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Station Fields, Foxton, Cambridgeshire

Preliminary Ecological Appraisal

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Client	Axis Land Partnership
Project	P19-706 Works at Station Fields, Foxton
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	Name	**Position**	**Date**
Originated	Lewis Saunders	Ecologist	12 November 2019
Reviewed	Roger Buisson	Associate Director	03 December 2019
Approved for issue to client	Roger Buisson	Associate Director	05 December 2019
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Contents

1 Summary

Report purpose	To present the results of a Preliminary Ecological Appraisal.
Client and commission date	Axis Land Partnerships, 18th October 2019.
Date and methods of survey	Extended Phase 1 habitat survey.
Key findings	The site contains deciduous woodland, ponds and native hedges, all priority habitats under the NERC Act. The site could support populations of great crested newt, common amphibians, and reptiles. The watercourse could support populations of / be used by water vole and otter. Bats are likely to be present and buildings on site provide suitable roost features and suitable foraging habitat is present. Badgers may make use of the Site but are unlikely to be resident. The site may support threatened or Section 41 biodiversity including vascular plants, invertebrates, birds and other mammals.
Potential impacts	Damage / loss of important / valued habitat including deciduous woodland, hedgerows, ponds, scrub, and grassland. Damage / loss of populations or killing of individuals of protected species including reptiles, amphibians, water vole, and bats. Damage / loss of Section 41 or threatened biodiversity.
Measures to avoid and/or reduce impacts	Retention of important habitats wherever possible. Retention of potential amphibian breeding ponds. Mitigation or compensation for loss of valuable habitat or habitat for protected species.
Opportunities for biodiversity enhancement	Development of green infrastructure in association with the corridor of the watercourse in the west of the Site. Development of a green buffer against the railway lines.

Further survey or consultation requirements	eDNA survey of potential GCN ponds. Focused water vole and otter survey of the watercourse. Focused reptile survey of most suitable habitat. Focused badger survey. Update botanical species list during the summer.

2 Introduction

Background to commission

2.1 BSG Ecology was contracted by Axis Land Partnerships on 18 October 2019 to carry out a desk study and extended Phase 1 survey of the proposed site of a new settlement to be called Station Fields, Foxton (henceforth referred to as 'the Site'). This ecology work was undertaken to support the promotion of the scheme into the emerging Local Plan. The local planning authority is South Cambridgeshire District Council.

Site description

2.2 The proposed development Site at Station Fields, Foxton is of approximately 100 hectares. It is located beside the A10 between the villages of Foxton, Shepreth, and Barrington around 11 km south-west of Cambridge and 8.5km north-east of Royston. There are railway stations at both Shepreth and Foxton. It is strongly divided into three by two railway lines which cross the Site - a main line and a mineral line. That division in to three has been used for the purposes of providing an indication of broad locations within this report and are referred to as Foxton South, Foxton North and Foxton East. A sewage works is located within an enclave of the Site.

2.3 The Site sits within a predominantly agricultural landscape. The River Rhee or Cam flows in a shallow valley around 400 m north of the Site and the minor watercourse on the western boundary of the Site is a tributary of this river. The site itself consists of four large arable fields, horse paddocks and small areas of woodland but few hedgerows.

2.4 The underlying solid geology is dominated by Upper Cretaceous Chalk, a narrow continuation of the chalk ridge that runs south-west to north-east across southern England. The overlying soils were deposited by river or ice, are nutrient poor, and described as freely draining lime-rich and loamy. The rolling downland of the region, mostly under cereal production, contains remnant chalk grasslands.

Aims of Study

2.5 The purpose of this study is to:

- Review and summarise the designated sites and biological records returned by the desk study.
- To classify the habitats present and identify any evidence of, or potential for, protected species on the Site and describe them in this report.
- Provide an early indication of potential impacts of the development of the Site.
- Outline the legislative and / or policy protection afforded to any habitats or species of importance likely to be associated with the Site.

3 Methods

Desk study

3.1 A desk study was carried out which included a data search to determine the presence of any protected / notable species records or designated non-statutory sites of conservation value (such as Local Wildlife Sites) within the Site or within a 2 km buffer projected from the boundary of the Site. Cambridgeshire and Peterborough Environmental Records Centre (CPERC) were contacted to supply this information, which was received on 07 November 2019.

3.2 Aerial photographs and mapping (Google Maps and OS Maps, accessed from 13 November 2019 and throughout the project) of the Site and its surroundings were reviewed to identify ponds within 250 m of the Site and assist in the characterisation of habitats within the Site. The MAGIC website (https://magic.defra.gov.uk) that provides geographic information about the natural environment from across Government was consulted for the presence of international statutory designated sites within 5 km, national statutory designated sites and European Protected Licences (EPSL) granted within 2 km of the Site and for previously classified habitats within and adjacent to the Site.

Field survey

3.3 An extended Phase 1 habitat survey of the Site was undertaken on 14 November 2019 by Lewis Saunders Ecologist at BSG Ecology.

3.4 The vegetation and land use types present within the Site were classified with reference to the standard JNCC Phase 1 methodology (JNCC, 2010). A botanical species list was recorded using the ACFOR scale A (abundant), C (common), F (frequent), O (occasional), R (rare) and can be found in Appendix 1.

3.5 The survey was extended to include an assessment of the potential of the habitats present to support protected species. Any signs of, and habitats of use to, protected species were recorded.

Interpretation

3.6 In this report the habitats and any sightings or evidence of protected species found during the Site survey have been described. Habitats have been evaluated for their intrinsic value and for their potential to support protected species.

3.7 A GCN Habitat Suitability Index (referred to as an HSI) has been calculated for each of the ponds present on Site according to a methodology published by Oldham *et al*. (2000). An HSI is a helpful measure of evaluating habitat quality for GCN. It is a numerical index between 0 and 1 where 0 indicates unsuitable habitat and 1 indicates optimal habitat. Its calculation is based on 10 individual suitability indices, all of which are factors thought to affect great crested newt presence.

Limitations to methods

3.8 Desk study records are limited by recorder effort with some areas being very well recorded and other areas being under-recorded. Factors which can affect recorder effort include presence/absence of resident local specialists, and land access. Absence of records cannot be taken as a guarantee of species absence but records indicate an increased likelihood of species presence.

3.9 The field survey was a walkover of a large site spread over one day, therefore a complete inventory of the species and features present on the Site was not possible however the time spent on Site was considered long enough to assess accurately the potential of the Site to support protected species and to evaluate the habitats.

Personnel Involved

3.10 The survey work and reporting was completed by Lewis Saunders, Ecologist at BSG Ecology. Lewis is an experienced botanist and has four years' professional ecology experience. Further details of his experience and qualifications can be found at https://www.bsg-ecology.com/portfolio_page/lewis-saunders-senior-ecologist-cambridge/.

3.11 The report has been technically reviewed by Dr Roger Buisson, Associate Director at BSG Ecology. Roger has over 30 years' professional ecology experience. Further details of his experience and qualifications can be found at https://www.bsg-ecology.com/portfolio_page/roger-buisson-director-of-ecology-cambridge/.

4 Results and Interpretation

Desk Study

Designated sites

4.1 The 2 km desk study area contains a total of three designated SSSI's including one biological SSSI and two Geological Conservation Review sites. In addition there are three County Wildlife Sites (CWS) and two protected road verges (PRV) within 2 km of the survey Site. A map of the designated sites is included as Appendix 3 of this report.

Sites of Special Scientific Interest (SSSI)

- **Barrington Chalk Pit,** TL392515, 97.07 ha, 1.8 km due north of the Site, Multiple barriers to dispersal, This is a 'Geological Conservation Review' site, and is noted as the last remaining exposure of the famous Cretaceous 'Cambridge Greensand'. The site has great stratigraphical importance for studies of the Upper Cretaceous of eastern England.
- **Barrington Pit,** TL383491, 3.76 ha, 1.2 km due north-east of the Site, Multiple barriers to dispersal, This is a 'Geological Conservation Review' Site of national importance for its vertebrate fauna from the Pleistocene Period of the Quaternary. One of the richest and most important fossil mammal localities in the British Isles.
- **L-moor, Shepreth,** TL385474, 7.32 ha, 1.8 km due south-east of the Site, Multiple barriers to dispersal, L-Moor holds floristically diverse and rich grassland communities which have largely developed on calcareous alluvium, and which are scarce in Cambridgeshire and nationally. The site has also been recognised as of high value for its invertebrate life.

County Wildlife Sites (CWS)

- **Hoffer Brook Pollard Willows (North),** TL418493, 3.56 ha, 1.2 km, some habitat connectivity along rail line, Supports at least 5 mature pollard willows in association with other semi-natural features.
- **River Rhee,** TL34, 0.4 km due north of the Site, Some habitat connectivity, Is a major river not grossly modified by pollution or canalisation. Additionally it has areas with concentrations of mature pollard willows.
- **Shepreth RSV**, TL394473, 0.02 ha, 1 km south-west of the Site, multiple barriers to dispersal, Supports a population of vascular plant species which is rare in the county, *Persicaria bistorta*.

Protected Road Verges (PRV)

- **Shepreth Unclassified road (S29),** TL394 473, 1 km south-west of the Site, multiple barriers to dispersal, Neutral/calcareous grassland, presence of 2 local red data book species
- **Mill Road, Fowlmere (S47),** 2 km south of the Site, multiple barriers to dispersal, TL40300 46050 - 41275 46475, 40625 46075 - 41275 46450, Neutral/calcareous grassland.

Ponds and watercourses

4.2 Use of the MAGIC website indicated that there were a total of three ponds within the Site and one minor watercourse. These are clustered in the north-west corner of the Site and two of these are connected with the watercourse. The minor watercourse formed the western boundary of the Site:

4.3 The surrounding landscape within 250 m contained a large lake of 2.5 ha and a smaller lake of 0.5 ha both west of the minor watercourse which formed the eastern boundary of the Site. A single pond was also located east of the watercourse. Following the watercourse to the north of the Site there is third widening into a pond. The River Rhee and a network of drains were also present to the north.

Priority Habitat

4.4 Use of the MAGIC website indicated that there was deciduous woodland within the Site at two points. Deciduous woodland was also scattered in numerous fragments throughout the landscape within a 1 km buffer.

4.5 Floodplain grazing marsh was found along the River Rhee immediately to the north of the Site within a 1 km buffer.

4.6 A traditional orchard was identified north of Barrington village within a 1 km buffer of the survey Site.

Field survey

Arable

4.7 The majority of the survey Site consisted of large arable fields.

4.8 Both Foxton South and Foxton East had been recently cultivated and consisted of bare ground. Foxton North had a recently sown cereal crop growing within it.

4.9 Arable land is a widespread habitat type of little ecological value.

Improved grassland

4.10 There were two blocks of improved grassland located in the west of Foxton North near to the minor watercourse amounting to 8 ha. They were used as horse paddocks associated with the South Cambridgeshire Equestrian Centre which lay outside of the survey Site to the west.

4.11 The grassland was species poor with very few herbs. It was dominated by a combination of perennial rye-grass *Lolium perenne*, cock's-foot *Dactylis glomerata*, and red fescue *Festuca rubra*. There were scattered, rare individuals of dandelion *Taraxacum officnale agg*., common ragwort *Senecio jacobaea*, and hogweed *Heracleum sphondylium*.

4.12 Improved grassland is a widespread habitat type of little ecological value.

Poor semi-improved grassland

4.13 Poor semi-improved grassland was very limited in area when compared to improved grassland. It was found as narrow strips around the edges of tracks and field, and as two slightly larger sections amongst new tree planting and adjacent to a horse paddock in Foxton North.

4.14 Typical species included false oat-grass *Arrhenatherum elatius,* cock's-foot and a few broadleaved species such as dock *Rumex sp.* and yarrow *Achillea millefolium.*

4.15 Poor semi-improved grassland is a widespread habitat type of little ecological value.

Semi-improved grassland

4.16 Semi-improved grassland was also very limited in area. It was found as small patches along the boundary of Foxton South with the A10, at the bases of hedgerows, and adjacent to the two railway lines which cross the Site.

4.17 The characteristic grass species were false oat-grass and cock's-foot. The herbs included yarrow, field scabious *Knautia arvensis*, perforate St-john's-wort *Hypericum perforatum*, black knapweed *Centaurea nigra,* greater knapweed *Centaurea scabiosa,* black horehound *Ballota nigra,* white campion *Silene latifolia,* common mallow *Malva sylvestris,* and ribwort plantain *Plantago lanceolata.*

4.18 Semi-improved grassland can be derived from a variety of species rich grassland types such as calcareous grassland. The semi-improved grasslands, although of limited extent, are of Site value. Field scabious is a plant that is considered Near Threatened.

Deciduous woodland

4.19 Deciduous woodland was found in two principal areas in Foxton South (Browns Spinney - W1) and Foxton North (Un-named W2/3), both adjacent to the minor watercourse and amounting to 1.5 ha in total.

4.20 Browns Spinney (0.8 ha) was located adjacent to the watercourse in Foxton South. The woody species were; Ash *Fraxinus excelsior,* (dominant), sycamore *Acer pseudoplatanus* (abundant), hawthorn *Crateagus monogyna* (frequent), field maple *Acer campestre* (occasional), elder *Sambucus nigra* (occasional), and walnut *Juglands regia* (rare). The ground flora consisted mostly of ivy *Hedera helix* (dominant) which also ascended the trees into the canopy. Other ground flora species included; Nettle *Urtica dioica,* wood sedge *Carex sylvatica* (occasional), remote sedge *Carex remota* (occasional), herb robert *Geranium robertianum*, hedge garlic *Alliaria petiolata,* wood avens *Geum urbanum, and* wood false-brome *Brachypodium sylvaticum* (all rare).

4.21 W2/3 (2.4 ha taken together) in Foxton North was found on both sides of an improved paddock, lay adjacent to the watercourse and contained three ponds. The woodland was bisected by the trackway to an equestrian centre and had an open managed feel. A proportion of the trees were certainly naturally occurring but others were clearly planted. The woody species included ash (abundant), white willow *Salix alba* (abundant), hawthorn *Crateagus monogyna* (frequent), grey willow *Salix cinerea* (occasional), elder , Norway maple *Acer platanoides* (occasional), Lime *Tilia x europaea,* horse-chestnut *Aesculus hippocastanum,* osier *Salix viminalis,* Italian alder *Alnus cordata,* silver birch *Betula pendula,* pedunculate oak *Quercus robur, and* grey alder *Alnus incana* (all rare).

4.22 Browns Spinney to the south certainly represents deciduous woodland priority habitat but that labelled W2/3 to the North doubtfully so because of obvious tree planting and management. Deciduous woodland is a habitat type of high ecological value providing habitat for a wide range of species groups. W2/3 contained some willows with medium potential to support roosting bats. The examples of deciduous woodland on this Site are likely to be of value above that of the Site level - probably of parish / neighbourhood value.

Scattered scrub

4.23 Boundaries within the Site generally supported scattered scrub rather than managed hedgerows. This habitat was noted along the boundary of Foxton South with the A10 and beside each of the railways which crossed the site. Species were a diverse range of woody plants including; blackthorn *Prunus spinosa,* dog-rose *Rosa canina,* field maple, hawthorn, ash, purging buckthorn *Rhamnus cathartica,* walnut, elm *Ulmus agg.,* apple *Malus domestica,* spindle *Eunonymus europaeus,* oak, sycamore, wild privet *Ligustrum vulgare*, and bramble *Rubus fruticosus agg*.

4.24 Diverse scrub can be of high value to a range of different species groups including invertebrates and birds. This habitat type is likely to be of at least Site value.

Hedgerows

4.25 Managed hedgerows were not a feature of the Site however four were encountered and they are described below.

4.26 Hedgerow 1 (H1) - Was as a managed mixed native hedgerow of 160 m at the eastern extend of Foxton South. Species included hawthorn, elm *Ulmus sp*. and sycamore.

4.27 Hedgerow 2 (H2) - Was a managed mixed native hedgerow of 250 m on the northern boundary of Foxton North. Probably of planted origin and included clearly planted standard oaks. Species included; dogwood *Cornus sanguinea,* dog-rose, Sycamore, hazel *Corylus avellana,* and ash.

4.28 Hedgerow 3 (H3) – Was an infrequently managed single species native hedgerow of hawthorn at the south-eastern extremity of Foxton North. 100 m length.

4.29 Hedgerow 4 (H4) – Was an un-managed hedge of pure beech *Fagus sylvatica* which surrounded the sewage works within Foxton North. 288 m length.

4.30 All hedgerows which consist of predominantly UK native species (even if one species only) are considered a priority habitat. Some hedgerows are considered important hedgerows under the Hedgerow Regulations if they meet certain criteria. Although assessment against the hedgerow regulations was outside the scope of this study it is not considered likely that any of the hedges on Site will be considered important hedgerows under the Regulations. All would qualify as priority habitat hedgerows and are of at least Site value.

Watercourse

4.31 As already described a minor watercourse formed the western boundary of the Site - a tributary of the River Rhee/Cam. The water was slowly flowing, sometimes sluggish and silty. Along its length within the Site parts of the course were shaded and other parts open. To the north the watercourse broadened into two ponds at points. The central part supported abundant reed *Phragmites australis.* Adjacent to Browns Spinney it was deeply shaded with hart's tongue fern *Phyllitis scolopendrium*. Other species associated with the watercourse included; reed canary grass *Phalaris arundinacea,* fool's watercress *Apium, nodiflorum,* branched bur-reed *Sparganium erectum,* meadowsweet *Filipendula ulmaria,* bulrush *Typha latifolia,* woody nightshade *Solanum dulcamara,* yellow flag-iris *Iris pseudacorus,* willows, and poplars.

4.32 The watercourse is likely to be an integral part of the local ecological network providing good habitat connectivity, and to be an important feature for a wide range of species groups, therefor it is of at least parish / neighbourhood value.

Standard trees

4.33 Mature scattered oaks were found around the boundaries of Foxton East adjoining the road. On the verge next to hedgerow 1, lime *Tilia x europaea* and Norway maple had been planted. Recent planting of a range of tree species had taken place along the trackway which bisected Foxton North.

4.34 Oak is a valuable species for a range of species groups therefore the mature trees along the road are likely to be of Site value. They have a low potential to support roosting bats.

Tall ruderal

4.35 Tall ruderal dominated by nettles and docks was found in Foxton South around the margins of Browns spinney and the watercourse.

4.36 Tall ruderal is a widespread and common habitat type of little ecological value.

Buildings

4.37 A total of three buildings were recorded on Site and they are described below along with their potential to support roosting bats.

4.38 Building 1 (B1) - Was located in the extreme east of Foxton South adjacent to the main railway close to its junction with the mineral line. It was constructed from concrete blocks, had wooden beams on a central floor and slate tiles on the roof. It was derelict with the window openings fully open but the roof and first floor still intact. It had high potential for roosting bats.

4.39 Building 2 (B2) - Was located in the extreme north of Site associated with the Equestrian Centre. It was an agricultural building of metal sheeting and concrete construction. It had medium potential to support roosting bats.

4.40 Building 3 (B3) - Was also located in the extreme north of the Site associated with the Equestrian Centre. It was an open shelter of metal sheeting. It had very low potential to support bats.

Protected Species

Lower Plants

4.41 A UK Section 41 fungus species is known from Shepreth L Moor, big-blue pinkgill *Entoloma bloxamii*.

4.42 As a species of long established grassland big-blue pinkgill is unlikely to be present on the Site and will not be considered further in this PEA.

Higher Plants

4.43 A large number of plant species (more than 40) afforded Red List, Section 41, or Cambridgeshire and Peterborough Additional Species of Interest status have been recorded from the 2 km data search area around the survey site. Many of these are declining species of calcareous habitats. A large proportion of the records originate from nearby designated sites such as Shepreth L Moor and Barrington Pits however there are also scattered records for species such as field scabious, hoary plantain *Plantago media*, and dwarf spurge *Euphorbia exigua* throughout the surrounding non-designated landscape. There are two records for more than 300 flowering spikes of Nationally Scarce species monkshood *Aconitum napellus subsp. napellus* recorded from the bank of the minor watercourse which forms part of the Site boundary of Foxton North and Foxton South (TL397488, & TL399486, both June 1992). There is also a record for Nationally Scarce, Red data book vulnerable Slender Tare *Vicia parviflora* (1991, TL408488) from Foxton East described as 'waste ground north of the railway. In large quantity.'

4.44 A small population of Red Data Book Near Threatened field scabious was found from the southern periphery of Foxton South by the A10 during the field survey.

4.45 It is noted that significant species records for monkshood and slender tare have been found from potentially within the Site and that there are a large number of records of other species afforded a conservation status from within the surrounding landscape. Given this evidence, the habitats present on Site, and the fact that the current survey was carried out outside of the optimal botanical survey season further botanical conservation interest from within the Site cannot be ruled out.

White-clawed crayfish

4.46 The data search returned four records for white-clawed freshwater crayfish *Austropotamobius pallipes* located from the River Rhee/ Shep at Barrington and the Guilden Brook at Meldreth.

4.47 Crayfish prefer stony substrates and the watercourse on Site had a muddy base. Additionally the records are all more than 10 years old. It is very unlikely crayfish occur on Site and will not be considered further in this PEA.

Other Invertebrates

4.48 The 2 km data search around the survey Site produced records for more than 40 different invertebrates afforded Red List, Section 41, or Cambridgeshire and Peterborough Additional Species of Interest status. This included a total of six beetles, small heath *Coenonympha pamphilus* butterfly, 36 moths, one orthopteran, one true bug, and one true fly.

4.49 The Site includes a range of habitats including woodland, scrub, grassland, and water, which means that it has the potential to support invertebrates of conservation interest.

Reptiles

4.50 Two of the six native British reptiles have been recorded from the area. A total of six records of common lizard *Zootoca vivipara* with five from the last 10 years almost exclusively from Shepreth L moor SSSI and nearby areas. A total of five records of grass snake *Natrix natrix* were returned with two records within the last 10 years, again mostly from Shepreth L Moor and surrounding areas but also from the River Rhee at Barrington.

4.51 None of the existing records have an especially high degree of habitat connectivity with the survey Site. The localised nature of the records would suggest that reptiles are not especially widespread or common in the surrounding landscape. Some suitable habitat for reptiles does exist on Site. Areas near the small watercourse support semi-natural woodlands and tussocky grasslands furthermore grass snake is often associated with ponds and watercourses. Railway lines are known to provide suitable habitat for reptiles and to provide corridors for dispersal. Given these factors it is possible that reptiles are present on the Site and they should be given further consideration within this PEA.

Great crested newt

4.52 A total of 12 records of great crested newt *Triturus cristatus* (referred to as GCN) were returned for the study area and five of these were from within the last 10 years. The majority of the records were located in the Shepreth area, especially Docwra's Meadow. There were also two recent records from the Barrington Pit SSSI.

4.53 The existing records do not have a high degree of proximity or connectivity with the survey Site but do indicate that great crested newts are present in the surrounding area. As mentioned under the habitats section three ponds (P1-3) were located in deciduous woodland in the north-western extent of the Site and their suitability for GCN has been evaluated by the calculation of HSI scores displayed in Table 1 below. The terrestrial habitat here and along the corridor formed by the minor watercourse was suitable for GCN however the fact that two of the ponds were connected to the watercourse could increase the likelihood of predatory fish presence. Given these factors it is possible that GCN are present on Site and they should be given further consideration within this report.

Table 1: HSI scores and ponds suitability for GCN.

Pond reference	HSI score	Suitability
Pond 1	0.69	Average
Pond 2	0.67	Average
Pond 3	0.72	Good

Other amphibians

4.54 A total of two recent records of common frog *Rana temporaria* were returned from Foxton and Shepreth respectively and none from within the Site boundary.

4.55 Despite the lack of records from within the Site presence of common amphibians such as frogs is considered likely.

Birds

4.56 A total of 74 species of Red and Amber listed birds have been recorded from the 2 km data search area including species of farmland bird such as grey partridge *Perdix perdix*, turtle dove *Streptopelia turtur*, tree sparrow *Passer montanus*, yellowhammer *Emberiza citrinella* and corn bunting *Emberiza calandra*.

4.57 The Site has habitat which could support a wide variety of bird species but especially those of farmland.

Bats

4.58 A total of 32 records for bats *Chiroptera* were returned from the study area including from Foxton, Shepreth and Barrington but not from within the Site itself showing this group to be widespread in the surrounding landscape. The species recorded included a large number of generalised *Chiroptera* records but also records for brown long-eared bat *Plecotus auritus*, common pipistrelle *Pipistrellus pipistrellus,* Daubenton's bat *Myotis daubentonii*, noctule bat *Nyctalus noctula,* serotine *Eptesicus serotinus,* and soprano pipistrelle *Pipistrellus pygmaeus.*

4.59 The fact that bats have been frequently recorded from the surrounding landscape indicates that they could be present on Site. Furthermore the Site contains habitat suitable for bats in the form of derelict buildings of high bat potential, agricultural buildings of low and medium bat potential, and trees of medium bat potential. There were also habitats suitable for foraging (woodlands, scrub, ponds and a watercourse) and linear features to provide commuting routes (railway line, watercourses and boundary features). Bats will need to be considered further within this PEA.

Badger

4.60 A total of 72 records for European badger *Meles meles* were returned by the data search but the majority of these were not localised by more than 10 km square precision making it not possible to know if they lay within the Site. A total of 10 records, all from within the last 10 years, were given to 100 m within the Site and these were mostly located to the south-west of the Site between Shepreth and Fowlmere with one record (TL402479, 10/01/2012) located close to the south-west corner of Site and described as 'Activity near otter survey site'.

4.61 No evidence of badgers was found during the Site survey. Despite the lack of evidence from the Site survey the records search indicates the presence of badger within the immediate surroundings. Badgers will need further consideration within this PEA.

Otter

4.62 A total of 31 records for otter *Lutra lutra* were returned for the study area with the majority of these being from within the last 10 years. The otter records are widespread throughout the area but were mainly centred around minor watercourses associated with the village of Shepreth and also on the River Rhee towards Barrington.

4.63 No evidence of otters was found during the Site survey. Despite the lack of evidence from the Site survey the records search indicates the presence of otter within the immediate surroundings. The watercourse which forms the western boundary of the Site has the potential to attract otters and at the very least could be used as a commuting route between the Shepreth area and the River Rhee. Otter will need further consideration within this PEA.

Water vole

4.64 A total of 13 records for water vole *Arvicola amphibius* were returned for the study area with the majority of these being from within the last 10 years. The majority of the records were located on minor watercourses around Shepreth to the south-west of the survey Site and also around the River Rhee towards Barrington.

4.65 No evidence of water vole was found during the Site survey. Despite the lack of evidence from the Site survey the records search indicates the presence of water vole within the immediate surroundings. The watercourse which forms the western boundary of the Site appears to be suitable for water voles and could support a resident population. Water vole will need further consideration within this PEA.

