



WEST CAMBRIDGE

OUTLINE PLANNING APPLICATION

ENVIRONMENTAL STATEMENT ADDENDUM VOLUME 2

MAIN REPORT



West Cambridge Masterplan

Environmental Statement Update

Volume 2 Main Report

University of Cambridge

October 2020

Notice

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1. Introduction

1.1 Background

1.1.1 The University of Cambridge has submitted an outline planning application (planning reference: 16/1134/OUT), for a new masterplan at their West Cambridge site, to Cambridge City Council in June 2016. The planning application was amended, and further information was provided to Cambridge City Council in October 2017. The planning application was determined to be EIA Development under the Town and Country Planning (Environmental Impact Assessment) Regulations 2011 (as amended 2015) and an Environmental Statement (ES) was submitted as part of the planning application. An addendum to the ES was submitted with the amendments in October 2017.

1.1.2 Discussions between the University of Cambridge and Cambridge City Council have since continued to try to resolve a number of planning related issues prior to determination. Some of the outstanding issues relate to the ES and can be summarised as follows:

- Due to the time that has elapsed since submission of the ES in June 2016, the baseline information needs to be validated to ensure that the conclusions of the ES remain valid.
- Since submission of the ES in June 2016, Cambridge City Council have adopted the Cambridge Local Plan in October 2018. This supersedes the policies used to inform the ES.
- A specific new policy in the Cambridge Local Plan, adopted in October 2018, requires developers to demonstrate no net loss or a net gain of priority habitat and local populations of priority species where there is a potential for harm or disturbance of these habitats and species. A Greater Cambridge Sustainable Design and Construction Supplementary Planning Document adopted in January 2020 also sets out a requirement for securing biodiversity net gain.
- The transport strategy has been updated.

1.2 Purpose of this document

1.2.1 The ES update comprises the following three volumes:

- Volume 1 – Non Technical Summary (NTS): A replacement of the original NTS
- Volume 2 – Main Report: This volume comprising the updated ES main report chapters
- Volume 3 – Appendices: Updated and new appendices

1.2.2 This document provides the additional information requested by Cambridge City Council to validate the original ES submitted in June 2016 and the subsequent addendum submitted in October 2017. There are ten technical chapters, one for each of the individual topics assessed in the ES. Each chapter provides an update to the relevant legislation and policies, and a validation of the baseline. Where necessary the baseline has been updated with current information.

1.2.3 Due to updates to the traffic and transport proposals and modelling, the bellow listed chapters also require an update to the impact assessments. For these topics the entire chapter of the ES is replaced.

- Traffic and transport
- Air quality
- Noise and vibration

1.2.4 Since the submission of the ES in June 2016, planning applications for new developments have been submitted to Cambridge City Council for determination. Where relevant these have been considered in an updated cumulative impact assessment.

1.3 Document authors

1.3.1 This ES update has been coordinated by Atkins. The following listed chapters have also been written by Atkins:

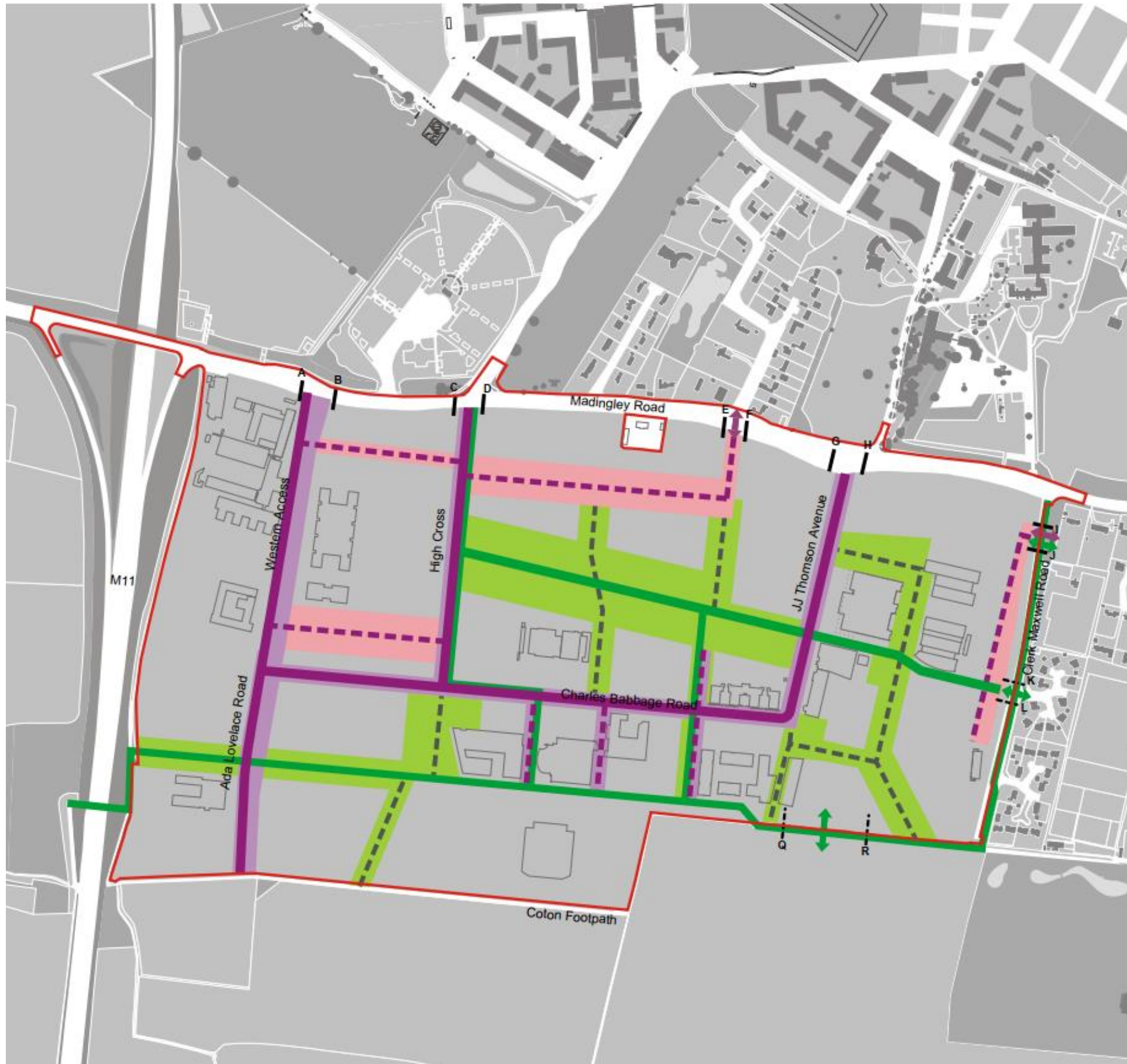
- Introduction
- Ecology
- Historic environment
- Landscape and visual
- Socio-economics
- Water quality elements of the water environment chapter
- Cumulative effects

1.3.2 Stantec have written the following chapters:

- Traffic and transport
- Air quality
- Noise and vibration
- Flood risk elements of the water environment chapter
- Ground conditions

1.4 Amendments to the Proposed Development

1.4.1 As a result of the ongoing discussions with Cambridge City Council, the access proposals into and out of the site have been amended. The amend access parameter plan is shown on Figure 1.1. The changes have been considered in the revised traffic and transport, air quality, and noise and vibration assessments. None of the other assessments are impacted by the changes.



KEY

Contextual Information:

- Primary street
- Secondary street
- Primary pedestrian/cycle route
- Secondary pedestrian/cycle route

For Approval:

- Application site boundary
- Intervention zone for street
- Flexible zone for street
- Secondary Vehicular access/egress points
- Secondary Vehicular egress only
- Secondary pedestrian and cycle only access/egress points
- Flexible zone for pedestrian and cycle routes
- Zones of access points
- General access points for pedestrians and cyclists

All information other than that identified as being for approval is shown for contextual purposes only.

West Cambridge
 WC/OPA/PAR/03/REV02
 - Access and Movement Parameter Plan
 December 2019

UNIVERSITY OF CAMBRIDGE

Scale 1:2500@A1

Figure 1.1 Amended access parameter plan

2. Ecology

2.1 Introduction

- 2.1.1 The Ecology chapter in the original ES and ES addendum was based on local policies that have since been updated. Section 6.2 'relevant legislation and policy' requires updating to account for the Cambridge Local Plan adopted in 2018 and the South Cambridgeshire Local Plan adopted in 2018. The below Section 2.2 replaces Section 6.2 of the original ES.
- 2.1.2 One of the new policy changes in the adopted Cambridge Local Plan is the need for developers to demonstrate no net loss or a net gain for priority habitats and species as a result of the development. Appendix 6.10 in Volume 2 provides this assessment.
- 2.1.3 In addition, the ecology surveys that were conducted for the original ES are now out of date and new surveys have been undertaken to confirm that the baseline in the original ES remains valid. Section 2.3 provides the updated baseline based on the new surveys. Appendix 6.9 in Volume 3 provides the detailed methodology and results of an additional desk study and ecological walkover survey undertaken in September 2020.
- 2.1.4 The data from the surveys has resulted in a change to the value of some of the receptors and the identification of new ecological receptors. An impact assessment has been undertaken on these ecological receptors in Section 2.4.

2.2 Relevant legislation and policy

- 2.2.1 As well as the recently adopted Cambridge Local Plan, there are a number of other relevant legislation and policy updates that are summarised in the following sections. Appendix 6.1 in Volume 3 provides a more comprehensive overview of the relevant policy and legislation changes.

National Planning Policy Framework 2019

- 2.2.2 Chapter 15 of the National Planning Policy Framework (NPPF) states that planning policies, and decisions, should contribute to and enhance the natural and local environment. This includes: protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils; recognising the wider benefits from natural capital and ecosystem services; identifying and pursuing opportunities for securing net gains for biodiversity and refusing developments resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) unless there are wholly exceptional reasons¹ and a suitable compensation strategy exists.

¹ For example, infrastructure projects (including nationally significant infrastructure projects, orders under the Transport and Works Act and hybrid bills), where the public benefit would clearly outweigh the loss or deterioration of habitat.

Conservation of Habitats and Species Regulations 2017

- 2.2.3 The 'Habitats Regulations' were updated in 2017. They transpose the European Commission (EC) Habitats Directive into national law. They provide for the designation and protection of European sites, the protection of European protected species and the adaptation of planning and other controls for the protection of European sites. A competent authority (including local and regional authorities) in exercising any of its functions, must have regard to the requirements of the Directives so far as they may be affected by the exercise of those functions.

Cambridge Local Plan 2018

- 2.2.4 The Cambridge Local Plan was published in October 2018 and includes three new Policies in relation to biodiversity.
- Policy 69: Protection of sites of biodiversity and geodiversity importance: by minimising harm, securing achievable mitigation and/or compensation measures and where possible enhancing the site. Replacement habitat must be in place before habitat is lost.
 - Policy 70: Protection of priority species and habitats. Proposals that harm or disturb populations and habitats should minimise ecological harm and secure achievable mitigation and/or compensation measures, resulting in no net loss or a net gain of priority habitats or species. In addition, it was identified that new developments should have regard to maximising opportunities to incorporate features that support biodiversity as outlined in Appendix J of the Local Plan. An assessment of how this masterplan will meet the requirements of this policy can be found in Appendix 6.10 in Volume 3.
 - Policy 71: Trees. Protection from felling, significant surgery and potential root damage to trees or amenity or other value, unless there are demonstrable public benefits that outweigh the current and future amenity value of the trees. Provide appropriate replacement planting, where felling necessary and sufficient space for trees and other vegetation to mature. Particular consideration should be given to veteran or ancient trees.

South Cambridgeshire Local Plan 2018

- 2.2.5 The South Cambridgeshire Local Plan aims to meet the overarching principle of environmental sustainability:
- Contributing to protecting and enhancing our natural, built and historic environment; and, as part of this, helping to improve biodiversity, prudent use of natural resources, minimising waste and pollution, and mitigating and adapting to climate change including to a low carbon economy.
- 2.2.6 The key policies relevant to the Study Area are listed below:
- Policy NH/4: Biodiversity
 - Development proposals where the primary objective is to conserve or enhance biodiversity will be permitted.

- New development must aim to maintain, enhance, restore or add to biodiversity. Opportunities should be taken to achieve positive gain through the form and design of development. Measures may include creating, enhancing and managing wildlife habitats and networks, and natural landscape. The built environment should be viewed as an opportunity to fully integrate biodiversity within new development through innovation. Priority for habitat creation should be given to sites which assist in the achievement of targets in the Biodiversity Action Plans (BAPs) and aid delivery of the Cambridgeshire Green Infrastructure Strategy.
- If significant harm to the population or conservation status of a Protected Species, Priority Species² or Priority Habitat resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission will be refused.
- Where there are grounds to believe that a proposal may affect a Protected Species, Priority Species or Priority Habitat, applicants will be expected to provide an adequate level of survey information and site assessment to establish the extent of a potential impact. This survey information and site assessment shall be provided prior to the determination of an application.
- Previously developed land (brownfield sites) will not be considered to be devoid of biodiversity. The reuse of such sites must be undertaken carefully with regard to existing features of biodiversity interest. Development proposals on such sites will be expected to include measures that maintain and enhance important features and appropriately incorporate them within any development of the site.
- Planning permission will be refused for development resulting in the loss, deterioration or fragmentation of irreplaceable habitats, such as ancient woodland, unless the need for, and benefits of, the development in that location clearly outweigh the loss.
- Climate change poses a serious threat to biodiversity and initiatives to reduce its impact need to be considered.
- NH/5: Sites of Biodiversity or Geological Importance
 - Proposed development likely to have an adverse effect on land within or adjoining a Site of Biodiversity or Geological Importance, as shown on the Policies Map (either individually or in combination with other developments), will not normally be permitted. Exceptions will only be made where the benefits of the development clearly outweigh any adverse impact.
 - In determining any planning application affecting Sites of Biodiversity or Geological Importance the Council will ensure that the intrinsic natural features of particular interest are safeguarded or enhanced having regard to:
 - A. The international, national or local status and designation of the site;
 - B. The nature and quality of the site's features, including its rarity value;
 - C. The extent of any adverse impacts on the notified features;
 - D. The likely effectiveness of any proposed mitigation with respect to the protection of the features of interest;

E. The need for compensatory measures in order to re-create on or off the site features or habitats that would be lost to development.

- Where appropriate the Council will ensure the effective management of designated sites through the imposition of planning conditions or Section 106 agreements as appropriate.
- Policy NH/7: Ancient Woodlands and Veteran Trees
 - Planning permission will be refused for development resulting in the loss or deterioration of ancient woodland (as shown on the Policies Map) or veteran trees found outside ancient woodland, unless the need for, and benefits of, the development in that location clearly outweigh the loss.
 - Development proposals affecting ancient woodland or veteran trees will be expected to mitigate any adverse impacts, and to contribute to the woodland's or veteran tree's management and further enhancement via planning conditions or planning obligations.

Cambridge City Council biodiversity emergency

2.2.7 In May 2019 Cambridge City Council passed a motion to declare a biodiversity emergency which sets out how they aim to reverse the decline in biodiversity in and around Cambridge. Further information is available at <https://www.cambridge.gov.uk/biodiversity-emergency>.

Greater Cambridge Sustainable Design and Construction Supplementary Planning Document

2.2.8 In January 2020 a supplementary planning document was adopted for Greater Cambridge which sets out a requirement to secure biodiversity net gain. The document states that:

- Net gain can be secured at a variety of different scales, from householder applications right up to new settlements, albeit the scale of improvement will differ. At a householder scale options can include the integration of nest boxes for birds and bats, integration of sustainable drainage systems such as rain gardens and the use of green and biodiverse roofs.
- Major development offers greater opportunities for delivering biodiversity net gain with options ranging from building scale approaches (nest boxes, green and biodiverse roofs) through to the integration of opportunities for biodiversity into green and blue infrastructure and habitat creation, both on and offsite. The approach to securing net gain in biodiversity should be outlined using the Defra Biodiversity Offsetting metric.

2.2.9 An assessment of how this masterplan will meet the requirements the requirement of biodiversity net gain of priority habitats and species is provided in Appendix 6.10 in Volume 3. As this planning application is for a masterplan it is not possible to provide a measurable evidence of biodiversity net gain for all habitats within the development area at this stage.

² Priority Species and Habitats are those that are identified within a Biodiversity Action Plan (BAP) and / or the Natural Environment and Rural Communities Act, 2006, Section 41.

2.3 Updated baseline methodology

- 2.3.1 Further to surveys undertaken to inform the original ES in 2016 and Addendum in 2017 a desk study and ecological walkover survey have been undertaken to update information on the current habitats and species on the Site. An initial review of reports undertaken by Cambridge Ecology in relation to the Cambourne to Cambridge Better Public Transport Scheme was undertaken in September 2019 and a number of update reports in relation to the Cambourne to Cambridge Better Public Transport Scheme were reviewed in September 2020. In addition, a desk study and walkover survey were undertaken in September 2020.
- 2.3.2 Surveys by Cambridge Ecology to inform the Cambourne to Cambridge Better Public Transport Scheme covered a much wider survey area with two main sections (i) between Madingley Rise and Grange Road and (ii) Madingley Road and Bourn Airfield between Bourn Airfield and Grange Road, Cambridge, Cambridgeshire. The red line boundary of this project includes the whole of the West Cambridge Site. It should be noted that these surveys have not been undertaken in relation to the proposed development at the West Cambridge site and therefore the data is considered as updated desk study information. The Cambridge Ecology reports are in the public domain and a review of the reports was undertaken to validate the site survey information previously obtained by Atkins and included in the 2016 ES and 2017 ES Addendum.
- 2.3.3 The following Cambridge Ecology reports for the Cambourne to Cambridge Better Transport project were reviewed in September 2019:
- Protected species constraints survey 2017 (August 2017);
 - Great crested newt eDNA report (July 2017);
 - Great crested newt eDNA survey 2018 update (August 2018);
 - Great crested newt survey of sports ground pond 1 (August 2018);
 - Phase 1 habitat survey (September 2017);
 - Water vole survey (August 2018);
 - Breeding bird survey (August 2018);
 - Reptile survey report (August 2018);
 - Stage 1 bat inspection survey 2017-18 (March 2018);
 - Invertebrate survey (October 2018);
 - Winter bird survey 2017-18 Survey (April 2018); and
 - Badger survey (August 2018) – maps of badger sett locations removed.

2.3.4 In September 2020 desk study information was obtained from the Cambridge and Peterborough Environmental Record Centre (CPERC) and the Multi-Agency Geographic Information for the Countryside (MAGIC) website³. Reports supplied by the client were also reviewed. These include the Whittle Laboratory Preliminary Ecological Appraisal and BREEAM Assessment (LE02-05) Report⁴ and the Biodiversity Enhancement and Mitigation Plan associated with the Cavendish III development⁵. The following updated reports in relation to the Cambourne to Cambridge Better Transport project were also reviewed in September 2020:

- Barn owl survey 2018-19 (March 2020);
- Brown hare survey 2018-19 (March 2020);
- Great crested newt eDNA survey (March 2020);
- Ecology Stage 1 bat inspection survey report 2018-19 (March 2020);
- Ecology Stage 2 bat activity survey report 2019 (March 2020); and
- Ecology wintering bird survey report 2018-19 (March 2020).

2.3.5 The full methodology for the desk study is provided in Appendix 6.9 in volume 3.

2.3.6 An extended Phase 1 habitat survey was also undertaken in September 2020 to provide an update on the current habitats and their potential to support legally protected and priority species within the Site. Further details of the methodology are provided in Appendix 6.9.

2.3.7 Baseline data below has been updated using the data provided from the 2020 extended Phase 1 habitat survey and the 2019/2020 desk study. For habitats and species, comparison tables have been produced (see Table 2.2 and 2.3) to help determine if any of the changes in baseline condition have taken place and could result in changes to the impact assessment or required mitigation measures.

Designated sites

2.3.8 The full results of the desk study undertaken in September 2020 is included in Appendix 6.9. A summary of any key changes from the original ES is provided below.

Statutory designated sites

2.3.9 In addition to the one Site of Special Scientific Interest SSSI and two Local Nature Reserves (LNRs) identified in the 2016 ES, Traveller's Rest Pit SSSI is located 550m north of the Site, although this SSSI is designated for geological rather than ecological reasons so its presence does not alter the approach of findings of the Ecology chapter.

³ magic.gov.uk

⁴ Applied Ecology Ltd (December 2019) Whittle Laboratory, University of Cambridge Preliminary Ecological Appraisal and BREEAM Assessment (LE02-05).

⁵ Practical Ecology (January 2019). Biodiversity Compensation and Enhancement Plan for Cavendish III

Non-statutory designated sites

2.3.10 There are nine County Wildlife Sites (CWS) and eight City Wildlife Sites (CiWS) within 2km of the Site boundary. These are detailed in Table 2.1. This baseline section has been updated to include sites between 700m and 2km of the Site, which were not included in the 2016 ES. These additional sites are identified with a * symbol. Adams Road Sanctuary has been upgraded from a CiWS to a CWS and Paradise LNR which was recorded in the 2016 as a LNR is also designated as a CWS. All the closest sites were included in the 2016 ES, albeit in some instances with different level of designation, and no impacts are predicted on the additional sites, so the additions just provided further context and do not alter the impacts, mitigation or conclusions of the impact assessment.

Table 2.1 Non-statutory designated sites within the study area

Designated site name	Designation	Brief description	Distance from Site	Conservation value
Coton Path Hedgerow	CWS	Supports populations of two Nationally Scarce vascular plants; yellow vetchling and slender tare.	Within Site – along the southern boundary	Local - see information below
Hedgerows East of M11	CWS	Supports populations of Nationally Scarce vascular plant species and a vascular plant species which is rare in the county.	100m south	County
Adams Road Sanctuary*	CWS	Recent woodland more than 1ha in area with five or more woodland plants. Also supports breeding populations of common frog, common toad and great crested newt.	500m east	County
Barton Road Pool*	CWS	A Grade C site in the Joint Nature Conservation Committee (JNCC) Invertebrate Site Register.	1.1km south-east	County
River Cam*	CWS	It is a major river (together with adjacent semi-natural habitat) that has not been grossly modified by canalisation and/or poor water quality. Additionally, it has areas with concentrations of mature pollard willows.	1.3km to the east	County
Sheep's Green*	CWS	Supports a population of a vascular plant rare in Cambridgeshire (<i>Catabrosa aquatica</i>); and because it supports at least 20 mature pollard willows.	1.6km south-east	County
Coe Fen*	CWS	Supports a population of whorl-grass, <i>Catabrosa aquatica</i> , which is rare in Cambridgeshire. It also supports at least 20 mature pollard willows.	1.9km south-east of the site	County
Skater's Meadow group*	CWS	Supports three or more strong neutral grassland indicator species in frequent numbers. Qualifies as part of the riparian habitat in the River Cam valley.	1.95km south-east	County
Paradise LNR*	CWS and LNR	Supports at least 0.5ha of NVC community W6 (Alder - Stinging Nettle woodland).	2km south-east	County

Designated site name	Designation	Brief description	Distance from Site	Conservation value
Scrub East of M11 Verge	CiWS	Scrub over 0.5ha in area with four or more woody species. Plus hedgerow more than 100m long and 2m wide at widest point with four or more woody species.	Within Site – on western boundary	Local
Bird Sanctuary, Conduit Head	CiWS	Supports greater pond sedge swamp, lesser pond sedge swamp and 0.5-1ha woodland with five or more woodland plants and 10% or more mature woodland. Also supports great crested newts.	100m north	Local
Ascension Parish Burial Ground	CiWS	Supports two or more strong neutral grassland indicator species in frequent numbers.	700m north	Local
Trinity Meadow*	CiWS	Supports grassland with two or more strong neutral grassland indicator species and four or more strong calcareous grassland indicator species in frequent numbers.	1km east	Local
Meadow and Ditch Opposite King's College*	CiWS	Area of undeveloped floodplain directly associated with the River Cam CWS.	1.3km south east	Local
Drain at Garret Hostel Lane*	CiWS	Unmodified drain joining the River Cam. Also supports mammal species protected by the WCA 1981, as amended.	1.4km south east	Local
Little St Mary's Churchyard*	CiWS	Supports a nationally scarce species of non-vascular plant; <i>Rhynchospora curviseta</i> .	1.9km south east	Local

2.3.11 A review of the reports by Cambridge Ecology did not identify any changes to habitats within the two designated sites within the site (Coton Path hedgerow CWS and Scrub East of M11 Verge CiWS). The Coton Path CWS was, however, identified as being of high invertebrate interest in surveys undertaken by Cambridge Ecology in 2018. Further details are provided in Appendix 6.11. It was noted that the reason for the high invertebrate value compared to other hedgerows surveyed was likely to be in part due to its length rather than just from habitat quality.

2.3.12 The 2016 ES stated that 'Neither of the vascular plant species which Coton Path Hedgerow is designated for (yellow vetchling and slender tare) were identified during the survey. The absence of these plants is thought to be due to the poor condition of the verge which in some sections, due to lack of management, has become dominated by grass species. In other sections the grass verge has been greatly reduced and is prone to erosion and trampling from foot and bike traffic on the cycle path which was widened in 2006. The Coton Path Hedgerow is considered to be of local value rather than county, even though it is a CWS, because it does not support the vascular species of plant it was designated for due to its poor condition.' The desk study section of the Whittle Laboratory PEA (December 2019) states that Coton Path Hedgerow is 'selected as a CWS on the basis of supporting two Nationally Scarce plant species, namely yellow vetchling *Lathyrus aphaca*, and slender tare *Ervum gracile*, although due to hedgerow and verge management neglect yellow vetchling is considered absent from the site and slender tare is present only in small quantity.' It is therefore possible that slender tare was present in small quantities in 2016.

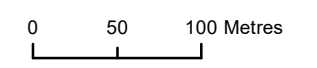
- 2.3.13 Neither yellow vetchling or slender tare were noted as present whilst walking along the hedgerow in September 2020. However, the Coton Path Hedgerow County Wildlife Site is over 1km in length and the exact locations of the previously recorded Nationally Scarce plants was unknown at the time of the site visit. A more focused search on the area where the species were previously recorded at an appropriate time of year would determine with greater confidence if these species were still present. Following the site visit in September 2020 additional information was requested from CPERC to identify a more exact location where these species were recorded. CPERC provided a Site Record Sheet for Coton Path Hedgerow from 2005 which states '*Along the eastern length, from the university sports ground to the dog-leg, the hedge grows on both sides of a steep-sided drain. ... South along the dog-leg, a dry narrow ditch runs to the west of the path and verge, and to the west of this ditch runs a line of occasional small whippy shrubs, overshadowed by a plantation behind it. Along this verge and ditch, two Nationally Scarce species, Slender Tare *Vicia parviflora* and Yellow Vetchling *Lathyrus aphaca*, have been recently recorded, but at the time of the survey little vegetation had survived the cyclepath work. East of the path there is frequent Bramble *Rubus fruticosus* agg. West from the dog-leg the northern verge of the path is wide, and Yellow Vetchling has been recorded here also.*'
- 2.3.14 The Coton Path Hedgerow is species rich and is likely to be an important source of food and shelter for a variety of animals and as discussed above is of high invertebrate value and it adds to the interesting mosaic of habitats which include ponds, a canal, species rich grassland and trees along the southern edge of the West Cambridge site (the Southern Ecological Corridor). Despite the two Nationally Scarce species not being confirmed as still present it the hedgerow still meets the criteria for designation as a CWS⁶.
- 2.3.15 As mentioned in the original ES, part of the Scrub East of M11 Verge CiWS was lost to the construction of the Data Centre. The remains of the CiWS is no longer hedgerow and scrub but a strip of young woodland along the western boundary of the Site and contiguous with the young woodland on the M11 road verge.
- 2.3.16 Whilst Coton Path Hedgerow still meets the criteria for a CWS, Scrub East of M11 CiWS is no longer accurately mapped and other habitats of ecological value, particularly along the southern part of the site, appear likely to meet the criteria for designation.

Habitats

- 2.3.17 Figure 2.1 below is a Phase 1 habitat map from the update survey by Atkins in September 2020. Key changes to the habitats since the Phase 1 survey undertaken in 2015 for the original ES are:
- Areas recorded in the 2015 Phase 1 survey as amenity grassland were found to be species-rich grassland in 2020. These were to the north-east of Whittle Laboratory (Target Note, TN 12 in Figure 2.1 below) and around the sports centre (TN 13). It is likely these areas have been wildflower seeded;
 - Areas recorded in the 2015 Phase 1 survey as bare ground were found to be ephemeral/ short perennial habitat in 2020. These were to the south, north and east of the Data Centre (TN 14, 15, 16);
 - Areas previously recorded as scrub and hedgerow along the western boundary of the site are now young woodland;
 - An area of amenity grassland around Lake 1 is now young woodland;
 - Some new buildings have been built or are in the process of being built (e.g. TN 7);
 - The size and location of Pond 5 is different to that shown in the 2015 Phase 1 map. A photograph in the 2015 target notes shows a waterbody looking similar to a waterbody seen in 2020 and therefore there appears to be inaccuracy in the location of Pond 5 in the 2015 mapping that has now been corrected. Pond 2 is now a small reedbed area that was dry at the time of the September 2020 site visit; and
 - Native species-poor (mainly beech) hedgerows were present around most of the boundaries within the developed part of the Site. These were not mentioned in the 2016 ES. They are likely to have been present but may not have been recorded due to their low ecological value and the lack of space in the Phase 1 map to illustrate the parallel tree lines and hedgerow features.
- 2.3.18 Further details of the changes identified between the 2015 and 2020 surveys are provided in the Phase 1 target notes and photographs in Appendix 6.9 in Volume 3.

⁶ Hedgerow systems at least 500m in length and more than 2m in width, with 5 or more woody species, and with at least part of the hedgerow allowed to flower or fruit. Cambridgeshire and Peterborough County Wildlife Sites Selection Criteria Version 6.2 April 2014. https://www.cambridgeshire.gov.uk/asset-library/imported-assets/CWS_selection_criteria_2014.pdf

- Site boundary
- Scattered trees
- Target notes
- Wet ditch
- Dry ditch
- Intact native species rich hedge
- Intact native species poor hedge
- Broad-leaved woodland
- Broad-leaved plantation woodland
- Mixed plantation woodland
- Dense Scrub
- SI Species-rich semi-improved grassland
- I Improved grassland
- SI Species-poor semi-improved grassland
- Swamp (reedbed)
- Pond
- A Amenity
- Ephemeral/short perennial
- Building
- Bare ground (temporary car park)
- Hardstanding
- Indicative location of proposed new building



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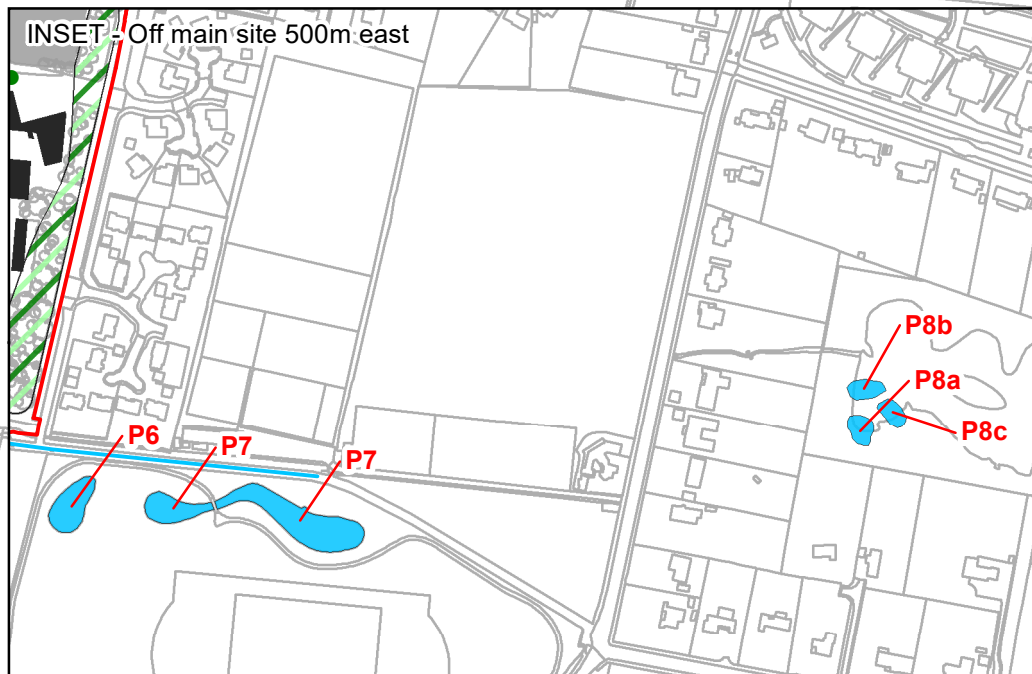
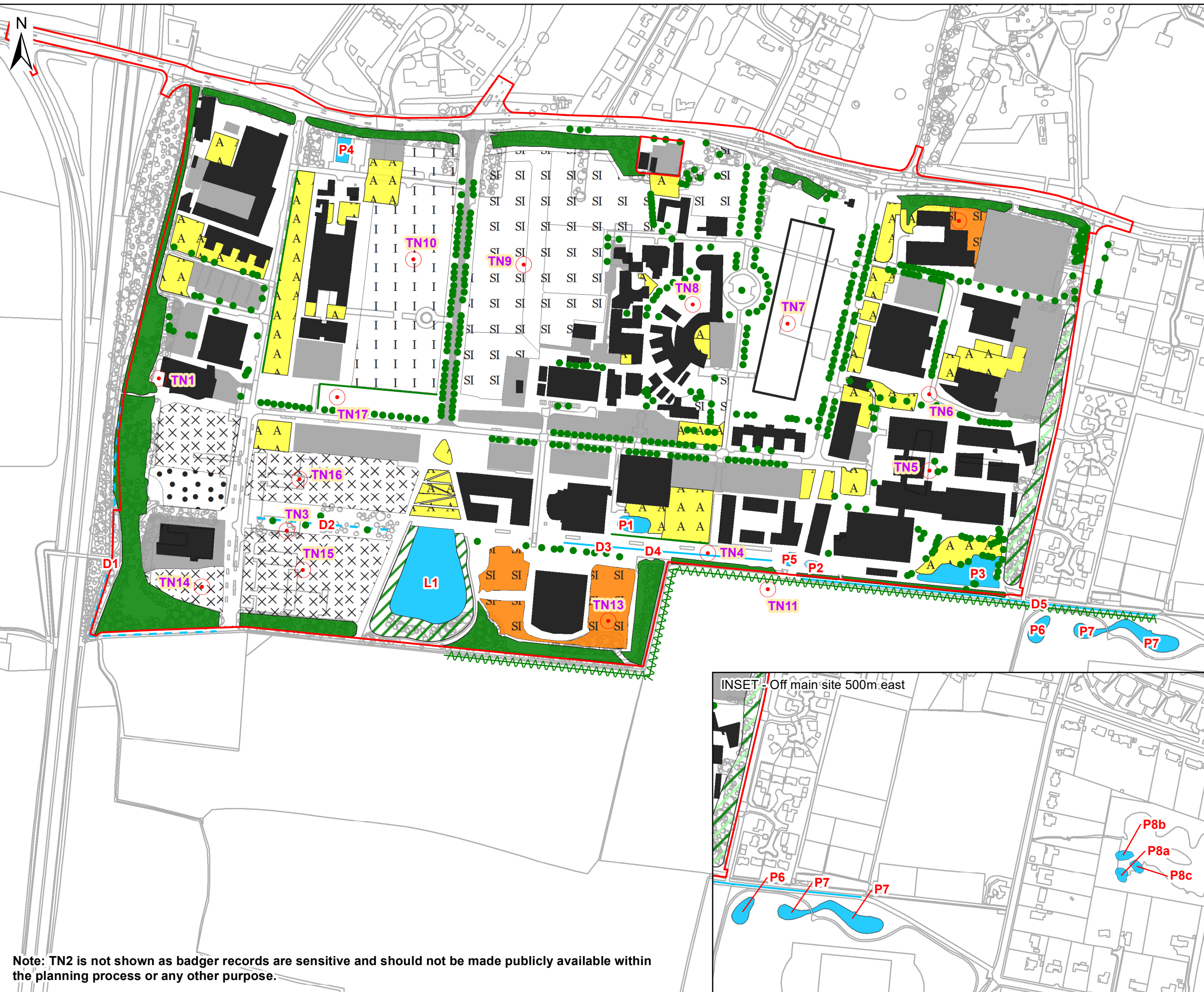
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Client
University of Cambridge

Project
West Cambridge Masterplan EIA

Title
**EcologyPhase 1
Habitat Map
Figure 2.1**

Sheet Size	Original Scale	Designed / Drawn AS	Checked SJD	Authorised CP
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Note: TN2 is not shown as badger records are sensitive and should not be made publicly available within the planning process or any other purpose.

Table 2.2 Baseline conditions for habitats

Habitats	Baseline information in 2016 ES and 2017 addendum	Updated baseline information	NERC Section 41 or local priority habitat
Waterbodies / watercourses	<p>There is one lake (West Cambridge Lake (L1)), five ponds (P1 to P5), one ditch (D1), the source of Coton Brook (D2), the West Cambridge Canal (D3) and the Swales (D4) on Site.</p> <p>Ponds P2, P3 and P5 on-Site are connected to each other via the West Cambridge Canal (D3) which is within a concrete channel and the Swales (D4) which have shallow banks and little vegetation cover. Ponds P2 and P5 are relatively new and are not established in terms of vegetation and species diversity. These ponds and ditches are considered to have a conservation value at the Site level. Pond P3 is located in the south eastern corner of the Site and is fairly well established although it has not been managed and has become overgrown and rank in the shallower sections. In its current condition this pond is considered to have a conservation value at the Site level.</p> <p>The West Cambridge lake (L1) is of fairly new construction and is connected to ponds P2, P3 and P5 via the West Cambridge Canal (D3) and the Swales (D4). The pond in the north of the Site (P4) is an isolated highway's balancing pond which appears to dry out regularly. Both the lake and P4 are considered to have a conservation value at the Site level.</p> <p>The Coton Brook (D5), which was dry during the survey, runs along the north of the cycleway/footpath under the hedgerow that marks the southern boundary of the Site. The brook is culverted, heavily shaded and dominated by ruderal species and trees with the banks being largely supported by tree roots. In its current condition in 2016 this ditch was considered to have negligible conservation value.</p> <p>Value: Site</p>	<p>Information from the Cambridge Ecology reports stated the waterbodies and associated marginal vegetation on the West Cambridge site comprised common reed, bulrush and sedge species.</p> <p>Further information on waterbodies is also provided in the invertebrate section below. Of the waterbodies within the West Cambridge Site, Cambridge Ecology noted the pond next to the Cavendish Laboratory, which is a large ornamental pond that is heavily shaded by trees and shrubs, has the highest conservation value (Pond 3 in the 2016 ES). Whilst none are individually exceptional, all but the seasonal pond support moderately diverse faunas, and, when considered collectively are of relatively high conservation value, especially in the context of the survey area, which has few ponds. On the basis of this aquatic invertebrate information it is considered that the ponds and lake within the West Cambridge site are upgraded to Local value.</p> <p>In September 2020 the habitats, particularly around Lake 1 and the Sports Centre, were found to be well established and likely to be of higher ecological value than in original ES.</p> <p>Pond 1 an open pond within amenity grassland that supported large carp and Pond 3 is an older ornamental pond that is heavily overshadowed by trees around much of its banks.</p> <p>The waterbody layout in the vicinity of Ponds 2 and 5 was different to that on shown on the previous Phase 1 map. Based on the 2015 Phase 1 map and the findings of the September 2020 site visit it appears Pond 2 is now a smaller dry reedbed and Pond 5 is slightly further north and larger than previously shown.</p> <p>Pond 4 was fenced and viewed only from the adjacent road verge. Marginal plant species were visible, but it was unclear if open water was present.</p> <p>Value: Local (with potential to reach County Value following the proposed enhancements).</p>	<p>Yes – The Cambridge Ecology invertebrate report identified Pond 3 as a priority pond under Habitat Action Plan guidance. Other waterbodies within the Southern Ecological Corridor may also meet the criteria for priority habitat. See Appendix 6.10 for assessment of drainage ditches and ponds priority habitats.</p>
Hardstanding footpaths, car parks, roads and buildings	<p>Buildings vary in age and condition across the Site with the Cavendish Laboratories, Veterinary School and Merton Hall Farmhouse buildings being the oldest. The majority of the other buildings are more recent or under construction. These habitats (except buildings with bat roosting potential) were considered to be of negligible value.</p> <p>Value: Negligible (except buildings with bat roost potential which are considered of Local Value as discussed in section on bats in Table 2.2 below)</p>	<p>The Site is subject to changes due to development of parts of the Site. Changes to these negligible value habitats do not significantly alter the baseline conditions.</p> <p>Habitat values given in the 2016 ES remain appropriate.</p> <p>Value: Negligible (except buildings with bat roost potential which are considered of Local Value)</p>	No
Amenity grassland, species-poor semi-improved grassland and improved grassland	<p>Areas of semi-improved grassland occur in the northern part of the Site around the Department of Veterinary Medicine. These areas are predominantly used for grazing or holding animals associated with the department and are considered to have a conservation value at the Site level only.</p> <p>Areas of amenity grassland surround the lake (L1) and ponds P1, P2 and P3. These areas of grassland are heavily mown and kept short for use by staff and residents on the Site. These areas were considered to be of negligible value.</p> <p>Value: Negligible</p>	<p>The amenity grassland around Pond 1 is now young woodland and some areas of amenity grassland are now species rich grassland (likely due to wildflower seeding).</p> <p>The areas now shown as amenity grassland, species poor-improved grassland and improved grassland on Figure 2.1 remain of negligible value.</p> <p>Value: Negligible</p>	No
Species-rich grassland	<p>None recorded in 2016 ES.</p> <p>Value: N/A</p>	<p>Areas to the south of Whittle Laboratory and around the Sports Centre were recorded as species-rich grassland in September 2020. It is likely these areas have been wildflower seeded.</p> <p>As they have established over a short time period and could easily be recreated, they are considered of Site value.</p> <p>Value: Site</p>	No

Habitats	Baseline information in 2016 ES and 2017 addendum	Updated baseline information	NERC Section 41 or local priority habitat
<p>Lowland mixed deciduous woodland, trees (including veteran trees) and scrub</p>	<p>Roads and footpaths are generally lined with a mixture of immature trees, with some mature oaks lining the newly constructed road south of Charles Babbage Road. Mature willows are also present around pond P3 in the south east corner of the Site. The mature oaks and willows were considered to be of local value whilst all other trees were considered to have a conservation value at the Site level as they provided linear commuting lines and foraging habitats for bats and birds.</p> <p>The Scrub East of M11 CiWS qualifies under scrub, hedgerow and neutral grassland. The extent of the site has been diminished through the construction of the university Data Centre which is located within the CiWS. A partially constructed ecological corridor running through the southern section of the Site connecting the CiWS with wider habitats was proposed as mitigation for the Data Centre. The formal boundary of the CiWS has not been adjusted to account for these developments. The area currently comprises hawthorn, sycamore, blackthorn and elder trees with an understorey of nettles and ground ivy. The woodland edge that adjoins the public footpath contains agrimony, black medic, creeping cinquefoil, St Johns wort, square stemmed willow, common spotted orchid and southern marsh orchid. The area was considered to be under managed and in poor condition in terms of its designation. This habitat was considered to be of Local value in terms of the species it supports.</p> <p>Veteran trees were not considered in the Biodiversity chapter of the June 2016 ES; however, an Arboricultural Impact Assessment accompanied the 2017 ES addendum, which identified a single veteran horse chestnut within one of the north east car parks.</p> <p>Value: Local</p>	<p>The Magic website identified potential lowland deciduous woodland priority habitat within and adjacent to the western boundary of the Site and within the northern boundary of the Site. The woodland along the western boundary of the Site aligns with the designation for the Scrub East of M11 CiWS and the area that was not lost to construction of the Data Centre is now young woodland habitat.</p> <p>Some areas previously identified as scrub, amenity grassland and hedgerow were found in September 2020 to be young woodland.</p> <p>The tree identified as a veteran has not been resurveyed to confirm this status, but it is to be retained and protected.</p> <p>Habitat values given in the 2016 ES remain appropriate.</p> <p>Value: Local</p>	<p>Yes - See Appendix 6.10 for assessment of lowland mixed deciduous woodland priority habitats, scrub and veteran trees</p>
<p>Hedgerows</p>	<p>Coton Path Hedgerow CWS is located along the Site's southern boundary. Surveys in 2015 found the hedgerow has become overgrown and contained field maple, hazel, blackthorn, ash, dogwood, elder and oak. Parts of the verge under the hedgerow have been lost due to the growth of the hedge, whereas other parts are dominated by grasses and common herb species. Full species lists for the verge habitats associated with the hedgerow are shown in Appendix 6.3, Volume 3 of the June 2016 ES. Neither of the vascular plant species for which Coton Path Hedgerow is designated for (yellow vetchling and slender tare) were identified during the survey. The absence of these plants is thought to be due to the poor condition of the verge which in some sections, due to lack of management, has become dominated by grass species. In other sections the grass verge has been greatly reduced and is prone to erosion and trampling from foot and bike traffic on the cycle path which was widened in 2006. The Coton Path Hedgerow was considered to be of local value rather than county, even though it is a CWS, because it does not support the vascular species of plant it was designated for due to its poor condition.</p> <p>Hedgerow habitat was recorded within the Scrub East of M11 CiWS.</p> <p>Value: Local</p>	<p>Most of the hedgerows present within the Site are native species-poor.</p> <p>The Coton Path Hedgerow CWS was identified as being of high invertebrate interest in surveys undertaken by Cambridge Ecology in 2018. Further details are provided in Appendix 6.11.</p> <p>It was noted that the reason for the high invertebrate value compared to other hedgerows surveyed was likely to be in part due to its length rather than just from habitat quality. Habitat values given in the 2016 ES therefore remain appropriate.</p> <p>A hedgerow is no longer present within the Scrub East of M11 CiWS. It may have been amalgamated into the woodland strip that is now present along the western boundary of the Site. Woodland habitat is discussed above.</p> <p>Value: County for Coton Path Hedgerow CWS, Negligible for species-poor hedgerows within the developed part of the Site.</p>	<p>Yes - See Appendix 6.10 for assessment of Hedgerows priority habitat</p>
<p>Bare ground</p>	<p>There are three plots of land in the western part of the Site which were predominantly bare ground and have presumably been cleared in the recent past. These areas were considered to be of negligible value.</p> <p>Value: Negligible</p>	<p>None identified in September 2020. An active construction site surrounded by construction hoarding was present (TN7 in Figure 2.1) which could create areas of bare ground.</p>	<p>No</p>

Habitats	Baseline information in 2016 ES and 2017 addendum	Updated baseline information	NERC Section 41 or local priority habitat
Ephemeral / short perennial	None recorded in 2016 ES. Value: N/A	The Cambridge Ecology reports identified tall ruderal habitat on the western part of the Site in 2017, likely due to succession as plants colonised the bare ground identified in 2015. Further information is provided in the invertebrate section below. Four habitat areas were identified as being of high invertebrate habitat. These include: open-structured legume-rich grassland on a level field with varied substrate character immediately to the east of Ada Lovelace Way; taller grassland on a bank between the level grassland and Charles Babbage Road to its north; very open-structured vegetation on recently disturbed ground to the west of Ada Lovelace Way; and unmanaged tall herbs with abundant flowers along a bank and footpath/cycleway immediately to the north of the disturbed ground. In 2020 the fields to the east of the Data Centre (TN 15 and 16) were noted to be dominated by bristly ox-tongue with other species including teasel and ribwort plantain present. These habitats are now considered to have a conservation value at the Site level. Value: Site	No – It is possible that these fields could have met the criteria for priority open mosaic habitats (often associated with brownfield sites) at an earlier stage of the successional process but they now have a closed sward. Other construction activities could however result in creation of this habitat and therefore the priority open mosaic habitat is considered further in Appendix 6.10.

Protected species

2.3.19 A summary of species identified in the original ES and ES addendum is provided in Table 2.3 in conjunction with additional baseline data identified by Cambridge Ecology.

Table 2.2 Baseline Conditions for Species

Species	Baseline information in original ES and ES addendum	Updated baseline information	Priority Species (if yes, see Appendix 6.9 for further details)
Great crested newt	No great crested newts were found in any of the ponds on Site during presence / likely absence survey in 2015. The closest population was a small population of great crested newts present in Adams Road Sanctuary CiWS (500m to the east). This species typically uses suitable terrestrial habitat up to 500m from a breeding pond. However, there is a notable decrease in great crested newt abundance beyond a distance of 250m from a breeding pond ⁷ . It is unlikely that individuals from this population would be present on the Site during construction due to the intervening distance and the lack of attractive habitats. It is considered unlikely that newts from this population will be on the Site; however, a low risk still remains. Great crested newts historically found in the Madingley Road Park and Ride (300m to the north) and a known population in the Birds Sanctuary, Conduit Head CiWS (130m to the north) are separated from the Site by a busy main road with no waterbody linkages. It is considered unlikely that the newts from this population will be on the Site, however a low risk still remains. Value: Local	In June 2017, Cambridge Ecology carried out eDNA analysis to test for the presence/likely absence of great crested eDNA newt. Water samples were taken from eight ponds, including the ponds within the West Cambridge Site. Only one pond located in the sports ground, 35m south-east of the Site (grid reference TL 43209 58670) was positive for the presence of great crested newt. In 2018, an updated eDNA survey was undertaken. This involved three new waterbodies identified in 2018, three waterbodies dry at the time of surveying in 2017 and a repeat of the pond that produced positive results for great crested newt in 2017. All ponds produced negative results for great crested newt eDNA. A survey using traditional survey techniques of the pond that tested positive in 2017 was undertaken and returned negative results for great crested newt presence in 2018. The positive eDNA result of a pond within 50m of the Site in 2017 could indicate only a very small population is present locally. In June 2020, updated eDNA was undertaken. Ponds 1, 3, 5 and Lake 1 within the West Cambridge site and the two ponds within the sports ground to the south east of the site had negative eDNA results indicating the species is currently likely to be absent. The September 2020 survey identified that waterbodies and terrestrial habitat within the Southern Ecological Corridor and boundary habitats were suitable for great crested newts, although large carp were seen in Pond 1 and young fish in Pond 5. The suitability of the habitat and records of great crested newts in the wider area means there is potential for the species to colonise the Site in the future. The value of the West Cambridge Site for great crested newts remains consistent with the 2016 ES. Value: Local	Yes

⁷ Natural England (2004) An assessment of the efficiency of capture techniques and the value of different habitats for the great crested newt (ENRR576). <http://publications.naturalengland.org.uk/publication/134002>.

