and requirements issued by the National Planning Policy Framework (NPPF), Environment Agency and Local Lead Flood Authority (LLFA).

Study area

- 12.4. The study area defined for flood risk is shown **Figure 12.1** which covers a 1km radius around the Site (defined as the red line boundary). The study area may be extended where there are sensitive features (protected areas) that may be affected downstream of the works via surface water bodies, and therefore these features are included in the assessment where appropriate. At this stage no receptors outside the 1km study area have been identified. This approach ensures that any potential effects of the Site are sufficiently identified.

Figure 12.1: Proposed development site and study area



Source: Esri, Intermap, NASA, NGA, USGS, Esri UK, Esri, HERE, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS

Baseline Conditions

12.5. Information to assist with defining the existing baseline conditions were obtained from the following sources:

- Environment Agency's Catchment Data Explorer (Environment Agency, 2019)
- Environment Agency's Flood Map for Planning (Environment Agency, 2023a)
- Environment Agency's Flood Risk Map for Surface Water (Environment Agency, 2023b)
- Environment Agency's Flood Risk from Artificial Sources (Environment Agency, 2023c)
- Cherwell and Ray Catchment Plan (Cherwell and Ray Catchment Partnership, 2012)
- Magic Map Application (MAGIC, 2021)
- BGS Geology Viewer (British Geological Survey, 2023)
- Cranfield Environment Centre (CEC) LandIS Soilscape mapping (CEC, 2023)
- Flood Risk Review undertaken as part of the feasibility stage (Ridge and Partners, 2023)

12.6. The baseline identifies potential receptors and considers that range and interactions of processes which will influence flood risk.

Fluvial flood risk

- 12.7. Using the statutory main river designation outlined by the Environment Agency (2019), there are no main rivers inside the red line boundary.
- 12.8. Using the same designations, there is a main river (Kingsbridge Brook) within the 1km radius of the Site. The Kingsbridge Brook is located to the west of the Oxford Canal (further details of which are provided in artificial sources of flood risk section below) and drains in a westerly direction away from the Site. Therefore, it is highly unlikely to need detailed review as part of the assessment.
- 12.9. The Site sits within the Cherwell (Ray to Thames) and Woodeaton Brook water body (as defined by the Environment Agency). The north-west boundary of the Site follows the boundary between the Cherwell and Woodeaton Brook and the Thames (Evenlode to Thame) water body.
- 12.10. The Site is located in Flood Zone 1 (low probability: this zone comprises of land having less than 1 in 1000 annual probability of river or sea flooding), as defined by the Environment Agency's Flood Map for planning.
- 12.11. The current day fluvial flood risk has been assigned as low importance as the whole site is in Flood Zone 1 (low risk).
- 12.12. This categorisation is unlikely to change under climate chance scenarios. This is due to the Site being at a large distance from the nearest main river (approximately 750m) and the Proposed Development is perched at a higher elevation (approximately 3m higher) than the ground levels the east and west.

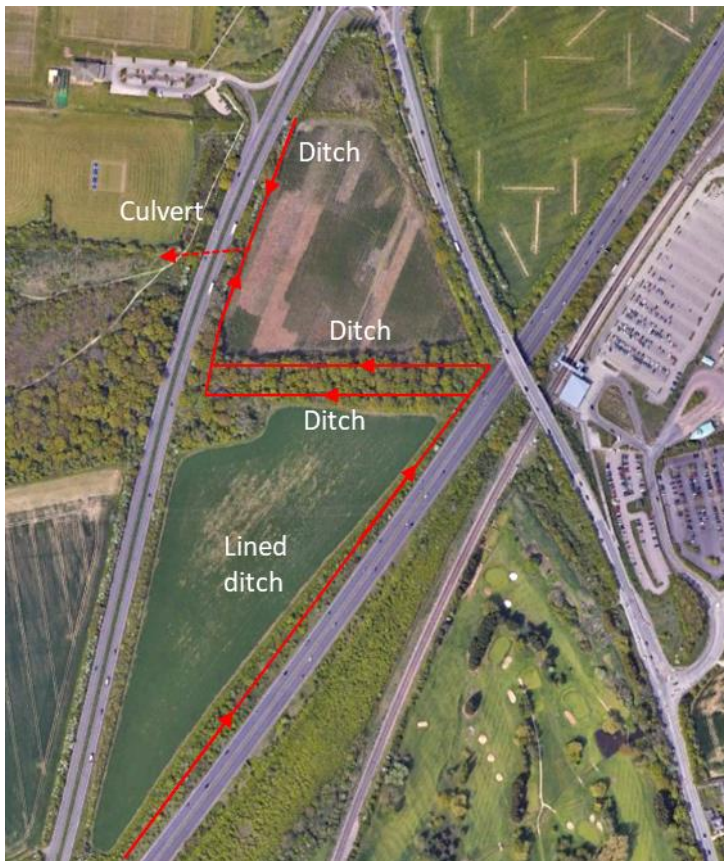
Surface water flood risk

- 12.13. Surface water flood risk refers to flooding as a result of rainwater not being able to drain away through the normal drainage system. For this site, the drainage system is being defined as recognisable watercourses or drainage ditches that are not defined as main rivers by the Environment Agency (2019), which have the potential to impact the study area.
- 12.14. Defined by the British Geological Society, the bedrock geology of the Site is clay/mudstone as part of the Oxford Clay Formation and West Walton formation. The superficial deposits are unspecified. The Soilscales (CEC, 2023) defines the soil across the Site as "slowly permeable, seasonally wet, slightly acid but base-rich loamy and clayey".
- 12.15. The combination of the geological and soil characteristics means the Site is likely have a flashy response to rainfall events, and subsequent surface water runoff. This is supported by the Cherwell

Strategic Flood Risk Assessment (SFRA) which states that the presence of clay/mudstone may result in flashy runoff and a rapid response of fluvial networks to rainfall events.

- 12.16. Given these factors the surface water flood risk has been assigned as medium importance and further assessment should be undertaken during the development of the drainage plan of the Site and for the construction phase plan.
- 12.17. The Flood Risk Review undertaken as part of the feasibility study (Ridge and Partners, 2023) outlines a number of ditches that are located within the Site. Figure 6 from the Flood Risk Review has been recreated (**Figure 12.2**) in higher resolution, which shows the estimated locations of the ditches and culvert under the A4260.
- 12.18. The Site has existing field ditches running along the south-eastern and north-western boundaries, draining west, and appear to discharge to the west via a culvert beneath the A4260. These field ditches are believed to be field and land drainage for the Site.

Figure 12.2: Ditch arrangement



Source: Figure adapted from Figure 6 of the Flood Risk Review (Ridge and Partners, 2023) to improve image quality. Ditch locations are approximate.

- 12.19. There are areas of high risk of surface water flooding (1 in 30 or less chance of flooding each year), as defined by the Environment Agency's surface water flood risk map (**Figure 12.3**). This area of higher risk is located to the west of the Site and correlates with an area of low topography

approaching the culvert underneath the A4260. There are no other areas of surface water flood risk on the Site.

- 12.20. The surface water flood risk has been assigned as medium importance as there are areas of high surface water flood risk that fall within the Site. These should be considered and addressed as part of the Flood Risk Assessment (FRA) and the drainage plan for the Site.

Figure 12.3: Surface water flood risk for the Site



Extent of flooding from surface water

● High ● Medium ● Low ○ Very low ⊕ Location you selected

Source: Environment Agency's Surface Water Flood Risk Map.

Groundwater flood risk

- 12.21. As defined by the British Geological Society (BGS), the bedrock geology of the Site is clay/mudstone as part of the Oxford Clay Formation and West Walton formation. The superficial deposits are unspecified. The aquifer designation of the bedrock and superficial deposits are specified by the BGS. The bedrock and superficial deposits are designated as unproductive aquifers.
- 12.22. This area of the Cherwell District is therefore likely to present a low risk to groundwater flooding. This is reflected in the Areas Susceptible to Groundwater (ASStGWF) map where the Site spans low (0-25%) and medium susceptibility (25-50%) to groundwater emergence.

12.23. The combination of the low permeability mudstone and absence of productive aquifers at the Site indicates that ground flooding could pose a low risk to the Site.

Artificial sources of flood risk

12.24. The artificial sources of flood risk that are considered are reservoirs, canals and public sewers.

12.25. The Environment Agency's Map for Flood Risk from Reservoirs shows that the Site is not at risk from reservoir breach (when there is also flooding from rivers). The nearest areas of flood risk from reservoirs are 600m to the east and 500m to the west. The former is related to the River Cherwell and associated upstream reservoirs. The latter is related to the collection of lakes (Cresswell Lake, Peninsula Lake, Oxe Mead Lake) along the A40 to the south-west of the Site.

12.26. Given that the Proposed Development is located a significant distance from the flood risk maps provided by the Environment Agency, the risk from reservoir flood risk is deemed to be of low importance.

12.27. The Oxford canal runs in a north-south axis 700m to the west of the Proposed Development. It is located approximately 3m lower than the minimum elevation on the Site (63.0mAOD) and is therefore deemed to be of low importance.

12.28. Adjacent to the canal (between the Site and the canal) are two lakes. It is unclear at present the method by which these are filled. This is to be included in the scope of the FRA.

12.29. The Flood Risk Review (Ridge and Partners, 2023) identified the nearest public sewers as being along Oxford Road to the east of the Site boundary. The Cherwell SFRA indicates that the Site is located in an area where between 0 and 25 sewer flooding incidents have been reported according to the Thames Water DG5 Register. It is worth noting that these incidents are reported per postcode region and therefore may have occurred a significant distance from the Site. Given the lack of evidence that the Site experiences sewer flooding and the proximity of the nearby sewers, the importance of sewer flood risk is low.

12.30. The importance of flood risk due to reservoirs, canals and public sewers have been deemed to be low. Therefore, the risk from artificial sources is deemed to be low.

Expected future condition

12.31. Climate forecasts show that because of climate change, the UK is likely to experience slightly wetter winters and drier summers with changing frequencies and intensities of rainfall across both. Current climatic conditions will be considered representative of the climate during the construction period.

Effects associated with the operation of the Proposed Development will take into account the likely impacts of climate change on the frequency and intensity of rainfall events, river flows and flood levels, based on published data, where relevant.

Key Issues and Requirement for Assessment

- 12.32. The key considerations in relation to flood risk are the need to ensure the project will be safe for its lifetime (including during construction), without increasing the flood risk at the Site, receptors and any areas impacted upstream and downstream.
- 12.33. Consideration also needs to be made for safe emergency access and egress to, from and within the Site during heavy rainfall and local flood conditions, given the Proposed Development use as outlined in **Chapter 3**.

Construction

- 12.34. There are a range of key issues that could impact flood risk during the construction phase, these include:
- Effects on the surface water flood risk due to the alteration of flow paths associated with construction, particularly due to changes in topography and/or earthworks.
 - Off-site changes to flood risk as a result of significant changes in discharges from the Site.
 - Ground and earthworks during construction may cause disruptions to the groundwater flow region. This may cause adverse impacts associated with interruptions of flow, leading to either a reduction or loss of water supply to abstractions.
 - The construction phase plan is required to consider these flood risk considerations during the construction phase.

Operation

- 12.35. The completed development could impact flood risk in a range of ways:
- There is the potential for an increase in flood risk from the presence of permanent infrastructure within the floodplain and the resultant decrease in areas to store water.
 - There is the potential for an increase in flood risk from construction or modification to the natural flow of water and diverting the water storage elsewhere.
 - There is potential for an increase in surface water flooding through the increase in impermeable surfaces.
 - There is potential for changes in surface water run-off as a result of changes in topography or flow patterns which may increase the risk of surface water flooding.

- 12.36. Permanent below-ground infrastructure may cause a change in the existing groundwater flow regime, resulting in an interruption to flow. This may lead to the loss of water supply to springs and streams. It may also lead to new springs and streams if groundwater flow paths are blocked or altered.

Approach to Assessment

Scope of assessment

- 12.37. Given the design is not available at this stage, surface water, groundwater and artificial sources of flood risk have been **scoped in** for further assessment.
- 12.38. As the Proposed Development is not expected to impact fluvial flood risk, this has been **scoped out** for further assessment.

Baseline assessment

- 12.39. The baseline assessment will consider the existing conditions both on and around the Site. Data will be gathered from the same sources as outlined in Paragraph 12.5. Supplementary information will be gathered where necessary to fulfil the purpose of the assessment and scope outlined.
- 12.40. The baseline condition review has identified the fluvial flood risk as low importance to the Site for the baseline and future scenarios. Therefore, it is recommended that the fluvial flood risk is assessed to the minimum requirement of the Flood Risk Assessment.
- 12.41. Two small lake/pond features have been identified adjacent to the Oxford Canal. Although the expected risks from these features are low, the mechanism by which these fill needs to be assessed and the potential flood risk evaluated.
- 12.42. Other than this descopeing, it is expected that a full Flood Risk Assessment will be completed and the conclusions of which will be summarised as inputs for the EIA assessment.

Impact assessment method

- 12.43. The EIA assessment methodology identified the significance of an effect by firstly considering the sensitivity of the receptor (i.e. its importance and ability to tolerate and recover from change) and by considering the likely magnitude of the impact (i.e. its spatial extent and duration). By combining sensitivity and magnitude, the significance of the effect is established. Where significant negative effects are identified, mitigation measures are to be proposed to reduce the significance.

12.44. In addition, a Flood Risk Assessment will be prepared in accordance with the requirements of the LLFA, EA and relevant contents of NPPF policy and PPG guidance and will assess all relevant sources of flood risk. The assessment related to flood risk will draw upon the studies and conclusions made within the FRA.

12.45. Receptors will be identified through desk study to identify risks to flooding from the Proposed Development. The sensitivity of these receptors to flood risk will be based on the National Planning Policy Framework (NPPF) Annex 3: Flood risk vulnerability classification. Receptors will be classified as High, Moderate or Low as defined in **Table 12.1**.

Table 12.1: Sensitivity of impact definitions

Sensitivity	Criteria for assessing sensitivity
High	The receptor has little ability to absorb an increase in flood risk without fundamentally altering its present character, is of high environmental value, or is of international or national importance (e.g. SPA, AONB).
Medium	The receptor has moderate capacity to absorb an increase in flood risk without significantly altering its present character, has some environmental value, or is of regional importance.
Low	The receptor is tolerant of an increase in flood risk without detriment to its character, is of low environmental value or is of low or local importance.
Negligible	The receptor is resistant to an increase in flood risk or is of little environmental value

Source: Adapted from OUFSC Scoping Request (Ridge, 2023)

12.46. The criteria to determine the magnitude of impact related to flood risk is summarised in **Table 12.2**. The magnitude of impact will be classified as negligible, low, medium or high.

Table 12.2: Magnitude of impact definitions

Magnitude of impact	Description	Example
High	Results in a loss of attribute and/or quality and integrity of the attribute. Following development, the baseline situation is fundamentally changed.	Examples include: Loss of flood storage/increased flood risk. Large change in: <ul style="list-style-type: none"> • NPPF Flood Risk Vulnerability Classification; • surface water flood risk; and • fluvial flood risk - increase in peak flood level (>100mm)
Medium	Results in impact on integrity of attribute, or loss of part of attribute. Following development, the baseline situation is noticeably changed.	Examples include: Contribution of a significant proportion of the effluent in the receiving river, but insufficient to change its qualities. Moderate change in: <ul style="list-style-type: none"> • NPPF Flood Risk Vulnerability Classification; • surface water flood risk; and • fluvial flood risk – increase in peak flood level (>50mm, <100mm)
Low	Results in some measurable change in attribute’s quality or vulnerability. Following development, the baseline situation is largely unchanged	Examples include: Measurable changes in attribute, but of limited extent/duration. Small change in:

	with barely discernible differences.	<ul style="list-style-type: none"> • NPPF Flood Risk Vulnerability Classification; • surface water flood risk; and • fluvial flood risk – increase in peak flood level (>10mm, <50mm)
Negligible	The impacts are unlikely to be detectable or outside the norms of natural variation.	<ul style="list-style-type: none"> • Negligible change to peak flood level (<+/- 10mm)

Source: Adapted from OUFC Scoping Request (Ridge, 2023)

12.47. Upon confirming the sensitivity of the receptor and the magnitude of the change, the impact to the receptor can be determined based on **Table 12.3**; asterisk denotes significant effect.

Table 12.3: Determining significance of effect

Magnitude	Sensitivity of receptor			
	High sensitivity	Medium sensitivity	Low sensitivity	Negligible
High	Major*	Major/Moderate*	Moderate*/Minor	Negligible
Medium	Major/Moderate*	Moderate*	Minor	Negligible
Low	Moderate/Minor	Minor	Minor/Negligible	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

The terms outlined in the above table have been defined as follows:

- Major (adverse or beneficial) – where the development would cause significant deterioration (or improvement) of the existing environment;
- Moderate (adverse or beneficial) – where the development would cause noticeable deterioration (or improvement) to the existing environment;
- Minor (adverse or beneficial) – where the development would cause perceptible deterioration (or improvement) to the existing environment;
- Negligible – no discernible improvement or deterioration to the existing environment.