Other mammals

4.66 The records search for the study area also returned recent records for western European hedgehog (5 records, Section 41, Red Data Book vulnerable, UKBAP), polecat (1 record, HabRegs4, HSD5, Sect.41, UKBAP), and brown hare *Lepus europaeaus* (8 records, Section 41, UKBAP).

4.67 The survey Site contains habitat suitable for the above species and their presence is likely in the case of hedgehog and brown hare and possible in the case of polecat.

Limitations to results and interpretation

4.68 The data held by CPERC will largely be limited to locations that are accessible to natural history recorders such as publicly owned land, rights of way and nature reserves whereas the Site is private farmland with limited access.

4.69 The results of the field survey are limited mainly by the time of year of the Site visit. This was outside of the optimal survey season for taxa groups such as plants and invertebrates.

5 Potential Impacts and Recommendations

5.1 The proposed development at Foxton, Station Fields, is at an early stage in its planning with this Preliminary Ecological Appraisal intended to inform the consideration of the proposal as a site to be included within the emerging Local Plan. Consequently potential impacts can only be outlined at this stage.

Habitats

5.2 Depending on the layout of the final scheme there is the potential for important / valued habitat to be lost or impacted upon including priority habitat deciduous woodlands, hedgerows, and ponds as well as small areas of semi-improved grassland and scattered scrub.

5.3 In the first instance it is recommended that as much valuable habitat as possible is retained on Site. In particular the priority habitat deciduous woodland, ponds, and hedgerows should be retained. It is acknowledged that some valuable habitat such as scrub and semi-improved grassland may be lost and this could be mitigated for on-site or compensated for off-site.

5.4 It is recommended that the corridor along the watercourse including the woodland and ponds is retained, developed and enhanced as part of the green infrastructure of the Site retaining linkages with the wider landscape and buffering the features of interest within the Site.

Species

Vascular plants

5.5 There is the potential for the development of the land to result in the loss of populations of Section 41 or recognised threatened plant species such as field scabious, monkshood and slender tare.

5.6 The habitats most likely to support threatened plant species could be recorded again for vascular plants during the main spring / summer survey season in conjunction with other surveys such as amphibians or water vole. Any threatened plant species found could be considered as part of the overall ecological design of the development, if given planning permission.

Invertebrates

5.7 There is the potential for the development of the land to result in the loss of populations of Section 41 or recognised threatened invertebrate species.

5.8 Invertebrates could be considered as part of the overall ecological design of the proposed development or compensated for in the form of on-site mitigation or off-site compensation.

Amphibians

5.9 Great crested newt and common amphibians could be present on the Site, in particular in the three ponds in Foxton North. It is possible that the proposed development could impact upon populations of amphibians including GCN and common frog. Impacts could include predation by domestic cats, introduction of fish by residents and loss of terrestrial habitat.

5.10 It is recommended in the first instance that an eDNA survey of the three ponds is carried out to determine the presence / likely absence of GCN. Based on the results of the eDNA it will be possible to determine the necessity for further survey and thence any on-site mitigation or off-site compensation.

Reptiles

5.11 There is the potential for populations of reptiles to be impacted upon by the proposed development. Potential impacts include loss of suitable habitat, predation by pets and disturbance by humans.

5.12 It is recommended that a survey for reptiles targeted at the most suitable habitat is carried out to determine the presence / likely absence of this group.

Birds

5.13 It is probable that the proposed development will result in habitat loss for Red or Amber listed birds that use open fields such as grey partridge and skylark.

5.14 Farmland birds could be taken into account in any off-site compensation should the development be given planning permission. Woody habitat could be retained and extended to enhance the Site for woodland birds No clearance of woody vegetation within the breeding bird season March-October to avoid destroying nests.

Bats

5.15 The proposed development is likely to impact upon bats. Based on the survey results it seems highly likely that bats could be using at least one building on Site (Building 1). Any demolition of buildings on Site could potentially destroy roosting places for bats. The future development of the Site would likely introduce lighting effects which would negatively impact upon the usage of any retained habitat features, such as woodland, by bats.

5.16 All the buildings on Site, but especially building 1, should be further investigated for their bat roost potential. At least building 1 is likely to require either a detailed internal inspection (subject to safe access) or regular bat surveys to determine if / the extent to which bats are likely to use it. The effects of the development on the habitat usage by bats should also be investigated.

Badgers

5.17 It is possible that development of the land could impact on the foraging of local badger clans but is unlikely to impact seriously upon the local population. No evidence of badger, not least any setts, was found during the Site survey.

5.18 Further focused badger survey could be carried out to establish the degree or lack off to which local badgers use the Site and any actions required to mitigate for changes to the habitat.

Otter and water voles

5.19 There is the potential for the development of the land to impact upon populations or usage of the watercourse by otter and water vole. Although the watercourse is likely to be left relatively undisturbed potential impacts could include changes of habitat management, predation by pets and disturbance by humans.

5.20 It is recommended that the watercourse is surveyed for evidence of both otter and water vole to establish their presence / likely absence. These species could be taken into account on any on-site mitigation or off-site compensation should the development receive planning permission.

Other mammals

5.21 There is the potential for the development to impact upon populations of Section 41 mammals including hedgehog, polecat and brown hare.

5.22 These species could be taken into account on any on-site mitigation or off-site compensation should the development receive planning permission.

6 Conclusions

6.1 The Site is predominantly arable land which is of low ecological value and there are no designated sites of wildlife value within its boundary. There are some localised habitat features of value including semi-natural deciduous woodland, ponds, watercourses, hedgerows and scrub.

6.2 Priority habitat woodlands, hedges, ponds and watercourse should be retained. The watercourse and associated habitats could be retained and enhanced and a valuable contribution to the green infrastructure of the Site, providing linkages with the wider landscape.

6.3 On-site mitigation could take the form of vegetation buffering the effects of the railway lines which cross the Site.

6.4 Further surveys are recommended for GCN, reptiles, otters, water voles, badgers and bats.

6.5 The potential loss of threatened biodiversity within the vascular plants, invertebrates, birds and other mammals could be mitigated or compensated for on or off site.

7 References

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8 Figures

(overleaf)

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BSG ecology

OFFICE: Cambridge
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JOB REF: P19-706

PROJECT TITLE

STATION FIELDS, FOXTON

DRAWING TITLE

Figure 1: Phase 1 Habitat Plan

DATE: 05/12/2019 CHECKED: LS SCALE: 1:5,000

DRAWN: COH APPROVED: RB VERSION: 1.3

LEGEND

- Survey boundary
- Scattered scrub
- Broadleaved tree
- Species-poor intact hedge
- Running water
- Fence
- A — Arable
- Bare ground
- Broadleaved semi-natural woodland
- Building
- I — Improved grassland
- SI — Poor semi-improved grassland
- Scattered scrub
- SI — Semi-improved grassland
- Standing water
- Tall ruderal

9 Photographs

Photo 1: Arable land in Foxton South.

Photo 2: Arable land in Foxton North

Photo 3: Improved grassland in Foxton North

Photo 4: Semi-improved grassland in Foxton South on boundary with A10.

Photo 5: Browns Spinney (W1), Foxton South

Photo 6: W2/3, Foxton North

Photo 1: W2/3, Foxton North

Photo 2: Semi-improved grassland and scrub on railway line, Foxton South

Photo 3: Building 2, Foxton North, Medium bat potential.

Photo 4: Building 3, Foxton North, Low bat potential.

Photo 5: Building 1, Foxton South, high bat potential, external view.

Photo 6: Building 1, Foxton South, high bat potential, internal view.

10 Appendices

Appendix 1: Species List

Scientific Name	English name	ACFOR	Status
Acer campestre	Field maple	C	
Acer platanoides	Norway maple	F	
Acer pseudoplatanus	Sycamore	A	
Achillea millefolium	Yarrow	A	
Aesculus hippocastanum	Horse-chestnut	F	
Agrimonia eupatorium	Common agrimony	O	
Agrostis stolonifera	Creeping bent-grass	O	
Alliaria petiolata	Hedge garlic	F	
Alnus glutinosa	Alder	R	
Angelica sylvestris	Angelica	R	
Anthriscus sylvestris	Cow parsley	A	
Apium nodiflorum	Fool's watercress	O	
Arctium lappa	Greater burdock	O	
Arctium minus	Lesser burdock	O	
Armoracia rusticana	Horseradish	R	
Arrhenatherum elatius	False oat-grass	C	
Artemisia vulgaris	Mugwort	C	
Atropa belladonna	Deadly nightshade	R	
Ballota nigra	Black horehound	R	
Brachypodium sylvaticum	Wood false-brome	F	
Calamogrostis epigejos	Wood small-reed	R	
Carex acutiformis	Lesser pond-sedge	R	
Carex pendula	Pendulous sedge	R	
Carex remota	Remote sedge	R	
Carex sylvatica	Wood sedge	R	
Centaurea nigra	Black knapweed	O	
Centaurea scabiosa	Greater knapweed	R	
Cirsium arvense	Creeping thistle	C	
Cirisum vulgare	Spear thistle	C	
Conium maculatum	Hemlock	O	

Scientific Name	English name	ACFOR	Status
Convolvulus arvensis	Field bindweed	O	
Corylus avellana	Hazel	O	
Crataegus monogyna	Hawthorn	C	
Crepis capillaris	Smooth hawk's-bit	R	
Dactylis glomerata	Cock's-foot	A	
Dipsacus fullonum	Teasel	F	
Epilobium hirsutum	Great willowherb	F	
Equisetum arvense	Field horsetail	R	
Eunonymus europaeus	Spindle	R	
Fagus sylvatica	Beech	R	
Festuca rubra	Red fescue	A	
Filipendula ulmaria	Meadowsweet	O	
Galium aparine	Cleavers	F	
Geranium dissectum	Cut-leaved crane's-bill	O	
Geum urbanum	Wood avens	O	
Glechoma hederacea	Ground ivy	F	
Glyceria maxima	Reed sweet-grass	R	
Hedera helix	Ivy	A	
Heracleum sphondylium	Hogweed	F	
Holcus lanatus	Yorkshire fog	F	
Hypericum perforatum	Perforate St John's-wort	O	
Hypericum terapterum	Square-stalked St John's-wort	R	
Iris pseudacorus	Yellow flag-iris	O	
Knautia arvensis	Field scabious	R	NT
Lactuca virosa	Great lettuce	R	
Lamium album	White deadnettle	F	
Lapsana communis	Nipplewort	O	
Ligustrum vulgaris	Wild privet	C	
Lolium perenne	Perennial rye-grass	F	
Malav sylvestris	Common mallow	F	
Medicago arabica	Spotted medick	R	
Phalaris arundinacea	Reed canary-grass	R	
Phragmites australis	Reed	F	

Scientific Name	English name	ACFOR	Status
Phyllitis scolopendrium	Hart's-tongue fern	R	
Picris echioides	Bristly ox-tongue	O	
Pinus sylvestris	Scot's pine	O	
Plantago lanceolata	Ribwort plantain	F	
Plantago major	Greater plantain	F	
Potentilla reptans	Creeping cinquefoil	F	
Prunus avium	Wild cherry	O	
Prunus domestica	Wild plum	R	
Quercus robur	Pedunculate oak	C	
Ranunclus repens	Creeping buttercup	F	
Reseda luteola	Weld	R	
Rhamnus cathartica	Purging buckthorn	R	
Ribes rubrum	Red currant	R	
Rorippa nasturtium-aquatica	Watercress	R	
Rosa canina	Dog-rose	C	
Rubus ceasius	Dewberry	F	
Rubus fruticosus	Bramble	A	
Rubus idaeus	Raspberry	R	
Rumex acetosa	Common sorrel	R	
Rumex crispus	Curled dock	O	
Rumex sanguineus	Wood dock	R	
Salix alba	White willow	F	
Salix caprea	Goat willow	F	
Salix cinerea	Grey willow	F	
Salix viminalis	Osier	F	
Sambucus nigra	Elder	C	
Saponaria officinalis	Soapwort	R	
Senecio erucifolius	Hoary ragwort	R	
Senecio jacobaea	Common ragwort	F	
Senecio vulgaris	Groundsel	R	
Silene dioica	White campion	F	
Sinapis arvensis	Charlock	R	
Sisymbrium officinale	Hedge mustard	R	

Scientific Name	English name	ACFOR	Status
Solanum dulcamara	Woody nightshade	O	
Solanum nigrum	Black nightshade	R	
Sonchus oleraceus	Smooth sow-thistle	R	
Sorbus aria	Common whitebeam	R	
Sparganium erectum	Branched bur-reed	R	
Stellaria media	Chickweed	R	
Symphytum officinale	Comfrey	R	
Taraxacum officinale agg.	Dandelion	F	
Tilia X europaea	Lime	R	
Tripleurospermum inodorum	Scentless mayweed	R	
Typha latifolia	Bulrush	R	
Ulmus agg.	Elm	O	
Urtica dioica	Nettle	A	
Verbascum thapsus	Great mullein	R	
Veronica persica	Common field-speedwell	R	
Viola arvensis	Field pansy	R	

Appendix 2: Pond great crested newt HSI.

POND 1- TL39654911	
Suitability Index	**Score**
Map location	1.00
Surface area	0.94
Desiccation rate	0.90
Water quality	0.67
Shade	0.60
Waterfowl	1.00
Fish population	0.33
Number of ponds within 1 km	1.00
Terrestrial habitat	0.67
Macrophyte cover (%)	0.32
Mean HSI Score	**0.69**
Pond suitability	**Average**

POND 2-TL39704904	
Suitability Index	**Score**
Map location	1.00
Surface area	1.00
Desiccation rate	0.90
Water quality	0.67
Shade	0.22
Waterfowl	1.00
Fish population	0.67
Number of ponds within 1 km	1.00
Terrestrial habitat	0.67
Macrophyte cover (%)	0.32
Mean HSI Score	**0.67**
Pond suitability	**Average**

POND 3-TL39684880	
Suitability Index	**Score**
Map location	1.00
Surface area	0.85
Desiccation rate	0.90
Water quality	0.67
Shade	1.00
Waterfowl	1.00
Fish population	0.33
Number of ponds within 1 km	1.00
Terrestrial habitat	0.67
Macrophyte cover (%)	0.32
Mean HSI Score	**0.72**
Pond suitability	**Good**

Appendix 3: Designated sites map

Designated Sites Map

for BSG Ecology

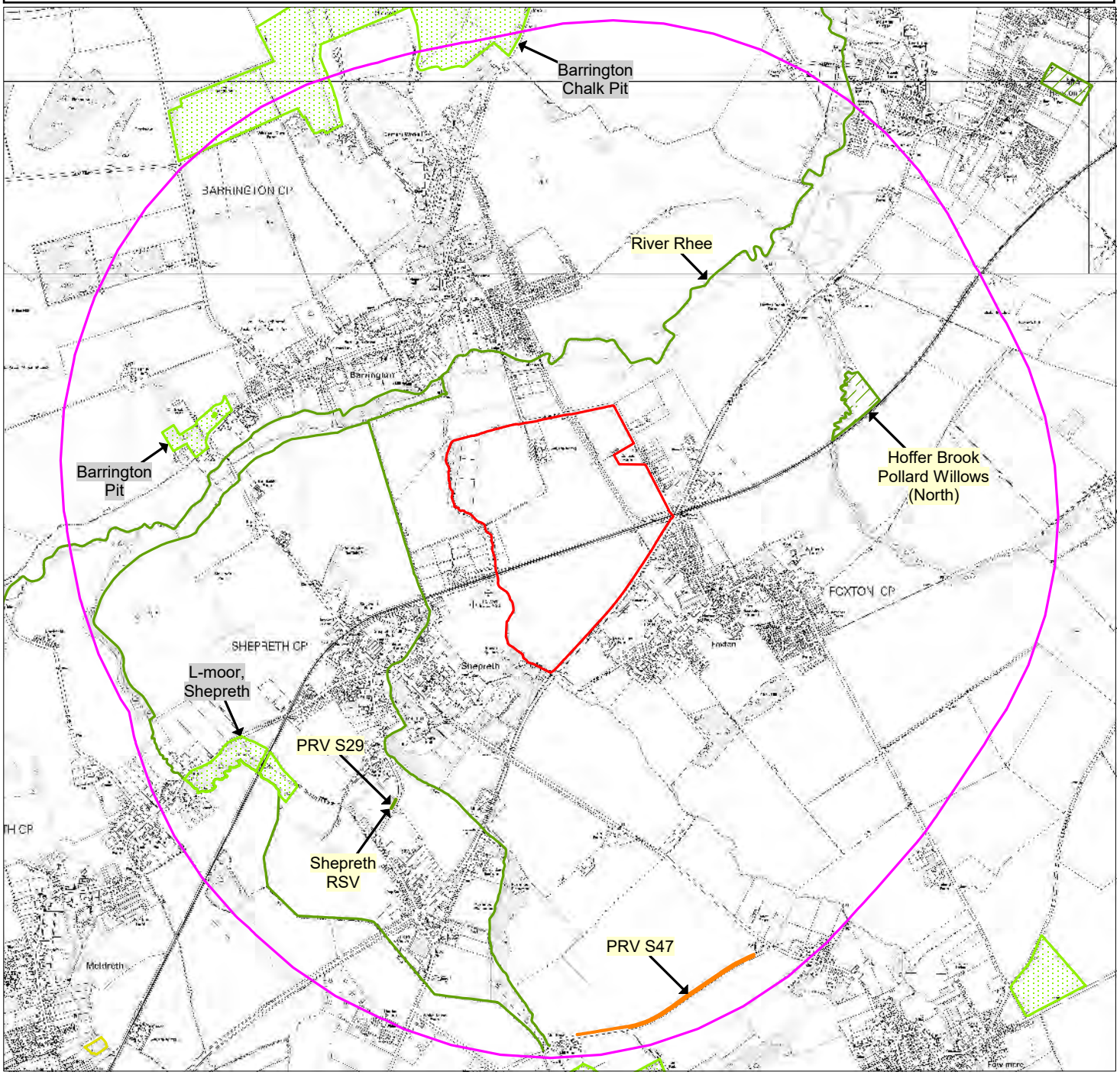
Foxton

07/11/2019

1:30,000

CPERC
The Manor House
Broad Street
Cambourne
Cambridgeshire
CB23 6DH

CPERC
CAMBRIDGESHIRE & PETERBOROUGH
ENVIRONMENTAL RECORDS CENTRE



Search Area

Site of Interest

SSSI

LNR

County Wildlife Site

Protected Road Verge (PRV)

N
W
E
S

Appendix 4: Summaries of Relevant Policy, Legislation and Other Instruments

This section briefly summarises the legislation, policy and related issues that are relevant to the main text of the report. The following text does not constitute legal or planning advice.

National Planning Policy Framework (England)

10.1 The Government revised the National Planning Policy Framework (NPPF) on 19 February 2019. Text excerpts from the NPPF are shown where they may be relevant to planning applications and biodiversity including protected sites, habitats and species.

10.2 The Government sets out the three objectives for sustainable development (economy, social and environmental) at paragraphs 8-10 to be delivered through the plan preparation and implementation level and 'are not criteria against which every decision can or should be judged.' At paragraph 8c) the planning system's environmental objective refers to 'protecting and enhancing our natural, built and historic environment' and to 'helping to improve biodiversity'

10.3 In conserving and enhancing the natural environment, the NPPF (Paragraph 170) states that 'planning policies and decisions should contribute to and enhance the natural and local environment' by:

- Protecting and enhancing...sites of biodiversity value... '(in a manner commensurate with their statutory status or identified quality in the development plan)'.
- Recognising the wider benefits from natural capital and ecosystem services including trees and woodland.
- Minimising impacts on and providing net gains in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures.
- Preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability.

10.4 In respect of protected sites, at paragraph 171, the NPPF requires local planning authorities to distinguish, at the plan level, '…between the hierarchy of international, national and locally designated sites; allocate land with the least environmental or amenity value...take a strategic approach to maintaining and enhancing networks of habitats and green infrastructure; and plan for the enhancement of natural capital at a catchment or landscape scale across local authority boundaries.'

10.5 Paragraph 174 refers to how plans should aim to protect and enhance biodiversity. Plans should: 'identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity [a footnote refers to ODPM Circular 06/2005 for further guidance in respect of statutory obligations for biodiversity in the planning system], wildlife corridors and stepping stones that connect them and areas identified by national and local partnerships for habitat management, enhancement, restoration or creation;' and to 'promote the conservation, restoration and re-creation of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity.'

10.6 Paragraph 175 advises that, when determining planning applications, '…local planning authorities should apply the following principles:

a. if significant harm to biodiversity 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 should be refused;

b. development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments) should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest;

c. development resulting in the loss or deterioration of irreplaceable habitats, (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists; and

d. development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to incorporate biodiversity improvements in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity.'

10.7 In paragraph 176, the following should be given the same protection as habitats sites[1]:

i. potential Special Protection Areas and possible Special Areas of Conservation

ii. listed or proposed Ramsar sites; and

iii. sites identified, or required, as compensatory measures for adverse effects on habitats sites, potential Special Protection Areas, possible Special Areas of Conservation, and listed or proposed Ramsar sites.'

10.8 In paragraph 177 the NPPF refers back to sustainable development in relation to appropriate assessment and states: 'the presumption in favour of sustainable development does not apply where the plan or project is likely to have a significant effect on a habitats site (either alone or in combination with other plans or projects), unless an appropriate assessment has concluded that the plan or project will not adversely affect the integrity of the habitats site'.

10.9 In paragraph 178, the NPPF refers to planning policies and decisions taking account of ground conditions and risks arising from land instability and contamination at sites. In relation to risks associated with land remediation account is to be taken of 'potential impacts on the natural environment' that arise from land remediation.

10.10 In paragraph 180 the NPPF states that planning policies and decisions should ensure that development is appropriate to the location and take into account likely effects (including cumulative) on the natural environment and , in doing so, they 'should limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.'

Government Circular ODPM 06/2005 Biodiversity and Geological Conservation (England only)

10.11 Paragraph 98 of Government Circular 06/2005 advises that "the presence of a protected species is a material consideration when a planning authority is considering a development proposal that, if carried out, would be likely to result in harm to the species or its habitat. Local authorities should consult Natural England before granting planning permission. They should consider attaching appropriate planning conditions or entering into planning obligations under which the developer would take steps to secure the long-term protection of the species. They should also advise developers that they must comply with any statutory species' protection provisions affecting the site concerned..."

10.12 Paragraph 99 of Government Circular 06/2005[2] advises that "it is essential that the presence or otherwise of protected species, and the extent that they may be affected by the proposed

[1] Habitats sites are defined in the glossary as 'Any site which would be included within the definition at regulation 8 of the Conservation of Habitats and Species Regulations 2017 (as amended) for the purpose of those regulations, including candidate Special Areas of Conservation, Sites of Community Importance, Special Areas of Conservation, Special Protection Areas and any relevant Marine Sites.'
[2] *ODPM Circular 06/2005. Government Circular: Biodiversity and Geological Conservation – Statutory Obligations and their Impacts within the Planning System* (2005). HMSO Norwich.

development, is established before the planning permission is granted, otherwise all relevant material considerations may not have been addressed in making the decision. The need to ensure ecological surveys are carried out should therefore only be left to coverage under planning conditions in exceptional circumstances, with the result that the surveys are carried out after planning permission has been granted".

Standing Advice (GOV.UK - England only)

10.13 The GOV.UK website provides information regarding protected species and sites in relation to development proposals: 'Local planning authorities should take advice from Natural England or the Environment Agency about planning applications for developments that may affect protected species.' GOV.UK advises that 'some species have standing advice which you can use to help with planning decisions. For others you should contact Natural England or the Environment Agency for an individual response.'

10.14 The standing advice (originally from Natural England and now held and updated on GOV.UK[3]) provides advice to planners on deciding if there is a 'reasonable likelihood' of protected species being present. It also provides advice on survey and mitigation requirements.

10.15 When determining an application for development that is covered by standing advice, in accordance with guidance in Government Circular 06/2005, Local planning authorities are required to take the standing advice into account. In paragraph 82 of the aforementioned Circular, it is stated that: 'The standing advice will be a material consideration in the determination of the planning application in the same way as any advice received from a statutory consultee…it is up to the planning authority to decide the weight to be attached to the standing advice, in the same way as it would decide the weight to be attached to a response from a statutory consultee.'

Natural Environment and Rural Communities (NERC) Act 2006 – Habitats and species of principal importance (England)

10.16 The Natural Environment and Rural Communities (NERC) Act came into force on 1st October 2006. Section 41 (S41) of the Act require the Secretary of State to publish a list of habitats and species which are of principal importance for the conservation of biodiversity in England. The list has been drawn up in consultation with Natural England as required by the Act. In accordance with the Act the Secretary of State keeps this list under review and will publish a revised list if necessary, in consultation with Natural England.

10.17 The S41 list is used to guide decision-makers such as public bodies, including local authorities and utilities companies, in implementing their duty under Section 40 of the NERC Act 2006, to have regard to the conservation of biodiversity in England, when carrying out their normal functions, including development control and planning. This is commonly referred to as the 'Biodiversity Duty.'

10.18 Guidance for public authorities on implementing the Biodiversity Duty[4] has been published by Defra. One of the key messages in this document is that 'conserving biodiversity includes restoring and enhancing species populations and habitats, as well as protecting them.' In England the administration of the planning system and licensing schemes are highlighted as having a 'profound influence on biodiversity conservation.' Local authorities are required to take measures to "promote the preservation, restoration and re-creation of priority habitats, ecological networks and the protection and recovery of priority species. The guidance states that 'the duty aims to raise the profile and visibility of biodiversity, clarify existing commitments with regard to biodiversity, and to make it a natural and integral part of policy and decision making.'

10.19 In 2007, the UK Biodiversity Action Plan (BAP) Partnership published an updated list of priority UK species and habitats covering terrestrial, freshwater and marine biodiversity to focus conservation action for rarer species and habitats in the UK. The UK Post-2010 Biodiversity Framework[5], which

[3] https://www.gov.uk/protected-species-and-sites-how-to-review-planning-proposals#standing-advice-for-protected-species
[4] Defra, 2007. *Guidance for Public Authorities on Implementing The Biodiversity Duty*. (http://www.defra.gov.uk/publications/files/pb12585-pa-guid-english-070516.pdf)
[5] JNCC and Defra (on behalf of the Four Countries' Biodiversity Group). 2012. *UK Post-2010 Biodiversity Framework*. July 2012. (http://jncc.defra.gov.uk/page-6189)

covers the period from 2011 to 2020, now succeeds the UK BAP. The UK priority list contained 1150 species and 65 habitats requiring special protection and has been used as a reference to draw up the lists of species and habitats of principal importance in England.