Species	Baseline information in original ES and ES addendum	Updated baseline information	Priority Species (if yes, see Appendix 6.9 for further details)
Bats	<p>Walking transect surveys identified low number of bats commuting and foraging around the Site with a peak count of 12 bats. Species identified included common and soprano pipistrelle and Daubenton's bats.</p> <p>In general, static detectors recorded species of common pipistrelle, soprano pipistrelle, noctules and <i>Myotis</i> species of bat. A single barbastelle bat was recorded to the west of the Site close to the M11 scrub area.</p> <p>Building inspections were undertaken on all buildings identified to be demolished as part of the master plan proposals in 2015. The surveys identified 12 buildings with features with moderate potential, five buildings with features with low potential and 18 buildings with negligible potential to support roosting bats. A combination of backtracking and emergence / re-entry surveys in 2015 identified the re-entry of a single pipistrelle bat into building W27 during the dawn survey on 13th August 2015. No other emergence or re-entry was recorded during the surveys on the Site. The roost was considered to be of Site value as it was considered to be an occasionally used transitional roost only.</p> <p>Ground level tree inspections of all trees to be removed as part of the masterplan proposals identified three trees with features of moderate to high potential to support roosting bats. Two of these trees had bat boxes which were checked by a licenced ecologist. Tree climbing surveys found no evidence of roosting bats within these trees and the closer inspection of the features resulted in them being re-classified as low and negligible potential for roosting bats.</p> <p>In general, the foraging and commuting value of the Site for bats is considered to be of local value with common species mainly being recorded. The single pass of the barbastelle species on the static monitoring equipment suggests that the Site is occasionally used by this species that are known to roost within approximately 10 miles of the Site. The Site is not considered to be a significant part of the foraging territory for this species and no roosts have been recorded within the Site for this species.</p> <p>Value: Site</p>	<p>An updated survey between November 2017- January 2018 by Cambridge Ecology comprised a Ground Level Tree Assessment and where reachable (within 5m of the ground) the inside of trees, crevices and bat boxes were inspected. Five trees within the West Cambridge Site, along the site boundary to the east of the Sports Centre, were identified as having high bat roost potential as they had bat boxes fitted, likely due to previous mitigation measures due to the Site development. These included three oak trees and two Scots Pine trees. No bats or signs indicating the presence of roosting/ hibernating bats were found in the trees.</p> <p>The hedgerows, tall ruderal and waterbodies within the Site were found to provide good foraging opportunities for bats.</p> <p>Additional bat surveys by Cambridge Ecology were undertaken between June and August 2019. The surveys comprised emergence/re-entry surveys of the trees to detect roost sites and static bat detector surveys of the hedgerows/linear feature, to identify notable foraging and commuting routes. A survey of the five trees with bat boxes to the east of the Sports Centre only identified small numbers of common and soprano pipistrelle bats commuting past. A roost of a single common pipistrelle was confirmed in a tree approximately 140m south of the Site. It should be noted that these tree assessments are focused on habitats most likely to be impacted by the Cambourne to Cambridge Better Public Transport Scheme and will not have identified all potential bat roosts within the West Cambridge Site. Static bat detectors along the southern boundary of the West Cambridge Site identified mainly common and soprano pipistrelle with occasional Nathusius pipistrelle, brown-long eared, Daubenton's, noctule and unidentified bat. A single Barbastelle pass was recorded. Eight of the 18 hedgerows surveyed detected Barbastelle passes. Only common and soprano pipistrelle were recorded along the western boundary of the West Cambridge Site.</p> <p>An inspection of buildings and trees associated with the Whittle Laboratory was undertaken in January 2019. The buildings were assessed as being of negligible bat roosting potential during the Preliminary Ecological Appraisal and one white willow towards the west of the Whittle Laboratory site was assessed as having moderate bat roosting potential. A dusk emergence survey of this tree in September 2019 indicated that it did not support a bat roost at that time.</p> <p>The ecological walkover survey undertaken by Atkins in September 2020 confirmed the tree close to Whittle Laboratory is still present and had moderate bat roosting potential. Willow trees surrounding Pond 3 had moderate to high bat roosting potential and one supported a bat box. Bat boxes were noted on a trees in the woodland block in the centre of the southern boundary of the Site (as identified by Cambridge Ecology above) and the woodland strip along the western boundary of the Site. A detailed ground level tree inspection of all trees within the Site was not undertaken during the September 2020 site visit and additional trees with bat roosting potential may be present. Of the buildings proposed for demolition the older buildings within the Department of Veterinary Medicine complex were considered to have the greatest potential for roosting bats although detailed inspections of the buildings were not undertaken.</p> <p>The habitats on site remain unchanged in terms of their suitability for bats and therefore the value of the West Cambridge Site for bats remains consistent with the 2016 ES.</p> <p>Value: Site</p>	Yes – some species
Water vole	<p>Suitable habitats for water voles were not identified on site.</p> <p>Value: N/A</p>	<p>A water vole survey conducted in 2018 by Cambridge Ecology found no evidence of water voles. Waterbodies on the West Cambridge Site were identified as suitable habitat for water vole but were possibly isolated from suitable habitat beyond the survey area where water vole has previously been recorded.</p> <p>The desk study in September 2020 identified the most recent records of water vole in the vicinity were from Bin Brook in 2014.</p> <p>Therefore, water voles are currently considered to be absent from the West Cambridge Site.</p> <p>Value: N/A</p>	Yes

Species	Baseline information in original ES and ES addendum	Updated baseline information	Priority Species (if yes, see Appendix 6.9 for further details)
Badgers	<p>An artificial badger sett was identified during the Phase 1 walkover. This sett was active and has been expanded by the badgers and includes five artificial entrances and seven 'natural' entrances. There was no evidence of further sett creation within the Site, beyond this artificial sett location. The woodland and arable fields beyond the Site provide suitable foraging habitats for badgers. Badgers were also found foraging on the Site during the bat surveys, although the habitats on Site are not considered as valuable for badger foraging as the surrounding rural areas.</p> <p>Value: Badgers are not rare or endangered, so they are not a feature of nature conservation value.</p>	<p>A badger survey was carried out between November 17 and January 2018 by Cambridge Ecology. This survey included a search for badger setts and evidence of their presence such as faeces, snuffle holes and footprints. Exact details of locations of badger activity and sett locations was not made available for review but reference to an active artificial (man-made) main sett with additional natural burrow entrances is highly likely to relate to the same sett identified in the 2016 ES. This sett was confirmed as still active during the September 2020 site visit.</p> <p>Value: Badgers are not rare or endangered, so they are not a feature of nature conservation value.</p>	No
Birds	<p>A total of 46 bird species were recorded during bird surveys between April and July 2015. 20 species recorded are considered to be notable due to their conservation status. A colony of house martins nesting on building W035 adjacent to the Department of Veterinary Medicine was of note. Swallows were found to be nesting on buildings W023, W068 and W056.</p> <p>A number of buildings within the Site were identified during initial ecological surveys in February 2015 as having potential to support breeding barn owl. These were associated with the Department of Veterinary Medicine towards the centre of the Site. During a site visit on the 16th April 2015, these buildings were inspected by two bird surveyors, who both hold survey licences for barn owl. No evidence of barn owl (pellets, feathers, splashing) was identified within the structures surveyed, and no suitable ledges or owl boxes were present.</p> <p>Anecdotal evidence of barn owl foraging at the south of the Site was provided from Site staff during the surveys. There are no recent records of hunting on the Site.</p> <p>Value: Site</p>	<p>Between April and June 2018 Cambridge Ecology undertook surveys in an area stretching from Childerley Lane to the east of the Site and encompassing the Site. Within this larger area 68 bird species were recorded. None of the species identified are listed as being Schedule 1 species of the WCA 1981 (as amended). 55 species were recorded as breeding, and 14 of which were UK BAP Priority species, Species of Principal Importance or Birds of Conservation Concern red list.</p> <p>In 2018, one pair of breeding grey partridge, six territories of skylark, one starling nest, eight territories of song thrush, five territories of mistle thrush, one pair of house sparrow, twenty-three territories of dunnock, one pair of bullfinch, two pairs of linnet, three territories of yellowhammer and four territories of reed bunting were found east of the M11 and extending to Grange Road. Nesting bird activity was primarily associated with hedgerows, woodland and scrub.</p> <p>The entire survey area (Grange Road in the East to Bourn Airfield in the West) investigated by Cambridge Ecology, which encompasses the Site is of county importance for breeding birds.</p> <p>No wintering waders (lapwing and golden plover) or owls were recorded during any nocturnal or winter bird surveys between November 2017 and March 2018.</p> <p>Wintering bird surveys identified the following birds of high conservation importance; song thrush, dunnock, redwing, woodcock, mistle thrush and starling which were identified on the boundary and within the West Cambridge Site. These are either Birds of Conservation Concern red/amber list, UK BAP, Species of Principal Importance or Schedule 1 species in the WCA 1981 (as amended).</p> <p>During barn owl and winter bird surveys by Cambridge Ecology between November 2018 and January 2019 a barn owl was noted foraging approximately 300m to the southeast of the Site on several occasions.</p> <p>The CPERC data search in September 2020 provided 163 recent records of birds within 1 km of the Site. Of these, 34 were of Schedule 1 birds, consisting of barn owl, brambling, fieldfare, hobby, kingfisher, peregrine and redwing. The closest of these is of a kingfisher recorded within the Site.</p> <p>The September 2020 walkover survey confirmed the Site had similar potential to support the range of bird species previously reported, and therefore the Site is still considered to be of Site value for birds.</p> <p>Value: Site</p>	Yes – some species
Reptiles	<p>Suitable habitats for reptiles were not identified on Site. The site is therefore of negligible value for reptiles.</p> <p>Value: N/A</p>	<p>In 2018 Cambridge Ecology reported a small population of grass snake immediately to the south-east of the West Cambridge Site. Adult and juvenile grass snakes were found, indicating that the species is breeding within or adjacent to the survey area. This contains a network of waterbodies for feeding and ditches, scrub, grassland and hedgerows for breeding and hibernating.</p> <p>In September 2020 the Southern Ecological Corridor was considered to have potential to support reptiles, particularly grass snakes.</p> <p>Value: Site</p>	Yes – grass snake

Species	Baseline information in original ES and ES addendum	Updated baseline information	Priority Species (if yes, see Appendix 6.9 for further details)
Otter	<p>Otters were not considered in the 2016 or 2017 ES. There do not appear to be aquatic linkages between the aquatic habitats within the site and local watercourses and therefore the site is likely to be of negligible value for otters.</p> <p>Value: N/A</p>	<p>The CPERC data search in September 2020 provided 10 records within the last 10 years of otter within 1 km of the Site, with the closest of these 80 m west of the Site, along the M11. The most recent record was in 2017.</p> <p>Otters are wide ranging species and although there are no direct aquatic linkages between the site and local watercourses it would be feasible for otters to cross terrestrial habitats from the Adams Road Sanctuary CWS and Bin Brook where they have been recorded. Habitats within the Southern Ecological Corridor are likely to have improved in suitability for otters since the 2016 ES, particularly now young woodland has established around Lake 1, providing improved sheltering opportunities for this species.</p> <p>Value: Negligible to Site</p>	Yes
Invertebrate	<p>Habitats of particular value for invertebrates were not identified on site during surveys in 2015.</p> <p>Value: N/A</p>	<p>Invertebrate surveys were undertaken on sections between Bourn Airfield and Grange Road between April and September 2018 as part of the Cambridge Ecology surveys. Several areas of high invertebrate value were identified within the West Cambridge Site:</p> <ul style="list-style-type: none"> • Payne’s Pond, south of the Cavendish Laboratories (P1) • The Coton Path Hedgerow • The West Cambridge drainage channel and associated habitats • Recently created grassland and open mosaic habitats in the West Cambridge Site • Hedge and grass verge on the east side of Ada Lovelace Road • Extracts of the report relevant to the West Cambridge Site have been included in Appendix 6.11. <p>The habitats may have increased in value for invertebrates since the 2017 ES due to areas of bare ground establishing habitats and sown wildflower areas. The invertebrate fauna is identified as being of lower quality than the surrounding habitats. This chiefly reflects low diversity and very limited interest in samples from some areas of improved grassland or planted trees in the West Cambridge Site.</p> <p>The CPERC data search in September 2020 provided three recent records of priority invertebrates within 1 km of the Site, consisting of the White-letter Hairstreak, Scarce Chaser dragonfly and Cinnabar moth.</p> <p>The West Cambridge site is now considered to be of value for invertebrates at a Local level.</p> <p>Value: Local</p>	Yes – some species
Invasive plants	<p>The 2014 annual ecology report produced by RPS presents results from site wide bi-annual surveys carried out on the Site. This report shows that the pond behind Cavendish Laboratories (P3) contains the invasive plant species New Zealand pygmy weed. This species was not present within this pond during the 2015 surveys.</p> <p>The invasive plant species, Nuttall’s waterweed, was identified to be present in the West Cambridge Lake (L1) and the West Cambridge Canal (D5) during the 2015 surveys.</p> <p>Invasive species were identified as being of no conservation value.</p>	<p>The CPERC data search in September 2020 provided 68 recent records of invasive non-native plant species within 1 km of the Site, consisting of Canadian waterweed, Virginia creeper, giant hogweed, Himalayan cotoneaster, Indian balsam, Japanese knotweed, montbretia, New Zealand pigmyweed, Nuttall’s waterweed and wall cotoneaster. The closest of these is of New Zealand pigmyweed recorded in the south-eastern corner of the Site. The majority of records provided by CPERC are of a resolution of 1 km, so it is impossible to ascertain whether these species are located within the site boundary or not.</p> <p>As noted in Chapter 9 Water Environment, Nuttall’s waterweed was identified as still being present in Lake 1 during a survey in August 2019. No invasive species were identified during the 2020 extended Phase 1 habitat survey, although a close inspection of the waterbodies where species were previously recorded was not undertaken and therefore it is likely they are still present.</p> <p>The potential for impacts from invasive species remains consistent with the 2016 ES.</p>	No

2.4 Impact assessment

2.4.1 There are three new impacts resulting from the updated baseline that were not assessed in the original ES. These relate to the ephemeral/short perennial habitat and species-rich grassland which were not present on Site at the time of the original ES and an invertebrate assemblage of site value has been identified, which were not identified in the original baseline surveys.

2.4.2 New records of great crested newt in close proximity of the Site in 2017 increases the chances of this species colonizing the suitable habitat on Site. Whilst recent surveys (2019) have confirmed likely absence of this species given the long construction phase covered by this masterplan an additional mitigation measure of update surveys has been added.

2.4.3 Waterbodies / watercourses have also been revalued and are now valued at local value compared with the site value of the original ES. However, the change in value does not result in a change to the significance of effect for this habitat and so has not been reassessed in this section. The original assessment findings for this habitat remain valid.

2.4.4 New impacts will occur during construction and there are no new impacts during operation.

Table 2.3 Impact assessment during construction

Baseline		Impact assessment			
Receptor	Value / sensitivity	Impact	Mitigation measure	Residual effect	Significance of effect
Ephemeral/ short perennial	Site	Construction work that has commenced at the site since the 2016 ES created bare ground that has now established into ephemeral/ short perennial habitat. Some of this habitat will be lost to development.	No new mitigation is required	This habitat only exists as a temporary feature of the site due to construction works. Its temporary presence adds to the diversity of the Site but it is unlikely to remain present in the long-term once the construction works are complete.	Short term - slight beneficial Long term - Neutral Not significant
Species-rich grassland	Site	None present at the time of the 2016 ES. It is likely the grassland around the Sports Centre will be retained. The Whittle Laboratory part of the Site will be developed but it is unknown at this time if the small area of species-rich grassland by this building will be lost.	No additional mitigation is required as habitat not present at time of 2016 ES and its addition is beneficial. Additional wildflower seeding as part of the development of the Site would be beneficial.	Increased area of species-rich grassland.	Slight beneficial Not significant
Invertebrates	Site	Construction works will result in the loss of some habitat favourable to invertebrates such as the ephemeral/ short perennial and species rich semi-improved grassland (wildflower seeded). Construction works will also result in new temporary habitats appearing including bare ground.	No new mitigation is required	The majority of habitats that would support invertebrates will be retained and protected as they are located around the edge of the site or within retained green corridors. This includes areas of amenity grassland that have been converted to species-rich semi-improved grassland (presumably by wildflower seeding) since the 2016 ES. Assemblages of invertebrates will change as a result of changing habitats. Some species, such as those associated with brownfield habitats may only be present whilst construction works are ongoing.	Slight beneficial Not significant
Great crested newt	Local	The positive eDNA result of a pond within 50m of the Site in 2017 could indicate only a very small population is present and could colonise the Site. Construction activities, such as reprofiling of waterbodies, could result in harm to individual great crested newts if the species colonises the Site.	Given the long construction period for works covered by the masterplan updated eDNA survey results may be required prior to activities like site clearance or reprofiling of waterbodies within suitable habitat for great crested newts. The timing of update survey will be dependent on the timing, scale and proximity to potential breeding ponds of proposed works.	None as species either confirmed as absent by surveys or mitigation measures agreed or appropriate mitigation measures will be implemented to ensure no harm to great crested newts.	Neutral Not significant
Reptiles	Site	Site clearance works could harm or kill any reptiles, most likely grass snakes, that are residing in the cleared area.	Site clearance should be undertaken under a Precautionary Method of Working (PMW) for reptiles, particularly grass snakes.	If works are undertaken in accordance with an agreed PMW, harm and mortality to reptiles including grass snakes should be avoided.	Neutral Not significant

3. Historic environment

3.1 Introduction

3.1.1 The historic environment chapter in the original ES and ES addendum was based on local policies that have since been updated. As such Section 7.2 'relevant legislation and policy' requires updating to account for the Cambridge Local Plan adopted in 2018 and the South Cambridgeshire Local Plan adopted in 2018. The below Section 3.2 replaces Section 7.2 of the original ES.

3.1.2 A review of the latest information has been undertaken to confirm that the baseline environment set out in Section 7.4 of the original ES and Section 7.3 of the ES Addendum remain valid. Two new archaeological investigations have taken place within the study area since the original ES and ES Addendum and the findings of these are set out in Section 3.3. The updated baseline does not result in a change to the impact assessment set out in Section 7.5 of the original ES or Section 7.4 of the ES Addendum.

3.1.3 For built heritage, no new buildings or conservation areas have been designated since the original ES or ES Addendum were produced. Since the submission of the original ES and ES Addendum the Merton Hall Farmhouse has been demolished as part of the Cavendish III development which has been consented under a separate planning application. The built heritage baseline set out in Section 7.4 of the original ES and Section 7.3 of the ES Addendum remain valid.

3.2 Relevant legislation and policy

National Planning Policy Framework 2019

3.2.1 While the NPPF is to be read as a whole in the context of archaeology the NPPF states at Section 16 that the Government's objective is 'to conserve heritage assets in a manner appropriate to their significance, so that they can be enjoyed for their contribution to the quality of life of this and future generations'.

3.2.2 **Paragraph 189.** In determining applications, local planning authorities should require an applicant to describe the significance of any heritage assets affected, including any contribution made by their setting. The level of detail should be proportionate to the assets' importance and no more than is sufficient to understand the potential impact of the proposal on their significance. As a minimum the relevant historic environment record should have been consulted and the heritage assets assessed using appropriate expertise where necessary. Where a site on which development is proposed includes, or has the potential to include, heritage assets with archaeological interest, local planning authorities should require developers to submit an appropriate desk-based assessment and, where necessary, a field evaluation.

3.2.3 **Paragraph 190.** Local planning authorities should identify and assess the particular significance of any heritage asset that may be affected by a proposal (including by development affecting the setting of a heritage asset) taking account of the available evidence and any necessary expertise. They should take this into account when considering the impact of a proposal on a heritage asset, to avoid or minimise any conflict between the heritage asset's conservation and any aspect of the proposal.

3.2.4 **Paragraph 191.** Where there is evidence of deliberate neglect of, or damage to, a heritage asset, the deteriorated state of the heritage asset should not be taken into account in any decision.

3.2.5 **Paragraph 192.** In determining applications, local planning authorities should take account of:

- The desirability of sustaining and enhancing the significance of heritage assets and putting them to viable use consistent with their conservation
- The positive contribution that conservation of heritage assets can make to sustainable communities including their economic vitality
- The desirability of new development making a positive contribution to local character and distinctiveness

Cambridge Local Plan 2018

3.2.6 The Cambridge Local Plan 2018 has three policies that are relevant to the historic environment, these comprise:

- **Policy 60:** Tall buildings and the skyline in Cambridge: Any proposal for a structure that breaks the existing skyline and/or is significantly taller than the surrounding built form will be considered against the following criteria:
 - Location, setting and context – applicants should demonstrate through visual assessment or appraisal with supporting accurate visual representations, how the proposals fit within the existing landscape and townscape
 - Impact on the historic environment – applicants should demonstrate and quantify the potential harm of proposals to the significance of heritage assets or other sensitive receptors (view of, backdrop and setting), assessed on a site-by-site basis but including impact on key landmarks and viewpoints, as well as from the main streets, bridges and open spaces in the city centre and from the main historic approaches, including road and river, to the historic core. Tall building proposals must ensure that the character or appearance of Cambridge, as a city of spires and towers emerging above the established tree line, remains dominant from relevant viewpoints as set out in Appendix F [of the Cambridge Local Plan 2018]
 - Scale, massing and architectural quality – applicants should demonstrate through the use of scaled drawings, sections, accurate visual representations and models how the proposals will deliver a high quality addition to the Cambridge skyline and clearly demonstrate that there is no adverse impact
 - Amenity and microclimate – applicants should demonstrate that there is no adverse impact on neighbouring buildings and open spaces in terms of the diversion of wind, overlooking or overshadowing, and that there is adequate sunlight and daylight within and around the proposals
 - Public realm – applicants should show how the space around tall buildings will be detailed, including how a human scale is created at street level.
- **Policy 61:** Conservation and enhancement of Cambridge's historic environment: To ensure the conservation and enhancement of Cambridge's historic environment, proposals should:
 - A. Preserve or enhance the significance of the heritage assets of the city, their setting and the wider townscape, including views into, within and out of conservation areas
 - B. Retain buildings and spaces, the loss of which would cause harm to the character or appearance of the conservation area

- C. Be of an appropriate scale, form, height, massing, alignment and detailed design which will contribute to local distinctiveness, complement the built form and scale of heritage assets and respect the character, appearance and setting of the locality
 - D. Demonstrate a clear understanding of the significance of the asset and of the wider context in which the heritage asset sits, alongside assessment of the potential impact of the development on the heritage asset and its context
 - E. Provide clear justification for any works that would lead to harm or substantial harm to a heritage asset yet be of substantial public benefit, through detailed analysis of the asset and the proposal.
- **Policy 62:** Local Heritage Assets: The Council will actively seek the retention of local heritage assets, including buildings, structures, features and gardens of local interest as detailed in the Council's local list and as assessed against the criteria set out in Appendix G of the Cambridge Local Plan. Where permission is required, proposals will be permitted where they retain the significance, appearance, character or setting of a local heritage asset. Where an application for any works would lead to harm or substantial harm to a non-designated heritage asset, a balanced judgement will be made having regard to the scale of any harm or loss and the significance of the heritage asset.

3.3 Updated baseline

Archaeology

3.3.1 Since the original ES and subsequent ES Addendum, two new archaeological investigations have taken place within the study area and the findings of these are summarised below.

Madingley Road (ECB5309⁸)

3.3.2 An archaeological evaluation was undertaken in 2018 by Archaeological Solutions. The evaluation consisted of five trenches measuring 10m by 1.80m and one trench measuring 15m by 1.80m. This represented a five percent sample of the development area.

3.3.3 Structural remains associated with a public house that was formerly on the site were identified during the fieldwork.

Cavendish Laboratory (ECB5540⁹)

3.3.4 A geophysical survey was carried out on land south of Cavendish Laboratory and the University Sports Ground in Newnham ward in August 2018. The work was carried out in order to inform proposals for new transport infrastructure in the area. The site comprised 18ha of land with a bedrock geology of gault mudstone but with no superficial geology recorded.

3.3.5 The site is currently in use as open ground with no structures present. Four discrete areas were surveyed using magnetometry. Archaeological features were identified in two discrete areas possibly of a Roman settlement.

3.3.6 The earlier phase identified as Romano-British in form, comprised a series of enclosures, ditches and trackways in the area immediately west of the University Sports Ground. A number of rectilinear enclosures showed internal divisions and some strong magnetic anomalies were suggestive of burning activity.

3.3.7 The later phase comprised medieval to post medieval ridge and furrow marks across the site. The ridge and furrow is aligned north-south.

3.3.8 Aside from evidence of the Roman settlement, the survey also revealed a linear feature corresponding to the line of a former rifle range in area 3 identified on the 1st edition OS (1885).

South Cambridgeshire Local Plan 2018

3.3.9 The key policies relevant to the Study Area are listed below:

- Policy NH/14: Heritage Assets
 - Development proposals will be supported when:
 - A. They sustain and enhance the special character and distinctiveness of the district's historic environment including its villages and countryside and its building traditions and details;
 - B. They create new high quality environments with a strong sense of place by responding to local heritage character including in innovative ways.

Development proposals will be supported when they sustain and enhance the significance of heritage assets, including their settings, as appropriate to their significance and in accordance with the NPPF, particularly:

- C. Designated heritage assets, i.e. listed buildings, conservation areas, scheduled monuments, registered parks and gardens;
 - D. Non-designated heritage assets including those identified in conservation area appraisals, through the development process and through further supplementary planning documents;
 - E. The wider historic landscape of South Cambridgeshire including landscape and settlement patterns;
 - F. Designed and other landscapes including historic parks and gardens, churchyards, village greens and public parks;
 - G. Historic places;
 - H. Archaeological remains of all periods from the earliest human habitation to modern times.
- Policy NH/15: Heritage Assets and Adapting to Climate Change
 - The retention and re-use of historic buildings and other heritage assets will be encouraged and supported as a sustainable resource.
 - Proposals for energy efficient and renewable energy measures for historic buildings which adequately safeguard their heritage significance will be permitted.

⁸ Edwards, N., (2018). 34 - 36 Madingley Road, Cambridge, Cambridgeshire CB3 0EX. An Archaeological Evaluation. Hertford: Archaeological Solutions Ltd

⁹ Brunning, E. 2018. Cambourne 2 Cambridge Busway Options east of M11. Archaeological Services WYAS Report 319

Built heritage

- 3.3.10 Since the submission of the original ES and ES Addendum the construction of the Cavendish III development has resulted in the demolition of the Merton Hall Farmhouse. Although the Cavendish III development has been consented under a separate planning application, it also forms part of the West Cambridge Masterplan and the loss of the Merton Hall Farmhouse was assessed in the original ES. Nevertheless, the demolition of the Merton Hall Farmhouse is a change in the built heritage baseline. No other changes to the built heritage baseline have occurred since the submission of the ES and ES Addendum and the baseline reported in these documents remains valid.

4. Landscape and visual

4.1 Introduction

4.1.1 The landscape and visual chapter in the original ES and ES addendum was based on local policies that have since been updated. As such Section 8.2 'relevant legislation and policy' requires updating to account for the Cambridge Local Plan adopted in 2018 and the South Cambridgeshire Local Plan adopted in 2018. The below Section 4.2 replaces Section 8.2 of the original ES.

4.1.2 In addition the landscape and visual baseline has changed since the original ES submission due to the continued development of the North West Cambridge site. Section 4.3 provides an update to the landscape character area and visual receptor points that are affected by the change.

4.2 Relevant legislation and policy

National Planning Policy Framework

4.2.1 Chapter 12 of the NPPF (Feb 2019) states that planning policies, and decisions, should add to the overall quality of the area, be visually attractive as a result of good architecture, layout and appropriate and effective landscaping, be sympathetic to the local character and history and establish or maintain a strong sense of place.

4.2.2 **Paragraph 170:** planning policies and decisions should protect and enhance valued landscapes and recognise the intrinsic character and beauty of the countryside.

Cambridge Local Plan 2018

4.2.3 The Cambridge Local Plan 2018 sets out the vision, policies and proposals for the future development and land use in the local authority to 2031. The key policies relevant to the landscape and visual assessment are:

- **Policy 55:** Responding to context: Development will be supported where it is demonstrated that it responds positively to its context and has drawn inspiration from the key characteristics of its surroundings to help create distinctive and high-quality places:
 - Identify and respond positively to existing features of natural, historic or local importance on and close to the proposed development site;
 - Be well connected to, and integrated with, the immediate locality and wider city; and
 - Use appropriate local characteristics to help inform the use, siting, massing, scale, form, materials and landscape design of new development.
- **Policy 59:** Designing landscape and the public realm: External spaces, landscape, public realm, and boundary treatments must be designed as an integral part of new development proposals and coordinated with adjacent sites and phases. High quality development will be supported where it is demonstrated that:
 - The design relates to the character and intended function of the spaces and surrounding buildings;

- Existing features including trees, natural habitats, boundary treatments and historic street furniture and/or surfaces that positively contribute to the quality and character of an area are retained and protected;
- Trees and other planting is incorporated, appropriate to both the scale of buildings and the space available;
- Species are selected to enhance biodiversity through the use of native planting and/or species capable of adapting to our changing climate.

South Cambridgeshire Local Plan 2018

4.2.4 The key policies relevant to the landscape and visual assessment are:

- **Policy NH/2:** Protecting and Enhancing Landscape Character:
 - Development will only be permitted where it respects and retains or enhances the local character and distinctiveness of the local landscape and of the individual National Character Area in which it is located.
- **Policy NH/6:** Green Infrastructure:
 - The council will aim to conserve and enhance green infrastructure within the district. Proposals that cause loss or harm to this network will not be permitted unless the need for and benefits of the development demonstrably and substantially outweigh any adverse impacts on the district's green infrastructure network.
 - The council will encourage proposals which: Reinforce, link, buffer and create new green infrastructure; and promote, manage and interpret green infrastructure and enhance public enjoyment of it.
 - The council will support proposals which deliver the strategic green infrastructure network and priorities set out in the Cambridgeshire Green Infrastructure Strategy, and which deliver local green infrastructure.
 - All new developments will be required to contribute towards the enhancement of the green infrastructure network within the district. These contributions will include the establishment enhancement and the on-going management costs.
- **Policy NH/8:** Mitigating the impact of Development in and Adjoining the Green Belt:
 - Any development proposals within the Green Belt must be located and designed so that they do not have an adverse effect on the rural character and adverse effect on the rural character and openness of the Green Belt.
 - Where development is permitted, landscaping conditions, together with a requirement that any planting is adequately maintained, will be attached to any planning permission in order to ensure that the impact on the Green Belt is mitigated.

4.2.5 Development on the edges of settlements which are surrounded by the Green Belt must include careful landscaping and design measures of a high quality.

4.3 Updated baseline

Local landscape character

4.3.1 The changes in developments within the study area since the previous ES Addendum have resulted in changes to Landscape Character Area (LCA) D – North West Cambridge. The North West Cambridge development has continued its construction, the effect of this development has increased the built forms and urbanising effects within this area. This has the additional effect of increasing the massing of built elements in conjunction with the University of Cambridge buildings within the wider landscape character. Table 4.1 provides an updated baseline appraisal of LCA D. The changes in built form do not result in a change to the quality, value, or sensitivity to change ratings prescribed in the original ES. The conclusions of the landscape character assessment remain valid and no further assessment is required.

Table 4.1 Revised Local Landscape Character Area descriptions and sensitivity to change

LCA	Description	Quality	Value	Sensitivity to change
D – North West Cambridge	This area lies immediately to the north of the Site and encompasses part of the North West Cambridge development which is a large mixed-use development that includes residential centers with associated leisure and recreational facilities, to the east of the M11 motorway. Construction on the site is well progressed.	Good	Value	Medium

Visual receptors

4.3.2 As a consequence of the continued construction of the North West Cambridge development resulting in a more urban LCA D, there has been a change to the baseline view from visual receptors 1 (Figure 4.1) and 21 (Figure 4.2). Table 4.2 sets out the revised baseline descriptions for these 2 viewpoints taking into account the changes at North West Cambridge. The sensitivity to change ratings for each viewpoint remains the same as the original ES. The conclusions of the visual assessment in the original ES remain valid and no further assessment is required.



Figure 4.1 Viewpoint 1



Figure 4.2 Viewpoint 21

Table 4.2 Revised visual receptor descriptions and sensitivity to change

Visual receptor	Description	Sensitivity to change
Viewpoint 1 Public viewpoint within the Coton Countryside Reserve	Users of open access land with long distance (1,600m) views of the Site from an elevated position. The Site is set against the urban backdrop of north Cambridge with the North West Cambridge development immediately to the left of the Site in the view. The built massing of the North West Cambridge development is rectilinear in character, its light colour appearance contrasts with the dark green tree foliage surrounding it. From this location the development has broken the horizon and is extending the appearance of built forms within this area of Cambridge.	High
Viewpoint 21 Public Right of Way along the top of Chapel Hill (117/15)	Users of a public right of way with long distance (7,200m) filtered views of the Site from an elevated position. The travelling Radio telescope is a prominent landscape feature within the view. The North West Cambridge development forms a minor but visible component within the wider view. The light colour appearance of the building forms contrasts with the surrounding vegetation.	Medium

5. Socio-economics

5.1 Introduction

- 5.1.1 The socio-economic chapter in the original ES and ES Addendum was based on local policies that have since been updated. As such Section 9.2 'relevant legislation and policy' requires updating to account for the Cambridge Local Plan adopted in 2018 and the South Cambridgeshire Local Plan adopted in 2018. The below Section 5.2 replaces Section 9.2 of the original ES.
- 5.1.2 The statistics used for the original ES socio-economic baseline have been updated with data for 2017 and 2018. However, the socio-economic conditions in Cambridge have not substantially changed since the publication of the original ES. Moreover, the statistics provided context and feed qualitatively, not quantitatively, into the impact assessment and the conclusions of the ES would remain unchanged. The socio-economic baseline in the original ES therefore remains valid.

5.2 Relevant legislation and policy

National Planning Policy Framework 2019

- 5.2.1 Chapter 6 of the NPPF states that planning policies and decisions should help create the conditions in which businesses can invest, expand and adapt. Significant weight should be placed on the need to support economic growth and productivity, taking into account both local business needs and wider opportunities for development. This includes a clear economic vision and strategy which positively and proactively encourages sustainable economic growth, having regard to Local Industrial Strategies and other local policies for economic development and regeneration; set criteria, or identify strategic sites, for local and inward investment to match the strategy and to meet anticipated needs over the plan period; seek to address potential barriers to investment, such as inadequate infrastructure, services or housing, or a poor environment; and be flexible enough to accommodate needs not anticipated in the plan, allow for new and flexible working practices (such as live-work accommodation), and to enable a rapid response to changes in economic circumstances.
- 5.2.2 Chapter 8 states that planning policies, and decisions, should provide social, recreational and cultural facilities and services the community needs. This includes planning positively for the provision and use of shared spaces, taking into account and supporting the delivery of local strategies, guard against the unnecessary loss of valued facilities and services and ensure facilities and services are able to develop and modernise and ensure an integrated approach to considering the location of housing, economic uses and community facilities and services.

Cambridgeshire and Peterborough Combined Authority Devolution Deal 2017

- 5.2.3 The Cambridgeshire and Peterborough Combined Authority represents Cambridge and Peterborough City Councils, Cambridgeshire County Council, The Business Board, and East Cambridgeshire, South Cambridgeshire, Fenland and Huntingdonshire District Councils. The devolution of resources, powers and accountability will be put to ambitions which include doubling the size of the local economy and increasing GVA from £22bn to over £40bn over the next 25 years and enhancing Cambridgeshire and Peterborough's position as a global leader in knowledge and innovation. Key sectors for development include life sciences, clean tech, high-value engineering and agri-business.

Greater Cambridge Partnership (formerly City Deal) 2014

- 5.2.4 The Greater Cambridge Partnership (GCP) brings together Cambridge City Council, South Cambridgeshire District Council, Cambridgeshire County Council, the University of Cambridge and local businesses, colleges and research facilities to deliver the City Deal.
- 5.2.5 The City Deal, awarded in 2014, placed importance on Greater Cambridge's ability to compete on a global stage, act as a gateway for high-tech investment and its role as the country's capital for innovation – Greater Cambridge's patent rate is higher than the next six cities combined. This is underpinned by the Cambridge Phenomenon (cluster of over 1,525 technology firms employing more than 54,000 people, with a combined revenue of over £12 billion).
- 5.2.6 Key sectors in Greater Cambridge rely on the contribution of leading global scientists, researchers and innovators. The City Deal attributed the current and future success of Greater Cambridge to the University, its connectivity and attractiveness and liveability. Thus, the GCP aims to enable a new wave of innovation-led growth by investing in infrastructure, housing and skills to support new and existing businesses.

Cambridge Local Plan 2018

- 5.2.7 The Cambridge Local Plan 2018 sets out the vision, policies and proposals for the future development and land use in the local authority to 2031. Its vision is for the City's continued development as a centre of excellence and a world leader in the fields of higher education and research, fostering the dynamism, prosperity and further expansion of the knowledge-based economy. The strength of the local economy is largely attributed to the emergence of the Cambridge Cluster over the last 50 years. This has entailed close links – sharing of ideas, staff, equipment and data, and collaborative working - between businesses locating near similar businesses and the University of Cambridge.
- 5.2.8 The Plan's Spatial strategy for the location of employment development (Policy 2) emphasises the growth of the Cambridge Cluster of knowledge-based industries and institutions and supports proposals to reinforce existing strengths in 'knowledge-based', research and high technology activities. The strategy establishes a close relationship between the Council and partners such as the universities and LEP to attract employment in Cambridge's high technology and research cluster. The Council aims to ensure that sufficient land is available to facilitate 22,100 new jobs by 2031, including 8,800 in B-use class (offices and industry).

- 5.2.9 West Cambridge is identified as a key employment location and an Area of Major Change (Policies 14 and 19) – an extensive area of development which requires significant infrastructure investment and support. West Cambridge’s land use will be intensified and principally comprise educational, academic and commercial research uses, interrelated through collaborative working on ‘open innovation’. Cambridge City Council’s intended capacity for the site is approximately 468,300 sqm of academic and commercial space, of which around 210,500 sqm would be B1(b) commercial uses (Paragraph 5.11). Policy 40, Development and expansion of business space, further emphasises Cambridge City Council’s support for research and research and development facilities at the West Cambridge site.

South Cambridgeshire Local Plan 2018

- 5.2.10 The South Cambridgeshire Local Plan aims to support economic growth by supporting the area’s position as a world leader in research and technology-based industries, research and education (Policy S/2). Doing so entails providing for appropriate levels of employment so the Cambridge area can continue to develop as part of the home of one of the largest clusters of research and development activity in Europe.
- 5.2.11 Economic sustainability is to be achieved by ensuring that sufficient land of the right type is available to support growth and innovation. The Development Strategy to 2031 Policy S/6 establishes the edge of Cambridge as the preferred location for meeting the demand for employment land.

South Cambridgeshire Employment Land Review Update 2012

- 5.2.12 The Employment Land Review (ELR) observes that whilst there is currently sufficient provision in Cambridge and South Cambridgeshire, there is likely to be a future shortage of B1a space. Demand for office space is particularly focused on the city centre and northern fringe around the Cambridge Science Park.
- 5.2.13 The ELR recommends that there is more to be done to increase supply in locations where firms most want to be as the only way to relieve the pressure on B1a space. This is dependent on the University of Cambridge - perhaps the strongest local pull-factor for businesses – upholding its reputation as a key player in the evolving spatial economy. Since there is no more land available in the city centre, the ELR identifies a need to intensify use of existing sites for B1a space.

6. Traffic and transport

6.1 Introduction

6.1.1 This chapter replaces Chapter 10 in the original ES which assessed the effects of the Proposed Development on traffic and transport capacity and infrastructure. This Chapter considers the potential for significant effects deriving from any:

- Severance;
- Driver Delay;
- Pedestrian Delay (also considering cyclist delay);
- Pedestrian Amenity (also considering cyclist amenity);
- Fear and Intimidation;
- Road Safety; and
- Hazardous Loads

6.1.2 No hazardous loads are associated with the construction, operation or decommissioning of the Project and therefore have been scoped out of the assessment.

6.1.3 The adopted Method of Assessment for the remaining environmental aspects is contained in Section 6.3.

6.1.4 The potential effects of the Proposed Development have been considered for the following four scenarios:

- The effects of the Construction Phase of Development – this is assessed in the context of the 2019 Base flows;
- The operational effects of completion of the Initial Phase of Development in 2021 – cumulative impact assessment;
- The operational effects of the Full Development in 2031 – cumulative impact assessment; and
- The operational effects of the Full Development in 2031 - with the benefit of Mitigation.

6.1.5 This assessment refers to the revised detailed Transport Assessment Version 3 prepared in support of the Proposed Development. The Transport Assessment document is separate to the environmental assessment.

6.1.6 Detailed discussions and negotiations have been continuing on a regular basis with the stakeholders (Highways England, Cambridge City Council and Cambridgeshire County Council) since the project commenced in 2015.

6.2 Relevant legislation

National Planning Policy Framework

6.2.1 The NPPF promotes sustainable development and states that there is to be a "presumption in favour of sustainable development" (paragraph 10) when making plans and decisions.

6.2.2 A Travel Plan should be provided for all "developments that will generate significant amounts of movement", and "the application should be supported by a transport statement or transport assessment so that the likely impacts of the proposals can be assessed" (Paragraphs 111 of the NPPF).

6.2.3 Section 9 of NPPF2 'Promoting sustainable transport' states:

6.2.4 "Transport issues should be considered from the earliest stages of plan-making and development proposals, so that:

- the potential impacts of development on transport networks can be addressed;
- opportunities from existing or proposed transport infrastructure, and changing transport technology and usage, are realised....;
- opportunities to promote walking, cycling and public transport use are identified and pursued;
- the environmental impacts of traffic and transport infrastructure can be identified, assessed and considered – including appropriate opportunities for avoiding and mitigating any adverse effects, and for net environmental gains; and
- patterns of movement, streets, parking and other transport considerations are integral to the design of schemes and contribute to making high quality places."

6.2.5 To facilitate the use of sustainable modes of transport, Paragraph 110 states that "applications for developments should:

- give priority to pedestrian and cycle movements ... facilitating access to high quality public transport ... and appropriate facilities that encourage public transport;
- address the needs of people with disabilities and reduced mobility in relation to all modes of transport;
- create places that are safe, secure and attractive - which minimise the scope for conflicts between pedestrians, cyclists and vehicles;
- allow for the efficient delivery of goods, and access by service and emergency vehicles; and
- enable charging of plug-in and other ultra-low emission vehicles...

Strategic Road Network and the Delivery of Sustainable Transport 2013

6.2.6 Relevant policy is also set out in Circular 02/2013 'The Strategic Road Network and the Delivery of Sustainable Development' published by Highways England (then operating as the Highways Agency) in September 2013. This sets out the role of Highways England in engaging with communities and developers to deliver sustainable development and economic growth.

6.2.7 Paragraph 9 sets out the broad policy aims of the circular as it relates to development proposals, stating that "Development proposals are likely to be acceptable if they can be accommodated within the existing capacity of a section (link or junction)...or they do not increase demand for use of a section that is already operating at over-capacity levels, taking account of any travel plan, traffic management and/or capacity enhancement measures that may be agreed....".

6.2.8 With reference to decision making regarding developments, paragraph 9 continues “However, development should only be prevented or refused on transport grounds where the residual cumulative impacts of development are severe”.

6.2.9 The emphasis of this document reflects national guidance, stressing the obligation placed on every developer to 'manage down' traffic generation from new development, and to provide evidence that proposals for measures to reduce traffic generation from the site have been considered.

Cambridge Local Plan 2018

6.2.10 15 strategic objectives are identified for the implementation of the Local Plan under “The spatial vision for Cambridge”, including:

- “promote and support economic growth in environmentally sustainable and accessible locations, facilitating innovation... while maintaining the quality of life and place that contribute to economic success;
- be located to help minimise the distance people need to travel and be designed to make it easy for everyone to move around the city and access jobs and services by sustainable modes of transport”.

6.2.11 Policy 5 of the spatial strategy regards strategic transport infrastructure, placing emphasis on modal shift and greater use of sustainable transport. In particular, the following points will be supported, with the ones relevant to West Cambridge identified:

- “promoting greater pedestrian and cycle priority through and to the city centre, district centres and potentially incorporating public real and cycle parking improvements;
- promoting sustainable transport and access for all to and from major employers, education and research clusters...;
- working with partners in supporting...city-wide cycle and pedestrian network by addressing ‘pinch-points’, barriers and missing links;
- linking growth to the proposed city-wide 20mph zone;
- easing pressure on the air quality management area in the city centre”.

6.2.12 Policy 19 identifies that densification of West Cambridge will be permitted, stating:

6.2.13 “Development of this area will be permitted in line with the existing planning permissions. The principal land uses will be:

- D1 educational uses, associated sui generis research establishments and academic research institutes...
- commercial research and development of products or processes within use class B1(b)...

6.2.14 Any densification of development on the site that results in a significant increase in floorspace, over that already approved, will be supported providing that:

- a revised masterplan ... is agreed that takes an integrated and comprehensive approach to the provision and distribution of the uses, and supporting facilities and amenities; ...

- it includes a comprehensive transport strategy for the site, incorporating a sustainable transport plan to minimise reliance on private cars. This should include assessing the level, form and type of car parking on the site;
- that walking, cycling and public transport links (including access for all) to the city centre, railway station(s), other principal educational and employment sites, and other key locations within the city are enhanced to support sustainable development; and
- That proposals provide appropriate green infrastructure which is well integrated with the existing and new development and with the surrounding area.

Area wide strategic schemes

Greater Cambridge Partnership

6.2.15 The Greater Cambridge Partnership (GCP - formerly the Cambridge City Deal) is the local delivery body for a City Deal with Central Government, bringing powers and investment, worth up to £1 billion over 15 years, to vital improvements in infrastructure, supporting and accelerating the creation of 44,000 new jobs, 33,500 new homes and 420 additional apprenticeships. The four GCP partners are: Cambridge City Council; Cambridgeshire County Council; South Cambridgeshire District Council; and the University of Cambridge.

6.2.16 Whilst there is uncertainty relating to the precise details of the delivery mechanism and programme for specific projects, area-wide transport schemes are required to enable the delivery of development in this area, especially to the west (specifically West Cambourne and Bourn Airfield Urban Extensions). Of direct relevance to West Cambridge are:

- a strategic non-car transport scheme to alleviate car movements between Cambourne to Cambridge; and
- a further cycle scheme along Madingley Road.

6.2.17 The Cambourne to Cambridge scheme will provide three elements:

- a new public transport link from Cambourne to Cambridge,
- a new Park & Ride site off the A428 / A1303; and
- new cycling and walking facilities

6.2.18 A cycle scheme along Madingley Road is being promoted to improve sustainable travel along this key route into the city. It would:

- deliver clear, dedicated cycling and walking routes from Northampton Street roundabout to the Park & Ride site;
- redesign junctions along the road to improve access for those travelling on foot or by cycle;
- improve the look and feel of the street with additional landscaping including more trees and planting;
- increase access to the West Cambridge site and Eddington; and
- aid future economic growth in the city.

6.2.19 The University is very supportive of these area-wide strategic transport schemes to improve non-car movement in the Cambridge Sub-Region, especially towards a mass transit scheme along the A428 / A1303 Corridor and has agreed to make a financial contribution towards them. This mass transit scheme would not be required before the start of the second Key Phase but to provide resilience, should there be a delay to the delivery of this mass transit scheme these contributions could alternatively form part of a “Monitor and Manage” response to the necessary transport mitigation, funding an independent transport strategy as identified in the West Cambridge Transport Assessment. Notwithstanding, it is agreed that the A428 / A1303 Corridor mass transit scheme is the preferred response, and it would be made more certain by being aided by the financial support offered by the University as part of this application.

Cambridgeshire and Peterborough Local Transport Plan 2019

6.2.20 The Cambridgeshire and Peterborough Local Transport Plan (CPLTP) was published on 17th June 2019 and replaces all previous LTPs. It sets out the policies and proposals for future development and spatial planning requirements up to 2050.

6.2.21 The strategy of the CPLTP is outlined. Of relevance to West Cambridge includes:

- The transport network has a role to provide access to sites for housing and employment, as well as increasing the capacity and connectivity of the overall transport network to accommodate the extra journeys from more households and to many more jobs, aligned with other investment in digital connectivity, energy supplies and other utilities, and skills, housing, and other civic infrastructure and business support.
- Transport will play an important part in ensuring that our workforce is able to access the skills and education required for the modern world. Investment in our sustainable transport network will facilitate improved access to education and skills provision, including for those without access to a car. Enabling suitable bus services from towns and villages to nearby Further Education colleges will be a priority, together with local walking and cycling links ...
- Our strategy is focused on transport-oriented planning and development. This approach aims to reduce the need to travel, particularly by private car, by providing attractive alternatives that support a significant shift to more sustainable forms of transport.
- More people travelling on foot, by bike and public transport, rather than by private car, will help to reduce congestion, improve air quality and safety, and create attractive, healthy, and thriving streets and communities. Many of our core policies aim to encourage this shift to walking, cycling and public transport: from providing sustainable connectivity to and within new developments, to delivering world-class walking and cycling infrastructure, and a new, more integrated and accessible, public transport network.

Transport Strategy for Cambridge / South Cambridgeshire

6.2.22 The Transport Strategy for Cambridge and South Cambridgeshire (TSCSC) ensures local councils plan together for sustainable growth and continued economic prosperity in the area. It was adopted by Cambridgeshire County Council in 2014 and is to be regularly reviewed given the extent of growth and development in the area. The strategy has two main roles for improving access across the area:

- To provide a detailed policy framework and programme of transport schemes for the area, addressing current problems, and being consistent with the Cambridgeshire LTP;
- Supporting the Cambridge and South Cambridgeshire Local Plans, taking into account future levels of growth in the area and detailing the transport infrastructure and service necessary to deliver this growth.

6.2.23 The document sets out a number of transport policies and supporting strategies for the development of movement in the region:

- TSCSC 1 The strategy approach - “The transport network will support economic growth, mitigate the transport impacts of the growth and help protect the areas distinctive character and environment”.
- TSCSC 2 Catering for travel demand in Cambridge - “More people will walk, cycle and use public transport services for journeys into, out of and within the city. More people will car share;”
- TSCSC 7 Supporting sustainable growth - “New development will be required to make provision for integrated and improvement transport infrastructure to ensure that most people have the ability to travel by foot, bicycle or by passenger transport and in line with specified modal split targets where relevant”.
- TSCSC 9 Access to jobs and services – “Access to areas of employment and key services will be maximised, particularly by sustainable modes of travel, to:
 - Provide a transport network that is efficient and effective;
 - Provide good accessibility to services and for businesses;
 - Provide a HQPT and cycle network to routes near major employment, education and service centres.

6.2.24 TSCSC 12 Encouraging Walking and Cycling” - “All new development must provide safe and convenient pedestrian and cycle environments including adequate and convenient cycle parking and ensure effective and direct integration with the wider network.”

6.3 Method of assessment

Assessment approach

6.3.1 A description of the detailed method used to assess the effects of traffic associated with the Proposed Development is set out within the Transport Assessment. In summary, a transport model has been constructed of the local highway network to evaluate the movement of trips generated by the Proposed Development on the external highway network in the area.

6.3.2 The assessment has been undertaken in accordance with the following guidelines:

- Guidelines for the Environmental Assessment of Road Traffic (IEMA)¹⁰;
- Design Manual for Roads and Bridges (DMRB)¹¹;
- Local Cambridgeshire County Council guidance.

¹⁰ Institute of Environmental Assessment (IEA), 1994, Guidelines on the Environmental Assessment of Road Traffic

¹¹ Highways Agency, 2020, Design Manual for Roads and Bridges, Sustainability and Environment LA 112 ‘Population and human health’

6.3.3 The outline planning application for the Proposed Development was first submitted in July 2016. During the associated planning deliberations, and with the agreement of Cambridge City Council, four further detailed applications were submitted for individual component parts of West Cambridge. Whilst these four applications were subsequently granted standalone planning approvals within the context of the Extant 2004 Consent, these three consents would form part of the Initial Phase upon the consent of the Proposed Development. As such, the future transport conditions include an assessment of the impact of these four buildings.

6.3.4 The Proposed Development will take around a further 12 years to build out, i.e. through to 2031. In order to test this “worst case”, the overall EIA has tested the operational phase in 2031 – this is coincidentally, consistent with the Joint Authorities’ latest available transport modelling assessment years for testing the emerging Local Plan.

6.3.5 Because of the timescales involved to 2031, this includes a substantial element of uncertainty in terms of:

- Development delivery across the Cambridge Sub Region;
- The associated infrastructure provision necessary to accommodate this level, of growth particularly relating to:
 - the A14 Huntingdon – Cambridge Enhancement;
 - The Greater Cambridge City Deal transport proposals;
 - Highways England’s recent inclusion within the March 2020 Road Investment Strategy 2 statement that the M11 Junction 13 is a “RIS3 Pipeline” Scheme for 2025 – 2030; and
 - Other emerging transport proposals – such as improvements to east - west movement;
- The emerging development policy, including that enshrined within the Cambridge Local Plan.

6.3.6 As such, the transport modelling cannot robustly define a baseline scenario for 2031.

6.3.1 For the purposes of assessing the transport effects of the Proposed Development, the principles of the proposed strategy have been discussed and agreed with the Joint Authorities. This “Monitor and Manage” (also referred to as the “Adaptive Phased Approach”) is summarised as incorporating both:

- A graduated approach – the assessment process reflecting current transport planning policy where travel demand management measures are introduced first, followed by any necessary highway infrastructure measures to mitigate the residual traffic impact; as well as
- An adaptive approach – where, to maintain future flexibility, the proposed mitigation for later phases responds to the quanta of development within the individual phase proposals, the timescales for the delivery, changes in future travel behaviour patterns, emerging transport policy, and the current uncertainty relating to the development and transport infrastructure enhancement proposals.

Scenarios

Year of assessment

6.3.2 The effect of the Proposed Development has been assessed with reference to the:

- Do Minimum (i.e., with the Constructed West Cambridge Development, and all other committed and consented highway enhancements and developments than the Proposed Development); and

- Do Something scenarios (i.e., with the committed and consented highway enhancements and developments as well as the relevant phase of the Proposed Development).

6.3.3 The following scenarios have therefore been considered:

- Baseline
 - 2019 Baseline (2019 has been maintained as the Baseline - reflecting earlier agreements. Whilst it is acknowledged that some time has passed, the 2020 flows have been significantly disrupted by the COVID19 Emergency and are unrepresentative);
 - 2021 Do Minimum;
 - 2031 Do Minimum;
- Future
 - 2019 With Construction (assumed to have the greatest traffic impact);
 - 2021 Do Something - (reflecting committed and proposed developments including the Initial Phase of the Proposed Development);
 - 2031 Do Something - (reflecting committed and proposed developments including the Proposed Development in its completed form); and
 - 2031 Mitigated Do Something - (reflecting committed and proposed developments including the Proposed Development in its completed form) with the benefit of Mitigation.

Development quanta

6.3.4 The development quanta assumed for West Cambridge in the 2021 and 2031 Do Minimum assessments reflects the existing development in the study area.

6.3.5 For the 2021 Do Something scenario, it has been agreed that an indicative Initial Phase of Development be assumed and assessed, the composition of this Initial Phase of West Cambridge Development is shown in Table 6.1, with the assumed completion in 2021.