Assumptions and limitations

12.48. This report has been prepared using publicly available information, design options available at this time and the scoping assessment presented is based on a desk-based study. Design input is based on the ongoing refinement of the design, consultation, and EIA processes. No flood modelling has been carried out for this report. No ground investigations have been carried out for this report. It has also been assumed that the available information on flood risk is representative of the general conditions. No detailed drainage design has been provided for the scoping assessment.

12.49. Consultation with the local planning authority as the Lead Local Flood Authority (LLFA) on matters relating to flood risk and drainage has not taken place as of the writing of this report. Before the application is finalised, stakeholders will be approached regarding consultation on flood risk.

Conclusions

- 12.50. There is potential for the Proposed Development to impact flood risk during the construction and operation stages. Flood risk will be assessed by considering the sensitivity of the receptor and the likely magnitude of the impact. By combining sensitivity and magnitude, the significance of the impact will be established. Where significant negative effects are identified, mitigation measures are to be proposed to reduce the significance.
- 12.51. A FRA is to be undertaken to input into this assessment following the requirements of NPPF policy and PPG guidance (and any additional local policies).
- 12.52. The Proposed Development is likely to impact the surface water flood risk, whilst having minimal impacts upon the fluvial, groundwater and sources of artificial flood risk. Consideration for flood risk will be an integral part of the construction phase plan and the design process to mitigate flood risk.

References

- British Geological Survey, 2023. BGS Geology Viewer [online]
- Cherwell and Ray Catchment Partnership, 2012. Cherwell and Ray Catchment Plan – March 2021 edit.
- Cranfield Environment Centre (CEC), 2023. LandIS Soilscape Mapping [online].
- Environment Agency, 2023a. Flood map for planning [online].
- Environment Agency, 2023b. Flood risk for surface water flooding [online].
- Environment Agency, 2023c. Flood risk from artificial sources [online].
- Environment Agency, 2019. Main river map for England: proposed changes and decisions [online].
- MAGIC, 2021. Magic Map Application [online].
- Ridge, 2023. OUFC Scoping Request – Brief for consultants.
- Ridge and Partners, 2023. Oxford United FC New Stadium Feasibility – Flood Risk Review (5018932-RDG-XX-XX-DOC-C-001).

13. SOCIO-ECONOMICS

Introduction

- 13.1. The socio-economic ES assessment will be undertaken, and the chapter will be prepared, by ekosgen.

Baseline Conditions

- 13.2. The baseline socio-economic assessment will address the baseline conditions at the following geographical scales:
- The Site;
 - A Local Impact Area (LIA) defined by the combined wards of Kidlington West and Kidlington East
 - The District of Cherwell (district), and
 - Oxfordshire (regional).
- 13.3. The socio-economic baseline conditions will be assessed using established statistical sources such as the Office for National Statistics (ONS) Business Register and Employment Survey (BRES), Annual Business Inquiry (ABI) and Annual Population Survey (APS)¹. This will be supplemented with any relevant data held by Cherwell Council and the client team. Where necessary, consultation will be undertaken with Cherwell Council.
- 13.4. Full details of the methodology including all sources and references will be provided as part of the ES chapter itself. In addition, the ES chapter will detail which geographical scales will be relevant for each indicator and why.
- 13.5. Key baseline indicators will include:
- Population and Labour Market: The existing population and economic activity and unemployment rates in the LIA and district including the age structure and proportion of working age population. There are currently 161,000 residents in Cherwell, of which 65% are of working age in line with the Oxfordshire average.
 - Employment: Current employment sustained in the LIA and at district level, including detail on the type of employment by sector and occupation where available. Data for the LIA shows that there are currently around 11,500 jobs in 2021, the most recent employment data available from BRES³ and around 84,000 across Cherwell as a whole, although this does not include all self-employment.
 - Gross Value Added: This is a measure of the value of goods and services produced in an area, by an industry or individual business. It will be estimated for the Proposed Development based on benchmark GVA per full time equivalent (FTE) jobs using ONS Gross

Value-Added statistics⁴ and from the same sources for Cherwell and Oxfordshire. Current GVA in Cherwell is recorded at £4.9 billion in 2021, the latest year for which the data is available. These GVA statistics will provide the baseline against which additional GVA generated by the Proposed Development would be assessed.

- Business Rates: an understanding of the current amount of non-domestic business rates collected by Cherwell will be provided based on data from the Valuation Office Agency.
- Deprivation: Sourced from the Index of Multiple Deprivation and in particular focussing on employment and income domains.
- Access to Open Space: the baseline position on access to open space will be included based on using the OS's Zoomstack data base together with consideration of Cherwell's Local Plan and Open Space Strategy.

Key Issues and Requirement for Assessment

13.6. The Proposed Development will deliver employment and new commercial, community and leisure floorspace. It will generate new jobs within Cherwell and Oxfordshire, which could support additional GVA and employee expenditure, as well as supporting additional business rates.

13.7. The selection of receptors that could be subject to effects has been informed by the initial baseline analysis, as well as consideration of evidence on socio-economic effects associated with the demolition, construction and operation of similar developments. These include:

- Existing total employment, including workplace-based and resident-based, and employment within the construction sector;
- The size, diversity and prosperity of the local economy as measured by employment and economic output (i.e. gross value added (GVA));
- Existing levels of business rates;
- Existing levels of deprivation related to employment and income; and
- Access to open space

13.8. The Proposed Development is expected to generate a range of social and economic effects, some of which would be during the demolition and construction phase of the Proposed Development and therefore, temporary (such as construction employment) and some of which would be when the Proposed Development is complete and operational, therefore permanent (such as those resulting from the new stadium and commercial floorspace once the Proposed Development is complete).

13.9. The likely potential effects are presented below:

Demolition and Construction Effects:

- The generation of temporary employment opportunities during the demolition and construction phase.

Completed Development Effects:

- The creation of any net additional long-term employment opportunities from the proposed commercial uses of the Proposed Development;
- The economic effect of additional expenditure in the surrounding area resulting from additional employees;
- Direct, indirect and induced economic output measured by GVA;
- An increase in the local business rate revenue collectible as a result of the development of new commercial floorspace on the Site;
- The effect of access to additional employment opportunities on existing deprivation levels; and
- The effect of additional publicly accessible open space on existing provision.

Approach to Assessment

13.10. The overall proposed methodology will include:

- Review of local, regional, national policy, plans and development constraints in so far as they influence the baseline conditions; judgements about the sensitivity of receptors; the assessment methodology or justification of a specific socio-economic effect described in the socio-economic assessment;
- A full review of baseline conditions for areas described in the baseline section above. This will be assessed using recognised data sources principally from the ONS but drawing where appropriate on evidence from the Cherwell and Oxfordshire local authorities;
- An assessment of the scale of the direct, indirect and induced employment effects generated during the demolition and construction phase of the Proposed Development;
- An assessment of the scale of the direct, indirect and induced employment and economic output (GVA) effects generated once the Proposed Development is operational;
- An assessment of employee spending effects generated once the Proposed Development is operational;
- An assessment of the scale of business rates supported by the Proposed Development; and
- An assessment of the impact on deprivation levels and access to open space of the Proposed Development
- Identification of any likely significant socio-economic effects; and
- Identification of appropriate mitigation measures should any significant adverse effects be identified.

13.11. The magnitude of the impact will be assessed against the relevant baseline conditions. Impacts will be quantified and contextualised to inform the judgment of magnitude wherever possible (for

example quantifying employment and placing it in the context of existing employment). Where qualitative judgments are required, they will be fully detailed and justified.

- 13.12. The magnitude of impact will be combined with the sensitivity of receptor (judged based upon professional judgement) to determine the significance of effects. However, there are no pre-defined quantitative thresholds which determine the significance of socio-economic effects. Accordingly, the significance of likely and residual effects will be determined based upon fully justified professional judgment.
- 13.13. An assessment of the Proposed Development coming forward alongside other relevant Cumulative Schemes in the local area shall be undertaken. Cumulative effects will be considered in the context of the appropriate impact area and using, where possible, the same approach outlined above.
- 13.14. It should be noted that a Health Impact Assessment will be prepared in line with the Oxfordshire Health Impact Assessment Toolkit (2021) and submitted as a stand-alone document alongside the Planning Application.

Conclusions

- 13.15. The topic of Socio-economics will be scoped in to the Environmental Statement on the basis that there will likely be significant effects.

14. CLIMATE CHANGE

Introduction

GHG emissions

- 14.1. This chapter has been prepared by Mott Macdonald and reviews the Proposed Development's potential effect on climate change and Greenhouse Gas (GHG) emissions¹² in construction and operation phases, including how the project will affect the ability of the Cherwell District Council and Oxfordshire County Council¹³ to meet its Net Zero targets, and makes a recommendation as to whether this topic should be scoped into a future ES for the Proposed Development.
- 14.2. The scoping of potential GHG impacts will be undertaken in accordance with best practice guidance issued by the Institute of Environmental Management and Assessment (IEMA), namely IEMA Guide: Assessing Greenhouse Gas Emissions and Evaluating their Significance¹⁴.

Climate resilience

- 14.3. This chapter assesses the Proposed Development's resilience to climate change in the construction and operational phases. Potential vulnerabilities of the design and local environment from climate trends and extreme weather events are identified when considering a future climate baseline obtained from the Met Office UK Climate Projections 2018 (UKCP18)¹⁵ dataset. A recommendation is then made on whether this topic should be scoped in for the Environmental Statement.
- 14.4. The scoping of the climate resilience of the Proposed Development is undertaken in accordance with best practice IEMA climate resilience guidance¹⁶.

¹² Greenhouse Gases (GHGs) refer to the seven gases covered by the Kyoto Protocol: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF₆) and nitrogen trifluoride (NF₃). These are measured in units of carbon dioxide equivalent (CO₂e) which expresses the impact of each gas in terms of the amount of CO₂ that would create the same impact. GHGs are commonly referred to as carbon.

¹³ Oxfordshire County Council, 2020. Climate Action Framework 2020. [online] Available at: [2020 Climate Action Framework \(oxfordshire.gov.uk\)](https://www.oxfordshire.gov.uk/2020-climate-action-framework) [Accessed July 2023]

¹⁴ IEMA, 2022. IEMA Guide: Assessing Greenhouse Gas Emissions and Evaluating their Significance [online] Available at: [IEMA - Launch of the Updated EIA Guidance on Assessing GHG Emissions - February 2022](#) [Accessed July 2023]

¹⁵ Met Office, 2019. UK Climate Projections (UKCP) [online] Available at: [UK Climate Projections \(UKCP\) - Met Office](#) [Accessed July 2023].

¹⁶ IEMA, 2020. IEMA EIA Guide to: Climate Change Resilience and Adaptation (2020) [online]. Available at: [IEMA - IEMA EIA Guide to: Climate Change Resilience and Adaptation \(2020\)](#) [Accessed July 2023].

Study area

GHG emissions

- 14.5. The assessment of the effects of GHG emissions does not have a spatially defined study area per se as the receptor (atmosphere) for GHG emissions is not spatially defined. Instead, it is proposed that the construction assessment would consider the embodied carbon within the Proposed Development's materials, construction stage emissions, and emissions from transport of materials to site. The operational assessment would consider the emissions from repair and maintenance (where possible), and energy use through operation.

Climate resilience

- 14.6. The spatial study area for the assessment of climate resilience is defined as the red line boundary with respect to effects of climate change on the Proposed Development, and the spatial extent of all other EIA topic assessments when identifying effects on the wider environment and community from the Proposed Development under a future climate baseline. Receptors at risk from future changes in climate and extreme weather events have been considered for both the construction and operational phases for the Proposed Development.
- 14.7. The temporal study period for climate resilience will include climate changes up to the end of this century, or interim periods as appropriate to specific design elements and asset design life.

Baseline Conditions

GHG emissions

- 14.8. The baseline considers existing GHG emissions related to the Site, which is currently undeveloped. The existing vegetation on site will provide a small amount of carbon sequestration, which is unlikely to be significant and hence scoped out. Therefore, there are no baseline emissions associated with the Site, and any development on the Site will result in additional emissions. The wider baseline (for construction emissions) considers emissions from the UK construction industry which will be used for context and to enable comparison of the project emissions once these are calculated in the detailed design stage.
- 14.9. The World Green Building Council has found that building materials and construction were responsible for around 11% of global energy related GHG emissions in 2018¹⁷. This is similar to previous findings for the UK construction industry consumption of natural resources in the UK

¹⁷ World green building council, Bringing Embodied Carbon Upfront, 2019 [Online] Available at: [Embodied Carbon - World Green Building Council \(worldgbc.org\)](https://www.worldgbc.org/) [Accessed July 2023]

accounting for equivalent to 10% of the total UK carbon emissions. Therefore, assuming a 10% proportion, it has been estimated that approximately 45 MtCO₂e (million tonnes of carbon dioxide equivalent) are attributed to the construction industry in the UK as a whole, based on 2019 emissions¹⁸.

Climate resilience

14.10. The future climate baseline for the Proposed Development has been obtained from the Met Office UKCP¹⁸ dataset which comprises projected changes to the UK's climate against a range of future GHG emission scenarios.

14.11. The chosen climate scenario for this assessment consists of a high GHG emissions scenario, Representative Concentration Pathway (RCP) 8.5¹⁹, as this represents a 'precautionary approach' or worst case within risk assessments. A time horizon of the 2090s (2080-2099) (against a 1981-2000 baseline) is used to cover the design life of the Proposed Development. The 50th percentile has been selected, representing an 'as likely as not' probability of change, and projections for the Southeast England spatial region as this provides high-level data for the region where the Proposed Development is located. **Table 14.1** presents projection data using the projected climate scenario for air temperature and precipitation.

Table 14.1: Climate projections for Southeast England (UKCP18 Probabilistic Projections, RCP8.5, 2080-2099 (1981-2000 baseline), 50th percentile)

Climate variable	Season	Baseline (1981-2000)	Change from baseline – 2090s	Final value
Mean Air Temperature (°C)	Summer	16.1	+5.8	21.9
	Winter	4.6	+3.5	8.1
Max Air Temperature (°C)	Summer	21	+6.3	27.3
	Winter	7.5	+3.3	10.8
Min Air Temperature (°C)	Summer	11.2	+5.3	16.5
	Winter	1.6	+3.7	5.3
Amount of precipitation per day (mm)	Summer	5	-41.4%	2.9
	Winter	7	+26%	8.82

14.12. Climate projections from **Table 14.1** shows that the Southeast England region is projected to become warmer throughout the year with an increase in average peak summer and winter temperatures. Winters are also projected to become wetter while summers are projected to become drier.

¹⁸ Gov.uk Final UK greenhouse gas emissions national statistics: 1990 to 2019 [online] Available at: [Final UK greenhouse gas emissions national statistics: 1990 to 2019 - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/statistics/final-uk-greenhouse-gas-emissions-national-statistics-1990-to-2019) [Accessed July 2023]

¹⁹ Representative Concentration Pathways (RCP) are prescribed trajectories for GHG and aerosol concentrations and are used to project a range of climate scenarios. There are four main RCP scenarios with RCP8.5 describing a worst-case scenario.

- 14.13. These projected climate trends are likely to exacerbate future extreme weather events. Warmer summers may result in more frequent, severe and prolonged heatwave events. Wetter winters may result in increased flood risk while drier summers can increase the frequency and severity of drought events. Drought events may also exacerbate the severity of flooding and lead to flash flood events during summer precipitation because of reduced soil moisture which decreases soil's ability to absorb water. In addition, Environmental Agency guidance includes an uplift for rainfall intensity, which is likely to increase surface water (pluvial) flooding and surface run-off²⁰.
- 14.14. Climate models for wind and storms contain greater uncertainties and therefore quantitative data on future wind projections have not been published by the Met Office. Global projections however do show that there is potential for an increase in near surface wind speeds over the UK in the second half of the 21st century during the winter months, alongside an increase in the frequency of winter storms²¹.
- 14.15. While research into climate change impacts on lightning is still uncertain, studies have been undertaken which show evidence of an increase in the frequency of lightning strikes by 12% with a 1°C average annual increase in air temperature²².
- 14.16. Projection data for additional time horizons, percentiles, extremes, and climate parameters will be used within further assessments as identified as appropriate.

Key Issues and Requirement for Assessment

GHG emissions

Construction

- 14.17. For this topic, the main impact during construction would be the release of GHG which adversely contribute towards further climate change.
- 14.18. The impact will be caused by GHG released by:
- Construction processes including transport to/from the works site and construction / installation processes.
 - Embodied GHG emissions from extraction and production of building materials

²⁰ Environment Agency, 2022. Flood risk assessments: climate change allowances [online] Available at: [Flood risk assessments: climate change allowances - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/101111/flood_risk_assessments_climate_change_allowances_-_gov.uk.pdf) [Accessed July 2023].

²¹ Met Office, 2019. UKCP18 Factsheet: Wind [online] Available at: [ukcp18-fact-sheet-wind_march21.pdf \(metoffice.gov.uk\)](https://www.metoffice.gov.uk/media/pdf/ukcp18-fact-sheet-wind_march21.pdf) [Accessed July 2023].

²² Romps, D.M., Seeley, J.T., Vollaro, D. and Molinari, J., 2014. Projected increase in lightning strikes in the United States due to global warming. *Science*. 346(6211), pp.851–854. Available at: <https://science.sciencemag.org/content/346/6211/851> [Accessed July 2023].