10.20 In England, there are 56 habitats of principal importance and 943 species of principal importance on the S41 list. These are all the habitats and species found in England that were identified as requiring action in the UK BAP and which continue to be regarded as conservation priorities in the subsequent UK Post-2010 Biodiversity Framework.

European protected species (Animals)

10.21 The Conservation of Habitats and Species Regulations 2017 (as amended) consolidates various amendments that have been made to the original (1994) Regulations which transposed the EC Habitats Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (Council Directive 92/43/EEC) into national law.

10.22 "European protected species" (EPS) of animal are those which are shown on Schedule 2 of the Conservation of Habitats and Species Regulations 2017 (as amended). They are subject to the provisions of Regulation 43 of those Regulations. All EPS are also protected under the Wildlife and Countryside Act 1981 (as amended). Taken together, these pieces of legislation make it an offence to:

a. Intentionally or deliberately capture, injure or kill any wild animal included amongst these species

b. Possess or control any live or dead specimens or any part of, or anything derived from a these species

c. deliberately disturb wild animals of any such species

d. deliberately take or destroy the eggs of such an animal, or

e. intentionally, deliberately or recklessly damage or destroy a breeding site or resting place of such an animal, or obstruct access to such a place

10.23 For the purposes of paragraph (c), disturbance of animals includes in particular any disturbance which is likely—

a. to impair their ability—

   i. to survive, to breed or reproduce, or to rear or nurture their young, or

   ii. in the case of animals of a hibernating or migratory species, to hibernate or migrate; or

b. to affect significantly the local distribution or abundance of the species to which they belong.

10.24 Although the law provides strict protection to these species, it also allows this protection to be set aside (derogated) through the issuing of licences. The licences in England are currently determined by Natural England (NE) for development works and by Natural Resources Wales in Wales. In accordance with the requirements of the Regulations (2017, as amended), a licence can only be issued where the following requirements are satisfied:

a. The proposal is necessary 'to preserve public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment'

b. 'There is no satisfactory alternative'

c. The proposals 'will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range.

Definition of breeding sites and resting places

10.25 Guidance for all European Protected Species of animal, including bats and great crested newt, regarding the definition of breeding and of breeding and resting places is provided by The

European Council (EC) which has prepared specific guidance in respect of the interpretation of various Articles of the EC Habitats Directive.[6] Section II.3.4.b) provides definitions and examples of both breeding and resting places at paragraphs 57 and 59 respectively. This guidance states that 'The provision in Article 12(1)(d) [of the EC Habitats Directive] should therefore be understood as aiming to safeguard the ecological functionality of breeding sites and resting places.' Further the guidance states: 'It thus follows from Article 12(1)(d) that such breeding sites and resting places also need to be protected when they are not being used, but where there is a reasonably high probability that the species concerned will return to these sites and places. If for example a certain cave is used every year by a number of bats for hibernation (because the species has the habit of returning to the same winter roost every year), the functionality of this cave as a hibernating site should be protected in summer as well so that the bats can re-use it in winter. On the other hand, if a certain cave is used only occasionally for breeding or resting purposes, it is very likely that the site does not qualify as a breeding site or resting place.'

European protected species (Plants)

10.26 The Conservation of Habitats and Species Regulations 2017 (as amended) consolidates various amendments that have been made to the original (1994) Regulations which transposed the EC Habitats Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (Council Directive 92/43/EEC) into national law.

10.27 "European protected species" (EPS) of plant are those which are present on Schedule 5 of the Conservation of Habitats and Species Regulations 2017 (as amended). They are subject to the provisions of Regulation 46 of those Regulations.

10.28 Regulation 47 makes it an offence to deliberately pick, collect, cut, uproot or destroy a wild plant of an EPS. It also makes it an offence to have in possession or control any live or dead plant or part of plant which has been taken in the wild and which is an EPS (or listed in Annexe II(b) or IV(b) of the Habitats Directive).

Competent authorities

10.29 Under Regulation 7 of the Conservation of Habitats and Species Regulations 2017 (as amended) a "competent authority" includes "any Minister of the Crown…, government department, statutory undertaker, public body of any description or person holding a public office.

10.30 In accordance with Regulation 9, "a competent authority must exercise their functions which are relevant to nature conservation, including marine conservation, so as to secure compliance with the requirements of the [Habitats and Birds] Directives. This means for instance that when considering development proposals a competent authority should consider whether EPS or European Protected Sites are to be affected by those works and, if so, must show that they have given consideration as to whether derogation requirements can be met.

Birds

10.31 All nesting birds are protected under Section 1 of the Wildlife and Countryside Act 1981 (as amended) which makes it an offence to intentionally kill, injure or take any wild bird or take, damage or destroy its nest whilst in use or being built, or take or destroy its eggs. In addition to this, for some rarer species (listed on Schedule 1 of the Act), it is an offence to disturb them whilst they are nest building or at or near a nest with eggs or young, or to disturb the dependent young of such a bird.

10.32 The Conservation of Habitats and Species Regulations 2017 (as amended) places duties on competent authorities (including Local Authorities and National Park Authorities) in relation to wild bird habitat. These provisions relate back to Articles 1, 2 and 3 of the EC Directive on the conservation of wild birds (2009/147/EC, 'Birds Directive'[7]) (Regulation 10 (3)) requires that the

[6] Guidance document on the strict protection of animal species of Community interest under the Habitats Directive 92/43/EEC. (February 2007), EC.
[7] 2009/147/EC Birds Directive (30 November 2009. European Parliament and the Council of the European Union.

objective is the 'preservation, maintenance and re-establishment of a sufficient diversity and area of habitat for wild birds in the United Kingdom, including by means of the upkeep, management and creation of such habitat, as appropriate, having regard to the requirements of Article 2 of the new Wild Birds Directive…' Regulation 10 (7) states: 'In considering which measures may be appropriate for the purpose of security or contributing to the objective in [Regulation 10 (3)] Paragraph 3, appropriate account must be taken of economic and recreational requirements'.

10.33 In relation to the duties placed on competent authorities under the 2017 Regulations, Regulation 10 (8) states: 'So far as lies within their powers, a competent authority in exercising any function [including in relation to town and country planning] in or in relation to the United Kingdom must use all reasonable endeavours to avoid any pollution or deterioration of habitats of wild birds (except habitats beyond the outer limits of the area to which the new Wild Birds Directive applies).'

Badger

10.34 Badger is protected under the Protection of Badgers Act 1992. It is not permitted to wilfully kill, injure, take, possess or cruelly ill-treat a badger, or to attempt to do so; or to intentionally or recklessly interfere with a sett. Sett interference includes disturbing badgers whilst they are occupying a sett, as well as damaging or destroying a sett or obstructing access to it. A badger sett is defined in the legislation as "a structure or place, which displays signs indicating current use by a badger".

10.35 ODPM Circular 06/2005[8] provides further guidance on statutory obligations towards badger within the planning system. Of particular note is paragraph 124, which states that "The likelihood of disturbing a badger sett, or adversely affecting badgers' foraging territory, or links between them, or significantly increasing the likelihood of road or rail casualties amongst badger populations, are capable of being material considerations in planning decisions."

10.36 Natural England provides Standing Advice[9], which is capable of being a material consideration in planning decisions. Natural England recommends mitigation to avoid impacts on badger setts, which includes maintaining or creating new foraging areas and maintaining or creating access (commuting routes) between setts and foraging/watering areas.

Reptiles

10.37 All native reptile species receive legal protection in Great Britain under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). Viviparous lizard, slow-worm, grass snake and adder are protected against killing, injuring and unlicensed trade only. Sand lizard and smooth snake receive additional protection as "European Protected species" under the provisions of the Conservation of Habitats and Species Regulations 2017 (as amended) and are fully protected under the Wildlife and Countryside Act 1981 (as amended).

10.38 All six native species of reptile are included as 'species of principal importance' for the purpose of conserving biodiversity under Section 41 (England) of the NERC Act 2006 and Section 7 of the Environment (Wales) Act 2016.

10.39 Current Natural England Guidelines for Developers[10] states that 'where it is predictable that reptiles are likely to be killed or injured by activities such as site clearance, this could legally constitute intentional killing or injuring.' Further the guidance states: 'Normally prohibited activities may not be illegal if 'the act was the incidental result of a lawful operation and could not reasonably have been avoided'. Natural England 'would expect reasonable avoidance to include measures such as altering development layouts to avoid key areas, as well as capture and exclusion of reptiles.'

[8] *ODPM Circular 06/2005. Government Circular: Biodiversity and Geological Conservation – Statutory Obligations and their Impacts within the Planning System* (2005). HMSO Norwich.
[9] http://www.naturalengland.org.uk/ourwork/planningdevelopment/spatialplanning/standingadvice/specieslinks.aspx

[10] English Nature, 2004. *Reptiles: guidelines for developers.* English Nature, Peterborough. https://webarchive.nationalarchives.gov.uk/20150303064706/http://publications.naturalengland.org.uk/publication/76006

10.40 The Natural England Guidelines for Developers state that 'planning must incorporate two aims where reptiles are present:

- To protect reptiles from any harm that might arise during development work;
- To ensure that sufficient quality, quantity and connectivity of habitat is provided to accommodate the reptile population, either on-site or at an alternative site, with no net loss of local reptile conservation status.'

Water vole

10.41 Water vole is protected under the Wildlife and Countryside Act 1981 (as amended). This makes it an offence to kill, injure or take any water vole, damage, destroy or obstruct access to any place of shelter or protection that the animals are using, or disturb voles while they are using such a place. Water vole is listed as a Species of Principal Importance under the provisions of the NERC Act 2006 in England and under the provisions of the Environment (Wales) Act 2016.

White-clawed crayfish

10.42 The white-clawed crayfish is scheduled under the Wildlife and Countryside Act 1981 (as amended), listed under the EC Habitats Directive (Annexe II and V) and is on the IUCN Red Data List for endangered and threatened species. It is also a Species of Principal Importance under the provisions of the NERC Act 2006 and the provisions of the Environment (Wales) Act 2016.

10.43 Under the Wildlife and Countryside Act 1981 (as amended) it is illegal to take or sell white-clawed crayfish. Whilst it is not an offence under the Act to disturb or kill white-clawed crayfish or to damage or destroy their habitat, both Natural England and the Environment Agency recommend that anyone carrying out any form of management or development work on suitable watercourses take into account the conservation of this species.

10.44 Signal crayfish and several other invasive non-native crayfish species are listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended). Strictly speaking, this makes it an offence to return to the wild any signal crayfish, even if inadvertently captured. Any signal crayfish or other non-native crayfish captured should be humanely destroyed (once their identification has been confirmed by a suitably qualified and experienced ecologist).

Wild mammals in general

10.45 The Wild Mammals (Protection) Act 1996 (as amended) makes provision for the protection of wild mammals from certain cruel acts, making it an offence for any person to intentionally cause suffering to any wild mammal. In the context of development sites, for example, this may apply to rabbits in their burrows.

Invasive non-native species

10.46 An invasive non-native species is any non-native animal or plant that has the ability to spread causing damage to the environment.

10.47 Under the Wildlife and Countryside Act 1981 (as amended) it is an offence to release, or to allow to escape into the wild, any animal which is not ordinarily resident in and is not a regular visitor to Great Britain in a wild state or is listed under Schedule 9 of the Act.

10.48 It is an offence to plant or otherwise cause to grow in the wild invasive non-native plants listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended).

Hedgerows

10.49 Article 10 of the Habitats Directive[11] requires that 'Member States shall endeavour…to encourage the management of features of the landscape which are of major importance for wild fauna and flora. Such features are those which, by virtue of their linear and continuous structure…or their function as stepping stones…are essential for the migration, dispersal and genetic exchange of wild species'. Examples given in the Directive include traditional field boundary systems (such as hedgerows).

10.50 The aim of the Hedgerow Regulations 1997[12], according to guidance produced by the Department of the Environment[13], is "to protect important hedgerows in the countryside by controlling their removal through a system of notification. In summary, the guidance states that the system is concerned with the removal of hedgerows, either in whole or in part, and covers any act which results in the destruction of a hedgerow. The procedure in the Regulations is triggered only when land managers or utility operators want to remove a hedgerow. The system is in favour of protecting and retaining 'important' hedgerows.

10.51 The Hedgerow Regulations set out criteria that must be used by the local planning authority in determining which hedgerows are 'important'. The criteria relate to the value of hedgerows from an archaeological, historical, wildlife and landscape perspective.

Japanese knotweed

10.52 It is an offence to plant or cause the spread of Japanese knotweed in the wild under the Wildlife and Countryside Act 1981 (as amended). All waste containing Japanese knotweed comes under the control of Part II of the Environmental Protection Act 1990.

10.53 The Environment Agency has produced "The Knotweed Code of Practice", which provides guidance on how to manage Japanese knotweed legally on development sites[14]. This document provides ecological information on Japanese knotweed, details of how to prevent its spread, how to manage Japanese knotweed and information on disposal. Natural Resources Wales refers to Environment Agency guidance in respect of landowners responsibilities in Wales and to the Wildlife and Countryside Act 1981 (as amended).

[11] Council Directive 92/43/EEC of 2i May 1992 on the conservation of natural habitats and of wild fauna and flora.
[12] Statutory Instrument 1997 No. 1160 – The Hedgerow Regulations 1997. HMSO: London
[13] The Hedgerow Regulations 1997: a guide to the law and good practice, HMSO: London
[14] *Managing Japanese knotweed on development sites: the knotweed code of practice* (2006). Environment Agency. https://www.gov.uk/government/publications/japanese-knotweed-managing-on-development-sites. See also 2013 Code of Practice update.

Axis Land Partnerships
December 2019

BIDWELLS

INITIAL HERITAGE APPRAISAL

LAND NORTH OF FOXTON, CAMBRIDGESHIRE

Quality Assurance

Site name:	Land North of Foxton, Cambridgeshire
Client name:	Axis Land Partnerships
Type of report:	Initial Heritage Appraisal
Prepared by:	Georgina Pickett BSc (Hons) MSc MRTPI
Signed:	[redacted]
Date:	11 December 2019
Reviewed by:	Chris Surfleet MA MSc PGDipUD IHBC
Signed:	[redacted]
Date:	13 December 2019

Table of Contents

1.0 Introduction

1.1 This Initial Heritage Appraisal has been prepared on behalf of Axis Land Partnerships to identify heritage assets in and around the proposed allocation site at Land North of Foxton, Cambridgeshire (hereafter referred to as the "site"), to inform initial design proposals for the potential development and to ensure that those proposals minimise impacts on the identified heritage assets.

Figure 1 – Aerial Photograph showing location of site.

1.2 The report identifies the relative heritage value of the existing site with reference to Section 66(1) and 72 of the Planning (Listed Buildings & Conservation Areas) Act 1990 and the National Planning Policy Framework (NPPF) where the impact of development on heritage assets or their settings is being considered (Paragraphs 189-197).

1.3 Through this process, the role of the site and assets can be defined in heritage terms, providing a clear framework from the outset for the designers to respond to with proposals for potential development which take their values fully into account.

1.4 This document has been prepared by Georgina Pickett BSc (Hons) MSc MRTPI (Principal Heritage Consultant), and reviewed by Chris Surfleet MA MSc PGDipUD IHBC (Head of Heritage).

2.0 Heritage Policy and Guidance Summary

Legislation

Planning (Listed Buildings & Conservation Areas) Act 1990

2.1 The primary legislation relating to Listed Buildings and Conservation Areas is set out in the Planning (Listed Buildings & Conservation Areas) Act 1990.

- Section 16(2) states "*In considering whether to grant listed building consent for any works the local planning authority or the Secretary of State shall have special regard to the desirability of preserving the building or its setting or any features of special architectural or historic interest which it possesses*."
- Section 66(1) reads: "*In considering whether to grant planning permission for development which affects a listed building or its setting, the local planning authority or, as the case may be, the Secretary of State shall have special regard to the desirability of preserving the building or its setting or any features of special architectural or historic interest which it possesses."*
- In relation to Conservation Areas, Section 72(1) reads: "*Special attention shall be paid to the desirability of preserving or enhancing the character or appearance of that area."* The site does not lie within the Foxton Conservation Area, but is adjacent to it. As such,

2.2 With regard to this particular site, the provisions of Section 72(1) do not apply as the site does not fall within a Conservation Area. However, impacts on the setting of any relevant Conservation Areas still form a key consideration of the work carried out within this report in accordance with planning policy.

National Planning Policy Framework (2019)

2.3 The revised National Planning Policy Framework (NPPF) was published on 19th February 2019, replacing the previously-published 2012 and 2018 Frameworks. With regard to the historic environment, the over-arching aim of the policy remains in line with philosophy of the 2012 framework, namely that "*our historic environments... can better be cherished if their spirit of place thrives, rather than withers."* The relevant policy is outlined within chapter 16, 'Conserving and Enhancing the Historic Environment'.

2.4 This chapter reasserts that heritage assets can range from sites and buildings of local interest to World Heritage Sites considered to have an Outstanding Universal Value. The NPPF subsequently requires these assets to be conserved in a *"manner appropriate to their significance"* (Paragraph 184).

2.5 NPPF directs local planning authorities to require an applicant to *"describe the significance of any heritage assets affected, including any contribution made by their setting"* and the level of detailed assessment should be "proportionate to the assets' importance" (Paragraph 189).

2.6 Paragraph 190 states that the significance any heritage asset that may be affected by a proposal should be identified and assessed. This includes any assets affected by development within their settings. This Significance Assessment should be taken into account when considering the impact of a proposal, *"to avoid conflict between the heritage asset's conservation and any aspect of the proposal"*. This paragraph therefore results in the need for an analysis of the impact of a proposed development on the asset's relative significance, in the form of a Heritage Impact Assessment.

2.7 Paragraph 193 requires that *"When considering the impact of a proposed development on the significance of a designated heritage asset, great weight should be given to the asset's conservation (and the more important the asset, the greater the weight should be). This is irrespective of whether any potential harm amounts to substantial harm, total loss or less than substantial harm to its significance."*

2.8 It is then clarified that any harm to the significance of a designated heritage asset, either through alteration, destruction or development within its setting, should require, *"clear and convincing justification"* (Paragraph 194). This paragraph outlines that substantial harm to grade II listed heritage assets should be exceptional, rising to 'wholly exceptional' for those assets of the highest significance such as scheduled monuments, Grade I and grade II* listed buildings or registered parks and gardens as well as World Heritage Sites.

2.9 In relation to harmful impacts or the loss of significance resulting from a development proposal, Paragraph 195 states the following:

"Where a proposed development will lead to substantial harm to (or total loss of significance of) a designated heritage asset, local planning authorities should refuse consent, unless it can be demonstrated that the substantial harm or total loss is necessary to achieve substantial public benefits that outweigh that harm or loss, or all of the following apply:

a. *the nature of the heritage asset prevents all reasonable uses of the site; and*

b. *no viable use of the heritage asset itself can be found in the medium term through appropriate marketing that will enable its conservation; and*

c. *conservation by grant-funding or some form of not for profit, charitable or public ownership is demonstrably not possible; and*

d. *the harm or loss is outweighed by the benefit of bringing the site back into use*."

2.10 The NPPF therefore requires a balance to be applied in the context of heritage assets, including the recognition of potential benefits accruing from a development. In the case of proposals which would result in *"less than substantial harm",* paragraph 196 provides the following:

"Where a development proposal will lead to less than substantial harm to the significance of a designated heritage asset, this harm should be weighed against the public benefits of the proposal, including, where appropriate, securing its optimum viable use."

2.11 It is also possible for proposals, where suitably conceived and designed, to result in no harm to the significance of heritage assets.

2.12 In the case of non-designated heritage assets, Paragraph 197 requires a Local Planning Authority to make a "*balanced judgement"* having regard to the scale of any harm or loss and the significance of the heritage asset.

2.13 The NPPF therefore recognises the need to clearly identify relative significance at an early stage and then to judge the impact of development proposals in that context.

2.14 With regard to Conservation Areas and the settings of heritage assets, paragraph 200 requires Local Planning Authorities to look for opportunities for new development, enhancing or better revealing their significance. Whilst it is noted that not all elements of a Conservation Area will necessarily contribute to its significance, this paragraph states that *"proposals that preserve those elements of a setting that make a positive contribution to the asset (or better reveal its significance) should be treated favourably."*

Planning Practice Guidance (PPG)

2.15 The Planning Practice Guidance (PPG) was updated on 23 July 2019 and is a companion to the NPPF, replacing a large number of foregoing Circulars and other supplementary guidance.

2.16 In relation to non-designated heritage assets, the NPPG explains the following:

"Non-designated heritage assets are buildings, monuments, sites, places, areas or landscapes identified by plan-making bodies as having a degree of heritage significance meriting consideration in planning decisions, but which do not meet the criteria for designated heritage assets."

2.17 It goes on to clarify that: *"A substantial majority of buildings have little or no heritage significance and thus do not constitute heritage assets. Only a minority have enough heritage significance to merit identification as non-designated heritage assets."*

2.18 This statement explains the need to be judicious in the identification of value and the extent to which this should be applied as a material consideration and in accordance with Paragraph 197.

Historic England Conservation Principles: Policies and Guidance 2008.

2.19 Historic England sets out in this document a logical approach to making decisions and offering guidance about all aspects of the historic environment, including changes affecting significant places. It states that:

"*New work or alteration to a significant place should normally be acceptable if: a. there is sufficient information comprehensively to understand the impacts of the proposal on the significance of the place; b. the proposal would not materially harm the values of the place, which, where appropriate, would be reinforced or further revealed; c. the proposals aspire to a quality of design and execution which may be valued now and in the future; d. the long-term consequences of the proposals can, from experience, be demonstrated to be benign, or the proposals are designed not to prejudice alternative solutions in the future*" (page 59).

Historic England Analysing Significance in Heritage Assets Advice Note 12 (October 2019)

2.20 This document provides guidance on the National Planning Policy Framework requirement for applicants to describe heritage significance in order to aid local planning authorities' decision making. It reiterates the importance of understanding the significance of heritage assets, in advance of developing proposals. This advice note outlines a staged approach to decision-making in which assessing significance precedes the design and also describes the relationship with archaeological desk-based assessments and field evaluations, as well as with Design and Access Statements.

2.21 The advice in this document, in accordance with the NPPF, emphasises that the level of detail in support of applications for planning permission and listed building consent should be no more than is necessary to reach an informed decision, and that activities to conserve the asset(s) need to be proportionate to the significance of the heritage asset(s) affected and the impact on that significance. This advice also addresses how an analysis of heritage significance could be set out before discussing suggested structures for a statement of heritage significance.

Historic England Making Changes to Heritage Assets Advice Note 2 (February 2016)

2.22 This advice note provides information on repair, restoration, addition and alteration works to heritage assets. It advises that "*The main issues to consider in proposals for additions to heritage assets, including new development in Conservation Areas, aside from NPPF requirements such as social and economic activity and sustainability, are proportion, height, massing, bulk, use of materials, durability and adaptability, use, enclosure, relationship with adjacent assets and definition of spaces and streets, alignment, active frontages, permeability and treatment of setting.*" (page 10)

Historic England Managing Significance in Decision Taking in the Historic Environment Historic Environment Good Practice Advice (GPA) in Planning Note 2 (March 2015)

2.23 This advice note sets out clear information to assist all relevant stake holders in implementing historic environment policy in the National Planning Policy Framework (NPPF) and the related guidance given in the Planning Practice Guidance (PPG). These include*: "assessing the significance of heritage assets, using appropriate expertise, historic environment records, recording and furthering understanding, neglect and unauthorised works, marketing and design and distinctiveness." (page 1)*

Historic England The Setting of Heritage Assets Historic Environment Good Practice Advice (GPA) in Planning Note 3 (Second Edition) (December 2017)

2.24 This document presents guidance on managing change within the settings of heritage assets, including archaeological remains and historic buildings, sites, areas and landscapes. Page 6, entitled: '*A staged approach to proportionate decision taking*' provides detailed advice on assessing the implications of development proposals and recommends the following broad approach to assessment, undertaken as a series of steps that apply equally to complex or more straightforward cases:

- *Step 1: Identify which heritage assets and their settings are affected*
- *Step 2: Assess the degree to which these settings and views make a contribution to the significance of the heritage asset(s) or allow significance to be appreciated*
- *Step 3: Assess the effects of the proposed development, whether beneficial or harmful, on the significance or on the ability to appreciate it*
- *Step 4: Explore ways to maximise enhancement and avoid or minimise harm*
- *Step 5: Make and document the decision and monitor outcomes*

Local Policy

South Cambridgeshire Local Plan (Adopted September 2018)

2.25 The following policies of the South Cambridgeshire Local Plan are considered relevant to this proposal.

2.26 **Policy NH/14:** Heritage Assets

1. 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 innovatory ways.

2. 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 National Planning Policy Framework, 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.

Emerging Greater Cambridge Local Plan

2.27 Cambridge City Council and South Cambridgeshire District Council are working together to prepare a joint Local Plan for the Greater Cambridge area. Both the Councils' current adopted Local Plans (2018) include a policy which makes a commitment to an early review of those Plans to commence before the end of 2019. The Issues and Options consultation is due to begin on 25 November 2019 and run through until the New Year.

Foxton Pre-submission Draft Neighbourhood Plan 2019-2031

2.28 **Policy FOX/3:** Heritage Assets and their Setting

Any development must conserve or enhance the heritage assets and their setting in the Foxton NP area. This includes both designated (Conservation Area, statutorily listed buildings and the scheduled ancient monument) and non-designated heritage assets.

Where proposals have any effect on a non-designated heritage asset, a balanced judgement will be applied having regard to the scale of any harm or loss and the significance of the heritage asset.

3.0 Methodology

3.1 A heritage asset is defined within the National Planning Policy Framework as "*a building, monument, site, place, area or landscape identified as having a degree of significance meriting consideration in planning decisions, because of its heritage interest. It includes designated heritage assets and assets identified by the local planning authority (including local listing*)" (NPPF Annex 2: Glossary).

3.2 To be considered a heritage asset *"an asset must have some meaningful archaeological, architectural, artistic, historical, social or other heritage interest that gives it value to society that transcends its functional utility. Therein lies the fundamental difference between heritage assets and ordinary assets; they stand apart from ordinary assets because of their significance – the summation of all aspects of their heritage interest." ('Managing Built Heritage: The Role of Cultural Values and Significance*' Stephen Bond and Derek Worthing, 2016.)

3.3 'Designated' assets have been identified under the relevant legislation and policy including, but not limited to: World Heritage Sites, Scheduled Monuments, Listed Buildings, and Conservation Areas. 'Non-designated' heritage assets are assets which fall below the national criteria for designation.