Table 6.1 Proposed Initial Phase of West Cambridge Development – Land Use Mix

Lane Use (GFA)	Area (m ²)
Academic Research (m ²)	168,259
Commercial Research and Research Institute (m ²)	92,386
Nursery (m ²)	1,900
Shop, Café Restaurant, Pub - A1-A5 (m ²)	350
Assembly and Leisure	6,060
Residential (m ²)	10,680
Ancillary Infrastructure (data centre, energy centre)	7,675
Total (m ²)	287,310

6.3.6 The Full Development quanta assumed for 2031 reflects the composition as stated in Chapter 3 of the original ES.

Access Strategy

- 6.3.7 Measures envisaged to mitigate the likely significant effects of this indicative Initial Phase are included later in this chapter.
- 6.3.8 Acknowledging that there is uncertainty regarding future development and transport infrastructure proposals, and that these would have a significant and substantial impact upon future traffic flows in the local area, as discussed with the Joint Authorities it is not appropriate to define further mitigation measures at this stage beyond an indicative Initial Phase of development (assumed to be 2021).
- 6.3.9 The supporting development access strategy is considered by mode within the respective Sections of the Transport Assessment as summarised below:
- Pedestrian and Cycle strategy - Section 6
 - Public Transport Strategy – Section 7
 - Travel Demand Management Strategy – Section 9
 - Site Layout, Vehicular Access and Parking - Section 8
- 6.3.10 As defined in the latter - Section 8 - the Vehicle access will be provided to the Proposed Development by a series of existing, enhanced and new vehicular access points off Maddingley Road. These will be delivered through the duration of the Proposed Development, to a programme to be determined. These access points assumed for the 2021 assessment for the Initial Phase of Development are:
- The existing traffic signal controlled High Cross junction;
 - The existing JJ Thomson Avenue priority junction; and
 - The existing Clerk Maxwell Road priority junction.
- 6.3.11 In addition, a further priority junction formerly serving the Vet School (currently closed), between JJ Thomson Avenue and High Cross would be opened and enhanced to provide limited service access only to the occupiers immediately adjacent Maddingley Road.
- 6.3.12 For the 2031 assessment, the above three accesses are assumed, along with a new traffic signal controlled, restricted movement (right in / left out), access junction onto Maddingley Road at the western end of the site, which would connect to the Western Access Road.

Establishing the baseline

Survey data

- 6.3.13 For the purposes of the traffic assessment, traffic count survey data has been collated from both existing sources as well as commissioning new traffic count surveys in order to set out baseline traffic flows.
- 6.3.14 Traffic turning count surveys were commissioned by Mayer Brown and undertaken by TSP on Thursday 18th June 2018 at the following junctions to inform the Bourn Airfield Development assessment work:
- M11 Junction 13 Northbound Off Slip;
 - M11 Junction 13 Southbound On Slip;
 - Maddingley Road / Park and Ride Access; and the

- Maddingley Road / High Cross / Eddington Avenue junction.

6.3.15 Further traffic counts were commissioned by the University of Cambridge at the flowing junctions and were undertaken on in May 2019 by Advanced Transport Research (ATR):

- Maddingley Road / JJ Thomson Avenue Junction – turning count; and
- Maddingley Road / Clerk Maxwell Junction – turning count.

Growth factors

6.3.16 Highways England Trip End Model Presentation Program (TEMPRO) database was used to provide the local growth factors for the Cambridge area as required, these are summarised in Table 6.2. These may be considered robust in the context of a network approaching capacity constraint.

Table 6.2 TEMPRO growth factors

TEMPRO V.7.2 Growth Factors										
Road Classification	2013-2019		2014-2019		2015-2019		2016-2019		2018-2019	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Urban Trunk	1.0897	1.0973	1.1000	1.0985	1.0657	1.0692	1.0520	1.0529	1.0168	1.0170
Urban Principal Road	1.0834	1.0910	1.0947	1.0932	1.0615	1.0650	1.0490	1.0498	1.0158	1.0160
Urban Minor Road	1.0804	1.0880	1.0934	1.0919	1.0620	1.0655	1.0493	1.0502	1.0160	1.0162
Rural Motorway	1.0983	1.1061	1.1071	1.1056	1.0711	1.0746	1.0560	1.0569	1.0180	1.0182
Rural Trunk	1.1025	1.1102	1.1111	1.1096	1.0748	1.0783	1.0586	1.0595	1.0189	1.0191
Rural Principal	1.0865	1.0941	1.0978	1.0962	1.0645	1.0680	1.0511	1.0520	1.0165	1.0167

Highway flow data

6.3.17 The trip generation from West Cambridge has been assessed for all scenarios; (Current – 2019), Do Minimum (Constructed) and Do Something for the two 2021 Initial Phase and 2031 Full Development tests, using:

- Stantec' Transport Model (2017) calibrated against the vehicle trip results arising from the Person Trip Model element of this (see below)
- Observation – including person trip surveys, and site access vehicle trip movement counts.

6.3.18 Stantec has developed a first-principles Transport Model to assess independently development trip generation, distribution and mode share in this area. The West Cambridge Person Trip Model element was based on the previously-approved North West Cambridge Model - albeit expanded considerably to incorporate:

- The West Cambridge Development;

- Demographic information contained within the updated 2011 Census data;
 - The trip generation from the allocated strategic developments included within the Cambridge Local Plan; and
 - The results of the 2014 University staff data postcode data analysis (later survey data have been collected, as these data do not differ significantly from the 2014 the original information has not been updated).
- 6.3.19 Further details are provided below.
- Base year traffic flows 2019**
- 6.3.20 The 2019 vehicle flows will be derived across the network from the most appropriate source, including inter alia:
- The traffic count surveys - including automatic traffic counts and manual part-classified junction turning counts - undertaken across the area in June 2018 and May 2019;
 - Traffic count survey data from Highways England's TRADS (now Webtris) database; and
 - Growth factors from the Department for Transport's TEMPRO model will be used to convert all the survey results to the necessary common year.
- 6.3.21 These flows are summarised in Appendix 10.1, with a Link Reference Plan in Appendix 10.2.
- Calculation of 2021 traffic**
- 6.3.22 The 2019 network traffic flows will be increased by the vehicle trips identified by Stantec's Transport Model arising from the consented strategic development delivered by 2021 assigning along each link.
- 6.3.23 These 2021 flows, being based in part on observation from the surveys in 2018 and 2019, would already include movements associated with West Cambridge. For the purposes of assessing the 2021 Do Something scenario for the Transport Assessment, to avoid double counting the existing West Cambridge development-generated vehicle trips:
- The Observed 2018 / 2019 West Cambridge vehicle movements would be deducted by link;
 - These Observed 2018 / 2019 West Cambridge vehicle movements would be replaced with the predicted Proposed Development (Initial Phase of the Do Something scenario) identified by the Transport Model.
- 6.3.24 To provide reassurance to the accuracy of these flow increases, the resulting increases in link flow will be considered with reference to the appropriate growth factor obtained from the Department for Transport's TEMPRO model. The flows are summarised in Appendix 10.1.
- Calculation of 2031 traffic**
- 6.3.25 The 2019 network traffic flows will be increased by the vehicle trips identified by Stantec's Transport Model arising from the consented strategic development delivered by 2031 assigning along each link.
- 6.3.26 These 2031 flows, being based in part on observation from the surveys in 2018 and 2019, would already include movements associated with West Cambridge. For the purposes of assessing the 2031 Do Something scenario for the Transport Assessment, to avoid double counting the existing West Cambridge development-generated vehicle trips:
- The Observed 2018 / 2019 West Cambridge vehicle movements would be deducted by link;
 - These Observed 2018 / 2019 West Cambridge vehicle movements would be replaced with the predicted Proposed Development (Full Do Something scenario) identified by the Transport Model.
- 6.3.27 The 2031 Mitigated Do Something flows have been assessed by reducing the 2031 Do Something flows to reflect the benefits of the Proposed Camborne to Cambridge bus scheme (agreed with the County Council), and the West Cambridge Public Transport Strategy – as reported in Section 18 of the Transport Assessment.
- 6.3.28 To provide reassurance to the accuracy of these flow increases, the resulting increases in link flow will be considered with reference to the appropriate growth factor obtained from the Department for Transport's TEMPRO model. These flows are summarised in Appendix 10.1.
- Calculation of construction traffic generation**
- 6.3.29 For the Proposed Development, a first-principles approach has been undertaken to derive the peak construction trip generation assumptions used in this assessment. These flows are summarised in Appendix 10.3.
- 6.3.30 Reference has been made to the Construction Environmental Management Plan (CEMP) prepared by Stantec in 2016 for West Cambridge to ascertain these movements.
- 6.3.31 This assessment of the indicative peak daily construction two-way flows arising from the Proposed Development has been completed in advance of appointing a contractor or defining the development programme completion targets. As a result of the range of construction projects and processes occurring on any one day, there is wide variation in the flows accruing to the construction of a multi-occupancy development such as the Proposed Development. Typically, the final rate of project completion reflects many competing factors – such as construction access to the Development, agreeing the final occupiers of the buildings, availability of labour or materials (such as concrete or bituminous material) as well as maintaining a quality environment during the early phases of a project during these construction phases. Nevertheless, a reasonable worst case assessment of the likely extent of construction-related activities occurring at any one time has been made for the purposes of assessing environmental effects. This has been forecast to occur during the construction of the infrastructure enabling works. Further details of the following construction traffic impacts are contained within Section 12 of the Transport Assessment:
- Earthworks
 - On-site Drainage;
 - Carriageway Construction; and
 - Initial Construction works to a major building.
- 6.3.32 For the purposes of this assessment it is assumed that the initial construction works for a major building (in this case, the concrete work casting the foundations) would not occur at the same time as the on-site carriageway construction due to the excessive heavy vehicle trip generation characteristics of both operations.
- 6.3.33 For the purposes of this assessment it is assumed that all heavy vehicle access will be from M11 Junction 13 / Madingley Road – it being assumed that the heavy vehicle movements through the City will be discouraged.

6.3.34 The assumed Initial Phase peak Daily Construction traffic flows are summarised in Table 6.3:

Table 6.3 Peak Daily Construction Movements

Activity	Max Light Vehicles Movts / day			Max Heavy Vehicles Movts / day			Max Total Vehicles Movts / day		
	In	Out	Tot	In	Out	Tot	In	Out	Tot
Earthworks	10	10	20	82	82	164	92	92	184
On-Site Drainage	4	4	8	4	4	8	8	8	16
Carriageway construction	6	6	12	60	60	120	66	66	132
Building construction	10	10	20	0	0	0	10	10	20
Total	30	30	60	146	146	292	176	176	352

Study area

6.3.35 The initial area of study agreed with the Joint Highway Authorities during the Transport Scoping exercise is shown on Figure 6.1.

6.3.36 The Institute of Environmental Assessment (now Institute of Environmental Management and Assessment (IEMA)) guidelines¹² suggest that for environmental impact, traffic flow increases (or HGV increases) of 30% represent a reasonable threshold for inclusion of highway links within the assessment process, although a lower threshold may be appropriate, for example, where there are existing high HGV flows. It also suggests that links with traffic flow increases of 10% or more should be assessed in other sensitive areas. This has been used to inform the links assessed.

6.3.37 Notwithstanding the TEMPRO growth factors identified in Table 6.2 in excess of 30% between 2019 and 2031, the transport modelling has calculated that the below listed links will experience a 30% or greater change in traffic flows in 2031 as a result of natural growth, plus growth from the specific cumulative developments and the Proposed Development.

- Link 3.9 – Madingley Rd – East of Storey’s Way;
- Link 3.10 - Madingley Rd – East of Grange Rd;
- Link 4.0 – Huntingdon Rd – West of Proposed NWC HRW Access;
- Link 11.1 – Proposed Madingley Rd West Access to NWC;
- Link 11.2 – Proposed Huntingdon Rd Access to NWC;
- Link 12.1 – High Cross Access to Madingley Rd;
- Link 12.2 – JJ Thomson Ave Access to Madingley Rd; and
- Link 12.3 – Clerk Maxwell Rd (to the north of the proposed car park entrance).

6.3.38 Similarly, the transport modelling has calculated that the below listed links will experience a 10% or greater change in traffic flows in 2031 as a result of natural growth, plus growth from cumulative developments and the Proposed Development.

- Link 3.2 – Madingley Rd on Over Bridge M11
- Link 3.3 – Madingley Rd between M11 On Slip – Proposed Madingley Rd West Access;
- Link 3.4 – Madingley Rd – West of P&R Access;
- Link 3.5 – Madingley Rd – East of P&R Access;
- Link 3.6 – Madingley Rd – East of Proposed High Cross Access;
- Link 3.7 – Madingley Rd – East of JJ Thomson Ave;
- Link 3.8 – Madingley Rd – East of Clerk Maxwell Rd;
- Link 3.11 – Madingley Rd – West of Queen’s Rd / Northampton St;
- Link 3.12 – Northampton St – West of Pound Hill;
- Link 6.0 – Queens Road – North of West Road;
- Link 11.0 – Proposed NIAB Access between Huntingdon Road and Histon Road; and
- Link 11.3 – Proposed Huntingdon Road Eastern Access to NWC.

¹² Institute of Environmental Assessment, 1993, Guidelines for the Environmental Assessment of Road Traffic

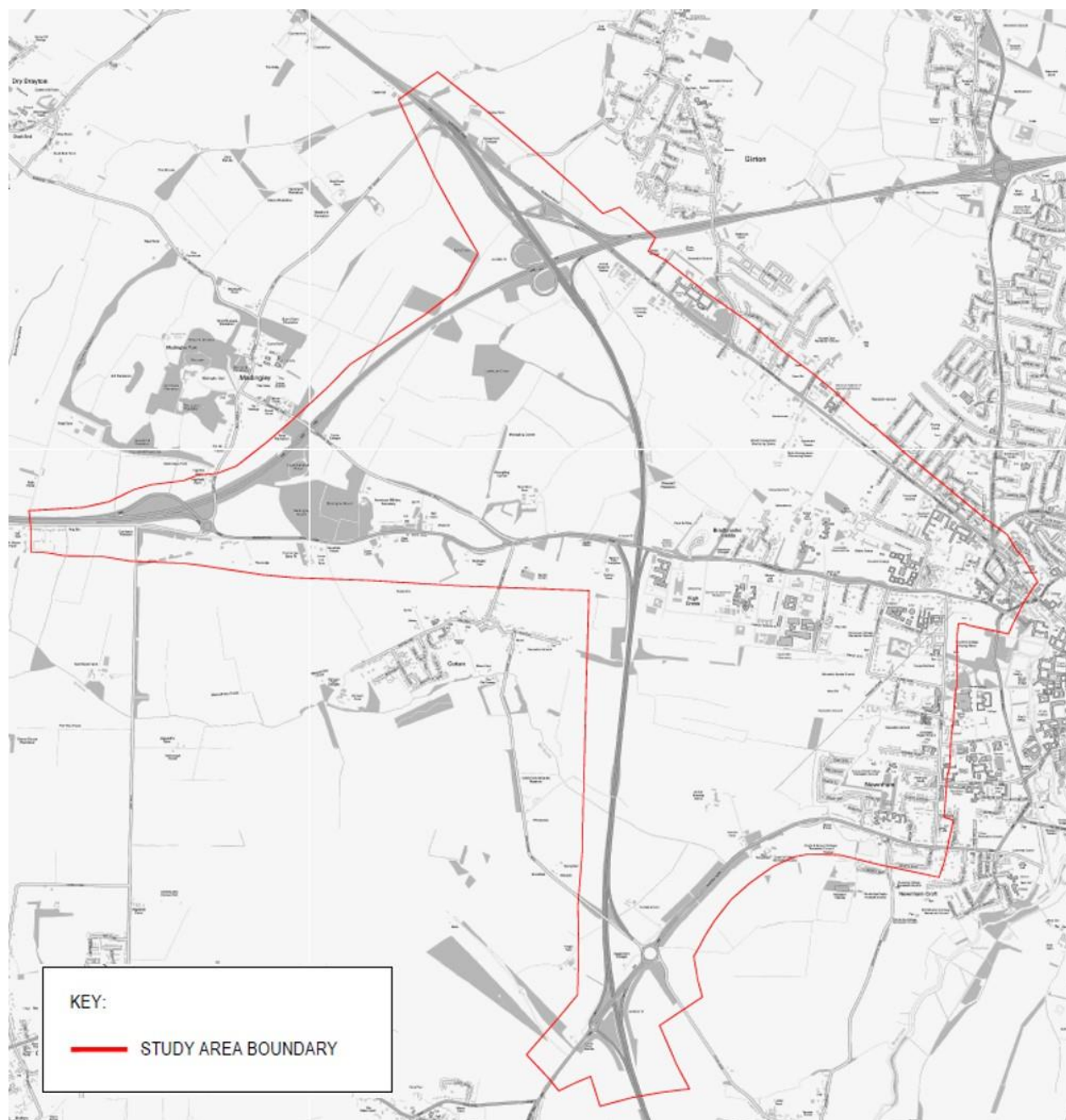


Figure 6.1 Study area

Impact assessment

- 6.3.39 The method and significance criteria used in this assessment reflect that within the guidance documents referenced earlier within this Chapter, together with professional judgement.
- 6.3.40 The significance of effect is derived from a combination of the sensitivity (or importance) of the receptors affected, and the magnitude (or scale) of impact from the change on the receptors. These two factors are considered individually.

Sensitivity

- 6.3.41 For the transport-related effects considered in this chapter, categories of receptor sensitivity have been defined from the principles set out in the IEMA Guidelines as set out in Table 6.4. In addition, although not specifically identified within the IEMA Guidelines as being sensitive, it has been assumed that residential areas and employment areas have low sensitivity to these effects, as they typically experience regular traffic movements on a day-to-day basis.

Table 6.4 Sensitivity of receptors

Sensitivity	Receptor
High	<ul style="list-style-type: none"> Schools, colleges and other educational institutions; Retirement / care homes for the elderly or infirm; Roads used by pedestrians with no footways; and Road safety black spots.
Medium	<ul style="list-style-type: none"> Hospitals, surgeries and clinics; Parks and recreation areas; Shopping areas; and Roads used by pedestrians with narrow footways.
Low	<ul style="list-style-type: none"> Open space; Tourist / visitor attractions; Historical buildings; and Churches.

Magnitude of impact

- 6.3.42 The magnitude of impact depends upon the category of traffic effects being assessed, and this has been based on the guidance relating to severance (as set out below) which suggests that 0%, 30%, 60% and 90% changes in traffic levels should be considered as "negligible", "minor", "moderate" and "major" impacts respectively.
- 6.3.43 IEMA's guidelines set out the broad principles of how to assess the magnitude of effect for each category of potential environmental impact. This is summarised below by category.

Magnitude of impact – Severance

- 6.3.44 The IEMA guidance states that "severance is the perceived division that can occur within a community when it becomes separated by a major traffic artery." Further, "Changes in traffic flow of 30%, 60% and 90% are regarded as producing 'slight', 'moderate' and 'substantial' changes in severance respectively". However, the guidance acknowledges that the measurement and prediction of severance is extremely difficult. The assessment of severance pays full regard to specific local conditions, in particular the location of pedestrian routes to key local facilities and whether or not crossing facilities are provided. For the purposes of this assessment, motorway and dual carriageway links where walking and cycling are excluded or the numbers extremely limited have not been included in the assessment tables.
- 6.3.45 The Design Manual for Roads and Bridges Sustainability and Environment LA 112 'Population and human health' dated January 2020 (the "DMRB") provides guidance on the assessment of new Severance for the trunk road schemes for which the DMRB was prepared. This assessment is based upon the 2-way Annual Average Daily Traffic Flow (AADT) on a link and the sensitivity of the receptor. It states that this new Severance should be described in terms of "Low", "Medium", "High" or "Very High".

6.3.46 For the purposes of assessing likely significant of effects of the changes in existing severance, the DMRB descriptions have been applied to both the existing and predicted flows. These descriptions of Severance have been adapted to maintain consistency with this ES assessment - these are now referred to as "Negligible" "Low", "Medium" and "High" respectively. Table 6.5 summarises these thresholds.

Table 6.5 Pedestrian Severance threshold (interpreted from DMRB LA 112)

Magnitude	AADT
High	> 16,000
Medium	8,000 - 16,000
Low	4,000 - 8,000
Negligible	< 4,000

Magnitude of impact – Driver Delay

6.3.47 Driver 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."

Magnitude of impact – Pedestrian Delay

6.3.48 "Changes in the volume, composition or speed of traffic may affect the ability of people to cross roads." The guidance suggests that assessors "... use their judgement to determine whether pedestrian delay is a significant effect".

6.3.49 For the purposes of this assessment, the pedestrian severance threshold levels identified in Table 6.5 above have been applied to pedestrian delay.

6.3.50 Although the IEMA's Guidelines for the Environmental Assessment of Road Traffic only considers pedestrian delay, consideration is also given to cyclist delay.

Magnitude of impact – Pedestrian Amenity

6.3.51 This is broadly defined as the relative pleasantness of a journey; it is affected by traffic flow, traffic composition and pavement width / separation from traffic. The guidance suggests a tentative threshold for judging the significance of changes in pedestrian amenity of where traffic flow (or its heavy vehicle component) is halved or doubled.

6.3.52 Although IEMA's Guidelines for the Environmental Assessment of Road Traffic only considers Pedestrian Amenity, within the assessment of the West Cambridge Development consideration is also given to Cyclist Amenity.

Magnitude of impact – Fear and Intimidation

6.3.53 The effect of this is dependent upon the volume of traffic, its heavy vehicle composition, its proximity to people or the lack of protection caused by such factors as narrow pavement widths.

6.3.54 Receptors are assessed as being pedestrians and cyclists. For the purposes of this assessment, the highest road category links (such as the M11 motorway and the A14 / A428 dual carriageways) do not have pedestrian / cyclist facilities, the use by these users of these links is minimal, if any. As no receptors would be present on these links, these links have not been included within the assessment tables below.

6.3.55 The IEMA guidelines state that there are no commonly agreed thresholds for estimating "fear and intimidation" from known traffic and physical conditions, but it does nevertheless suggest some thresholds which could be used, based on previous research, and these are shown in Table 6.6.

Table 6.6 Fear and Intimidation thresholds

Degree of hazard	Average traffic flow over 18 hr day – vehicles / hour 2-way	Total 18 hour heavy vehicle flow	Average vehicle speed over 18 hour day - mph
High	+1,800	+ 3,000	+20
Medium	1,200 – 1,800	2,000 – 3,000	15 – 20
Low	600 - 1,200	1,000 – 2,000	10-15
Negligible	<600	<1,000	<10

Note 1: Although no category is given in the guidance for flows less than the "Low" (was Moderate) threshold, this has been added to the table.

Note 2: These categories of degree / magnitude of hazard have also been expressed consistently with the terms used in this assessment as High, Medium, Low, and Negligible.

Magnitude of impact – Accidents and safety

6.3.56 The guidance suggests that "Professional judgement will be needed to assess the implications of local circumstances, or factors, which may elevate or lessen risks of accidents, e.g. junction conflicts".

Significance of effect

6.3.57 The sensitivity of the receptor and the magnitude of impact are combined to give the overall significance of effect for both beneficial and adverse conditions as shown in Table 6.7 Definitions for the effect significance are given in Table 6.8.

Table 6.7 Significance of Effect Categories

		Sensitivity		
		High	Medium	Low
Magnitude of impact)	High	Major	Major	Moderate
	Medium	Major	Moderate	Minor to Moderate
	Low	Moderate	Minor to Moderate	Minor
	Negligible	Negligible	Negligible	Negligible

Table 6.8 Generic Significance Criteria

Significance Level	Criteria
Major	These effects are likely to be important considerations at a local or district scale
Moderate	These effects are likely to be important considerations at a local scale
Minor	These effects may be raised as local issues but are unlikely to be of importance.
Negligible	No effect or effect which is beneath the level of perception, within normal bounds of variation or within the margin of forecasting error.

6.3.58 In addition to the above, as the percentage of increased traffic is a function of the level of baseline traffic flows. Trigger levels in terms of absolute levels of increase have been introduced to prevent very minor changes on links with low baseline flows from being considered as more significant.

6.3.59 For example, with reference to the above table, a change in traffic flow of greater than 90% on a road with a high sensitive receptor would result in a 'major significant effect'. However, the existing baseline traffic flows could be very minor and an increase of only a few vehicles would produce a large change in magnitude whereas in real terms the increase in traffic is still considered to be insignificant. Therefore, reference has been made to the Fear and Intimidation threshold trigger levels in Table 6.6 where a significant effect is only considered to occur if the baseline traffic flow is increased to any of the trigger levels identified.

Assumptions and limitations

6.3.60 As agreed with Cambridge City Council and Highways England, the transport-related technical assessment work used to support the development is based on Stantec's Transport Model.

6.3.61 To create the baseline, this Transport Model includes the Constructed West Cambridge Development, and all other committed and consented highway enhancements and developments other than the Proposed Development. The increases on individual links are reviewed against general TEMPRO growth factors, there is some uncertainty regarding when these sites may come forward in reality. The assumptions included within the model for these developments were agreed with the Joint Authorities and represent the best available information at the present time.

6.3.62 Whilst this Transport Model is a suitable tool for assessing the strategic impact of West Cambridge and steps have been undertaken to ensure the assignment of the model trips on local routes around the development reflects reality, minor limitations inherent in all such transport models may remain. However, these will not have a significant impact on the conclusions of this EIA process.

6.3.63 Typical construction traffic movements have been based on experience of other similar projects.

6.3.64 This assessment of the indicative peak daily construction two-way flows arising from the Proposed Development has been completed in advance of appointing a contractor, or defining the development programme completion targets. As a result of the range of construction projects and processes occurring on any one day, there is wide variation in the flows accruing to the construction of a multi-occupancy development such as the Proposed Development. Typically, the final rate of project completion reflects many competing factors – such as construction access to the Site, agreeing the final occupiers of the buildings, availability of labour or materials (such as concrete or bituminous material) as well as maintaining a quality environment during the early phases of a project during these construction phases. Nevertheless, a reasonable worst case assessment of the likely extent of construction-related activities occurring at any one time has been made for the purposes of assessing environmental effects. This has been forecast to occur during the construction of the infrastructure enabling works. Further details of the following construction traffic impacts are contained within Section 12 of the Transport Assessment:

- Earthworks
- On-site Drainage;
- Carriageway Construction; and
- Initial Construction works to a major building.

6.3.65 For the purposes of this assessment it is assumed that the initial construction works for a major building (in this case, the concrete work casting the foundations) would not occur at the same time as the on-site carriageway construction due to the excessive heavy vehicle trip generation characteristics of both operations.

6.3.66 For the purposes of this assessment it is assumed that all heavy vehicle access will be from M11 Junction 13 / Madingley Road – it being assumed that the heavy vehicle movements through the City will be discouraged.

6.3.67 The assumed Initial Phase peak Daily Construction traffic flows are summarised in Table 6.9:

Table 6.9 Peak Daily Construction Movements

Activity	Max Light Vehicles Movts / day			Max Heavy Vehicles Movts / day			Max Total Vehicles Movts / day		
	In	Out	Tot	In	Out	Tot	In	Out	Tot
Earthworks	10	10	20	82	82	164	92	92	184
On-Site Drainage	4	4	8	4	4	8	8	8	16
Carriageway construction	6	6	12	60	60	120	66	66	132
Building construction	10	10	20	0	0	0	10	10	20
Total	30	30	60	146	146	292	176	176	352

6.4 Baseline conditions

6.4.1 The following existing conditions are contained within the respective Sections of the Transport Assessment as summarised below:

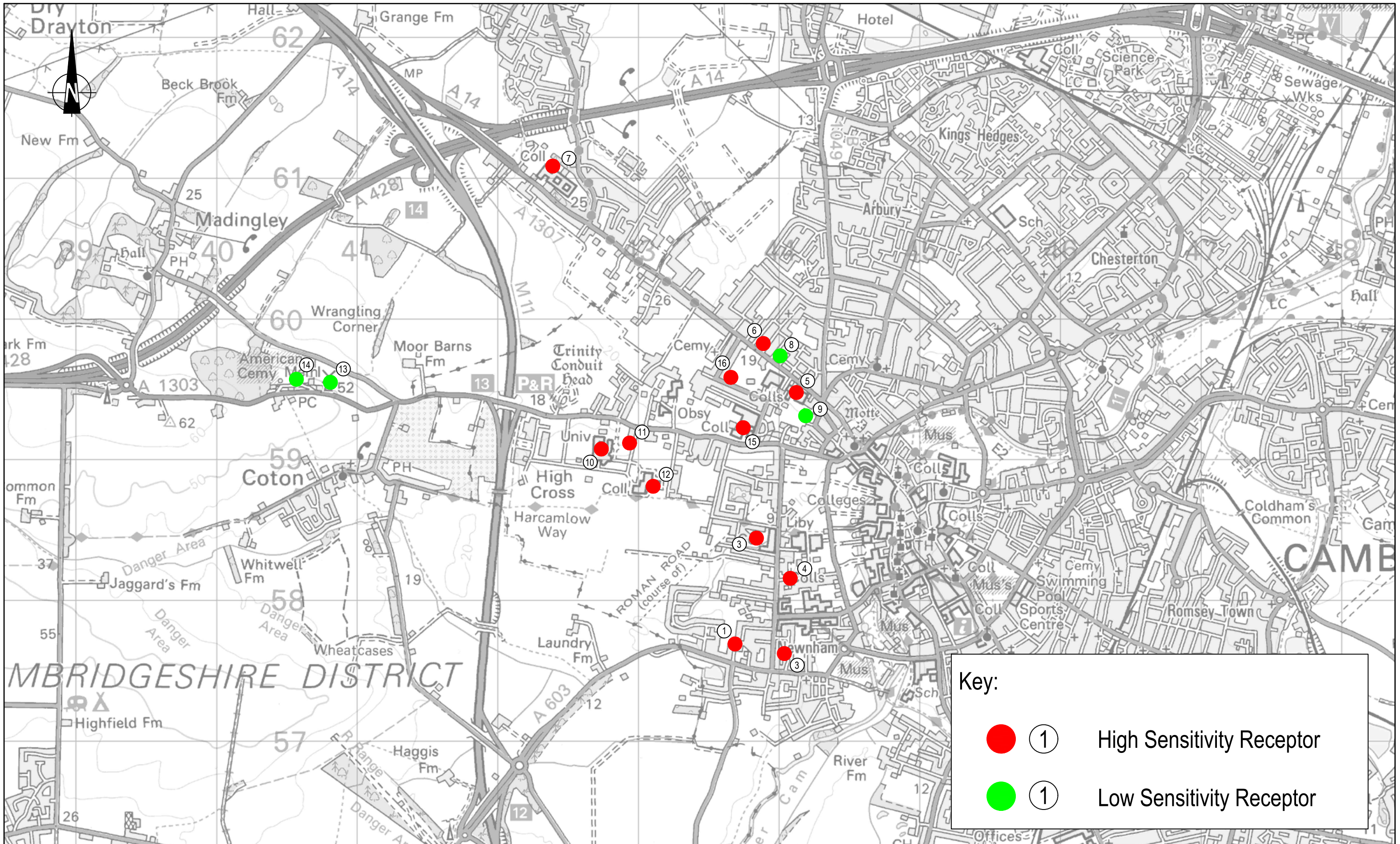
- Existing Pedestrian and Cycle Facilities - Section 3.3
- Existing Bus Services – Section 3.4
- Existing Rail Services – Section 3.5
- Existing Vehicular Access - Section 2.7
- Existing Road Network – Section 3.6
- Public Rights of Way – Section 3.3
- Road Safety Assessment – Section 3.10

Receptors

6.4.2 A review of the Study Area has been undertaken to understand the receptors potentially affected by the traffic generated by the Proposed Development in the general area of the Site. These Sensitive Receptors are shown in Table 6.9 and Figure 6.2. In addition, the receptors on the links identified in Section 6.3 as experiencing increases in flow of greater than 30% / 10% are listed in Table 6.10.

Table 6.9 Sensitive Receptors

Reference on Figure 6.2	Receptor	Sensitivity
Barton Road 1	Wolfson College	High
Grange Road 2 3 4	Robinson College Margaret Beaufort Institute Selwyn College	High High High
Huntingdon Road 5 6 7 8 9	Murray Edwards (ex-New Hall) College and Art Collection Westfield House Girton College Church Blackfriars Priory	High High High Low Low
JJ Thomson Avenue 10 & 11 12	University of Cambridge Dept of Veterinary Medicine University of Cambridge Cavendish Laboratory	High High
Madingley Road 13 14	Madingley Windmill American Cemetery	Low Low
Storey's Way 15 16	Churchill College Fitzwilliam College / Murray Edwards College	High High



Key:

- ① High Sensitivity Receptor
- ① Low Sensitivity Receptor

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SCALING NOTE: Do not scale from this drawing. If in doubt, ask.
 UTILITIES NOTE: The position of any existing public or private sewers, utility services, plant or apparatus shown on this drawing is believed to be correct, but no warranty to this is expressed or implied. Other such plant or apparatus may also be present but not shown. The Contractor is therefore advised to undertake his own investigation where the presence of any existing sewers, services, plant or apparatus may affect his operations.

WEST CAMBRIDGE ES
SENSITIVITY RECEPTORS

Mark	Revision	Date	Drawn	Chkd	Appd
Drawing Status					
FOR INFORMATION					
Date of 1st Issue	07.10.2015	Drawing Number	Revision		
A3 Scale	NTS	FIGURE 6.2		-	
Design	Drawn DS				
Chkd	PC	Appd			

Table 6.10 Road link receptors

Road link	Receptor	Sensitivity
Link 3.2 – Madingley Road on Over Bridge M11	Drivers along Madingley Road	Low
	Pedestrians and cyclists travelling along Madingley Road	Low
Link 3.3 – Madingley Rd between M11 On Slip – Proposed Madingley Rd West Access	Drivers along Madingley Road	Low
	Pedestrians and cyclists travelling along Madingley Road	Low
Link 3.4 – Madingley Rd – West of P&R Access	Drivers along Madingley Road	Low
	Pedestrians and cyclists travelling along Madingley Road	Low
Link 3.5 – Madingley Rd – East of P&R Access	Drivers along Madingley Road	Low
	Pedestrians and cyclists travelling along Madingley Road	Low
Link 3.6 – Madingley Rd – East of Proposed High Cross Access	Drivers along Madingley Road	Low
	Pedestrians and cyclists travelling along Madingley Road	Low
	Residents living along Madingley Road	Low
Link 3.7 – Madingley Rd – East of JJ Thomson Ave	Drivers along Madingley Road	Low
	Pedestrians and cyclists travelling along Madingley Road	Low
Link 3.8 – Madingley Rd – East of Clerk Maxwell Rd	Drivers along Madingley Road	Low
	Pedestrians and cyclists travelling along Madingley Road	Low
	Residents living along Madingley Road	Low
Link 3.9 – Madingley Rd – East of Storey's Way	Drivers along Madingley Road	Low
	Pedestrians and cyclists travelling along Madingley Road	Low
	Residents living along Madingley Road	Low
Link 3.10 - Madingley Rd – East of Grange Rd	Drivers along Madingley Road	Low
	Pedestrians and cyclists travelling along Madingley Road	Low
	Residents living along Madingley Road	Low
Link 3.11 – Madingley Rd – West of Queen's Rd / Northampton St	Drivers along Madingley Road	Low
	Pedestrians and cyclists travelling along Madingley Road	Low
Link 3.12 – Northampton St – West of Pound Hill	Drivers along Northampton Street	Low
	Pedestrians and cyclists travelling along Northampton Street	Low
	Residents living at Northampton Street	Low
Link 4.0 – Huntingdon Rd – West of Proposed NWC HRW Access	Drivers along Huntingdon Road	Low
	Pedestrians and cyclists travelling along Huntingdon Road	Low
Link 6.0 – Queens Road – North of West Road	Drivers along Queen's Road	Low
	Pedestrians and cyclists travelling along Queen's Road	Low
	Drivers along NIAB Development Road	Low

Road link	Receptor	Sensitivity
Link 11.0 – Proposed NIAB Access between Huntingdon Road and Histon Road	Pedestrians and cyclists travelling along NIAB Development Road	Low
Link 11.1 – Proposed Madingley Rd West Access to NWC	Residents living at North West Cambridge	Low
	Employees working at North West Cambridge	Low
	Drivers along the access road	Low
	Pedestrians and cyclists along the access road	Low
Link 11.2 – Proposed Huntingdon Rd Access to NWC	Residents living at North West Cambridge	Low
	Employees working at North West Cambridge	Low
	Drivers along the access road	Low
	Pedestrians and cyclists along the access road	Low
Link 11.3 – Proposed Huntingdon Road Eastern Access to NWC	Residents living at North West Cambridge	Low
	Employees working at North West Cambridge	Low
	Drivers along the access road	Low
	Pedestrians and cyclists along the access road	Low
Link 12.1 – High Cross Access to Madingley Rd	Drivers along High Cross Road	Low
	Pedestrians and cyclists travelling along High Cross Road	Low
	Employees working at West Cambridge	Low
Link 12.2 – JJ Thomson Ave Access to Madingley Rd	Drivers along JJ Thomson Avenue	Low
	Pedestrians and cyclists travelling along JJ Thomson Avenue	Low
	Employees working at West Cambridge	Low
Link 12.3 – Clerk Maxwell Rd south of Car Park Access	Drivers along Clerk Maxwell Road	Low
	Pedestrians and cyclists travelling along Clerk Maxwell Road	Low
	Residents living at The Lawns and Perry Close	Low
Link 12.4 – Clerk Maxwell Rd north of Car Park Access	Drivers along Clerk Maxwell Road	Low
	Pedestrians and cyclists travelling along Clerk Maxwell Road	Low

Baseline traffic flow information

6.4.3 Table 6.11 shows the predicted baseline traffic flows for the three assessment scenarios; 2019, 2021, and 2031. Increases in traffic flows between the three scenarios are attributed to natural growth, plus growth from the specific cumulative developments as referred to in paragraph 6.3.7.

Table 6.11 Baseline traffic flows for assessment years 2019, 2021, and 2031

Link	Estimated 24hr base 7-day flows all vehicles		
	2019	2021	2031
Link 3.2 – Madingley Road on Over Bridge M11	26,212	27,188	28,936
Link 3.3 – Madingley Rd between M11 On Slip – Proposed Madingley Rd West Access	25,276	27,074	28,824
Link 3.4 – Madingley Rd – West of P&R Access	25,666	27,464	30,550
Link 3.5 – Madingley Rd – East of P&R Access	24,280	26,078	29,373
Link 3.6 – Madingley Rd – East of Proposed High Cross Access	19,774	21,408	23,743
Link 3.7 – Madingley Rd – East of JJ Thomson Ave	17,305	18,861	30,687
Link 3.8 – Madingley Rd – East of Clerk Maxwell Rd	16,872	18,483	29,760
Link 3.9 – Madingley Rd – East of Storey's Way	15,782	17,669	18,882
Link 3.10 - Madingley Rd – East of Grange Rd	15,782	17,597	18,792
Link 3.11 – Madingley Rd – West of Queen's Rd / Northampton St	17,040	19,529	20,382
Link 3.12 – Northampton St – West of Pound Hill	14,313	16,331	17,271
Link 4.0 – Huntingdon Rd – West of Proposed NWC HRW Access	11,114	14,344	15,881
Link 6.0 – Queens Road – North of West Road	15,589	16,449	17,169
Link 11.0 – Proposed NIAB Access between Huntingdon Road and Histon Road	-	768	1,626
Link 11.1 – Proposed Madingley Rd West Access to NWC	-	3,650	4,530
Link 11.2 – Proposed Huntingdon Rd Access to NWC	-	1,260	1,409
Link 11.3 – Proposed Huntingdon Road Eastern Access to NWC	-	3,292	4,190
Link 12.1 – High Cross Access to Madingley Rd	3,272	2,798	2,798
Link 12.2 – JJ Thomson Ave Access to Madingley Rd	2,006	2,082	2,082
Link 12.3 – Clerk Maxwell Rd south of Car Park Access	322	466	466
Link 12.4 – Clerk Maxwell Rd north of Car Park Access	891	949	949

Baseline severance

6.4.4 The existing levels of severance on the road network surrounding the Site are detailed in Table 6.12. All the link flows considered are as two-way flows on a particular link.

6.4.5 It is noted that although identified as experiencing high levels of severance, no pedestrian and cyclists may use the M11, and would be discouraged from using the A14 or A428. As such, these links are not considered further in this assessment.

6.4.6 The existing and future level of severance experienced within the vicinity of the Site on the local roads within the city area (i.e., excluding the M11, A14, A428 and rural lengths of the A1303) with sensitive receptors is shown in Table 6.12.

Table 6.12 Baseline severance (24 hour all vehicle two-way traffic flows)

Receptor	2019		2021		2031	
	Base traffic flow	Severance	Base traffic flow	Severance	Base traffic flow	Severance
Link 3.2 – Madingley Road on Over Bridge M11	26,212	High	27,188	High	28,936	High
Link 3.3 – Madingley Rd between M11 On Slip – Proposed Madingley Rd West Access	25,276	High	27,074	High	28,824	High
Link 3.4 – Madingley Rd – West of P&R Access	25,666	High	27,464	High	30,550	High
Link 3.5 – Madingley Rd – East of P&R Access	24,280	High	26,078	High	29,373	High
Link 3.6 – Madingley Rd – East of Proposed High Cross Access	19,774	High	21,408	High	23,743	High
Link 3.7 – Madingley Rd – East of JJ Thomson Ave	17,305	High	18,861	High	30,687	High
Link 3.8 – Madingley Rd – East of Clerk Maxwell Rd	16,872	High	18,483	High	29,760	High
Link 3.9 – Madingley Rd – East of Storey's Way	15,782	Medium	17,669	High	18,882	High
Link 3.10 - Madingley Rd – East of Grange Rd	15,782	Medium	17,597	High	18,792	High
Link 3.11 – Madingley Rd – West of Queen's Rd / Northampton St	17,040	High	19,529	High	20,382	High
Link 3.12 – Northampton St – West of Pound Hill	14,313	Medium	16,331	High	17,271	High
Link 4.0 – Huntingdon Rd – West of Proposed NWC HRW Access	11,114	Medium	14,344	Medium	15,881	Medium

Receptor	2019		2021		2031	
	Base traffic flow	Severance	Base traffic flow	Severance	Base traffic flow	Severance
Link 6.0 – Queens Road – North of West Road	15,589	Medium	16,449	High	17,169	High
Link 11.0 – Proposed NIAB Access between Huntingdon Road and Histon Road	-	-	768	Negligible	1,626	Negligible
Link 11.1 – Proposed Madingley Rd West Access to NWC	-	-	3,650	Negligible	4,530	Low
Link 11.2 – Proposed Huntingdon Rd Access to NWC	-	-	1,260	Negligible	1,409	Negligible
Link 11.3 – Proposed Huntingdon Road Eastern Access to NWC	-	-	3,292	Negligible	4,190	Low
Link 12.1 – High Cross Access to Madingley Rd	3,272	Negligible	2,798	Negligible	2,798	Negligible
Link 12.2 – JJ Thomson Ave Access to Madingley Rd	2,006	Negligible	2,082	Negligible	2,082	Negligible
Link 12.3 – Clerk Maxwell Rd south of Car Park Access	322	Negligible	466	Negligible	466	Negligible
Link 12.4 – Clerk Maxwell Rd north of Car Park Access	891	Negligible	949	Negligible	949	Negligible

Baseline driver delay

- 6.4.7 The Transport Assessment considers that the local network operates towards capacity in 2019 during the network peak hours.
- 6.4.8 As the junctions along Madingley Road, and others across the network, are operating close to capacity during the peak hours, some driver delay would be expected at these limited peak hour times – albeit that these junctions would operate within capacity throughout the significant majority of the day.

6.4.9 Whilst the above assessment suggests there is some driver delay during the peak periods across the study area, taking into account conditions across a full day, only limited driver delay is experienced in normal operating conditions.

Baseline pedestrian and cyclist delay

- 6.4.10 The level of existing pedestrian delay is assumed to broadly reflect the severance as described above – i.e., that there would be limited pedestrian delay experienced within the built-up areas where there is pedestrian activity.
- 6.4.11 There are reasonable crossing facilities for pedestrians and cyclists to use across the area – this would assist in minimising delay on these routes. Existing pedestrian delay is therefore slight / negligible.

Baseline pedestrian and cyclist amenity

- 6.4.12 Pedestrian and cyclist amenity, broadly defined as “the relative pleasantness of a journey”, is affected by traffic flows and composition, footway width and the degree of segregation.
- 6.4.13 Although the strategic highway links (such as the M11, A14, and A428) have high levels of traffic flow and high speeds, there is no pedestrian or cyclist access and there are few / no attractors along these for existing pedestrian and cyclist amenity to be a material consideration.
- 6.4.14 Although the levels of traffic flows on the local principal highway network are high, existing pedestrian and cyclist amenity within Cambridge is good due to the quality of the footway and cycleway provision, the alternative off-road routes, the frequency of crossing facilities, the limited heavy vehicle proportions, and the relatively controlled vehicle speeds.

Baseline fear and intimidation

- 6.4.15 The existing levels of fear and intimidation on the road network surrounding the Site are also detailed in Table 6.13. Table 6.13 summarises the baseline fear and intimidation for the three assessment years. There is currently no fear and intimidation related to the use of public rights of way within the Site.

Table 6.13 Baseline fear and intimidation (average hourly traffic flows over 18 hours)

Receptor	a) Average Hourly Flows Over 18hr Day			b) Total 18hr HV Flows			c) Traffic Speed (mph)	Weighted Assessment of a), b) and c)		
	2019	2021	2031	2019	2021	2031		2019	2021	2031
Link 3.2 – Madingley Road on Over Bridge M11	1509	1566	1666	1,557	1,615	1,718	40	Medium	Medium	Medium
Link 3.3 – Madingley Rd between M11 On Slip – Proposed Madingley Rd West Access	1462	1566	1667	965	1,034	1,101	40	Low	Medium	Medium
Link 3.4 – Madingley Rd – West of P&R Access	1484	1588	1767	980	1,049	1,167	40	Low	Medium	Medium
Link 3.5 – Madingley Rd – East of P&R Access	1404	1508	1699	927	996	1,122	40	Low	Low	Medium
Link 3.6 – Madingley Rd – East of Proposed High Cross Access	1144	1238	1373	755	818	907	40	Low	Low	Low
Link 3.7 – Madingley Rd – East of JJ Thomson Ave	1001	1091	1775	661	720	1,172	30	Low	Low	Medium
Link 3.8 – Madingley Rd – East of Clerk Maxwell Rd	976	1069	1721	644	706	1,136	30	Low	Low	Low
Link 3.9 – Madingley Rd – East of Storey’s Way	913	1022	1092	603	675	721	30	Low	Low	Low
Link 3.10 - Madingley Rd – East of Grange Rd	913	1018	1087	603	672	718	30	Low	Low	Low
Link 3.11 – Madingley Rd – West of Queen’s Rd / Northampton St	985	1129	1179	651	746	778	30	Low	Low	Low
Link 3.12 – Northampton St – West of Pound Hill	828	944	999	547	624	660	30	Low	Low	Low
Link 4.0 – Huntingdon Rd – West of Proposed NWC HRW Access	643	830	918	424	548	606	60	Low	Low	Low
Link 6.0 – Queens Road – North of West Road	901	951	993	595	628	656	30	Low	Low	Low
Link 11.0 – Proposed NIAB Access between Huntingdon Road and Histon Road		55	117		66	140	20		Negligible	Negligible
Link 11.1 – Proposed Madingley Rd West Access to NWC		263	327		314	390	20		Negligible	Negligible
Link 11.2 – Proposed Huntingdon Rd Access to NWC		91	102		109	121	20		Negligible	Negligible
Link 11.3 – Proposed Huntingdon Road Eastern Access to NWC		237	302		283	361	20		Negligible	Negligible
Link 12.1 – High Cross Access to Madingley Rd	236	202	202	282	241	241	30	Negligible	Negligible	Negligible
Link 12.2 – JJ Thomson Ave Access to Madingley Rd	145	150	150	173	179	179	30	Negligible	Negligible	Negligible
Link 12.3 – Clerk Maxwell Rd south of Car Park Access	23	33	33	21	39	39	30	Negligible	Negligible	Negligible

Existing accidents and safety

- 6.4.16 A Road Safety Review is reported in Section 3.9 of the Transport Assessment, including Personal Injury Collision (PIC - formerly known as Personal Injury Accident – PIA) summary data was obtained from Cambridgeshire County Council for the latest available 5-year period between February 2014 to February 2019 for Madingley Road.
- 6.4.17 The Transport Assessment provides a summary of the PICs (location and nature) and provides an estimate of the likely anticipated number of PICs for similar types of links and junctions to provide a comparison.
- 6.4.18 A total of 22 collisions were observed along Madingley Road within the study area. Of the observed incidents:

- None were classified as fatal in severity;
- Four were classified as a serious injury collision;
- One slight PIC was recorded within the West Cambridge development (along JJ Thomson Avenue);
- No PICs were recorded along Clerk Maxwell Road; and
- Eighteen were classified as slight in severity.

- 6.4.19 As stated above, one PIC was recorded along JJ Thomson Avenue which was classified as slight in severity and involved a cyclist. There are proposals to provide a parallel Zebra Crossing along JJ Thomson Avenue, which will enhance highway safety conditions for cyclists at this location in the future.
- 6.4.20 The assessment has specifically commented upon vulnerable road users, of which there are a high number of collisions - albeit it is acknowledged that:

- Motorcycle usage in Cambridge is generally 25% higher than the rest of the UK; and
- Cambridge City is recognised as having a high number of cycle movements.

6.4.21 This Road Safety Assessment has identified one existing road safety issue:

- Madingley Road / Storey's Way priority junction has a higher incident rate than would be anticipated, with a high number of vulnerable road users;

6.4.22 Remedial measures are proposed at this location - further details of the proposed measures are discussed in Section 17 of the Transport Assessment.

6.4.23 The Proposed Development will not result in any detriment to the existing highway safety conditions within the vicinity of the Site.

6.5 Impact assessment

Construction phase

6.5.1 No links within the study area exceed the 10% or 30% thresholds for total traffic increases but a number of links exceed these thresholds for heavy vehicles. These are detailed in Table 6.14.

Table 6.14 Traffic flow increases due to construction traffic

Link	Base 2019 Daily Flow (24-hour, 7 day 1-way flows)		Estimated Daily Construction Traffic (1 way)			Increase	
	All Vehs	Heavy Vehs	Light Vehs	Heavy Vehs	All Vehs	All Vehs	Heavy Vehs
Link 3.2 - Madingley Rd on Over Bridge M11	26,212	1,435	9	168	177	0.67%	11.70%
Link 3.3 - Madingley Rd between M11 Sbd On Slip - Proposed Madingley Rd West Access	25,276	859	12	292	304	1.20%	33.99%
Link 3.4 - Madingley Rd - West of P&R Access	25,666	872	12	292	304	1.18%	33.47%
Link 3.5 - Madingley Rd - East of P&R Access	24,280	825	12	292	304	125%	35.39%
Link 3.6 - Madingley Rd - East of Proposed High Cross Access	19,774	672	12	292	304	1.54%	43.45%

6.5.2 Table 6.15 provides the assessment for construction phase transport impacts.

Table 6.15 Construction phase transport effects

Baseline		Impact assessment				
Receptor	Sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
Link 3.2 - Madingley Rd on Over Bridge M11 (Drivers along Madingley Road, pedestrians and cyclists travelling along Madingley Road)	Low	304 daily one-way (152 two-way) vehicle movements due to construction traffic for plant, materials, and staff deliveries and the removal of construction waste and excess cut material. Additional traffic flows caused by construction traffic could result in increased severance; driver delay; pedestrian and cyclist delay, fear and intimidation, and reduced pedestrian and cycling amenity	Hours of operation and delivery routes to and from Site will be agreed with the local highways authority and specified in the Construction Environment Management Plan (CEMP)	Negligible	The All Vehicle Construction impact assessment results show that the highest impact would be no more than 1.2%. As such, there are no links experiencing increases exceeding the assessment magnitude threshold of either 30%, or 10% in any sensitive areas. The daily percentage impact for Heavy Vehicles on Link 3.6 Madingley Road to the East of the High Cross Access peaks at 43.45% - significantly higher than the increase in All Vehicle traffic flows. However, there are no sensitive receptors at this location, nor is the increase in heavy vehicle flow more than a doubling (refer to the thresholds identified earlier in Section 10.3), such that there would be no discernible effect on Severance, Driver Delay, Pedestrian Delay, Pedestrian Amenity, Fear and Intimidation, Road Safety and Hazardous Loads associated with construction activities. In all cases, the magnitude of Construction daily flow increases – be it All Vehicle or Heavy Vehicle - is Negligible, and therefore the significance of effect for the impacts assessed for construction movements is also Negligible. Full details of the assignment of the construction traffic are detailed in Section 11 of the Transport Assessment	Negligible Not significant
Link 3.3 – Madingley Rd between M11 On Slip – Proposed Madingley Rd West Access (Drivers along Madingley Road, pedestrians and cyclists travelling along Madingley Road)	Low			Negligible		Negligible Not significant
Link 3.4 – Madingley Rd – West of P&R Access (Drivers along Madingley Road, pedestrians and cyclists travelling along Madingley Road)	Low			Negligible		Negligible Not significant
Link 3.5 – Madingley Rd – East of P&R Access (Drivers along Madingley Road, pedestrians and cyclists travelling along Madingley Road)	Low			Negligible		Negligible Not significant
Link 3.6 – Madingley Rd – East of Proposed High Cross Access (Drivers along Madingley Road, pedestrians and cyclists travelling along Madingley Road)	Low			Negligible		Negligible Not significant

Operational phase

Potential Effects in 2021

6.5.3 Table 6.16 shows the predicted severance levels in 2021. Links 4.0 and 12.1 are predicted to increase in severance magnitude by one category.