- Land use change as a result of greenfield loss to accommodate the project.
- GHG emissions from site clearance and waste removal.

Operation

14.19. Likewise, the main impact during operation would be the release of GHG by:

- Day to day operational energy requirements for functioning of the building.
- Operational transport of workers, and match day visitors
- Maintenance activities including repair, replacement, and refurbishment of assets.
- End-of-life demolition

Climate resilience

Construction

14.20. The planned opening date for the Proposed Development is 2026, which indicates a short construction period. As climate change is generally considered over longer time horizons, risks from changing climate conditions during construction are limited and not significant. However, the Proposed Development may still be at risk from temporary extreme weather events such as flooding and heatwaves typical of our present-day climate, which may disrupt and delay construction, as well as pose health and safety risks to construction workers. Potential risks due to extreme weather events will be addressed by weather-resilience measures within the Construction Environmental Management Plan (CEMP).

Operation

14.21. During the operational phase, the Proposed Development may experience adverse effects from climate change. These potential effects are described in **Table 14.2**.

Table 14.2: Climate change potential effects and vulnerability of the Proposed Development

Climate variable	Climate change effect	Vulnerability of the Proposed Development
Precipitation	<ul style="list-style-type: none"> • Increased seasonal precipitation in winters • Increase in intensity and/or frequency of extreme precipitation events • Decreased precipitation in summer 	<ul style="list-style-type: none"> • Surface flooding may affect access and operation of the Proposed Development for example flooding of the pitch, leading to cancellation of matches, or difficulties for spectators travelling to and from the stadium. • Changing seasonal precipitation trends may impact maintenance of the pitch grass. • Summer drought events may reduce water availability and impact local water supply, with potential effects on maintenance and during event management.

		<ul style="list-style-type: none"> ● Drought conditions combined with high temperature days may increase risk of wildfire. Wildfires may cause damage to assets and pose direct safety risks, and wildfire smoke from a wider area may cause health issues for visitors, staff and players.
Temperature	<ul style="list-style-type: none"> ● Increased temperature in summer and winter ● Increase in extreme temperature events such as heatwaves 	<ul style="list-style-type: none"> ● Risks to human health and thermal discomfort (visitors, staff and particularly players where severe heat may impact performance) from heat stress during high temperature days. Depending on the orientation and design of buildings and stands, this risk may be exacerbated in some parts of the stadium. Different staff and user groups may additionally be affected travelling to and from the stadium, and some means of active travel may be restricted in hotter future summers. ● Changing temperature trends may impact maintenance of the pitch grass. ● Exceedance of heat tolerance of electrical and steel components of structure, equipment and machinery, leading to failure. ● Soil shrinkage in dry conditions can lead to structural subsidence, structural deformation, and collapse. ● Increasing temperatures combined with summer droughts may lead to increased vegetation dieback of landscaped areas, and soil desiccation and erosion (exacerbated by surface runoff erosion intensity summer storms).
Winds and storms	<ul style="list-style-type: none"> ● Increase in wind speeds ● Increase in winter storms 	<ul style="list-style-type: none"> ● Potential for strong winds and storms to cause structural damage due to flying debris. ● Increased wind loading of structures may lead to structural damage, in particular of stands and roofs, which may pose consequent safety risks.
Lightning	<ul style="list-style-type: none"> ● Increase in lightning frequency 	<ul style="list-style-type: none"> ● Damage to structures, equipment, and machinery.

14.22. In addition to the risks to the stadium directly, risks due to climate change external to the Proposed Development may additionally affect it, for example a risk of more frequent outages of power and communications utilities in storms or other extreme weather events.

14.23. The Proposed Development may affect the local environmental and communities receptors differently under a future climate setting, for example water or air emissions may affect the local area under different air temperature and precipitation averages.

Approach to Assessment

Legislation and policy

- 14.24. On 27th June 2019 the UK government amended the Climate Change Act (2008)²³ and set a legally binding target to achieve Net Zero GHG emissions from across the UK economy by 2050. The Act also legally requires the government to assess the risks and opportunities from climate change for the UK and to adapt to them. In October 2021 the UK government released their Net-Zero strategy, further outlining how this reduction is to be achieved.
- 14.25. The National Adaptation Programme (NAP)²⁴ and National Planning Policy Framework (NPPF)²⁵ are both national policies which sets out clear objectives to mitigate and adapt to climate change.
- 14.26. On a regional level, the Oxfordshire Climate Action Framework²⁶ outlines the Council's aim to operate at Net Zero by 2030 and enable a Net Zero Oxfordshire by 2050. In support of this, the local Cherwell District Council have also declared a climate emergency and declared to work in collaboration with Oxfordshire County Council to achieve their Net Zero targets. New developments therefore need to reflect the need to achieve Net Zero through assessment of whole life carbon and through appropriate design and operational choices.

Scope of assessment

GHG emissions

- 14.27. The GHG emissions are considered qualitatively at this stage and will be assessed quantitatively later at full detailed stage in the EIA. Recommendations shall be made should it be included in the EIA methodology. Currently, given the nature of the stage this is a proportionate approach. The lifetime of the Proposed Development including construction and operation are scoped in and the carbon sequestration from existing vegetation are scoped out due to unlikely significance.
- 14.28. GHGs are gaseous compounds that have been identified as contributing to a warming effect in the earth's atmosphere. The primary GHG of concern with respect to the Proposed Development is carbon dioxide (CO₂) which is emitted from combustion sources such as vehicular transport and heating and energy plant. Other GHGs such as methane also contribute to climate change, and these

²³ UK Parliament (2012), Climate Change Act 2008 available at: [Climate Change Act 2008 \(legislation.gov.uk\)](https://www.legislation.gov.uk/ukpga/2008/27/section/1) ((Last accessed July 2022)

²⁴ DEFRA, 2018. Climate change: second national adaptation programme (2018 to 2023) [online]. Available at: [Climate change: second national adaptation programme \(2018 to 2023\) - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/744214/Climate-change-second-national-adaptation-programme-2018-to-2023.pdf). [Accessed July 2023].

²⁵ Department for Levelling Up, Housing and Communities, 2021. National Planning Policy Framework. [online] Available at: [National Planning Policy Framework - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/987142/nppf-2021.pdf). [Accessed July 2023].

²⁶ Oxfordshire County Council, 2020. Climate Action Framework 2020. [online] Available at: [2020 Climate Action Framework \(oxfordshire.gov.uk\)](https://www.oxfordshire.gov.uk/oxfordshire-climate-action-framework) [Accessed July 2023]

will be accounted for based on their Global Warming Potential (GWP). The combined effect of all GHG emissions will be presented as carbon dioxide equivalent (CO₂e).

Climate resilience

- 14.29. It is proposed that the construction phase be scoped out of the climate resilience assessment in the Environmental Statement due to the short construction period during which climate is not anticipated to change significantly from the present day.
- 14.30. It is proposed that the operational phase be scoped in for the climate resilience assessment in the Environmental Statement due to the potential for significant risks identified in **Table 14.2**. The assessment will be undertaken in line with the IEMA climate resilience guidance²⁷. This would include both risks to the Proposed Development due to climate change, and changing risks to the local environment and community receptors under a future climate baseline.

Baseline assessment

GHG emissions

- 14.31. The baseline for the Proposed Development is defined as the current GHG emissions arising from activities within the Site boundary as defined in the IEMA Greenhouse Gas Guidance. The current nature of the Site is greenfield, however, the emissions arising from loss of carbon sequestration through vegetation is unlikely to be significant.
- 14.32. A GHG assessment at the earliest stage of design where suitable information is available would be undertaken informing a baseline for the Outline design of the Proposed Development. It is expected that the GHG footprint calculated for the ES would form the baseline for the future design stages. Any quantifiable reductions identified through design would then be used to inform further footprints in the absence of complete materials information.
- 14.33. Unlike other environmental effects that will be assessed in the EIA, effects from GHG emissions are not localised but contribute to the global atmospheric concentration of GHG's and consequently contribute to the global climate change effect. The Proposed Development should be viewed, rather, in the context of developments and construction projects globally as it contributes to a global climatic effect. Therefore, an assessment of the cumulative effects of GHG emissions from the Proposed Development with other nearby committed developments is not proposed to be carried out. As there are GHG emissions associated with almost all new developments globally, it may be stated that cumulative effects are significant.

²⁷ IEMA, 2020. IEMA EIA Guide to: Climate Change Resilience and Adaptation (2020) [online]. Available at: [IEMA - IEMA EIA Guide to: Climate Change Resilience and Adaptation \(2020\)](#) [Accessed July 2023].

Climate resilience

- 14.34. The baseline will describe the present-day climate for the location of the Proposed Development informed by historical observed climate data from the Met Office.
- 14.35. The baseline will also include a future climate baseline using Met Office UKCP18 data for seasonal winter and summer trends in temperature and precipitation as well as extreme temperature and extreme precipitation projections. Doing so will allow for more detailed assessment of future climate trends and extreme weather events relevant to the Proposed Development.

Sensitive receptors

GHG emissions

- 14.36. The principal receptor is atmospheric GHG concentrations. As atmospheric GHG emissions are pushed closer towards their environmental limit, this indirectly triggers subsequent effects on the global climate system that contribute to climate change.
- 14.37. In line with IEMA Greenhouse Gas Guidance, the sensitivity of the receptor (i.e., the global atmosphere) in relation to GHG emissions is always considered to be 'high', based on the value and vulnerability of the resource and irreversibility of the effect.

Climate resilience

- 14.38. The receptors to be considered in the Environmental Statement are all assets that will be constructed or modified as part of the Proposed Development. Sensitive receptors will also include risks to human health for visitors, staff and players who will use the Site.
- 14.39. Sensitive receptors in the local environment communities that may be affected by the project under a future climate baseline will be those identified as part of the other EIA topic assessments (for example sensitive ecological sites).

Impact assessment method

GHG emissions

- 14.40. The assessment will quantify the GHG emissions from the Proposed Development over its lifetime. To fully capture a development's carbon impact a whole life cycle approach is needed, which will account for embodied carbon emissions (emissions generally associated with materials and

products used in Construction) as well as operational carbon emissions (emissions generally associated with occupant's energy and water usage).

- 14.41. It is recommended that best practice guidance be drawn from the following sources:
- IEMA Guide to Assessing GHG emissions and Evaluating their Significance²⁸
 - Royal Institute of Chartered Surveyors (RICS) Whole Life Carbon Assessment for Built Environment²⁹
 - Publicly Available Specification (PAS) 2080:2023: Carbon Management in Buildings and Infrastructure
- 14.42. It is recommended that whole life carbon calculations are undertaken using proprietary life cycle assessment software (OneClick LCA) for the Proposed Development in line with RICS Whole Life Carbon Assessment (WLC) guidance³⁰. The scope of the emissions will be aligned to the lifecycle stages defined in the RICS guidance on Whole Life Carbon Assessment for the Built Environment.
- 14.43. It is proposed that the GHG emissions during construction stage are calculated by applying appropriate industry embodied carbon benchmarks based on floor area and building typology.
- 14.44. As the application for the Proposed Development will be submitted at the initial outline design stage, the operational carbon assessments will be estimated using likely worst-case assumption-based scenario. It is recommended that where information is available from energy consultants on operational energy and likely operational water, carbon factors be applied to estimate the emissions. Where the information is unavailable, suitable industry benchmarks shall be used.
- 14.45. The results from the calculations will be assessed against current industry benchmarks (e.g. LETI, RIBA, GLA) and compared against the national and regional carbon budgets to illustrate the magnitude of the GHG emissions associated with the Proposed Development as outlined in the IEMA Greenhouse Gas Guidance.
- 14.46. Significance of the resultant effects will be determined in line with the IEMA Guidance provided in the below **Table 14.3**.

²⁸ IEMA, 2022. IEMA Guide: Assessing Greenhouse Gas Emissions and Evaluating their Significance [online] Available at: [IEMA - Launch of the Updated EIA Guidance on Assessing GHG Emissions - February 2022](#) [Accessed July 2023]

²⁹ RICS, 2017. Whole Life Carbon Assessment for the Built Environment [online] Available at: [Whole Life Carbon Assessment for the Built Environment \(rics.org\)](#) [Accessed July 2023]

³⁰ RICS, 2017. Whole Life Carbon Assessment for the Built Environment [online] Available at: [Whole Life Carbon Assessment for the Built Environment \(rics.org\)](#) [Accessed July 2023]

Table 14.3: Significance Criteria

Significance of Effect	Criteria of assessing the Significance of Effect
Major adverse	The project's GHG impacts are not mitigated or are only compliant with do-minimum standards set through regulation, and do not provide further reductions required by existing local and national policy for projects of this type. A project with major adverse effects is locking in emissions and does not make a meaningful contribution to the UK's trajectory towards net zero.
Moderate adverse	The project's GHG impacts are partially mitigated and may partially meet the applicable existing and emerging policy requirements but would not fully contribute to decarbonisation in line with local and national policy goals for projects of this type. A project with moderate adverse effects falls short of fully contributing to the UK's trajectory towards net zero.
Minor adverse	The project's GHG impacts would be fully consistent with applicable existing and emerging policy requirements and good practice design standards for projects of this type. A project with minor adverse effects is fully in line with measures necessary to achieve the UK's trajectory towards net zero.
Negligible	The project's GHG impacts would be reduced through measures that go well beyond existing and emerging policy and design standards for projects of this type, such that radical decarbonisation or net zero is achieved well before 2050. A project with negligible effects provides GHG performance that is well 'ahead of the curve' for the trajectory towards net zero and has minimal residual emissions.
Beneficial	The project's net GHG impacts are below zero and it causes a reduction in atmospheric GHG concentration, whether directly or indirectly, compared to the without-project baseline. A project with beneficial effects substantially exceeds net zero requirements with a positive climate impact.

Source: IEMA, 2022. IEMA Guide: Assessing Greenhouse Gas Emissions and Evaluating their Significance.

14.47. The sensitivity of a receptor combined with the magnitude of the effect upon the receptor is then compared within the significance of effect matrix to define the overall effect (**Table 14.4**).

Table 14.4: Significance of Effect Matrix

Magnitude of Effect	Sensitivity of Receptor			
	High	Medium	Low	Negligible
High	Major	Major/Moderate	Moderate/Minor	Negligible
Medium	Major/Moderate	Moderate	Minor	Negligible
Low	Moderate/Minor	Minor	Minor/Negligible	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

Source: Ridge and Partners LLP 2023 – Proposed New Stadium -OUFC Scoping Request – Brief for Consultants

14.48. Where an effect is classified as falling into one of two levels of significance (Major/Moderate, Moderate/Minor or Minor/Negligible) professional judgement is used to define which of the levels of significance is most applicable.

14.49. Effects classified as Moderate or above are considered to be significant effects, and secondary mitigation may be required to reduce these effects. Effects classified as Minor are not considered

significant, but it may be prudent to implement secondary mitigation. Negligible effects equate to no perceptible change and secondary mitigation will have no measurable or perceptible effect.

Climate resilience

- 14.50. A climate change risk assessment (CCRA) will be undertaken to assess the climate resilience of the Proposed Development’s current design and will be used to inform future design stages. The CCRA methodology will be adapted from IEMA’s climate resilience guidance³¹ which takes a qualitative approach informed by the future climate baseline. The approach will consider the magnitude of climate change risks and sensitivity of receptors, along with consideration of embedded mitigation measures within the design, to determine whether identified climate change risks to the Proposed Development should be considered significant.
- 14.51. The criteria for defining the magnitude of impacts of climate change on the climate resilience of the Proposed Development are described in **Table 14.5**.
- 14.52. The magnitude is based on information from the climate change projections, together with the knowledge and professional judgement on the nature of the impacts and level of certainty associated with the projections. For example, there is a higher degree of certainty within climate projections in relation to temperature change; however, there is a lower level of certainty in relation to the exact change in rainfall patterns or the frequency of extreme rainfall or temperature maximums.

Table 14.5: Magnitude of Impact Criteria

Magnitude	Criteria	Examples
Major	Large change to climate condition and large increase in the frequency of the event.	Increased and prolonged maximum summer temperatures that create extreme regional heatwaves throughout each summer.
Moderate	A large, measurable change in climate conditions at a regular frequency.	Increase in the intensity and volume of extreme rain events of an intensity that could lead to surface water flooding.
Minor	Change in climate conditions that may have measurable effect on an asset, but which are low likelihood / infrequent.	Increased average annual frequency of lightning strikes.
Negligible	Small or undetectable change in climatic or weather conditions.	Change in average wind direction for a few days in a year.
No change	No change in climate condition.	No change in climate condition.

- 14.53. The criteria for defining sensitivity for the assessment of receptors of the Proposed Development are described in **Table 14.6**.

³¹ IEMA, 2020. IEMA EIA Guide to: Climate Change Resilience and Adaptation (2020) [online]. Available at: [IEMA - IEMA EIA Guide to: Climate Change Resilience and Adaptation \(2020\)](#) [Accessed July 2023].

14.54. The sensitivity of the receptors is the ability of the receptor to withstand and recover from a climate impact while keeping or shortly returning to its normal functionality. The sensitivity of a receptor considers its susceptibility to a change in climatic conditions or an extreme weather event, and the consequences of this change.