3.4 The absence of a national designation should not be taken to mean that an asset does not hold any heritage interest. The Planning Policy Guidance (PPG) states that "*non-designated heritage assets are buildings, monuments, sites, places, areas or landscapes identified by plan-making bodies as having a degree of heritage significance meriting consideration in planning decisions, but which do not meet the criteria for designated heritage assets."* (Paragraph: 039 Reference ID: 18a-039-20190723)

3.5 The PPG goes on to clarify that "*a substantial majority of buildings have little or no heritage significance and thus do not constitute heritage assets. Only a minority have enough heritage significance to merit identification as non-designated heritage assets*."

Meaning of Significance

3.6 The concept of significance was first expressed within the 1979 Burra Charter (Australia ICOMOS, 1979). This charter has periodically been updated to reflect the development of the theory and practice of cultural heritage management, with the current version having been adopted in 2013. It defines cultural significance as the *"aesthetic, historic, scientific, social or spiritual value for past, present or future generations. Cultural significance is embodied in the place itself, its fabric, setting, use, associations, meanings, records, related places and related objects. Places may have a range of values for different individuals or groups*" (Page 2, Article 1.2)

3.7 The NPPF (Annex 2: Glossary) also defines significance as "*the value of a heritage asset to this and future generations because of its heritage interest. The interest may be archaeological,*

architectural, artistic or historic. Significance derives not only from a heritage asset's physical presence, but also from its setting."

3.8 Significance can therefore be considered to be formed by "*the collection of values associated with a heritage asset*." ('Managing Built Heritage: The Role of Cultural Values and Significance' Stephen Bond and Derek Worthing, 2016.)

Assessment of Significance/Value

3.9 It is important to be proportionate in assessing significance as required in both national policy and guidance as set out in paragraph 189 of NPPF.

3.10 The Historic England document 'Conservation Principles' states that "*understanding a place and assessing its significance demands the application of a systematic and consistent process, which is appropriate and proportionate in scope and depth to the decision to be made, or the purpose of the assessment.*"

3.11 The document goes on to set out a process for assessment of significance, but it does note that not all of the stages highlighted are applicable to all places/ assets.

- Understanding the fabric and evolution of the asset;
- Identify who values the asset, and why they do so;
- Relate identified heritage values to the fabric of the asset;
- Consider the relative importance of those identified values;
- Consider the contribution of associated objects and collections;
- Consider the contribution made by setting and context;
- Compare the place with other assets sharing similar values;
- Articulate the significance of the asset.

3.12 At the core of this assessment is an understanding of the value/significance of a place. There have been numerous attempts to categorise the range of heritage values which contribute to an asset's significance. Historic England's '*Conservation Principles*' sets out a grouping of values as follows:

Evidential value – '*derives from the potential of a place to yield evidence about past human activity…Physical remains of past human activity are the primary source of evidence about the substance and evolution of places, and of the people and cultures that made them…The ability to understand and interpret the evidence tends to be diminished in proportion to the extent of its removal or replacement*.' (Page 28)

Aesthetic Value – '*Aesthetic values can be the result of the conscious design of a place, including artistic endeavour. Equally, they can be the seemingly fortuitous outcome of the way in which a place has evolved and been used over time. Many places combine these two aspects… Aesthetic values tend to be specific to a time cultural context and appreciation of them is not culturally exclusive'*. (Pages 30-31)

Historic Value – '*derives from the ways in which past people, events and aspects of life can be connected through a place to the present. It tends to be illustrative or associative… Association with a notable family, person, event, or movement gives historical value a particular resonance...The historical value of places depends upon both sound identification and direct experience of fabric or landscape that has survived from the past, but is not as easily diminished*

by change or partial replacement as evidential value. The authenticity of a place indeed often lies in visible evidence of change as a result of people responding to changing circumstances. Historical values are harmed only to the extent that adaptation has obliterated or concealed them, although completeness does tend to strengthen illustrative value'. (Pages 28-30)

Communal Value – "*Commemorative and symbolic values reflect the meanings of a place for those who draw part of their identity from it, or have emotional links to it… Social value is associated with places that people perceive as a source of identity, distinctiveness, social interaction and coherence. Some may be comparatively modest, acquiring communal significance through the passage of time as a result of a collective memory of stories linked to them…They may relate to an activity that is associated with the place, rather than with its physical fabric…Spiritual value is often associated with places sanctified by longstanding veneration or worship, or wild places with few obvious signs of modern life. Their value is generally dependent on the perceived survival of the historic fabric or character of the place, and can be extremely sensitive to modest changes to that character, particularly to the activities that happen there*". (Pages 31-32)

3.13 Value-based assessment should be flexible in its application, it is important not to oversimplify an assessment and to acknowledge when an asset has a multi-layered value base, which is likely to reinforce its significance.

Contribution of setting/context to significance

3.14 In addition to the above values, the setting of a heritage asset can also be a fundamental contributor to its significance - although it should be noted that 'setting' itself is not a designation. The value of setting lies in its contribution to the significance of an asset. For example, there may be instances where setting does not contribute to the significance of an asset at all.

3.15 Historic England's Conservation Principles defines s*etting* as *"an established concept that relates to the surroundings in which a place is experienced, its local context, embracing present and past relationships to the adjacent landscape."*

3.16 It goes on to state that "*context embraces any relationship between a place and other places. It can be, for example, cultural, intellectual, spatial or functional, so any one place can have a multi-layered context. The range of contextual relationships of a place will normally emerge from an understanding of its origins and evolution. Understanding context is particularly relevant to assessing whether a place has greater value for being part of a larger entity, or sharing characteristics with other places*" (page 39).

3.17 In order to understand the role of setting and context to decision-making, it is important to have an understanding of the origins and evolution of an asset, to the extent that this understanding gives rise to significance in the present. Assessment of these values is not based solely on visual considerations but may lie in a deeper understanding of historic use, ownership, change or other cultural influence – all or any of which may have given rise to current circumstances and may hold a greater or lesser extent of significance.

3.18 The importance of setting depends entirely on the contribution it makes to the significance of the heritage asset or its appreciation. It is important to note that impacts that may arise to the setting of an asset do not, necessarily, result in direct or equivalent impacts to the significance of that asset(s).

Assessing Impact

3.19 It is evident that the significance/value of any heritage asset(s) requires clear assessment to provide a context for, and to determine the impact of, development proposals. Impact on that

value or significance is determined by first considering the sensitivity of the receptors identified which is best expressed by using a hierarchy of value levels.

3.20 There are a range of hierarchical systems for presenting the level of significance in use; however, the method chosen for this project is based on the established 'James Semple Kerr method' which has been adopted by Historic England, in combination with the impact assessment methodology for heritage assets within the *Design Manual for Roads and Bridges* (DMRB: HA208/13) published by the Highways Agency, Transport Scotland, the Welsh Assembly Government and the department for Regional Development Northern Ireland. This 'value hierarchy' has been subject to scrutiny in the UK planning system, including Inquiries, and is the only hierarchy to be published by a government department.

3.21 The first stage of our approach is to carry out a thoroughly researched assessment of the significance of the heritage asset, in order to understand its value:

SIGNIFICANCE	EXAMPLES
Very High	World Heritage Sites, Listed Buildings, Scheduled Monuments and Conservation Areas of outstanding quality, or built assets of acknowledged exceptional or international importance, or assets which can contribute to international research objectives. Registered Parks & Gardens, historic landscapes and townscapes of international sensitivity.
High	World Heritage Sites, Listed Buildings, Scheduled Monuments, Conservation Areas and built assets of high quality, or assets which can contribute to international and national research objectives. Registered Parks & Gardens, historic landscapes and townscapes which are highly preserved with excellent coherence, integrity, time-depth, or other critical factor(s).
Good	Listed Buildings, Scheduled Monuments, Conservation Areas and built assets (including locally listed buildings and non-designated assets) with a strong character and integrity which can be shown to have good qualities in their fabric or historical association, or assets which can contribute to national research objectives. Registered Parks & Gardens, historic landscapes and townscapes of good level of interest, quality and importance, or well preserved and exhibiting considerable coherence, integrity time-depth or other critical factor(s).
Medium/ Moderate	Listed Buildings, Scheduled Monuments, Conservation Areas and built assets (including locally listed buildings and non-designated assets) that can be shown to have moderate qualities in their fabric or historical association. Registered Parks & Gardens, historic landscapes and townscapes with reasonable coherence, integrity, time-depth or other critical factor(s).
Low	Listed Buildings, Scheduled Monuments and built assets (including locally listed buildings and non-designated assets) compromised by poor preservation integrity and/or low original level of quality of low survival of contextual associations but with potential to contribute to local research objectives. Registered Parks & Gardens, historic landscapes and townscapes with modest sensitivity or whose sensitivity is limited by poor preservation, historic integrity and/or poor survival of contextual associations.
Negligible	Assets which are of such limited quality in their fabric or historical association that this is not appreciable. Historic landscapes and townscapes of limited sensitivity, historic integrity and/or limited survival of contextual associations.

Neutral/ None	Assets with no surviving cultural heritage interest. Buildings of no architectural or historical note. Landscapes and townscapes with no surviving legibility and/or contextual associations, or with no historic interest.

3.22 Once the value/ significance of an asset has been assessed, the next stage is to determine the assets 'sensitivity to change'. The following table sets out the levels of sensitivity to change, which is based upon the vulnerability of the asset, in part or as a whole, to loss of value through change. Sensitivity to change can be applied to individual elements of a building, or its setting, and may differ across the asset.

3.23 An asset's sensitivity level also relates to its capacity to absorb change, either change affecting the asset itself or change within its setting (remembering that according to Historic England The Setting of Heritage Assets – Planning Note 3, 'change' does not in itself imply harm, and can be neutral, positive or negative in effect).

3.24 Some assets are more robust than others and have a greater capacity for change and therefore, even though substantial changes are proposed, their sensitivity to change or capacity to absorb change may still be assessed as low.

SENSITIVITY	EXPLANATION OF SENSITIVITY
High	High Sensitivity to change occurs where a change may pose a major threat to a specific heritage value of the asset which would lead to substantial or total loss of heritage value.
Moderate	Moderate sensitivity to change occurs where a change may diminish the heritage value of an asset, or the ability to appreciate the heritage value of an asset.
Low	Low sensitivity to change occurs where a change may pose no appreciable thereat to the heritage value of an asset.

3.25 Once there is an understanding of the sensitivity an asset holds, the next stage is to assess the 'magnitude' of the impact that any proposed works may have. Impacts may be considered to be adverse, beneficial or neutral in effect and can relate to direct physical impacts, impacts on its setting, or both. Impact on setting is measured in terms of the effect that the impact has on the significance of the asset itself – rather than setting itself being considered as the asset.

MAGNITUDE OF IMPACT	TYPICAL CRITERIA DESCRIPTORS
Very High	**Adverse**: Impacts will destroy cultural heritage assets resulting in their total loss or almost complete destruction. **Beneficial**: The proposals would remove or successfully mitigate existing and significant damaging and discordant impacts on assets; allow for the substantial restoration or enhancement of characteristic features.
High	**Adverse**: Impacts will damage cultural heritage assets; result in the loss of the asset's quality and integrity; cause severe damage to key characteristic features or elements; almost complete loss of setting and/or context of the asset. The assets integrity or setting is almost wholly destroyed or is severely compromised, such that the resource can no longer be appreciated or understood.

	Beneficial: The proposals would remove or successfully mitigate existing damaging and discordant impacts on assets; allow for the restoration or enhancement of characteristic features; allow the substantial re-establishment of the integrity, understanding and setting for an area or group of features; halt rapid degradation and/or erosion of the heritage resource, safeguarding substantial elements of the heritage resource.
Medium	**Adverse**: Moderate impact on the asset, but only partially affecting the integrity; partial loss of, or damage to, key characteristics, features or elements; substantially intrusive into the setting and/or would adversely impact upon the context of the asset; loss of the asset for community appreciation. The assets integrity or setting is damaged but not destroyed so understanding and appreciation is compromised. **Beneficial:** Benefit to, or partial restoration of, key characteristics, features or elements; improvement of asset quality; degradation of the asset would be halted; the setting and/or context of the asset would be enhanced and understanding and appreciation is substantially improved; the asset would be bought into community use.
Minor/Low	**Adverse**: Some measurable change in assets quality or vulnerability; minor loss of or alteration to, one (or maybe more) key characteristics, features or elements; change to the setting would not be overly intrusive or overly diminish the context; community use or understanding would be reduced. The assets integrity or setting is damaged but understanding and appreciation would only be diminished not compromised. **Beneficial:** Minor benefit to, or partial restoration of, one (maybe more) key characteristics, features or elements; some beneficial impact on asset or a stabilisation of negative impacts; slight improvements to the context or setting of the site; community use or understanding and appreciation would be enhanced.
Negligible	Barely discernible change in baseline conditions and/or slight impact. This impact can be beneficial or adverse in nature.
Neutral	Some changes occur but the overall effect on the asset and its significance is neutral.
Nil	No change in baseline conditions.

Summary

3.26 The aim of this Initial Heritage Appraisal is to identify and assess the significance of the identified heritage assets with particular regard to their settings and set design parameters to ensure any potential impacts on the surrounding assets.

3.27 The level of detail provided within these assessments is "*proportionate to the assets' importance and no more than is sufficient to understand the potential impact of the proposal on their significance*" as set out in Paragraph 189 of the National Planning Policy Framework.

4.0 Historic Context

4.1 Foxton lies almost 9.5 km. south-south-west of Cambridge. The parish is bounded on the north by the River Cam or Rhee, on the north-east and southwest by the Hoffer, formerly Hoppeforth, and Shepreth brooks. To the south-east it is bound by an ancient road running north-east from Fowlmere, called by 1315 the Mareway, and further west by an earthwork called once Grim's ditch, later Thriplow bank. It is mostly level and low-lying, at between 15 and 25 metres, though just south of the village it rises a little to over 30 metres at West Hill and Chalk Hill, where the village clunch pit has probably been since the Middle Ages. Foxton had little wood in historic times, although a lane, running south-east from the village, was named Woodway by 1315. The parish has usually been devoted mainly to arable farming, on a triennial rotation until inclosure in 1830.

Figure 2 - Foxton shown on Blaeu's 1650 map of Cambridgeshire.

4.2 Settlement at Foxton goes back for almost 2,000 years. A Belgic settlement of the first century A.D. was followed by a Romano-British farmstead near Hoffer bridge, and a pagan English cemetery has been traced north of Foxton station. The population rose from 43 in 1086 to 132 adults in 1676 and peaked at just over 450 by the 1840s, and after dropping slightly rose again to 480 in 1910. In the late 20th century the population grew steadily to 567 by 1951, 643 by 1961, and 811 by 1971.

Figure 3 - 1777 map by Moll showing Foxton on the road from Cambridge to Royston.

4.3 The village stands slightly north of the middle of the parish along the line of a brook linking the bordering streams. The village street follows the central part of its course: very few houses were built away from it before the mid-19th century. The brook, called by 1500 the common stream, once ran along the street and remained the village's main source of water until in 1873 Canon Selwyn paid for boring deep wells to supply pumps. The principal manor house stood near the middle of the street, nearly opposite the church. Two other manorial sites were at each end, and near the western one was a green, used for fairs until 1912.

Figure 4 - this 1850 map by Slater shows the built form of Foxton and the railway line which has been constructed. The approximate location of the site is circled in red.

4.4 There was much rebuilding in the 16th and 17th centuries. About 1571 one house was put up by night in the street, and in 1618 seven villagers had lately built new tenements to house immigrants. Surviving 16th or early 17th century timber framed houses include Herods Farm. There is a group of five near the western green, among them the L-plan Home Farm, with a massive brick chimney, topped by a tall shaft. There are over 20 one-storeyed cottages of the late 17th and the 18th century, many timber-framed and thatched, such as Michaelhouse. In 1788 several dwellings at the east end of the village were destroyed by fire.

4.5 In the early 19th century Foxton included almost 50 dwellings. About 1840 there were 14 houses and 25 cottages, subdivided to accommodate nearly 90 households. In 1851 approximately 80 dwellings were inhabited along the street, and almost 20 on the lanes leading off it, half of them on Stocker's Lane, later Station Road. It ran north from the middle of the street towards the main Cambridge road, beside which a few houses had been built by 1861. The village grew slowly in the early 20th century from 95 to over 130 houses. About 1908 four blocks of four dwellings each were built along Station Road for the workers at a new printing works, and named after authors. They were the first in the village to have piped water. Council houses were built from the 1920s along Station Road. Growth was rapid after 1945. The number of dwellings increased from 180 in 1951 to 290 by 1971. Gaps along the street were mostly filled in, and many cottages refurbished for middle-class newcomers. By 1961 the rural district council had built the Highfields Estate on the rising ground south of the village, while between that and the street private estates totalling approximately 100 houses were built in the 1970s.

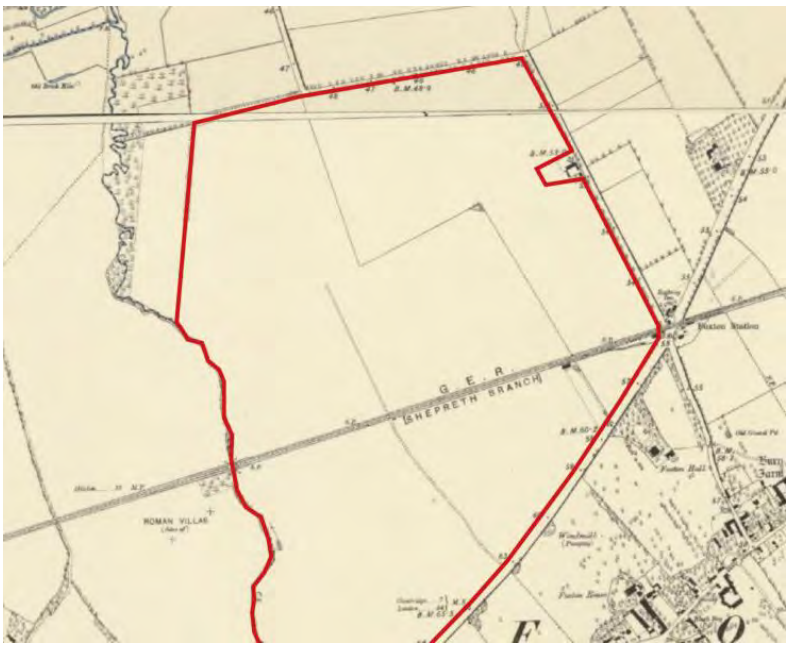


Figure 5 - This 1886 OS map shows the site north of the village amd bisected by the railway line.

4.6 The parish is crossed slightly north of the village by the main Royston–Cambridge road, called by 1300 the 'Portway', which was a turnpike from 1793 to 1872. Lanes running north towards it from the village, including Pound and Baker's Lanes, were mostly stopped at inclosure; as were roads southward close to the Shepreth brook. The Royston–Cambridge branch of the Great Eastern railway, crossing Foxton north of the village, was opened in 1851. The station was then built where it crossed the main road was still open in 1979.

Figure 6 - 1946 OS map showing the site located between the villages of Foxton, Barrington and Shepreth.

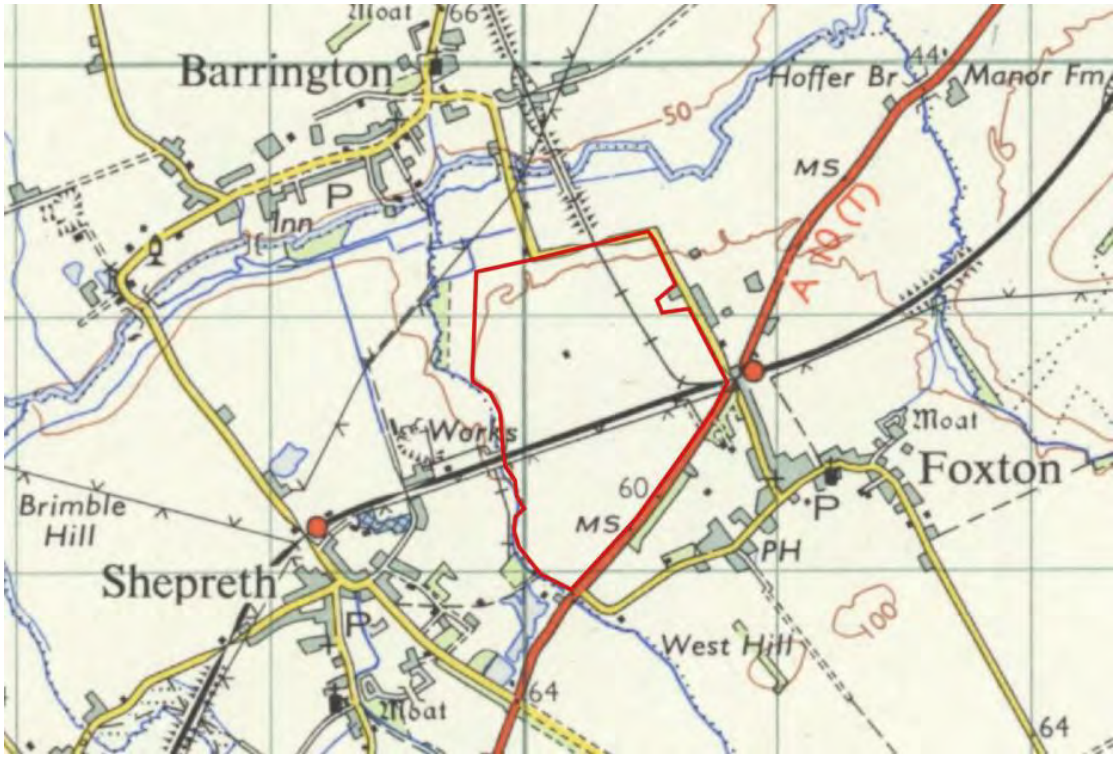


Figure 7 - 1960 OS map showing the site in the context of the expanding villages.

5.0 Heritage Assets

5.1 This section identifies heritage assets which surround the site. In this case, the following heritage assets have been identified as they may be affected by the current proposals. The identification of these assets is consistent with '***Step 1***' of the GPA3 The Setting of Heritage Assets.

5.2 Although there are a number of assets within the local surrounding area, the location and significance of many of them results in them having no perceptible relationship with the proposed site. For this reason, only the heritage assets which may be considered to be affected by the proposed development have been identified. There are no on-site built heritage assets.

5.3 In the case of this proposed development site, the following heritage assets may be affected by the current proposals and we consider that they have required assessment at this early stage:

Foxton

1. Foxton Conservation Area;
2. Church of St Laurence – Grade I listed building;
3. Milestone (on A10) – Grade II listed structure;
4. Foxton House – Grade II listed building;
5. 1 High Street – Grade II listed building;
6. 3 High Street – Grade II listed building;
7. Carshalton Cottage – Grade II listed building;

Barrington

8. Barrington Conservation Area;
9. Church of All Saints – Grade I listed building;
10. Bulbeck Mill – Grade II listed building;
11. Bulbeck Mill House – Grade II listed building;
12. Barn at Bulbeck Mill House – Grade II listed building;
13. 24 Foxton Road – Grade II listed building;
14. 2 Challis Green – Grade II listed building;
15. 4, 6 Challis Green – Grade II listed building;
16. 10 Challis Green – Grade II listed building;
17. 27 High Street – Grade II listed building;
18. 29 High Street – Grade II listed building;
19. 31, 33 High Street – Grade II listed building;

Shepreth

20. Shepreth Conservation Area;
21. Church of All Saints – Grade II* listed building;
22. Wimbish Manor – Grade II listed building;

23. Lodge at Entrance to Tyrell's Hall – Grade II listed building;

24. Granary North East of Tyrell's Hall – Grade II listed building;

25. Tyrell's Hall – Grade II listed building;

26. Bridge South of Tyrell's Hall – Grade II listed building;

27. Barn North East of Tyrell's Hall – Grade II listed building

Foxton Station Group

28. Foxton Station – Non-designated heritage asset;

29. 1 Cambridge Road – Non-designated heritage asset;

30. Signal Box – Non-designated heritage asset;

31. Railway Inn – Non-designated heritage asset;

32. 29 Barrington Road (College Farm) – Non-designated heritage asset.

5.4 All relevant Statutory List descriptions can be found in **Appendix 1**. Any buildings or structures considered to fall within the curtilage of the above listed buildings would be considered to form part of the listed building and impacts would be assessed accordingly.

5.5 For the purposes of this assessment, where we consider Conservation Areas, we assess them both in terms of an 'area' designation but also with reference to the individual built assets they contain; in other words, we assess the Conservation Area as a grouping of buildings and spaces and the manner in which these relate to their surroundings. Thus, consideration of effects on the setting of a Conservation Area also takes into account potential effects on the setting of built assets within that designated area. Where we consider that individual buildings within the designated area require individual assessment, we have undertaken this assessment as a separate exercise.

Figure 8 - Aerial Photograph with the approximate locations of the heritage assets marked.

6.0 Significance Assessment

6.1 As shown in Section 5 of this document, there are a number of heritage assets which have the potential to be affected by proposed development within the site, depending on the scale, location and massing of any such proposals.

6.2 At this early stage in the process, we have undertaken an Initial Assessment of the significance of the identified assets and the extent to which their significance and setting may impact the potential to deliver development on the site.

6.3 From an initial review, it is apparent that the site does contribute, to varying extents and in separate parts, to the setting of a number of heritage assets. In some cases, the allocation site forms part of an 'immediate' setting; for example, the Grade II listed Milestone to the south of the site, whilst in other cases, the site forms part of what may be termed an 'extended' setting; or in other words, a more distant connection.

6.4 The range of contribution which the site makes to the setting of heritage assets varies. Some are likely to have a beneficial relationship with the site due to it forming a part of its context, whilst other will have only a slight relationship, or none at all.

6.5 This section explores the broad relationships between the site and the identified heritage assets by grouping them into three village groups and the station group, as detailed in Section 5.

Foxton Group

Figure 9 - Asset plan of Foxton with assets numbered as per list in Section 5.

6.6 Foxton village is situated to the immediate south of the site, on the south side of the A10. The village is separated from the site by the A10, which is lined by mature tree planting. The main body of the village is also separated from the site by the parkland of Foxton House. The Foxton Conservation Area boundary extends from the southern side of the A10 to the properties on the south side of the High Street as far as the northern end of Fowlmere Road and encompassing the southern end of Station Road.

6.7 The Grade II listed buildings closest to the site are a group on the High Street and Foxton House. The Group on the High Street are domestic in scale and residential in use, principally dating to the 18th and early 19th centuries, which some evidence of earlier origins. The Milestone is adjacent to the site and dates to the same period.

6.8 The Grade I listed Church of St Laurence is situated to the south-east of the site within the Conservation Area. It contains evidence from the 12th – 15th centuries with restoration undertaken in the 19th century.

Contribution of Site to Setting

6.9 The site is situated immediately north of the Conservation Area and forms part of its setting in its open rural character. However, there are no views from the Conservation Area over the site, as such it is not as important as the open setting to the south which can be appreciated from a number of views points.