Table 6.16 Predicted severance in 2021 (24 hour all vehicle two-way traffic flows)

Receptor	Baseline		Proposed Development	
	Base traffic flow	Severance	Base traffic flow	Severance
Link 3.2 – Madingley Road on Over Bridge M11	27,188	High	28,362	High
Link 3.3 – Madingley Rd between M11 On Slip – Proposed Madingley Rd West Access	27,074	High	28,576	High
Link 3.4 – Madingley Rd – West of P&R Access	27,464	High	29,141	High
Link 3.5 – Madingley Rd – East of P&R Access	26,078	High	27,965	High
Link 3.6 – Madingley Rd – East of Proposed High Cross Access	21,408	High	25,234	High
Link 3.7 – Madingley Rd – East of JJ Thomson Ave	18,861	High	20,738	High
Link 3.8 – Madingley Rd – East of Clerk Maxwell Rd	18,483	High	21,505	High
Link 3.9 – Madingley Rd – East of Storey's Way	17,669	High	20,900	High
Link 3.10 - Madingley Rd – East of Grange Rd	17,597	High	20,709	High
Link 3.11 – Madingley Rd – West of Queen's Rd / Northampton St	19,529	High	19,945	High
Link 3.12 – Northampton St – West of Pound Hill	16,331	High	16,399	High
Link 4.0 – Huntingdon Rd – West of Proposed NWC HRW Access	14,344	Medium	16,310	High
Link 6.0 – Queens Road – North of West Road	16,449	High	17,643	High
Link 11.0 – Proposed NIAB Access between Huntingdon Road and Histon Road	768	Negligible	827	Negligible
Link 11.1 – Proposed Madingley Rd West Access to NWC	3,650	Negligible	5,282	Low
Link 11.2 – Proposed Huntingdon Rd Access to NWC	1,260	Negligible	2,510	Negligible
Link 11.3 – Proposed Huntingdon Road Eastern Access to NWC	3,292	Negligible	2,947	Negligible

Receptor	Baseline		Proposed Development	
	Base traffic flow	Severance	Base traffic flow	Severance
Link 12.1 – High Cross Access to Madingley Rd	2,798	Negligible	6,409	Low
Link 12.2 – JJ Thomson Ave Access to Madingley Rd	2,082	Negligible	2,103	Negligible
Link 12.3 – Clerk Maxwell Rd south of Car Park Access	466	Negligible	254	Negligible

6.5.4 Table 6.17 shows the predicted fear and intimidation levels with and without the Proposed Development in 2021. The weighted magnitude of fear and intimidation increases only on link 3.5, as a consequence of a limited increase in flows.

Table 6.17 Increase in fear and intimidation at 2021 due to the Proposed Development

Receptor	Baseline				Proposed Development			
	a) Average Hourly Flows Over 18hr Day	b) Total 18hr HV Flows	c) Traffic Speed (mph)	Weighted Assessment of a), b) and c)	a) Average Hourly Flows Over 18hr Day	b) Total 18hr HV Flows	c) Traffic Speed (mph)	Weighted Assessment of a), b) and c)
Link 3.2 – Madingley Road on Over Bridge M11	1,566	1,615	40	Medium	1,633	1,684	40	Medium
Link 3.3 – Madingley Rd between M11 On Slip – Proposed Madingley Rd West Access	1,566	1,034	40	Medium	1,652	1,091	40	Medium
Link 3.4 – Madingley Rd – West of P&R Access	1,588	1,049	40	Medium	1,685	1,113	40	Medium
Link 3.5 – Madingley Rd – East of P&R Access	1,508	996	40	Low	1,617	1,068	40	Medium
Link 3.6 – Madingley Rd – East of Proposed High Cross Access	1,238	818	40	Low	1,459	964	40	Low
Link 3.7 – Madingley Rd – East of JJ Thomson Ave	1,091	720	30	Low	1,199	792	30	Low
Link 3.8 – Madingley Rd – East of Clerk Maxwell Rd	1,069	706	30	Low	1,244	821	30	Low
Link 3.9 – Madingley Rd – East of Storey's Way	1,022	675	30	Low	1,209	798	30	Low
Link 3.10 - Madingley Rd – East of Grange Rd	1,018	672	30	Low	1,198	791	30	Low
Link 3.11 – Madingley Rd – West of Queen's Rd / Northampton St	1,129	746	30	Low	1,153	762	30	Low
Link 3.12 – Northampton St – West of Pound Hill	944	624	30	Low	948	626	30	Low
Link 4.0 – Huntingdon Rd – West of Proposed NWC HRW Access	830	548	60	Low	943	623	60	Low
Link 6.0 – Queens Road – North of West Road	951	628	30	Low	1,020	674	30	Low
Link 11.0 – Proposed NIAB Access between Huntingdon Road and Histon Road	55	66	20	Negligible	60	71	20	Negligible
Link 11.1 – Proposed Madingley Rd West Access to NWC	263	314	20	Negligible	381	455	20	Negligible
Link 11.2 – Proposed Huntingdon Rd Access to NWC	91	109	20	Negligible	181	216	20	Negligible
Link 11.3 – Proposed Huntingdon Road Eastern Access to NWC	237	283	20	Negligible	212	254	20	Negligible
Link 12.1 – High Cross Access to Madingley Rd	202	241	30	Negligible	462	552	30	Negligible
Link 12.2 – JJ Thomson Ave Access to Madingley Rd	150	179	30	Negligible	152	181	30	Negligible
Link 12.3 – Clerk Maxwell Rd south of Car Park Access	33	39	30	Negligible	18	21	30	Negligible

6.5.5 Table 6.18 shows the environmental impact assessment for operational phase effects for the first phase of the development in 2021.

Table 6.18 Operational phase transport effects in 2021

Baseline		Impact assessment				
Receptor	Value / sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
<ul style="list-style-type: none"> Employees working at West Cambridge (link 12.1) Pedestrians and cyclists travelling along Huntingdon Road (link 4.0) 	Low	Increased traffic flows could result in an increase in severance for workers on these links	Provisions within the transport strategy to: <ul style="list-style-type: none"> reduce new vehicle trips; enhance pedestrian and cyclist infrastructure. 	Low adverse	Baseline severance in 2021 is predicted to range from high for receptors along Madingley Road to negligible for receptors along the three roads on-Site and the new access road to North West Cambridge off Huntingdon Road. Once the first phase of the Proposed Development is operational in 2021 traffic flows are predicted to increase along all of these links. For most receptors the severance magnitude will remain unchanged. For receptors along High Cross on link 12.1 traffic flows will increase by 3,611 vehicles across 24 hours. Whilst this will increase severance magnitude from negligible to low and the effect is likely to be noticeable given the proportionate increase against the baseline traffic flows, the severance will still be low. Overall the effects from increase severance would be permanent low adverse.	Minor adverse Not significant
<ul style="list-style-type: none"> Drivers along Madingley Road (links 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 3.10, and 3.11) Drivers along Northampton Street (link 3.12) Drivers along Huntingdon Road (links 4.0, 11.2) Pedestrians and cyclists along the North West Cambridge access roads from Madingley Road and Huntingdon Road (links 11.1 and 11.2) Drivers along High Cross Road (link 12.1) Drivers along JJ Thomson Avenue (link 12.1) Drivers along Clerk Maxwell Road (link 12.3) 	Low	Increase in driver delay at junctions and road links caused by increased use of the local road network by drivers travelling to and from the Proposed Development.	Provisions within the transport strategy to reduce new vehicle trips, and – only where shown to be necessary – minor enhancements to the local junction infrastructure.	Negligible	Whilst the results of the 2021 junction capacity assessments for the Proposed Development shows the network generally with conditions at capacity in peak periods, there would be limited levels of delay for drivers when considered across the full 24-hour day. Overall the magnitude of change in daily flows as a consequence of the addition of cumulative development and development traffic – considered to be the difference between 2019 Base and 2021 scenarios - is negligible and the sensitivity of the links and junctions to increases in daily flow is low, therefore the overall significance of effect for driver delay is negligible.	Negligible Not significant
<ul style="list-style-type: none"> Pedestrians and cyclists travelling along Madingley Road (links 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 3.10, and 3.11) Pedestrians and cyclists travelling along Northampton Street (link 3.12) Pedestrians and cyclists travelling along Huntingdon Road (links 4.0, 11.2) 	Low	Increase in Pedestrian Delay as a result of an increase in traffic travelling to and from the Proposed Development.	Provisions within the transport strategy to <ul style="list-style-type: none"> reduce new vehicle trips; enhance pedestrian and cyclist infrastructure. 	Negligible	Based on the change in pedestrian severance category due to the addition of cumulative development and Proposed Development traffic flow changes, there is unlikely to be a perceptible change in the level of pedestrian delay. As such, the likely significance of effect for pedestrian delay is negligible.	Negligible Not significant
<ul style="list-style-type: none"> Pedestrians and cyclists travelling along Queen's Road (Links 6.0) Pedestrians and cyclists travelling along NIAB (links 11.0) Pedestrians and cyclists along the North West Cambridge access roads from Madingley Road and Huntingdon Road (links 11.1, 11.2, 11.3) Pedestrians and cyclists travelling along High Cross Road (link 12.1) Pedestrians and cyclists travelling along JJ Thomson Avenue (link 12.1) Pedestrians and cyclists travelling along Clerk Maxwell Road (link 12.3) 	Low	Changes to Pedestrian Amenity – the relative pleasantness of pedestrian and cyclist journeys – as a result of changes in traffic.	Provisions within the transport strategy to <ul style="list-style-type: none"> reduce new vehicle trips; enhance pedestrian and cyclist infrastructure. 	Negligible	The relevant guidance suggests a tentative threshold for assessing the significance of changes in pedestrian amenity of where traffic flow is halved or doubled. There are no existing off-site links forecast to experience a doubling of traffic flow with the addition of cumulative development and development traffic – most increases are well below 30%. However, traffic flows approximately half on Link 12.3 – Clerk Maxwell Road. Within the Site, the traffic flow changes arising from the Proposed Development will not result in any discernible change in pedestrian amenity, and that the significance of effect on Pedestrian Amenity is therefore negligible.	Negligible Not significant

Baseline		Impact assessment				
Receptor	Value / sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
Pedestrians and cyclists	Low	Changes in traffic volume, composition and speed resulting in an increase in fear and intimidation to pedestrians and cyclists.	Provisions within the transport strategy to <ul style="list-style-type: none"> • reduce new vehicle trips; • enhance pedestrian and cyclist infrastructure, and • improve the amenity of pedestrian and cyclist routes along popular corridors. 	Negligible	The Proposed Development will result in an increase in overall and heavy vehicle traffic flows on most of the assessed links with sensitive receptors, with a maximum increase of 221 overall vehicles per average hour and a total of 146 heavy vehicles over 18 hours for link 3.6 Madingley Road East of High Cross Access. Speeds are not predicted to change for any of the links. The Proposed Development will not change the magnitude of fear and intimidation for any of the receptors and the overall effect will be negligible.	Negligible Not significant
Drivers, pedestrians and cyclists on all links	Low	Changes in traffic flows could result in a change on personal injury collision rates.	Provisions within the transport strategy to provide road safety measures at identified blackspots.	Negligible	The additional traffic flows on the network resulting from the West Cambridge Development would be unlikely to have any significant effect on existing personal injury collision rates. The overall significance of effect for highway safety is therefore negligible.	Negligible Not significant

Potential Effects in 2031

6.5.6 Table 6.19 shows the predicted severance levels in 2031. Links 4.0, 11.1, 11.2, 12.1 and 12.2 are predicted to increase in severance magnitude. There are no receptors along link 4.0 so this link has not been considered further in the impact assessment for severance.

Table 6.19 Predicted severance in 2031

Receptor	Baseline		Proposed Development	
	Base traffic flow	Severance	Base traffic flow	Severance
Link 3.2 – Madingley Road on Over Bridge M11	28,936	High	32,266	High
Link 3.3 – Madingley Rd between M11 On Slip – Proposed Madingley Rd West Access	28,824	High	33,361	High
Link 3.4 – Madingley Rd – West of P&R Access	30,550	High	28,017	High
Link 3.5 – Madingley Rd – East of P&R Access	29,373	High	26,841	High
Link 3.6 – Madingley Rd – East of Proposed High Cross Access	23,743	High	26,565	High
Link 3.7 – Madingley Rd – East of JJ Thomson Ave	30,687	High	36,002	High
Link 3.8 – Madingley Rd – East of Clerk Maxwell Rd	29,760	High	34,838	High
Link 3.9 – Madingley Rd – East of Storey’s Way	18,882	High	25,986	High
Link 3.10 - Madingley Rd – East of Grange Rd	18,792	High	25,705	High

Receptor	Baseline		Proposed Development	
	Base traffic flow	Severance	Base traffic flow	Severance
Link 3.11 – Madingley Rd – West of Queen’s Rd / Northampton St	20,382	High	22,872	High
Link 3.12 – Northampton St – West of Pound Hill	17,271	High	18,659	High
Link 4.0 – Huntingdon Rd – West of Proposed NWC HRW Access	15,881	Medium	20,905	High
Link 6.0 – Queens Road – North of West Road	17,169	High	19,692	High
Link 11.0 – Proposed NIAB Access between Huntingdon Road and Histon Road	1,626	Negligible	1,774	Negligible
Link 11.1 – Proposed Madingley Rd West Access to NWC	4,530	Low	8,718	Medium
Link 11.2 – Proposed Huntingdon Rd Access to NWC	1,409	Negligible	4,494	Low
Link 11.3 – Proposed Huntingdon Road Eastern Access to NWC	4,190	Low	4,151	Low
Link 12.1 – High Cross Access to Madingley Rd	2,798	Negligible	10,449	Medium
Link 12.2 – JJ Thomson Ave Access to Madingley Rd	2,082	Negligible	8,583	Medium
Link 12.3 – Clerk Maxwell Rd south of Car Park Access	466	Negligible	254	Negligible

6.5.7 Table 6.20 shows the predicted fear and intimidation levels with and without the Proposed Development in 2031. The magnitude of effect for fear and intimidation would increase by one category for links 3.6, 3.8, 12.1 and 12.2 with no change on any other links.

Table 6.20 Increase in fear and intimidation at 2031 due to the Proposed Development

Receptor	Baseline				Proposed Development			
	a) Average Hourly Flows Over 18hr Day	b) Total 18hr HV Flows	c) Traffic Speed (mph)	Weighted Assessment of a), b) and c)	a) Average Hourly Flows Over 18hr Day	b) Total 18hr HV Flows	c) Traffic Speed (mph)	Weighted Assessment of a), b) and c)
Link 3.2 – Madingley Road on Over Bridge M11	1,666	1,718	40	Medium	1,858	1,916	40	Medium
Link 3.3 – Madingley Rd between M11 On Slip – Proposed Madingley Rd West Access	1,667	1,101	40	Medium	1,929	1,274	40	Medium
Link 3.4 – Madingley Rd – West of P&R Access	1,767	1,167	40	Medium	1,620	1,070	40	Medium
Link 3.5 – Madingley Rd – East of P&R Access	1,699	1,122	40	Medium	1,552	1,025	40	Medium
Link 3.6 – Madingley Rd – East of Proposed High Cross Access	1,373	907	40	Low	1,536	1,014	40	Medium
Link 3.7 – Madingley Rd – East of JJ Thomson Ave	1,775	1,172	30	Medium	2,082	1,375	30	Medium
Link 3.8 – Madingley Rd – East of Clerk Maxwell Rd	1,777	1,174	30	Low	2,015	1,351	30	Medium
Link 3.9 – Madingley Rd – East of Storey’s Way	1,092	721	30	Low	1,503	992	30	Low
Link 3.10 - Madingley Rd – East of Grange Rd	1,087	718	30	Low	1,486	982	30	Low
Link 3.11 – Madingley Rd – West of Queen’s Rd / Northampton St	1,179	778	30	Low	1,323	873	30	Low
Link 3.12 – Northampton St – West of Pound Hill	999	660	30	Low	1,079	713	30	Low
Link 4.0 – Huntingdon Rd – West of Proposed NWC HRW Access	918	606	60	Low	1,209	798	60	Low
Link 6.0 – Queens Road – North of West Road	993	656	30	Low	1,139	752	30	Low
Link 11.0 – Proposed NIAB Access between Huntingdon Road and Histon Road	117	140	20	Negligible	128	153	20	Negligible
Link 11.1 – Proposed Madingley Rd West Access to NWC	327	390	20	Negligible	629	751	20	Negligible
Link 11.2 – Proposed Huntingdon Rd Access to NWC	102	121	20	Negligible	324	387	20	Negligible
Link 11.3 – Proposed Huntingdon Road Eastern Access to NWC	302	361	20	Negligible	299	358	20	Negligible
Link 12.1 – High Cross Access to Madingley Rd	202	241	30	Negligible	753	900	30	Low
Link 12.2 – JJ Thomson Ave Access to Madingley Rd	150	179	30	Negligible	619	739	30	Low
Link 12.3 – Clerk Maxwell Rd south of Car Park Access	33	39	30	Negligible	18	21	30	Negligible

6.5.8 Table 6.21 shows the environmental impact assessment for operational phase effects for the first phase of the development in 2031.

Table 6.21 Operational phase transport effects in 2031

Baseline		Impact assessment				
Receptor	Value / sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
<ul style="list-style-type: none"> Users of Huntingdon Road (link 4.0) Residents living at North West Cambridge (links 11.1, 11.2 and 11.3) Employees working at North West Cambridge (links 11.1, 11.2 and 11.3) Employees working at West Cambridge (links 12.1, 12.2) 	Low	Increased traffic flows could result in an increase in severance for residents and workers along these affected links	Monitor and Manage Approach to long-term transport mitigation.	Low adverse	<p>Baseline severance in 2031 is predicted to range from high for receptors along Madingley Road and Northampton Street, to negligible/low on the new access road to North West Cambridge off Huntingdon Road. Once the Proposed Development is fully built out and operational in 2031, traffic flows may increase on some of these links by at worst one criteria.</p> <p>For link 4.0 – Huntingdon Road, west of the NWC HRW access, the numbers of pedestrians and cyclists is low, but connectivity across Huntingdon Road will be improved by the delivery of the pedestrian / cyclist crossing at this junction as part of the NWC Proposals.</p> <p>For receptors in NWC on link 11.1 traffic flows will increase by 4,188 vehicles across 24 hours. Whilst this will increase severance magnitude from low to medium, the AADT of 8,700 vehicles is 8% above the threshold of 8,000 AADT. Overall the effects from increase severance would be permanent low adverse.</p> <p>For receptors in West Cambridge on links 12.1 and 12.2, traffic flows will increase by 7,600 vehicles across 24 hours. Whilst acknowledging that the DMRB Guidelines identify that the threshold below which severance is not considered significant is an AADT of 8,000 vehicles - and these increases exceed this threshold – there are a number of mitigation measures, including significant investment in measures to reduce car movement so this impact does not occur in full, then on-site surface treatments and enhanced toucan crossings to reduce any residual severance. Overall the magnitude of the increased severance would be permanent low adverse, leading to an effect of minor adverse.</p> <p>In addition, and although not identified as a change in severance, there will be changes in traffic volumes along Madingley Road affecting links 3.2, 3.3, 3.6, 3.7, 3.8, 3.9, 3.10 and 3.11 with changes in 24-hour traffic volumes varying between a reduction of 2,500 to an increase of 7,104 depending on the particular link. Severance is already a recognised issue along Madingley Road and there are a number of mitigation measures already in place including centre refuges and pelican crossings. The effect of severance on residents and employees along Madingley Road is unlikely to be significant. Overall the effects from increased severance would be permanent minor adverse.</p>	Minor adverse Not significant
<ul style="list-style-type: none"> Drivers along Madingley Road (links 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 3.10, and 3.11) Drivers along Northampton Street (link 3.12) Drivers along Huntingdon Road (links 4.0, 11.2) Drivers along Queens Road (Link 6.0) Pedestrians and cyclists along the North West Cambridge access roads from Madingley Road and Huntingdon Road (links 11.1 and 11.2) Drivers along High Cross Road (link 12.1) Drivers along JJ Thomson Avenue (link 12.1) Drivers along Clerk Maxwell Road (links 12.3, 12.4) 	Low	Increase in driver delay at junctions and road links caused by increased use of the local road network by drivers travelling to and from the Proposed Development.	Monitor and Manage Approach to long term transport mitigation, including a fully-funded public transport strategy.	Low Adverse	<p>The future local highway network in 2031 without the Proposed Development is predicted to operate above capacity in the peak hours. This would be worse as a consequence of the Proposed Development. The proposed suite of measures aimed at mode shift, demand management and improvement of conditions on the network would manage the transport effects. Outside of the peak hours there would be limited levels of delay for drivers across the day. Further mitigation measures would be considered and applied in accordance with the Monitor and Manage Approach where the impact of West Cambridge is considered significant.</p> <p>The magnitude of change in daily flows as a consequence of the Proposed Development would be Low. The overall significance of effect for driver delay is minor adverse.</p>	Minor adverse Not significant
<ul style="list-style-type: none"> Pedestrians and cyclists travelling along Madingley Road (links 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 3.10, and 3.11) Pedestrians and cyclists travelling along Northampton Street (link 3.12) 	Low	Increase in pedestrian delay as a result of an increase in traffic travelling to and from the Proposed Development.	Monitor and Manage Approach to long term transport mitigation.	Low Adverse	<p>Based on the change in pedestrian severance category due to the addition of cumulative development and Proposed Development traffic flow changes, there is unlikely to be a perceptible change in the level of pedestrian delay. As such, the likely significance of effect for pedestrian delay is minor adverse.</p>	Minor Adverse Not significant

Baseline		Impact assessment				
Receptor	Value / sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
<ul style="list-style-type: none"> • Pedestrians and cyclists travelling along Huntingdon Road (links 4.0, 11.2) • Pedestrians and cyclists along the North West Cambridge access roads from Madingley Road and Huntingdon Road (links 11.1 and 11.2) • Pedestrians and cyclists travelling along High Cross Road (link 12.1) • Pedestrians and cyclists travelling along JJ Thomson Avenue (link 12.1) • Pedestrians and cyclists travelling along Clerk Maxwell Road (link 12.3, 12.4) 	Low	Changes to Pedestrian Amenity - the relative pleasantness of pedestrian and cyclist journeys as a result of changes in traffic.	Provisions within the transport strategy to improve the amenity of pedestrian and cyclist routes.	Medium Adverse	The relevant guidance suggests a tentative threshold for assessing the significance of changes in pedestrian amenity of where traffic flow is halved or doubled. There are no existing off-site links forecast to experience a doubling of traffic flow with the addition of cumulative development and development traffic – except for Link 11.2 which started from a low base. Within the Site, the traffic flow changes arising from the Proposed Development are greater and will result in a medium change in pedestrian amenity – assessed as such due to the low base flow. The proposed suite of measures aimed at mode shift, demand management and improvement of conditions on the network would manage the transport effects down. The significance of effect on pedestrian amenity in the site is considered to be minor.	Minor Adverse Not significant
Pedestrians and cyclists	Low	Changes in traffic volume, composition and speed resulting in an increase in fear and intimidation to pedestrians and cyclists.	Monitor and Manage Approach to long term transport mitigation. Provisions within the transport strategy to improve the amenity of pedestrian and cyclist routes	Low Adverse	The Proposed Development will result in an increase in overall and heavy vehicle traffic flows on all of the assessed links with sensitive receptors, with a maximum increase of 411 overall vehicles per average hour and 271 heavy vehicles over 18 hours for link 3.9. Speeds are not predicted to change for any of the links. The Proposed Development changes the magnitude of fear and intimidation for any of the receptors by one step, hence the overall magnitude of impact will be minor.	Minor Adverse Not significant

Baseline		Impact assessment				
Receptor	Value / sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
<ul style="list-style-type: none"> • Drivers along Madingley Road (links 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 3.10, and 3.11) • Pedestrians and cyclists travelling along Madingley Road (links 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 3.10, and 3.11) • Drivers along Northampton Street (link 3.12) • Pedestrians and cyclists travelling along Northampton Street (link 3.12) • Drivers along Huntingdon Road (links 4.0, 11.2) • Pedestrians and cyclists travelling along Huntingdon Road (links 4.0, 11.2) • Drivers along the North West Cambridge access roads from Madingley Road and Huntingdon Road (links 11.1 and 11.2) • Pedestrians and cyclists along the North West Cambridge access roads from Madingley Road and Huntingdon Road (links 11.1 and 11.2) • Drivers along High Cross Road (link 12.1) • Pedestrians and cyclists travelling along High Cross Road (link 12.1) • Drivers along JJ Thomson Avenue (link 12.1) • Pedestrians and cyclists travelling along JJ Thomson Avenue (link 12.1) • Drivers along Clerk Maxwell Road (link 12.3) • Pedestrians and cyclists travelling along Clerk Maxwell Road (link 12.3) 	Low	Changes in traffic flows could result in a change on personal injury collision rates.	Adaptive Phased Approach to long term transport mitigation.	Negligible	The additional traffic flows on the network resulting from the Proposed Development would be unlikely to have any significant effect on existing personal injury collision rates, although the number of personal injury collisions would be likely to increase as a function of additional traffic flows on these links in 2031. The overall significance of effect for highway safety is negligible.	Negligible Not significant

6.6 Mitigation measures

Construction phase

6.6.1 A Construction Environment Management Plan (CEMP) will be implemented by the developer, approved by Cambridge City Council prior to construction commencing, and implemented by all contractors associated with the Proposed Development. This document will identify the appropriate hours of operation, and routes to be used by construction vehicles travelling to and from the Site. Specific mitigation which will be included within the CEMP include:

- Delivery routes will be agreed with the local highways authority and will preferentially access the Site from the M11 Junction 13/ Madingley Road particularly for heavy vehicles; and
- Heavy vehicle movements will not be permitted through Cambridge City unless no alternative is available and only once agreement has been sought with the local highway authority.

Operational mitigation for the initial phase of development 2021

Transport strategy

6.6.2 The overall transport strategy for the Proposed Development responds to a number of important national and local objectives. The mitigation provision for the initial phase of the Proposed Development is set within the agreed context for the overall transport mitigation strategy for West Cambridge, consisting of:

- A graduated approach – the assessment process reflecting current transport planning policy where travel demand management measures are introduced first, followed by any necessary highway infrastructure measures to mitigate the residual traffic impact;
- An adaptive approach – where, to maintain future flexibility, the proposed mitigation for later phases responds to the quanta of development within the individual phase proposals, the timescales for the delivery, changes in future travel behaviour patterns, emerging transport policy, and the current uncertainty relating to the development and transport infrastructure enhancement proposals.

6.6.3 The mitigation measures to be implemented; to reduce the vehicular trip generation of the Proposed Development, to reduce vehicle use on the network, and to manage the effects of the Proposed Development, are:

- The travel demand management strategy, set out in the Framework Travel Plan based on:
 - The benefit of a fully-funded quality FTP;
 - The consequences of the application of “Smarter Choices” guidance to reduce vehicular trip generation from the Proposed Development; and
 - The provision of car parking at a controlled, appropriate level of provision, and the implementation of a car parking management scheme combined with permit provision on a demonstrated needs basis;
- An enhanced public transport strategy. The scale of the Proposed Development means that there will be both a high quantum of demand for public transport, and a number of locations that will need to be connected to West Cambridge. The strategy, detailed within Section 7 of the Transport Assessment, includes:

- Increased regularity of bus provision;
- Direct on-site routes;
- Provision of high quality bus stops (including real time passenger information, and the provision of comprehensive timetable information including network maps and fare details);
- Bus priority measures to be provided with Selective Vehicle Detection technology at any new traffic signals controlling the entrances to the Site from Madingley Road;
- Provision of service information and incentive measures to increase patronage; and
- Promote network ticketing with operators serving West Cambridge, allowing for passengers from destinations other than Cambridge city centre to make journeys on other services and transfer using the same ticket stored on a smartcard, mobile phone or EMV wave and pay card;
- Quality pedestrian and cyclist facilities. The strategy, detailed within Section 6 of the Transport Assessment, includes:
 - Direct, quality North-South footway and cycleway provision across West Cambridge linking between Madingley Road and Coton Path using the Western Access, High Cross, JJ Thomson Avenue and Clerk Maxwell Road;
 - The East - West Shared Space Link to provide the main east - west spine for Pedestrians and Cyclists connecting Clerk Maxwell Road and High Cross with access to a number of plots and lower-hierarchy Cycle routes;
 - As with North West Cambridge, all vehicle routes being designed for a 20mph speed limit using passive speed management measures such as constrained widths and the use of shared surface areas. This low-speed environment is primarily to control vehicle speeds, but in so doing will create a safer and more attractive environment for pedestrians and cyclists;
 - Footways being provided on both sides of the on-site streets and at the Site access locations. Controlled crossing points would be provided, and traffic calming measures would be present to reduce traffic speed and to ease pedestrian movement;
 - Improved links between West Cambridge and popular destinations to the East, towards the City;
 - Proportionate, phased contributions to the County Council’s GCP Madingley Road Cycle Scheme, which would assist in the delivery of improved connectivity to the north to North West Cambridge. These links will be supported with controlled crossings;
 - Provision of high levels of quality cycle parking, at least to the adopted Cambridge Local Plan 2018 minimum cycle parking standards, within private covered, secure, lit and well-located areas at the destinations, as well as further provision through the Site; and
 - All major employers being encouraged to provide associated shower and changing room facilities for walkers and cyclists after their journeys;
- Schemes to improve environmental conditions. The strategy, identified in Section 16 of the Transport Assessment, includes:
 - Contributions to effect a lower speed limit than the existing 40mph speed limit locally on Madingley Road – thus providing environmental benefit from existing vehicular movements;

- Contributions to the necessary Traffic Regulation Orders to implement car parking zones or prohibitions on surrounding streets to minimise inappropriate overspill parking – potentially in the context of providing improved cycle facilities;
- Measures at three locations to address existing highway safety concerns – especially affecting vulnerable road users;
- Provision of EV charging stations in accordance with the City Council’s SPD requirements - to cater for both all-day parking slow charging as well as the fast charging points;
- The extension of the SCOOT and MOVA traffic signal optimisation to the proposed traffic signals along Madingley Road – JJ Thomson Avenue and Clerk Maxwell – to control any additional queuing and delays as a consequence of the Proposed Development.

6.6.4 As there may be a degree of variability in future traffic flow projections (which can be attributed to a number of factors including fuel prices, Government policy etc.), this pragmatic mitigation strategy has been formulated which is designed to be resilient to change in conditions by being focused to all sustainable modes, with appropriate levels of mitigation for vehicular traffic. This strategy therefore reflects current planning policy by:

- Reducing and controlling existing and future vehicular trips across the network;
- Improving pedestrian and cyclist infrastructure through the area for the benefit of both the existing and future users;
- Providing financial contributions towards the delivery of public transport services on and off-Site infrastructure; and
- Where necessary, providing measures to preserve and / or enhance capacity on particular links or junctions.

Operational mitigation for the full development 2031

6.6.5 At the date of the submission of the Planning Application, there was significant uncertainty regarding:

- Development delivery across the Cambridge Sub Region;
- The associated infrastructure provision necessary to accommodate this level, of growth - particularly relating to:
 - The A14 Huntingdon – Cambridge Enhancement;
 - Area-Wide strategic transport proposals – such as providing an enhanced mass transit capacity along the A428 / A1303 Corridor;
 - Highways England’s recent inclusion within the March 2020 Road Investment Strategy 2 statement that the M11 Junction 13 is a “RIS3 Pipeline” Scheme for 2025 - 2030;
 - Other emerging transport proposals – such as improvements to east - west movement;
- The emerging development policy, including that enshrined within the Cambridge Local Plan.

6.6.6 As such, the transport modelling cannot robustly define a cumulative development scenario for 2031.

6.6.7 Acknowledging this situation, as discussed with the Joint Authorities, it is not appropriate to define further mitigation measures at this stage beyond an indicative Initial Phase of development (i.e. over and above the measures described in the Framework Travel Plan and those additional measures envisaged in the 2021 scenario) prior to confirmation of the details of the above. Instead, the Adaptive Phase Approach is proposed, through which a mitigation scheme will be developed at the appropriate time, and ensured through a planning condition, which sets out:

- The mitigation scheme's objectives including the targets it must meet over time;
- The mitigation scheme's parameters;
- The methods of achieving the mitigation scheme's objectives and reviewing and adapting those methods over time to ensure that the objectives are met; and
- A review mechanism to ensure that the achievement of the objectives is kept under review and the methods adapted if further steps prove necessary.

6.7 Summary

6.7.1 During the construction phase, construction traffic will be controlled through measures specified in the CEMP. This will include reaching an agreement with the local highways authority about delivery routes which will avoid Cambridge City centre. There would be no significant adverse or beneficial transport effects from the Proposed Development during the construction phase.

6.7.2 The first phase of the Proposed Development is anticipated to be operational in 2021. A transport strategy has been produced and this sets out mitigation measures identified as being required through transport modelling and other measures to improve the amenity of pedestrian and cyclist routes. There would be no significant adverse or beneficial transport effects in 2021.

6.7.3 The full Proposed Development will be operational in 2031. Due to uncertainty about other developments in the city and region and the required provision of new or upgraded transport infrastructure it is not possible to specify what mitigation measures might be required. Instead mitigation will be identified and implemented through the “Monitor and Manage” response which will ensure that the right measures are implemented at the right time and in the right location. Despite this the increase in traffic along Madingley Road, resulting from the Proposed Development in 2031, this will cause no greater than minor adverse effects to pedestrians and cyclists travelling along these links – the increase in traffic increasing severance, fear and intimidation, and a reduction in pedestrian amenity. No other significant effects are anticipated.

7. Air quality

7.1 Scope of the assessment

- 7.1.1 This chapter replaces the air quality chapter (Chapter 11) in the original ES. It assesses the likely significant effects of the Proposed Development in terms of air quality and has considered:
- Construction dust emissions;
 - Operational CHP plant emissions;
 - Operational laboratory emissions; and
 - Road traffic emissions
- 7.1.2 The Proposed Development has the potential to adversely affect air quality during both the construction phase and the operational phase. The main air pollutants of concern related to construction are dust and fine particulate matter (PM₁₀) and for road traffic they are nitrogen dioxide (NO₂) and fine particulate matter (PM₁₀ and PM_{2.5}).
- 7.1.3 In addition, an assessment of the potential adverse effect on air quality of emissions of oxides of nitrogen (NO_x) and PM₁₀ from the Combined Heat and Power (CHP) plant has been undertaken. A qualitative assessment of laboratory emissions has been undertaken.
- 7.1.4 Table 7.1 describes the scoping opinion in terms of air quality from the local authority.

Table 7.1 Scoping response

Issue Raised	Respondent
Reference to joint EPUK / IAQM guidance in terms of magnitude /significance of impacts	Cambridge City Council Refuse and Environmental Services
The potential air quality impacts of the Combined Heat and Power plant need to be modelled alongside any potential traffic/ travel impacts. Expected flue heights, exit velocities, temperatures and throughputs will need to be determined ready for the ES	Cambridge City Council Refuse and Environmental Services
Air quality impacts to Madingley Wood SSSI should be assessed.	Natural England

- 7.1.5 All scoping responses have been considered in this assessment.

7.2 Relevant legislation

The Air Quality Strategy 2007

- 7.2.1 The Air Quality Strategy¹³ establishes the policy framework for ambient air quality management and assessment in the UK. The primary objective is to ensure that everyone can enjoy a level of ambient air quality which poses no significant risk to health or quality of life. The Strategy sets out the National Air Quality Objectives (NAQOs) and Government policy on achieving these objectives.
- 7.2.2 Part IV of the Environment Act 1995 introduced a system of Local Air Quality Management (LAQM). This requires local authorities to regularly and systematically review and assess air quality within their boundary and appraise development and transport plans against these assessments. The relevant NAQOs for LAQM are prescribed in the Air Quality (England) Regulations 2000¹⁴ and the Air Quality (Amendment) (England) Regulations 2002¹⁵.
- 7.2.3 Where an objective is unlikely to be met, the local authority must designate an Air Quality Management Area (AQMA) and draw up an Air Quality Action Plan (AQAP) setting out the measures it intends to introduce in pursuit of the objectives within its AQMA.
- 7.2.4 The Local Air Quality Management Technical Guidance document¹⁶ for Local Authorities provides advice as to where the NAQOs apply. These include outdoor locations where members of the public are likely to be regularly present for the averaging period of the objective (which vary from 15 minutes to a year). Thus, for example, annual mean objectives apply at the façades of residential properties, whilst the 24-hour objective (for PM₁₀) would also apply within the garden. They do not apply to occupational, indoor or in-vehicle exposure.

Clean Air Strategy

- 7.2.5 The Clean Air Strategy aims to lower national emissions of pollutants, thereby reducing background pollution and minimising human exposure to harmful concentrations of pollution. The Strategy aims to create a stronger and more coherent framework for action to tackle air pollution¹⁷.

EU Limit Values

- 7.2.6 The Air Quality Standards (Amendment) Regulations 2016¹⁸ amended the Air Quality Standard Regulations 2010¹⁹, which implemented the European Union's Directive on ambient air quality and cleaner air for Europe (2008/50/EC), and includes limit values. These limit values are numerically the same as the NAQO values but differ in terms of compliance dates, locations where they apply and the legal responsibility for ensuring that they are complied with. The compliance date for the NO₂ EU Limit Value was 1 January 2010, five years later than the date for the NAQO.
- 7.2.7 Directive 2008/50/EC consolidated the previous framework directive on ambient air quality assessment and management and its first three daughter directives. The limit values remained unchanged, but it now allows Member States a time extension for compliance, subject to European Commission (EC) approval.

¹³ DETR (2007). 'The Air Quality Strategy for England, Scotland, Wales, Northern Ireland'. HMSO, London

¹⁴ Statutory Instrument 2000, No 921. 'The Air Quality (England) Regulations 2000'. HMSO, London

¹⁵ Statutory Instrument 2002, No 3034. 'The Air Quality (England) (Amendment) Regulations 2002'. HMSO, London

¹⁶ Defra, 2016, Local Air Quality Management Technical Guidance LAQM.TG(16)

¹⁷ Defra, 2019. 'Clean Air Strategy 2019'.

¹⁸ Statutory Instrument 2016, No 1184, 'The Air Quality Standards (Amendment) Regulations 2016'. HMSO, London.

¹⁹ Statutory Instrument 2010, No 1001, 'The Air Quality Standards Regulations 2010'. HMSO, London.

7.2.8 The Directive limit values are applicable at all locations except:

- Where members of the public do not have access and there is no fixed habitation
- On factory premises or at industrial installations to which all relevant provisions concerning health and safety at work apply
- On the carriageway of roads, and on the central reservations of roads except where there is normally pedestrian access.

Protection of habitats

7.2.9 European Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the Habitats Directive) requires member states to introduce a range of measures for the protection of habitats and species. The Conservation of Habitats and Species Regulations (2017) (Statutory Instrument, 2017), transposes the Directive into law in England and Wales. Sites as Special Areas of Conservation (SACs) are designated under these regulations, as are Special Protection Areas (SPAs); with these classified under the Council Directive 2009/147/EC on the Conservation of Wild Birds. These Sites form a network termed “Natura 2000.”

7.2.10 The Regulations primarily provide measures for the protection of European Sites and European Protected Species, but also require local planning authorities to encourage the management of other features that are of major importance for wild flora and fauna.

7.2.11 The Habitats Directive (as implemented by the Regulations) requires the competent authority, which in this case will be the planning authority, to firstly evaluate whether the development is likely to give rise to a significant effect on the European site. Where this is the case, it has to carry out an ‘appropriate assessment’ in order to determine whether the development will adversely affect the integrity of the site.

7.2.12 Sites of national importance may be designated as Sites of Special Scientific Interest (SSSIs). Originally notified under the National Parks and Access to the Countryside Act 1949, SSSIs have been re-notified under the Wildlife and Countryside Act 1981. Improved provisions for the protection and management of SSSIs (in England and Wales) were introduced by the Countryside and Rights of Way (CROW) Act 2000. If a development is “likely to damage” a SSSI, the CROW act requires that a relevant conservation body (i.e. Natural England) is consulted. The CROW act also provides protection to local nature conservation sites, which can be particularly important in providing ‘stepping stones’ or ‘buffers’ to SSSIs and European sites. In addition, the Environment Act (1995) and the Natural Environment and Rural Communities Act (2006) both require the conservation of biodiversity.

National Air quality objectives

7.2.13 The NAQOs for NO₂ and particulate matter (PM₁₀) set out in the Air Quality Regulations (England) 2000 and the Air Quality (England) (Amendment) Regulations 2002, are shown in Table 7.2.

Table 7.2 NO₂ and PM₁₀ objectives

Pollutant	Time Period	Objective
Nitrogen dioxide (NO ₂)	1-hour mean	200µg/m ³ not to be exceeded more than 18 times a year
	Annual mean	40µg/m ³
Particulate matter (PM ₁₀)	24-hour mean	50µg/m ³ not to be exceeded more than 35 times a year
	Annual mean	40µg/m ³

7.2.14 The objectives for NO₂ and PM₁₀ were to have been achieved by 2005 and 2004, respectively, and continue to apply in all future years thereafter.

7.2.15 The Air Quality Strategy (2007)²⁰ includes an exposure reduction target for smaller particles known as PM_{2.5}. These are an annual mean target of 25 µg/m³ by 2020 and an average urban background exposure reduction target of 15% between 2010 and 2020.

7.2.16 The Ambient Air Quality and Cleaner Air for Europe Directive (2008/50/EC) was adopted in May 2008, and includes a national exposure reduction target, a target value and a limit value for PM_{2.5}, shown in Table 7.3. The UK Government transposed this new directive into national legislation in June 2010.

Table 7.3 PM_{2.5} objectives

Objectives	Time Period	Objective /Obligation	To be Achieved by
UK objectives	Annual mean	25µg/m ³	2020
	3 year running annual mean	15% reduction in concentrations measured at urban background sites	Between 2010 and 2020
European obligations	Annual mean	Target value of 25µg/m ³	2010
	Annual mean	Limit value of 25µg/m ³	2015
	Annual mean	Stage 2 indicative Limit value of 20µg/m ³	2020
	3-year Average Exposure Indicator (AEI) (a)	Exposure reduction target relative to the AEI depending on the 2010 value of the 3-year AEI (ranging from a 0% to a 20% reduction)	2020
	3-year Average Exposure Indicator (AEI)	Exposure concentration obligation of 20µg/m ³	2015

The 3-year annual mean or AEI is calculated from the PM_{2.5} concentration averaged across all urban background monitoring locations in the UK e.g. the AEI for 2010 is the mean concentration measured over 2008, 2009 and 2010.

Ecological receptors

7.2.17 Critical levels are a quantitative estimate of exposure to one or more airborne pollutants in gaseous form, below which significant harmful effects on sensitive elements of the environment do not occur, according to present knowledge.

²⁰ DEFRA (2007). ‘The Air Quality Strategy for England, Scotland, Wales, Northern Ireland’. HMSO, London

7.2.18 The critical level for NO_x for the protection of vegetation and ecosystems have been set as an NAQO by the UK Government and were to have been achieved by 2000. They are summarised in Table 7.4 and are the same as the EU limit values. Natural England applies the objective to all internationally designated conservation Sites and SSSIs.

Table 7.4 Vegetation and ecosystem objectives (critical levels)

Pollutant	Time Period	Objective
Nitrogen Oxides	Annual mean	30µg/m ³

7.2.19 Critical loads for nitrogen deposition onto sensitive ecosystems have been specified by United Nations Economic Commission for Europe (UNECE). They are defined as the amount of pollutant deposited to a given area over a year, below which significant harmful effects on sensitive elements of the environment do not occur, according to present knowledge.

7.2.20 In relation to combustion emissions critical loads for eutrophication and acidification are relevant which can occur via both wet and dry deposition; however, on a local scale only dry (direct deposition) is considered significant.

7.2.21 Empirical critical loads for eutrophication (derived from a range of experimental studies) are assigned based for different habitats, including grassland ecosystems, mire, bog and fen habitats, freshwaters, heathland ecosystems, coastal and marine habitats, and forest habitats and can be obtained from the UK Air Pollution Information System (APIS) website²¹.

7.2.22 Critical loads for acidification have been set in the UK using an empirical approach for non-woodland habitats on a 1km grid square based upon the mineralogy and chemistry of the dominant soil series present in the grid square, and the simple mass balance (SMB) equation for both managed and unmanaged woodland habitats.

7.2.23 The lowest critical loads for the most sensitive habitat within Madingley Wood (SSSI), approximately 1.8km from the Proposed Development, are presented in Table 7.5.

Table 7.5 Deposition and site relevant critical loads

Habitat	Critical Load			
	Nitrogen Deposition (kgN/ha/yr)	Acid Deposition (keq/ha/yr)		
		MinCLMinN	MinCLMaxN	MinCLMaxS
Broad-leaved, mixed and yew woodland	15-20	0.21	10.86	10.65

National Planning Policy Framework 2019

7.2.24 The NPPF sets out the Government's planning policies for England and how they are expected to be applied²².

7.2.25 Paragraph 102 on promoting sustainable transport states:

- "Transport issues should be considered from the earliest stages of plan-making and development proposals, so that:
- "the environmental impacts of traffic and transport infrastructure can be identified, assessed and taken into account – including appropriate opportunities for avoiding and mitigating any adverse effects, and for net environmental gains..."

7.2.26 Paragraph 103 continues to state:

- "Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions, and improve air quality and public health."

7.2.27 Paragraph 170 on conserving and enhancing the natural environment states:

- "Planning policies and decisions should contribute to and enhance the natural and local environment by: preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land stability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans"

7.2.28 Paragraph 180 within ground conditions and pollution states:

- "Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development."

7.2.29 Paragraph 181 states that:

- "Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan."

²¹ Air Pollution Information System (APIS) (2019). <http://www.apis.ac.uk/>

²² Ministry of Housing, Communities & Local Government (2019). National Planning Policy Framework. Available at: <https://www.gov.uk/government/publications/national-planning-policy-framework--2>

7.2.30 Paragraph 182 states that:

- "Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed".

Planning Practice Guidance

7.2.31 PPG²³ was first published in March 2014 to support the National Planning Policy Framework. Paragraph 005, Reference 32-005-20191101 (revision date 01.11.2019), of the PPG provides guidance on how considerations regarding air quality can be relevant to the development management process as follows:

- "Whether air quality is relevant to a planning decision will depend on the proposed development and its location." Concerns could arise if the development is likely to have an adverse effect on air quality in areas where it is already known to be poor, particularly if it could affect the implementation of air quality strategies and action plans and/or breach legal obligations (including those relating to the conservation of habitats and species). Air quality may also be a material consideration if the proposed development would be particularly sensitive to poor air quality in its vicinity.

7.2.32 Where air quality is a relevant consideration the local planning authority may need to establish:

- The 'baseline' local air quality, including what would happen to air quality in the absence of the development;
- Whether the proposed development could significantly change air quality during the construction and operational phases (and the consequences of this for public health and biodiversity); and
- Whether occupiers or users of the development could experience poor living conditions or health due to poor air quality.
- Paragraph 006, Reference 32-006-20191101 (revision date 01.11.2019), of the PPG identifies what specific air quality issues need to be considered in determining a planning application:
- "Considerations that may be relevant to determining a planning application include whether the development would:
 - Lead to changes (including any potential reductions) in vehicle-related emissions in the immediate vicinity of the proposed development or further afield. This could be through the provision of electric vehicle charging infrastructure; altering the level of traffic congestion; significantly changing traffic volumes, vehicle speeds or both; and significantly altering the traffic composition on local roads. Other matters to consider include whether the proposal involves the development of a bus station, coach or lorry park; could add to turnover in a large car park; or involve construction sites that would generate large Heavy Goods Vehicle flows over a period of a year or more;

- Introduce new point sources of air pollution. This could include furnaces which require prior notification to local authorities; biomass boilers or biomass-fueled Combined Heat and Power plant; centralised boilers or plant burning other fuels within or close to an air quality management area or introduce relevant combustion within a Smoke Control Area; or extraction systems (including chimneys) which require approval or permits under pollution control legislation;
- Expose people to harmful concentrations of air pollutants, including dust. This could be by building new homes, schools, workplaces or other development in places with poor air quality;
- Give rise to potentially unacceptable impacts (such as dust) during construction for nearby sensitive locations; and
- Have a potential adverse effect on biodiversity, especially where it would affect sites designated for their biodiversity value."

7.2.33 Paragraph 007, Reference 32-007-20191101 (revision date 01.11.2019), of the PPG provides guidance on how detailed an assessment needs to be;

- "Assessments need to be proportionate to the nature and scale of development proposed and the potential impacts (taking into account existing air quality conditions), and because of this are likely to be locationally specific." And,
- "The following could form part of assessments:
 - A description of baseline conditions and any air quality concerns affecting the area, and how these could change both with and without the proposed development;
 - Sensitive habitats (including designated sites of importance for biodiversity);
 - the assessment methods to be adopted and any requirements for the verification of modelling air quality;
 - The basis for assessing impacts and determining the significance of an impact;
 - Where relevant, the cumulative or in-combination effects arising from several developments;
 - Construction phase impacts;
 - Acceptable mitigation measures to reduce or remove adverse effects; and
 - Measures that could deliver improved air quality even when legally binding limits for concentrations of major air pollutants are not being breached."

7.2.34 Paragraph 008, Reference 32-008-20140306 (revision date 01.11.2019), of the PPG provides guidance on how an impact on air quality can be mitigated;

- "Mitigation options will need to be locationally specific, will depend on the proposed development and need to be proportionate to the likely impact. It is important that local planning authorities work with applicants to consider appropriate mitigation so as to ensure new development is appropriate for its location and unacceptable risks are prevented. Planning conditions and obligations can be used to secure mitigation where the relevant tests are met.
- Examples of mitigation include:

²³Planning Practice Guidance (2019). 'Air Quality'.

- Maintaining adequate separation distances between sources of air pollution and receptors;
- Using green infrastructure, trees, where this can create a barrier or maintain separation between sources of pollution and receptors;
- Appropriate means of filtration and ventilation;
- Including infrastructure to promote modes of transport with a low impact on air quality (such as electric vehicle charging points);
- Controlling dust and emissions from construction, operation and demolition; and
- Contributing funding to measures, including those identified in air quality action plans and low emission strategies, designed to offset the impact on air quality arising from new development."

Cambridge Local Plan 2018

7.2.35 The Cambridge Local Plan²⁴ was adopted in October 2018 and sets out the vision, policies and proposals for the future development and land use in Cambridge to 2031. The Local Plan contains Policy 36 on 'Air Quality, Odour and Dust' which states:

- "Development will be permitted where it can be demonstrated that:
 - it does not lead to significant adverse effects on health, the environment or amenity from polluting or malodorous emissions, or dust or smoke emissions to air; or
 - where a development is a sensitive end-use, that there will not be any significant adverse effect on health, the environment or amenity arising from existing poor air quality, sources of odour or other emissions to air."

7.2.36 According to the end-use and nature of the area and applications, applicants must demonstrate that:

- there is no adverse effect on air quality in an air quality management area (AQMA);
- pollution levels within the AQMA will not have a significant adverse effect on the proposed use/users;
- the development will not lead to the declaration of a new AQMA;
- the development will not interfere with the implementation of the current Air Quality Action Plan (AQAP);
- any sources of emissions to air, odours and fugitive dusts generated by the development are adequately mitigated so as not to lead to loss of amenity for existing and future occupants and land uses; and
- any impacts on the proposed use from the existing poor air quality, odour and emissions are appropriately monitored and mitigated by the developer.

7.2.37 Furthermore, Policy 29 on 'Renewable and Low Carbon Energy Generation' states the following in relation to air quality:

- "Proposals for development involving the provision of renewable and/or low carbon energy generation, including community energy projects, will be supported, subject to the acceptability of their wider impacts. As part of such proposals, the following should be demonstrated:
 - that any adverse impacts on the environment...have been minimised as far as possible. These considerations will include air quality concerns, particularly where proposals fall within or close the air quality management area(s) or areas where air pollution levels are approaching the EU limit values..."

Cambridge City Council Air Quality Action Plan 2018-2023

7.2.38 The Cambridge City Council Air Quality Action Plan²⁵ sets out the Council's priority actions for improving areas of poor air quality in the city. The plan responds to the evidence gathered from air quality monitoring across Cambridge and analysis of the sources of air pollution contributing to the problem. The main source of air pollution in Cambridge is road transport.

Developers Guide to Air Quality in Cambridge 2008

7.2.39 The Developers Guide to Air Quality in Cambridge published in September 2008²⁶, provides information on the way in which air quality and air pollution issued will be dealt with through the development control system in Cambridge City. It defines how air quality assessment should be undertaken and reported for developments that have the potential to significantly affect air quality in Cambridge.

Greater Cambridge Sustainable Design and Construction Supplementary Planning Document

7.2.1 The Greater Cambridge Sustainable Design and Construction Supplementary Planning Document (SPD)²⁷ outlines a hierarchy of mitigating air quality impacts of developments and requires the preparation of an Air Quality Mitigation Statement (AQMS) to identify whether appropriate and proportionate mitigation measures have been applied.

Gas CHP Developers Advice Note

7.2.2 The Gas CHP developers Advice Note²⁸ is an interim advice note for developers which outlines the requirements to minimise impact of Combined Heat and Power installations on wider air quality issued in the city.

²⁴ Cambridge City Council (2018). 'Cambridge Local Plan 2018'.

²⁵ Cambridge City Council (2018). 'Air Quality Action Plan 2018-2023'.

²⁶ Cambridge City Council (2008). 'Air Quality in Cambridge: Developers Guide'.

²⁷ Greater Cambridge Sustainable Design and Construction SPD, January 2020.

²⁸ Cambridge City Council (2016). 'Gas CHP Developers Advice Note'. Available at: <https://www.cambridge.gov.uk/content/air-quality-guide-developers>

7.3 Method of assessment

Establishing the baseline

7.3.1 Information on existing air quality has been obtained by collating the results of monitoring carried out by the Cambridge City Council and South Cambridgeshire District Council. Background concentrations for the Site have been defined using the 2017-based national pollution maps published by Defra. These cover the whole country on a 1x1km grid²⁹.

7.3.2 Existing nitrogen and acid deposition rates within the Madingley Woods SSSI were determined from the Air Pollution Information System (APIS) website³⁰.