Table 14.6: Sensitivity of Receptors Criteria

Sensitivity	Definition	Examples
Very high	Adverse: Short-term, acute impact to receptor functionality or a substantial, measurable decrease in receptor lifespan following the occurrence of a climate impact. Substantial increase in need for periodic maintenance or in maintenance costs.	Tracks and stations located in existing flood risk zones are highly susceptible to surface water flooding during an extreme rainfall event and may incur significant repair costs.
	Benefit: Very strong improvement to matter’s performance, lifespan or a large reduction maintenance requirements.	None identified.
High	Adverse: Large, measurable decrease in receptor lifespan following the occurrence of a climate impact. Large increase in need for periodic maintenance or in maintenance costs.	Periodic cycles of drought or dry periods followed by severe rainfall events can result in continuous shrink-swell of soils, potentially leading to ground subsidence.
	Benefit: strong improvement to matter’s performance, lifespan or a large reduction in maintenance requirements.	None identified.
Medium	Adverse: measurable decrease in receptor performance (short-term or long-term) or lifespan or increase in necessary maintenance frequency and costs following the occurrence of climate impact.	Landscaping vegetation that is susceptible / reactive to changes in weather conditions –the climate impact of longer growing season will lead to increased growth (impact on the receptor) and associated maintenance costs.
	Benefit: moderate measurable increase in matter lifespan or performance, or a measurable reduced need for maintenance.	None identified.
Low	Adverse: small, measurable impact to a receptor’s performance following climate impact, or small reduction in receptors lifespan due to chronic deterioration (e.g. slight decrease in lifespan of an asset due to increased higher temperatures).	Ability of reinforced concrete receptors to withstand daily changes in temperature, which can result in a small but noticeable increase in the rate of spalling and deterioration (due to expansion of metal components).
	Beneficial: small, measurable increase in matter lifespan due to less severe deterioration, increase performance or reduced need for maintenance.	Key personnel onsite attendance improves as the inability to travel to work on days of severe snow and ice will reduce slightly due to increase in

		average temperatures, leading to fewer snow and ice events.
Negligible	No change to the integrity of receptor or a small, temporary, reversible change to receptor performance following the occurrence of a climate impact	Underground/buried assets have negligible susceptibility to higher temperatures due to being buried below ground.

14.55. The significance of each risk is calculated through quantifying magnitude and sensitivity ratings to determine overall significance using the significance matrix shown in **Table 14.7**. Where a risk is determined have a Moderate risk or above, this will be considered significant.

Table 14.7: Significance Matrix (effects can be either adverse or beneficial)

Magnitude	Sensitivity				
	Very high	High	Medium	Low	Negligible
Major	Major	Major	Moderate	Moderate	Minor
Moderate	Major	Moderate	Moderate	Minor	Negligible
Minor	Moderate	Moderate	Minor	Negligible	Negligible
Negligible	Minor	Minor	Negligible	Negligible	Negligible

14.56. The methodology for assessing the significance of risks to local environmental and community receptors due to the project under a future climate baseline will be based on the methodology to be used within that parent technical topic (for example ecology, water etc).

Assumptions and limitations

GHG emissions

14.57. The proposed scope of assessment assumes availability at assessment stage of adequate data for quantitative assessment, where project-specific data is unavailable, industry benchmarks will be used where possible.

14.58. At this stage there is very limited design information and hence the proposed scope will make appropriate qualitative assessments based on available industry guidance.

14.59. There is a degree of uncertainty within carbon footprint calculation as carbon emissions factors represent industry averages and are calculated on a set of assumptions, and thus may not reflect real world scenarios or specific products that are later used in the construction. The final carbon footprint of the constructed design is likely to be different to any prior estimation as it is dependent on the final products selected, their location, and the fuel used on site.

Climate resilience

14.60. The assessment in this chapter is based on freely available information available from third parties for reporting purposes, being observational data from local weather stations, a number of readily available climate change projections and a range of existing climate change datasets and literature at the time of writing this assessment. The following limitations and disclaimer should be noted:

- Climate change projections: climate projections are not predictions or forecasts but simulations of potential scenarios of future climate under a range of hypothetical emissions scenarios and assumptions. The results, therefore, from the experiments performed by climate models cannot be treated as exact or factual, but projection options. They represent internally consistent representations of how the climate may evolve in response to a range of potential forcing scenarios and their reliability varies between climate variables. For a single emission scenario, projections can vary significantly as a function of the model used and how it is applied, so that there is a wide uncertainty band in the results. Scenarios exclude outlying “surprise” or “disaster” scenarios in the literature and any scenario necessarily includes subjective elements and is open to various interpretations. Generally global projections are more certain than regional, and temperature projections more certain than those for precipitation. Further, the degree of uncertainty associated with all climate change projections increases for projections further into the future. Climate models and associated projections are updated on a regular basis, implying changes in the forecasted future climate.
- Validation of information: Mott MacDonald has not independently verified the observational or projection data and does not accept responsibility or liability for any inaccuracies or shortcomings in this information. Should these information sources be modified by these third parties we assume no responsibility for any of the resulting inaccuracies in any of our reports. Issued reports are relevant to the project information provided and are not intended to address changes in project configuration or modifications which occur over time. The data is obtained to provide a general ‘sense check’ on the published literature on existing observational and climate projections for the region.
- We have not undertaken any climate modelling and rely solely on freely available data on climate projections in this region. Accordingly, any further research, analysis or decision-making should take account of the nature of the data sources and climate projections and should consider the range of literature, additional observational data, evidence and research available - and any recent developments in these.
- Application of information: climate projections are used in detailed impact assessment modelling, whose results therefore carry the uncertainty associated with the input data. In addition, any environmental modelling exercise is an approximation of the real natural processes and has its own uncertainty related to the choice of model and its configuration, its spatial and temporal resolution, and the information used for its calibration. We follow accepted procedures in providing this modelling work, but results need to be interpreted in light of the related overall uncertainty.

Conclusions

GHG emissions

- 14.61. Based on this scoping review of the Proposed Development's potential impact on GHG emissions, it is recommended that GHG assessments be scoped in to any future EIA, for both construction and operational stages. National and regional policy both require emissions to be reduced to Net Zero within the lifetime of the development and given the undeveloped nature of the Site at present, the Proposed Development will result in a significant increase in GHG emissions compared to the baseline.

Climate resilience

- 14.62. Based on this scoping review of the Proposed Development's resilience to climate change, it is recommended that the construction phase be scoped out of the climate resilience assessment in the Environmental Statement due to the short construction period during which climate is not anticipated to change significantly from the present day.
- 14.63. It is recommended that the operational phase be scoped into the climate resilience assessment in Environmental Statement due to the potential for adverse risks from future climate change and a need to incorporate resilience measures to mitigate these risks.

15. WASTE

Introduction

15.1. This chapter has been prepared by Mott Macdonald and provides an initial baseline in relation to material assets and generation of waste in the context of the Site (defined in **Chapter 2** of this report), a description of the potential effects of the Proposed Development upon the material assets and generation of waste in the vicinity of the Site in both the construction and operational phases. It sets out mitigation applicable to construction and operation phases which will form part of the application as appendices to the ES and provides rationale for scoping out material assets from the ES.

Study area

15.2. The IEMA guidance Materials and Waste in Environmental Impact Assessment (2020)³² provides definitions for two geographically different study areas to examine and assess the use of material assets and waste generation.

15.3. The first study area is defined as the development study area and comprises the Proposed Development Footprint and any areas required for temporary access, site compounds, working platforms and other enabling activities. The first study area is shown by the red line boundary in **Appendix 1** and indicates the area where material asset will be consumed and waste will be generated.

15.4. The second study area is defined as the expansive study area and extends to the availability of construction materials, capacity of waste management infrastructure and landfill void. For the purposes of the assessment, this study area will comprise the county of Oxfordshire and the South East England region. The South East England region includes the counties of Buckinghamshire, East Sussex, Hampshire, the Isle of Wight, Kent, Oxfordshire, Berkshire, Surrey and West Sussex.

15.5. For waste management, the second study area is also used to sufficiently identify suitable waste infrastructure including landfills, considering the Proximity Principle³³ and value for money. It will be assessed based on an initial search area of 10km from the Site. Where sufficient capacity is not available the search area will be extended accordingly, based on professional judgement.

³² IEMA (2020) Materials and Waste in Environmental Impact Assessment – March 2020 [online]. Available at: [IEMA - Materials and Waste in Environmental Impact Assessment - March 2020](#). Accessed June 2023.

³³ Implies that waste should generally be managed as near as possible to its place of origin, mainly because transporting waste could result in significant environmental effects.

Baseline Conditions

15.6. The baseline conditions are based on the demand for key construction materials and the national and local generation of waste, within Oxfordshire and the South East England region. The baseline outlines the key construction materials required and the capacity and availability of waste management infrastructure within the vicinity of the Site. The assessment will describe the current and likely future state of the types and quantities of material use and waste associated with the operation of the Proposed Development. The information in this chapter is determined through a desk-based study, using a range of online resources.

Use of material assets

15.7. Information on the demand for key construction materials within the UK and within South East England has been used to provide the baseline for material assets. This information has been determined from data from the British Geological Society (BGS), World Steel Association, and Oxfordshire County Council.

15.8. Great Britain's demand of minerals and mineral products in 2018 is shown in **Table 15.1** and the production of minerals within England in 2021 and available mineral workings is shown in **Table 15.2**.

Table 15.1: Great Britain demand for minerals and mineral products

Mineral/ mineral product	Great Britain Demand (2018, unless otherwise stated)
Aggregates, of which:	251 million tonnes
Crushed rock	117.3 million tonnes
Sand and gravel - land won	48.9 million tonnes
Sand and gravel - marine	13.7 million tonnes
Recycled and secondary aggregates	71 million tonnes
Finished cement (2021)	15.6 million tonnes
Ready-mixed concrete (UK, 2021)	22.2 million cubic meters
Concrete products	32.0 million tonnes
Asphalt (2021)	140.9 million tonnes
Apparent steel use (2021)	10.8 million tonnes

Source: British Geological Society (2022)³⁴, Mineral Products Association (2020)³⁵ and World Steel Association (2022)³⁶

³⁴ British Geological Society (2023). United Kingdom Minerals Yearbook 2022. [online] available at: <https://nora.nerc.ac.uk/id/eprint/534312/1/OR23001.pdf>. Accessed June 2023.

³⁵ Mineral Products Association (2020). Profile of the UK Mineral - Products Industry. [online] available at: [Profile of the UK Mineral Products Industry 2020 Spread.pdf](https://www.mineralproducts.org/Profile_of_the_UK_Mineral_Products_Industry_2020_Spread.pdf) (mineralproducts.org) Accessed June 2023.

³⁶ World Steel Association (2023), 2021 World Steel in Figures. [online] available at: <https://worldsteel.org/steel-topics/statistics/world-steel-in-figures-2022/>. Accessed June 2023.

Table 15.2: Production of minerals in 2021

Mineral	UK production in tonnes	Number of mineral workings in England	Number of mineral workings in South East England
Igneous rock	125.9 million*	34	0
Limestone and dolomite		230	11
Sandstone		157	6
Sand and gravel	64.6 million	267	41

Source: British Geological Society (2023)³⁴

Note: *Includes marine-dredged landings at foreign ports

15.9. The Oxfordshire Local Aggregate Assessment 2021³⁷ and South East England Aggregate Working Party Annual Monitoring Report 2021³⁸ assess the demand for and supply of aggregates in the study area of the Site. The South East England Aggregate Working Party Annual Report provides data for 13 mineral planning authorities, including Oxfordshire County Council (OCC).

15.10. **Table 15.3** and **Table 15.4** outline aggregate sales and reserves in Oxfordshire and the South East region in 2021 respectively.

Table 15.3: The 10-year and 3-year total land-won primary aggregate sales average (to 2021) for Oxfordshire

Aggregate	10-year average aggregate sales (Mtpa)	3-year average aggregate sales (Mtpa)	Annual sales, 2021 (Mt)	Existing permitted reserves at end of 2021 (Mt)	Landbank at end of 2021 (years)*
Soft sand	0.22	0.24	0.26	3.82	15.74
Sharp sand and gravel	0.75	0.99	1.16	10.59	10.4
Crushed rock	0.82	1.06	1.25	6.46	7.83
Recycled and secondary aggregates	0.42	0.41	0.42	N/A	N/A

Source: Oxfordshire County Council³⁷

Table 15.4: The 10-year and 3-year total land-won primary aggregate sales average (to 2021) for South East England

Aggregate	10-year average aggregate sales (Mtpa)	3-year average aggregate sales (Mtpa)	Annual sales, 2021 (Mt)	Existing permitted reserves at end of 2021 (Mt)	Landbank at end of 2021 (years)*
Land won sand and gravel	5,969	6,185	6,644	54,349	8

³⁷ Oxfordshire County Council (2023) Oxfordshire Local Aggregate Assessment (calendar year 2021). Available at: oxfordshire.gov.uk/sites/default/files/file/planning-minerals-and-waste/LocalAggregateAssessment2021.pdf. Accessed June 2023.

³⁸ South East England Aggregates Working Party (SEAWP) (2021) Annual Report 2021. Available at: assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1142514/2021_SEAWP_Report_Dec_2022_.pdf. Accessed June 2023.

Crushed rock	1,684	2,165	2,077	23,434	14
Marine dredged aggregates	6,442	6,388	6,588	N/A	N/A
Secondary aggregates	384*	469	923	N/A	N/A
Recycled aggregates	4,027*	4,208	4,232	N/A	N/A

Source: South East England Aggregate Working Party³⁸

- 15.11. The landbank in Oxfordshire at the end of 2021 stood at 10.4 years for sand and gravel, and 7.83 years for crushed rock. The landbank figure for sand and gravel provide sufficient supplies of seven years, as required by the National Planning Policy Framework (NPPF)³⁹. However, the landbank figure for crushed rock does not satisfy the recommended level of 10 years. Therefore, any crushed rock required for the Site may need to be sourced from the wider South East England region where there is sufficient supply.
- 15.12. The Site is not underlain by peat resources⁴⁰ and is not located in a mineral safeguarding area⁴¹.
- 15.13. Based on the information sources listed above, it is anticipated that the UK will have a sufficient quantity of steel available for construction works. Additionally, it is likely that Oxfordshire and South East England will have a sufficient supply of aggregates to support construction works within the region.

Generation and management of waste

- 15.14. The most recent information available, relating to waste generation and operational waste management infrastructure in Oxfordshire and the South East England region, has been gathered to provide the baseline for this scoping report. Information on the current waste arisings, and the waste management infrastructure have been determined through a desktop study, using a number of readily available resources, in particular data from the Environment Agency, Department for Environment, Food & Rural Affairs (Defra) and Oxfordshire County Council.
- 15.15. The latest data from the Environment Agency indicated that England produced over 236 million tonnes of waste in 2021, which was managed by 8,825 permitted waste facilities. The permitted waste facilities in the South East England region received almost 37 million tonnes of waste in 2021, and those in Oxfordshire received approximately 4.5 million tonnes (as shown in **Table 15.5**).

³⁹ Department for Levelling Up, Housing and Communities (2012) National Planning Policy Framework [online]. Available at: [National Planning Policy Framework - Guidance - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/262402/nppf-2012.pdf). Accessed June 2023.

⁴⁰ Natural England (2023) Peaty Soils Location Map. Available at: <https://magic.defra.gov.uk/MagicMap.aspx> Accessed June 2023.

⁴¹ Oxfordshire County Council (2017) Minerals and Waste Local Plan Policies Map South. Available at: [Oxfordshire Minerals & Waste South 2](#). Accessed June 2023.

Table 15.5: Waste breakdown by site type in tonnes (2021)

Site type	Oxfordshire	South East England	England
Landfill	1,637,049	9,547,891	43,179,246
Transfer	238,002	6,504,965	45,111,106
Treatment (excluding metal recycling)	1,794,399	11,817,292	92,477,108
Metal recovery	48,443	1,036,641	15,181,200
Incineration	404,331	3,488,603	16,944,811
Use of waste	0	0	194,781
Land disposal	373,701	2,381,949	11,674,040
Total	4,495,964	36,924,362	236,702,048

Source: Environment Agency⁴²

Note: Mobile plant, processing, combustion and storage of waste are included in the overall waste breakdown

- 15.16. The Environment Agency's Waste Data Interrogator (WDI) recorded that 17,239,639 tonnes of inert construction and demolition (C&D) waste were received in permitted waste facilities in the South East England region in 2021, with 2,277,170 tonnes received in Oxfordshire⁴². The WDI states that 2,209,579 tonnes of inert construction and demolition (C&D) waste were removed from permitted waste facilities in the South East England region with 171,804 tonnes removed from Oxfordshire⁴³. A total of 84,724,460 tonnes of non-hazardous C&D waste was received in permitted waste facilities in England in 2021, of which 18,304,109 tonnes were removed.
- 15.17. According to Defra⁴⁴, the recovery rate of non-hazardous C&D waste in 2018 was 92.3% and 93.8% in the UK and England respectively.
- 15.18. In terms of organic waste treatment, a total of 114,241 tonnes of waste was treated through composting in Oxfordshire in 2021, of which 113,804 (99.6%) was municipal waste. Also, 100,681 tonnes of waste was treated through anaerobic digestion, of which 60,196 tonnes (52.9%) was municipal waste.
- 15.19. Of the 223,321 tonnes of waste received at material recycling facilities in Oxfordshire in 2021, a total of 105,408 tonnes were municipal wastes. This included 11,025 tonnes of paper and cardboard, 2,849 tonnes of glass and 83,050 tonnes of mixed municipal waste.
- 15.20. Of the 5,655 tonnes of packaging waste received in Oxfordshire in 2021, it was primarily managed in metal recycling facilities (1,374 tonnes) and physical treatment facilities (508 tonnes), but most is sent to a transfer station (2,836 tonnes).