6.10 The Milestone is also adjacent to the site, which forms part of its setting given an open, rural character to its setting. With regard to the listed buildings on the High Street, the site is sufficiently separated from the buildings by the grounds of Foxton House to not form part of its setting, but still contribute to the wider character within which the buildings are appreciated. In relation to Foxton House, the site is separated from the house by its extensive grounds, but does form part of its extended setting.

6.11 With regard to the Church of St Lawrence, it is sufficiently removed from the site that, in spite of its tower, it is not visible from the site due to the intervening built form and mature trees. As such, the site does not form part of the setting of the church.

Barrington Group

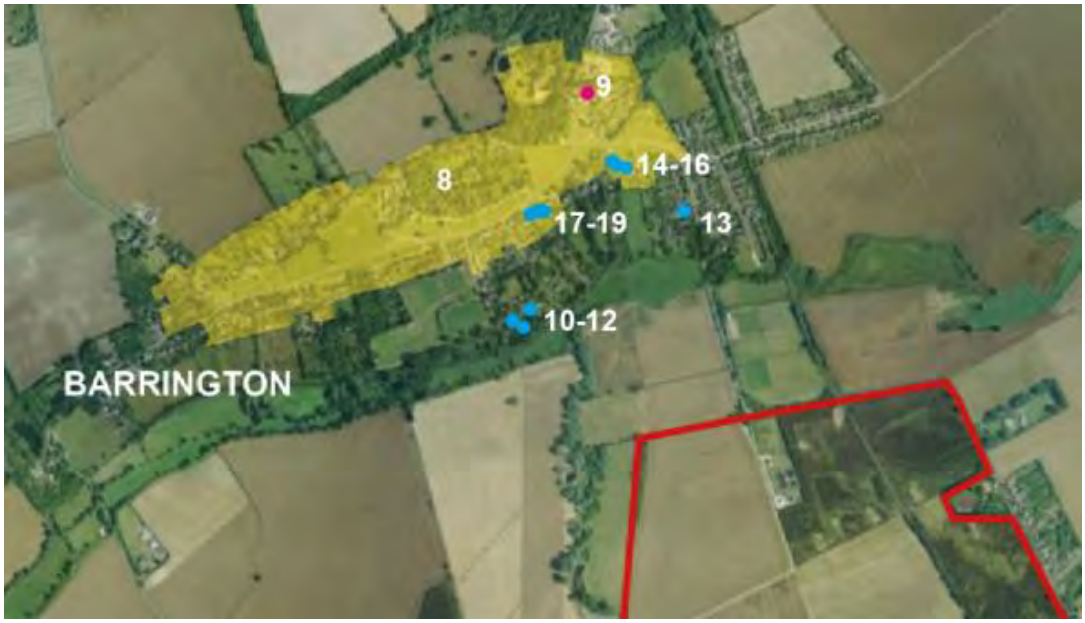


Figure 10 - Asset plan of Barrington with assets numbered as per list in Section 5.

6.12 Barrington is situated on rising ground to the north of the site and the River Cam. There are a number of arable fields separating the site from the village, with mature planting lining the River Cam and thus providing a visual buffer between the site and the village. There are a number of listed buildings on the southern side of the green which have been identified for consideration. The listed buildings are located at Challis Green and the High Street, while the buildings at

Bulbeck Mill lie south of the Conservation Area, towards the site. The Grade I listed church sits on rising ground at the eastern end of the Green, occupying a prominent position within the village.

Contribution of Site to Setting

6.13 The bulk of the linear village, included within the Conservation Area, is screened by the mature tree planting along the River Cam. As such, the listed properties along the High Street and Challis Green are sufficiently separated from the site for it not to form part of their settings, but it does nevertheless contribute to their wider agricultural surroundings.

6.14 The listed buildings south of the village (the Bulbeck Mill Group) do have a closer relationship with the site but are nevertheless well screened by the mature trees along the route of the River Cam. As such, the site is not considered to form a direct part of the setting of the group, but it does contribute to its wider agricultural context.

6.15 However, the tower of the Grade II* All Saints Church is visible across the site from the A10 and railway line, with the site therefore forming part of its extended setting. The site makes a positive contribution to the setting of the church through its openness and rural character.

Shepreth Group

Figure 11 - Asset plan of Shepreth with assets numbered as per list in Section 5.

6.16 Whilst physically closer to the site than Barrington, Shepreth is screened from it by mature tree planting. There are a number of listed buildings south-east of the village which are not included within the Conservation Area but are set within extensive grounds with mature boundary planting. The Grade II* listed church is located in the far south-west of the village.

Contribution of Site to Setting

6.17 The Grade II listed buildings are screened from the site by the mature planting, resulting in no visual links. The character of the land surrounding and contributing to the setting of these buildings is characterised as parkland or enclosed parcels. As such, the arable land further afiend (of which the site forms a part) is not so much a contributor to their significance. The Grade II*

listed church is situated at the south-western end of the village and has no relationship with the site due to the intervening built form and mature trees.

6.18 As such, whilst closer in proximity to the site than Barrington, the nature of the built form and the relationship between the village and the site is much more limited with no visual connections. Therefore, the site is not considered to form a direct part of the setting of the Conservation Area, but it does form part of its wider agricultural context.

Foxton Station Group

Figure 12 - Asset plan of Foxton Station with assets numbered as per list in Section 5.

6.19 This group of non-designated heritage assets is clustered around the railway station at Foxton but also includes 29 Barrington Road (Collage Farm). The significance of assets 29-31 is largely tied to the railway line and the village of Foxton.

Contribution of Site to Setting

6.20 The group of non-designated assets around the station are located in close proximity to the site; however, as their significance is derived from their association with the railway station, the question is whether the site forms an important part of its setting. The railway line is the factor which has caused the station and these ancillary buildings to be built, and as such it makes a significant contribution to their settings. However, the surrounding arable land, of which the site is part, does not contribute to the significance of the assets and, whilst it may be partly considered to form part of their settings, it retains a good capacity for change without affect on the significance of the assets.

6.21 In terms of 29 Barrington Road (College Farm), which protrudes into the site, this property was originally associated with farming and therefore has a stronger link to the arable landscape. The openness and agricultural character of the site does therefore make a positive contribution to the setting of this non-designated heritage asset.

7.0 Impact Considerations

Listed Building considerations

7.1 The statutory duty under Section 16(2) states "*In considering whether to grant listed building consent for any works the local planning authority or the Secretary of State shall have special regard to the desirability of preserving the building or its setting or any features of special architectural or historic interest which it possesses.*" At this stage, there are no current plans for the listed buildings on site, however if a scheme is progressed for the wider site it is likely to include the redevelopment of the listed buildings. Any works will be required to maintain and enhance the special interest of these buildings.

7.2 Section 66(1) of the Planning (Listed Building and Conservation Areas) Act 1990 sets out that any development should "*have special regard to the desirability of preserving the building or its setting or any features of special architectural or historic interest which it possesses*."

7.3 'Setting' is defined as the "*surroundings in which the asset is experienced*", and a reduction in the ability to appreciate the existing character of this site may result in a reduction in the ability to appreciate the identified listed buildings in a setting which supports their significance.

7.4 Therefore, the degree to which a sense of contribution that the site makes to the setting of these assets can be maintained will relate directly to the extent to which the integrity of the setting can be preserved.

7.5 In accordance with Paragraph 193 of the NPPF, *"when considering the impact of a proposed development on the significance of a designated heritage asset, great weight should be given to the asset's conservation (and the more important the asset, the greater the weight should be). This is irrespective of whether any potential harm amounts to substantial harm, total loss or less than substantial harm to its significance."*

7.6 of substantial harm are identified as a result of the proposed development, in order to accord with national policy, local planning authorities should refuse consent *"unless it can be demonstrated that the substantial harm or total loss is necessary to achieve substantial public benefits that outweigh that harm"* (NPPF 195).

7.7 If aspects of less-than-substantial harm are identified as a result of the proposed development, in order to accord with the national policy, this potential harm *"should be weighed against the public benefits of the proposal including, where appropriate, securing its optimum viable use"* (NPPF 196).

Conservation Area considerations

7.8 In relation to development within Conservation Areas, the statutory duty under section 72(1) of the Planning (Listed Building and Conservation Areas) Act 1990 sets out that special attention shall be paid to "*the desirability of preserving or enhancing the character or appearance of the Conservation Area*".

7.9 In this case, the site does not fall within a Conservation Area; however, it is considered to form part of the wider setting of both the Foxton Conservation Area and the Barrington Conservation Area and therefore the contribution the site makes to the setting of these assets needs to be fully considered in accordance with the relevant NPFP policies relating to the setting of heritage assets.

7.10 In this regard, the alteration or loss of these identified characteristics may be considered to cause harm to the setting of the Conservation Area. They may be other opportunities, however, that reinforce existing positive characteristics or provide other benefits to the character or appearance of the Conservation Area.

7.11 To accord with national policy, any potential harm arising from the development would need to be clearly outweighed by "public benefits" arising from the development. Public benefits could be achieved in a number of ways to be explored through the evolution of the proposals and their content. They could also entail 'heritage benefits', by which existing heritage considerations and/or significance could be improved as a result of the proposals.

Non-designated asset considerations

7.12 In terms of any non-designated heritage assets which may be identified, paragraph 197 of the National Planning Policy Framework requires a *"balanced judgement"* to be undertaken when considering impact on these assets alongside other material considerations.

7.13 The relative significance of these assets should be acknowledged within the proposals and it should be demonstrated that their significance has been taken in account in the evolution of proposals which affect them.

8.0 Design Parameters

8.1 The following section identifies where proposals for the development should take into account the relevant heritage considerations and how these considerations can be taken forward into the proposed design to minimise impacts and maximise benefits to character and appearance.

Location of development

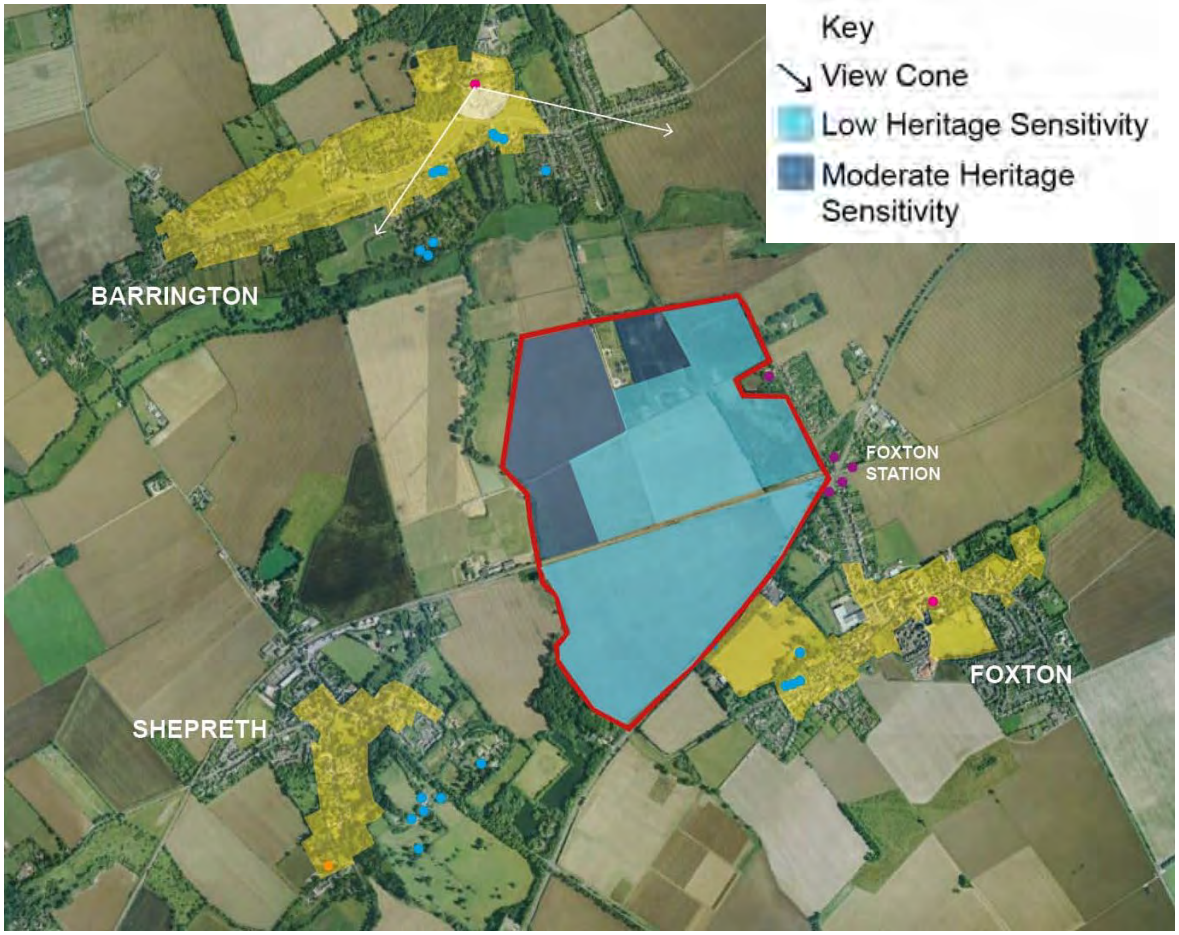


Figure 13 - Plan showing the sensitivity of the site in terms of potential impacts to heritage assets.

8.2 The above sensitivity plan shows areas of low and moderate sensitivity in terms of heritage impacts. There are no areas of high heritage sensitivity within the site. The areas of moderate sensitivity have a closer relationship to the village of Barrington, its Conservation Area and the Grade I Church of All Saints. These areas form part of the extended setting of the church due to the intervisibility between the two, and forms part of the wider context of the Conservation Area.

8.3 The low sensitivity areas do not have any direct association with the Conservation Areas and the majority of listed buildings, with the exception of the Grade II listed milestone. However, the significance of the milestone is linked to the road rather than the open countryside. The low sensitivity areas do contribute to the wider context of the identified heritage assets through their openness and agricultural character.

8.4 The potential change to arable character of the site will result in a reduction in the ability to appreciate the assets in their wider rural context which supports their significance, albeit in a

limited way due to the degree of separation between the assets and the site. A potential approach to the location of development is shown in Figure 13. This takes into account the historic subdivision of the site, the setting of the identified heritage assets, including the Conservation Areas.

9.0 Initial Impact Assessment

9.1 An initial masterplan has been developed to accompany the promotion of the site's development. This has been informed by a number of factors, including potential impact on built heritage considerations.

9.2 The masterplan provides for between 900-1800 dwellings at an average density of 30-40 dph, an employment area, a potential school site, a transport hub and various public open space opportunities, offering informal open areas, play facilities, ecological areas and public art.

9.3 In initial assessment of the potential impact considerations of the proposed development is as follows:

- Partial loss or erosion of open setting of the Foxton, Shepreth and Barrington Conservation Areas. A buffer should be provided to Barrington Conservation Area which has the closest relationship with the site. There is less of a visual link between the site and Foxton and Shepreth Conservation Areas, but the change in character of the site will nevertheless affect the appreciation of the Areas in their wider surroundings.

- Development within the wider setting of the Church of All Saints Barrington – the church can be viewed from the A10 and from locations within the site, which presents opportunities for this view to be highlighted through the master-planning of the site.

- The interface between the site and the A10 should be landscaped to ensure this stretch of road retains a rural character.

9.4 At this stage of the process, it is considered that there would be **minor adverse** harm caused to the setting of the Barrington and Foxton Conservation Areas, with **negligible adverse** harm caused to the setting of the Shepreth Conservation Area. **Minor/negligible adverse** harm would also be caused to the setting of the Church of All Saints, Barrington.

10.0 Summary

10.1 This Initial Heritage Review has been prepared on behalf of Axis Land Partnerships to identify heritage assets, in and around the site, and to inform the design of proposals for potential development on the Land North of Foxton.

10.2 As a result of the initial assessment of the site, a series of parameters have been set out from which the design team has been able to develop a response which takes account of the contribution which the site makes to the setting of various heritage assets.

10.3 There is the potential for the development of certain areas of the site to cause harm to the significance of heritage assets, and great care will be required to mitigate such impacts through the location, form, scale and design of the proposals as they emerge. In order to accord with the provisions of the 1990 Act, great weight will be attached to the objective of preserving the settings of listed buildings and other impacts arising would need to be clearly outweighed by public benefits arising from proposals.

10.4 At this stage, and based on the information available, it is considered that there would be **minor adverse** harm caused to the setting of the Barrington and Foxton Conservation Areas, with **negligible adverse** harm caused to the setting of the Shepreth Conservation Area. **Minor/negligible adverse** harm would also be caused to the setting of the Church of All Saints, Barrington. These are at the level of “less than substantial” harm.

10.5 Forward development of the masterplan should be informed by the content of this Initial Appraisal and the parameters set. There is potential that the masterplan could reduce impacts levels arising, and that those remaining can be at the lower end of the scale of “less than substantial” harm in terms of the policies of the NPPF – although it is not possible to define any more precisely the levels of impact at this stage until more detail is available.

10.6 It would be our intention to continue to advise the design team through the development of the scheme to ensure that the principles laid out in this document are fully considered and developed in forward masterplanning and detailed design.

10.7 The result of this iterative and informed design approach will be that the aspects of heritage impact will be fully addressed through the design process, with the intention to ensure that the provisions of the relevant legislation are satisfied, and that national and local policies are adhered to.

APPENDIX 1
STATUTORY LIST DESCRIPTIONS

Historic England

1, HIGH STREET

Overview

Heritage Category:
Listed Building

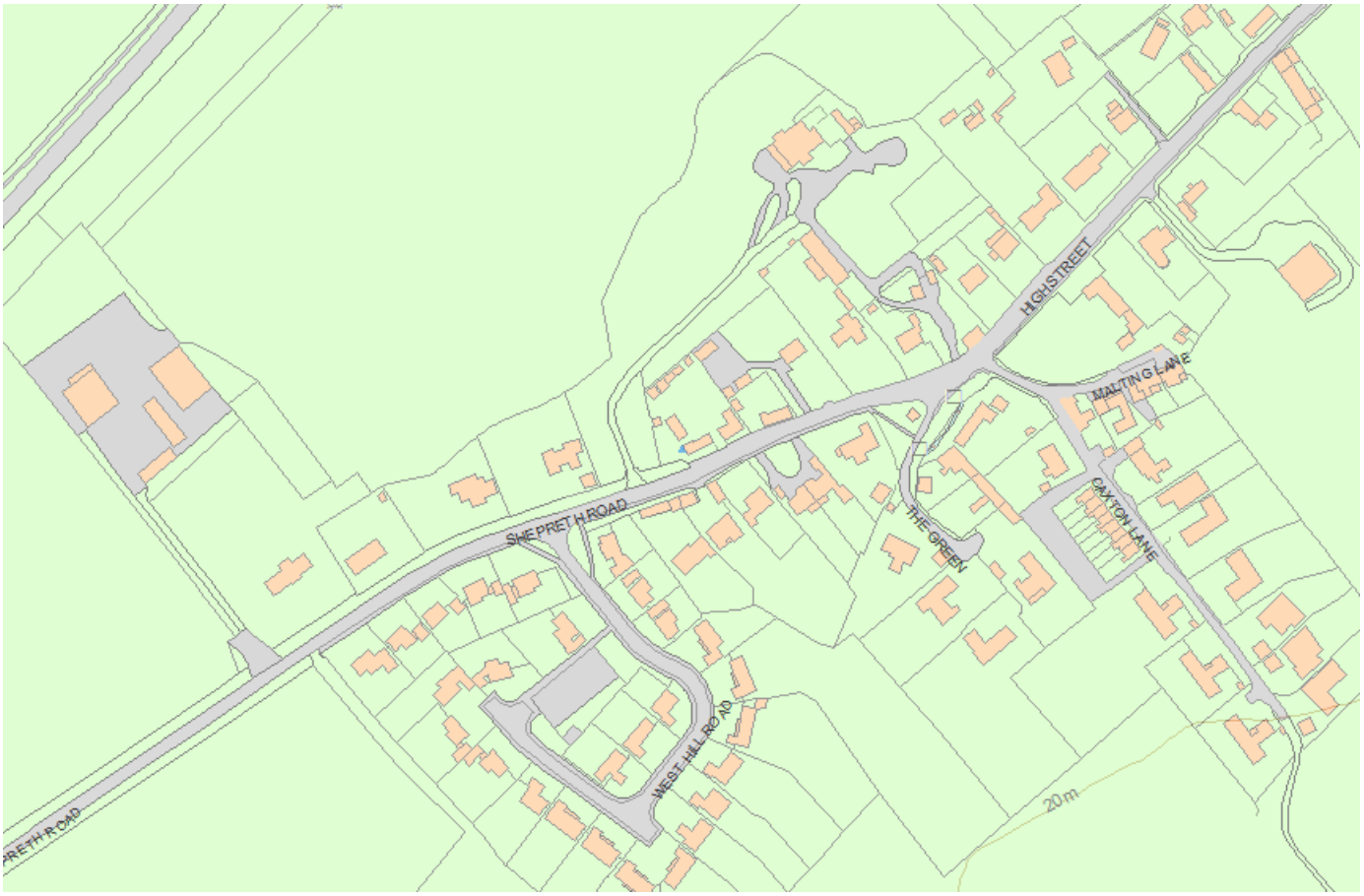
Grade:
II

List Entry Number:
1162133

Date first listed:
18-Oct-1985

Statutory Address:
1, HIGH STREET

Map



The above map is for quick reference purposes only and may not be to scale. For a copy of the full scale map, please see the attached PDF - **1162133.pdf**

The PDF will be generated from our live systems and may take a few minutes to download depending on how busy our servers are. We apologise for this delay.

This copy shows the entry on 25-Oct-2019 at 15:01:24.

Location

Statutory Address:
1, HIGH STREET

The building or site itself may lie within the boundary of more than one authority.
County:
Cambridgeshire

District:
South Cambridgeshire (District Authority)

Parish:
Foxton

National Grid Reference:
TL 40731 48059

Details

TL 4048 FOXTON HIGH STREET (North west side) 18/56 No. 1

GV II

Cottage. c1550 for John Fuller. Rebuilt c.1720, and widened at north west side late in C.18 to accommodate a staircase. Timber framed, plaster rendered and part weather-boarded. Long straw thatch roof, half hipped to west end. Diagonally set ridge stack of red brick. Three bay, lobby entry plan. One storey and attic. One dormer. Three C.18 wood casements of three leaded lights, the centre light with original iron fastenings. Doorway to lobby entry. Inside: Inglenook fireplace to centre bay. Smaller, later hearth to parlour which was widened when staircase added.

Rowland Parker: The Common Stream R.C.H.M.: Record Card (1950)

Listing NGR: TL4073148059

Legacy

The contents of this record have been generated from a legacy data system.

Legacy System number:
52105

Legacy System:
LBS

Sources

Books and journals
Parker, R, The Common Stream

Legal

This building is listed under the Planning (Listed Buildings and Conservation Areas) Act 1990 as amended for its special architectural or historic interest.

End of official listing

Historic England

3, HIGH STREET

Overview

Heritage Category:
Listed Building

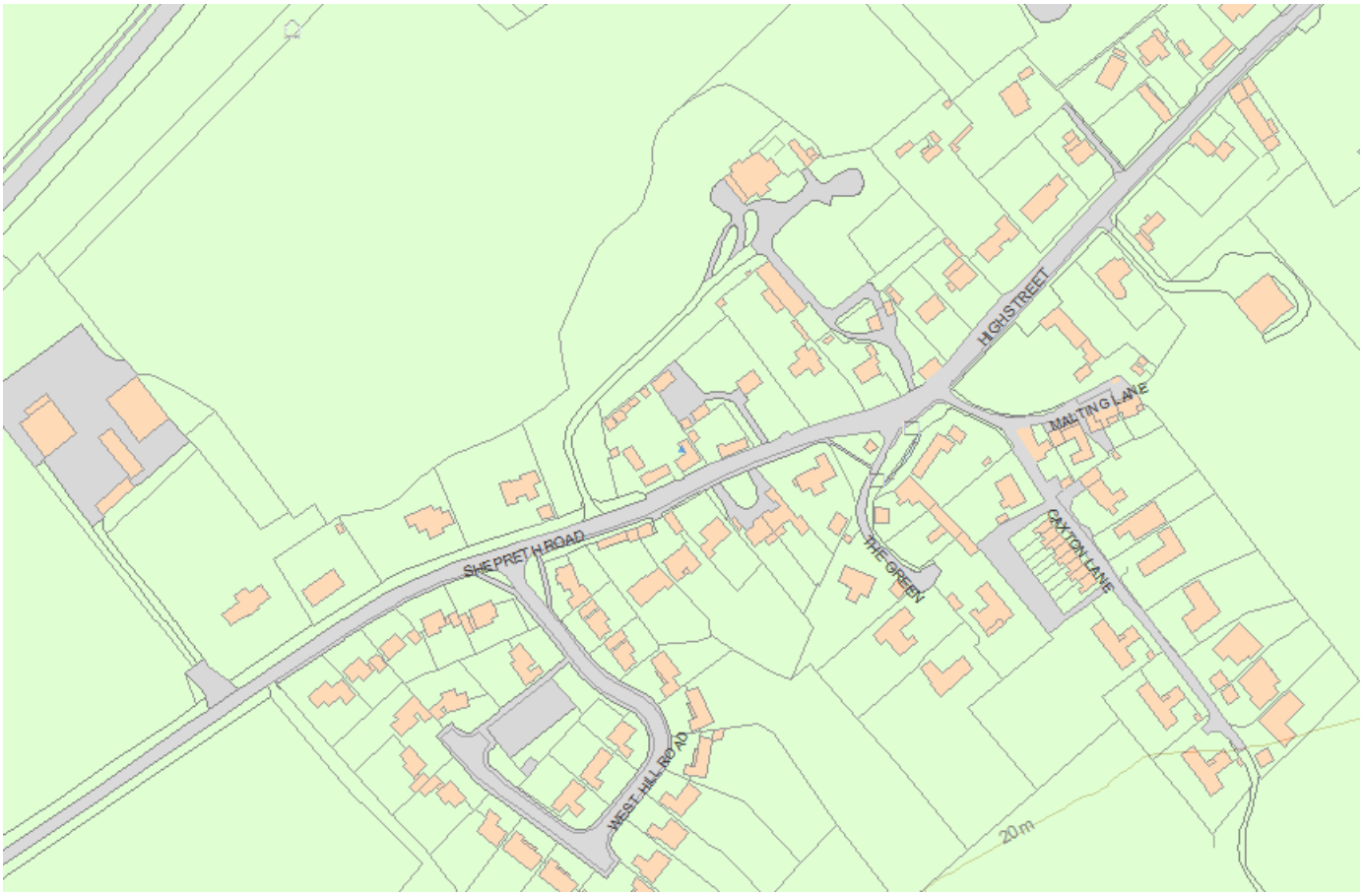
Grade:
II

List Entry Number:
1331206

Date first listed:
18-Oct-1985

Statutory Address:
3, HIGH STREET

Map



The above map is for quick reference purposes only and may not be to scale. For a copy of the full scale map, please see the attached PDF - **1331206.pdf**

The PDF will be generated from our live systems and may take a few minutes to download depending on how busy our servers are. We apologise for this delay.