Impact assessment

Construction dust effects

7.3.3 The Institute of Air Quality Management (IAQM) has issued guidance on the assessment of dust from demolition and construction³¹. Within the IAQM guidance, an 'impact' is described as a change in pollutant concentrations or dust deposition and an 'effect' is described as the consequence of an impact.

7.3.4 During pre-construction demolition and construction, the main potential effects are dust annoyance and locally elevated concentrations of PM₁₀. The suspension of particles in the air is dependent on surface characteristics, weather conditions and on-site activities. Impacts have the potential to occur when dust generating activities coincide with dry, windy conditions, and where sensitive receptors are located downwind of the dust source.

7.3.5 Separation distance is also an important factor. Large dust particles (greater than 30µm), responsible for most dust annoyance, will largely deposit within 100m of sources. Intermediate particles (10-30µm) can travel 200-500m. Consequently, significant dust annoyance is usually limited to within a few hundred metres of its source. Smaller particles (less than 10µm) are deposited slowly and may travel up to 1km; however, the impact on the short-term concentrations of PM₁₀ occurs over a shorter distance. This is due to the rapid decrease in concentrations with distance from the source due to dispersion.

7.3.6 The IAQM guidance recommends that the risk of dust emission magnitude is combined with the sensitivity of the area surrounding the site to determine the risk of dust impacts from construction and demolition activities. Depending on the level of risk (high, medium, low or negligible) for each activity, appropriate mitigation is selected.

7.3.7 In accordance with the IAQM, the dust emission magnitude is defined as either large, medium or small (Table 7.6) considering the general activity descriptors on site and professional judgement.

7.3.8 The sensitivity of the study area to construction dust impacts is defined based on the examples provided within the IAQM 2014 guidance (summarised in Table 7.7), considering professional judgement.

Table 7.6 Indicative Criteria for dust emission magnitude

Dust Emission Magnitude	Activity
Large	Demolition >50,000 m ³ building demolished, dusty material (e.g. concrete), on-site crushing/screening, demolition >20m above ground level
	Earthworks >10,000 m ² site area, dusty soil type (e.g. clay), >10 earth moving vehicles active simultaneously, >8m high bunds formed, >100,000 tonnes material moved
	Construction >100,000 m ³ building volume, on site concrete batching, sandblasting
	Trackout >50 HDVs out / day, dusty soil type (e.g. clay), >100m unpaved roads
Medium	Demolition 20,000 - 50,000 m ³ building demolished, dusty material (e.g. concrete) 10-20m above ground level
	Earthworks 2,500 - 10,000 m ² site area, moderately dusty soil (e.g. silt), 5-10 earth moving vehicles active simultaneously, 4m – 8m high bunds, 20,000 -100,000 tonnes material moved
	Construction 25,000 - 100,000 m ³ building volume, on site concrete batching
	Trackout 10 - 50 HDVs out / day, moderately dusty surface material, 50 -100m unpaved roads
Small	Demolition <20,000 m ³ building demolished, non-dusty material, <10m above ground level, work in winter
	Earthworks <2,500 m ² site area, non-dusty soil, <5 earth moving vehicles active simultaneously, <4m high bunds, <20,000 tonnes material moved
	Construction <25,000 m ³ , non-dusty material
	Trackout <10 HDVs out / day, non-dusty soil, < 50m unpaved roads

²⁹ Department of the Environment, Food and Rural Affairs (Defra) (2019). '2017 Based Background Maps for NO_x, NO₂, PM₁₀ and PM_{2.5}'. Available: <https://uk-air.defra.gov.uk/data/iaqm-background-home>

³⁰ Air Pollution Information System (APIS) (2019). 'Site relevant critical loads'. Available at: <http://www.apis.ac.uk/>

³¹ IAQM, 2014. 'Guidance on the Assessment of Dust from Demolition and Construction'. V1.1. IAQM, London.

Table 7.7 Indicative Area sensitivity definitions

Area Sensitivity	People and Property Receptors	Ecological Receptors
High	<ul style="list-style-type: none"> >100 dwellings, hospitals, schools, care homes within 50m 10 – 100 dwellings within 20m Museums, car parks, car showrooms within 50m PM₁₀ concentrations approach or are above the daily mean objective. 	<ul style="list-style-type: none"> National or Internationally designated site within 20m with dust sensitive features / species present
Medium	<ul style="list-style-type: none"> >100 dwellings, hospitals, schools, care homes within 100m 10 – 100 dwellings within 50m Fewer than 10 dwellings within 20m Offices/shops/parks within 20m PM₁₀ concentrations below the daily mean objective. 	<ul style="list-style-type: none"> National or Internationally designated site within 50m with dust sensitive features / species present Nationally designated site or particularly important plant species within 20m
Low	<ul style="list-style-type: none"> >100 dwellings, hospitals, schools, care homes 100 – 350m away 10 – 100 dwellings within 50 – 350m Fewer than 10 dwellings within 20 – 350m Playing fields, parks, farmland, footpaths, short term car parks, roads, shopping streets PM₁₀ concentrations well below the daily mean objective. 	<ul style="list-style-type: none"> Nationally designated site or particularly important plant species 20 – 50m Locally designated site with dust sensitive features within 50m

7.3.9 Based on the dust emission magnitude (Table 7.6) and the area sensitivity (Table 7.7), the risk of dust impacts is then determined (Tables 7.8-7.10), taking into account professional judgement.

Table 7.8 Risk of dust impacts – demolition

		Dust Emission Magnitude		
		Large	Medium	Small
Sensitivity of Area	High	High	Medium	Low
	Medium	Medium	Medium	Low
	Low	Low	Low	Negligible

Table 7.9 Risk of dust impacts – earthworks and construction

		Dust Emission Magnitude		
		Large	Medium	Small
Sensitivity of Area	High	High	Medium	Low
	Medium	Medium	Medium	Low
	Low	Low	Low	Negligible

Table 7.10 Risk of dust impacts - trackout

		Dust Emission Magnitude		
		Large	Medium	Small
Sensitivity of Area	High	High	Medium	Low
	Medium	Medium	Low	Negligible
	Low	Low	Low	Negligible

7.3.10 Based on the 'Risk of Dust Impacts', appropriate mitigation is selected from the IAQM 2014 guidance using professional judgement. The guidance recommends that no assessment of the significance of effects is made without mitigation in place, as mitigation is assumed to be secured by planning conditions, legal requirements or required by regulations.

7.3.11 With appropriate mitigation in place, the residual effect of construction impacts on air quality is assessed as not significant.

Operational effects

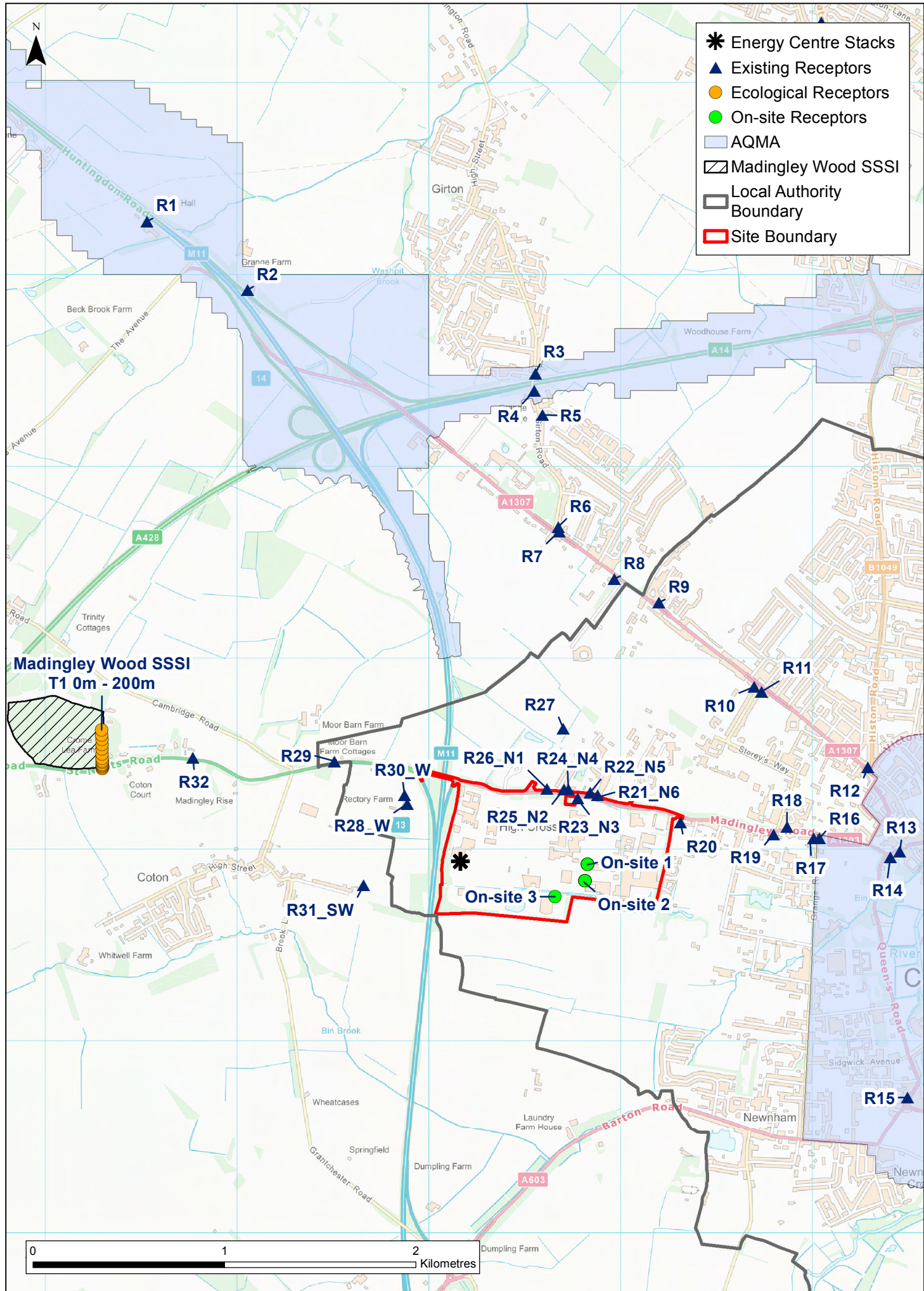
7.3.12 Relevant sensitive locations are places where members of the public might be expected to be regularly present over the averaging period of the objectives. For the annual mean and daily mean objectives that are the focus of this assessment, sensitive receptors will generally be residential properties, schools, nursing homes, etc. When identifying these receptors, particular attention has been paid to assessing impacts close to junctions, where traffic may become congested, and where there is a combined effect of several road links.

7.3.13 The area assessed also considers guidance developed by Environmental Protection UK (EPUK) and the IAQM. The guidance provides indicative criteria for when an air quality assessment is required. Existing receptors have been included in the assessment where they are adjacent to roads with an increase in traffic above the IAQM/EPUK guidance criteria below:

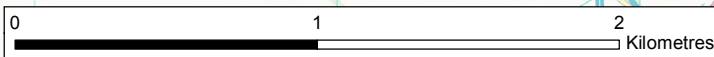
- A change of Light Duty Vehicles (LDVs) flows of more than 100 AADT within or adjacent to an AQMA or more than 500 AADT elsewhere.
- A change of Heavy Duty Vehicles (HDVs) flows of more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere (IAQM, 2017).

7.3.14 Based on the above criteria, thirty-two existing properties have been identified as residential receptors for the assessment. The locations of existing residential receptors were chosen to represent locations where impacts from road traffic related to the Proposed Development are likely to be the greatest, i.e. as a result of development traffic at junctions. These locations are described in Appendix 11.1 and are shown in Figure 7.1. Receptors were modelled at a height of 1.5m and 4.5m representing ground and first floor exposure, depending upon the first level of relevant exposure.

7.3.15 Analysis of long-term monitoring data suggests that if the annual mean NO₂ concentration is less than 60µg/m³ then the one-hour mean NO₂ objective is unlikely to be exceeded where road transport is the main source of pollution. This concentration has been used to screen whether the one-hour mean objective is likely to be achieved¹⁶.



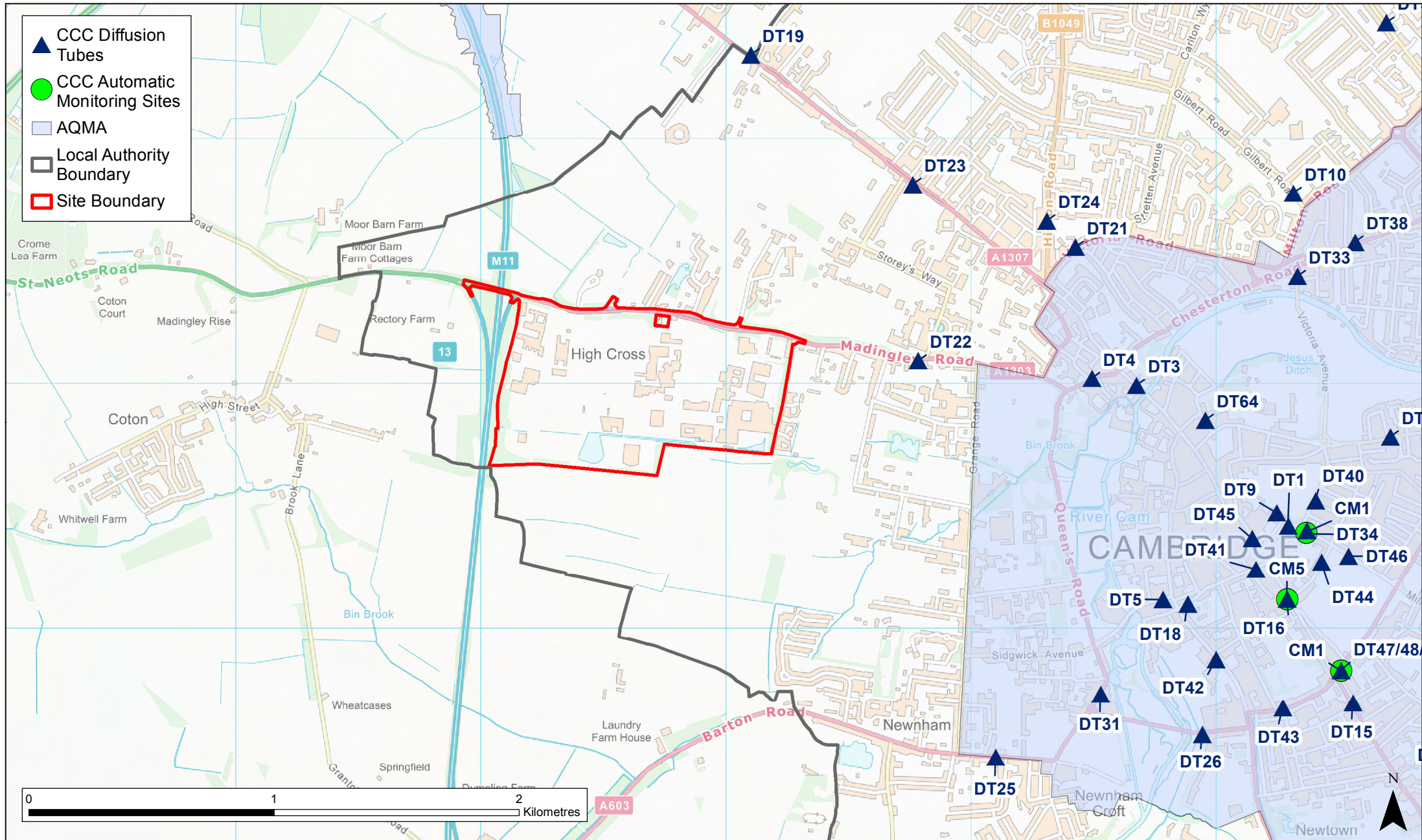
- ✱ Energy Centre Stacks
- ▲ Existing Receptors
- Ecological Receptors
- On-site Receptors
- AQMA
- Madingley Wood SSSI
- Local Authority Boundary
- Site Boundary

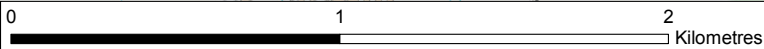
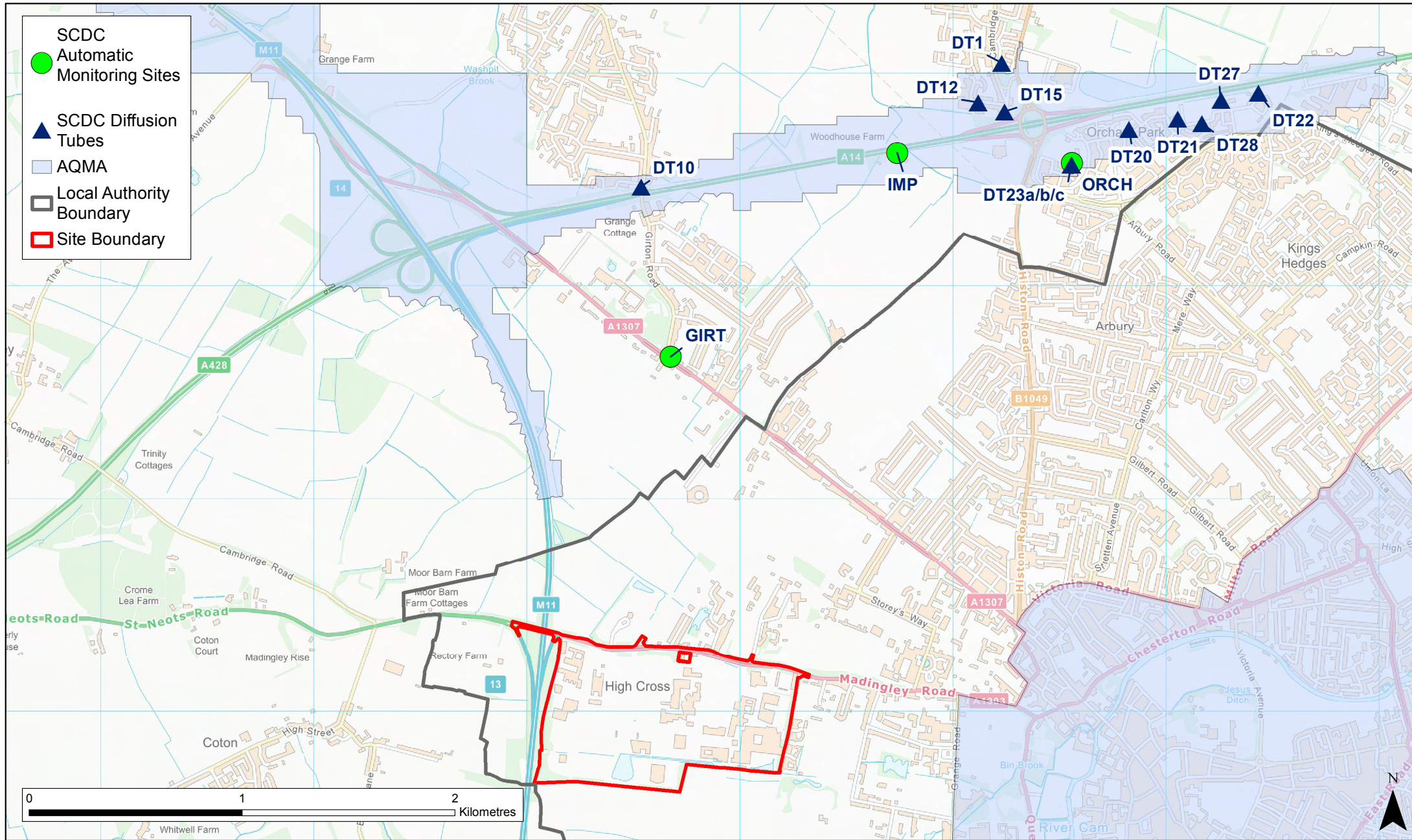


- 7.3.16 Emissions from the proposed centralised energy centre have been modelled at existing on-site and off-site residential receptors and proposed receptor locations on site, as listed in Table 11.1.1, in Appendix 11.1.
- 7.3.17 Concentrations have also been predicted at five diffusion tube monitors and one automatic monitor located within the administrative boundary of Cambridge City Council and South Cambridgeshire District Council in order to verify the modelled results. Appendix 11.2 provides further details on the verification method.
- 7.3.18 The IAQM has published guidance on the assessment of air quality impacts on designated nature conservation sites³² which adopts a similar procedure to that detailed in Natural England's approach³³. In accordance with the guidance, a detailed (quantitative) air quality assessment of impacts is required if there are designated sites with sensitive habitats within 200m of a road with an increase in traffic of 1000 Annual Average Daily Traffic (AADT) resulting from the development alone, and in combination with cumulative developments in the area. The next step is to identify the spatial distribution of qualifying features (e.g. those sensitive to nitrogen and/or acid deposition) within the habitat. If there are no sensitive habitats present within 200m of the affected road, then no further assessment is required.
- 7.3.19 The Madingley Wood SSSI meets the IAQM criteria stated above and therefore concentrations of nitrogen oxides have been predicted, and deposition calculated, at a range of receptors at increasing distances from the adjacent road network within the SSSI in order to assess the impact of the Proposed Development (shown in Figure 7.2). Transect T1 covers the Broadleaved, Mixed and Yew Woodland habitat with the Madingley Wood SSSI from 0m to 200m from Madingley Road.
- 7.3.20 Predictions have been carried out using the ADMS-Roads dispersion model (v4.1.1). The model requires the user to provide various input data, including the AADT flow, the proportion of Heavy Duty Vehicles (HDVs, i.e. Heavy Good Vehicles and buses), road characteristics (including road width and street canyon height, where applicable), and the vehicle speed. It also requires meteorological data. For the proposed development the most appropriate data available was from the Cambridge Airport monitoring station. This meteorological station is considered the most appropriate due to its proximity to the Site.
- 7.3.21 AADT flows and the proportions of HDVs, for roads adjacent to the Site have been provided by the project's transport consultants, Stantec (refer to Chapter 10 – Transport and Traffic for more detailed information). Traffic speeds were based on local speed restrictions, considering congestion and proximity to junctions. Traffic data used for this assessment have been summarised in Appendix 11.3.
- 7.3.22 The transport model has a forecast relating to 'Key Phase 1' reflecting partial development over the initial 3-4 year development period, and a 'Full Development Scenario' as defined in Chapter 6. For Air Quality modeling purposes the 'Key Phase 1' traffic data has been combined with 2021 emission factors and background concentrations, and future traffic data for the year 2031 has been combined with 2025 emission factors and background concentrations, in order to provide a conservative assessment of the effects of the proposed development, as road traffic emissions are predicted to decline with time as discussed in Appendix 11.9.
- 7.3.23 Emissions were calculated using the Emission Factor Toolkit (EFT) v9, incorporated within ADMS-Roads (v4.1.1). The traffic data were entered into the model, along with speed data to provide combined emission rates for each of the road links entered into the model. The modelling has been verified against 2018 monitoring data as this was the most recent available at the time of the assessment.
- 7.3.24 In late August 2020, DEFRA updated the EFT to v10; this update largely reflects revised fleet composition projections and importantly a more realistic assumption as to future Electric Vehicle (EV) and hybrid uptake as well as updated NOx emission data from vans EFT v10 therefore results in lower NOx emissions for typical urban traffic by approximately 5% by 2021 and 10% by 2025
- 7.3.25 Nitrogen deposition has been calculated from the predicted NO₂ concentrations using a deposition velocity 3mm/s for taller vegetation such as trees.

³² IAQM (2019). 'A Guide to the Assessment of Air Quality Impacts on Designated Nature Conservation Sites'. V1.0. IAQM, London.

³³ Natural England (2018). 'Natural England's approach to advising competent authorities on the assessment of road traffic emissions under the Habitats Regulations'.





7.3.26 There is no official guidance in the UK on how to assess the significance of air quality impacts of a new development. The approach developed by the IAQM and Environmental Protection UK (EPUK) has therefore been used

7.3.27 The guidance sets out three stages: determining the magnitude of change at each receptor, describing the impact, and assessing the overall significance. Impact magnitude relates to the change in pollutant concentration; the impact description relates this change to the air quality objective.

Table 7.11 Impacts at in long-term ambient pollutant concentrations at individual receptors

Long-term Average Concentration at Receptor in Assessment Year	% Changes in Concentration with Development in Relation to Objective/Limit Value			
	1*	2-5	6-10	>10
>110% ^a	Moderate	Substantial	Substantial	Substantial
>10.2% - ≤110% ^b	Moderate	Moderate	Substantial	Substantial
>95% - ≤102% ^c	Slight	Moderate	Moderate	Substantial
>75% - ≤95% ^d	Negligible	Slight	Moderate	Moderate
≤75% ^e	Negligible	Negligible	Slight	Moderate

Where concentrations increase the impact is described as adverse, and where it decreases as beneficial.
*% change rounded to nearest whole number. Where the % change is 0 (i.e. Less than 0.5%) the impact will be Negligible.
(a) NO₂ or PM₁₀: > 44µg/m³ annual mean; PM_{2.5}>27.5µg/m³ annual mean; PM₁₀ >35.2µg/m³ annual mean (days).
(b) NO₂ or PM₁₀: > 40.8 – ≤ 44µg/m³ annual mean; PM_{2.5} > 25.5 – ≤27.5µg/m³ annual mean; PM₁₀ >32.64 – ≤35.2 µg/m³ annual mean (days).
(c) NO₂ or PM₁₀: > 38 – ≤40.8µg/m³ annual mean; PM_{2.5}>23.75 – ≤25.5µg/m³ of annual mean; PM₁₀ >30.4 – ≤32.64µg/m³ annual mean (days).
(d) NO₂ or PM₁₀: >30 - ≤38µg/m³ annual mean; PM_{2.5} >18.75 - ≤23.75µg/m³ annual mean; or <24 - ≤ 30.4µg/m³ annual mean (days).
(e) NO₂ or PM₁₀: ≤30 µg/m³ annual mean; PM_{2.5} ≤18.75 µg/m³ annual mean; PM₁₀ ≤24µg/m³ annual mean (days).

7.3.28 For short term impacts, the baseline concentration is less important as the short-term peaks in concentration are not additive to short-term baseline peaks. Table 7.12 sets out how short-term impacts are determined.

Table 7.12 Impact magnitude and severity for changes in short-term ambient pollutant concentrations

Magnitude of Change % of the Relevant NAQO	Impact
Large (>51%)	Substantial
Medium (>21-≤50)	Moderate
Small (>11-≤20)	Slight
Imperceptible (≤10)	Negligible

7.3.29 The guidance states that the assessment of significance should be based on professional judgement, taking into account factors including:

- the number of properties affected by slight, moderate or substantial air quality impacts and a judgement on the overall balance;
- the magnitude of the changes and the descriptions of the impacts at the receptors i.e. Table 7.11 findings;
- whether or not an exceedance of an objective or limit value is predicted to arise in the operational study area (where there are significant changes in traffic) where none existed before or an exceedance area is substantially increased;
- the uncertainty, comprising the extent to which worst-case assumptions have been made; and
- the extent to which an objective or limit value is exceeded.

7.3.30 Where impacts can be considered in isolation at an individual receptor, moderate or substantial impacts (i.e. per Table 7.11) may be considered to be a significant environmental effect, whereas negligible or minor impacts would not be considered significant. The overall effect however, needs to be considered in the round taking into account the changes at all of the modelled receptor locations, with a judgement made as to whether the overall air quality effect of the development is significant or not.

7.3.31 Where critical levels or loads (Table 7.4 & Table 7.5) are already exceeded, an increase of more than 1% of the critical level or load is an indication that the risk of potentially significant effects cannot automatically be ruled out and would trigger the need for further, more detailed assessment. It should be noted that an increase in deposition of more than 1% is not, per se, an indication that a significant effect exists, only that the risk cannot be automatically ruled out. Depending on a more detailed assessment which would take account of the actual ecological conditions at the location under consideration, an increase of more than 1% may be acceptable.

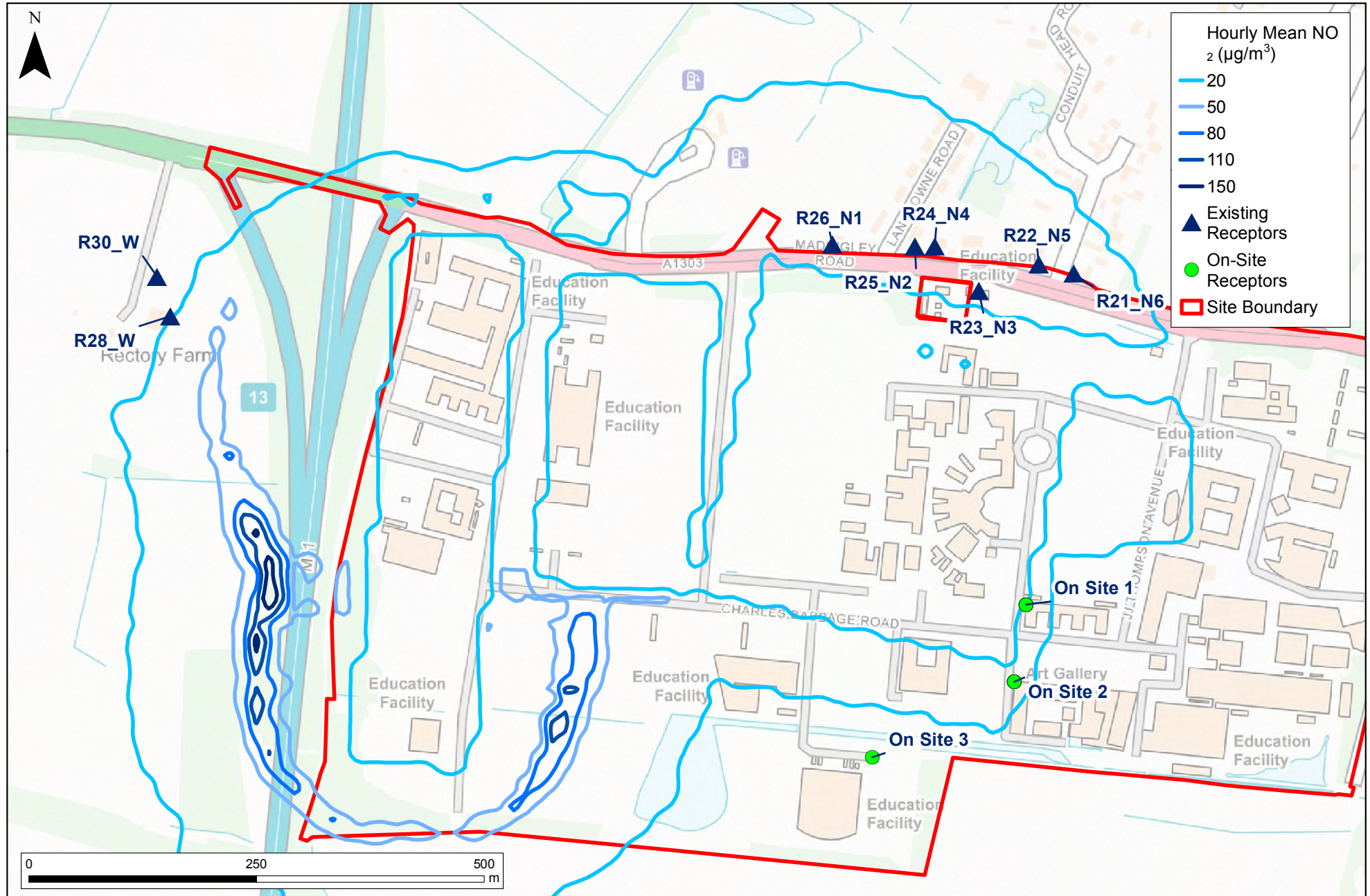
7.3.32 The assessment of the impact of emissions from the permanent energy centre has been considered in line with method in the Environment Agency H1 guidance³⁴. Emissions from the boilers and CHP system have been based on typical manufacturer's data for the type of equipment to be used.

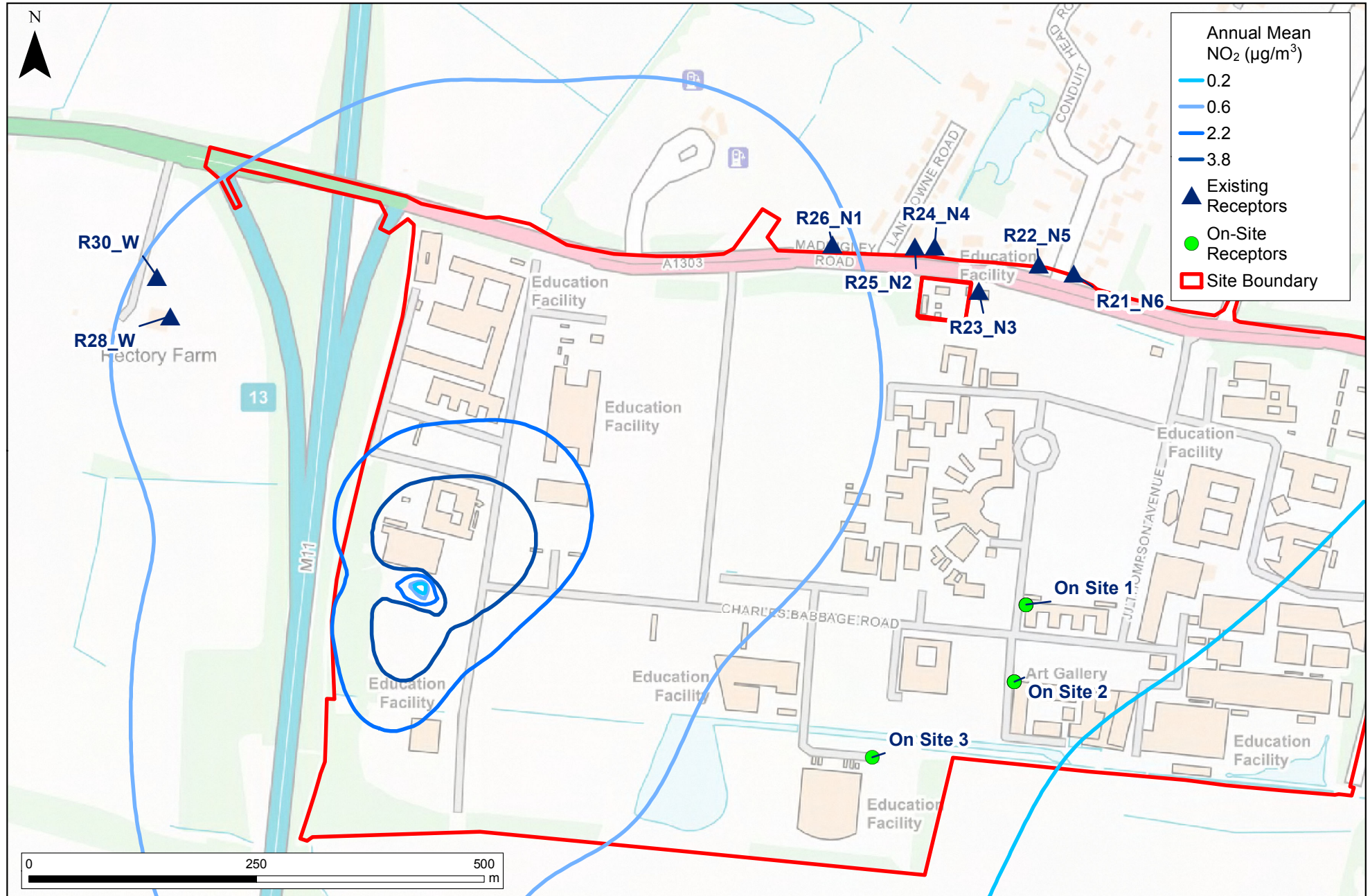
7.3.33 The modelling has been based on a conceptual design for the energy centre. This is for three CHP engines to be installed operating for 5,590; 3,630 and 2,785 hours per year. In addition, in order to provide heat when the CHP is unavailable, up to three 10MW and one 5MW boilers would be required. The CHP would operate preferentially to the boilers; with the CHP heat generator estimated to be 31,000MWH/yr. The boiler heat generation would be 15,000MWH/yr.

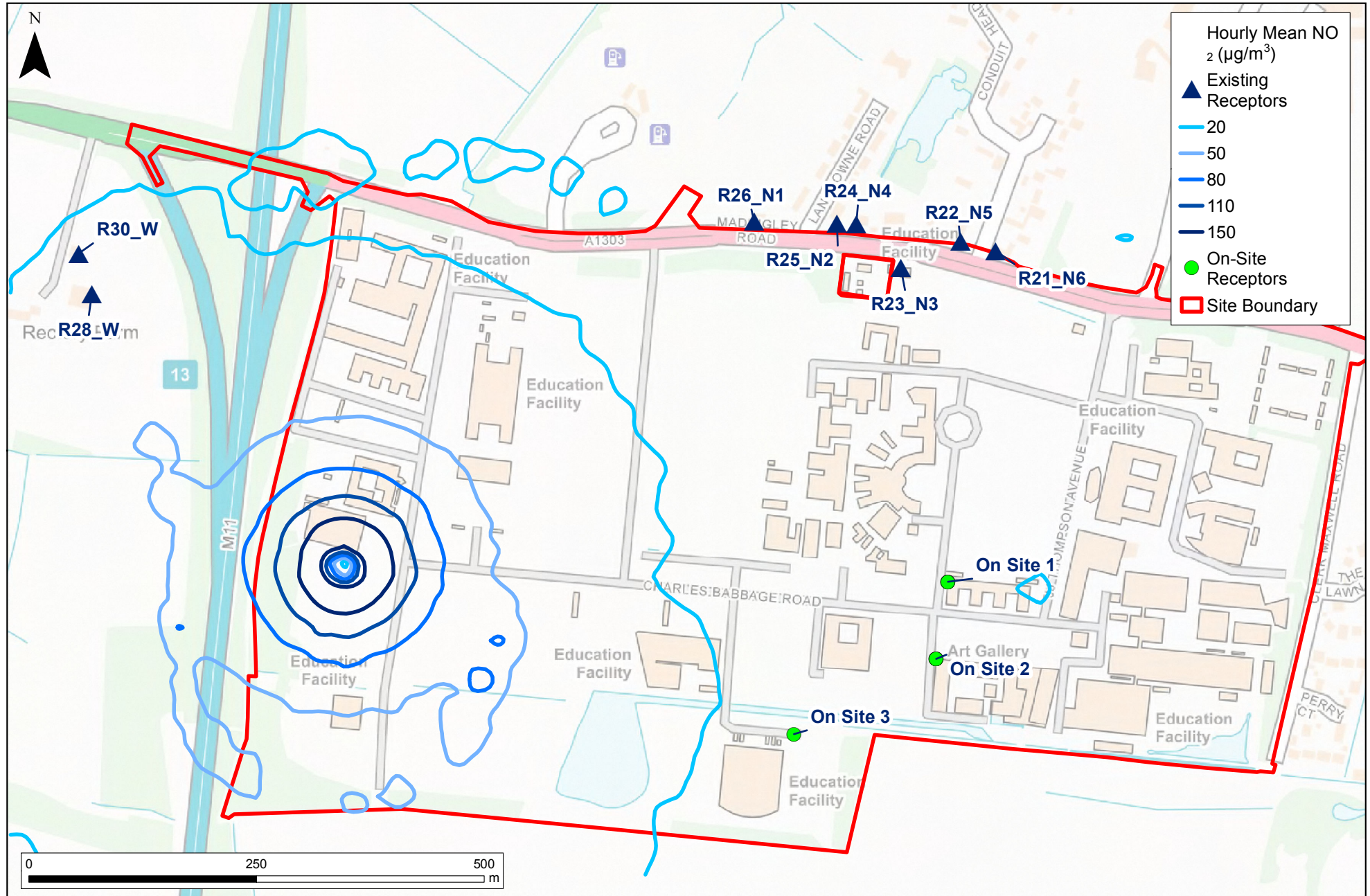
7.3.34 The energy centre location is a zone in the south-west of the Site. The energy centre flues were located in the worst-case locations for dispersion in the zone i.e. on the northern side of the zone. The CHP engines were assumed to be Jenbacher type G engines operating on natural gas with NO_x emissions of 256mg/Nm³ (5% oxygen), consistent with the emission limits for new equipment within the Medium Combustion Plant Directive. The boilers were assumed to be Cochran Thermox natural gas boilers with NO_x emissions of 100 mg/Nm³ (3% oxygen).

³⁴ H1 Annex f – Air Emissions. Environment Agency.

- 7.3.35 Dispersion modelling was undertaken using the ADMS 5 dispersion model. The maximum flue heights were assumed to be 8m above the stated building parameter plan heights, i.e. 46mAOD. The model input parameters are shown in Appendix 11.4.
- 7.3.36 Entrainment of the plume into the wake of nearby buildings (the so-called building downwash effect) has been taken into account in the model by including the proposed buildings within the model.
- 7.3.37 The gas fired boilers and the CHP system emit oxides of nitrogen, which is a combination of nitrogen monoxide and nitrogen dioxide, with the vast majority being nitrogen monoxide. Some of the nitrogen monoxide is converted in the atmosphere to nitrogen dioxide. On a conservative basis, the Environment Agency criteria is for 70% of the annual average NO_x concentration and 35% of the hourly average NO_x concentration to be converted to nitrogen dioxide.
- 7.3.38 The contribution to pollutant concentrations from the proposed energy centre (the process contribution (or PC)) has been added to the background concentration at specific roadside modelled receptor locations to provide the predicted environmental concentration (PEC).
- 7.3.39 The Predicted Environmental Concentration (PEC) is calculated differently for short-term or long-term effects as presented below:
- Long-term effects: $PEC = \text{Process Contribution} + \text{Background Concentration}$; and
 - Short-term effects: $PEC_{\text{short-term}} = \text{Process Contribution}_{\text{short-term}} + (2 \times \text{Background Concentration}_{\text{long-term}})$.
- 7.3.40 The roadside receptor locations were chosen as combined locations where the effect of the energy centre emissions and road traffic emissions would be largest. In this case, these were receptors R22 – R29 from Appendix 11.1. The impact of energy centre emissions at other receptor locations will be lower than indicated. Given the separation distance to Madingley Wood (over 2km), the impact of energy centre emissions on the ecological receptor will be negligible.
- 7.3.41 Contour plots of the annual and hourly average NO₂ concentrations at elevations of 1.5m and 22.5m are contained in Figures 7.4 to 7.7. The differences in the contour plots show the effect of buildings on the dispersion of emissions albeit the buildings can only be modelled as blocks at present as detailed design work has not been undertaken.
- 7.3.42 It should be noted in interpreting the contour plots that the annual average NO₂ concentration only applies at the specific receptor locations assessed, i.e. the residential receptor locations on-site and off-site. The predicted hourly average NO₂ concentrations assume that all of the combustion equipment is operating all year round and are therefore significant over-estimates of the actual concentrations that will occur. In addition, the 100th percentile concentration has been predicted which does not take into account the allowable exceedances of the objective.
- 7.3.43 There is the potential that instead of a centralised energy centre, heat will be provided for each building or clusters of buildings across the site, with part of the energy provision being provided by ground or air source heat pumps. In the case of an individual building approach, CHP would unlikely to be viable. In a distributed energy scenario, each combustion source will be much smaller than a centralised energy centre and the overall quantity of emissions will be lower. Emissions will be dispersed from more points geographically and the maximum ground level concentrations will be lower. The assessment that has been undertaken for the centralised energy centre is therefore considered to be the reasonable worst case scenario.
- 7.3.44 A number of buildings on the site will have emissions associated with laboratory experiments. At this stage it is not known what these emissions will be; but the scale of the emissions will be low and capable of being abated by standard mitigation techniques. Such emissions will be intermittent and will not have a significant effect on the environment with the appropriate abatement in place. Such abatement can be covered by a condition on any planning permission for the development and therefore emissions from laboratories have not been considered further in this assessment.







7.4 Baseline Conditions

Local Air Quality Management

7.4.1 Cambridge City Council and South Cambridgeshire District Council have investigated air quality within their districts as part of its responsibilities under the LAQM regime. To date, one AQMA has been declared by Cambridge City Council; an area encompassing the inner ring road and the land within it, including a buffer zone around the ring road and its junction with main feeder roads. This AQMA is located approximately 800m east of the Site and has been declared due to exceedances of the annual mean NO₂ objective. In addition, South Cambridgeshire District Council has declared an AQMA, an area along the A14 between Bar Hill and Milton. It has been declared due to exceedances of the annual mean NO₂ objective. This AQMA is located approximately 650m north of the Site.

Monitoring

NO₂

7.4.2 Cambridge City Council and South Cambridgeshire District Council carry out NO₂ monitoring using automatic analysers and also deploy a number of diffusion tubes within their administrative areas. The monitoring locations within approximately 3km of the Proposed Development are shown on Figures 7.2 and 7.3 and monitored NO₂ concentrations between 2014-2018 are provided in Table 7.13 and Table 7.14.

Table 7.13 Measured annual mean NO₂ concentrations (2014 – 2018)

ID	Site Type	Within AQMA	Annual Mean (µg/m ³)				
			2014	2015	2016	2017	2018
Cambridge City Council Automatic Monitors							
CM1 – Gonville Place	R	Yes	37	35	36	31	30
CM4 – Parker Street	R	Yes	45	45	41	37	32
CM5 – Regent Street	R	Yes	39	34	32	29	26
Cambridge City Council Diffusion Tubes							
DT1 – Emmanuel Street	R	Yes	39	35	38	34	36
DT3 – Magdalene Street	R	Yes	30	28	27	21	22
DT4 – Northampton Street *	R	Yes	39	38	37	33	31
DT5 – Silver Street	R	Yes	36	33	34	29	26
DT9 – Drummer Street	R	Yes	35	32	31	25	28
DT10 – Gilbert Road	R	No	21	21	22	21	20
DT15 – Hills Road	K	Yes	37	35	36	31	-
DT16 – Regent Street	R	Yes	33	34	30	29	27
DT18 – Pembroke Road	R	Yes	43	39	36	34	30
DT19 – Huntingdon Road 2 *	R	No	23	27	23	21	20
DT21 – Victoria Road	R	Yes	33	30	28	25	24
DT22 – Madingley Road *	K	No	40	38	37	33	30

ID	Site Type	Within AQMA	Annual Mean (µg/m ³)				
			2014	2015	2016	2017	2018
DT23 – Huntingdon Road 1 *	R	No	25	24	23	19	17
DT24 – Histon Road. 1	K	No	32	35	29	29	24
DT25 – Barton Road	R	No	20	22	22	19	19
DT26 – Fen Causeway	R	Yes	24	23	22	19	19
DT30 – Arbury Road	K	No	21	20	19	18	17
DT31 – Newnham Road *	R	Yes	44	42	33	31	31
DT33 – Victoria Avenue	R	Yes	40	38	37	35	35
DT34 – Parker Street	R	Yes	40	39	39	32	33
DT38 – Chesterton Road	R	Yes	26	26	26	23	21
DT39 – Maids Causeway	K	Yes	33	34	32	28	30
DT40 – Emmanuel Road	R	Yes	40	42	39	33	34
DT41 – Downing Street	R	Yes	38	34	36	28	31
DT42 – Trumpington Street	R	Yes	26	26	27	24	20
DT43 – Lensfield Road	R	Yes	34	34	36	32	29
DT44 – Park Terrace	R	Yes	30	30	31	23	20
DT45 – St Andrew's Street	UC	Yes	42	40	37	33	33
DT46 - Parkside	K	Yes	25	23	25	23	23
DT47/48/49 – Gonville Place (triplicate)	R	Yes	37	36	35	31	31
DT64 – Park Street	R	Yes	-	-	-	-	24
South Cambridgeshire District Council Automatic Monitors							
GIRT – Girton *	R	No	25	24	23	23	18
IMP – Impington (A14)	R	Yes	23	22	23	23	19
ORCH – Orchard Park Primary School (A14)	UB	Yes	19	18	18	18	14
South Cambridgeshire District Council Diffusion Tubes							
DT1 – 1 Coppice, Histon	UB	No	19	17	21	17	15
DT10 – 3 Garner Close, Milton	UB	Yes	31	26	26	26	26 ^a
DT12 – Heath House, A505, Thriplow	UB	Yes	21	18	19	19	15
DT15 – 72 Cambridge Road, Impington	UB	Yes	22	20	20	19	18
DT18 – 1 Catchall Farm Cottages, A14	R	Yes	25	22	24	26	33 ^a
DT20 – Chieftain Way, Orchard Park	R	Yes	22	18	23	18	23
DT21 – Neal Drive, Orchard Park	R	Yes	21	18	21	19	17
DT22 – Flack End, Orchard Park	R	Yes	24	21	22	21	18

ID	Site Type	Within AQMA	Annual Mean ($\mu\text{g}/\text{m}^3$)				
			2014	2015	2016	2017	2018
DT23A – Orchard Park School	UB	Yes	20	17	18	17	16
DT23B – Orchard Park School	UB	Yes	20	17	18	16	17
DT23C - Orchard Park School	UB	Yes	19	18	17	16	16
DT27 – Urban Background	UB	Yes	24	21	22	21	18
Objective			40 $\mu\text{g}/\text{m}^3$				
Exceedances of the objective in bold							
^a Low data capture K=Kerbside; R= Roadside; UB= Urban Background; UC=Urban Centre *Used for model verification Monitoring data for Cambridge City Council obtained from the 2019 Air Quality Annual Status Report ³⁵ . Monitoring data for South Cambridgeshire District Council obtained from the 2019 Air Quality Annual Status Report ³⁶ .							

Table 7.14 Measured hourly mean NO₂ concentrations (2014 – 2018)

ID	Number of Hours >200 $\mu\text{g}/\text{m}^3$				
	2014	2015	2016	2017	2018
Cambridge City Council					
CM1 – Gonville Place	0	2	0	0	0
CM4 – Parker Street	0	0	0	0	0
CM5 – Regent Street	0	0	0	0	0
South Cambridgeshire District Council					
IMP	0	0	0	0	0
ORCH	0	0	0	0	0
GIRT	0	0	0	0	0
Objective		18 days (200 $\mu\text{g}/\text{m}^3$)			
Exceedances of the objective in bold					
Monitoring data for Cambridge City Council obtained from the 2019 Air Quality Annual Status Report ³⁵ . Monitoring data for South Cambridgeshire District Council obtained from the 2019 Air Quality Annual Status Report ³⁶ .					

7.4.3 The measured annual mean concentrations at the closest monitoring location to the site (Figure 7.2 and Figure 7.3), Cambridge City Council DT22 approximately 510m east, have been below the objective since 2014. There have been no exceedances of the annual mean objective at any of the monitoring sites detailed in Table 7.13, since 2016. Furthermore, there have been no exceedances of the hourly mean objective at monitoring sites detailed in Table 7.14 between 2014 – 2018. Monitored concentrations generally appear to be on a declining trend, with annual mean NO₂ concentrations at the majority of monitoring sites in Cambridge City Council and South Cambridgeshire District Council in 2018 being lower than those in 2014.

7.4.4 More recent 2019 monitoring data³⁷ indicates broadly stable concentrations and continuation of the small downward trend at almost all monitoring locations and there have now been no exceedances of the annual mean objective at any of the monitoring sites detailed in Table 7.13, since 2016.

PM₁₀

Table 7.15 Measured annual mean PM₁₀ concentrations (2014 – 2018)

ID	Annual Mean ($\mu\text{g}/\text{m}^3$)				
	2014	2015	2016	2017	2018
Cambridge City Council					
CM1 – Gonville Place	19	21	20	18	19
CM4 – Parker Street	22	23	22	21	23
South Cambridgeshire District Council					
IMP	22	18	17	16	17
ORCH	22	16	16	14	14
GIRT	16	11	17	17	17
Objective		40 $\mu\text{g}/\text{m}^3$			
Exceedances of the objective in bold					
Monitoring data for Cambridge City Council obtained from the 2019 Air Quality Annual Status Report ³⁵ . Monitoring data for South Cambridgeshire District Council obtained from the 2019 Air Quality Annual Status Report ³⁶ .					

Table 7.16 Measured 24-hour mean PM₁₀ concentrations (2014 – 2018)

ID	Number of Days >50 $\mu\text{g}/\text{m}^3$				
	2014	2015	2016	2017	2018
Cambridge City Council					
CM1 – Gonville Place	5	2	1	3	1
CM4 – Parker Street	5	4	4	4	1
South Cambridgeshire District Council					
IMP	4	2	1	2	1
ORCH	7	1	1	1	1

³⁵ Cambridge City Council (2019). '2019 Air Quality Annual Status Report'. Cambridge, UK

³⁶ South Cambridgeshire District Council (2019). '2019 Air Quality Annual Status Report'. South Cambridgeshire, UK

³⁷ Cambridge City Council (2020). '2020 Air Quality Annual Status Report'. Cambridge, UK

ID	Number of Days >50 µg/m ³				
	2014	2015	2016	2017	2018
GIRT	2	1	1	1	1
Objective	35 days (50 µg/m ³)				
Exceedances of the objective in bold Monitoring data for Cambridge City Council obtained from the 2019 Air Quality Annual Status Report ³⁵ . Monitoring data for South Cambridgeshire District Council obtained from the 2019 Air Quality Annual Status Report ³⁶ .					

PM_{2.5}

Table 7.17 Measured annual mean PM_{2.5} concentrations (2014 – 2018)

ID	Annual Mean (µg/m ³)				
	2014	2015	2016	2017	2018
Cambridge City Council					
CM1	17	15	15	15	15
South Cambridgeshire District Council					
GIRT	12	11	13	11	11
Objective	25 µg/m ³				
Exceedances of the objective in bold Monitoring data for Cambridge City Council obtained from the 2019 Air Quality Annual Status Report ³⁵ . Monitoring data for South Cambridgeshire District Council obtained from the 2019 Air Quality Annual Status Report ³⁶ .					