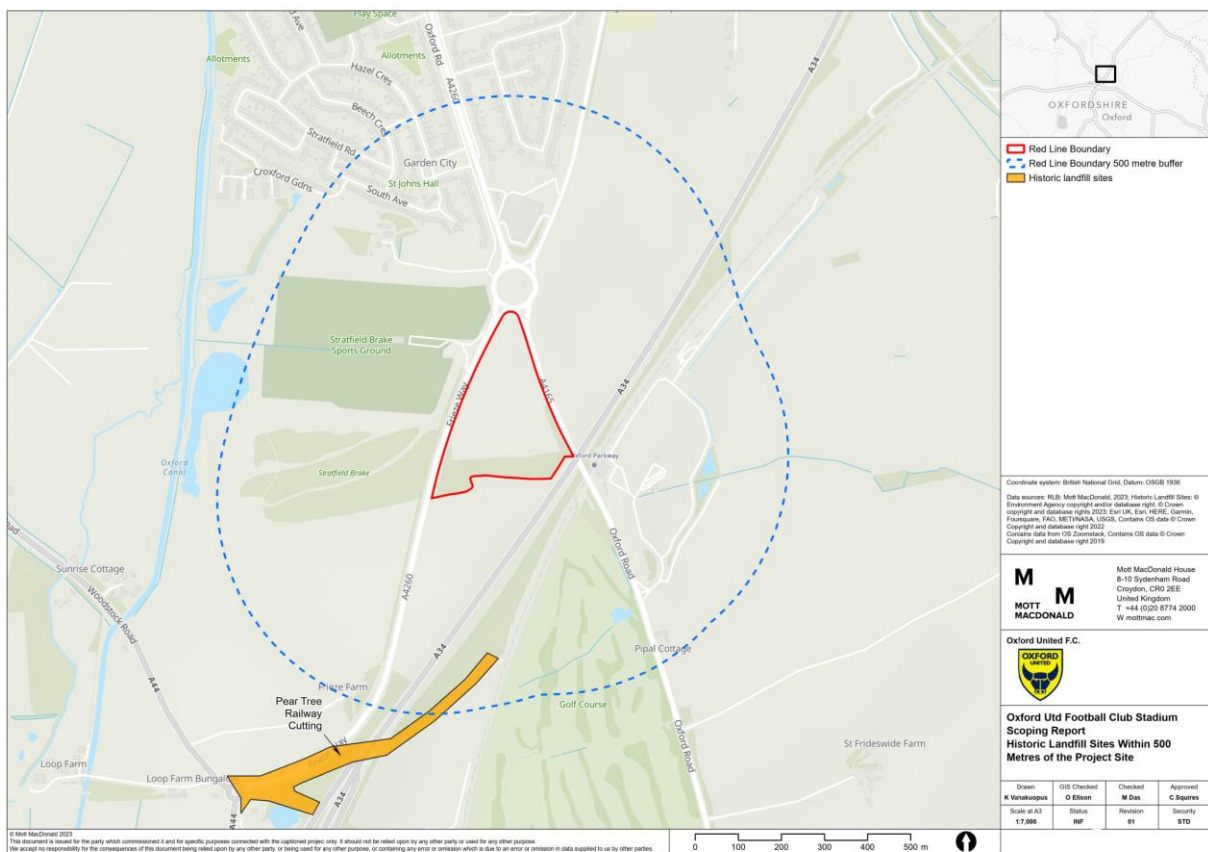
⁴² Environment Agency (2022) Waste Data Interrogator – Wastes Received (Excel) V2 [online]. Available at: [2021 Waste Data Interrogator - Wastes Received \(Excel\) - Version 2](#). Accessed June 2023.

⁴³ Environment Agency (2022) Waste Data Interrogator – Wastes Removed (Excel) V3 [online]. Available at: <https://environment.data.gov.uk/portalstg/home/item.html?id=ba30c9bc257e4bb290e0831615e1e624>. Accessed June 2023.

⁴⁴ DEFRA (2022) UK Statistics on Waste [online]. Available at: [UK statistics on waste - GOV.UK \(www.gov.uk\)](http://www.gov.uk). Accessed June 2023.

- 15.21. Regarding hazardous waste, 43,103 tonnes of hazardous waste were managed in Oxfordshire, of which 2,785 tonnes were specified as C&D waste. 29,615 tonnes of hazardous waste were removed from Oxfordshire, of which 1,529 tonnes were removed as C&D waste (5.2% of all hazardous waste removed).
- 15.22. To identify potential sources of contamination, an initial review of authorised and historic landfill sites that are in close proximity to the Site was undertaken using the Environment Agency’s ‘Historic Landfill Sites’ web map⁴⁵ and ‘Permitted Waste Sites - Authorised Landfill Site Boundaries’ web map⁴⁶.
- 15.23. There is one historic landfill within 500m of the Site known as Pear tree Railway Cutting located approximately 300m south of the Site, as shown in **Figure 15.1**. The landfill closed in 1973 and accepted inert, industrial, commercial and household wastes. There are no authorised landfill sites within 500m of the Site.

Figure 15.1: Historic Landfill Sites within 500m of the Site



⁴⁵ Environment Agency (2023) Historic Landfill online map [online]. Available at: <https://environment.data.gov.uk/arcgis/rest/services/EA/HistoricLandfill/FeatureServer>. Accessed June 2023.

⁴⁶ Environment Agency (2023) Authorised Landfill Site Boundaries Online Map [online]. Available at: <https://www.arcgis.com/home/webmap/viewer.html?url=https%3A%2F%2Fenvironment.data.gov.uk%2Farcgis%2Frest%2Fservices%2FEA%2FPermittedWasteSitesAuthorisedLandfillSiteBoundaries%2FFeatureServer&source=sd>. Accessed June 2023.

- 15.24. Potential sources of contamination that are greater than 500m away from the Site have not been considered, as these are considered unlikely to affect Site itself.
- 15.25. The Environment Agency reported that in 2021, 830 sites in South East England had environmental permits to accept waste. **Table 15.6** outlines the remaining landfill capacity within Oxfordshire, South East England, and England at the end of 2021.

Table 15.6: Landfill capacity in Oxfordshire, South East England and England at the end of 2021 (cubic metres)

Landfill type	Oxfordshire	South East England	England
Hazardous Merchant	-	121,318	12,106,518
Hazardous Restricted	-	98,187	2,105,291
Non-Hazardous with SNRHW* cell	-	12,555,978	52,006,226
Non-Hazardous	2,766,766	19,183,751	162,369,640
Inert	2,104,965	20,084,319	129,077,630
Total	4,871,731	52,043,553	358,665,304

Source: Environment Agency (2022)⁴⁷

Note: *SNRHW: Stable Non-Reactive Hazardous Waste

- 15.26. The remaining capacity for Oxfordshire at the end of 2021 for inert landfill was 2,104,965m³. At the end of 2021, the county had six permitted inert landfills and four non-hazardous landfills with remaining capacity.
- 15.27. A search on the Environment Agency's public register was undertaken for all permitted waste facilities within 10km of the Site, measured from postcode OX5 1UP⁴⁸. The search found five permitted sites for recycling and recovery of C&D waste within 10km of the Site suitable for the construction phase, and two sites suitable for treatment of wastes likely to be generated in the operational phase. There are three inert landfills within 10km of the Site.
- 15.28. There are no treatment facilities for organic wastes within 10km of the Proposed Development for waste arisings from hospitality activities, grounds maintenance (grass clippings) and vegetation clearance.
- 15.29. In addition to permitted C&D waste management sites, inert material is also managed on sites that have an Environment Agency environmental permit exemption. These exempt sites generally comprise land restoration activities such as restoring mineral voids, engineering or landscaping schemes and for agricultural improvements on farmland. These sites are an important part of the

⁴⁷ Environment Agency (2022) 2021 Remaining Landfill Capacity – Version 2 [online]. Available at: <https://environment.data.gov.uk/portalstg/home/item.html?id=cfc2ce5bc354d89a8d0c2a85dbe7daa> Accessed June 2023.

⁴⁸ Environment Agency (2023) Waste Operation permits Search [online]. Available at: https://environment.data.gov.uk/public-register/waste-operations/registration?easting=449613&northing=212209&name-search=&number-search=&local-authority=&address-search=&_postcode=OX5+1UP&dist=10 Accessed June 2023.

provision of the capacity for managing inert materials. Although small tonnages of waste from other waste streams (e.g. biodegradable waste) may be managed at locations with an exemption, the largest tonnage of exempt activities is likely to involve C&D material.

- 15.30. There are 335 waste exempt sites listed by the Environmental Agency within 10km of the proposed scheme, of which 122 are 'use of waste in construction' (U1) exempt sites⁴⁹. These U1 exempt sites utilise waste for the purpose of construction, such as buildings or engineering work, and are often short-lived, and therefore should be identified upon commencement of construction.
- 15.31. Not all treatment facilities may be suitable for the waste generated by the Site during construction and operational phases, but it demonstrates that sufficient treatment facilities are available for the waste that will be generated by the Site. Reuse, recycling and recovery of wastes will be prioritised. However, if these options are not available or feasible, the alternative is to adopt the Proximity Principle. The Site will be assessed against the capacities of the relevant waste infrastructure to identify if there is sufficient capacity available.
- 15.32. Baseline study indicates that the region has sufficient waste treatment infrastructure for the treatment of waste arisings generated by the Proposed Development. Oxfordshire has sufficient capacity to treat C&D waste arisings associated with the construction phase of the Proposed Development. Biodegradable waste from site clearance in the construction phase and food waste and grass clippings in the operational phase should be treated in a composting or anaerobic facility. No such facilities exist within 10km of the Site. It is likely that contaminated waste may arise during construction if excavation activities are undertaken within 500m boundary of the Proposed Development.
- 15.33. It is also expected that the region will have sufficient treatment capacity for operational wastes, provided the waste hierarchy is followed and landfilling of wastes is avoided where possible, as per the Stadium Vision.

Key Issues and Requirement for Assessment

- 15.34. This section provides an overview of potential impacts relating to material assets use and waste generation as a result of the construction and operation of the Site.

⁴⁹ Environment Agency (2023) Waste Exemptions [online]. Available at: [Results of searching Waste Exemptions \(data.gov.uk\)](https://data.gov.uk) Accessed June 2023.

Construction

15.35. This section provides an overview of potential impacts relating to resource use and waste generation as a result of the construction phase of the Proposed Development. The construction phase includes site preparation (including ground clearance) and construction. Exact quantities of resources required and waste to be generated by the construction of the Site have not been quantified at this stage.

Impacts associated with the use of resources

15.36. Material assets include raw materials such as aggregate and minerals from primary, secondary and recycled sources, and manufactured construction products. Manufactured construction products can include the materials required for the construction of the Site, and precast elements for the construction of structures such as signage, pipework, barriers, lighting and fencing.

15.37. The Site would likely require a moderate quantity of material assets for construction due to the scale of the Proposed Development, and would, therefore, have the potential for some direct adverse impacts on the environment through the reduction in the availability of material assets and potentially the depletion of natural resources. These are summarised in **Table 15.7**.

15.38. Many material assets may originate off-site and outside the study area, purchased as construction products. However, the construction phase could generate resources during the initial excavations and levelling works for the Proposed Development, for example excavated soils and sub-strata. The consideration of the impacts associated with raw material extraction, processing, and manufacturing of construction material will be outside the scope of the assessment, as these are subject to separate environmental assessments.

Table 15.7: Impacts of material asset use during the construction phase

Project activity	Resource use and potential to generate significant impacts
Site preparation	Potential direct impacts associated with the import and use of primary aggregates and/or fill material, which may result in the depletion of non-renewable resources.
Demolition	No demolition is required for the Proposed Development. In the event that demolition occur, it is unlikely to require the use of any materials.
Construction	Construction of the Proposed Development, along with signage, lighting, safety barriers, drainage, communications infrastructure, pavement, and landscaping works, would require moderate amounts of materials. Although quantities of materials are not known at present, the type of materials that are likely to be required may include (and are not limited to): <ul style="list-style-type: none"> • Steel • Aggregate • Cement • Concrete • Bitumen

	<ul style="list-style-type: none"> • Wood • Associated playing surface separately • Plastic • Other metal
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15.39. The receptors likely to be subject to impacts as a result of the requirement for material assets during the construction of the Proposed Development include quarries and other sources of minerals, and other finite raw material assets. The potential impacts associated with the use of material assets on these receptors include:

- Materials would need to be imported to the Site as it is assumed the Proposed Development would be unlikely to entirely recover or reuse site-won material;
- The majority of materials used on the Proposed Development would comprise primary materials as the Proposed Development is unlikely to be able to source all required materials from recycled or secondary materials; and
- The Proposed Development may sterilise (substantially constrain/prevent existing and potential future use of) mineral sites.

Impacts associated with the generation and management of waste

15.40. The construction phase of the Proposed Development has the potential to generate waste which may result in adverse environmental effects, including the temporary occupation of waste management facility space (from treatment of waste) and the permanent reduction to landfill capacity (from disposal of waste). This is summarised in **Table 15.8**. However, the Proposed Development would aim to minimise the generation of waste as much as possible, through the implementation of the waste hierarchy (as set out in The Waste (England and Wales) Regulations, 2011 as amended). The generation and management of waste would require transport off-site, however, the impacts related to the transport of this waste this is more logically dealt with in the Air quality chapter.

15.41. In considering the generation and management of waste, it is important to define when, under current legislation and understanding, a material is considered to be a waste. The EU Waste Framework Directive 2008/98/EC defines waste as “any substance or object which the holder discards or intends or is required to discard”.

Table 15.8: Impacts of waste generation during the construction phase

Project activity	Waste arisings and potential to generate significant impacts
Site remediation / preparation / earthworks	<p>Potential direct impacts associated with the off-site disposal of waste, which may result from:</p> <ul style="list-style-type: none"> • The production of waste from site clearance, e.g. green waste, contaminated soils, inert waste • Exceeding the cut and fill balance, therefore, generating excess cut material as waste

Demolition	As the Site is on a greenfield site with no existing built developments, no demolition is required. there may be direct impacts associated with the generation of waste, in particular bricks, concrete and timber. This may cause indirect impacts if disposal in landfill is required, which will result in a permanent reduction in landfill void capacity.
Site construction	It is likely that the majority of waste would be generated in the Site preparation. However, the construction phase of the proposed development may result in the following waste arisings: <ul style="list-style-type: none"> • Materials brought to site that are not used for their intended purpose, e.g. damage items, offcuts, and surplus materials • Excavated materials such as soil which may be contaminated, unsuitable or surplus to requirements

15.42. The receptors likely to be subject to impacts as a result of waste generation and its management are the surrounding environment and habitats, landfills and other waste management infrastructure. The potential impacts relating to the generation and management of waste on these receptors include:

- Temporary occupation of waste management infrastructure capacity (from treatment of waste) and temporary occupation of land for the storage of waste awaiting transfer off-site; and
- Permanent reduction in landfill capacity (from disposal of waste).

Mitigation measures for the impacts associated with material asset use and waste generation and treatment in the construction phase

15.43. Mitigation measures that would be implemented on-site to ensure efficient use of material assets and reduction of waste arisings, and to reduce the potential impacts identified, are expected to be as follows (but not limited to):

- A Construction Environmental Management Plan (CEMP) would be produced and will incorporate the mitigation measures proposed. These will be considered against the South East of England Joint Waste Strategy in terms of waste streams, volumes and opportunities for reuse, recycling and diversion from landfill;
- A Materials Management Plan (MMP) would be compiled by the contractor as part of the EMP, if required. It would identify ways to reuse site-won or excavated materials within the construction of the Proposed Development, provided they meet the requirements of the Contaminated Land: Applications in Real Environments (CL:AIRE) Definition of Waste: Code of Practice (DoW CoP);
- A Site Waste Management Plan (SWMP) will be developed by the contractor, as part of the CEMP. The aim of the SWMP is to ensure that waste is managed in accordance with the waste hierarchy and other relevant legislative requirements, and it details information on the waste carriers and waste management facilities that could be used. It will also be used to measure and monitor the types and quantities of waste removed off-site. The SWMP is a key part of the CEMP and will be a live document based on construction operations as they

occur. The SWMP will be produced in line with best practice guidance and will establish resource efficiency and waste minimisation opportunities;

- A circular economy workshop with the design team which will ensure consideration of resource efficiency, use of renewable materials and waste minimisation in design;
- The design process for the Proposed Development will explore on-site reuse of demolition materials;
- The Proposed Development will support the council's net zero carbon emissions pledge through highly sustainable development; and
- The design process will explore the reuse of excavated materials generated on-site and the use of secondary/ recycled aggregates.