This copy shows the entry on 25-Oct-2019 at 15:01:27.

Location

Statutory Address:
3, HIGH STREET

The building or site itself may lie within the boundary of more than one authority.
County:
Cambridgeshire

District:
South Cambridgeshire (District Authority)

Parish:
Foxton

National Grid Reference:
TL 40749 48072

Details

TL 4048 FOXTON HIGH STREET (North west side) 18/57 No. 3 GV II

Handed pair of cottages. c.1830-40. Clay bat, plaster rendered with low pitch slate roof and shared grey brick ridge stack. Two storeys. Each cottage has a flush frame casement at first floor above a similar window at yround floor, and a boarded door with narrow, cut bracketted hood.

Listing NGR: TL4074948072

Legacy

The contents of this record have been generated from a legacy data system.

Legacy System number:
52106

Legacy System:
LBS

Legal

This building is listed under the Planning (Listed Buildings and Conservation Areas) Act 1990 as amended for its special architectural or historic interest.

End of official listing

Images of England

Images of England was a photographic record of every listed building in England, created as a snap shot of listed buildings at the turn of the millennium. These photographs of the exterior of listed buildings were taken by volunteers between 1999 and 2008. The project was supported by the Heritage Lottery Fund.

Date: 20 Apr 2003

Reference: IOE01/10009/19

Archive image, may not represent current condition of site.

Historic England

CARSHALTON COTTAGE

Overview

Heritage Category:
Listed Building

Grade:
II

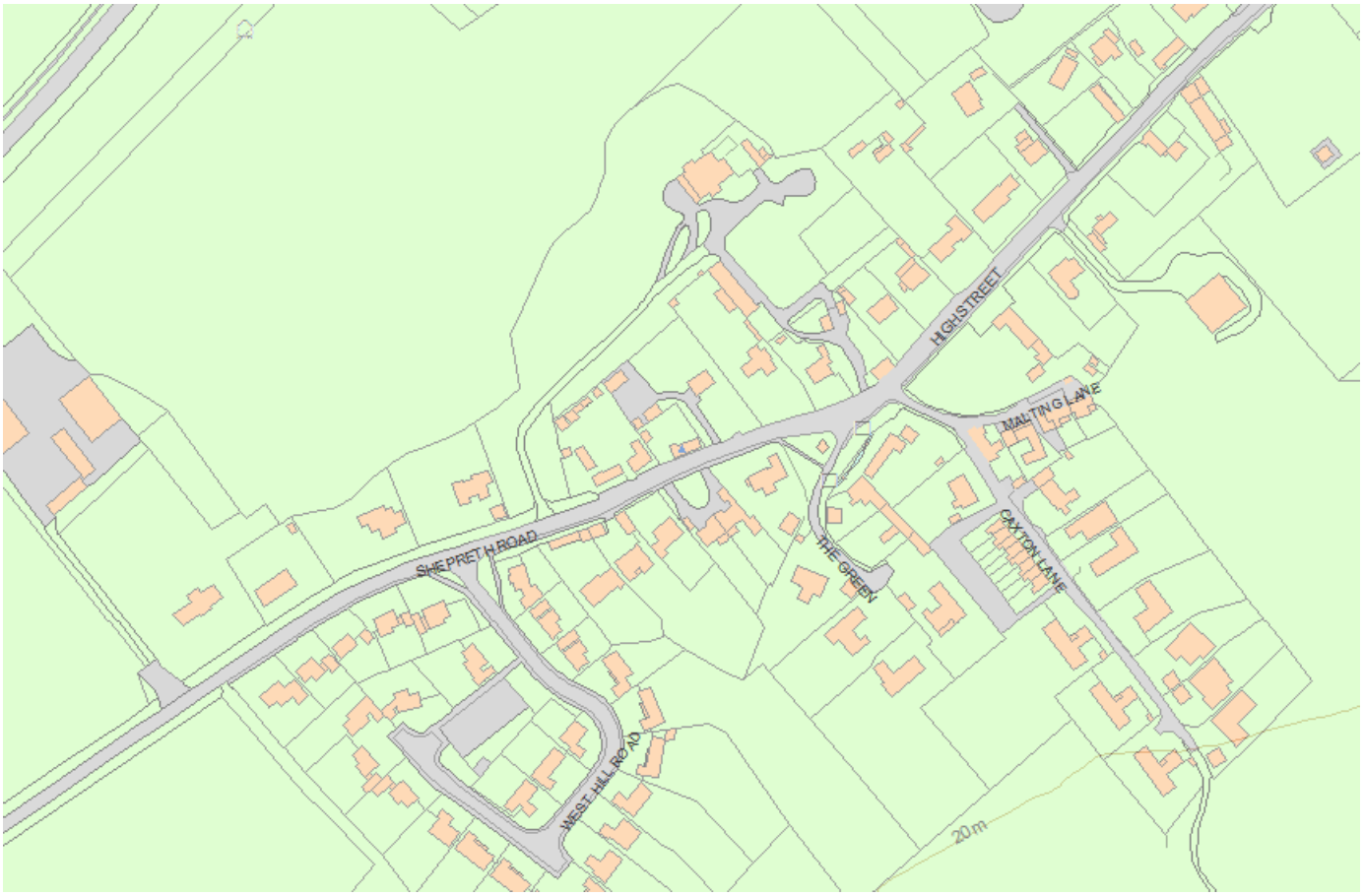
List Entry Number:
1162202

Date first listed:
22-Mar-1985

Date of most recent amendment:
18-Oct-1985

Statutory Address:
CARSHALTON COTTAGE, 5, HIGH STREET

Map



The above map is for quick reference purposes only and may not be to scale. For a copy of the full scale map, please see the attached PDF - **1162202.pdf**

The PDF will be generated from our live systems and may take a few minutes to download depending on how busy our servers are. We apologise for this delay.

This copy shows the entry on 25-Oct-2019 at 15:01:31.

Location

Statutory Address:
CARSHALTON COTTAGE, 5, HIGH STREET

The building or site itself may lie within the boundary of more than one authority.
County:
Cambridgeshire

District:
South Cambridgeshire (District Authority)

Parish:
Foxton

National Grid Reference:
TL 40769 48072

Details

TL 4048 FOXTON HIGH STREET (North west side) 18/58 No. 5 (Carshalton 22.3.85 Cottage)

GV II

Cottage. 1586 for Richard Dunnidge. The bay at the east end was probably rebuilt in C17. Timber framed, plaster rendered and long straw thatch roof with red brick stack at right angles to the ridge. Lobby entry plan and four bays including a narrower bay to east end. One storey and attic. Two dormers. Six windows including two C19 horizontal sliding sashes and two small casements. Doorway opposite the stack of four flush panels, probably C18. Inside: Some framing, particularly in centre and west bay, exposed. Downward wall bracing and heavy, close set ceiling joists laid flat and carried on chamfered clamp. Original clasped side purlin roof. The partition wall between the centre room and the bay to the west has close set framing with downward bracing. Over the centre bay the ceiling main beam appears to be later although the clamp is of late C16 date. The fireplace in the bay to the east was added later. In this room the ceiling is carried on a middle rail with small, ovolo moulding. Rowland Parker: The Common Stream

R.C.H.M.: Record Card (1950)

Listing NGR: TL4076948072

Legacy

The contents of this record have been generated from a legacy data system.

Legacy System number:
52107

Legacy System:
LBS

Sources

Books and journals
Parker, R, The Common Stream

Legal

This building is listed under the Planning (Listed Buildings and Conservation Areas) Act 1990 as amended for its special architectural or historic interest.

End of official listing

Historic England

CHURCH OF ST LAURENCE

Overview

Heritage Category:
Listed Building

Grade:
I

List Entry Number:
1162382

Date first listed:
22-Nov-1967

Statutory Address:
CHURCH OF ST LAURENCE, HIGH STREET

Map

The above map is for quick reference purposes only and may not be to scale. For a copy of the full scale map, please see the attached PDF - **1162382.pdf**

The PDF will be generated from our live systems and may take a few minutes to download depending on how busy our servers are. We apologise for this delay.

This copy shows the entry on 25-Oct-2019 at 14:29:33.

Location

Statutory Address:
CHURCH OF ST LAURENCE, HIGH STREET

The building or site itself may lie within the boundary of more than one authority.
County:
Cambridgeshire

District:
South Cambridgeshire (District Authority)

Parish:
Foxton

National Grid Reference:
TL 41211 48335

Details

This list entry was subject to a Minor Amendment on 13/05/2015

TL 4148 19/72

FOXTON HIGH STREET(South east side) Church of St. Laurence

(Formerly listed as Church of St. Lawrence)

22.11.67

GV I Parish church. Late C12 or early C13 chancel and nave in a continuous range. North and south nave arcades and aisles of early C14. Clerestory, one bay of south arcade and west tower, c.1475. Restored 1876-86. Fieldstone, flint with limestone dressings. West tower, late C15, embattled and of three stages on plinth. Three stage diagonal buttressing. Cut down spire. Central gargoyle to main cornice. Restored west window of three cinquefoil lights in four centred head. Bell stage has two coupled openings each with cinquefoil head in four centred arch. The gable end of an earlier - nave roof is visible internally in the east wall of the tower. Nave: Late C12 or early C13 origin with walls pierced by north and south arcades early in C14. Roof raised for clerestory, C15. Clerestory has on each side three windows of clunch, each of three cinquefoil lights in a four centred head. However a window on each side at the west end is earlier and has reticulated tracery in two centred arch. The existence of the gable of an earlier roof may indicate that there was a C14 clerestory, replaced or rebuilt in C15. South aisle, early C14, extended by one bay to the west in c.1475. Two windows, C14, of two trefoil lights with reticulated tracery. (Meldreth and Grantchester parish churches with similar fenestration). One three-light window, C15, much restored to C15 bay addition. The south doorway has been much restored. Chancel: late C12-early C13. Externally of fieldstone with steeply pitched tiled roof. Rood loft staircase in angle between south aisle and chancel. South wall has an original window of two lights with Y tracery in two centred arch and an early C14 window of two trefoil lights. East wall has three original lancet windows in a much restored wall. The north wall has similar fenestration opposite that of the south wall. North aisle with two early C14 windows of clunch with reticulated tracery. The porch and north doorway date from c.1876-86 restoration. Inside: Nave arcade, south side is probably late C13 or early C14. Originally of two bays. Two centred arches of two chamfered orders on columns of quatrefoil section with moulded bases and capitals. The large bay to the west was added in C15, probably contemporary with the tower. The north arcade is slightly later. Three bays. Two centred arches of one wave and one hollow moulded order with broach stops on similar early C14 columns of quatrefoil section. The roof is c.1475 with arch braced tiebeams, moulded main beams with carved bosses, including those of the donor and his wife, at the intersections. North aisle has a North chapel at the east end with screen of C15. Oak, with entrance front in eight bays and two stages. The lower stage is blocked and has modern panelling. Open upper stage with subcusped ogee arches in square heads and vertical tracery to the spandrels. Embattled cornice. The south aisle has an early C14 piscina in south wall. Trefoil cusping to ogee arch with label and finial. Quatrefoil drain. Chancel arch of wood, restored c.1876. Two centred arch, moulded, C15 and associated with the rood screen below. The box framing above the arch is also C19. The screen has much restored work to the upper stage but the closed, lower stage has a frieze of running foliate ornament above panels with subcusping to two centred arches in square heads with vertical tracery to spandrels. Each of the nine bays is divided by a pilaster buttress similar but larger than those at the pew ends in the nave and aisles. Rood loft stair opening in four centred arch. The present rood is c.1950. The chancel has moulded band at original sill height. The rear arches of the three lancets in the east wall are two centred with dog-tooth ornament to label carried over each arch. The roof is C15 and similar to that over the nave at St. Edmunds, Hauxton (q.v.). Steeply pitched and in four bays, it has short king posts on arch braced raised tie beams. The intersections in the roof are enriched with carved bosses. The pews in the nave and aisles are late C15 to early C16, probably contemporary with chancel screen. There have been some repairs. There are two stage pilaster buttresses, and roll moulding to the rail of the pews. There are some unmoulded poppy head finials to the pew ends in the chancel. Font: The bowl is C12 or earlier origin and is incorporated in later work.

Rowland Parker: The Church of St. Laurence, Foxton V.C.H.: Cambs. Vol. p.177 R.C.H.M.: Record Card (1950) Pevsner: Buildings of

England: p.387

Listing NGR: TL4121148335

Legacy

The contents of this record have been generated from a legacy data system.

Legacy System number:
52120

Legacy System:
LBS

Sources

Books and journals

Parker, Rowland, The Church of St Laurence, Foxton
Pevsner, N, The Buildings of England: Cambridgeshire, (1954), 387
Salzman, L F , The Victoria History of the County of Cambridgeshire and the Isle of Ely, (1953), 177

Legal

This building is listed under the Planning (Listed Buildings and Conservation Areas) Act 1990 as amended for its special architectural or historic interest.

End of official listing

Images of England

Images of England was a photographic record of every listed building in England, created as a snap shot of listed buildings at the turn of the millennium. These photographs of the exterior of listed buildings were taken by volunteers between 1999 and 2008. The project was supported by the Heritage Lottery Fund.

Date: 06 Mar 2006

Reference: IOE01/14874/15

Rights: Copyright IoE Mr Peter Tree. Source Historic England Archive

Archive image, may not represent current condition of site.

Historic England

FOXTON HOUSE

Overview

Heritage Category:
Listed Building

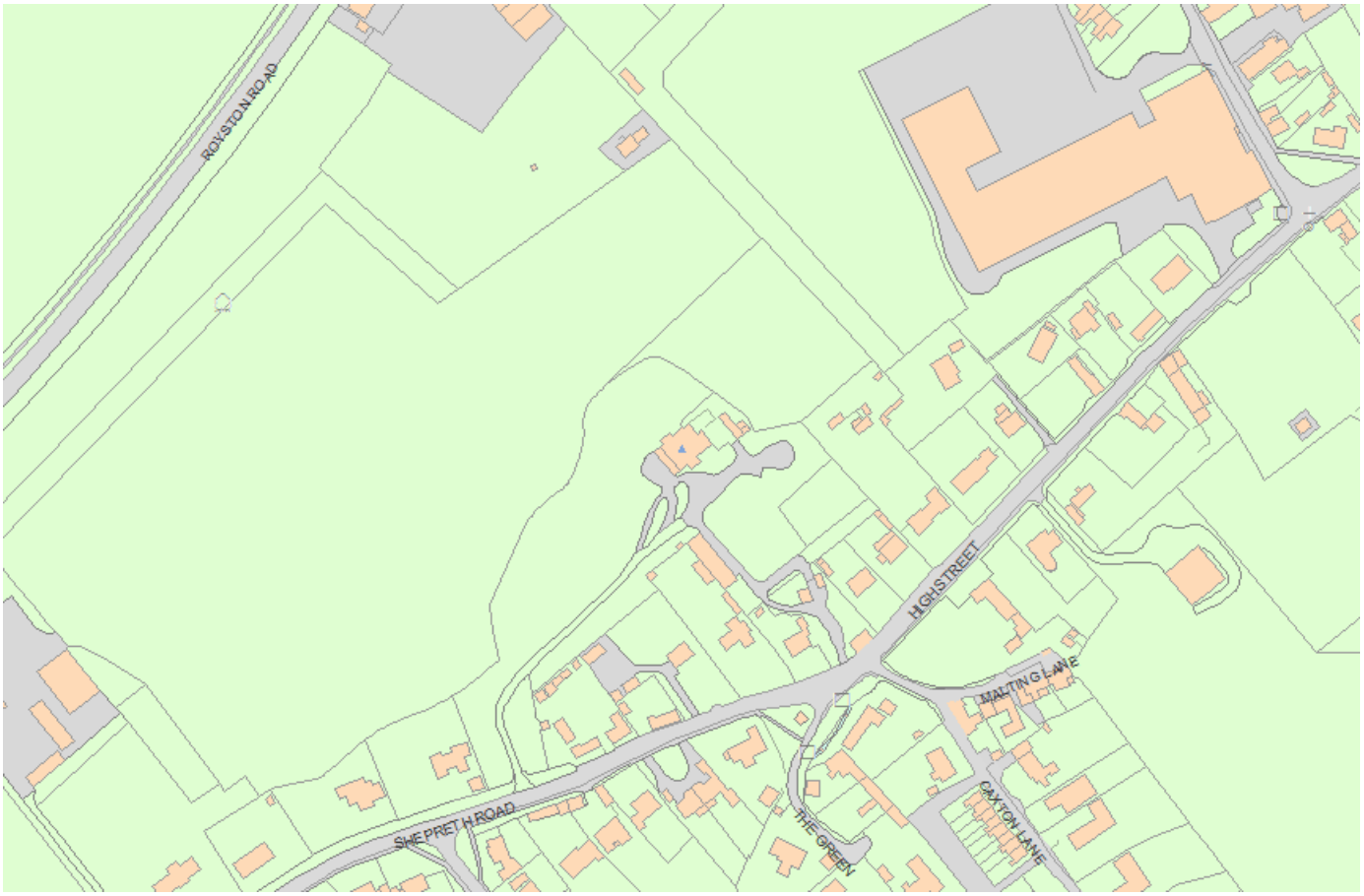
Grade:
II

List Entry Number:
1127614

Date first listed:
18-Oct-1985

Statutory Address:
FOXTON HOUSE, 11, HIGH STREET

Map



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This copy shows the entry on 25-Oct-2019 at 14:29:27.

Location

Statutory Address:
FOXTON HOUSE, 11, HIGH STREET

The building or site itself may lie within the boundary of more than one authority.
County:
Cambridgeshire

District:
South Cambridgeshire (District Authority)

Parish:
Foxton

National Grid Reference:
TL 40778 48186

Details

TL 4048 FOXTON HIGH STREET (North west side) 18/59 No. 11 (Foxton House) II

House. 1825 for William Hurrell, extended later C19. Gault brick with hipped, slate roof and side stack. Double pile. Two storeys. South east front has three recessed hung sashes of twelve panes each, at first floor. The parapetted brick porch is probably later and has an open, round headed outer arch flanked by pilasters. The garden front is in three window bays with similar hung sashes. At yround floor there is a glazed veranda with brick end walls and lean-to roof. In five bays with two smaller bays at the ends. Each bay has an arch with tracery to the spandrels and trellis work at the sides. In the grounds is an outbuilding with dressed clunch walls, and red brick quoins. The interior is said to retain a fine staircase.

Rowland Parker: A Guide to Foxton

Listing NGR: TL4077848186

Legacy

The contents of this record have been generated from a legacy data system.

Legacy System number:
52108

Legacy System:
LBS

Sources

Books and journals
Parker, R, A Guide to Foxton

Legal

This building is listed under the Planning (Listed Buildings and Conservation Areas) Act 1990 as amended for its special architectural or historic interest.

End of official listing

Historic England

MILESTONE

Overview

Heritage Category:
Listed Building

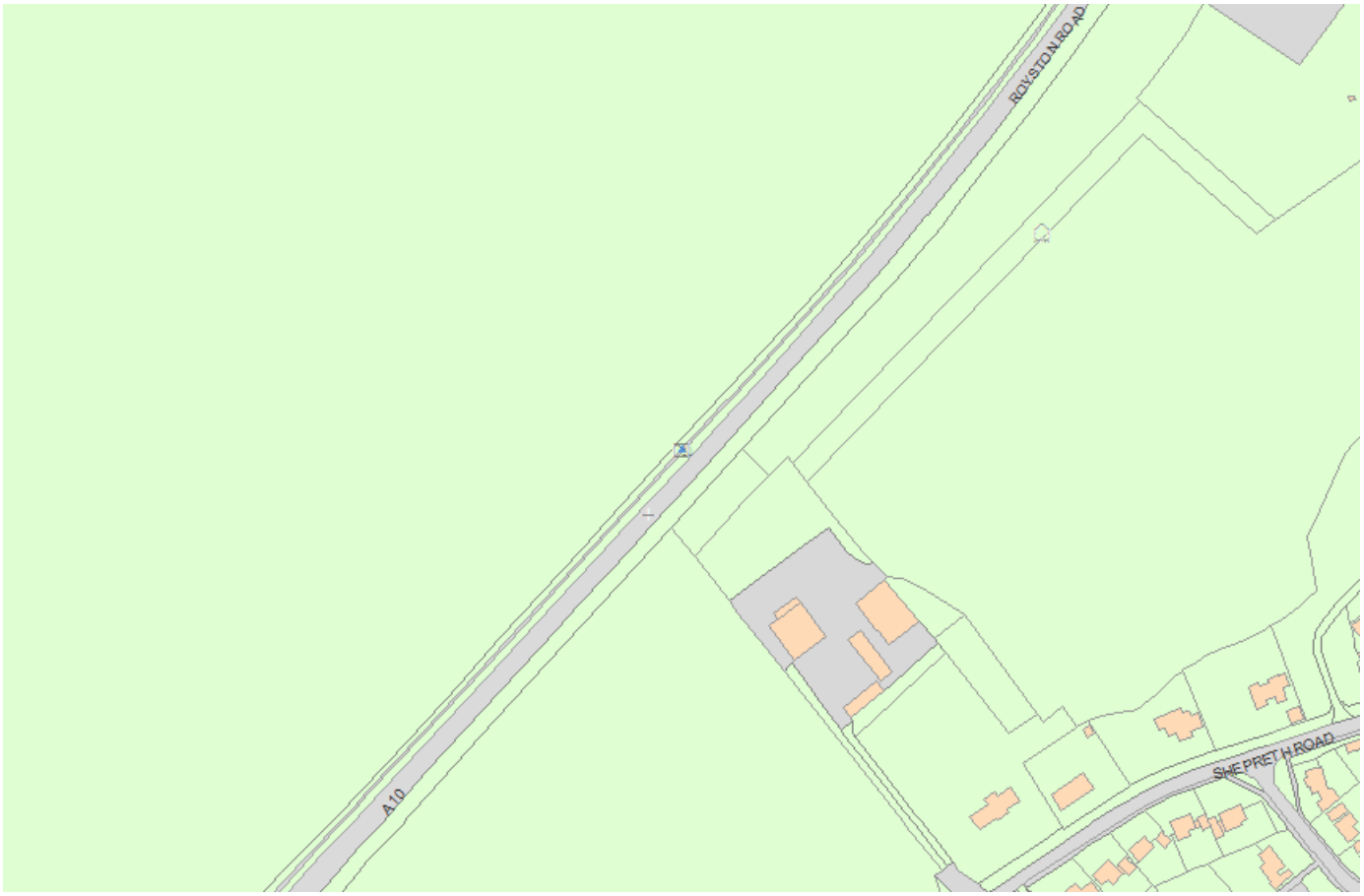
Grade:
II

List Entry Number:
1331170

Date first listed:
18-Oct-1985

Statutory Address:
MILESTONE, ROYSTON ROAD

Map



The above map is for quick reference purposes only and may not be to scale. For a copy of the full scale map, please see the attached PDF - **1331170.pdf**

The PDF will be generated from our live systems and may take a few minutes to download depending on how busy our servers are. We apologise for this delay.

This copy shows the entry on 25-Oct-2019 at 14:16:57.

Location

Statutory Address:
MILESTONE, ROYSTON ROAD

The building or site itself may lie within the boundary of more than one authority.
County:
Cambridgeshire

District:
South Cambridgeshire (District Authority)

Parish:
Foxton

National Grid Reference:
TL 40435 48157

Details

TL 4048 FOXTON ROYSTON ROAD

8/76 Milestone

II

Milestone. Stone painted white, with black lettering "Cambridge? "; "London 44". The road was turnpiked in 1793 and ceased to be turnpiked in 1872.

V.C.H. Cambs. Vol. VIII p.252.

Listing NGR: TL4043548157

Legacy

The contents of this record have been generated from a legacy data system.

Legacy System number:
52124

Legacy System:
LBS

Sources

Books and journals

Salzman, L F, The Victoria History of the County of Cambridgeshire and the Isle of Ely, (1982), 252

Legal

This building is listed under the Planning (Listed Buildings and Conservation Areas) Act 1990 as amended for its special architectural or historic interest.

End of official listing

Images of England

Historic England

2, CHALLIS GREEN

Overview

Heritage Category:
Listed Building

Grade:
II

List Entry Number:
1127627

Date first listed:
18-Oct-1985

Statutory Address:
2, CHALLIS GREEN

Map

The above map is for quick reference purposes only and may not be to scale. For a copy of the full scale map, please see the attached PDF - **1127627.pdf**

The PDF will be generated from our live systems and may take a few minutes to download depending on how busy our servers are. We apologise for this delay.

This copy shows the entry on 25-Oct-2019 at 15:13:45.

Location

Statutory Address:
2, CHALLIS GREEN

The building or site itself may lie within the boundary of more than one authority.
County:
Cambridgeshire

District:
South Cambridgeshire (District Authority)

Parish:
Barrington

National Grid Reference:
TL3970749821

Details

TL 3949 17/2

BARRINGTON CHALLIS GREEN (South west side) No. 2

GV II Cottage. Two principal building periods. Three bays at south end mid-late C17. Timber frame, part exposed, roughcast rendered. Tiled roof, half hipped, with original red brick ridge stack. Later external end stack. One storey and attic. One swept roof dormer. Two windows, C20, on either side of doorway. Bay added or rebuilt to north end. C18. Timber frame, with clunch rubble infill and plaster rendered. Tiled roof, half hipped to north end, with ridge at lower level. One storey and attic. One swept dormer and one casement at ground floor. Inside: Red brick inglenook to hall. Dentil cornice and boxed main beam. Stairs to two chambers above with landing balustrade of mid C18 column-on-vase type. Chamber over hall has mid C18 sunk panelling to two cupboard doors on either side of small fireplace with mid C18 mantelpiece and overmantel. R.CH.M: West Cambs. Mon. (27)

Listing NGR: TL3970749821

Legacy

The contents of this record have been generated from a legacy data system.

Legacy System number:
52046

Legacy System:
LBS

Sources

Other
An Inventory of the Historical Monuments in Cambridgeshire West, (1968)

Legal

This building is listed under the Planning (Listed Buildings and Conservation Areas) Act 1990 as amended for its special architectural or historic interest.