7.4.5 There have been no exceedances of the annual or 24-hour mean PM₁₀ objectives, or the annual mean PM_{2.5} objective between 2014-2018.

Background Concentrations

7.4.6 In addition to these measured concentrations, estimated background concentrations for the Site and Madingley Wood SSSI have been obtained from the national maps provided by Defra for the years 2018, 2021 and 2025 and shown in Table 7.18 below.

Table 7.18 Estimated annual mean background concentrations

Year	Grid Ref	Annual Mean (µg/m ³)			
		NO _x	NO ₂	PM ₁₀	PM _{2.5}
2018	540_259 ^a	12.8	9.6	15.5	9.7
	540_262 ^b	21.0	15.1	18.8	11.1
	541_258 ^c	16.7	12.2	16.9	10.4
	541_259 ^d	13.6	10.1	15.6	9.8
	541_261 ^e	24.4	17.3	17.6	10.9
	542_259 ^f	18.8	13.6	17.0	10.7
	542_258 ^g	16.3	11.9	17.2	10.4

Year	Grid Ref	Annual Mean (µg/m ³)			
		NO _x	NO ₂	PM ₁₀	PM _{2.5}
2021	542_260 ^h	17.3	12.6	16.7	10.4
	542_261 ⁱ	21.9	15.6	17.3	10.9
	543_259 ^j	17.3	12.5	15.6	10.0
	543_260 ^k	15.9	11.7	15.6	10.0
	544_257 ^l	17.1	12.4	14.8	9.7
	544_258 ^m	20.9	14.7	14.7	9.7
	544_259 ⁿ	22.1	15.6	15.4	10.3
	540_259 ^a	11.2	8.4	14.9	9.2
	540_262 ^b	17.4	12.8	18.3	10.6
	541_258 ^c	14.3	10.6	16.3	10.0
	541_259 ^d	11.8	8.8	15.1	9.4
	541_261 ^e	20.3	14.7	17.0	10.4
	542_259 ^f	15.9	11.7	16.5	10.2
	542_258 ^g	14.0	10.4	16.6	10.0
542_260 ^h	14.8	11.0	16.1	9.9	
542_261 ⁱ	18.5	13.5	16.7	10.4	
543_259 ^j	14.9	11.0	15.0	9.5	
543_260 ^k	13.8	10.3	15.0	9.5	
544_257 ^l	15.0	11.0	14.2	9.3	
544_258 ^m	18.4	13.2	14.1	9.2	
544_259 ⁿ	19.4	13.9	14.8	9.8	
2025	540_259 ^a	9.6	7.3	14.3	8.7
	540_262 ^b	14.2	10.5	17.7	10.1
	541_258 ^c	11.8	8.9	15.7	9.4
	541_259 ^d	10.0	7.6	14.5	8.8
	541_261 ^e	16.4	12.1	16.4	9.9
	542_259 ^f	13.1	9.8	15.9	9.7
	542_258 ^g	11.7	8.8	16.0	9.4
	542_260 ^h	12.4	9.3	15.5	9.4
	542_261 ⁱ	15.2	11.3	16.1	9.9
	543_259 ^j	12.6	9.4	14.4	9.0
	543_260 ^k	11.8	8.8	14.4	9.0
	544_257 ^l	12.9	9.6	13.6	8.8

Year	Grid Ref	Annual Mean ($\mu\text{g}/\text{m}^3$)			
		NO _x	NO ₂	PM ₁₀	PM _{2.5}
	544_258 ^m	16.1	11.7	13.5	8.7
	544_259 ⁿ	16.7	12.1	14.2	9.3
Objectives		30*	40	40	25
^a R32, R33 and Madingley Wood SSSI; ^b R1; ^c R30; ^d R29 and R30; ^e R2; ^f R22, R23, R24, R25, R26, R27 and R28; ^g Development Site; ^h R6, R7, R8 and monitoring site South Cambridgeshire District Council GIRT; ⁱ R3, R4 and R5; ^j R10, R11, R18, R19, R20, monitoring site Cambridge City Council DT22 and DT23; ^k R9 and monitoring site Cambridge City Council DT19; ^l R15 and monitoring site Cambridge City Council DT31; ^m R13 and R14; ⁿ R12, R14, R16, R17 and monitoring sites Cambridge City Council DT4. * Only relevant to ecological receptors.					

7.4.7 Background concentrations for human receptors and within the SSSI are well below the relevant objectives for the years 2018, 2021 and 2025.

Designated sites

7.4.8 The three-year average (2015 – 2017) nitrogen and acid deposition rates for Madingley Wood SSSI are presented in Table 7.19; data has been taken from the APIS website²¹. The APIS website does not include future year predictions and therefore on a conservative basis, the APIS baseline is assumed constant for the future year assessments.

Table 7.19 Baseline deposition rates

Habitat	Nitrogen Deposition (kgN/ha/yr)	Acid Deposition	
		(keqN/ha/yr)	(keqS/ha/yr)
Madingley Wood SSSI			
Broadleaved, Mixed and Yew Woodland	29.1	2.1	0.23
Critical Load	15	10.86	10.65
Exceedances of the Critical Load highlighted in bold			

7.4.9 The baseline nitrogen deposition for the habitat exceeds the minimum critical load of 15 kgN/ha/yr. The baseline acid deposition rates are below the relevant critical loads.

Predicted baseline concentrations

Human receptors

7.4.10 The ADMS- Roads model has been run to predict NO₂, PM₁₀ and PM_{2.5} concentrations at each of the existing receptor locations identified in Appendix 11.1. The results for the baseline scenarios for the 2018, 'Key Phase 1' and 'Full Development' scenarios are presented in Appendix 11.5.

7.4.11 Predicted concentrations of NO₂, PM₁₀ and PM_{2.5} are not predicted to exceed the relevant air quality objectives at any of the existing receptor locations in any of the baseline scenarios.

Ecological receptors

7.4.12 Predicted concentrations and deposition rates for the baseline scenarios are contained in Appendix 11.5 for the 2018, 'Key Phase 1' and 'Full Development' scenarios.

Baseline year 2018

7.4.13 For Transect T1 within the Broadleaved, Mixed and Yew Woodland habitat, the NO_x critical level is predicted to be exceeded from 0m up to 5m from the road. The nitrogen deposition critical load is predicted to be exceeded at all distances (from 0m up to 200m) from the road, due to a high baseline deposition rate (Table 7.19). There are no exceedances of the acid deposition critical load within the habitat.

Baseline - Key Phase 1 Scenario

7.4.14 The NO_x critical level is predicted to be exceeded only at 0m from the road. The nitrogen deposition critical load is predicted to be exceeded at all distances (from 0m up to 200 m) from the road. There are no exceedances of the acid deposition critical load within the habitat.

Baseline - Full Development scenario

7.4.15 The NO_x critical level or acid deposition critical load is not predicted to be exceeded at any distance from the road. The nitrogen deposition critical loads are predicted to be exceeded at all distances (from 0m up to 200 m) from the road.

7.5 Impact assessment

Construction

7.5.1 Construction phase effects are shown in Table 7.20.

Table 7.20 Construction phase effects

Baseline		Impact assessment				
Receptor	Value / sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
Area Sensitivity for Human receptors within 50m of the site boundary	Medium	<p>The main potential effects during construction are dust deposition and elevated PM₁₀ concentrations. The following activities have the potential to cause emissions of dust:</p> <ul style="list-style-type: none"> • Site preparation including delivery of construction material, erection of fences and barriers; • Demolition of existing buildings on Site; • Earthworks including digging foundations and landscaping; • Materials handling such as storage of material in stockpiles and spillage; • Construction and fabrication of units; and • Disposal of waste materials off-Site. 	<p>Mitigation measures specified in the IAQM guidance for a medium risk site will be implemented during construction. The measures relate to specific works activities including:</p> <ul style="list-style-type: none"> • Communication; • Management; • Earthworks; • Demolition; • Construction; and • Trackout. 	Negligible	<p>Typically the main cause of unmitigated dust generation on construction sites is from demolition and vehicles using unpaved haul roads, and off-Site from the suspension of dust from mud deposited on local roads by construction traffic. The main determinants of unmitigated dust annoyance are the weather and the distance to the nearest receptor.</p> <ul style="list-style-type: none"> • Based on the IAQM criteria (Table 7.7), the dust emission magnitude for the phases of construction are as follows: • For demolition activities, the potential dust emission magnitude is medium given the scale and nature of existing on-site structures. • For earthworks, the emissions magnitude is classified as large given the size of the site, activities involved and soil type. • For construction activities, the dust emission magnitude is considered to be large due to the volume of buildings to be constructed. • For trackout, the dust emission magnitude is considered to be large due to the length of potential haul roads, and as there are anticipated to be between 10-50 HGVs out/day. <p>The study area is considered to be of medium sensitivity to potential dust impacts as there are more than 10 residential properties located within 50m of the site (Table 7.8). The study area is considered to be of low sensitivity to potential PM₁₀ impacts due to the low baseline PM₁₀ concentrations in the area (Table 7.15-7.16 and Table 7.18).</p> <p>The overall risk of dust impacts for demolition, earthworks and construction is classified as medium, and for trackout it is classified as low.</p> <p>Appropriate mitigation corresponding to a medium risk site is therefore required during the construction phases of the proposed development. With appropriate mitigation in place the construction phase effects are described as not significant.</p>	Negligible Not significant
Madingley Wood SSSI	Negligible		None required	Negligible	Madingley Wood SSSI is located more than 350m away from the Site. Therefore, construction phase impacts on the SSSI are very unlikely to occur and will not be significant.	Negligible Not significant

Operation

7.5.2 Table 7.21 below provides a summary of the operation phase effects for the proposed development.

Table 7.21 Operational phase effects

Baseline		Impact assessment				
Receptor	Value / sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
Human Receptors off-site	High	Increase in road traffic emissions leading to increased NO ₂ , PM ₁₀ and PM _{2.5} concentrations	Whilst impacts are classified 'not significant' a wide range of mitigation measures are proposed as detailed in the Air Quality Mitigation Statement, Appendix 11.10.	Negligible – slight adverse	<p>Predicted concentrations of NO₂, PM₁₀ and PM_{2.5} at the modelled existing receptor locations in the 'Key Phase 1' and 'Full Development' scenarios, both without and with the Proposed Development in place are presented in Appendix 11.6.</p> <p>Key Phase 1 scenario</p> <p>For the Key Phase 1 scenario, without and with the development in place, NO₂, PM₁₀ and PM_{2.5} concentrations are not predicted to exceed the air quality strategy objectives at any of the modelled receptor locations.</p> <p>The changes in annual mean concentrations are presented in Appendix 11.6. The changes in annual mean NO₂ concentrations range from 0% (i.e. less than 0.5%) to 3% of the objective when rounded to the nearest whole number. The changes in annual mean PM₁₀ and PM_{2.5} concentrations range from 0% to 1% when rounded to the nearest whole number. Using the criteria set out in Table 7.10, the impact on annual mean NO₂ concentrations are described as negligible at the majority of the receptor locations, except for R15 where the impact is described as slight adverse. The impacts on annual mean PM₁₀ and PM_{2.5} concentrations are described as negligible at all modelled receptor locations.</p> <p>Considering the criteria set out in Paragraph 7.3.27, in particular the conservative nature of the modelling by applying 2021 emission factors and background concentrations when only a small proportion of Key Phase 1 could be operational by then, and the higher NOX emission rates (due under-estimated EV uptake) applied by EFTv9, the air quality effects of road traffic associated with the Key Phase 1 development are considered to be not significant and there are no predicted exceedances of the relevant objectives.</p> <p>Full development scenario</p> <p>In the Full Development scenario, without and with the full development in place, NO₂, PM₁₀ and PM_{2.5} concentrations are not predicted to exceed the air quality strategy objectives at any of the modelled receptor locations.</p> <p>The changes in annual mean concentrations are presented in Appendix 7.6. The changes in annual mean NO₂ concentrations range from 0% (i.e. less than 0.5%) to 5% of the objective when rounded to the nearest whole number. The changes in annual mean PM₁₀ and PM_{2.5} concentrations range from 0% to 1% when rounded to the nearest whole number. Using the criteria set out in Table 7.10, the impacts on annual mean NO₂, PM₁₀ and PM_{2.5} concentrations are described as negligible at all modelled receptor locations.</p> <p>Considering the criteria set out in Paragraph 7.3.27, in particular the conservative nature of the modelling by applying 2025 emission factors and background concentrations, and the higher NOX emission rates (due under-estimated EV uptake) applied by EFTv9, the air quality effects of road traffic associated with the full development are considered to be not significant and there are no predicted exceedances of the relevant objectives.</p> <p>Full development including transport mitigation scenario</p> <p>The changes in annual mean concentrations resulting from the proposed development (including transport mitigation as detailed in Chapter 6) are presented in Appendix 7.6. The changes in annual mean NO₂ concentrations range from 0% (i.e. less than 0.5%) to 3% of the objective when rounded to the nearest whole number. The changes in annual mean PM₁₀ and PM_{2.5} concentrations range from 0% to 1% when rounded to the nearest whole number. Using the criteria set out in Table 7.10, the impacts on annual mean NO₂, PM₁₀ and PM_{2.5} concentrations are described as negligible at all modelled receptor locations.</p> <p>Considering the criteria set out in Paragraph 7.3.27, in particular the conservative nature of the modelling by applying 2025 emission factors and background concentrations and the higher NOX emission rates (due under-estimated EV uptake) applied by EFTv9, the air quality effects of road traffic associated with the Full Development scenario (including transport mitigation) are considered to be not significant and there are no predicted exceedances of the relevant objectives.</p>	Negligible Not significant

Baseline		Impact assessment				
Receptor	Value / sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
Human Receptors off-site and on-site	High	Energy Centre emissions leading to elevated NO ₂ concentrations	Whilst impacts are classified 'not significant' a wide range of mitigation measures are proposed as detailed in the Air Quality Mitigation Statement, Appendix 11.10.	Negligible - slight adverse	<p>Predicted concentrations from the energy centre emissions are presented in Appendix 11.8. The significance of the impacts has been judged in accordance with the IAQM/EPUK criteria.</p> <p>There are no predicted exceedances of the air quality strategy objectives as a result of emissions from the energy centre. The maximum change in annual mean NO₂ concentrations is 0.8 µg/m³ (1.9% of the air quality objective) which occurs at receptor R26_N1. The maximum change in hourly NO₂ concentrations is 49.7 µg/m³ (24.9% of the air quality objective) which occurs at on-site receptor 1A. When considered in conjunction with the baseline concentrations, the maximum annual mean impact at the worst-case receptor is described as negligible. The maximum hourly impact at the worst-case receptor is described as slight adverse.</p> <p>Given that there are no exceedances of air quality strategy objectives the effect of the energy centre emissions is considered to be not significant.</p> <p>Contour plots of the predicted annual average and 1-hour average NO₂ concentrations at elevations of 1.5m and 22.5m are shown in Figures 7.4 to 7.7 to demonstrate the effect of buildings on the dispersion; only the results at the specific receptor sites are relevant for the assessment.</p>	Negligible Not significant
Human Receptors off-site and on-site	High	Combined Road Traffic and Energy Centre emissions leading to elevated NO ₂ concentrations	Whilst impacts are classified 'not significant' a wide range of mitigation measures are proposed as detailed in the Air Quality Mitigation Statement, Appendix 11.10.	Negligible - slight adverse	The predicted environmental concentrations in Appendix 11.8 for the energy centre include the contribution from the road traffic in the baseline concentration. Given that there are no exceedances of air quality strategy objectives the combined effect of the energy centre and road traffic emissions is considered to be not significant.	Negligible Not significant
Human Receptors on-site	High	Emissions from on-site laboratories	Additional abatement may be required.	Negligible	Process abatement will be designed to ensure environmental concentrations do not breach environmental assessment levels specific to the chemical species being released. This will be undertaken during the detailed design stage of the specific laboratory building.	Negligible Not significant

Baseline		Impact assessment				
Receptor	Value / sensitivity	Impact	Mitigation measure	Impact magnitude	Residual effect	Significance of effect
Madingley Wood SSSI	High	Road traffic emissions leading to elevated NO _x concentrations and Nitrogen / Acid Deposition	Not required	Negligible	<p>Predicted concentrations and deposition rates without and with the proposed development in place in 2021 and 2031 are contained in Appendix 11.7.</p> <p>Key Phase 1 scenario</p> <p>The NO_x critical level is predicted to be exceeded only at the kerb of the road (0m) without or with the Key Phase 1 development in place. The increase in NO_x concentrations is only 1.3% of the critical level at the kerb of the road, and therefore the increase in NO_x concentrations is considered unlikely to have a significant effect. The nitrogen deposition critical load is predicted to be exceeded at all of the receptor locations within the habitat for the Key Phase 1 scenario. There are no exceedances of the acid deposition critical load in the habitat for the Key Phase 1 scenario without or with the Development in place. The increase in nitrogen and acid deposition due to development traffic is less than 1% and therefore not significant.</p> <p>Full development scenario</p> <p>The NO_x critical level is not predicted to be exceeded without or with the Full Development in place. The nitrogen deposition critical load is predicted to be exceeded at all of the receptor locations within the habitat for the Full Development Scenario. There are no exceedances of the acid deposition critical load in the habitat in 2031 for the Full Development Scenario without or with the Development in place. The increase in nitrogen and acid deposition due to development traffic is less than 1% and therefore not significant.</p>	Negligible Not significant

7.6 Mitigation measures

Construction

7.6.1 Because of the uncertainty around construction works the mitigation measures listed in this section are intended to be a starting point based on the assumptions used for the impact assessment and the subsequently predicted effects. The mitigation measures are those specified in the IAQM guidance for a medium risk site and will be appropriately implemented during construction. The CEMP will specify which works activities will be subject to which specific mitigation measures.

Communication

- Develop and implement a stakeholder communications plan.
- Display the name and contact details of persons accountable on the site boundary.
- Display the head or regional office information on the site boundary.

Management

- Develop and implement a dust management plan.
- Record all dust and air quality complaints, identify causes and take measures to reduce emissions.
- Record exceptional incidents and action taken to resolve the situation.
- Carry out regular site inspections to monitor compliance with the dust management plan and record results.
- Increase site inspection frequency during prolonged dry or windy conditions and when activities with high dust potential are being undertaken.
- Agree dust monitoring locations with the local authority and instigate monitoring 3 months in advance of works commencing in the area.

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as possible.
- Erect solid screens or barriers around dusty activities or the site boundary at least as high as any stockpile on site.
- Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.
- Avoid site run off of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove potentially dusty materials from site as soon as possible.
- Cover, seed or fence stockpiles to prevent wind whipping.
- Ensure all vehicles switch off engines when stationary.
- Avoid the use of diesel or petrol powered generators where possible.
- Produce a Construction Logistics Plan to manage the delivery of goods and materials.
- Only use cutting, grinding and sawing equipment with dust suppression equipment.
- Ensure an adequate supply of water on site for dust suppressant.
- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use water sprays on such equipment where appropriate.
- Ensure equipment is readily available on site to clean up spillages of dry materials.
- No on-site bonfires and burning of waste materials on site.

Earthworks

- Re-vegetate earthworks and exposed areas /soil stockpiles to stabilise surfaces as soon as practicable.

- Only remove the cover in small areas during work and not all at once.

Demolition

- Incorporate soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).
- Ensure water suppression is used during demolition operation.
- Avoid explosive blasting, using appropriate manual and mechanical alternatives.
- Bag and remove any biological debris or damp down such material before demolition.

Construction

- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless required for a particular process.
- Ensure bulk cement and other fine powder materials are delivered in enclosed tanker sand stored silos with suitable emissions control systems.

Trackout

- Use water assisted dust sweepers on the site access and local roads.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving the site are covered to prevent escape of materials.
- Record inspection of on-site haul routes and any subsequent action, repairing as soon as reasonably practicable.
- Install hard surfaced haul routes which are regularly damped down.
- Install a wheel wash with a hard-surfaced road to the site exit where site layout permits.
- The site access gate to be located at least 10m from receptors where possible.

Operation

- 7.6.2 The effects of the development on local air quality are judged to be not significant however a wide range of mitigation measures are proposed as detailed in the Air Quality Mitigation Statement, Appendix 11.10.
- 7.6.3 In particular, a fully-funded Framework Travel Plan has been submitted in support of this application. It sets out a wide-ranging series of measures to maximise movement by all non-car modes of travel to the development. It will be reviewed and approved by the Joint Authorities and delivered in an agreed manner.
- 7.6.4 The transport mitigation measures have been incorporated into the traffic flows for the 'Full Development with transport mitigation scenario' – results for which are discussed in Table 7.21 and presented in Tables 11.6.1 – 11.6.2, Appendix 11.6. The results show that the transport mitigation measures reduce the impact of the proposed development at all modelled receptor locations when compared to the 'Full Development scenario' with no transport mitigation (Tables 11.6.4 – 11.6.6, Appendix 11.6).
- 7.6.5 The design of the development incorporates appropriate separation distances between sources of pollution and residential receptor locations. There are no residential receptors alongside Madingley Road and the centralised energy centre is located on the west side of the development, well away from the nursery and student accommodation.

7.6.6 Combustion equipment installed as part of the energy centre will be gas-fired and therefore there will be no significant particulate emissions. NO_x emissions will comply with the requirements of the Medium Combustion Plant Directive which is designed to limit emissions from combustion equipment in the size range proposed.

7.6.7 An appropriate number of electric vehicle (EV) charging stations will be provided to cater for both all-day parking slow charging as well as the fast charging points which may be more attractive for visitors, pool vehicles, Car Clubs and taxis. The number of EV charging points will be periodically reviewed so that the provision matches demand.

7.6.8 As part of the Sustainability objectives for the development, the aim is to incorporate at least two exemplar sustainable University buildings as part of the masterplan. The aim to achieve BREEAM Outstanding or equivalent for each of the exemplar buildings. All other buildings will have to demonstrate why Outstanding is not viable and will have to achieve BREEAM Excellent as a minimum.

7.7 Summary

7.7.1 Concentrations of NO₂, PM₁₀ and PM_{2.5} have been predicted for a number of worst-case locations representing existing properties adjacent to the road network. Predicted concentrations are below the relevant air quality objectives at all of the existing receptor locations for the Key Phase 1 and Full Development scenarios with the proposed development in place. A wide range of mitigation measures are proposed as detailed in the Air Quality Mitigation Statement, Appendix 11.10. The increase in NO_x concentrations, nitrogen and acid deposition is considered unlikely to have a significant effect on the integrity on the Madingley Wood SSSI.

7.7.2 Modelling of the emissions from the energy centre have shown that a flue height of 8m above building parameter plan height is sufficient to disperse emissions without leading to exceedances of air quality objectives.

7.7.3 The operational effects of the proposed development are judged to be negligible and not significant.

8. Noise and vibration

8.1 Introduction

8.1.1 This chapter replaces the noise and vibration assessment in the original submitted ES (Chapter 12), and subsequent ES Addendum, to show the changes resulting from the amended Proposed Development. Due to the time that has elapsed since submission of the ES in June 2016, the baseline information needs to be validated to ensure that the conclusions of the ES remain valid. New environmental sound surveys have been undertaken and the results of these surveys have been used to update the baseline conditions section.

8.1.2 Following engagement with the Cambridge City Council Environmental Health Officer (EHO), assessments have been undertaken to identify noise impacts from the access route onto Clerk Maxwell Road and the overall change in noise levels based on the updated traffic data and the results of the latest environmental sound survey.

8.2 Relevant legislation and policy

The Control of Pollution Act 1974

8.2.1 The Control of Pollution Act 1974 (COPA) Section 61, sets out procedures for contractors to obtain 'Prior Consent' for demolition and construction works within agreed noise limits.

8.2.2 The provisions set out in COPA include that prior to the start of demolition and construction, an assessment of demolition and construction noise impacts taking account of the methods of working is undertaken. Applications for prior consent would be made to the local authority. These would contain a method statement of the proposed works and the steps that would be taken to minimise and mitigate noise to acceptable levels and time periods during the whole construction period.

8.2.3 Sections 60 and 61 describe the process that developers and local authorities will be required to perform to gain permission for potentially noisy construction works.

8.2.4 Using COPA, local authorities may impose limitations on working hours, plant and machinery used, and noise levels emitted from sites.

The Environmental Protection Act 1990

8.2.5 Under Part III of the Environmental Protection Act 1990, local authorities have a duty to investigate noise complaints from premises (land and buildings) and vehicles, machinery or equipment in the street. This includes noise arising from construction sites.

8.2.6 If the EHO from the local authority is satisfied that the problem complained about amounts to a statutory nuisance, then the authority must serve an abatement notice on the person responsible or in certain cases the owner or occupier of the property. The notice could require that the noise or nuisance must be stopped altogether or limited to certain times of the day.

8.2.7 The assessments have been undertaken in accordance with current national policy including the NPPF, the Noise Policy Statement for England (NPSE) and the PPG for Noise.

National Planning Policy Framework 2019

8.2.8 Paragraph 170 states that in relation to conserving and enhancing the natural environment:

- "Planning policies and decisions should contribute to and enhance the natural and local environment by...
 - preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of ... noise pollution..."

8.2.9 In relation to ground conditions and pollution, paragraph 180 states that:

- "Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:
 - mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and quality of life;
 - Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason..."

8.2.10 In relation to the integration of new development with existing premises and community facilities, paragraph 182 states that:

- "Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed."

8.2.11 The NPPF indicates that the NPSE should be used to define the "significant adverse impacts".

Noise Policy Statement for England 2010

8.2.12 The NPSE sets out the long-term vision of Government noise policy:

- "To promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development."

8.2.13 The NPSE clarifies that noise should not be considered in isolation of the wider benefits of a scheme or development, and that the intention is to minimise noise and noise effects as far as is reasonably practicable having regard to the underlying principles of sustainable development.

8.2.14 The first two aims of the NPSE follow established concepts from toxicology that are applied to noise impacts, for example, by the World Health Organisation. They are:

- NOEL – No Observed Effect Level - the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise; and
- LOAEL – Lowest Observed Adverse Effect Level - the level above which adverse effects on health and quality of life can be detected.

8.2.15 The NPSE extends these to the concept of a significant observed adverse effect level.

- SOAEL – Significant Observed Adverse Effect Level - The level above which significant adverse effects on health and quality of life occur.

National Planning Practice Framework 2019

8.2.16 The National PPG was launched on 6th March 2014 (latest update – July 2019) and provides additional guidance and interpretation to the Government’s strategic policies outlined within the NPPF in a regularly updated, web-based resource.

8.2.17 It states that “noise needs to be considered when developments may create additional noise, or would be sensitive to the prevailing acoustic environment” (Paragraph: 001 Reference ID: 30-001-20190722).

8.2.18 The PPG provides advice regarding how to determine the impact of noise, including whether or not a significant adverse effect or adverse effect “*is occurring or likely to occur*” and whether or not a “*good standard of amenity can be achieved*” (Paragraph: 003 Reference ID: 30-003-20190722).

8.2.19 It provides more descriptive detail for the definitions of NOEL, LOAEL and SOAEL but refrains from using numerical values. A summary of the advice is reproduced in Table 8.1. (Paragraph: 005 Reference ID: 30-005-20190722).

Table 8.1 Summary of Effect Levels

Perception	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level (NOEL)			
Not noticeable	No effect	No observed effect	No specific measures required
No Observed Adverse Effect Level (NOAEL)			
Noticeable and not intrusive	Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No observed adverse effect	No specific measures required
Lowest Observed Adverse Effect Level (LOAEL)			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; closing windows for some of the time because of the noise. Potential for non-awakening sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed adverse effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level (SOAEL)			

Perception	Examples of Outcomes	Increasing Effect Level	Action
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. having to keep windows closed most of the time, avoiding certain activities during periods of intrusion. Potential for sleep disturbance resulting in difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant observed adverse effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable adverse effect	Prevent

Cambridge Local Plan 2018

8.2.20 Cambridge Local Plan was released in October 2018.

- **Policy 35:** Protection of Human Health and Quality of Life from Noise and Vibration states: “Development will be permitted where it is demonstrated that:
 - It will not lead to significant adverse effects and impacts, including cumulative effects and construction phase impacts wherever applicable, on health and quality of life/amenity from noise and vibration; and
 - B. adverse noise effects/impacts can be minimised by appropriate reduction and/or mitigation measures secured through the use of conditions or planning obligations, as appropriate (prevention through high quality acoustic design is preferable to mitigation).”

8.3 Method of assessment

Environmental sound survey 2019

8.3.1 An unattended environmental sound survey was undertaken over a 24-hour period at a single location between Tuesday 22nd October 2019 and Wednesday 23rd October and a period of one week at two further locations from Tuesday 22nd October 2019 to Tuesday 29th October 2019 in order to determine the existing sound climate at the overall site and the closest local noise sensitive receptors.

8.3.2 The survey locations are described in Table 8.15 below and are also presented in Figure 8.2

Table 8.2 2019 Environmental Sound Survey Measurement Locations

Measurement Location	Description
LT2	The microphone was located on the north east corner of the site at the junction of Madingley Road and Clerk Maxwell Road. The microphone was located approximately 20m from each road at a height of approximately 1.5m from ground height.
LT3	The microphone was located to the south of the site approximately 15m to the west of the Forster Court residential building. The microphone was located approximately 1.5m above ground height.
LT4	The microphone was located towards the north of the site approximately 25m to the south of Madingley Road. The microphone was located approximately 1.5m above ground height

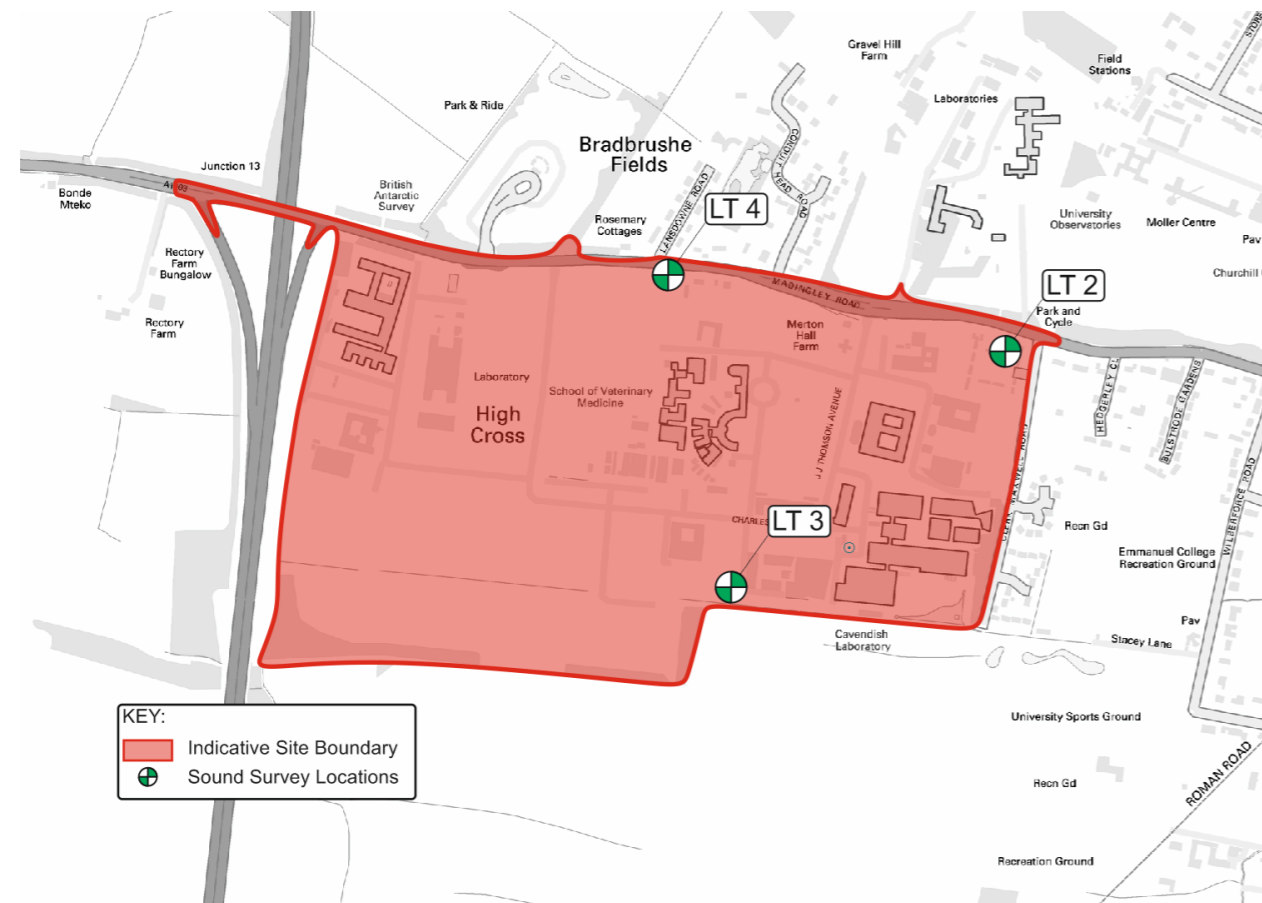


Figure 8.1 2019 Environmental Sound Survey Locations (Contains Ordnance Survey data © Crown Copyright and Database Right 2019)

Instrumentation

8.3.3 The instrumentation used in the Stantec environmental sound surveys is listed in **Table 8.16**. Field calibrations were performed before and after the measurements with no significant fluctuation recorded (< 0.5 dB). Calibration certificates are available upon request.

Table 8.3 Environmental Sound Survey Instrumentation

Description	Manufacturer	Type	Serial Number	Laboratory Calibration Date
Sound Level Meter	RION	NL-52	542902	05/01/2018
½" Pre-polarised microphone		UC-59	07374	05/01/2018
Pre-amplifier		NH-25	43580	05/01/2018
Sound Level Meter		NL-52	1043456	13/02/2019
½" Pre-polarised microphone		UC-59	7231	13/02/2019
Pre-amplifier		NH-25	43485	13/02/2019
Sound Level Meter		NL-52	542903	06/02/2019
½" Pre-polarised microphone		UC-59	06480	06/02/2019
Pre-amplifier		NH-25	42931	06/02/2019
Sound Calibrator		NC-74	34546655	30/08/2019

Meteorological conditions

8.3.4 Due to the nature of the survey (i.e. unattended), it is not possible to accurately comment on the weather conditions throughout the entire survey period. However, using historic weather data **Table 8.17** presents the average conditions during the survey period.

Table 8.4 Historic Weather Conditions During Survey Period

Date	Wind Speed (m/s ⁻¹)	Temperature (°C)	Precipitation (in)
22/10/2019	3	11	0
23/10/2019	1	11	0
24/10/2019	3	11	0
25/10/2019	6	13	0
26/10/2019	1	13	0.18
27/10/2019	3	7	0
28/10/2019	2	6	0
29/10/2019	3	7	0

Assumptions and Limitations

8.3.5 The engineer noticed nothing unusual in terms of the noise climate at the time of the survey, when setting up and collecting equipment. This report refers, within the limitations stated, to the environment of the site in the context of the surrounding area at the time of the inspections. Environmental conditions can vary and no warranty is given as to the possibility of changes in the environment of the site and surrounding area at differing times.

Noise sensitive receptors

8.3.6 Noise Sensitive Receptors (NSRs) are those aspects of the environment sensitive to changes in baseline conditions. The sensitivity of a particular receptor depends upon the extent to which it is susceptible to such changes.

8.3.7 Table 8.2 provides details of noise sensitive receptors identified in the vicinity of the site. Figure 8.1 details the approximate locations of the identified receptors along with a reference letter as defined in Table 8.2.

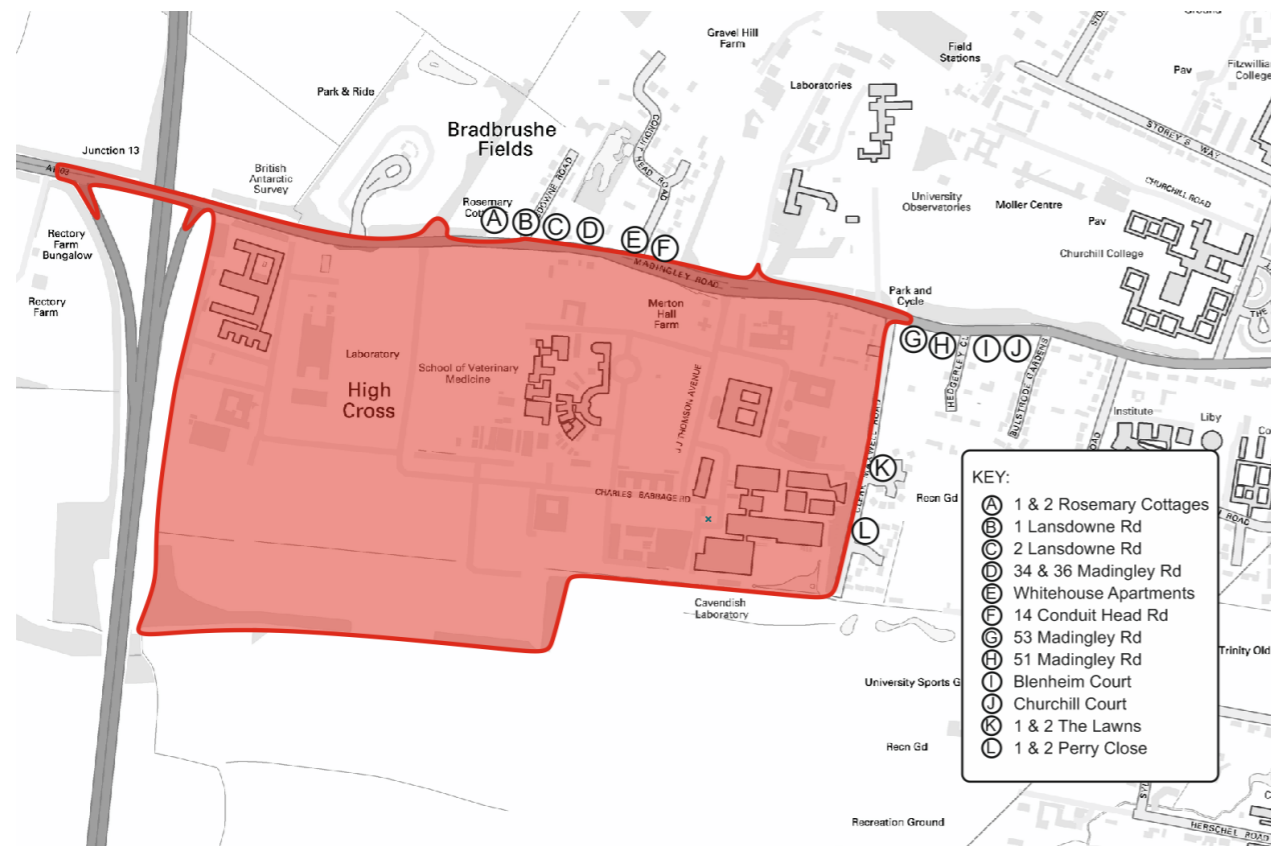


Figure 8.2 Noise Sensitive Receptors (Contains Ordnance Survey data © Crown Copyright and Database Right 2019)

Table 8.5 Noise sensitive receptors

Noise Sensitive Receptor	Figure Reference
1 + 2 Rosemary Cottages	A
1 Lansdowne Rd	B
2 Lansdowne Rd	C
34 + 36 Madingley Rd	D
Whitehouse Apartments	E
14 Conduit Head Rd	F
53 Madingley Rd	G
51 Madingley Rd	H
Blenheim Court	I
Churchill Court	J
1 + 2 The Lawns	K
1 + 2 Perry Close	L

Construction noise

8.3.8 The sound levels that are considered the LOELs and SOELs for construction noise are set out in Table 8.3. The LOELs are the “lower cut offs” identified in Appendix E of BS 5228 Part 1 and the SOELs are the levels identified that, if exceeded for “significant” periods of time (either continuously or sporadically), could result in “widespread community disturbance, or interfere with activities or sleep”.

Table 8.6 Construction noise adverse effect levels for permanent buildings

Day	Time (hours)	Averaging Period, T	Lowest Observed Adverse Effect Level LAeq,T (dB)	Significant Observed Adverse Effect Level LAeq,T (dB)
Mondays to Fridays	07:00 – 08:00	1 hour	60	70
	08:00 – 18:00	10 hours	65	75
	18:00 - 19:00	1 hour	60	70
	19:00 – 22:00	1 hour	55	65
Saturdays	07:00 - 08:00	1 hour	60	70
	08:00 - 13:00	5 hours	65	75
	13:00 - 14:00	1 hour	60	70
	14:00 – 22:00	1 hour	55	65
Sundays & Public Holidays	07:00 – 22:00	1 hour	55	65
Any night	22:00 – 07:00	1 hour	45	55

8.3.9 Table 8.7 presents the corresponding magnitude scale of impact for construction noise.

Table 8.7 Construction noise impact levels

Magnitude of impact	Description of construction noise
High	Daytime construction noise levels exceed the SOELs in Table 8.6 for a period of 10 or more days of working in any 15 consecutive days or for a total number of days exceeding 40 in any 6 consecutive months.
Medium	Daytime construction noise levels exceed the SOELs in Table 8.6 less than 10 days in any 15 consecutive days or for a total of days less than or equal to 40 in any 6 consecutive months.
Low	Daytime construction noise levels between the LOAEL and SOEL levels in Table 8.6.
Negligible	Daytime construction noise levels less than or equal to the LOAELs in Table 8.6.

8.3.10 Construction noise is likely to affect existing off-site and on-site receptors during all construction phases as well as any earlier completed construction phases.

8.3.11 It is noted that some of the older existing buildings on site will be demolished. Demolition of these buildings is likely to require breakers, crushers and site clearance. Any internal stripping out prior to demolition of the structure is unlikely to be a significant source of noise or vibration for nearby receptors.

- 8.3.12 The construction of new buildings is likely to include site levelling/clearance, ground excavation, concreting, piling, superstructure construction and external works such as road construction. The building construction phase and the servicing and fitting out of new buildings is not normally a significant source of noise or vibration for nearby receptors.
- 8.3.13 BS 5228 Part 1 provides typical construction plant noise levels in terms of L_{Aeq} at a distance of 10m from the source. The standard also provides calculation methods in order to predict the noise levels at a receptor with corrections for distance and ground attenuation, noise screening, reflections and the percentage on-time of an activity over the course of the assessment period.
- 8.3.14 An assessment of demolition and construction noise has been undertaken based on typical construction plant noise levels provided in BS 5228 Part 1. Prior to the production of specific details on the phasing and siting of construction activities, the BS 5228 data and calculation procedures have been used to derive indicative noise levels at selected distance bands from the construction site boundary. The assessment considers a worst case scenario without noise controls such as screening or operational constraints.

Construction vibration

- 8.3.15 The simplest approach to quantify vibration effects is to use the concept of peak particle velocity (PPV). BS 5228 Part 2 suggests that, for construction activities, it is considered more appropriate to provide guidance in terms of the PPV, since this parameter is likely to be more routinely measured based upon the more usual concerns over potential building damage.
- 8.3.16 Table 8.5 presents the impact levels for the human response to construction vibration as measured at the point of entry into the recipient in terms of PPV.

Table 8.8 Construction vibration impact levels for the human response to vibration

Magnitude of Impact	Adverse Effect Level	Peak Particle Velocity	Effect
High	SOAEL	10 mm/s	Vibration is likely to be intolerable for any more than a very brief exposure to this level.
Medium	LOAEL	1 mm/s	It is likely that vibration of this level in residential environments will cause complaint but can be tolerated if prior warning and explanation has been given to residents.
Low		0.3 mm/s	Vibration might just be perceptible in residential environments.
Negligible		0.14 mm/s	Vibration might just be perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.

- 8.3.17 BS 5228 Part 2 also provides guidance on the assessment of vulnerability of contents of buildings identifying that many types of equipment, activities and processes are often sensitive to levels of vibration below those levels that are perceptible to humans. Example criteria are provided in terms of root mean squared (RMS) particle velocity ($\mu\text{m/s}$) for a range of facilities and equipment, however, specific criteria should be established through investigation of the existing site conditions or through discussion with the receptor manufacturer, supplier or operator.

- 8.3.18 Construction vibration has been assessed using typical vibration level data and calculation methodology provided in BS 5228 Part 2

Operational road traffic noise

Assessment method

- 8.3.19 The impact of the Proposed Development on the noise climate in the surrounding areas is based in part on the change in noise levels at noise sensitive receptors due to a change in the volumes of road traffic generated by the Proposed Development.
- 8.3.20 The assessment of operational road traffic noise implements the noise prediction procedures as detailed in the Department of Transport and Welsh Office's 'The Calculation of Road Traffic Noise' (CRTN). The assessment compares the changes between the existing traffic noise levels and the potential future traffic noise levels at noise sensitive receptors.
- 8.3.21 The noise assessment utilises the 18-hour Average Annual Weekly Traffic flow (AAWT) information provided by the project transport consultant as presented in Appendix 12.1 and compares the baseline traffic flows against the predicted future traffic flows associated with the Proposed Development. Technical details regarding the updated flows are contained in the traffic and transport chapter.
- 8.3.22 It should be noted that this will include all committed developments in the local area.

Assessment criteria

- 8.3.23 The Design Manual for Roads and Bridges (DMRB) provides a magnitude scale of impact for the change in noise levels in the 'long-term' (future year). Assessment for the EIA uses long-term future year assessment criteria to assess the full and permanent effects of the Proposed Development. These are presented in Table 8.6 in terms of adverse effect levels.

Table 8.9 Operational road traffic noise impact levels

Magnitude of Impact	Adverse Effect Levels	Increase in $L_{A10,18h}$ Noise Levels due to Operational Road Traffic
High	SOAEL	10 dB
Medium		5 dB
Low	LOAEL	3 dB
Negligible		Less than 3 dB

Operational multi-storey car park noise impact assessment

Assessment method

- 8.3.24 A new multi-storey car park is proposed towards the north-east boundary of the site providing 450 car parking spaces. The proposed multi-story car park replaces an existing ground level car park.
- 8.3.25 The closest residential dwellings lie approximately 50m to the east of the site at 53 Madingley Road and approximately 150m to the south east of the proposed multi-storey car park at The Lawns of Clerk Maxwell Road. Sound levels associated with the car park movements and activities have been calculated at these receptors

- 8.3.26 Local trip generation for the proposed car park has been established based on calculations undertaken by the project transport consultant.
- 8.3.27 The AM and PM peak hours have been identified by the project transport consultants as 08:00 – 09:00 (AM) and 17:00 – 18:00 (PM).
- 8.3.28 Table 8.7 details the estimated AM peak hour and PM peak hour car movements associated with the proposed development.

Table 8.10 Proposed peak hour car movements

Time Period	Proposed Car Park (450 Spaces)	
	Arrive	Depart
AM Peak Hour 08:00-09:00	148	40
PM Peak Hour 17:00-18:00	36	130

- 8.3.29 Due to the nature of the proposals, it is anticipated that the key noise impact to existing noise sensitive receptors would be associated with changes in ambient noise levels due to additional vehicle movements and activities (i.e. door slams and switching engines on) during the operation of the proposed new car park. However, the assessment should take into consideration the historical use of the site as a car park, and therefore assess the change in noise levels based on the increases in car park movements due to the increased capacity against the ambient noise levels measured during the AM and PM peak hours.
- 8.3.30 Measurements of car movements associated with the car park have previously been undertaken. Activities measured included:
- Car driving in, maneuvering and stopping including occupant exiting the car and door slam;
 - Occupant getting in car, slamming door and driving away.
- 8.3.31 The likely noise impact of the car park operations has been assessed based on car arrival (including door slam) and car departure (including door slam). Sound levels used in the assessment for are provided in **Table 8.8**.

Table 8.11 Typical sound level associated with car park activity

Source	SEL at 3m (dB)
Car pass by and park	74
Engine starting and car pulling away	77

Assessment criteria

- 8.3.32 The assessment of vehicle related noise has been based upon the noise prediction methods detailed in CRTN.
- 8.3.33 Based on national planning requirements and relevant standards the following assessment criteria are proposed:

Table 8.12 NOEL, LOAEL and SOAEL for changes in ambient sound levels

Increasing Effect Level	Change in Ambient Sound Level Daytime Free-Field LAeq,16h (dB)	Comments
NOEL	0	No effect; not noticeable.
LOAEL	+3 dB	Noticeable and not intrusive. Unlikely to cause a change in attitude or behaviour. Generally, just noticeable.
SOAEL	+10 dB	Noticeable and disruptive. The noise causes a material change in behaviour and/or attitude.

Operational access route noise impact assessment

Assessment method

- 8.3.34 Servicing access is proposed at certain points along Clerk Maxwell Road. These are identified as I-J (North of Clerk Maxwell Road), K-L (mid-way down Clerk Maxwell Road) and M-N (South of Clerk Maxwell Road) on Parameter Plan: Access and Management.
- 8.3.35 An indicative assessment has been undertaken in general accordance with BS 4142:2014 to determine the likely noise impact associated with the use of Clerk Maxwell Road for deliveries, servicing and access.
- 8.3.36 As full details of the specific delivery and servicing activities are not available it has been assumed that activities generating noise along the proposed access road and at the nearest proposed building to the east of the site are likely to include the following: -
- Delivery vehicles arriving, parking and departing;
 - General loading activities (loading/unloading/movement of trolleys).
- 8.3.37 The specific sound level of the combined servicing operations has been calculated by considering each activity as an individual sound event and then combining them to obtain the specific sound level within a worst case one-hour period.
- 8.3.38 The assessment undertaken is based on 1 HGV movement in any worse case hour during a typical day as per the 'Servicing the East of the West Cambridge Site Note – AECOM dated 30/06/17'.
- 8.3.39 Table 8.10 details the activities associated with the servicing operations, the associated noise level and the number of activities taking place during a worst case 1-hour daytime period. As night-time deliveries are not anticipated; a night-time assessment has not been undertaken. Unless otherwise stated, sound levels are based on measurements from our in-house database.

Table 8.13 Noise levels associated with deliveries

Measurement Description	Sound Pressure Level SEL (dB)	Source Level Measurement Distance (metres)	Number of Events During 1-Hour Period (Daytime)
Lorry Arriving	68	1	1
Lorry door slam	83	1	1
Opening lorry shutter	76	1	1
Removing support bars	88	4	14
Moving roll cages inside lorry	93	3	14
Loading roll cages	94	1	14
Wheeling roll cages off into facility	97	1	14
Wheeling empty roll cages from inside the facility to outside	92	3	4
Loading empty roll cages onto lorry	95	1	14
Securing support bars	88	4	3
Closing lorry shutter	76	1	1
Door slam	83	1	1
Lorry Starting	89	1	1
Reversing Alarm	94	1	1
Lorry Driving Away	90	1	1

8.3.40 During the survey to obtain delivery activity source data, the temperature was cool (approx. 10 °C), with light winds (< 5 m/s), approximately 50 % cloud cover and no precipitation. These conditions were considered suitable for obtaining representative source levels.

Noise sensitive receptors

8.3.41 It has been assumed that the nearest noise sensitive receptors to both the access route and the closest proposed building associated with delivery noise will be the existing residential dwellings located identified as noise sensitive receptor K located approximately 20m from the access route and 70m from the closest proposed building associated with delivery noise.

Acoustic feature corrections and reflections

8.3.42 There is an earth mound between the proposed servicing area and the closest noise sensitive receptors. The height of the earth mound varies along the length of the access road, however for the purpose of this assessment a height of 1.5m above ground level has been assumed. Based on line-of-sight screening, the attenuation provided by the earth mound is likely to be around 5 dB.

8.3.43 Acoustic feature corrections have been applied where considered appropriate. **Table 8.11** details the acoustic feature corrections applied.

Table 8.14 Acoustic feature corrections

Source	Acoustic Feature Correction (dB)
Lorry Door Slam	+ 3
Reversing Alarm	+ 6
Earth Mound	- 5

Background sound levels

8.3.44 For the purpose of this assessment background sound levels during the operational periods will be derived from location LT 1 which is described in the baseline conditions sections of this chapter.

Uncertainty

8.3.45 Care has been taken to reduce uncertainty as far as reasonably possible. However, it should be recognised that in any environmental sound survey and assessment process uncertainty exists.

8.3.46 The sound level data that forms the basis of the assessment are considered representative of future operations. A degree of uncertainty is therefore inherent in the source level data used. It is considered, however, that the assessed operations are an accurate representation of the operation of the access route.

Assessment criteria

8.3.47 Based on the requirements of BS 4142:2014 the following assessment criteria is proposed in **Table 8.12**.

Table 8.15 Operational Access Route Noise Impact Assessment Criteria

Level	Change in Sound Level (dB)
LOAEL	+ 5 dB above typical background noise level
SOAEL	+ 10 dB above typical background noise level

Operational plant noise emissions

8.3.48 Operational plant noise emissions are assessed in accordance with BS 4142.

8.3.49 Table 8.13 presents the proposed adverse effect levels for cumulative plant noise emissions.

Table 8.16 Cumulative plant noise emissions impact levels

Magnitude of Impact	Adverse Effect Level	Cumulative Plant Noise Emissions at 1m from a residential window
High	SOAEL	More than 10 dB above typical background sound level
Medium	LOAEL	More than 5 dB above typical background sound level
Low	NOAEL	Meets typical background sound level
Negligible	NOEL	Below typical background sound level

8.4 Existing baseline

Introduction

8.4.1 Since the submission of the 2016 ES it is possible that the current noise climate on the site and surrounding area has changed. As such, an additional environmental sound survey has been conducted in 2019 to inform the assessment. These complement the surveys undertaken as part of the wider application.