15.44. Waste audits should be undertaken by the contractor throughout the construction phase. The contractor would report on the types and quantities of waste taken off-site and performance against reuse and recycling targets throughout the construction phase, and indicate where continual improvements to waste management and minimisation can be made. Information relating to these audits would be used to inform the revisions of the SWMP.

15.45. The MMP, SWMP and CEMP would capture how efficient use of material assets and reduction of waste arisings would be achieved, and how the potential impacts identified in this chapter would be reduced or mitigated.

15.46. Set targets for waste reduction and recovery of waste in procurement contracts.

15.47. Where waste must be taken to a recycling or disposal site, the contractor has a legal duty to ensure that the Sites have the appropriate permits. The appointed contractor would identify the closest relevant treatment and disposal sites, to minimise the impacts of transportation.

Operation

Impacts associated with material asset use

15.48. Relatively small quantities of materials are going to be required for maintenance of the Proposed Development during the operational lifetime in comparison to the construction phase. This includes localised repairs, which may require concrete, and other materials consistent with construction materials to be used for the construction phase.

15.49. With the exception of the upkeep of sports pitch and landscaping, maintenance activities are expected to occur infrequently and would require relatively negligible quantities of both primary raw materials and manufactured construction products compared to the construction phase.

Table 15.9: Impacts of material asset use during the operation phase

Project activity	Material asset use and potential to generate significant impacts
Operation	<p>Operation in this case includes maintenance activities.</p> <p>No significant impacts relating to the operation of the Site are anticipated on raw materials as maintenance of built development would be infrequent and unlikely to require large volumes of materials.</p> <p>No significant impacts are expected for the use of material assets for the maintenance of the Proposed Development as there is sufficient availability of likely required resources in the region.</p>

15.50. The receptors likely to be subject to impacts as a result of the requirement for material assets during the operation of the Proposed Development include quarries and other sources of minerals, and other finite raw material assets. The potential impacts associated with the use of material assets on these receptors include:

- Materials would need to be imported to the Site as it is assumed the Proposed Development would be unlikely to entirely recover or reuse site-won material; and
- The majority of materials used within the Proposed Development comprise primary materials as the Proposed Development is unlikely to be able to source all required materials from recycled or secondary materials.

15.51. The type and volume of materials used for operation and maintenance of the built development aspects of the Proposed Development will be small in comparison to that required for the construction works of the Proposed Development. Therefore, it is proposed that this element is scoped out of further assessment.

Impacts associated with the generation and management of waste

15.52. Maintenance works may generate waste from vegetation clearance, clearing of drainage networks, materials brought to site that are not used for their intended purposes, as well as surplus materials such as concrete, paints and oils (some of which may be hazardous or require additional requirements for safe and compliant handling). Based on professional experience, the maintenance work is expected to be infrequent and associated works would not require large volumes of materials.

15.53. The venue would be used for football matches and other large events. Sporting and music events during general operation have the potential to generate large quantities of varied waste including food waste, dry recyclables, packaging, and single use plastics. Union of European Football Associations (UEFA) estimates that for events of up to 25,000 spectators there may be as much as

20 tonnes of waste based of a rate of 0.8kg of waste per spectator⁵⁰. Expected waste volumes generated by the adjoining hotel are currently unknown, but published data gives an indication of likely arisings of approximately 2.8 kg/guest/night⁵¹ for a hotel of this scale.

Table 15.10: Waste impacts during the operation phase

Project activity	Waste arisings and potential to generate significant impacts
Operation	<p>Operation in this case includes maintenance activities.</p> <p>Waste will be generated during the operation and maintenance of the Site. Although in minimal quantities, waste would be likely to arise from the following activities during operation:</p> <ul style="list-style-type: none"> • Waste from hospitality activities including <ul style="list-style-type: none"> ○ Food waste ○ Packaging and single use containers ○ Glass bottles and containers ○ Paper ○ Metal cans and tins • Waste from retail facilities including packaging • Grass cuttings from pitch maintenance • Municipal solid waste and dry recyclables from match days <p>Relatively small volumes of waste arising from maintenance activities such as road sweepings and gully clearings, replacement signage and lighting, road and parking area resurfacing and landscape maintenance would be produced.</p>

15.54. The receptors likely to be subject to impacts as a result of waste generation and its management are the surrounding environment and habitats, landfills and other waste management infrastructure. The potential impacts relating to the generation and management of waste on these receptors include:

- Temporary minor occupation of waste management infrastructure capacity (from treatment of waste) and temporary occupation of land for the storage of waste awaiting transfer off-site
- Permanent minor reduction in landfill capacity (from disposal of waste)

Mitigation measures for the impacts associated with material asset use and generation and management of waste in the operational phase

15.55. Mitigation measures that would be implemented on-site to ensure efficient use of material assets and reduction of waste arisings, and to reduce the potential impacts identified are listed below. The

⁵⁰ UEFA (2022) Circular Economy Guidelines. Available at: https://editorial.uefa.com/resources/0279-160d7cdbf5c9-d926ee78c765-1000/uefa_circular_economy_guidelines_f_b_07092022_rgb_20220907111725.pdf Accessed June 2023

⁵¹ Mandarin Oriental Hotel Group (2019) Sustainability Report – Global Hotel Average. Available at: [mandarin-oriental-sustainability-report-2019-](https://www.mandarin-oriental.com/sustainability-report-2019/) (mandarinoriental.com) Accessed June 2023.

development vision master plan⁵² states that the stadium will operate with zero plastic and minimal waste and packaging.

- A stadium sustainability and resources management strategy (SSRMS) will be prepared and implemented to embed circular economy principles into operations specifically looking at means to reduce food waste and single use plastics (such as such as cups, straws and carrier bags), as well as zero-waste to landfill targets and supply chain policies to govern sources of packaging. It will also outline initiatives to reduce the quantity of wastes produced and maximise recycling and reuse rates.
- An operational waste management strategy (OWMS) will be produced which will provide estimates of the anticipated waste generation for the Proposed Development during operation. The OWMS will provide guidance on how to allow waste to be disposed, stored and managed in a sustainable manner.

15.56. In addition, the Proposed Development will be designed to achieve at least BREEAM⁵³ very good status, with a clear aspirational target of achieving 'Excellent'.

15.57. The Proposed Development would develop contracts with local facilities to manage the waste arising from the Proposed Development. The baseline study indicates that there is sufficient waste management capacity for waste management in the region, enabling application of the Proximity Principle.

Approach to Assessment

Scope of assessment

Construction

Use of material assets

15.58. Due to the size and scale of the Proposed Development, there is the potential for moderate to large volumes of material assets to be required for the construction phase. Therefore, there is the potential for adverse effects on the environment, through a reduction in the availability of material assets and potentially the depletion of natural resources. It is likely that any significant effects due to the quantity of materials assets required could be appropriately mitigated through the

⁵² Oxford United FC (2023) New Stadium Development Project Vision – May 2023. Available at: [PowerPoint Presentation \(oufcstadium.co.uk\)](https://www.oufcstadium.co.uk). Accessed June 2023.

⁵³ Building Research Establishment Environmental Assessment Method (BREEAM) - a sustainability assessment method that is used to masterplan projects, infrastructure, and buildings. Sets standards for the environmental performance of buildings through the design, specification, construction and operation phases. Includes waste criteria to encourage sustainable management (and reuse where feasible) of construction and operational waste and waste through future maintenance and repairs associated with the building structure.

implementation of mitigation measures outlined in Paragraphs 15.43 to 15.47. However, without accurate material quantification, a cut/fill balance calculation and further design information at this stage, this assumption cannot be confirmed. Therefore, further assessment is required, with accurate material quantification, a cut/fill balance calculation and further design information, to confirm the likelihood of significant effects.

- 15.59. The specific mitigation measures to be implemented throughout the construction works will be outlined within the introductory chapters of the ES. Through the implementation of mitigation measures, the quantities of waste generated will be minimised. Providing measures in the CEMP, MMP and SWMP are enforced and adhered to, significant adverse effects on sensitive receptors, pertaining to the quantity and composition of waste during the demolition and construction of the Proposed Development, are considered unlikely.
- 15.60. It is therefore proposed that further assessment of material assets use relating to construction of the Proposed Development is **scoped in**.

Generation and management of waste

- 15.61. The Proposed Development would likely to generate waste during construction which could result in the temporary occupation of waste management facility space (from treatment of waste) and the permanent reduction in landfill capacity (from disposal of waste). Without the application of mitigation measures there is the potential for significant and adverse effects on the environment through the generation of waste during the construction.
- 15.62. In line with good design, and effective cost management, materials generated on the Site by construction works will be retained on site and reused wherever possible. Mitigation measures such as the MMP and production of a SWMP would implement the principles of the waste hierarchy to reduce the amount of waste produced and maximise the reuse of any waste on site, will reduce the overall effects. However, due to current uncertainty regarding the quantities of waste anticipated and limited design information for assessment, further investigation is required to confirm the likely significant effects.
- 15.63. Accounting for good industry practice and the application of mitigation measures, secured through planning condition, the volume of construction, demolition and excavation waste to the regional waste handling facilities is not likely to be significant.
- 15.64. It is therefore proposed that further assessment of waste generation and management relating to the construction of the Proposed Development is **scoped out** and will not be considered further in the EIA or reported in the ES.

Operation

Use of material assets

- 15.65. Maintenance and repair activities of structures and buildings would occur infrequently and would require relatively negligible quantities of both primary raw materials and manufactured products compared to the construction phase.
- 15.66. Maintenance of the pitch and landscape areas would be a more frequent task, however quantities of both primary raw materials (e.g fertilizers) and manufactured products, required would also be relatively negligible compared to the construction phase.
- 15.67. It is therefore proposed that further assessment of use of material assets relating to the operation of the Proposed Development is **scoped out**.

Generation and management of waste

- 15.68. Without the application of mitigation measures the waste produced during both maintenance and general operation of the Site are expected to be significant, particularly during match days. An overarching SSRMS and OWMS will implement the principles of the waste hierarchy to reduce the amount of waste produced and maximise the reuse of any waste on site, will reduce the overall effects.
- 15.69. As a minimum, the SSRMS and OWMS will accord with the LPA Planning and waste management design guide (2009)⁵⁴ as well adopting measures to meet relevant BREEAM criteria where possible.
- 15.70. It is intended that the SSRMS and OWMS will be submitted as appendices to the ES, and the calculated waste storage provisions for the stadia and hotel for both the food and beverage kitchens and the concourses will be summarised in the development description of the ES. This approach provides the best approach for outlining the SSRMS, rather than 'assessing' waste as an environmental topic. The impacts of waste management, such as handling, storage and transport, will be assessed within relevant technical chapters. The completion and implementation of the SSRMS and OWMS, secured by planning condition, is considered as embedded mitigation as part of the Proposed Development and the conclusions made in this Scoping Report.

⁵⁴ Cherwell DC (2009) Planning and waste management design guide. Available at: <https://www.cherwell.gov.uk/directory-record/1662/planning-and-waste-management-design-guide>. Accessed June 2023.

- 15.71. However, this is a new development, built in a new green field area with no existing waste management contract. Large volumes of business waste is expected to be generated during its operational phase.
- 15.72. It is therefore proposed that further assessment of waste generation and management relating to the operation of the Proposed Development is **scoped in**.

Evaluation of effects

- 15.73. The significance of an effect is determined based on the magnitude of an impact and the sensitivity of the receptor affected by the impact of that magnitude. This section describes the criteria applied in this chapter to characterise the magnitude of potential impacts and sensitivity of receptors. The terms used to define magnitude and sensitivity are based on IEMA's guide to Materials and Waste in EIA.
- 15.74. The assessment criteria used to assess the potential effects on material resources use and generation and management of waste arising from the Proposed Development differs from the generic EIA methodology and are described below.

Sensitivity and Magnitude

- 15.75. For waste generation, IEMA guidance offers two methods for assessing the magnitude of impact from the generation and disposal of waste:
- W1 – Void Capacity; and
 - W2 – Landfill Diversion.
- 15.76. For this assessment, the W1 – Void Capacity method has been selected. **Table 15.11** and **Table 15.12** for assessing the sensitivity and magnitude of impact from the generation and disposal of waste has been selected for the following reasons:
- it is a robust approach based on availability of industry data;
 - it is a detailed methodology; and
 - this method is recommended for statutory EIAs.
- 15.77. For these tables "Region" means the authority comprising the second study area, in this case Oxfordshire and the South East region. "Primary materials" describes materials that are from a non-renewable source

Table 15.11 Criteria to determine sensitivity for material assets and waste generation

Sensitivity category	Description
Negligible	<p>Material assets for the key materials required for the construction and/or operation of a development:</p> <ul style="list-style-type: none"> • are forecast (through trend and analysis and other information) to be free from known issues regarding supply and stock; • are available comprising a very high proportion of sustainable features and benefits compared to industry-standard materials; and/or • sustainable features and benefit could include materials or products that comprise reuse, secondary or recycled content (including excavated and other arisings), support the drive to a circular economy or in some other way reduce lifetime environmental impacts. <p>Waste generation across construction and/or operation phases, the baseline/future baseline of regional (or where justified, national):</p> <ul style="list-style-type: none"> • inert and non-hazardous landfill capacity void is expected to remain unchanged or is expected to increase through a committed change in capacity; and • hazardous landfill capacity void is expected to remain unchanged or is expected to increase through a committed change in capacity.
Low	<p>Material assets for the key materials required for the construction and/or operation of a development:</p> <ul style="list-style-type: none"> • are forecast (through trend and analysis and other information) to be generally free from known issues regarding supply and stock; and/or • are available comprising a high proportion of sustainable features and benefits compared to industry-standard materials. <p>Waste generation across construction and/or operation phases, the baseline/future baseline of regional (or where justified, national):</p> <ul style="list-style-type: none"> • inert and non-hazardous landfill capacity void is expected to reduce minimally by <1% as a result of waste forecast; and/or • hazardous landfill capacity void is expected to reduce minimally by <0.1% as a result of waste forecast.
Medium	<p>Material assets for the key materials required for the construction and/or operation of a development:</p> <ul style="list-style-type: none"> • are forecast (through trend and analysis and other information) to suffer from some potential issues regarding supply and stock; and/or • are available comprising some sustainable features and benefits compared to industry-standard materials. <p>Waste generation across construction and/or operation phases, the baseline/future baseline of regional (or where justified, national):</p> <ul style="list-style-type: none"> • inert and non-hazardous landfill capacity void is expected to reduce noticeably by 1-5% as a result of waste forecast; and/or • hazardous landfill capacity void is expected to reduce noticeably by 0.1- 0.5% as a result of waste forecast.
High	<p>Material assets for the key materials required for the construction and/or operation of a development:</p> <ul style="list-style-type: none"> • are forecast (through trend and analysis and other information) to suffer from some potential issues regarding supply and stock; and/or • comprise little or no sustainable features and benefits compared to industry-standard materials. <p>Waste generation across construction and/or operation phases, the baseline/future baseline of regional (or where justified, national):</p> <ul style="list-style-type: none"> • inert and non-hazardous landfill capacity void is expected to reduce considerably by 6-10% as a result of wastes forecast; and/or • hazardous landfill capacity void is expected to reduce considerably by 0.5 - 1% as a result of wastes forecast.

Very High	<p>Material assets for the key materials required for the construction and/or operation of a development:</p> <ul style="list-style-type: none"> • are known to be insufficient in terms of production, supply and/or stock; and/or • comprise no sustainable features and benefits compared to industry-standard materials. <p>Waste generation across construction and/or operation phases, the baseline/future baseline of regional (or where justified, national):</p> <ul style="list-style-type: none"> • inert and non-hazardous landfill capacity void is expected to reduce very considerably (by >10%); end during construction or operation; is already known to be unavailable; or, would require new capacity or infrastructure to be put in place to meet forecast demand; and/or • hazardous landfill capacity void is expected to reduce very considerably (by >1%); end during construction or operation; is already known to be unavailable; or, would require new capacity or infrastructure to be put in place to meet forecast demand.
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Table 15.12: Criteria to determine magnitude for material assets and waste generation

Magnitude	Description
No change	<p>Material assets: no materials required</p> <p>Waste generation:</p> <ul style="list-style-type: none"> • based on void capacity: for inert, non-hazardous and hazardous waste, zero waste generation and disposal from the development.
Negligible	<p>Material assets: no individual material type is equal to or greater than 1% by volume of the regional or where justified national baseline availability</p> <p>Waste generation:</p> <ul style="list-style-type: none"> • based on void capacity, the development will reduce: <ul style="list-style-type: none"> – regional or where justified national landfill void capacity baseline** for inert and non – hazardous by <1%; and/or – national landfill void capacity baseline** for hazardous waste by <0.1%.
Minor	<p>Material assets:</p> <ul style="list-style-type: none"> • one or more materials is between 1-5% by volume of the regional or where justified national baseline availability; and/or • the development has the potential to adversely and substantially* impact access to one or more allocated mineral site (in their entirety), placing their future use at risk. <p>Waste generation:</p> <ul style="list-style-type: none"> • based on void capacity, the development will reduce: <ul style="list-style-type: none"> – regional or where justified national landfill void capacity baseline** for inert and non-hazardous by 1- 5%; and/or – national landfill void capacity baseline** for hazardous waste by <0.1-0.5%.
Moderate	<p>Material assets:</p> <ul style="list-style-type: none"> • one or more materials is between 6-10% by volume of the regional or where justified national baseline availability; and/or • the allocated mineral site is substantially* sterilised by the development rendering it inaccessible for future use. <p>Waste generation:</p> <ul style="list-style-type: none"> • based on void capacity, the development will reduce: <ul style="list-style-type: none"> – regional or where justified national landfill void capacity baseline** for inert and non-hazardous by 6-10%; and/or – national landfill void capacity baseline** for hazardous waste by <0.5-1%.
Major	<p>Material assets:</p> <ul style="list-style-type: none"> • one or more materials is >10% by volume of the regional or where justified, national baseline availability; and/or

	<ul style="list-style-type: none"> more than one allocated mineral site is substantially* sterilised by the development rendering it inaccessible for future use. <p>Waste generation:</p> <ul style="list-style-type: none"> based on void capacity, the development will reduce: <ul style="list-style-type: none"> regional or where justified national landfill void capacity baseline** for inert and non-hazardous by >10%; and/or national landfill void capacity baseline** for hazardous waste by >1%.
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Source: (The Institute of Environmental Management and Assessment, 2020)

*Justified using professional judgement, based on the scale and nature of the allocated mineral site being assessed.