End of official listing

Images of England

Historic England

4, 6, CHALLIS GREEN

Overview

Heritage Category:
Listed Building

Grade:
II

List Entry Number:
1127628

Date first listed:
22-Nov-1967

Date of most recent amendment:
18-Oct-1985

Statutory Address:
4, 6, CHALLIS GREEN

Map

The above map is for quick reference purposes only and may not be to scale. For a copy of the full scale map, please see the attached PDF - **1127628.pdf**

The PDF will be generated from our live systems and may take a few minutes to download depending on how busy our servers are. We apologise for this delay.

This copy shows the entry on 25-Oct-2019 at 15:13:42.

Location

Statutory Address:
4, 6, CHALLIS GREEN

The building or site itself may lie within the boundary of more than one authority.
County:
Cambridgeshire

District:
South Cambridgeshire (District Authority)

Parish:
Barrington

National Grid Reference:
TL3973049820

Details

TL 3949 17/3 22.11.67

BARRINGTON CHALLIS GREEN (South west side) Nos. 4, 6, (formerly listed as Challis Green Cottages) GV II

Pair of cottages. Early C19. Timber framed plaster rendered and long straw thatch with shared gault brick ridge stack. Two storeys. Two half dormers. Two C20 windows and two doorways. Interior has two small abutting hearths and a slender main beam. Said to have been converted from a barn and apple store. R.C.H.M West Cambs. Mon. (7).

Listing NGR: TL3973049820

Legacy

The contents of this record have been generated from a legacy data system.

Legacy System number:
52047

Legacy System:
LBS

Sources

Other
An Inventory of the Historical Monuments in Cambridgeshire West, (1968)

Legal

This building is listed under the Planning (Listed Buildings and Conservation Areas) Act 1990 as amended for its special architectural or historic interest.

End of official listing

Images of England

Images of England was a photographic record of every listed building in England, created as a snap shot of listed buildings at the turn of the millennium. These photographs of the exterior of listed buildings were taken by volunteers between 1999 and 2008. The project was supported by the Heritage Lottery Fund.

Historic England

10, CHALLIS GREEN

Overview

Heritage Category:
Listed Building

Grade:
II

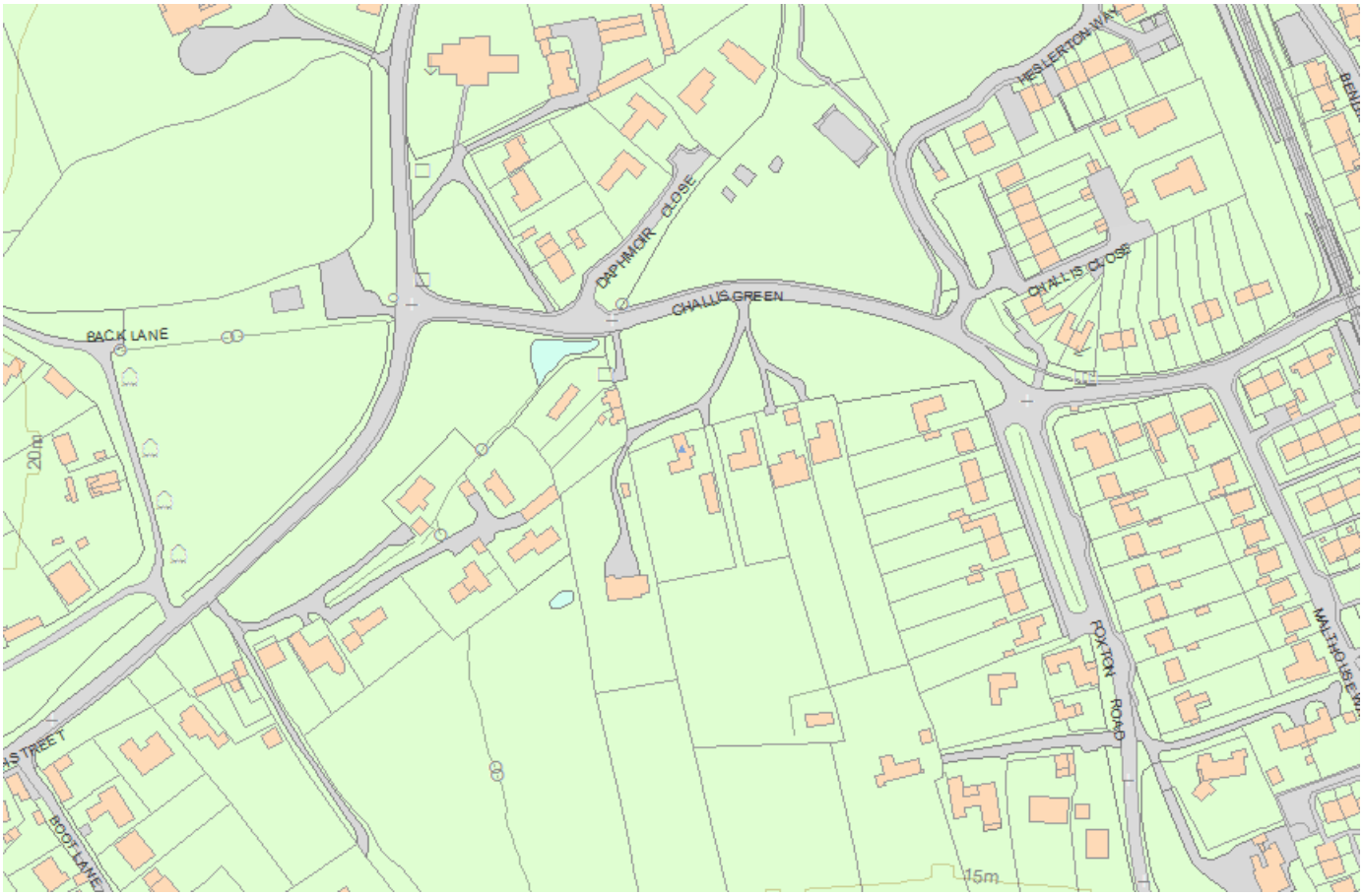
List Entry Number:
1127629

Date first listed:
22-Nov-1967

Date of most recent amendment:
18-Oct-1985

Statutory Address:
10, CHALLIS GREEN

Map



The above map is for quick reference purposes only and may not be to scale. For a copy of the full scale map, please see the attached PDF - **1127629.pdf**

The PDF will be generated from our live systems and may take a few minutes to download depending on how busy our servers are. We apologise for this delay.

This copy shows the entry on 25-Oct-2019 at 15:13:39.

Location

Statutory Address:
10, CHALLIS GREEN

The building or site itself may lie within the boundary of more than one authority.
County:
Cambridgeshire

District:
South Cambridgeshire (District Authority)

Parish:
Barrington

National Grid Reference:
TL3975749802

Details

TL 3949 17/4 22.11.67

BARRINGTON CHALLIS GREEN (South west side) No. 10 (formerly listed as white -House)

GV II

Cottage. Early C19 renovated and enlarged at south end late C20. Timber framed plaster rendered and thatched. Grey brick C19 ridge stack. Two storeys. Four C20 casements with leaded lights and brick, replacing the four C19 horizontal sliding sashes. Central boarded door now blocked. Inside: some of original south gable end framing is exposed and now forms a partition wall. Abutting gault brick fireplaces. Included for group value only. R.C.H.M. West Cambs. Mon. (8)

Listing NGR: TL3975749802

Legacy

The contents of this record have been generated from a legacy data system.

Legacy System number:
52048

Legacy System:
LBS

Sources

Other
An Inventory of the Historical Monuments in Cambridgeshire West, (1968)

Legal

This building is listed under the Planning (Listed Buildings and Conservation Areas) Act 1990 as amended for its special architectural or historic interest.

End of official listing

Images of England

Historic England

24, FOXTON ROAD

Overview

Heritage Category:
Listed Building

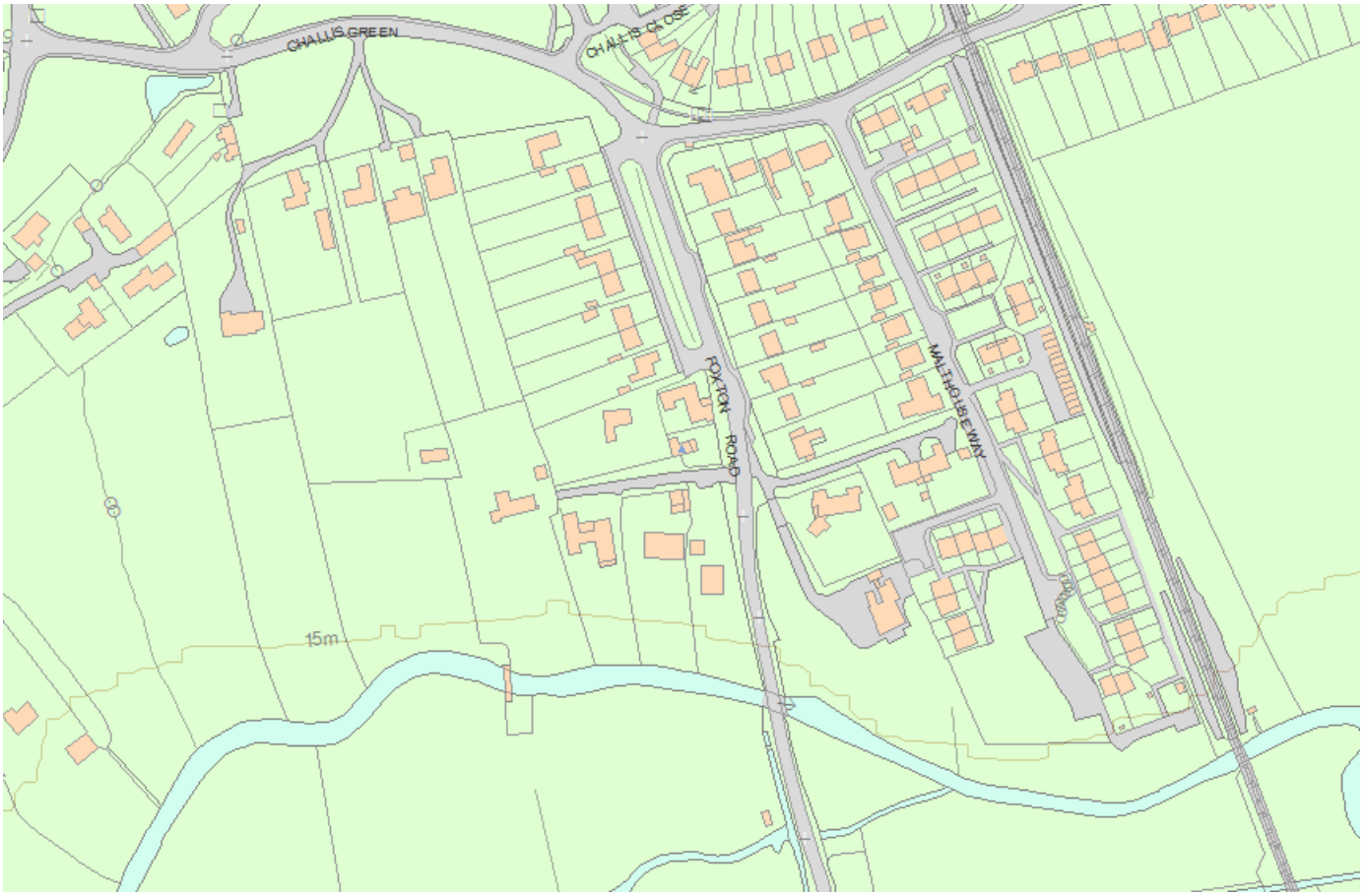
Grade:
II

List Entry Number:
1127630

Date first listed:
01-Mar-1983

Statutory Address:
24, FOXTON ROAD

Map



The above map is for quick reference purposes only and may not be to scale. For a copy of the full scale map, please see the attached PDF - **1127630.pdf**

The PDF will be generated from our live systems and may take a few minutes to download depending on how busy our servers are. We apologise for this delay.

This copy shows the entry on 25-Oct-2019 at 15:13:36.

Location

Statutory Address:
24, FOXTON ROAD

The building or site itself may lie within the boundary of more than one authority.
County:
Cambridgeshire

District:
South Cambridgeshire (District Authority)

Parish:
Barrington

National Grid Reference:
TL3991849692

Details

TL 3949 17/5 1.3.83

BARRINGTON FOXTON ROAD (West side) No. 24 II Cottage. Probably C18, renovated late C20. Timber framed plaster rendered and long straw thatch with single flue grey brick end stack. Single range and two bay plan with lobby entry. Narrower and possibly later storage bay to East end. One storey and attic. One dormer. Two horizontal sliding sashes. Doorway opposite the stack. Inside : rebuilt inglenook hearth. Slender wall framing staggered over the bracing.

R.C.H.M.: West Cambs. Mon. (26).

Listing NGR: TL3991849692

Legacy

The contents of this record have been generated from a legacy data system.

Legacy System number:
52049

Legacy System:
LBS

Sources

Other
An Inventory of the Historical Monuments in Cambridgeshire West, (1968)

Legal

This building is listed under the Planning (Listed Buildings and Conservation Areas) Act 1990 as amended for its special architectural or historic interest.

End of official listing

Images of England

Images of England was a photographic record of every listed building in England, created as a snap shot of listed buildings at the turn of the millennium. These photographs of the exterior of listed buildings were taken by volunteers between 1999 and 2008. The project was supported by the Heritage Lottery Fund.

Historic England

27, HIGH STREET

Overview

Heritage Category:
Listed Building

Grade:
II

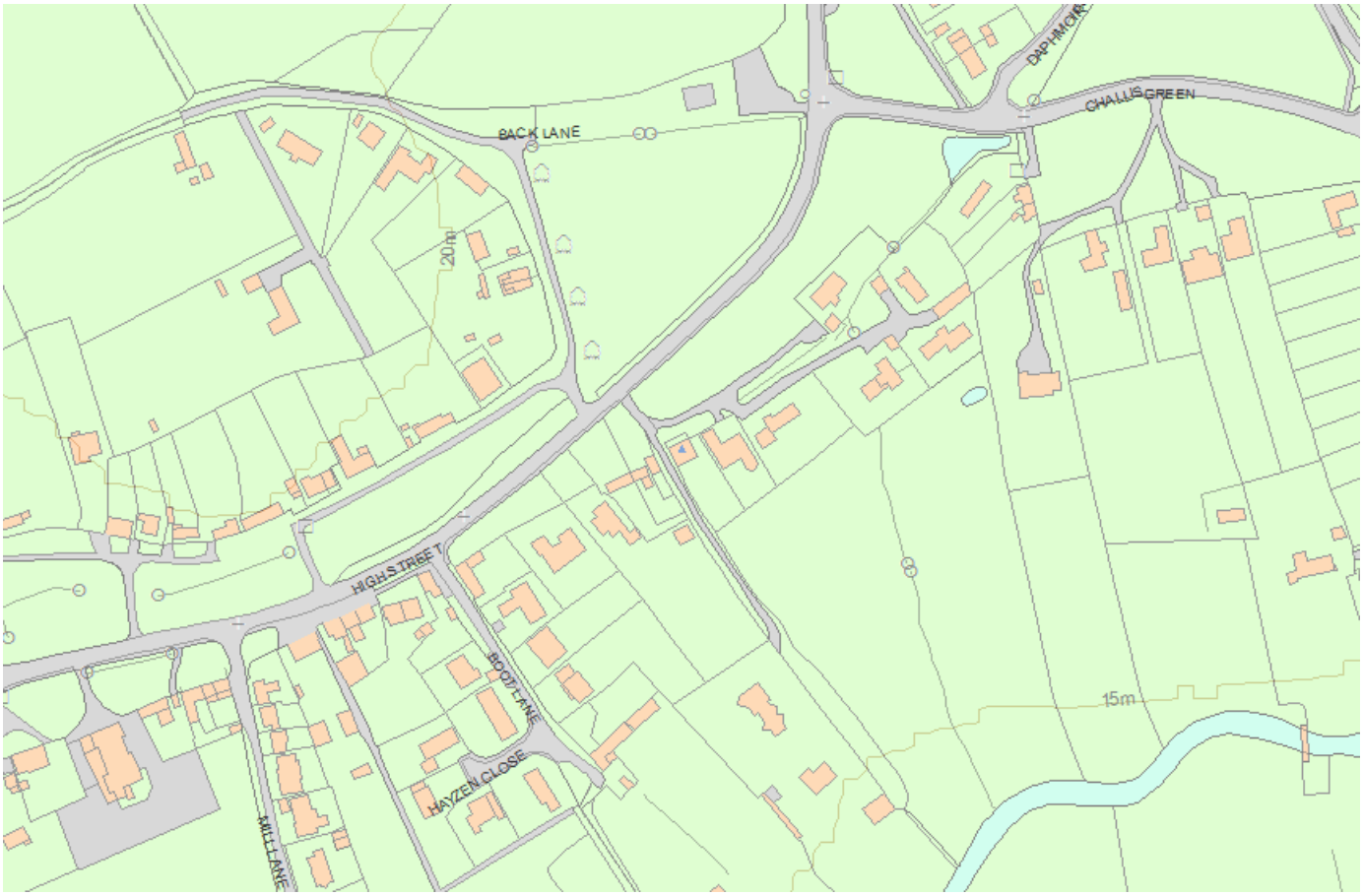
List Entry Number:
1309955

Date first listed:
22-Nov-1967

Date of most recent amendment:
18-Oct-1985

Statutory Address:
27, HIGH STREET

Map



The above map is for quick reference purposes only and may not be to scale. For a copy of the full scale map, please see the attached PDF - **1309955.pdf**

The PDF will be generated from our live systems and may take a few minutes to download depending on how busy our servers are. We apologise for this delay.

This copy shows the entry on 25-Oct-2019 at 15:15:08.

Location

Statutory Address:
27, HIGH STREET

The building or site itself may lie within the boundary of more than one authority.
County:
Cambridgeshire

District:
South Cambridgeshire (District Authority)

Parish:
Barrington

National Grid Reference:
TL3958449717

Details

TL 3949 17/23 22.11.67

BARRINGTON HIGH STREET (South side) No. 27 (formerly listed as Red House)

GV II

House. Late C17 origin with later front wall. Red brick, mostly Flemish bond, and framed upper gable ends. Tiled, with original ridge stack of grouped shafts set diagonally. Two storeys. Three recessed, horizontal sliding sashes. Three brick band carried over two C19 twelve pane hung sashes and the central doorway at ground floor. C20 addition at rear.

R.C.H.M. West Cambs. Mon. (11)

Listing NGR: TL3958449717

Legacy

The contents of this record have been generated from a legacy data system.

Legacy System number:
52075

Legacy System:
LBS

Sources

Other
An Inventory of the Historical Monuments in Cambridgeshire West, (1968)

Legal

This building is listed under the Planning (Listed Buildings and Conservation Areas) Act 1990 as amended for its special architectural or historic interest.

End of official listing

Images of England

Historic England

29, HIGH STREET

Overview

Heritage Category:
Listed Building

Grade:
II

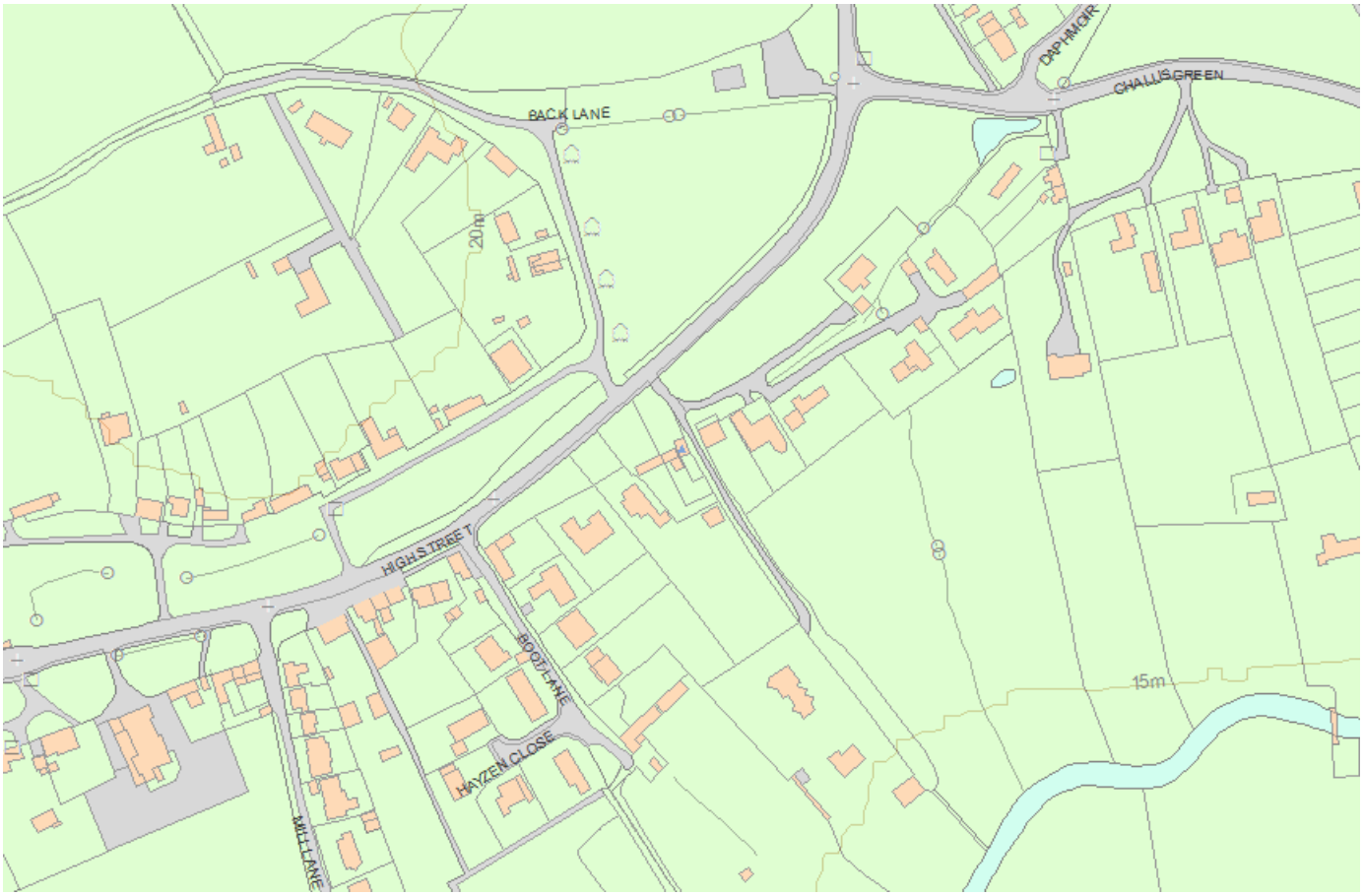
List Entry Number:
1161719

Date first listed:
22-Nov-1967

Date of most recent amendment:
18-Oct-1985

Statutory Address:
29, HIGH STREET

Map



The above map is for quick reference purposes only and may not be to scale. For a copy of the full scale map, please see the attached PDF - **1161719.pdf**

The PDF will be generated from our live systems and may take a few minutes to download depending on how busy our servers are. We apologise for this delay.

This copy shows the entry on 25-Oct-2019 at 15:15:10.

Location

Statutory Address:
29, HIGH STREET

The building or site itself may lie within the boundary of more than one authority.
County:
Cambridgeshire

District:
South Cambridgeshire (District Authority)

Parish:
Barrington

National Grid Reference:
TL 39572 49709

Details

TL 3949 17/24 22.11.67

BARRINGTON HIGH STREET (South side) No. 29 (formerly listed as Slid Lane) GV II

Cottage. Late C18 and early C19. Timber framed, rendered and long straw thatch. Small single flue ridge stack and end stack. End to Green and lobby entry from east side. Two storeys. End to the Green has a sliding sash at first floor above early C19 doorway, with cut bracketed hood and modern door. Front to the lane has a horizontal sliding sash at first floor and a modern casement at ground floor. The doorway to the lobby entry also has a cut bracketed hood.

R.C.H.M.: Record Card

Listing NGR: TL3957249709

Legacy

The contents of this record have been generated from a legacy data system.

Legacy System number:
52072

Legacy System:
LBS

Legal

This building is listed under the Planning (Listed Buildings and Conservation Areas) Act 1990 as amended for its special architectural or historic interest.

End of official listing

Images of England

Images of England was a photographic record of every listed building in England, created as a snap shot of listed buildings at the turn of the millennium. These photographs of the exterior of listed buildings were taken by volunteers between 1999 and 2008. The project was supported by the Heritage Lottery Fund.

Date: 17 Jul 2004

Reference: IOE01/10008/27

Historic England

31, 33, HIGH STREET

Overview

Heritage Category:
Listed Building

Grade:
II

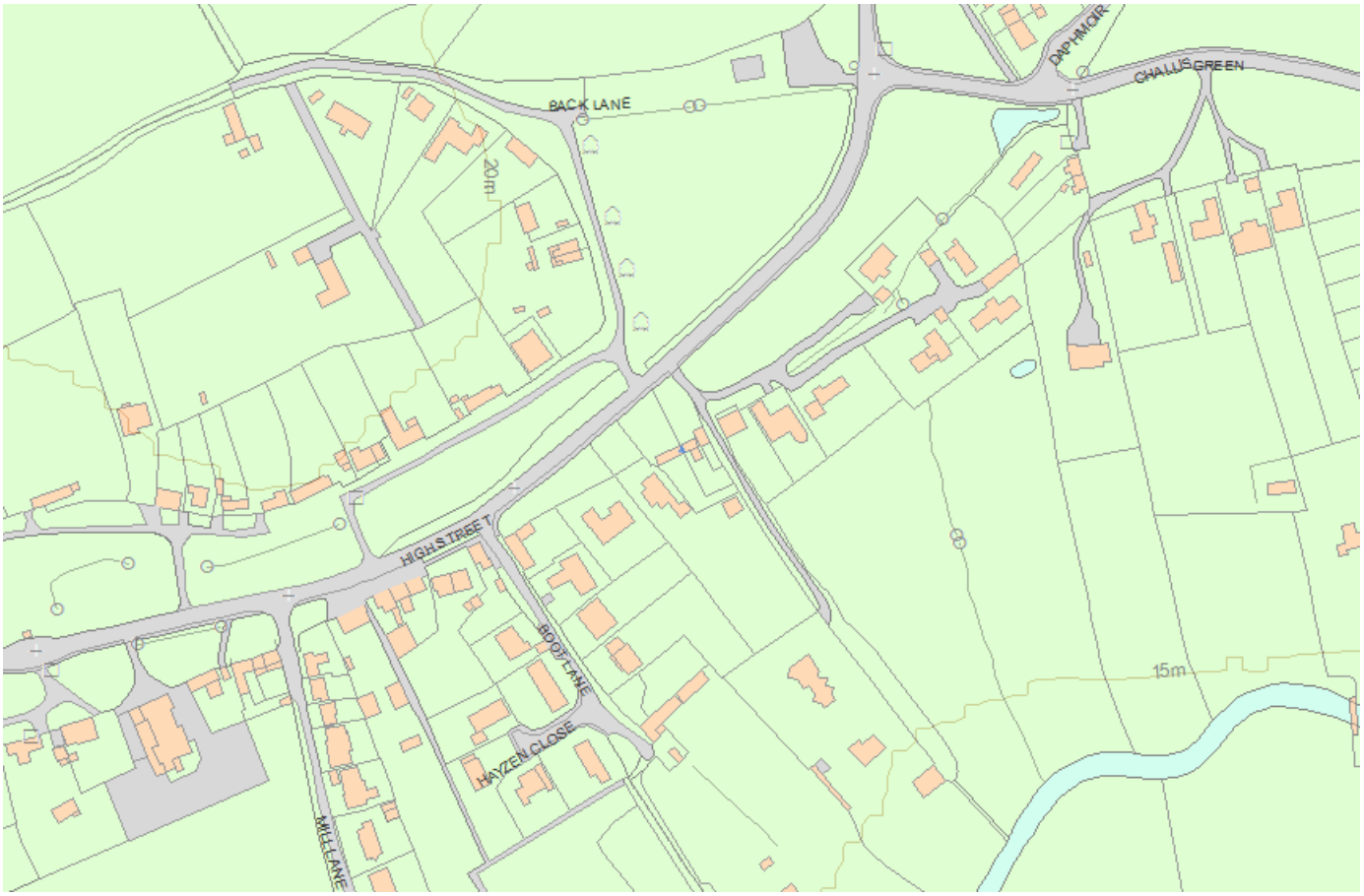
List Entry Number:
1331180

Date first listed:
22-Nov-1967

Date of most recent amendment:
18-Oct-1985

Statutory Address:
31, 33, HIGH STREET

Map



The above map is for quick reference purposes only and may not be to scale. For a copy of the full scale map, please see the attached PDF - **1331180.pdf**

The PDF will be generated from our live systems and may take a few minutes to download depending on how busy our servers are. We apologise for this delay.