Surveys undertaken as part of the wider application area

8.4.2 Additional environmental sound surveys have been undertaken by Max Fordham to support the ‘Civil Engineering Building’ project. This data has been used to inform the baseline conditions which form part of assessments used within this ES Chapter. These have been reported in this document and have been used to determine appropriate background sound levels at existing dwellings. The survey location is presented in Figure 8.2. The survey methodology and results are detailed in their report referenced Revision Version F. A summary of the key results is presented in this ES

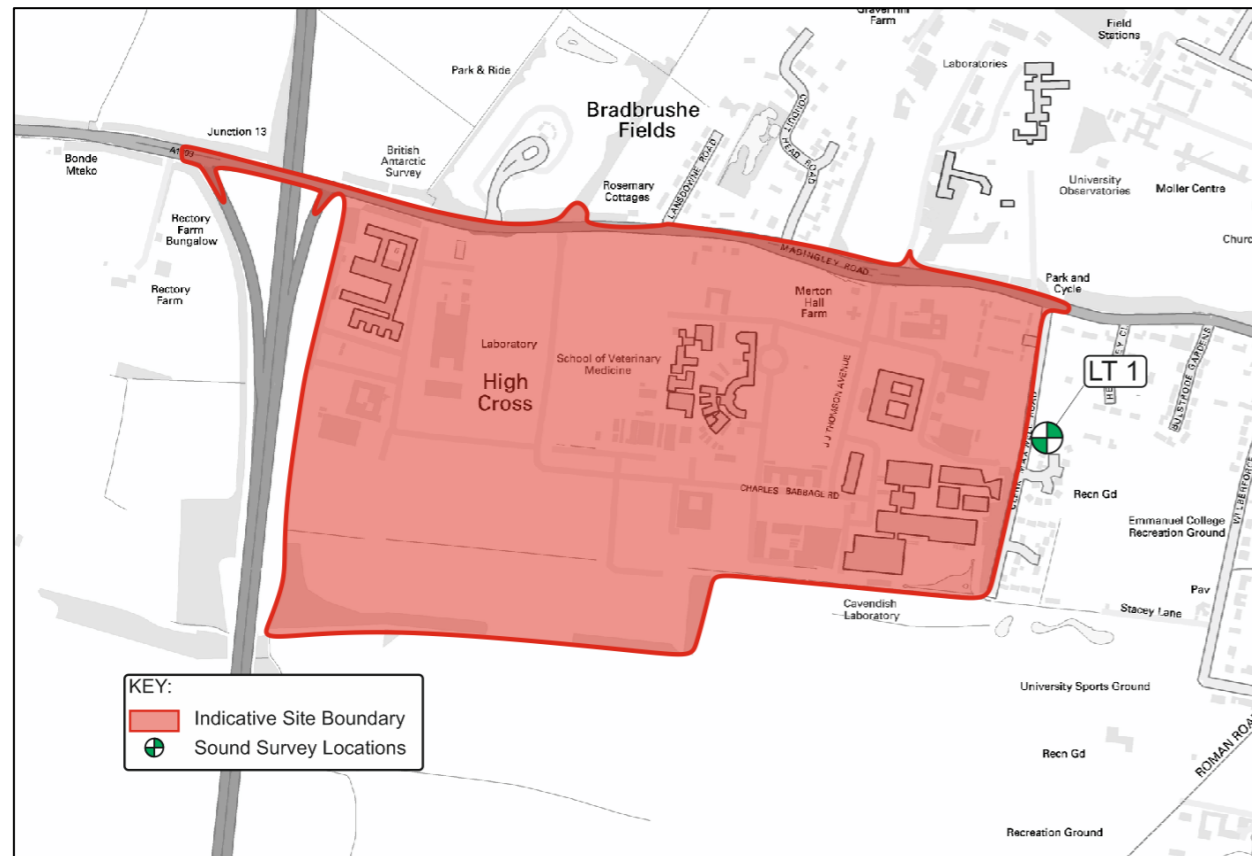


Figure 8.3 Additional Surveys Undertaken as Part of the Wider Application Area (Contains Ordnance Survey data © Crown Copyright and Database Right 2019)

8.4.3 The results of the baseline sound survey are summarised in Table 8.14 below. Where appropriate the corresponding noise sensitive receptor has been identified. Full results are presented in Appendix 12.2.

Table 8.17 Cavendish III baseline survey results summary

Measurement Position	Weekday / Weekend	Time Period	LAeq, T	Typical LA90	Closest Noise Sensitive Receptor
LT1	Weekday	Day (07:00 – 18:00)	51	47	Closest Residential Dwellings on The Lawns
		Evening (18:00 – 23:00)	49	47	
		Night (23:00 – 07:00)	49	43	
	Weekend	Day (07:00 – 18:00)	48	42	
		Evening (18:00 – 23:00)	46	41	
		Night (23:00 – 07:00)	44	37	

8.4.4 Full details of the survey and derivation of results are available in the full report presented in Appendix 12.3

Environmental sound survey 2019

Environmental sound survey climate

8.4.5 Due to the nature of the survey (i.e. unattended), it is not possible to accurately comment on the dominant noise sources or specific noise events during the entire survey period. However, at the start and end of the surveys it was noted that on-site sound levels at locations LT 2 and LT 4 were dominated by road traffic noise from the surrounding road network (mainly the Madingley Road and the M11). At the measurement location LT 3 sound levels were dominated by road traffic noise from the M11.

Environmental sound survey results

8.4.6 A summary of the 2019 environmental sound survey results is presented by date in Tables 8.18 – 8.20. The results have been plotted on time history graphs (see Appendix 12.4), detailing the full results of the automated environmental sound survey.

Table 8.18 Summary of Environmental Sound Survey Results – LT 2

Location	Date	Period	LAeq, T	Typical LAmax, T*
LT2	22/10/2019 – 23/10/2019	Daytime (07:00 – 23:00)	61	-
		Night-time (23:00 – 07:00)	56	71

Table 8.19 Summary of Environmental Sound Survey Results – LT 3

Location	Date	Period	L _{Aeq, T}	Typical L _{Amax, T} *
LT3	22/10/2019	Daytime (07:00 – 23:00)	54	-
		Night-time (23:00 – 07:00)	53	60
	23/10/2019	Daytime (07:00 – 23:00)	51	-
		Night-time (23:00 – 07:00)	49	57
	24/10/2019	Daytime (07:00 – 23:00)	54	-
		Night-time (23:00 – 07:00)	53	60
	25/10/2019	Daytime (07:00 – 23:00)	55	-
		Night-time (23:00 – 07:00)	53	67
	26/10/2019	Daytime (07:00 – 23:00)	53	-
		Night-time (23:00 – 07:00)	51	59
	27/10/2019	Daytime (07:00 – 23:00)	56	-
		Night-time (23:00 – 07:00)	55	60
	28/10/2019	Daytime (07:00 – 23:00)	56	-
		Night-time (23:00 – 07:00)	51	59

Table 8.20 Summary of Environmental Sound Survey Results – LT 4

Location	Date	Period	L _{Aeq, T}	Typical L _{Amax, T} *
LT4	22/10/2019	Daytime (07:00 – 23:00)	57	-
		Night-time (23:00 – 07:00)	56	66
	23/10/2019	Daytime (07:00 – 23:00)	57	-
		Night-time (23:00 – 07:00)	51	65
	24/10/2019	Daytime (07:00 – 23:00)	59	-
		Night-time (23:00 – 07:00)	56	67
	25/10/2019	Daytime (07:00 – 23:00)	60	-
		Night-time (23:00 – 07:00)	60	70
	26/10/2019	Daytime (07:00 – 23:00)	59	-
		Night-time (23:00 – 07:00)	53	63
	27/10/2019	Daytime (07:00 – 23:00)	58	-
		Night-time (23:00 – 07:00)	54	64
	28/10/2019	Daytime (07:00 – 23:00)	57	-
		Night-time (23:00 – 07:00)	50	64

* Based on the 10-th highest measured L_{Amax} sound level during the time period

Background sound levels, L_{A90}

8.4.7 The weekday and weekend daytime, evening and night-time background sound levels have been calculated for measurement locations LT 2, LT 3, and LT 4 using the statistical analysis method as detailed in BS 4142. Table 8.21 presents the typical background sound levels.

Table 8.21 Typical Background Sound Levels

Week Day/ Weekend	Period	Typical L _{A90, 15 min}		
		LT2	LT3	LT4
Weekday	Daytime (07:00 – 19:00)	55	53	58
	Evening (19:00 – 23:00)	51	53	56
	Night-time (23:00 – 07:00)	46	50	56
Weekend	Daytime (07:00 – 19:00)	n/a	52	56
	Evening (19:00 – 23:00)		48	53
	Night-time (23:00 – 07:00)		45	46

8.5 Impact assessment

Construction phase

Construction noise

8.5.1 Predicted indicative construction activity noise levels based on typical construction noise levels in BS 5228 Part 1 are shown in Table 8.22. The assessment considers a worst-case scenario without noise controls such as screening or operational constraints.

Table 8.22 Predicted indicative construction activity noise levels

Type of Construction Activity	Typical L _{Aeq, 1h} Noise Levels (dB) At various distances from the construction site boundary				
	10 m	20 m	30 m	50 m	100 m
Demolition	93	87	84	79	73
Site Preparation/Clearance	87	81	77	73	67
Piling	84	78	74	70	64
Concrete Pouring	82	76	73	68	62
Road Construction	86	80	77	72	66

8.5.2 If all plant associated with a construction activity shown in Table 8.22 operated at the same time for 100% of the time along the construction site boundary, noise levels are likely to exceed the SOAEL of 75 dB L_{Aeq} 10h over distances of approximately 20-30m from the construction site boundary. Therefore, construction plant operating on the site will have the potential to affect noise-sensitive receptors located immediately adjacent to the Site.

8.5.3 However, in practice, the main construction activities such as ground excavation works and new build construction will tend to take place slightly further onto the construction site, or only affect a limited number of receptors for a temporary period at any given time during each construction phase. Plant will only have to progress a relatively short distance away from each existing receptor before noise levels fall below the typical construction noise criterion.

Construction vibration

8.5.4 Construction of new development is not normally seen to be significant source of vibration for human receptors. Vibration is normally mainly associated with piling activity. An example piling method which reduces adverse impacts is continuous flight auguring which does not involve driving piles into the ground using impulsive forces.

8.5.5 Many existing and proposed vibration sensitive receptors close to the construction site boundary are likely to be 20m or more from the closest construction works. BS 5228 Part 2 provides some indicative levels of vibration associated with auger piling which indicates levels below 0.4 mm/s peak particle velocity (PPV) at distances beyond 10 m. Vibration due to auger piling is considered to be below the proposed LOAEL of 1 mm/s PPV for adverse comment from a human response, with the threshold of perception typically being up to 0.3 mm/s

8.5.6 The criterion set out in BS 5228 Part 2 for cosmetic damage to buildings is generally higher than the criteria set out for the human response to vibration in buildings. Due to this, the risk of minor or cosmetic damage to buildings is also considered to be negligible.

8.5.7 However, even reduced levels of vibration due to auger piling (or other types of piling methods or other construction activities) may affect vibration sensitive equipment in nearby buildings such as research, commercial or educational equipment. Further investigation into sensitivities of these operations should be undertaken prior to the commencement of construction works to ensure such uses are unaffected by construction vibration.

Table 8.23 Construction phase effects

Baseline		Impact Assessment				
Receptor	Value / Sensitivity	Impact	Mitigation Measure	Impact Magnitude	Residual Effect	Significance of Effect
Off-site residential dwellings (Noise)	High	The construction of new buildings is likely to include site levelling/clearance, ground excavation, concreting, piling, superstructure construction and external works such as road construction. The building construction phase and the servicing and fitting out of new buildings is not normally a significant source of noise or vibration for nearby receptors.	Best practice construction as methods determined in the CEMP. Agreement with the council and neighbours on suitable approach to noisy activities. Keep neighbours and stakeholders informed about construction activities.	Low	If all plant associated with a construction activity shown in Table 8.22 operated at the same time for 100% of the time along the construction site boundary, noise levels are likely to exceed the SOAEL of 75 dB LAeq 10h over distances of approximately 20-30m from the construction site boundary. Therefore, construction plant operating on the site will have the potential to affect noise-sensitive receptors located immediately adjacent to the Site. However, in practice, the main construction activities such as ground excavation works and new build construction will tend to take place slightly further onto the construction site, or only affect a limited number of receptors for a temporary period at any given time during each construction phase. Plant will only have to progress a relatively short distance away from each existing receptor before noise levels fall below the typical construction noise criterion. With mitigation in place, noise levels should approach the recommended LOAEL. Construction noise from each phase is likely to result in an adverse effect. Construction noise is likely to be localised, temporary and reversible.	Minor – Moderate Adverse Not Significant
Existing on-site buildings (Noise)	High					
Off-site residential dwellings (Vibration – human response)	Medium	Construction vibration from piling activities.	To be determined once a demolition and construction programme has been decided.	Low	Many existing and proposed vibration sensitive receptors close to the construction site boundary are likely to be 20m or more from the closest construction works. BS 5228 Part 2 provides some indicative levels of vibration associated with auger piling which indicates levels below 0.4 mm/s peak particle velocity (PPV) at distances beyond 10 m. Vibration due to auger piling is considered to be below the proposed LOAEL of 1 mm/s PPV for adverse comment from a human response, with the threshold of perception typically being up to 0.3 mm/s. The criterion set out in BS 5228 Part 2 for cosmetic damage to buildings is generally higher than the criteria set out for the human response to vibration in buildings. Due to this, the risk of minor or cosmetic damage to buildings is also considered to be negligible. However, even reduced levels of vibration due to auger piling (or other types of piling methods or other construction activities) may affect vibration sensitive equipment in nearby buildings such as research, commercial or educational equipment. Further investigation into sensitivities of these operations should be undertaken prior to the commencement of construction works to ensure such uses are unaffected by construction vibration. With mitigation in place, vibration levels should fall below the recommended LOAEL for human receptors. Construction vibration for each phase is likely to result in an adverse effect. Construction vibration is likely to be localised, temporary and reversible.	Minor Adverse Not Significant
Existing on-site buildings (Vibration – human response)	Medium					
Existing on-site buildings (Vibration – sensitive equipment)	High	Construction vibration.	CEMP, investigation into existing vibration levels, setting vibration limits, continuous vibration monitoring	High	With the correct mitigation in place, the adverse effects of construction vibration on this receptor should fall below the determined vibration limits of the sensitive equipment. Construction vibration is likely to be localised and temporary, however if the mitigation is inadequate, the effects may not be reversible.	Minor Adverse Not Significant

Operational Phase

Operational road traffic noise

8.5.8 The assessment considers the likely impact due to operational traffic.

8.5.9 A comparison has been made between the 2021 Do Minimum - 'Without Development' and 2031 Do Something – 'With Development' scenarios. The effect of the change is based on the criteria detailed in the ES. Table 8.24 presents a summary of the predicted change in road traffic noise levels in the long term based on the supplied traffic flow predictions. Figure 8.1 of the ES chapter details the approximate locations of the identified receptors along with a reference letter as defined in Table 8.1 of this ES chapter.

Table 8.24 Summary of Predicted Change in Noise Levels due to the Increase in Long Term Road Traffic Noise

Noise sensitive receptor	Reference Letter	Long-term Change in Ambient Noise Levels due to the Increase in Traffic Flows (dB)	Adverse Effect Level
1 + 2 Rosemary Cottages	A	< 3	< LOAEL
1 Lansdowne Rd	B	< 3	< LOAEL
2 Lansdowne Rd	C	< 3	< LOAEL
34 + 36 Madingley Rd	D	< 3	< LOAEL
Whitehouse Apartments	E	< 3	< LOAEL
14 Conduit Head Rd	F	< 3	< LOAEL
53 Madingley Rd	G	< 3	< LOAEL
51 Madingley Rd	H	< 3	< LOAEL
Blenheim Court	I	< 3	< LOAEL
Churchill Court	J	< 3	< LOAEL
1+2 The Lawns	K	< 3	< LOAEL
1+2 Perry Court	L	< 3	< LOAEL

8.5.10 The results show that the change in ambient noise levels at existing receptors, would be below the LOAEL, as set out in Table 8.25. Therefore, any increase in noise levels along local road links and the effect on existing residential receptors due to operational traffic would be negligible.

Operational multi-storey car park assessment

8.5.11 Table 8.25 details the calculated sound level at the nearest noise sensitive residential receptors and the subsequent change in ambient sound level.

Table 8.25 Car park noise impact assessment summary

Noise Sensitive Receptor	Time period	Calculated Sound Level at Receptor (LAeq, 1 hour)	Measured Existing Ambient Sound Level dB (LAeq, 1 hour)	Cumulative Ambient Sound Level at Receptor (LAeq, 1 hour)	Change in Noise Levels	Impact assessment
K	Daytime (07:00 – 19:00)	48	51	53	+ 2	< LOAEL
	Evening (19:00 – 23:00)	49	49	49	0	< LOAEL
G	Daytime (07:00 – 19:00)	53	61	62	+ 1	< LOAEL
	Evening (19:00 – 23:00)	54	59	60	+ 1	< LOAEL

8.5.12 The full calculations are presented in Appendix 12.5.

8.5.13 The results show that the change in ambient noise levels at existing receptors, would be below the LOAEL. Therefore, any increase in noise levels along local road links and the effect on existing residential receptors due to the car park would be negligible.

HGV servicing activities noise impact assessment

8.5.14 The rating level associated with servicing activities along the operational access route has been calculated and the assessment summarised in Table 8.26.

Table 8.26 HGV Servicing Activities Assessment

Time Period	HGV Servicing Activities Assessment
	Daytime (07:00 – 23:00 hours) Typical Week Day
Combined Rating Level (dB LA _{r,Tr}) at Existing Noise Sensitive Receptor	42
Background Sound Level (dB LA _{90, 15 min})	47
Excess of Rating over Background Sound Level (dB)	-5
Assessment of Impact	Indication of the specific sound source having a low impact, depending on the context

8.5.15 The initial numerical assessment should be considered in relation to the context of the site and any mitigating factors.

- 8.5.16 The initial numerical assessment of sound levels associated with the proposed access route and associated delivery noise at the nearest proposed noise sensitive receptor indicates that the operation of Clerk Maxwell Road for servicing and access is likely to result in a less than adverse impact during the daytime.
- 8.5.17 The calculations are presented in Appendix 12.6.
- 8.5.18 The above assessment details the results of the initial numerical assessment at the nearest noise sensitive receptors. It is important to note that the numerical assessment of impact is influenced by the context of the proposals including the surrounding environment and the operating characteristics.
- 8.5.19 In many instances deliveries may take less time than assumed and consist of less noise generating activities. It is also possible that the background sound level could be higher (as deliveries may not take place at the same time every day). These factors would further reduce the initial impact of the delivery operations.

Operation plant noise emissions

- 8.5.20 At this stage, it is unknown what type of plant services will be required to serve the range of potential uses.
- 8.5.21 Based on the plant noise emissions criteria and the background noise levels measured during the additional environmental sound surveys, cumulative plant noise emissions at the nearest noise sensitive receptor should not exceed the values in Table 8.27.

Table 8.27 Cumulative Plant Noise Emission Levels

Time period	Façade of Noise sensitive Receptor	Cumulative Plant Noise Emission Criteria ($L_{Aeq,T}$)
Daytime (07:00 – 19:00)	A - J	58
	On site Receptors	53
	K - L	47
Evening (19:00 – 23:00)	A - J	56
	On site Receptors	53
	K - L	47
Night-time (23:00 – 07:00)	A - J	56
	On site Receptors	50
	K - L	43

Table 8.28 Operational phase effects

Baseline		Impact Assessment				
Receptor	Value / Sensitivity	Impact	Mitigation Measure	Impact Magnitude	Residual Effect	Significance of Effect
Off-site noise sensitive receptors (residential and academic/commercial buildings)	Medium-High	Increase in road traffic noise levels due to increased road traffic volumes	No additional mitigation measures suggested.	Negligible	Based on the results of the assessment, the predicted increase in road traffic noise for the closest noise sensitive receptors does not exceed the proposed LOAEL in the long term.	Negligible Not Significant
		Noise from use of proposed multi storey car park.	No additional mitigation measures suggested.			
		Noise from proposed HGV servicing activities	No additional mitigation measures suggested.			
On-site, external amenity areas	Low	Road traffic noise	No additional mitigation measures suggested.			
All off-site and on-site noise sensitive receptors	Low-High	Noise from plant	<ul style="list-style-type: none"> • Enclosing noisy plant within the building envelope; • Selecting suitably quiet 'low noise' plant; • Positioning air intake/discharge louvres away from noise sensitive receptors; • Orientating air intake/discharge louvres away from noise sensitive receptors; • Attenuation of air intake/discharge louvres with duct mounted attenuators; and • Sound insulating plant housings/enclosures. 	Negligible	Noise from plant has the potential to be a direct, permanent adverse effect associated with the development. Depending on the type and use of the plant, the effect may be episodic, particularly if the plant is used intermittently. Mitigation measures would minimise any effects.	Negligible Not Significant
						(Depending on location selection and mitigation measures incorporated) Negligible to High Not significant and significant

8.6 Mitigation Measures

Construction phase

Construction noise

8.6.1 Best practice construction methods to control noise and vibration from demolition and construction activities would be specified in a site-specific Construction Environmental Management Plan (CEMP). The CEMP would be agreed in consultation with Cambridge City Council at the reserved matters stage and could include the following routine noise and vibration management controls:

- Breaking out of concrete structures would be undertaken, where possible, using low noise effect methods including bursting and splitting rather than percussive breaking;
- Detailed programming of works to make maximum use of existing barriers to noise;
- Retention of the outer walls of structures for as long as possible before demolition is necessary;
- Careful selection of demolition/construction methods and plant to be used;
- Switching off of plant and vehicle engines when not in use;
- Restriction of drop heights onto lorries;
- Regular maintenance and servicing of vehicles, equipment and plant;
- Appropriate handling and storage of materials;
- Appropriate operational hours (to be agreed with the local authority);
- Enforcement of restricted working hours for excessively noisy activities;
- Implementation of an appropriate traffic management strategy;
- Use of temporary acoustic barriers where appropriate and other noise containment measures such as screens, sheeting and acoustic hoardings at the construction site boundary to minimise noise breakout and reduce noise levels at the potentially affected receptors.

8.6.2 If a temporary source of noise cannot reasonably be prevented and the works being undertaken are crucial to progressing the particular project phase then separate liaison with Cambridge City Council and the appropriate neighbours would be held to agree a suitable approach.

8.6.3 In addition to the above, all reasonable steps would be taken to keep the local community (including the existing commercial and university occupants as well as nearby residential inhabitants) informed of proposed demolition and construction operations. Measures for community liaison would be dealt with by a dedicated Community Liaison Officer to co-ordinate the dissemination of information (for example, by means of a regular newsletter) and to program those operations at time that would minimise the potential for disturbance.

8.6.4 With mitigation in place, noise levels should approach the recommended LOAEL.

Construction vibration

8.6.5 Further controls may be required to ensure vibration sensitive equipment or experiments in the existing buildings are protected from damage or malfunction.

8.6.6 Along with the CEMP to control construction vibration impacts on sensitive equipment, further investigation into existing vibration levels should be undertaken and vibration limits should be set along with continuous vibration monitoring.

8.6.7 Appendix B.5 of BS 5228 Part 2 reviews the assessment of vulnerability of contents of buildings such as scientific laboratories or microelectronics manufacturing.

8.6.8 Precise details and locations of vibration sensitive equipment or long-term vibration sensitive experiments are unknown at this stage. Once a demolition and construction programme are available, suitable vibration limits and the requirement for vibration monitoring can be determined.

8.6.9 With mitigation in place, vibration levels should fall below the recommended LOAEL for human receptors.

Operational phase

Operational road traffic noise

8.6.10 Based on the results of the assessments undertaken, no further mitigation measures are specified.

Operational access route noise impact assessment

8.6.11 Based on the results of the assessments undertaken, no further mitigation measures are specified.

Operational plant noise emissions

8.6.12 Plant will be selected, located and attenuated so that planning conditions attached to the development by Cambridge City Council are satisfied. This is likely to require meeting noise limits at nearby receptors through a combination of the following environmental noise control techniques which could be implemented:

- Enclosing noisy plant within the building envelope;
- Selecting suitably quiet 'low noise' plant;
- Positioning air intake/discharge louvres away from noise sensitive receptors;
- Orientating air intake/discharge louvres away from noise sensitive receptors;
- Attenuation of air intake/discharge louvres with duct mounted attenuators; and
- Sound insulating plant housings/enclosures.

8.7 Summary

8.7.1 The results of the assessments undertaken and detailed in this chapter indicate that there is no change in the predicted noise impact of the development when compared with the acoustic assessments presented in the 2016 ES chapter and subsequent addendum.

9. Water environment

9.1 Introduction

- 9.1.1 The water environment in the original ES and ES addendum was based on local policies that have since been updated. As such Section 9.2 'relevant legislation and policy' requires updating to account for the Cambridge Local Plan adopted in 2018 and the South Cambridgeshire Local Plan adopted in 2018. The below Section 9.2 and 9.3 replaces Section 13.2 and 13.4 of the original ES respectively.
- 9.1.2 The only changes to the original ES relate to the relevant legislation and policy and baseline conditions and these have not resulted in any change to the impact assessment itself. Operational phase mitigation measures outlined in the ES Addendum remain unchanged. The following sections therefore remain unchanged from the original ES and ES Addendum and have not been replicated within this document.
- Scope of assessment;
 - Method of assessment;
 - Impact assessment;
 - Mitigation measures;
 - Summary.
- 9.1.3 The following sections require updating to reflect the obligatory amendments and are presented in this chapter:
- Relevant legislation and policy;
 - Baseline conditions (reaches 1 and 2 only).

9.2 Relevant legislation and policy

National Planning Policy Framework 2019

- 9.2.1 Section 10 of the NPPF requires a site-specific flood risk assessment (FRA) for new developments that demonstrates the development will be safe from flood risk for the duration of the development's lifetime taking into account changes in flood risk due to climate change.
- 9.2.2 Section 11 of the NPPF seeks to protect the natural environment by preventing new development from contributing to water pollution.

Planning Practice Guidance 2018

- 9.2.3 The Planning Practice Guidance (PPG) for water supply, wastewater and water quality supports the NPPF with additional guidance to ensure protection of the water environment. It directs development away from areas at highest risk of flooding via the application of the Sequential Test. If, following application of the Sequential Test, it is not possible for the development to be located in zones with a lower probability of flooding, the Exception Test can be applied, if appropriate.

The Water Framework Directive 2000/60/EC

- 9.2.4 The Water Framework Directive (WFD) is the overarching piece of legislation applicable to the water environment assessment. The purpose of the WFD is to commit European Union member states to achieving good qualitative and quantitative status of all water bodies including surface water bodies, ground water bodies and marine water bodies up to 1 nautical mile offshore. The WFD was enacted into domestic legislation by The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003.
- 9.2.5 The WFD is transposed into the UK law by the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017.

The Water Environment (Water Framework Directive) England and Wales Regulations 2017

- 9.2.6 The purpose of this Regulation amendment was to revoke and replace the Water Environment (Water Framework Directive) England and Wales Regulation 2003. The 2003 Directive had been amended several times already so a consolidation was undertaken and greater detail provided of some key aspects of the transposition in particular to be clearer on the face of the Regulations what key objectives for water bodies are, the deadlines by which they must be achieved and the exemptions which may be relied on. An additional provision also explains how regulators are to ensure WFD compliance when making certain regulatory decisions.

UK Government 25-year environment plan 2018

- 9.2.7 The 25 Year Plan to Improve the Environment sets out Government action to help the natural world regain and retain good health. It aims to deliver cleaner air and water in our cities and rural landscapes, protect threatened species and provide richer wildlife habitats. The plan aims to improve water quality and reverse the deterioration of groundwater by minimising the risk of chemical contamination in water.

The Flood and Water Management Act 2010

- 9.2.8 The Act defines the regulatory body responsible for assessing the management of flood risk associated with the Proposed Development and the adequacy of proposed measures to manage land drainage on Site. For the watercourses flowing through the Site, Cambridge City Council is the competent authority.

Water Resources Act 1991 (as modified by the Water Act 2003), and Environmental Permitting (England and Wales) Regulations 2016

- 9.2.9 With regard to controlled waters, the Environment Agency has a remit to prevent or reduce the risk of water pollution wherever possible, and to ensure that clean-up takes place if pollution occurs that might lead to effects on ecosystems or people. A regulatory regime supporting this policy has been introduced by these two Acts.

The Land Drainage Act 1991 (as amended 1994)

- 9.2.10 The Act requires that the free flow of a watercourse is maintained by its riparian owner. The owner only needs to maintain the natural free flow of the water course and is not obliged to provide additional capacity to cater for upstream developments.

The Water Resources (EIA) England and Wales Amendments Regulations 2017

- 9.2.11 The EIA Regulation was amended in respect of water management projects for agriculture (including irrigation projects) in England and Wales. These Regulations requires an EIA to be carried out for water management projects for agriculture which would likely to have significant effects on the environment due to their nature, size or locations. These Regulations do not apply if the project is subject to any other EIA legislation. Projects involving the abstraction of water are only included if the amounts abstracted exceed 20 cubic meters in 24 hours.

Environment Agency Anglian River Basin Management Plan

- 9.2.12 The proposed development lies within the Environment Agency Anglian River Basin Management Plan (RBMP). The plan describes the river basin district, and the pressures that the water environment faces. It shows what this means for the current state of the water environment, and what actions will be taken to address the pressures.
- 9.2.13 The RBMP sets out the baseline classification of water bodies, statutory objectives for protected areas and water bodies, and a programme of measures to achieve these statutory objectives. It outlines what improvements are possible by 2021 and how the actions will make a difference to the local environment.

Environment Agency Great Ouse Catchment Flood Management Plan

- 9.2.14 The Great Ouse Catchment Flood Management Plan (CFMP) considers all types of inland flooding, from rivers, groundwater, surface water and tidal flooding, to establish flood risk management policies which will deliver sustainable flood risk management for the long term.

Cambridge City Council Local Plan 2018

- 9.2.15 The Cambridge City Council Local Plan identifies managing and mitigating flood risk under the NPPF regulations and the conservation and efficient management of water resources, as key environmental issues for the district. The Local Plan contains several policies relevant to water environment relating to climate change and best practice guidance for sustainable urban drainage.

Cambridgeshire County Council Surface Water Management Plan 2014

- 9.2.16 The overall objects of the Surface Water Management Plan (SWMP) are to map historic surface water influenced flooding locations and identify areas still at risk of flooding (referred to as 'wet spots'). The wet spots are assessed and prioritized for detailed assessment and mitigation.

Cambridge County Council Surface Water Drainage Guidance for Developers 2018

- 9.2.17 Cambridge County Council has produced a Surface Water Guidance document outlining the standard design specification parameters for proposed surface water drainage strategies at outline and full application stages.

Cambridgeshire Flood and Water Supplementary Planning Document 2016

- 9.2.18 Cambridgeshire County Council in conjunction with South Cambridgeshire District Council and the four other local planning authorities in Cambridgeshire produced this document to ensure that Cambridgeshire has a consistent, locally appropriate approach to flood risk and water management. The Supplementary Planning Document (SPD) was re-adopted by South Cambridge District Council in November 2018 and by Cambridge City Council in December 2018. This followed the adoption of the Cambridge and South Cambridge Local Plans.

South Cambridgeshire District Council and Cambridge City Council Strategic Flood Risk Assessment 2010

- 9.2.19 The objectives of the Strategic Flood Risk Assessment (SFRA) are to assess the risks from all forms of flooding affecting the South Cambridgeshire District Council and Cambridge County Council area. To provide a reference and policy document to inform the preparation of future local development framework documents to ensure that South Cambridgeshire District Council and Cambridge County Council meet their obligations under the current Planning Policy Statement 25 (PPS25) and Local Development Framework Policy guidelines and standards. The SFRA also aims to inform the sustainability appraisal so that flood risk is taken into account when considering options and in the preparation of land use policies and to provide a sufficient level of detail to allow South Cambridgeshire District Council and Cambridge County Council to undertake the Sequential Test as per the PPG.

South Cambridgeshire Local Plan 2018

- 9.2.20 The South Cambridgeshire Local Plan sets out the planning policies and land allocations to guide the future development of the district up to 2031. It includes policies wide range of topics such as housing, employment, services, facilities and the natural environment.
- 9.2.21 Policy CC/1 'Mitigation and Adaptation to Climate Change' "planning permission will only be granted for proposals that demonstrate and embed the principles of climate change mitigation and adaptation into the development. Applicants must submit a Sustainability Statement to demonstrate how these principles have been embedded into the development proposal".
- 9.2.22 Climate change adaptation also includes using water more efficiently and controlling high levels of rainwater runoff.

- **Policy CC/4 Water Efficiency:** All new developments must achieve as a minimum water efficiency equivalent to 100 litres per person per day. Proposals for non-residential development must be accompanied by a water conservation strategy, which demonstrates a minimum water efficiency standard equivalent to the BREEAM standard for 2 credits for water use levels unless demonstrated not practicable.
- **Policy CC/7 Water Quality:** In order to protect and enhance water quality, all development proposals must demonstrate that they comply to the requirements listed within this policy, including adequate water supply, sewerage and land drainage systems. The quality of ground, surface and water bodies will not be harmed, and appropriate consideration is given to sources of pollution and by incorporating appropriate SuDS measures.
- **Policy CC/8 SuDS.** Requires development proposals to incorporate sustainable surface water drainage systems (SuDS) appropriate to the nature of the site. The policy lists what developments are required to demonstrate with regards to SuDS and enforces the need that they should be considered, from the beginning of the design and master-planning process.
- **Policy CC/9 Managing Flood Risk:** is for development proposals to ensure they demonstrate that flood risk from all sources has been avoided or managed in accordance with the requirements of the National Planning Policy and the Local Plan.

9.3 Updated baseline

Water quality

9.3.1 Changes to the baseline relate to Reaches 1 and 2 of the Coton Brook and are based on a site visit undertaken on the 15th August 2019. For reaches 3 to 8 the baseline conditions as per the original ES still stand. Changes in the baseline conditions relate largely to the establishment of vegetation over time since the initial site visit (13th August 2015) was undertaken.

9.3.2 It should be noted that construction of the new Cavendish Laboratory has commenced on the land to the east of the Veterinary Medicine buildings. The construction site is isolated from the wider West Cambridge Site. The construction site does not impede into any of the watercourses identified during the initial site visit.

Reach 1

9.3.3 The channel has been constructed and planted since the adoption of the existing planning permission (i.e. since 1999). It contains two low-head weir type structures. On the northern, left bank (looking downstream), planting is more formal, whilst on the right bank (looking downstream) some mature trees have been retained and less formal planting has been installed. Trees planted along the left bank (looking downstream), are now established (see Figure 9.1). There is little evidence of siltation, although the plant growth and shallow weirs are likely to inhibit the movement of silt downstream in the long-term once the system has matured. Flora observed in this reach were almost exclusively terrestrial, with aquatic/marginal species observed limited to purple loosestrife, yellow flag iris, gypsywort, and common water-plantain. Ultimately, the maintenance regime will dictate whether sediment accumulates or is transported through the system. This reach discharges to the West Cambridge Lake at the downstream end of the reach via a culvert (see Figure 9.2).



Figure 9.1 Channel looking upstream, with established trees (on true left bank), mature tree (on tree right bank)



Figure 9.2 Looking upstream to outfall structure from Reach 1 into West Cambridge Lake, with landscaped platform on northern bank and established riparian vegetation along the western bank

Reach 2

- 9.3.4 The West Cambridge Lake was constructed following the adoption of the existing planning permission. It is artificial and online, with levels determined by the downstream reach (Figure 9.3). The bed and banks are artificial (see Figure 9.2), including some reinforcement, with gabion baskets visibly extending in a southerly direction from the north bank. Reedbed (*Phragmites australis*) and riparian habitats have established along the perimeter of the lake. Submerged aquatic flora observed were limited to spiked water milfoil, Nuttall's waterweed and filamentous algae indicative of eutrophic (high nutrient) conditions. Nuttall's waterweed is listed under Schedule 9 of the Wildlife and Countryside Act 1981 with respect to England and Wales and the potential implications of its presence are considered in Chapter 6: Ecology.



Figure 9.3 West Cambridge Lake with outfall to the West Cambridge Canal, with the canal defining water levels in the lake and established riparian vegetation along the perimeter

Flood Risk Assessment

- 9.3.1 As detailed in the previously issued ES Chapter Groundwater and hydrogeology are considered in the Chapter 10: Ground Conditions. Offline ponds were considered in the Ecology Chapter of the original ES, in relation to their ecological value, except where they form part of the surface water drainage system and this is as detailed within the Water Environment Chapter of the previous ES, therefore no assessment has been undertaken in relation to this.
- 9.3.2 Potable Water and Foul Water resources are as detailed and assessed within the original ES. The works associated within utility upgrades needed to accommodate the Site form part of the embedded mitigation for the scheme and therefore excluded from this ES update.
- 9.3.3 The technical studies used to inform the production of this ES update have been based on the latest regional and national policy data, used to inform the baseline assessment.

Surface Water

- 9.3.4 The existing baseline surface water drainage situation is as detailed within the previous ES Chapter. However, with development now underway at the site there has been some recent changes made to the approved design. Both the consented strategy, assessed as part of the original ES, and updated surface water strategy is discussed further within this chapter.
- 9.3.5 The consented FRA assessed as part of the previous ES, set out the proposed drainage strategy for the entire site. The proposal was for the eastern plots to accommodate on-site storage, with all flows restricted to the equivalent one in one-year greenfield runoff rate. This approach has been agreed with the Lead Local Flood Authority (LLFA).
- 9.3.6 Development at West Cambridge is underway with the first phase of the proposed engineering department now completed. New development is also underway at plot A17, the proposed Cavendish III building and A16 and the Shared Facilities Hub (SFH).
- 9.3.7 Under the consented FRA the drainage for the plot areas addressed within this ES addendum were to be discharged via a new surface water sewer, into an existing sewer located to the east of the site. The consented FRA and supporting drainage phasing assumed that the existing Cavendish II laboratory would be demolished allowing a drainage route to the existing offsite sewer. This however is no longer the case with the existing Cavendish II laboratory to remain.
- 9.3.8 The principles of the overall consented drainage strategy remain the same, as detailed within the previous ES, with discharge either proposed via the existing ponds or to an existing sewer. The baseline environment with regard to the overall drainage strategy remains unchanged.
- 9.3.9 With the Cavendish II library not yet demolished and still operational, an interim solution is required to allow for the discharge of surface water from the A17 plot. The revised surface water drainage strategy proposes for the A17 plot will to discharge to and utilize the available capacity within the existing Paynes Pond.
- 9.3.10 To demonstrate that Paynes Pond has sufficient capacity to take the additional flows a revised hydraulic drainage model was produced for the site. The conclusion of the drainage technical note, produced by Stantec reference West Cambridge – Cavendish III / SFH – Surface Water Diversion dated 19th September 2019, shows the pond has sufficient capacity and therefore the proposals does not present a flood risk.
- 9.3.11 The original FRA proposed some upstream SuDS solutions (swales) to intercept flow prior to the discharge to the existing surface water sewer. However, following consultation with cycle groups some of these features are to either be relocated or removed entirely. However, with the flows relocated towards the Paynes Pond, rather than discharged direct to the sewer, treatment of the surface water is still being provided, therefore the level of water treatment remains as per the previous ES chapter produced.
- 9.3.12 The Sensitivity of the proposed Surface Water Drainage remains unchanged from the previous ES Chapter and is still considered to be Low.
- 9.3.13 The assessment for determining the sensitivity for Groundwater has been updated to reflect the aquifer status. This was already assessed as part of the previous Ground Conditions ES Chapter. Therefore, the hydrogeological setting remains unchanged.

Flood risk

9.3.14 The flood risk associated with the setting remains unchanged.

10. Ground conditions

10.1 Scope of the assessment

- 10.1.1 The ground conditions in the original ES and ES addendum was based on local policies that have since been updated. The below Section 9.2 replaces Section 14.2 of the original ES.
- 10.1.2 The update to the ES has incorporated the following scope:
- Purchase and review of an up to date Envirocheck Report in relation to the information provided in the original Phase 1 desk study;
 - Consultation with the Environment Agency and Local Planning Authority environmental health/contaminated land officer;
 - Site walkover
- 10.1.3 The Envirocheck report, consultation responses and site walkover records are provided in Appendices 10.1 to 10.3 of this ES.
- 10.1.4 This chapter should be read in conjunction with the originally completed Ground Conditions chapter provided in the ES.

10.2 Relevant legislation

- 10.2.1 Guidance to the identification and remediation of contaminated land has been updated and superseded since Stantec produced the West Cambridge Masterplan Site, Phase 1 Ground Condition (Geotechnical and Contamination) Assessment Report in June 2016 (reference: 31500/3503/R001) (Phase 1 Report). This report was used to inform the ES Ground Conditions Chapter.
- 10.2.2 The changes to the assessment of contaminated land are detailed in Section 6.2 of BS10175:2011+A2:2017 and within online guidance provided by GOV.UK, Land Contamination: Risk Management (LC:RM). This guidance sets out the process based on a tiered risk assessment with increasing level of detail required to progress through the tiers.
- 10.2.3 Guidance for planning authorities on the need to take into account the environmental consequences of contaminated land in drawing up development plans and in determining planning applications has been updated. This update was made in the National Planning Policy Framework (NPPF) 2019 revised.
- 10.2.4 No material changes to the scope, framework and purpose for land contamination assessment and management have been made, therefore providing that no significant changes have occurred in the ground conditions prevailing at the Site, conclusions made within the Phase 1 Report remain valid.

10.3 Method of assessment

- 10.3.1 No changes in the method of assessment are required.

10.4 Baseline conditions

- 10.4.1 The baseline conditions have been reviewed from updated available information and a recent site walkover.
- 10.4.2 This information has been compared against information presented within the Phase 1 Ground Condition (Contamination and Geotechnical) assessment prepared for the site by Stantec has been reviewed.

Geological setting

- 10.4.3 The geological setting remains unchanged.

Hydrogeological Setting

- 10.4.4 The hydrogeological setting remains unchanged.

Hydrological Setting

- 10.4.5 The hydrological setting remains unchanged.

Historical Setting

- 10.4.6 The site historical setting remains unchanged.

Baseline Risk Assessment

- 10.4.7 As no changes to the baseline conditions have occurred, the risk assessment remains unchanged.

10.5 Impact Assessment

- 10.5.1 No changes in the construction phase or operational phase of the development are assessed as required.

10.6 Mitigation Measures

- 10.6.1 No changes in the proposed mitigation measures are assessed as being required.

10.7 Summary

- 10.7.1 The potential adverse effects of the Development related to ground contamination and ground conditions are unchanged following a review of legislation/best practice guidance and baseline data.

11. Cumulative effects

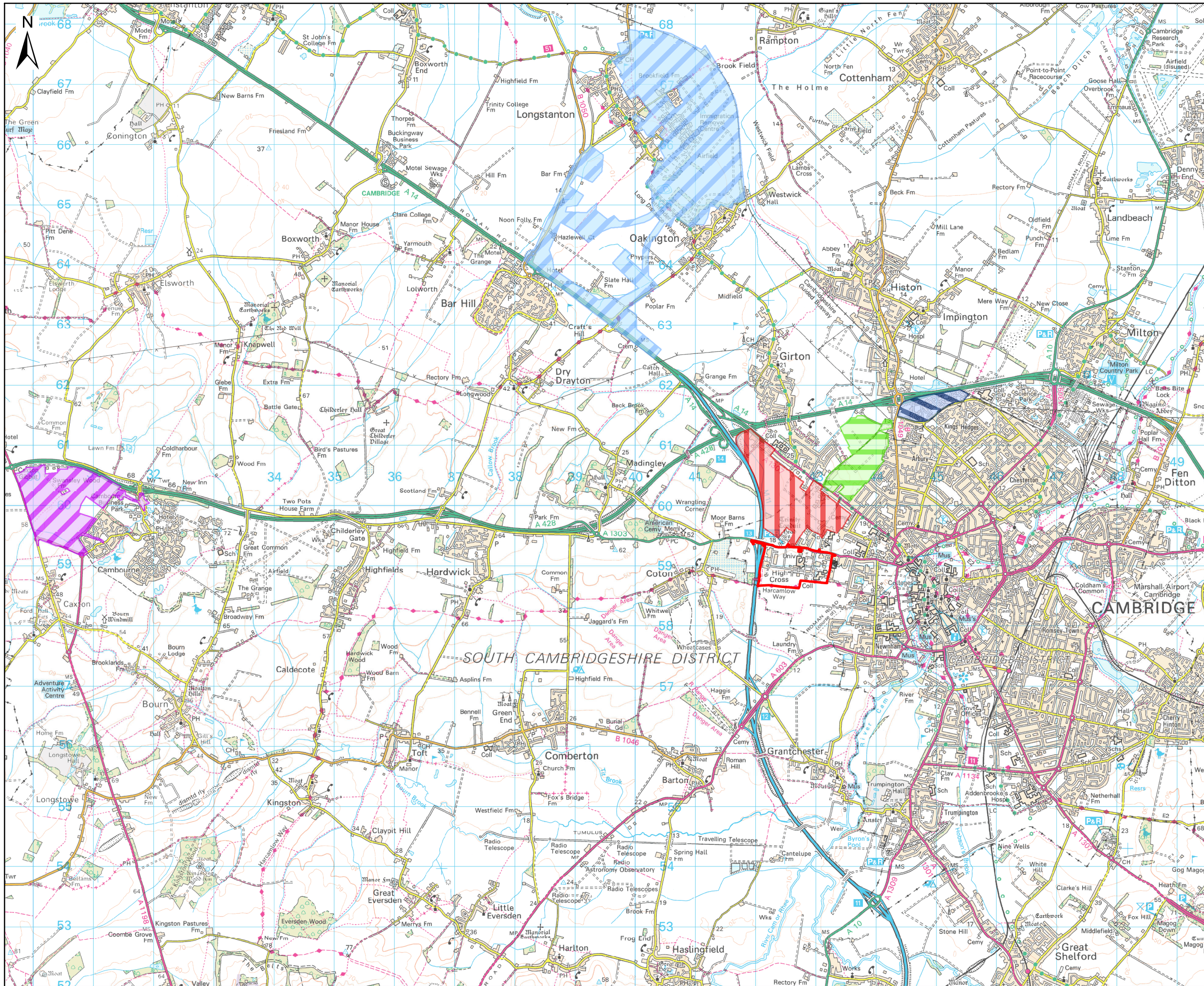
11.1 Introduction

- 11.1.1 Since the submission of the original ES, a new planning application for a development at Clerk Maxwell Road has been submitted to Cambridge City Council for determination. Since the identification of the Clerk Maxwell Road development, the planning application has been withdrawn by the applicant. Nevertheless, the proposal has been considered based on the submitted application.
- 11.1.2 This chapter provides an updated cumulative effects assessment to consider the Clerk Maxwell Road application.
- 11.1.3 The in-combination assessment in the original ES remains valid and has not been repeated in this chapter.

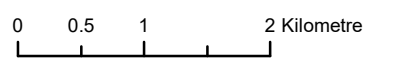
11.2 Baseline conditions

- 11.2.1 The projects which have been considered in the cumulative effects assessment are listed below. The Clerk Maxwell Road development is the only newly identified development, and the others have all been described in the original ES. This section only describes the Clerk Maxwell Road proposal. For a description of the other developments, please see the original ES.
- North West Cambridge;
 - National Institute of Agricultural Botany (NIAB);
 - Orchard Park;
 - Northstowe;
 - West Cambourne; and
 - Clerk Maxwell Road Cambridge Cambridgeshire
- 11.2.2 Figure 11.1 shows the location and scale of each of these projects and how they relate geographically to the Site and the Proposed Scheme.
- Clerk Maxwell Road Cambridge Cambridgeshire**
- 11.2.3 A planning application (18/2062/FUL) was submitted to Cambridge City Council in December 2018 for erection of 35 dwellings (12 x 1bed, 4 x 2bed, 10 x 3bed and 9 x 4+bed) and re-position of existing access onto Clerk Maxwell Road including provision of new spine road, parking, cycle provision, landscaping and associated infrastructure. The development proposal seeks the demolition of these existing structures and the construction of 35 residential dwellings. The application was withdrawn in December 2019.
- 11.2.4 The planning application was supported by following technical documents of relevance to the cumulative effects assessment:
- Ecological Impact Assessment
 - Flood Risk Assessment and Drainage Strategy
 - Ground Investigation Report (phases 1 and 2)
 - Transport Statement

- Arboricultural Impact Assessment and Tree Constraints Plan



- Site boundary
- Camboorne West
- Clerk Maxwell Road Development
- National Institute of Agricultural Botany (NIAB)
- North West Cambridge
- Northstowe
- Orchard Park



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Client
University of Cambridge

Project
West Cambridge Masterplan EIA

Title
**Location of Major Projects in and around Cambridge
Figure 15.1**

Sheet Size	Original Scale	Designed / Drawn	Checked	Authorised
A3	1:60,000	SD	FD	DP
Drawing Number	Date	Date	Date	Rev
5137998_CAM_CT_LMP	17/12/19	17/12/19	17/12/19	02

11.3 Impact Assessment

Construction phase

11.3.1 Table 11.4 lists all those receptors that would be impacted by the construction of the Proposed Scheme and notes any impacts from the other developments shown on Figure 11.1, summarising the potential for significant cumulative effects.