** forecast as the worst-case scenario, during a defined construction and/or operational phase.

Significance

15.78. The significance of the effect is determined by assigning an impact magnitude and sensitivity to the receptor. **Table 15.13** and **Table 15.14** set out the significance matrix used to determine significant effects for waste and materials.

15.79. For the purpose of this assessment, any effects with a significance level of minor or less are considered to be not significant.

Table 15.13: Effect threshold used in EIA

		Magnitude of impact				
		No change	Negligible	Minor	Moderate	Major
Sensitivity (or value) of receptor	Very high	Neutral	Minor*	Moderate or large	Large or very large	Very Large
	High	Neutral	Minor*	Minor* or Moderate	Moderate or large	Large or very large
	Medium	Neutral	Minor*	Minor*	Moderate	Moderate or large
	Low	Neutral	Minor*	Neutral or Minor*	Minor*	Minor* or Moderate
	Negligible	Neutral	Minor*	Neutral or Minor*	Neutral or Minor*	Minor*

Source: (The Institute of Environmental Management and Assessment, 2020)

*Modified based on professional judgement and project requirement.

Table 15.14: Significance of effect

Effect	Materials	Waste

Neutral	Not Significant	Not Significant
Minor*		
Moderate	Significant	Significant
Large		
Very Large		

Source: (The Institute of Environmental Management and Assessment, 2020)

*Modified based on professional judgement and project requirement.

Assumptions and limitations

- 15.80. Consultation with the local planning authority on material assets and waste has not taken place as of the writing of this report. Before the application is finalised stakeholders will be approached regarding consultation on the environmental impact assessment.
- 15.81. This assessment will not consider the environmental effects associated with the off-site extraction of raw materials used for the off-site manufacture of products. This includes ancillary materials required for hospitality or retail activities including food, drink, containers and merchandise for example. These stages of the products' or materials' lifecycles are outside of the scope of the assessment due to the range of unknown variables associated with the processes involved and are not considered to form part of the Proposed Development.
- 15.82. Information on permitted capacity of waste management facilities has been used in the assessment, based on current publicly available data at the time of writing. However, it should be noted that the capacity information obtained from the Environment Agency for the Sites and regions identified does not necessarily mean that the capacity detailed would be available for use by the Proposed Development.
- 15.83. It is noted that any future changes to the permitted capacity and throughput are uncertain. It is also difficult to assess the available capacity due to the commercial sensitivity of existing contracts and the timescales over which waste would be produced. It is likely that additional capacity would become available. However, it is not currently possible to predict the timeframes for when these new waste management facilities would become available and, therefore, how many of these sites would be available to accommodate waste arisings from the Site. Similarly, it is also possible that some of the existing waste management facilities might close or be unavailable.
- 15.84. Given the early stages of design, estimates relating to the quantity of materials required are not available nor are there estimates available relating to the quantity of waste arisings anticipated. As such, a qualitative exercise has been carried out at this stage, limited to identifying activities that are likely to require significant quantities of materials, or are likely to produce significant quantities of waste. Quantitative estimates will be included within the project description of the ES and or within the relevant sections of management plans appended to the ES.

15.85. Any hazardous waste arising during the construction and operational phase will be handled in line with the best practice procedures and certifications, regulations and permits held by the appointed waste management company and as such are not considered within this chapter.

Conclusions

15.86. Without the application of mitigation measures the Proposed Development has the potential to result in a significant adverse effect upon material assets use and waste management capacity in the region. The aspects scoped in for the assessment are summarised in **Table 15.15** below.

Table 15.15: Scoping recommendation summary

Phase	Mitigation measure	Scoped in	Scoped out
Construction			
Use of material assets	Good industry practice to minimise material assets use (such as application of Modern Methods of Construction) Designed to achieve at least BREEAM very good status, with a clear aspirational target of achieving 'Excellent'. CEMP to set out specific targets, control measures and monitoring requirements MMP, Circular Economy workshop	X	
Waste generation and management	Good industry practice to minimise waste (such as application of Modern Methods of Construction) CEMP to set out specific targets, control measures and monitoring requirements, Circular Economy workshop, Designing out waste, SWMP, MMP		X
Sterilisation of MSA and/or peat resources	No MSA or peat resources in study area	N/A	N/A
Operation			
Use of material assets	SSRMS including zero plastic policy		X
Waste generation and management	SSRMS, OWMP	X	

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16. TOPICS WHERE SIGNIFICANT EFFECTS ARE UNLIKELY

16.1. The following matters are proposed to be scoped out of the ES in light of desk-based research, the information provided as part of the previous application on the Site, professional judgement, and other information available. In light of this, and in line with the Regulation 4(2), these matters are not considered to result in significant environmental effects and is therefore proposed to be scoped out of the ES. This section sets out the justification as to why these topics should be scoped out.

Human Health

Introduction

16.2. The need for a human health ES Chapter has been considered by ekosgen.

Justification of why Significant Effects are not likely

16.3. In line with the requirements of the EIA Regulations, the potential effects on human health have been considered in relation to the likelihood for significant effects to occur. In accordance with the EIA Regulations, the assessment of potential effects on human health should be proportionate to the Proposed Development that is being considered.

16.4. The Site currently comprises greenfield land and is located in an area of high public transport accessibility, with extensive local amenity and services within a short distance as well as access to a large labour force across Oxfordshire.

16.5. There is likely to be a range of beneficial health effects resulting from the Proposed Development including increased access to work and training opportunities, increased access to local amenity provision and leisure activities, improved public transport connections and support for active travel.

16.6. It is considered that the Proposed Development does not comprise uses or activities, and is not located within the vicinity of any activities or uses, that would pose a significant risk to human health. It is further deemed that human health implications of the Proposed Development, if any, would arise as a result of impacts which are already being assessed and presented within the ES, or addressed in standalone reports that will be submitted in support of the planning application. This includes, but is not limited to, the following:

- ES Volume 1, Chapter 11: Noise and Vibration,
- ES Volume 1, Chapter 12: Air Quality;
- ES Volume 1, Chapter 14: Flood Risk and Drainage
- ES Volume 1, Chapter 15: Socio-Economics (Population); and

- Geoenvironmental and Preliminary Environmental Risk Assessment.

- 16.7. On the basis of the above, it is proposed that human health is scoped out of the EIA.
- 16.8. In line with planning validation requirements, a health impact assessment is required to be submitted for a scheme of the Proposed Development's scale. As such, a standalone Health Impact Assessment (HIA) will be undertaken in line with the Oxfordshire Health Impact Assessment Toolkit (2021) and submitted in support of the planning application.
- 16.9. The HIA will cover a wide range of health determinants which relate to other technical elements, such as socio-economics, noise, air quality and transport. In order to minimise any overlap and to enable a comprehensive presentation of health effects, a HIA will be prepared as a standalone report.
- 16.10. Considering the above, a Human Health ES Chapter will not be included within the ES. Instead, text will be provided in ES Volume 1, Chapter 2: EIA Methodology discussing how human health has been considered throughout the ES in relevant technical chapters. Additionally, a detailed HIA will be produced to support the planning application, Therefore, it is proposed that health is **scoped out** of the EIA.

Soils

Introduction

- 16.11. The need for a soils chapter within the ES has been considered by Mott Macdonald.

Justification of why Significant Effects are not likely

- 16.12. Provisional Agricultural Land Classification (ALC) (England) maps indicate the Site is within an area considered to be Grade 3 agricultural land.
- 16.13. None of the land required is likely to be considered best and most versatile land (BMV) therefore no BMV would be removed from production.
- 16.14. It is the intention that the design retains all soils on site, supported by an initial plan for reuse, the extent to which material can be retained is dependent on the outcome of surveys which will be completed, and this information made available within the application and used to inform the detailed soil management measures. The quantum of soils that would be retained on site is related to the final landscape proposals including the proposals brought forward to deliver Biodiversity Net Gain

(BNG). Excess of topsoil would wherever possible be as a priority used for beneficial use offsite, subject to a Materials Management Plan (MMP)⁵⁵ or disposed of as a last resort.

- 16.15. During construction measures to mitigate potential impacts on soil resources during the Site preparation, earthworks and construction activities will be to store and re-use surplus soils in a sustainable manner (for an after-use appropriate to the soil quality) in accordance with the Construction Code of Practice for the Sustainable Use of Soils on Construction Sites⁵⁶. This approach will ensure that the quality of soils retained on-site and exported off-site (if required) is maintained by good soil handling and storage, particularly to avoid compaction and biodegradation of soils that are in storage.
- 16.16. It is not considered that there would be any significant effect on soils or agricultural land resources. It is not proposed that the ES will contain a detailed assessment of soil and agricultural land.

Land quality and ground conditions

Introduction

- 16.17. The need for a land quality and ground conditions to be considered within the ES has been considered by Mott Macdonald.

Justification of why Significant Effects are not likely

- 16.18. With reference to the BGS map, the entire Site is shown to be underlain by mudstone of the Oxford Clay Formation and West Walton Formation (Undifferentiated). The Site is underlain by the Oxford Clay Formation, the top 1.5 – 4.5m of which is likely to be weathered based on nearby BGS records reviewed. It is possible for disturbed ground/fill is encountered associated with the track way on site.
- 16.19. A Phase 1 study has been completed⁵⁷ and used to conduct a preliminary Conceptual Site Model (CSM) of the potential level of risk posed to human health or controlled waters associated with the development of the Site. The assessment of contamination risk is based on the source-pathway-receptor concept, i.e., if one of these elements is absent, no significant risk is considered to be present.

⁵⁵ The materials would be managed in such a way that, wherever possible, they would not become a waste, thereby complying with the principles of the CL:AIRE (Contaminated Land: Applications in Real Environments) protocol 'The Definition of Waste: Development industry Code of Practice – Version 2, March 2011'.

⁵⁶ DEFRA (2018) Construction Code of Practice for the Sustainable Use of Soils on Construction Site. Available: <https://www.gov.uk/government/publications/code-of-practice-for-the-sustainable-use-of-soils-on-construction-sites>

- 16.20. The CSM shows that the overall risk to the health of construction workers ('R1') is "Very Low", in relation to application of herbicides and pesticides, groundwater, presence of made ground and historic land use in relation to the use of the land for the Stadium and hotel uses. A "Very Low" level risk is identified to groundwater water, attributed to the disturbance in construction, use of herbicides and pesticides and historic leaks and spills from vehicles associated with the roads which border the Site.
- 16.21. The Site and surroundings are located within a surface water Nitrate Vulnerable Zone (NVZ) (Cherwell (Ray to Thames) and Woodeaton Brook, Thames (Leach to Evenlode)), and within a Drinking Water Safeguard Zone, but not within a Drinking Water Protected Area. The aquifer which underlies the development footprint is designated as Unproductive, and therefore has low permeability and flow rates. It is considered that the development proposed will reduce pollution risk by inclusion of a surface water drainage design incorporating sustainable drainage features as well as the application of an ongoing environmental management system for the Site.
- 16.22. During construction the risk remains of the possibility of encountering unexpected contamination, potentially associated with the use of the track way. This must be considered during any below-ground works. Unexpected contamination would be managed through the use of a discovery strategy and unexpected contamination protocol which should be detailed in the Construction Environment Management Plan (CEMP). Should unexpected contamination be identified, this should form part of a risk assessment and managed in accordance with the discovery strategy.
- 16.23. Based on this information, it is considered that there is no potential for significant effects related to ground conditions during development of the Site, or that is likely to affect residents in the completed scheme. It is proposed that the assessment of land quality and ground conditions is scoped out of the ES.

Major Accidents and Disasters

Introduction

- 16.24. This chapter of the scoping report sets out the proposed approach to consideration of the Proposed Development in relation to major accidents and disasters which can potentially result in significant adverse environmental and human health effects. Through identifying the potential for major accidents and disasters at an early stage, it is possible to prevent such events, reduce the risk of them occurring, or decrease the extent of their potential harm to the local area and local communities.
- 16.25. This chapter, therefore, considers whether:

- The Proposed Development would be more vulnerable to major accidents and disasters than the surrounding areas.
- The Proposed Development would be a source of hazard that could result in a major accident or would interact with an external source of hazard.
- The presence of the Proposed Development could be expected to increase the risk of serious harm to people or the environment, in the event of an external disaster or accident.

16.26. This chapter has been written by LUC, a Registrant of IEMA's EIA Quality Mark scheme, which demonstrates the Consultancy's commitment to best EIA practice and preparation of ESs to a high standard.

Definitions

16.27. Although 'accident' 'risk' and 'disaster' are well known terms and used in everyday language, there is potential for their meaning to be interpreted differently. IEMA's Major Accidents and Disasters in EIA: A Primer⁵⁸ (2020, 'the Primer') provides definitions for these in an EIA context. The Primer defines 'major accidents' as:

"Events that threaten immediate or delayed serious environmental effects to human health, welfare and/or the environment and require the use of resources beyond those of the client or its appointed representatives to manage. Whilst malicious intent is not accidental, the outcome (e.g., train derailment) may be the same and therefore many mitigation measures will apply to both deliberate and accidental events."

16.28. The Primer's definition of 'disaster' is:

"May be a natural hazard (e.g., earthquake) or a man-made/external hazard (e.g., act of terrorism) with the potential to cause an event or situation that meets the definition of a major accident".

16.29. Risk is defined in this Primer as:

"The likelihood of an impact occurring, combined with the effect or consequence(s) of the impact on a receptor if it does occur..."

⁵⁸ IEMA (2020). Major Accidents and Disasters in EIA. Available online: <https://www.iema.net/resources/blog/2020/09/23/iema-major-accidents-and-disasters-in-eia-primer>

Baseline Conditions

- 16.30. The Proposed Development will be constructed on vacant land situated in the Green Belt, east of Frieze Way and south of Kidlington roundabout.
- 16.31. It is assumed that, in its current condition, the Site of the Proposed Development is no more vulnerable to major accidents and disasters than the surrounding areas.

Key Issues and Requirement for Assessment

Legislation, Policy and Guidance

- 16.32. As the consideration of major accidents and disasters is a relatively recent EIA requirement, most currently available guidance has principally been developed to meet the requirements of other UK regulatory processes, particularly the Control of Major Accident Hazard Regulations 2015 (COMAH) which came into force on 1st June 2015⁵⁹. The COMAH Regulations aim to prevent and mitigate the effects of major accidents involving dangerous substances which can cause serious damage/harm to people and/or the environment. It is important to note that COMAH treats risks to the environment as seriously as those to people.
- 16.33. The Environmental Permitting (England and Wales) Regulations 2016 (EPR)⁶⁰ are another key regulatory process. Permits are obtained for specific industrial and waste activities which have the potential to cause harm to human health or the environment.
- 16.34. Reference is made throughout this chapter to the IEMA's 'Major Accidents and Disasters in EIA: A Primer'⁶¹ (hereafter referred to as 'the Primer') which provides guidance for impact assessment practitioners undertaking a major accidents and disasters assessment. The Primer is the first IEMA guide of its kind and structured around a typical assessment approach that offers a proportionate method for considering major accidents and disasters through screening, scoping and assessment.

⁵⁹ UK Government (2015). The Control of Major Accident Hazards Regulations 2015. Legislation.gov.uk. Available at: <https://www.legislation.gov.uk/uksi/2015/483/contents/made>

⁶⁰ UK Government (2016). The Environmental Permitting (England and Wales) Regulations 2016. Legislation.gov.uk. Available at: <https://www.legislation.gov.uk/uksi/2016/1154/contents/made>

⁶¹ IEMA (2020) Major Accidents and Disasters in EIA: A Primer. Available at: <https://www.iema.net/resources/blog/2020/09/23/iema-major-accidents-and-disasters-in-eia-primer>

National

- 16.35. The EU Directive 2014/52/EU⁶² was transposed into UK law before the UK fully transitioned out of the European Union in January 2021; Schedule 4(8) of the EIA Regulations⁶³ requires:

“A description of the expected significant adverse effects of the development on the environment deriving from the vulnerability of the development to risks of major accidents and/or disasters which are relevant to the project concerned.”