Table 11.1 Construction phase cumulative effects assessment

Baseline		Impact assessment									
Receptor	Value	Proposed Development	North West Cambridge	NIAB	Orchard Park	Northstowe	West Cambourne	Clerk Maxwell Road	Cumulative effect	Cumulative Impact magnitude	Significance of effect
Designated ecological sites	National to local	Minor adverse effects will occur to Adams Road Sanctuary City Wildlife Site (CIWS) due to works in the upper reaches of Coton Brook impacting downstream water quality.	None	None	Potential to affect King's Hedges Hedgerow CIWS due to dust.	None	Negligible effect on designated sites due to intervening distances.	None	None of the developments will affect the same designated ecological site. Cumulative effects to any individual designated ecological site will not arise.	Negligible	Negligible Not significant

Baseline		Impact assessment									
Receptor	Value	Proposed Development	North West Cambridge	NIAB	Orchard Park	Northstowe	West Cambourne	Clerk Maxwell Road	Cumulative effect	Cumulative Impact magnitude	Significance of effect
Habitats	Site	Minor adverse effects will occur to water bodies and green corridors on site during construction due to temporary habitat loss and impacts to water quality.	Adverse effect due to the loss of short sections of hedgerow.	Locally significant effects due to the loss of on-site arable farmland, scrub, ditches, ponds, and small sections of hedgerow.	Habitats within the site which will be lost are of negligible to site value.	Moderate adverse effect due to loss of grassland and arable habitats.	Minor to negligible effects due to the removal of hedgerows,	Trees to be removed within the footprint of the new access road. However, no significant effects are anticipated.	Across all sites existing habitats will inevitably be lost. The value of most habitats on Site is at the site or local level only and the most important habitats are the waterbodies and green corridor. Impacts to water bodies will be temporary whilst physical works are undertaken to increase their volume after which they will be restored and improved. This will not result in cumulative effects with the NIAB development where surface water bodies will be completely lost. The green corridor is orientated east-west and links the M11 Scrub CiWS with sites within the City such as the Adams Road Sanctuary CWS. It does not link to habitats north of Madingley Road which are effectively severed by the road. Temporary loss of the corridor during construction will not result in adverse cumulative effects and will be enhanced and improved after construction.	Negligible	Negligible Not significant
Protected species	Local	Minor adverse effects will occur to Badgers, bats, and birds during construction due to increased disturbance and loss of foraging habitats.	Adverse effect to great crested newts, common toads, badgers, breeding birds, and brown hares due to the loss of habitat.	Adverse effects to bats foraging on site due to construction lighting. Locally to district significant adverse effects to badgers, brown hare, and birds due to a reduction in foraging habitat. Positive and adverse effects to water voles.	Loss of habitats will impact bird populations on site.	Moderate adverse effects due to the loss of skylark nesting habitat.	Major to moderate adverse effect to skylark due to a loss of habitat, minor adverse effect to yellow wagtail due to habitat loss and disturbance, temporary moderate to minor beneficial effect to corn bunting and grey partridge due to phasing creating set aside land.	None	All developments have reported an adverse impact to birds during construction due to habitat loss and disturbance. Cumulative effects to birds are likely to occur particularly around the West Cambridge, North West Cambridge and NIAB sites which all located relatively closely. As all these sites are at the edge of the city there is ample habitat in the surrounding countryside for birds to be displaced to so the loss of habitat from these sites is a minor cumulative impact. The same applies to the local badger population at West Cambridge, North West Cambridge and NIAB.	Minor	Minor Not significant

Baseline		Impact assessment									
Receptor	Value	Proposed Development	North West Cambridge	NIAB	Orchard Park	Northstowe	West Cambourne	Clerk Maxwell Road	Cumulative effect	Cumulative Impact magnitude	Significance of effect
Invasive species	No conservation value	Minor beneficial effect due to the treatment and removal of invasive species on Site.	None	None	None	None	None	None	No invasive species impacts have been reported on any of the other developments. No cumulative effects will arise.	Neutral	Neutral Not significant
Conservation areas	High	Slight adverse effect on the setting of the Central Cambridge Conservation Area and moderate adverse effects on the setting of the Conduit Head Road, and West Cambridge Conservation Areas due to construction works activities.	Negligible effects on conservation areas.	None	None	None	None	None	The North West Cambridge development reported negligible effects on all conservation areas within the study area which included Conduit Head Road, and West Cambridge Conservation Areas. These negligible effects will not result in cumulative effects to any conservation areas	No change	Neutral Not significant
Listed buildings	Medium to high	Moderate adverse effect on White House, and slight adverse effect on five other listed buildings due to impacts on their setting. Slight adverse effect to non-designated buildings on-Site due to their demolition.	Negligible effects on listed buildings. Minor to moderate adverse effect to Clements End and Conduit Rise locally listed buildings. Moderate adverse effect to two locally listed buildings on-site due to demolition.	None	None	Potential adverse effects to a listed water pump due to construction traffic passing nearby.	Moderate to minor adverse effect to non-designated medieval moated site at Swansley Farm due to extensive changes to setting.	None	The only development which could result in cumulative effects to the listed buildings impacted by the Proposed Scheme is North West Cambridge. The North West Cambridge ES reported adverse effects to a number of listed and locally listed buildings, but none of these will be impacted by the Proposed Scheme. Cumulative effects to listed buildings will not arise.	No change	Neutral Not significant

Baseline		Impact assessment									
Receptor	Value	Proposed Development	North West Cambridge	NIAB	Orchard Park	Northstowe	West Cambourne	Clerk Maxwell Road	Cumulative effect	Cumulative Impact magnitude	Significance of effect
Landscape character areas (LCA)	Low to high	Slight adverse effects to the Site and West Cambridge Central Core LCAs, and moderate adverse effects to Coton LCA due to a loss of tranquillity and impacts to setting during construction.	Minor adverse effects to Regional Character Area 3 – Western Claylands, major adverse effects to LCA 5 and minor adverse effects to LCA 2 due to re-definition of the western urban edge of Cambridge.	Slight to moderate adverse effects to Southern Fen Edge LCA, and slight adverse effects to Huntingdon Road LCA due to impacts on the open landscape from construction activities, cranes and scaffolding.	None	Slight adverse effects to Lowland Village Farmlands LCA, Planned Silt Fen LCA, Planned Peat Fen LCA, and Wooded Village Farmlands due to visibility of cranes.	Moderate adverse effect to landscape character due to construction activities being uncharacteristic to the existing landscape.	None	All of the developments will result in an increase in urban development in the north west of Cambridge. Northstowe and West Cambourne are sufficiently distant from Cambridge so as to not affect the landscape character areas influenced by the other developments. The Proposed Scheme combined with North West Cambridge, NIAB, and Orchard Park will result in a large area under construction at the same time, assuming that construction programmes overlap. This will result in large change to the peri-urban character for the duration of construction. The cumulative magnitude of impact for this urban extension is large adverse.	High adverse	Moderate to large adverse (depending on LCA) Significant
Key viewpoints	Low to high	Large adverse effects to four viewpoints, moderate adverse effects to two viewpoints and slight adverse effects to thirteen viewpoints due to the introduction of cranes and tall plant into views.	Minor adverse effect to five key viewpoints due to the introduction of construction activities into the existing views.	Substantial adverse effects to four viewpoints, moderate to substantial adverse effects to one viewpoint, moderate adverse effects to one viewpoint, slight to moderate adverse effects to one viewpoint, and slight adverse effects to two viewpoints due to views of construction activities.	None	Slight adverse effects to nine viewpoints, moderate adverse effects to four viewpoints, substantial adverse effects to nine viewpoints, and very substantial adverse effects to three viewpoints due to construction activities and plant appearing in views.	Major to minor adverse effects to viewpoints due to varying degrees of visibility of construction works.	None	With the exception of Orchard Park all of the developments will result in adverse effects to visual receptors. The only visual receptor impacted by the Proposed Scheme which also has views of the other developments is Viewpoint 1 at the Coton Countryside Reserve which has commanding views of both the Site and the North West Cambridge site. When the baseline was recorded for this viewpoint construction at North West Cambridge was well underway as demonstrated by the presence of cranes in the photomontages. Potential cumulative impacts have therefore already been considered in the assessment and no further consideration is required.	None	Neutral Not significant

Baseline		Impact assessment									
Receptor	Value	Proposed Development	North West Cambridge	NIAB	Orchard Park	Northstowe	West Cambourne	Clerk Maxwell Road	Cumulative effect	Cumulative Impact magnitude	Significance of effect
Employment	Medium	Moderate beneficial effects will arise due to the direct and indirect creation of 1,000 jobs at the local level and 1,200 jobs at the regional level.	Significant benefits will arise due to job creation during construction. It is expected many of these will be sourced nationally resulting in leakage.	Beneficial effect due to job creation during construction. It is anticipated these jobs will mainly be sourced from outside of the region.	None	Small beneficial effects will arise from the direct employment of up to 250 construction workers on-Site. Likely to be a mix of local workers and workers from further afield.	Moderate to minor beneficial effects due to the creation of 331 construction jobs per month.	None	All of the developments will result in an increase in construction work opportunities although as not all the developments have quantified the predicted number of construction workers required this is difficult to quantify. As the construction programmes of all the developments are likely to overlap to some degree, given the large time scales involved, there is likely to be a cumulative benefit to employment. The construction sector in Cambridge and South West Cambridge is generally under represented compared to national averages so the cumulative benefits of this increased employment is likely to be felt outside the region.	Moderate beneficial	Moderate beneficial Significant
Local economy	Moderate	Minor beneficial effects to the local economy will result due to the use of local supply chains and construction worker expenditure.	Not directly assessed but assumed to be beneficial due to increased employment, supply chains, worker expenditure etc.	Not directly assessed but assumed to be beneficial due to increased employment, supply chains, worker expenditure etc.	None	Not directly assessed but assumed to be beneficial due to increased employment, supply chains, worker expenditure etc.	Not directly assessed but assumed to be beneficial due to increased employment, supply chains, worker expenditure etc.	None	Although employment benefits from construction are likely to be mainly felt outside the region, a proportion of new construction jobs will be catered for by local demand. In addition there will be the local economic benefits of supply chains, and businesses catering for construction workers. There will be a cumulative benefit to the local and regional economy from all of the developments collectively.	Low beneficial	Minor beneficial Not significant
Local residents / businesses	Moderate	Minor adverse effects to local businesses and residents will arise during construction due to temporary disruption.	None	None	None	None	None	None	No other developments anticipated effects to local residents and businesses so cumulative effects to these receptors are unlikely to arise.	Negligible	Negligible Not significant

Baseline		Impact assessment									
Receptor	Value	Proposed Development	North West Cambridge	NIAB	Orchard Park	Northstowe	West Cambourne	Clerk Maxwell Road	Cumulative effect	Cumulative Impact magnitude	Significance of effect
Security	Low	Negligible security effects will occur as the work site will remain secure and guarded throughout construction.	None	None	None	None	None	None	No other developments anticipated effects to security so cumulative effects are unlikely to arise.	Negligible	Negligible Not significant
Housing and services	Low	Negligible adverse effects to housing and services will result from increased demand from construction workers.	None	None	None	None	Negligible	None	No other developments anticipated effects to housing and services so cumulative effects to these receptors are unlikely to arise.	Negligible	Negligible Not significant
Dust receptors	Medium	Negligible effects from dust will occur due to effective implementation of standard mitigation measures.	Negligible effects from dust will occur with mitigation in place.	None	Minor to negligible adverse effects to residential and school receptors with mitigation.	Moderate adverse effects to residential receptors and schools within 200m of construction works.	Negligible effects from dust will occur due to effective implementation of standard mitigation measures.	None	With the exception of Northstowe, all projects are predicted to result in negligible or minor effects from dust due to the implementation of effective standard mitigation measures. At Northstowe only receptors within 200m of dust generating activities will be impacted. As the Site is substantially further than 200m from Northstowe none of the receptors impacted by Northstowe could be impacted by the Proposed Development	No change	Negligible Not significant
Noise and vibration receptors	Medium to high	Minor adverse effects to receptors off site and moderate adverse effects to receptors on Site will occur due to construction activities and the operation of construction plant.	Negligible to minor adverse noise and vibration effects during construction to nearby sensitive receptors.	No impacts to receptors due to separation distance.	None	Small adverse effect to residents at Magdalene Close, Longstanton and large adverse effect to residents occupying initial stages of development due to piling. Mitigation will ensure that no significant noise effects arise.	Negligible noise and vibration effects during construction to nearby sensitive receptors.	Not directly assessed but likely negligible to minor adverse effects during construction to nearby sensitive receptors.	Negligible to minor noise and vibration effects will be experienced by receptors in close proximity to all the developments except Orchard Park and NIAB. As both noise and vibration impacts lessen substantially over distance, receptors over 200m from construction activities are unlikely to be impacted. Off-site receptors who will experience minor adverse effects from noise and vibration during construction of the Proposed Development will not be impacted by any of the other developments due to the separation distance.	Negligible	Negligible Not significant

Baseline		Impact assessment									
Receptor	Value	Proposed Development	North West Cambridge	NIAB	Orchard Park	Northstowe	West Cambourne	Clerk Maxwell Road	Cumulative effect	Cumulative Impact magnitude	Significance of effect
Surface water bodies	Low to high	Negligible to low adverse effects to surface water bodies during construction due to physical alterations of the upper reaches of Coton Brook and potential risk of contaminated runoff from construction works areas.	Minor beneficial effect to Washpit Brook due to improved ecological design.	None	None	Mitigation measures will ensure no significant effects occur to surface water bodies due to contaminated runoff during construction.	Mitigation measures will ensure no significant effects occur to surface water bodies due to contaminated runoff during construction.	None	The Proposed Development will result in temporary adverse effects to the upper reaches of the Coton Brook due to the requirement to re-profile these reaches to increase capacity. None of the other developments will impact on the Coton Brook or its catchment so no cumulative effects will arise.	Negligible	Negligible Not significant
Ground water	Very low	Minor adverse effects to ground water due to the risk of contamination during construction. Ground water is not in continuity with nearby aquifers.	None	Mitigation means that no effects will arise.	None	Mitigation will ensure that no significant effects occur to groundwater due to contamination, from new pollution sources or pathways.	Mitigation will ensure that no significant effects occur to groundwater due to contamination, from new pollution sources or pathways.	None	For all developments, mitigation measures will be put in place to protect ground water during construction. The clay underlying the Site is an effective aquatard that will prevent the contamination of ground water so no effects are anticipated. No cumulative effects to ground water will occur	Negligible	Negligible Not significant
Construction workers	Low	Negligible / minor adverse effects due to the potential for contaminated land to be present.	None	Mitigation means that no effects will arise.	None	Mitigation will ensure that no significant adverse effects occur to construction workers handling potentially contaminated material.	None	None	There is very little potential for contamination on the Site and mitigation such as PPE for workers will prevent effects occurring if contamination is encountered. Construction workers are unlikely to be working on more than one site at a time so cumulative effects to this receptor will not occur.	Negligible	Negligible Not significant

Operational phase

11.3.2 Table 11.5 lists all those receptors that will be impacted during operation of the Proposed Scheme and notes any impacts from the other developments shown on Figure 11.1, summarising the potential for significant cumulative effects

Table 11.2 Operational phase cumulative effects assessment

Baseline		Impact assessment									
Receptor	Value	Proposed Development	North West Cambridge	NIAB	Orchard Park	Northstowe	West Cambourne	Clerk Maxwell Road	Cumulative effect	Cumulative Impact magnitude	Significance of effect
Protected species	Local	Neutral effect on bats during operation as there is limited bat activity on Site.	Adverse effect to great crested newts and toads due to severance of the population. Increased disturbance to badgers.	Positive effect to bats due to habitat enhancements. Farmland birds will decline on-site whilst numbers of urban species will increase. Locally significant adverse effect to brown hares due to increased disturbance. Beneficial effects to badger due to proposed mitigation.	None	None	Major to minor adverse effects to farmland birds due to loss of habitat and increased disturbance. Major to minor beneficial effects to great crested newts, bats, badgers, and birds due to habitat creation.	None	No effects to protected species are predicted to occur from the Proposed Development once operational so no cumulative effects will arise.	Negligible	Negligible Not significant
Conservation areas	High	Slight adverse effect to Central Cambridge Conservation Area, moderate adverse effect to Conduit Head Road Conservation Area and West Cambridge Conservation Area due to the impact of the Proposed Development on their setting.	Negligible effects on conservation areas.	None	None	Medium to small change to the setting of Longstanton Conservation Area due to the increased presence of development, minor changes to key views, and loss of the agricultural context.	None	None	The Proposed Development will impact Central Cambridge Conservation Area, Conduit Head Road Conservation Area and West Cambridge Conservation Area. None of the other developments will impact these conservation areas so no cumulative effects will occur.	No change	Neutral Not significant
Listed buildings	Medium to high	Moderate adverse effect to White House grade II* listed building and minor adverse effects to five other listed buildings due to the impact of the Proposed Development on their setting.	Moderate to minor adverse effects to one locally listed building, Ascension burial ground chapel, due to impacts to setting.	None	None	Negligible effects to two listed churches in Longstanton.	Moderate adverse effect to two scheduled monuments due to change in setting. Minor adverse effects to the non-designated Swansley Farm moated site due to a change in setting.	None	The Proposed Development will impact the setting of White House and five other listed buildings. None of these will be impacted by any of the other developments so no cumulative effects will arise.	No change	Neutral Not significant

Baseline		Impact assessment									
Receptor	Value	Proposed Development	North West Cambridge	NIAB	Orchard Park	Northstowe	West Cambourne	Clerk Maxwell Road	Cumulative effect	Cumulative Impact magnitude	Significance of effect
Landscape character areas (LCA)	Low to high	Large adverse effect to Coton, and Grantchester LCAs, large to moderate adverse effect to West Cambridge Central Core LCA, moderate adverse effect to Madingley LCA, and slight adverse effect to North West Cambridge, and High Cross LCAs due to the urbanising effect of the Proposed Development.	Minor adverse effects to Regional Character Area 3 – Western Claylands, major adverse effects to LCA 5 and minor adverse effects to LCA 2 due to re-definition of the western urban edge of Cambridge.	Slight beneficial impact to Southern Fen Edge LCA, Western Arbury and King's Hedges LCA, and Huntingdon Road LCA due to improved landscape design on the site.	None	Slight adverse effects to Lowland Village Farmlands LCA, Planned Silt Fen LCA, Planned Peat Fen LCA, and Wooded Village Farmlands due to visibility of development.	Negligible effect due to screening planting.	None	All of the developments will result in an increase in urban development in the north west of Cambridge. Northstowe and West Cambourne are sufficiently distant from Cambridge so as to not affect the city's urban expansion. The Proposed Scheme combined with North West Cambridge, NIAB, and Orchard Park collectively represent a significant urban extension to the north west quadrant of Cambridge by extending the urban environment towards the green belt. The cumulative magnitude of impact for this urban extension is large adverse.	High adverse	Moderate to large adverse (depending on LCA) Significant
Key viewpoints	Low to high	Large adverse effects to two viewpoints, large to moderate adverse effects to two viewpoints, moderate adverse effects to two viewpoints, moderate to slight adverse effects to five viewpoints, and slight adverse effects to seven viewpoints due to the introduction of new urban elements into existing views.	Minor adverse effects to nine viewpoints, moderate adverse effects to one viewpoint, and major adverse effects to two viewpoints due to the introduction of new urban elements into existing views.	Slight adverse effects to six viewpoints fifteen years after construction due to an urbanising effect on views.	None	Slight adverse effects to nine viewpoints, moderate adverse effects to four viewpoints, substantial adverse effects to nine viewpoints, and very substantial adverse effects to three viewpoints due to the proposed scheme appearing in views.	Moderate adverse to negligible effects due to varying degrees of views being impinged by the proposed scheme.	None	With the exception of Orchard Park all of the developments will result in adverse effects to visual receptors. The only visual receptor impacted by the Proposed Scheme which also has views of the other developments is Viewpoint 1 at the Coton Countryside Reserve which has commanding views of both the Site and the North West Cambridge site. The combination of both developments within this view will increase the perception of urban encroachment resulting in cumulative effects on this high value viewpoint.	Medium adverse	Moderate adverse Significant

Baseline		Impact assessment									
Receptor	Value	Proposed Development	North West Cambridge	NIAB	Orchard Park	Northstowe	West Cambourne	Clerk Maxwell Road	Cumulative effect	Cumulative Impact magnitude	Significance of effect
Employment	Moderate	Major beneficial effects due to the direct creation of 11,600 new jobs on Site.	Moderate beneficial effect due to the creation of 4,350 new jobs on site.	Beneficial effect due to the creation of 64 net new jobs on site.	None	Medium to large beneficial effect due to the creation of 666 new jobs on site.	Moderate to minor beneficial effect due to the creation of employment land which will serve 1,076 new FTE jobs.	None	The combined total of direct new jobs anticipated to be delivered by all of the developments is 17,756 which is a substantial increase from the Proposed Development alone. In addition there will be many more indirect jobs created resulting in a substantial beneficial cumulative effect.	High beneficial	Major beneficial Significant
Local economy	Moderate	Major beneficial effect due to the predicted generation of £476.6 million per annum Gross Value Added to the regional economy.	Not directly assessed but assumed to be beneficial due to increased employment.	Not directly assessed but assumed to be beneficial due to increased employment.	None	Not directly assessed but assumed to be beneficial due to increased employment.	Moderate to minor beneficial effect due to expenditure of new workers and residents.	None	The combined effect of the new economic activity that will be generated by the six new developments and the cumulative total of 17,756 new jobs will be beneficial to the local and regional economy.	High beneficial	Major beneficial Significant
Socio-economic policy objectives	High	Major beneficial effect due to the Proposed Development significantly supporting key targeted growth areas including academic, high-technology, and research and development.	Not directly assessed but assumed to be beneficial due to provision of employment land, housing and services.	Not directly assessed but assumed to be beneficial due to provision of employment land, housing and services.	Not directly assessed but assumed to be beneficial due to housing and services.	Not directly assessed but assumed to be beneficial due to provision of employment land, housing and services.	Not directly assessed but assumed to be beneficial due to provision of employment land, housing and services.	Not directly assessed but assumed to be beneficial due to provision of housing and required amenities.	All of the developments serve to meet socio-economic policy objectives for the local area and region by providing housing, services, and skilled employment in the academic, high-technology, and research and development sectors. There is a synergistic socio-economic relationship between these developments resulting in significant cumulative benefits.	High beneficial	Major beneficial Significant
Security	Low	Negligible effect due to Site wide vitality and the designing out of security risks through site layout, landscape and lighting design.	None	None	None	None	None	None	None of the other developments have raised any security concerns that could result in effects. No cumulative effects will arise.	Negligible	Negligible Not significant

Baseline		Impact assessment									
Receptor	Value	Proposed Development	North West Cambridge	NIAB	Orchard Park	Northstowe	West Cambourne	Clerk Maxwell Road	Cumulative effect	Cumulative Impact magnitude	Significance of effect
Housing and services	Low	Minor adverse effects to local housing and services due to increased demand created by the new jobs.	Negligible effect on demand as the proposal provides both housing and services to cater for new jobs.	Positive effect due to the provision of 1,593 new dwellings, school, and health centre.	Not assessed but assumed to be positive due to the provision of 112 new dwellings.	Substantial positive effect due to the provision of 1,500 new dwellings, school, retail and community facilities.	Moderate to minor beneficial due to the provision of 2,350 new dwellings, schools, leisure, and community facilities.	Not assessed but assumed to be positive due to the provision of 35 new dwellings.	The local development plans of South Cambridgeshire and Cambridge City Council intend these developments to interact positively with housing provided at Northstowe and West Cambourne providing part of the housing and social infrastructure demands created by the provision of new jobs created particularly at the Proposed Development and North West Cambridge sites.	Moderate beneficial	Minor beneficial Not significant
Human health receptors (air quality)	High	Negligible effects to local residents and workers from the Proposed Development due to increases in emissions to air from increased traffic and the energy centre.	Negligible effects to local residents and workers from the scheme due to increases in emissions to air from increased traffic and the energy centre.	None	None	None	None	Likely increase in peak time traffic but no significant effects assessed.	Cumulative emissions from transport have been considered in Chapter 11 (air quality) since the transport modelling data included future developments. Cumulative effects from the energy centre flues on the Proposed Development and the North West Cambridge development are unlikely to result in a cumulative reduction in air quality to local receptors due to the distance of separation between the two flues and resultant dispersion of emissions.	Imperceptible	Negligible Not significant
Noise and vibration receptors	Medium to high	Negligible effects to off Site receptors and minor to high adverse effects to on Site receptors due to noise from rooftop plant and the energy centre.	Negligible effects from fixed plant during operation.	None	None	No significant noise effects.	None	Likely increase in peak time traffic but no significant effects assessed.	Noise effects from fixed plant on the different developments will only impact receptors within the developments. Cumulative effects will not arise.	Negligible	Negligible Not significant

Baseline		Impact assessment									
Receptor	Value	Proposed Development	North West Cambridge	NIAB	Orchard Park	Northstowe	West Cambourne	Clerk Maxwell Road	Cumulative effect	Cumulative Impact magnitude	Significance of effect
Surface water bodies	Low to high	Negligible to low beneficial effects due to improved morphological and ecological design of the upper reaches of the Coton Brook and the extension of SUDs across the Site.	Minor beneficial effects to Washpit Brook due to improved water quality from drainage design.	None	None	Moderate beneficial effect due to the creation of new linear waterbodies and enhancement of the diverted section of Longstanton Brook.	Minor beneficial effects to surface watercourses due to improved water quality of runoff from treatment through SUDS.	None	All of the developments that are predicting an impact to surface water bodies will result in beneficial effects to the respective water bodies due to the installation of modern SUDs based drainage designs which will improve water quality. None of the receiving water courses for each of the developments are shared by any of the developments so no cumulative effects will arise to any of the surface water bodies.	Negligible	Negligible Not significant
Ground water	Very low	Negligible effects to ground water due to lack of continuity with deeper aquifers and the extension of SUDs across the Site.	None	Mitigation means that no effects will arise.	None	Mitigation measures will ensure that ground water is not significantly affected during operation of the scheme.	Negligible effects to groundwater due to low impermeability and low vulnerability of underlying aquifer.	None	For all developments, mitigation measures will be put in place to protect ground water during operation. The clay underlying the Site is an effective aquatard that will prevent the contamination of ground water so no effects are anticipated. No cumulative effects to ground water will occur	Negligible	Negligible Not significant
Site users	Low	Minor beneficial effects to site users due to the remediation of any potential contamination on Site.	None	Mitigation would mean no effects would arise.	None	Mitigation measures will ensure that site users are not significantly affected by contamination.	None	None	There is unlikely to be any contamination on Site but if any is encountered, it will be remediated. Site users will not be affected by ground contamination at the Proposed Development or any of the other developments. No cumulative effects will arise.	Negligible	Negligible Not significant

11.4 Mitigation measures

In-combination mitigation

11.4.1 No additional mitigation measures would be necessary.

Cumulative mitigation

11.4.2 No additional mitigation measures will be implemented beyond those listed in the original ES.

11.5 Summary

11.5.1 The only significant adverse cumulative effects relate to landscape and visual impacts as per the conclusions in the original ES. No new cumulative effects have been identified with the inclusion of the Clerk Maxwell Road proposal. The original ES cumulative effects assessment conclusions remain valid.

12. Schedule of mitigation

12.1.1 Table 16.1 below provides a summary of all the mitigation proposed in the assessment chapters, determines who is responsible for implementing the mitigation, and when in the project lifecycle the mitigation would be implemented. This does not include measures that are already part of the design as these have already been implemented.

Table 12.1 Schedule of proposed mitigation measures

Assessment chapter	Mitigation measure	Secured through:
Ecology	As the Proposed Development is anticipated to be phased over 15 years it should be recognised that there are difficulties in accurately predicting the effects of the later stages of development. For example, a species that is common and has no legal protection at this time may decline in numbers and become protected by law before construction of the later stages of development. Natural England and the Cambridge City Council ecologist will be consulted prior to submission of the reserved matters applications to determine if any new or further surveys, as appropriate, are needed to support future reserved matters applications.	Planning condition
	A protective exclusion buffer will be established around the Cotton Path Hedgerow CWS and remaining extent of the Scrub East of M11 CiWS and clearly marked with netlon fencing or equivalent for the duration of construction works in the vicinity of the CWS.	Planning condition
	Replacement aquatic and marginal planting within the surface water bodies re-profiled to increase drainage capacity will be of equivalent or better habitat value than existing.	Planning condition
	The new profile and plan of the waterbodies (D3, D4 and D5) and ponds (P2, P3 and P5), which will be re-engineered to increase drainage capacity, will maximise ecological value by providing a variety of physical habitats. Hard engineering structures along the banks of these surface water bodies will be minimised with preference given to softer natural banks planted with species to maximise ecological value.	Planning condition
	Prior to works within habitat connected to the Southern Ecological Corridor, such as reprofiling of waterbodies, consideration should be given to the need to undertake updated great crested newt surveys to determine if works need to be undertaken under a European Protected Species licence from Natural England. To minimise the risk of harm and disturbance to great crested newts, a Precautionary Method of Working (PMW) will be produced and implemented during the construction phase for all works within 500m of the ponds within Madingley Road Park and Ride, Adams Road Sanctuary CiWS and Birds Sanctuary, Conduit Head CiWS. This will include measures such as hand-searching of potential refuges within working areas, supervised clearance of suitable habitat, and provision of toolbox talks to workers.	Planning condition
	Site clearance should be undertaken under a PMW for reptiles, particularly grass snakes.	Planning condition
	A 50m exclusion buffer zone around the artificial badger sett will be maintained and marked with netlon fencing or equivalent for the duration of construction works that occur in the vicinity of the sett. No works activities will proceed within the buffer without further consultation with Natural England and the Cambridge City Council ecologist first to agree additional protection measures. This may include the submission of an application for a Natural England licence to interfere or prevent damage to the sett.	Planning condition
	A survey of the existing artificial badger sett will be undertaken prior to any construction works within 50m of the sett to check for any further expansion and levels of activity.	Planning condition
	Green corridor links to the existing hedgerows and surrounding countryside from the artificial badger sett will be maintained and protected throughout construction.	Planning condition
	Update surveys will be required for buildings and trees a season before any proposed demolition and vegetation clearance during the construction phase for works taking place after 2017.	Planning condition
	A bat box suitable for pipistrelle bats (such as a Schwegler bat box) will be installed on buildings or trees within approximately 50m of the existing building W27 to replace the loss of the confirmed transitional roost at this location.	Planning condition
	Currently an application to Natural England for a protected species licence will be required for the demolition of building W27 and further surveys will be required one season before the demolition of this building to support the application for a Wildlife Licence from Natural England. Works will be undertaken under the watching brief of an appropriately qualified ecologist to ensure bats are not harmed, killed or disturbed during demolition.	Planning condition

Assessment chapter	Mitigation measure	Secured through:
	<p>Lighting schemes during construction and operation will be undertaken in accordance with wildlife and lighting guidance which advises:</p> <ul style="list-style-type: none"> • Minimisation of the spread of light spill; • Lowering the height of lighting columns; • Abstaining from lighting areas such as the M11 scrub, Coton footpath hedgerow and West Cambridge lake, effectively creating dark corridors and areas in which bats can still forage and commute around the Site; • Limiting the times lights are on to provide dark periods, if practical, especially during the peak summer months of June, July and August; • Using narrow spectrum light sources; • Using light sources that emit minimal ultra-violet light; • Using lights that peak higher than 550nm; and <p>Avoiding white and blue wavelengths of the light spectrum.</p>	Planning condition
	Dark corridors / areas around the M11 scrub, Coton Footpath hedgerow and West Cambridge lake will be provided during construction. Contractors should seek advice from a suitably qualified ecologist to enable this measure.	Planning condition
	Vegetation and building clearance will be undertaken outside of the bird nesting season if possible. The core bird nesting season is March to August inclusive, although some species have been recorded nesting during all months of the year and so care will be taken at all times. All vegetation and structures will be checked by a suitably trained and qualified ecologist prior to clearance to ensure no nesting birds are present. If active birds' nests are found, all works that could damage the nests will cease until the eggs have hatched and the young have fledged.	Planning condition
	Approximately 25 bird boxes suitable for house martins and 5 bird boxes suitable for swallows will be installed in areas close to the Department for Veterinary Medicine buildings and sports centre to replace the loss of, or disturbance to, existing nesting sites identified in the surveys.	Planning condition
	Prior to any construction works, checks will be undertaken by a suitably qualified botanist to ensure that new invasive species have not colonised the Site in the intervening period.	Planning condition
	All existing invasive plant species and any new invasive plant species found will be treated and removed from the Site by a specialist contractor before any construction works that could result in their disturbance and subsequent spread are undertaken.	Planning condition
Historic environment	As confirmed by the 2011 Whittle Laboratory excavations (Slater 2011), the north western side of the Vicar's Farm Roman settlement extends into the eastern portion of that facility's grounds. This will require excavation over approximately 3,375m ² . Of this, excluding the 2011-area, approximately 2,100m ² lie exterior to that building's footprint and will require full excavation prior to the Laboratory's demolition; occurring within the footprint-area, the remaining portion (approximately 1,275m ²) will require more summary investigation concurrent with the Laboratory's demolition.	Planning condition
	A limited degree of Iron Age occupation evidence was found during the course of the 2001 Nano-Fabrication Building Site investigations. The settlement is likely to have extended across at least part of the area of the Cavendish Laboratory complex, but where it was unfeasible to cut any trial trenches during the 2015 evaluation programme. Accordingly, upon vacating the Laboratory buildings (but prior to their demolition), a limited trenching programme will be conducted within the grounds; should further evidence of early settlement be recovered, then an appropriate excavation programme will occur in conjunction with the demolition works.	Planning condition
	Site 2 will require full open-area excavation when development proceeds there. The further investigation of the Site 3 field system and trackway – aside from its incidental exposure in Site 2 – can, within Field 1, be limited to the area of new major building footprints and any further areas that will be disturbed through excavation, augmented by additional trenching.	Planning condition
	Nano-Fabrication Building Site - A limited degree of Iron Age occupation evidence was found during the course of the 2001 investigations ²⁰ . The settlement is likely to have extended across at least part of the area of the Cavendish Laboratory complex, but where it was unfeasible to cut any trial trenches during the 2015 evaluation programme. Accordingly, upon vacating the Laboratory buildings (but prior to their demolition), a limited trenching programme will be conducted within the grounds; should further evidence of early settlement be recovered, then an appropriate excavation programme will occur in conjunction with the demolition works.	Planning condition
	In addition to the height parameter plan at the edge of Development zone adjacent to the eastern boundary the built form must comply with an additional height restriction of 25m AOD. From this line, the development heights can rise with an angle of 45° to the parameter height of 31m AOD.	Approval (Design Guidelines)
	Building frontages longer than 60m facing onto Madingley Road or eastern boundaries should be broken down by variation in build-to line and/or height and roofscape.	Approval (Design Guidelines)
	Any visible frontages facing onto Madingley Road or the eastern boundary must have a high quality architectural treatment. Alternatively or in addition, the woodland buffer shall be reinforced to limit visibility into the Site.	Approval (Design Guidelines)
	Landscaped gaps may be used to break frontage lengths. Any new gaps should be a minimum of 15m for buildings facing Madingley Road and the eastern boundary from building face to building face.	Approval (Design Guidelines)
	A variable and interesting roofline should be formed along Madingley Road and eastern development edges	Approval (Design Guidelines)

Assessment chapter	Mitigation measure	Secured through:
	Service areas, multi storey car parks and development 'backs' must be screened by the existing woodland buffer (reinforced where necessary) and/or additional planting.	Approval (Design Guidelines)
	The existing woodland buffer along the northern boundary must be maintained and reinforced to ensure it is effective in maintaining the character of Madingley Road.	Approval (Design Guidelines)
	There must be effective screening of rooftop plant to ensure that its visual impact on the street is minimised.	Approval (Design Guidelines)
	Rooftop plant should, wherever possible be set back from the predominant building line along the eastern edge. Where not possible to avoid this, there must be effective screening of rooftop plant	Approval (Design Guidelines)
	The existing woodland buffer along the eastern boundary must be maintained and reinforced to ensure a green edge to the new development.	Approval (Design Guidelines)
	Any gaps between frontages facing the eastern boundary should be appropriately planted, ensuring that some individual trees can grow to maturity.	Approval (Design Guidelines)
	Visibility to the development from Clerk Maxwell Road must be minimised and development should be set within the existing eastern woodland edge.	Approval (Design Guidelines)
Landscape and visual	Vegetation on Site that will be retained will be protected from accidental damage during construction by erecting temporary fencing.	Planning condition
	Temporary hoarding will be used around all construction compounds and work sites to screen views of construction activities.	Planning condition
	The use of security lighting during construction will be minimised. Where it is needed Institute of Lighting Engineers guidance will be followed to minimise light spill.	Planning condition
	Construction traffic travelling to and from the Site will travel along haul routes agreed with Cambridgeshire County Council. The haul routes will avoid Cambridge city centre and Madingley Road west of the M11 where possible.	Planning condition
	Mitigation measures to minimise construction noise and dust will help to preserve the tranquil character of the adjacent landscape character areas.	Planning condition
	Operation of a clean and tidy construction site, including covering of stockpiles.	Planning condition
	Additional height restrictions apply to the northern and southern frontages of the Southern Ecological Corridor. The aim of these restrictions is to form a coherent frontage to the space but allow for variation and interest in response to long distance views from the south.	Approval (Design Guidelines)
	In addition to the height parameter plan at the edge of Development zone adjacent to the eastern boundary the built form must comply with an additional height restriction of 25m AOD. From this line, the development heights can rise with an angle of 45° to the parameter height of 31m AOD.	Approval (Design Guidelines)
	Building frontages longer than 60m facing onto Madingley Road, southern or eastern boundaries, or more than 70m facing onto the western boundary should be broken down by variation in build-to line and/or height and roofscape.	Approval (Design Guidelines)
	Any visible frontages facing onto Madingley Road, the eastern boundary, or the southern boundary must have a high quality architectural treatment. Alternatively or in addition, the woodland buffer shall be reinforced to limit visibility into the Site.	Approval (Design Guidelines)
	Landscaped gaps may be used to break frontage lengths. Any new gaps should be a minimum of 15m for buildings facing Madingley Road and the eastern boundary, 20m for buildings facing the western boundary, and 25m for buildings facing the southern boundary from building face to building face.	Approval (Design Guidelines)
	A variable and interesting roofline should be formed along Madingley Road, the southern, and eastern development edges.	Approval (Design Guidelines)
	Any multi-storey car parking structures along the western frontage must be appropriately and sensitively designed to ensure interest and variation in building line and roof line.	Approval (Design Guidelines)
	No multi storey car parking should be located along the southern edge, unless set behind a woodland buffer.	Approval (Design Guidelines)
New planting must relate to the landscape, must be used to help soften the urban edge: any new setbacks and gaps between frontages should be appropriately planted with trees and greenscape, ensuring that some individual trees can grow to maturity.	Approval (Design Guidelines)	
Vertical planting should be considered to soften development edges and boundaries.	Approval (Design Guidelines)	

Assessment chapter	Mitigation measure	Secured through:
	Service areas, multi storey car parks and development 'backs' must be screened by the existing woodland buffer (reinforced where necessary) and/or additional planting.	Approval (Design Guidelines)
	Service areas and service yards must be located away from the Southern edge and set within new development.	Approval (Design Guidelines)
	Existing trees must be maintained where possible and major feature trees shall be added at key locations.	Approval (Design Guidelines)
	The best trees on Site, due to their condition, prominence, or contribution to the landscape are to be retained as set out in Table 3.3, Chapter 3.	Approval (Design Guidelines)
	The existing woodland buffer along the northern boundary must be maintained and reinforced to ensure it is effective in maintaining the character of Madingley Road.	Approval (Design Guidelines)
	The greenery of the woodland buffer along the Madingley Road shall be extended southwards to West Green by adding planting to this part of the Site.	Approval (Design Guidelines)
	Visibility to the development from Clerk Maxwell Road must be minimised and development should be set within the existing eastern woodland edge.	Approval (Design Guidelines)
	Any gaps between frontages facing the eastern boundary should be appropriately planted, ensuring that some individual trees can grow to maturity.	Approval (Design Guidelines)
	The existing woodland buffer along the eastern boundary must be maintained and reinforced to ensure a green edge to the new development.	Approval (Design Guidelines)
	Visibility to the development from the west must be minimised and development should be set within the existing woodland edge along the western boundary.	Approval (Design Guidelines)
	The existing woodland buffer along the western boundary must be maintained to provide screening from the M11 and form a green edge to the new development.	Approval (Design Guidelines)
	The greenery of the western woodland buffer shall be extended eastwards to Ada Lovelace Road by adding planting to this part of the Site.	Approval (Design Guidelines)
	Additional landscape and planting at the western boundary must relate to the rural and agricultural landscape to the west.	Approval (Design Guidelines)
	Rooftop plant must be set back from the southern development edge.	Approval (Design Guidelines)
	There must be effective screening of all rooftop plant, when viewed from the south and this built element should contribute to the composition of a varied skyline.	Approval (Design Guidelines)
	Rooftop plant should, wherever possible be set back from the predominant building line along the eastern edge. Where not possible to avoid this, there must be effective screening of rooftop plant.	Approval (Design Guidelines)
	Rooftop plant should be screened and/or grouped to avoid visual clutter in distant views.	Approval (Design Guidelines)
Socio-economics	During the construction phase, disturbance to local residents and businesses will be minimised by phasing and restricting hours of construction work. This will be specified in the Construction Environmental Management Plan.	Planning condition
	Efficient guarding and surveillance of the Site during construction will mitigate risks to security, as will ensuring that the Site is well lit during evening and night hours and that valuable materials are secured.	Planning condition
	For the operational phase, measures in the design and layout of the Proposed Development will minimise anti-social behaviour and crime. This would include ensuring external areas are well lit.	Planning condition
Traffic and transport	Delivery routes will be agreed with the local highways authority and will preferentially access the Site from the M11 Junction 13/ Madingley Road particularly for heavy vehicles.	Planning condition
	Heavy vehicle movements will not be permitted through Cambridge City unless no alternative is available and only once agreement has been sought with the local highway authority.	Planning condition

Assessment chapter	Mitigation measure	Secured through:
	<p>The travel demand management strategy, set out in the Framework Travel Plan based on:</p> <ul style="list-style-type: none"> • The benefit of a fully-funded quality FTP; • The consequences of the application of “Smarter Choices” guidance to reduce vehicular trip generation from the Proposed Development; and • The provision of car parking at a controlled, appropriate level of provision, and the implementation of a car parking management scheme combined with permit provision on a demonstrated needs basis; 	Section 106 agreement
	<p>An enhanced public transport strategy. The scale of the Proposed Development means that there will be both a high quantum of demand for public transport, and a number of locations that will need to be connected to West Cambridge. The strategy includes:</p> <ul style="list-style-type: none"> • Increased regularity of bus provision; • Direct on-site routes; • Provision of high quality bus stops (including real time passenger information, and the provision of comprehensive timetable information including network maps and fare details); • Bus priority measures to be provided with Selective Vehicle Detection technology at any new traffic signals controlling the entrances to the Site from Madingley Road; • Provision of service information and incentive measures to increase patronage; and • Promote network ticketing with operators serving West Cambridge, allowing for passengers from destinations other than Cambridge city centre to make journeys on other services and transfer using the same ticket stored on a smartcard, mobile phone or EMV wave and pay card; 	Section 106 agreement
	<p>Quality pedestrian and cyclist facilities. The strategy includes:</p> <ul style="list-style-type: none"> • Direct, quality North-South footway and cycleway provision across West Cambridge linking between Madingley Road and Coton Path using the Western Access, High Cross, JJ Thomson Avenue and Clerk Maxwell Road.; • The East - West Shared Space Link to provide the main east - west spine for Pedestrians and Cyclists connecting Clerk Maxwell Road and High Cross with access to a number of plots and lower-hierarchy Cycle routes; • As with North West Cambridge, all vehicle routes being designed for a 20mph speed limit using passive speed management measures such as constrained widths and the use of shared surface areas. This low-speed environment is primarily to control vehicle speeds, but in so doing will create a safer and more attractive environment for pedestrians and cyclists; • Footways being provided on both sides of the on-site streets and at the Site Access locations. Controlled crossing points would be provided, and traffic calming measures would be present to reduce traffic speed and to ease pedestrian movement; • Improved links between West Cambridge and all popular destinations; including to the East, towards the City, and to the north through North West Cambridge. These links will be supported with controlled crossings; • Provision of high levels of quality cycle parking, at least to the adopted Cambridge Local Plan 2014 minimum cycle parking standards, within private covered, secure, lit and well-located areas at the destinations, as well as further provision through the Development; and • All major employers being encouraged to provide associated shower and changing room facilities for walkers and cyclists after their journeys. 	Section 106 agreement
	<p>Schemes to improve environmental conditions. The strategy includes:</p> <ul style="list-style-type: none"> • Contributions to effect a lower speed limit than the existing 40mph speed limit locally on Madingley Road – thus providing environmental benefit from existing vehicular movements; • Contributions to the necessary Traffic Regulation Orders to implement car parking zones or prohibitions on surrounding streets to minimise inappropriate overspill parking – potentially in the context of providing improved cycle facilities; • Measures at three locations to address existing highway safety concerns – especially effecting vulnerable road users; • The extension of the SCOOT and MOVA traffic signal optimisation to the proposed traffic signals along Madingley Road – JJ Thomson Avenue and Clerk Maxwell – to control any additional queuing and delays as a consequence of the Proposed Development. 	Section 106 agreement
	<p>Adaptive Phase Approach through which a mitigation scheme will be developed at the appropriate time, and ensured through a planning condition, which sets out:</p> <ul style="list-style-type: none"> • The mitigation scheme's objectives including the targets it must meet over time; • The mitigation scheme's parameters; • The methods of achieving the mitigation scheme's objectives and reviewing and adapting those methods over time to ensure that the objectives are met; and • A review mechanism to ensure that the achievement of the objectives is kept under review and the methods adapted if further steps prove necessary. 	Section 106 agreement
Air quality	Develop and implement a stakeholder communications plan which displays the name and contact details of persons accountable, and the head or regional office information on the site boundary.	Planning condition
	Develop and implement a dust management plan.	Planning condition
	Record all dust and air quality complaints, identify causes and take measures to reduce emissions.	Planning condition

Assessment chapter	Mitigation measure	Secured through:
	Record exceptional incidents and action taken to resolve the situation.	Planning condition
	Carry out regular site inspections to monitor compliance with the dust management plan and record results.	Planning condition
	Increase site inspection frequency during prolonged dry or windy conditions and when activities with high dust potential are being undertaken.	Planning condition
	Agree dust monitoring locations with the local authority and instigate monitoring 3 months in advance of works commencing in the area.	Planning condition
	Plan site layout so that machinery and dust causing activities are located away from receptors, as far as possible.	Planning condition
	Erect solid screens or barriers around dusty activities or the site boundary at least as high as any stockpile on site.	Planning condition
	Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.	Planning condition
	Avoid site run off of water or mud.	Planning condition
	Keep site fencing, barriers and scaffolding clean using wet methods.	Planning condition
	Remove potentially dusty materials from site as soon as possible.	Planning condition
	Cover, seed or fence stockpiles to prevent wind whipping.	Planning condition
	Ensure all vehicles switch off engines when stationary.	Planning condition
	Avoid the use of diesel or petrol powered generators where possible.	Planning condition
	Produce a Construction Logistics Plan to manage the delivery of goods and materials.	Planning condition
	Only use cutting, grinding and sawing equipment with dust suppression equipment.	Planning condition
	Ensure an adequate supply of water on site for dust suppressant.	Planning condition
	Use enclosed chutes and conveyors and covered skips.	Planning condition
	Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use water sprays on such equipment where appropriate.	Planning condition
	Ensure equipment is readily available on site to clean up spillages of dry materials.	Planning condition
	No on-site bonfires and burning of waste materials on site.	Planning condition
	Re-vegetate earthworks and exposed areas /soil stockpiles to stabilise surfaces as soon as practicable.	Planning condition
	Only remove the cover in small areas during work and not all at once.	Planning condition
	Incorporate soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).	Planning condition
	Ensure water suppression is used during demolition operation.	Planning condition
	Avoid explosive blasting, using appropriate manual and mechanical alternatives.	Planning condition
	Bag and remove any biological debris or damp down such material before demolition.	Planning condition
	Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless required for a particular process.	Planning condition
	Ensure bulk cement and other fine powder materials are delivered in enclosed tanker sand stored silos with suitable emissions control systems.	Planning condition
	Use water assisted dust sweepers on the site access and local roads.	Planning condition
	Avoid dry sweeping of large areas.	Planning condition
	Ensure vehicles entering and leaving the site are covered to prevent escape of materials.	Planning condition
	Record inspection of on-site haul routes and any subsequent action, repairing as soon as reasonably practicable.	Planning condition
	Install hard surfaced haul routes which are regularly damped down.	Planning condition
	Install a wheel wash with a hard-surfaced road to the site exit where site layout permits.	Planning condition

Assessment chapter	Mitigation measure	Secured through:
	The site access gate to be located at least 10m from receptors where possible.	Planning condition
	An appropriate number of electric vehicle (EV) charging stations will be provided to cater for both all-day parking slow charging as well as the fast charging points which may be more attractive for visitors, pool vehicles, Car Clubs and taxis. The number of EV charging points will be periodically reviewed so that the provision matches demand.	Planning condition
Noise and vibration	Breaking out of concrete structures would be undertaken, where possible, using low noise effect methods including bursting and splitting rather than percussive breaking.	Planning condition
	Detailed programming of works to make maximum use of existing barriers to noise.	Planning condition
	Retention of the outer walls of structures for as long as possible before demolition is necessary.	Planning condition
	Careful selection of demolition/construction methods and plant to be used.	Planning condition
	Switching off of plant and vehicle engines when not in use.	Planning condition
	Restriction of drop heights onto lorries.	Planning condition
	Regular maintenance and servicing of vehicles, equipment and plant.	Planning condition
	Appropriate handling and storage of materials.	Planning condition
	Appropriate operational hours (to be agreed with the local authority).	Planning condition
	Enforcement of restricted working hours for excessively noisy activities.	Planning condition
	Implementation of an appropriate traffic management strategy.	Planning condition
	Use of temporary acoustic barriers where appropriate and other noise containment measures such as screens, sheeting and acoustic hoardings at the construction site boundary to minimise noise breakout and reduce noise levels at the potentially affected receptors.	Planning condition
	If a temporary source of noise cannot reasonably be prevented and the works being undertaken are crucial to progressing the particular project phase then separate liaison with Cambridge City Council and the appropriate neighbours would be held to agree a suitable approach.	Planning condition
	Keep neighbours and stakeholders (including the existing commercial and university occupants as well as nearby residential inhabitants) informed about construction activities. Measures for community liaison would be dealt with by a dedicated Community Liaison Officer to co-ordinate the dissemination of information (for example, by means of a regular newsletter) and to program those operations at time that would minimise the potential for disturbance.	Planning condition
Precise details and locations of vibration sensitive equipment or long-term vibration sensitive experiments are unknown at this stage. Additionally, some buildings which are likely to house vibration sensitive uses, such as the Cavendish Laboratory, are scheduled for demolition as part of the masterplan. Once a demolition and construction programme is available, suitable vibration limits and the requirement for vibration monitoring will be determined.	Planning condition	
Plant will be selected, located and attenuated so that planning conditions attached to the development by Cambridge City Council are satisfied. This is likely to require meeting noise limits at nearby receptors through a combination of the following environmental noise control techniques which could be implemented: <ul style="list-style-type: none"> • Enclosing noisy plant within the building envelope; • Selecting suitably quiet 'low noise' plant; • Positioning air intake/discharge louvres away from noise sensitive receptors; • Orientating air intake/discharge louvres away from noise sensitive receptors; • Attenuation of air intake/discharge louvres with duct mounted attenuators; and • Sound insulating plant housings/enclosures. 	Planning condition	

Assessment chapter	Mitigation measure	Secured through:
Water environment	The following list shows measures that will be put in place via the CEMP to prevent pollution and would conform to the best practice policy issued by the Environment Agency via PPG. The key guidelines that would be followed are: <ul style="list-style-type: none"> • PPG 1 General Guide to the Prevention of Water Pollution; • PPG 2 Above ground oil storage tanks; • PPG 3 Use and design of oil separators in surface water systems; • PPG 4 Treatment and disposal of sewage where no foul sewer is found; • PPG 5 Work in, near or liable to affect a Watercourse; • PPG 6 Working at Demolition and Construction Sites; • PPG 22 Dealing with Spillages on Highways; • PPG 23 Maintenance of Structures over Water. 	Planning condition
	The design of the revised drainage network, and associated temporary works, presents the most effective means of controlling risks to the upper reaches of the Coton Brook.	Planning condition
	The timing and phasing of works will help to minimise effects, increasing the potential to control water quality effects, minimise the movement of sediment and minimise effects to aquatic flora and fauna.	Planning condition
	Surface water runoff will be monitored and the results actioned if required.	Planning condition
	Construction phasing will be planned to ensure new pipework and sufficient storage is provided before removal of existing infrastructure.	Planning condition
	Use of drip trays under mobile plant.	Planning condition
	Timing of works close to watercourses so that they do not interfere with spawning fish.	Planning condition
	Temporary construction site drainage will be designed, where practicable, to retain surface run-off within the Site boundary. Where possible the permanent drainage arrangements will be utilised in the temporary management system.	Planning condition
	The use of construction materials on-Site free from contaminated material, so as to avoid any potential contamination of the watercourse.	Planning condition
	Regular inspection and monitoring of on Site surface water drainage features and clearance works to maintain their character and function;	Planning condition
	Water management will be an important part of the earthworks operation. During wet periods, storage of surface run-off should be undertaken to assist in dust suppression during dry periods. Prior to the commencement of Site clearance, initial water management systems should be installed.	Planning condition
	Surface water discharge flows will discharge to existing outfalls at rates not exceeding the agreed pre-development rates. The increased volume will be attenuated on Site.	Planning condition
	Foul water systems supporting construction will be connected to the existing foul sewer.	Planning condition
	Wherever practicable, grey water systems will be used at Site compounds to reduce run-off from the Site, improve water efficiency and lessen the potential for polluting discharges to surface watercourses	Planning condition
	Contaminated runoff will not be discharged to the foul sewer network without prior agreement from Anglian Water that it is acceptable.	Planning condition
	Discharge from the Site will be designed to be the equivalent of greenfield runoff rates. This will be achieved through Site-wide measures (e.g. the operation of the drainage system on the Site's southern boundary) and plot specific controls (e.g. permeable paving and temporary storage). The appropriate sustainable urban drainage (SUDS) standards will be applied where appropriate;	Planning condition
	The drainage system will be designed to include the treatment of runoff to manage the movement of silt and other pollutants. Sediment monitoring is proposed to characterise current operational effects and inform the detailed design of drainage systems for the plots as they are developed.	Planning condition
	The majority of drainage from the Site will be routed in a southerly direction, reducing potential effects on the Washpit Brook and the North West Cambridge development. The design of the revised system will, as a minimum, reflect its current ecological and amenity value.	Planning condition
Periodic CCTV inspections of on Site sewers and cyclic jetting will be undertaken as part of the Site wide maintenance.	Planning condition	
Cyclic maintenance of on Site surface water drainage assets will be undertaken in accordance with LLFA guidance. Attenuation will be provided on a phased basis as plots are developed.	Planning condition	
Anglian Water is assessing the capacity available through a foul water impact study. If required tanked sewers would be provided to mitigate increased demand.	Planning condition	

Assessment chapter	Mitigation measure	Secured through:
Ground conditions	<p>The risk to Site workers during the construction works relates to the risk of skin contact, inhalation and ingestion of contaminated material on Site. In accordance with current health and safety legislation, the contractor will be required to adopt the following measures to mitigate the risk to Site workers, and these will be incorporated in the CEMP:</p> <ul style="list-style-type: none"> • Appropriate protective clothing and equipment will be worn by site workers; and good standards of hygiene adopted to prevent prolonged skin contact, inhalation and ingestion of soils during construction; • In addition, the methods of working will be selected to limit the potential for air-borne dust to arise associated with the excavation and disturbance of the soils present on the Site; • Ensure workers at risk of encountering potentially hazardous materials have had appropriate training <p>As part of the CEMP, a watching brief for the visual and olfactory assessment of the soil quality will be maintained with sampling and testing for verification and assessment purposes where necessary, together with treatment as required.</p>	Planning condition
	<p>Methods of working will be selected to limit the potential for air-borne dust to arise associated with the excavation and disturbance of the soils present on the Site. These are detailed in Chapter 11 and will be specified within the Soils Management Strategy which will form part of the CEMP.</p>	Planning condition
	<p>Further to the results of future ground investigation, appropriate gas protection measures may be required in new buildings.</p>	Planning condition
	<p>The risk to Site workers during any subsequent maintenance works relates to the risk of skin contact, inhalation and ingestion of any residual as yet undetermined contaminated material on Site. In accordance with current health and safety legislation, the maintenance contractor will be required to adopt measures to mitigate the risk to Site workers.</p>	Planning condition
	<p>The placement of buildings / hardcover, as well as replacement of the existing surface water drainage system will mitigate against the risk of potential mobilisation / migration of any residual potential contaminants. The removal and / or remediation of any contamination sources discovered, together with any localised remedial action necessary, will reduce the risk of migration of contaminants impacting ground waters.</p>	Planning condition
	<p>Incorporation of measures to mitigate against potentially contaminated run-off e.g. bunding in areas of fuel and chemical storage, adoption of oil / silt interceptors in drainage design, control valves on outlet structures to ponds and drainage features etc.</p>	Planning condition

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