- 16.36. It is worth noting that the UK approach has removed the word ‘natural’. However, it is now assumed through evolved practice and the Primer that given the intention underlying this aspect of the 2017 Directive, both manmade and natural disasters should be considered.
- 16.37. The Cabinet Office National Risk Register (2020 Edition)⁶⁴ is a government assessment of the likelihood and potential impact of national security risks. These include natural hazards, industrial accidents, malicious attacks, and others. This document is used as a supporting guide for assessment and scoping within this chapter.

Local

- 16.38. A legal requirement of the Civil Contingencies Act (2004)⁶⁵ creates a set of roles and responsibilities for emergency preparation and response at the local level. Under this act, Cherwell District Council maintains an emergency plan⁶⁶ which details the Council’s arrangements for responding to emergency. Part B of this document is an internal document detailing emergency response arrangement. The emergency plan is used as a guide and point of reference for further information within the chapter.

Study Area

- 16.39. The proposed Study Area encompasses all areas of potential activities relating to the Proposed Development as detailed in the Site Context and Proposed Development section of the Scoping Report.

⁶² EU Directive 2014/52/EU amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment.

⁶³ The Town and Country Planning (Environmental Impact Assessment) Regulations 2017.

⁶⁴ Cabinet Office (2020) National Risk Register 2020 edition. HM Government. Available at: <https://www.gov.uk/government/publications/national-risk-register-2020>

⁶⁵ UK Government (2004). Civil Contingencies Act 2004. Legislation.gov.uk. Available at: <https://www.legislation.gov.uk/ukpga/2004/36/contents>

⁶⁶ Cherwell District Council (2008). Cherwell District Council North Oxfordshire Emergency Plan Part A. Available at: <http://modgov.cherwell.gov.uk/documents/s143/Scrutiny%20Breifing%20Emergency%20Plan%202008.pdf>

Approach to Assessment

- 16.40. It is recognised that the 2017 EIA Regulations apply to a wide range of development types. It is reasonable to assume that development types such as nuclear power stations and chemical installations would be more vulnerable to major accidents and/ or disasters than the Proposed Development. It is also noted that some risks are covered by other legislation such as the Health and Safety at Work etc. Act 1974. It, therefore, follows that the consideration of the risks of major accidents and/ or disasters in the context of EIA needs to be proportionate to the likelihood of the risks.
- 16.41. In line with the Primer, only “low-likelihood but potentially high-consequence events” are taken forward for further consideration. When considering the baseline risks with the receptors, events and hazards which have no credible source-pathway-receptor linkage are removed from further consideration.
- 16.42. The significance of the remaining risks alongside the relevant receptors and pathways considers the magnitude of impact, defined by the geographic area, duration of effects, and severity of effects; the sensitivity of receptors, defined by the adaptability, tolerance, and recoverability of the receptor; and effort required to restore any damage.
- 16.43. The potential sensitive receptors considered in this section are:
- Population and human health (stadium users, pedestrians, road users);
 - Biodiversity (species and habitats);
 - Land, soil, water, air and climate;
 - Material assets, cultural heritage, and landscape; and
 - The interaction between the factors above.
- 16.44. Risks that could result in a ‘significant effect’ are therefore considered further below; these are defined in the Primer as:
- “the loss of life, permanent injury and temporary or permanent destruction of an environmental receptor which cannot be restored through minor clean-up and restoration”.*
- 16.45. Mitigation measures, standard construction and operational good practice, and further discussion with the designer and operator will also inform a number of these risks.
- 16.46. Following the above definitions, the Proposed Development’s vulnerability to major accidents or disasters is made based on professional judgement and evidence provided where possible.

16.47. Potential Major Accidents and Disasters which could present risks during the construction and operation Phase are summarised in **Table 16.1** below and potential effects considered to present a potential risk are discussed further below.

Assessment of Effects

16.48. The list of potential significant effects considered for the Proposed Development, which are of “low-likelihood but potentially high-consequence” as noted the Primer, is set out in **Table 16.1** and discussed in more detail below. This has been informed by professional judgement and experience of undertaking EIAs of similar schemes, with evidence provided where possible. Each major accident or disaster that is considered in the list below uses the following approach to assess potential effects in the absence of mitigation:

- Could the Proposed Development cause/worsen a major accident or disaster?; and
- Could the Proposed Development be affected by the major accident or disaster?

Disease, epidemics, and pandemics

16.49. The Proposed Development will encourage large crowds to congregate which could increase the risk of transmission of disease epidemic or pandemic. However, it is anticipated that any quarantine procedures and additional health and safety measures will be adhered to during the construction and operation of the Stadium and its facilities in the event of an outbreak. On the assumption that public health measures and controls will be in place, outbreaks of human diseases as a result of the Proposed Development are unlikely to be a significant risk and this is therefore scoped out of the EIA.

Terrorism and war

16.50. It is not anticipated that the Proposed Development will attract warfare or terrorist activities. Though the risk is low, it is anticipated that the Proposed Development will implement security protocols during the construction and operational phases to deter such activities, including CCTV, bag and personal searches/spot checks during games and events, as well as the potential for the installation of anti-terrorism bollards and barriers. As the risk of terrorism and war can be mitigated during the construction and operation phases, this effect is considered unlikely to be a significant risk and is scoped out of the EIA.

Flooding from rivers and the sea

- 16.51. According to the Government's surface water flooding map⁶⁷, the Site has a very low risk (less than 0.1% each year) of flooding from rivers and the sea. Therefore, this effect is not anticipated to be significant and the risk during the construction or operational phase is anticipated to be low. As such, this effect is scoped out of the EIA.

Surface water flooding (rainfall)

- 16.52. According to the Government's surface water flooding map, the Site has a very low risk (less than 0.1% each year) of surface water flooding. As such, surface water flooding is not expected to pose a risk during the construction or operational phase, and appropriate site drainage and surface water management will be incorporated into the final design of the Proposed Development. This effect is therefore not anticipated to be significant and is scoped out of the EIA.

Flooding from reservoirs and groundwater

- 16.53. According to the Government's surface water flooding map, flooding from reservoirs and groundwater is unlikely in the study area. As such, the potential for flooding from reservoirs and groundwater is scoped out of the EIA and will not be considered further.

Cyclones/Hurricanes/Typhoons, Storms, and Gales

- 16.54. Cyclones, hurricanes, and typhoons are the same weather phenomenon, but hurricane is the correct term for locations in the North Atlantic Ocean. Hurricanes cannot form in or around the United Kingdom as the sea temperatures are not warm enough to sustain a wind of 120km/h, which is one of the main measurements used to classify a hurricane. However, deep depressions (also known as 'low pressure systems') that originate from hurricanes are experienced in the United Kingdom, and gusts from storms and gales are not uncommon. Historical weather records indicate that the highest gust speed recorded in the South East of England was a gust of approximately 196km/h in February 2022.
- 16.55. Extreme storms can have significant adverse effects on structural, human and environmental receptors, however, it is anticipated that weather warnings issued by the Met Office and Environment Agency for forecast on extreme adverse weather conditions using the National Severe Weather Warning Service and Flood Information Service, respectively, will be considered in the management of the Proposed Development both during construction and operation. Additionally, it is anticipated that safety and management procedures will be implemented to mitigate any effects

⁶⁷ UK Government, 'Long Term Flood Risk Information'. Available at: <https://www.gov.uk/check-long-term-flood-risk?easting=336263&northing=393106&address=38007511>

caused by severe storms and gales during construction phase. Therefore, effects associated with storms and gales, and other extreme weather, are not anticipated to be significant and are scoped out of the EIA.

Extreme Temperatures (heatwaves and sub-zero temperatures)

- 16.56. The latest UK climate projections⁶⁸ suggest that the UK will experience hotter and drier summers as well as wetter winters. Warming UK temperatures may lead to an increased risk of overheating and the occurrence of sub-zero temperatures can cause disruptions to human receptors. The occurrence of these extreme temperatures are expected to increase as a result of climate change. Measures will be implemented to comply with the Construction (Design and Management) Regulations 2015⁶⁹ to disclose and reduce the risks from extreme temperatures to employees during the construction period.
- 16.57. It is expected that design and mitigation measures will be implemented once the Proposed Development is operational, to comply with TM52: Limits of Thermal Comfort⁷⁰. To further reduce the risk of users suffering during heatwaves, the stadium will provide adequate drinking facilities and educate users prior and during matches or events of the importance of remaining hydrated during heatwaves. Similar measures would be put in place during periods of extreme cold.
- 16.58. As the risks can associated with extreme temperatures can be mitigated for during construction and operation, these are unlikely to be considered significant and are therefore scoped out of further detailed assessment in the EIA.

Droughts

- 16.59. It is suggested in the latest UK climate projects (Met Office, 2022) that summers are projected to become drier. Droughts are caused by insufficient rainfall and in the UK, a drought is defined as at least 15 consecutive days where there is no more than 0.2mm of precipitation. Periods of drought are projected to be increasingly common as a result of climate change. Drought planning is, however, undertaken by the Environment Agency and water utility companies. It is anticipated that management plans and strategies will be informed by warnings from these organisations during the construction and operation period and that measures would be put in place to conserve water during a drought.

⁶⁸ Met Office (2022). UK Climate Projections Headline Findings. Available at: https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp18_headline_findings_v4_aug22.pdf

⁶⁹ UK Government (2015). The Construction (Design and Management) Regulations 2015. Legislation.gov.uk. Available at: <https://www.legislation.gov.uk/uksi/2015/51/contents/made>

⁷⁰ CIBSE (2013). TM52 The limits of thermal comfort: avoiding overheating (2013). Available at: <https://www.cibse.org/knowledge-research/knowledge-portal/tm52-the-limits-of-thermal-comfort-avoiding-overheating-in-european-buildings>

16.60. As this risk can be reduced with sufficient mitigation measures, risk to or from drought is not considered significant and is scoped out of the EIA, and will not be considered further.

Transport Accidents

16.61. Increased transits to the Proposed Development during construction and operational periods could increase the risk of accidents. It is expected that the risk of any major transport accidents during the operational and construction phases will be included in management plans and mitigated for, to reduce the risk to employees, residents, and other road users, and these will be assessed in detail in the assessment of effects on traffic and transport (see chapter 8). As the risk can be reduced with the implementation of mitigation measures, and will be assessed separately in the ES, it is anticipated that this effect will not be significant and is therefore scoped out of the assessment of effects associated with major accidents and disasters.

Building fires

16.62. Depending on the severity and scale of a fire, the Proposed Development could be significantly adversely affected, resulting in structural damage and, potentially, a danger to human life. In addition, there could also be significant adverse effects to environmental receptors depending on water and/or other gases and powders applied to suppress fires and thermal events. It can be assumed that the building will be subject to a range of fire related Statutory Legislation including the Building Regulations (2010)⁷¹ and the Regulatory Reform (Fire Safety) Order 2005⁷². In addition, It is anticipated that evacuation and safety measures will be put in place to comply with Construction (Design and Management) Regulations 2015 (UK Government (2015) during operational and construction periods, respectfully. Therefore, it is anticipated that this effect will not be significant and is scoped out of the EIA.

Employee Safety

16.63. As with most new buildings, the construction period has the potential to have a significant adverse effect on human receptors, specifically employees should an accident or serious injury occur. It is anticipated that all effects to employee safety during construction will be considered in compliance with the CDM Regulations, the Management of Health and Safety at Work Regulations 1999, the Workplace (Health, Safety and Welfare) Regulations 1992 and the Reporting of Injuries, Diseases

⁷¹ UK Government (2010). The Building Regulations 2010. Legislation.gov.uk. Available at: <https://www.legislation.gov.uk/uksi/2010/2214/contents/made>

⁷² UK Government (2005). The Regulatory Reform (Fire Safety) Order 2005 Legislation.gov.uk. Available at: <https://www.legislation.gov.uk/uksi/2005/1541/contents/made>

and Dangerous Occurrences Regulations 1995. Therefore, it is anticipated that this effect will not be significant and it is scoped out of the EIA.

Cumulative Effects

16.64. Some potential major accidents and disasters could lead to cumulative effects, however, It is anticipated that any developments considered in the cumulative assessment, will be regulated by environmental protection legislation, health and safety regulations and design standards, as with the Proposed Development, all of which are focussed on preventing and/or mitigating major accidents and disasters.

16.65. Any in-combination effects of relevance will be considered in relation to other ES chapters, as well as the potential for effects from the Proposed Development to interact with effects from other projects, plans and activities.

Conclusions

16.66. Whilst the potential major accidents and disasters included in this chapter have been scoped out, some of these will be covered within other topic assessments undertaken as part of the EIA and/or will be considered during the design process e.g. the assessment of effects on traffic and transport will consider the risks associated with an increase in traffic in the area during construction and operation and associated road traffic accident risk (see chapter 8).

16.67. It is anticipated that the Proposed Development will be regulatorily compliant and, therefore, mitigation measures will be in place to minimise significant effects during the construction and operational periods for each of the identified potential risks associated with major accidents and disasters. As such, a standalone assessment relating to major accidents and disasters is not proposed in the ES, as no significant effects are anticipated.

Table 16.1: Major Accidents and Disasters Summary Table

Effect	Could the Proposed Development cause/worsen a major accident or disaster?	Could the use of the Proposed Development be affected by the major accident or disaster?	Residual Effect
Disease epidemics and pandemics	Yes	Yes	Not significant on the assumption that public health and safety measures and controls will be in place.
Terrorism and war	No	Yes	Not significant based on the implementation of security protocols during construction and operation.

Flooding from rivers and the sea	No	Yes	Not significant due to the low risk of fluvial flooding at the Site.
Surface water flooding	No	Yes	Not significant due to the low risk of surface water flooding at the Site, and the incorporation of surface water management into the design of the Proposed Development.
Flooding from reservoirs and groundwater	No	Yes	Not significant due to the low risk of reservoir and groundwater flooding at the Site.
Cyclones/ Hurricanes/ Typhoons, storms and gales	No	Yes	Not significant due to appropriate management of the construction and operation of the Proposed Development during extreme weather events.
Extreme temperature	No	Yes	Not significant due to implementation of construction and operational good practice measures.
Droughts	Yes	Yes	Not significant on the basis that management plans and strategies will be put in place to manage water usage during a drought situation.
Transport accidents	Yes	No	Not significant due to implementation of construction and operational traffic management plans; this will also be assessed in the assessment of effects on traffic and transport.
Building fires	No	Yes	Not significant on the assumption that all fire regulations will be complied with.
Employee safety	Yes	Yes	Not significant on the basis that all health and safety regulations will be complied with during construction and operation of the Proposed Development.
Cumulative effects	No	No	Not significant on the assumption that other developments nearby will also comply with standard good practice measures during construction and operation.

17. STRUCTURE OF ENVIRONMENTAL STATEMENT

17.1. The ES will comprise the main report (Volume 1), Figures (Volume 2) and Appendices (Volume 3), as well as a Non-Technical Summary

17.2. The contents of Volume 1 would include:

Table 17.1: Structure of ES

Chapters	Content
Chapter 1 – Introduction	This Chapter summarises the background to the Site and the Applicant, and the Proposed Development, the requirement and purpose of an EIA, and a summary of the structure of this ES and the project team involved.
Chapter 2 – Approach to EIA	This Chapter outlines the approach to the EIA in order to meet the information required in an ES under the EIA Regulations.
Chapter 3 – Description of the Site and Surrounding Area	This Chapter provides a description of the Site location, defined by the Redline Boundary, and the surrounding area.
Chapter 4 – Consideration of Alternatives	This Chapter outlines the description of the alternatives in terms of alternative site layouts during the evolution of its design.
Chapter 5 – Description of Development	This Chapter provides a description of development.
Chapter 6 – Planning Policy Context	This Chapter summarises the relevant national and local planning policy context against the proposed scheme.
Chapter 7 – Landscape and Visual Impact	These Chapters provide a description of the existing baseline environment, the specific methods used to assess the potential effects of the proposed scheme, an assessment of these effects and mitigation measures proposed to remove/reduce adverse effects for each receptor on a chapter-by-chapter basis. A summary of the significant effects will be given at the end of each chapter.
Chapter 8 – Ecology and Nature Conservation	
Chapter 9 – Cultural Heritage and Archaeology	
Chapter 10 – Transport and Access	
Chapter 11 – Noise	
Chapter 12 – Air Quality	
Chapter 13 - Lighting	
Chapter 14 – Flood Risk and Drainage	
Chapter 15 – Socio-Economics	
Chapter 16 – Climate Change	
Chapter 17 - Waste	
Chapter 18 – Cumulative Effects	This Chapter assesses the potential for significant cumulative environmental effects associated with the proposed scheme.
Chapter 19 – Summary	This Chapter provides a summary of effects for each of the technical assessment chapters of the ES. A summary of all proposed mitigation measures is also included.

17.3. To ensure consistency throughout the ES Chapters 7 to 17 will follow a standard structure as follows:

- Introduction
- Legislation and Policy
- Assessment Methodology and Significance Criteria
- Baseline Conditions
- Potential Effects
- Mitigation Measures and Residual Effects
- Cumulative Effects
- Conclusions (including summary table).