This copy shows the entry on 25-Oct-2019 at 15:15:14.

Location

Statutory Address:
31, 33, HIGH STREET

The building or site itself may lie within the boundary of more than one authority.
County:
Cambridgeshire

District:
South Cambridgeshire (District Authority)

Parish:
Barrington

National Grid Reference:
TL3956449705

Details

TL 3949 17/25 22.11.67

BARRINGTON HIGH STREET (South side) Nos. 31, 33 (formerly listed as Honey-suckle) GV II

Pair of cottages. Early C19. Timber framed plaster rendered and long straw thatch with grey brick, shared ridge stack. Single range and four bay plan, extended in late C20 by one bay to south west. Two storeys. Four small casements at first floor. No. 33 has shared dripmould to original doorway and boarded door and horizontal sliding sash. Another horizontal sliding sash to right hand. The doorway to no. 31 has been blocked, but it retains the dripmould and two horizontal sliding sashes. Inside: No. 31 has small early C19 brick hearth (similar to No. 10 Challis Green, no. 22 High Street and No. 18 High Street). Slender tie beams and wall plate exposed.

R.C.H.M: Record Card

Listing NGR: TL3956449705

Legacy

The contents of this record have been generated from a legacy data system.

Legacy System number:
52073

Legacy System:
LBS

Legal

This building is listed under the Planning (Listed Buildings and Conservation Areas) Act 1990 as amended for its special architectural or historic interest.

End of official listing

Images of England

Images of England was a photographic record of every listed building in England, created as a snap shot of listed buildings at the turn of the millennium. These photographs of the exterior of listed buildings were taken by volunteers between 1999 and 2008. The project was supported by the Heritage Lottery Fund.

Date: 17 Jul 2004

Historic England

BARN AT BULBECK MILL HOUSE

Overview

Heritage Category:
Listed Building

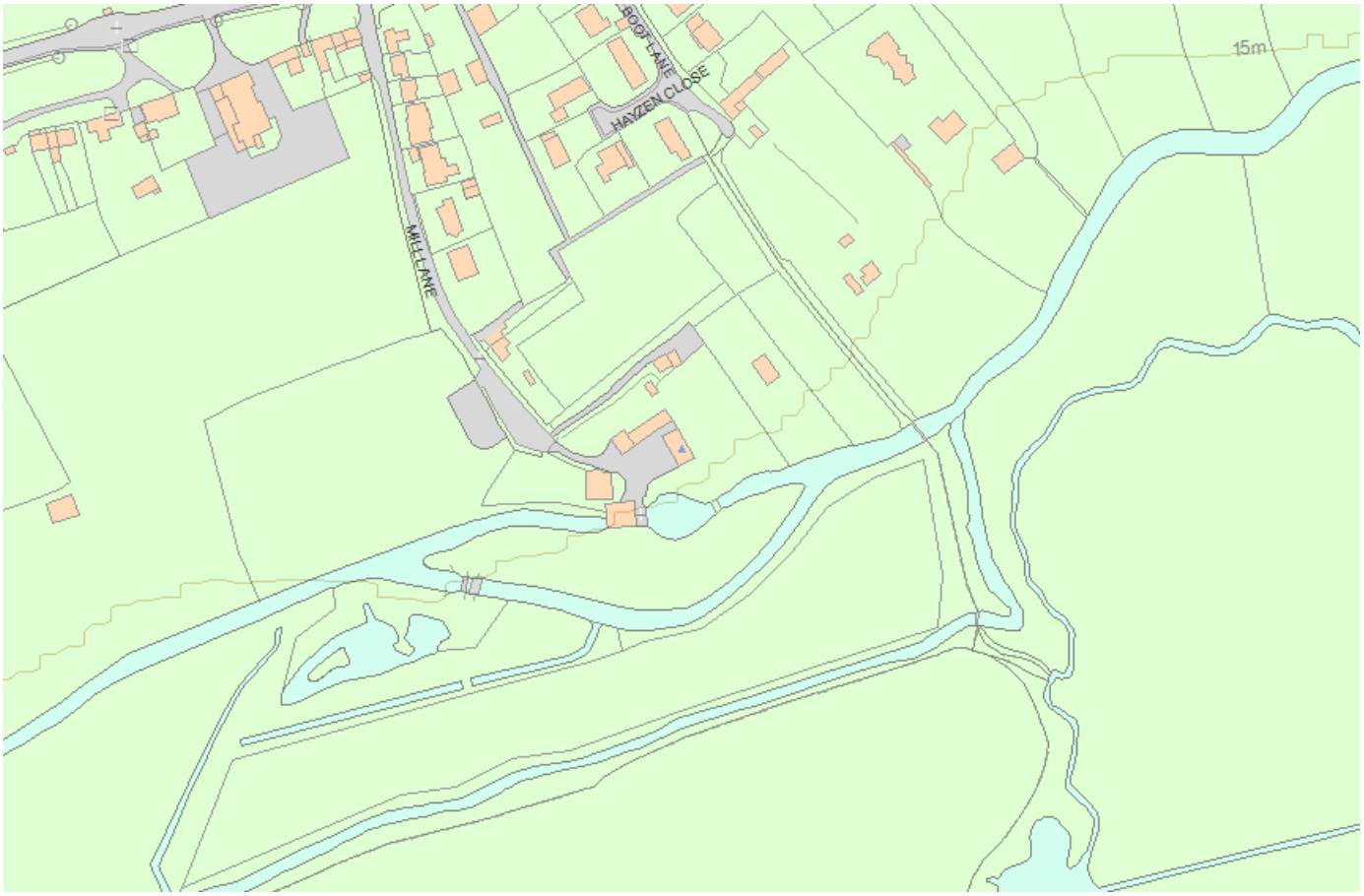
Grade:
II

List Entry Number:
1127639

Date first listed:
18-Oct-1985

Statutory Address:
BARN AT BULBECK MILL HOUSE, MILL LANE

Map



The above map is for quick reference purposes only and may not be to scale. For a copy of the full scale map, please see the attached PDF - **1127639.pdf**

The PDF will be generated from our live systems and may take a few minutes to download depending on how busy our servers are. We apologise for this delay.

This copy shows the entry on 25-Oct-2019 at 14:44:18.

Location

Statutory Address:
BARN AT BULBECK MILL HOUSE, MILL LANE

The building or site itself may lie within the boundary of more than one authority.
County:
Cambridgeshire

District:
South Cambridgeshire (District Authority)

Parish:
Barrington

National Grid Reference:
TL 39530 49444

Details

TL 3949 BARRINGTON MILL LANE

17/31 Barn at Bulbeck Mill House GV II

Barn, now club room. C18. Timber framed weatherboarded with combed wheat reed thatch roof, half-hipped. Single aisled. Included for group value.

Listing NGR: TL3953049444

Legacy

The contents of this record have been generated from a legacy data system.

Legacy System number:
52079

Legacy System:
LBS

Legal

This building is listed under the Planning (Listed Buildings and Conservation Areas) Act 1990 as amended for its special architectural or historic interest.

End of official listing

Images of England

Images of England was a photographic record of every listed building in England, created as a snap shot of listed buildings at the turn of the millennium. These photographs of the exterior of listed buildings were taken by volunteers between 1999 and 2008. The project was supported by the Heritage Lottery Fund.

Date: 07 Oct 2004

Reference: IOE01/13330/02

Rights: Copyright IoE Mr Peter Tree. Source Historic England Archive

Archive image, may not represent current condition of site.

Historic England

BARN NORTH EAST OF TYRELL'S HALL

Overview

Heritage Category:
Listed Building

Grade:
II

List Entry Number:
1165808

Date first listed:
18-Oct-1985

Statutory Address:
BARN NORTH EAST OF TYRELL'S HALL, FOWLMERE ROAD

Map

The above map is for quick reference purposes only and may not be to scale. For a copy of the full scale map, please see the attached PDF - **1165808.pdf**

The PDF will be generated from our live systems and may take a few minutes to download depending on how busy our servers are. We apologise for this delay.

This copy shows the entry on 25-Oct-2019 at 15:20:24.

Location

Statutory Address:
BARN NORTH EAST OF TYRELL'S HALL, FOWLMERE ROAD

The building or site itself may lie within the boundary of more than one authority.
County:
Cambridgeshire

District:
South Cambridgeshire (District Authority)

Parish:
Shepreth

National Grid Reference:
TL 39575 47681

Details

SHEPRETH FOWLMERE ROAD TL 3947 (South west side) 21/318 Barn, North east of Tyrell's Hall GV II

Barn. Late C17 or early C18. Timber framed, weatherboarded on brick plinth, rendered and half-hipped long straw thatch roof. Five bays with barn door opening. Inside: In three bays with original roof of arch braced tie beams and Queenstrut roof trusses.

Listing NGR: TL3957547681

Legacy

The contents of this record have been generated from a legacy data system.

Legacy System number:
52370

Legacy System:
LBS

Legal

This building is listed under the Planning (Listed Buildings and Conservation Areas) Act 1990 as amended for its special architectural or historic interest.

End of official listing

Images of England

Images of England was a photographic record of every listed building in England, created as a snap shot of listed buildings at the turn of the millennium. These photographs of the exterior of listed buildings were taken by volunteers between 1999 and 2008. The project was supported by the Heritage Lottery Fund.

Date: 03 May 2004

Reference: IOE01/10008/18

Archive image, may not represent current condition of site.

Historic England

BRIDGE SOUTH OF TYRELL'S HALL

Overview

Heritage Category:
Listed Building

Grade:
II

List Entry Number:
1128327

Date first listed:
18-Oct-1985

Statutory Address:
BRIDGE SOUTH OF TYRELL'S HALL, FOWLMERE ROAD

Map

The above map is for quick reference purposes only and may not be to scale. For a copy of the full scale map, please see the attached PDF - **1128327.pdf**

The PDF will be generated from our live systems and may take a few minutes to download depending on how busy our servers are. We apologise for this delay.

This copy shows the entry on 25-Oct-2019 at 15:19:40.

Location

Statutory Address:
BRIDGE SOUTH OF TYRELL'S HALL, FOWLMERE ROAD

The building or site itself may lie within the boundary of more than one authority.
County:
Cambridgeshire

District:
South Cambridgeshire (District Authority)

Parish:
Shepreth

National Grid Reference:
TL 39586 47526

Details

SHEPRETH FOWLMERE ROAD TL 3947 (South west side) 21/321 Bridge, south of Tyrell 's Hall GV II

Bridge. Early C19. Gault brick. Parapetted single span with segmental arch. Included for group value. Tithe Map. 1844 P.139/27/1

Listing NGR: TL3958647526

Legacy

The contents of this record have been generated from a legacy data system.

Legacy System number:
52373

Legacy System:
LBS

Legal

This building is listed under the Planning (Listed Buildings and Conservation Areas) Act 1990 as amended for its special architectural or historic interest.

End of official listing

Images of England

Images of England was a photographic record of every listed building in England, created as a snap shot of listed buildings at the turn of the millennium. These photographs of the exterior of listed buildings were taken by volunteers between 1999 and 2008. The project was supported by the Heritage Lottery Fund.

Date: 03 May 2004

Reference: IOE01/10008/15

Archive image, may not represent current condition of site.

Historic England

BULBECK MILL HOUSE

Overview

Heritage Category:
Listed Building

Grade:
II

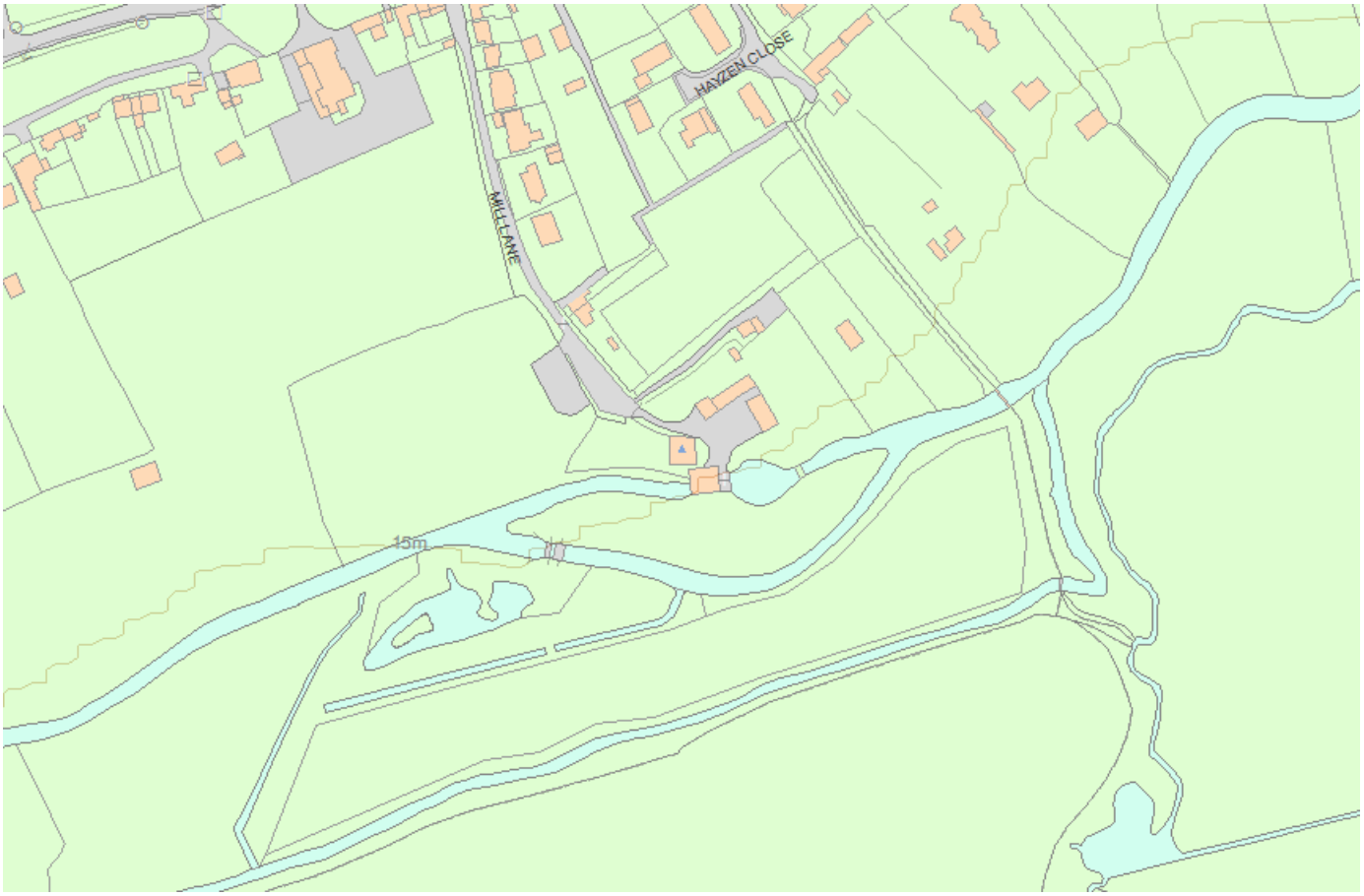
List Entry Number:
1127638

Date first listed:
22-Nov-1967

Date of most recent amendment:
18-Oct-1985

Statutory Address:
BULBECK MILL HOUSE, 14, MILL LANE

Map



The above map is for quick reference purposes only and may not be to scale. For a copy of the full scale map, please see the attached PDF - **1127638.pdf**

The PDF will be generated from our live systems and may take a few minutes to download depending on how busy our servers are. We apologise for this delay.

This copy shows the entry on 25-Oct-2019 at 14:44:25.

Location

Statutory Address:
BULBECK MILL HOUSE, 14, MILL LANE

The building or site itself may lie within the boundary of more than one authority.
County:
Cambridgeshire

District:
South Cambridgeshire (District Authority)

Parish:
Barrington

National Grid Reference:
TL 39495 49430

Details

TL 3949 BARRINGTON MILL LANE

17/29 22.11.67 No. 14 (Bulbeck Mill House) GV II

Mill House. C17 rear range with main range of c1740. Rear range timber framed, rendered. Rear wall removed and rebuilt. Tiled, steeply pitched roof. Two storeys. c.1740 principal range of red brick, flemish bond. Tiled roof and tumbled gable end parapets on kneelers. Flush end stacks. Two storeys and attics. Two original hipped dormers. Symmetrical facade of five, eighteen pane hung sashes in opening boxing with ovolo moulded glazing bars and cambered arches. Central doorway in moulded architrave and round headed arch. Raised and fielded panelled door with radial glazing bars to fanlight. Flat hood on shaped brackets. Inside: Original closed-string staircdse with column-on-vase balusters and moulded rail. One ground floor room has original raised and fielded panelling in two heights with dentil cornice and moulded dado. Fireplace, now replaced, flanked by original niches in half round arches, with raised key blocks and panelled pilasters. Original shutters to windows.

R.C.H.M. West Cambs. mon. (15) V.C.H. Cambs. Vol. 5

Listing NGR: TL3950349418

Legacy

The contents of this record have been generated from a legacy data system.

Legacy System number:
52071

Legacy System:
LBS

Sources

Books and journals

Salzman, L F, The Victoria History of the County of Cambridgeshire and the Isle of Ely, (1973)

Other

An Inventory of the Historical Monuments in Cambridgeshire West, (1968)

Legal

This building is listed under the Planning (Listed Buildings and Conservation Areas) Act 1990 as amended for its special architectural or historic interest.

End of official listing

Historic England

BULBECK MILL

Overview

Heritage Category:
Listed Building

Grade:
II

List Entry Number:
1309962

Date first listed:
18-Oct-1985

Statutory Address:
BULBECK MILL, MILL LANE

Map

The above map is for quick reference purposes only and may not be to scale. For a copy of the full scale map, please see the attached PDF - **1309962.pdf**

The PDF will be generated from our live systems and may take a few minutes to download depending on how busy our servers are. We apologise for this delay.

This copy shows the entry on 25-Oct-2019 at 14:44:20.

Location

Statutory Address:
BULBECK MILL, MILL LANE

The building or site itself may lie within the boundary of more than one authority.
County:
Cambridgeshire

District:
South Cambridgeshire (District Authority)

Parish:
Barrington

National Grid Reference:
TL 39505 49417

Details

TL 3949 BARRINGTON MILL LANE

17/30 Bulbeck Mill GV II

Water mill now a factory, c1810 and 1863. Gault brick and white brick with slate roof. Three storeys and loft with timber lucarn to Eaat end Undershot water wheel now removed. East front has a central hoist opening to each storey flanked by a small metal frame, fixed light window with central pivot opening in segmental arch. The windows on third floor were inserted in mid-C20. Including the road bridge on the east side.

A.T. Smith: Wind and Watermills of Cambs.V.C.H. Cambs. Vol. 5 R. Stephens: Wind and Watermills of Cambs. (forthcoming) (Cambs. Wind and Watermill Society)

Listing NGR: TL3950349418

Legacy

The contents of this record have been generated from a legacy data system.

Legacy System number:
52078

Legacy System:
LBS

Sources

Books and journals

Salzman, L F, The Victoria History of the County of Cambridgeshire and the Isle of Ely, (1973)
Stephens, R, Wind and Watermills of Cambridgeshire, (1985)

Legal

This building is listed under the Planning (Listed Buildings and Conservation Areas) Act 1990 as amended for its special architectural or historic interest.

End of official listing

Images of England

Historic England

CHURCH OF ALL SAINTS

Overview

Heritage Category:
Listed Building

Grade:
I

List Entry Number:
1331176

Date first listed:
22-Nov-1967

Statutory Address:
CHURCH OF ALL SAINTS, HASLINGFIELD ROAD

Map

The above map is for quick reference purposes only and may not be to scale. For a copy of the full scale map, please see the attached PDF - **1331176.pdf**

The PDF will be generated from our live systems and may take a few minutes to download depending on how busy our servers are. We apologise for this delay.

This copy shows the entry on 25-Oct-2019 at 15:10:51.

Location

Statutory Address:
CHURCH OF ALL SAINTS, HASLINGFIELD ROAD

The building or site itself may lie within the boundary of more than one authority.
County:
Cambridgeshire

District:
South Cambridgeshire (District Authority)

Parish:
Barrington

National Grid Reference:
TL 39664 49963

Details

TL 3949 BARRINGTON HASLINGFIELD ROAD (East side) 17/11 Church of All 22.11.67 Saints GV I

Parish Church. Nave, chancel and north and south aisles, early C13. West tower early C13, C14 and completed C15. North aisle enlarged and clerestorey added late C14. Dressed clunch, and some limestone. Roman cement render to some of the clunch. Plan of West tower, nave with north and south aisles, and chancel. West Tower has some limestone to plinth but otherwise is _ dressed clunch. Some limestone repairs to fenestration. Four stages with angle buttressing, stepped embattled parapet and main cornice with central gargoyles. On moulded plinth. Ground stage, late C13, with upper stages of C14 and C15. Restored C15 West window. First stage has lancet window, C13 to each side. Bell stage of two cinquefoil openings in four centred arch. Nave with late C14 clerestorey and low pitched roof. Original gable visible in west wall of tower. Clerestorey of five windows to each side. Two cinquefoil lights in pointed arches with square heads and dagger tracery to spandrels. South aisle is C13 but openings are late C14-C15. Two original windows of three cinquefoil lights with vertical tracery. South porch also late C14. Much worn outer arch, C13 inner archway, restored. Two centred arch of keeled roll moulding with dog tooth and other ornament, on engaged shafts with leaf capitals and hold-water bases. South door of vertical planks with moulded cover strips, the head with blind tracery. C19 vestry on south side of south aisle. Chancel has early C14 flowing tracery to two windows in the south wall. East window, C14-C15 with vertical tracery. The north aisle is partly obscured by the Bendyshe mortuary chapel, formerly a chantry chapel. C15. Late C14-C15 windows in the north wall of the north aisle. Interior: Five bay nave arcade, early C13. Two centred arches of two orders, each with two hollow mouldings on columns of quatrefoil section each with moulded capital, enriched with nail head ornament and base. The roof is late C14. In five bays. King posts on arch braced tie beams with dagger and quatrefoil ornament to the spandrels. The jack-posts have stone corbels carved with angel and mask heads. The westernmost columns of the nave arcade have been partly obscured by the late C13 west tower. North aisle has late C14 early C15 roof. Chapel, originally a chantry chapel, now a mortuary chapel to the Bendyshe family. Two C15 bays. Two centred arches of two orders, the outer continuous, the inner on half octagonal responds. Inside, C18 stone paving with black sets and wall monuments to Bendyshe family including: Robert Bendyshe (1687) and Margaret, his wife (1673); Thomas Bendyshe (1684); and Constantia Gyles 1663) daughter of Thomas Bendyshe. South aisle, narrower than enlarged North aisle. Reset C13 arch with nail head ornament leads to C19 vestry on site of south chapel. Chancel arch early C13. Two centred of two hollow moulded orders on responds of semi-quatrefoil section, one with nail head ornament to the capital. The north wall of the chancel is part C13 and has a lancet with a deep splay. In the south wall, the piscina to an ogee arch with label, mask stops and finial. Doorway, now blocked, in north wall of chancel. C14-C15. Continuous moulded two-centred arch. Wall monument, north wall of chancel. Anna Lyng. 1586 Pulpit: oak. Early C17 with original sounding board but cut down stem. Pews: In nave. Late C15 or C16. Oak. Some repairs but others with original seats. End and fronts are panelled and have tracery to the heads and two stage buttressing. Moulded rails. Font: C13 limestone bowl with shafted corners on clunch base, C14, with panelled sides. Chest C16 oak with interlaciny iron straps. Coffin bearer: in north aisle. There are numerous scratchings in the church, medieval to modern. Late medieval wall painting is visible in part of the south wall of the nave arcade.

Pevsner: Buildings of England p.297 R.C.H.M: West Cambs. Mon. (1). V.C.H.: West Cambs. Vol. 5

Listing NGR: TL3966449963

Legacy

The contents of this record have been generated from a legacy data system.

Legacy System number:
52055

Legacy System:

LBS

Sources

Books and journals

Pevsner, N, The Buildings of England: Cambridgeshire, (1954), 297
Salzman, L F, The Victoria History of the County of Cambridgeshire and the Isle of Ely, (1973)

Other

An Inventory of the Historical Monuments in Cambridgeshire West, (1968)

Legal

This building is listed under the Planning (Listed Buildings and Conservation Areas) Act 1990 as amended for its special architectural or historic interest.

End of official listing

Images of England

Images of England was a photographic record of every listed building in England, created as a snap shot of listed buildings at the turn of the millennium. These photographs of the exterior of listed buildings were taken by volunteers between 1999 and 2008. The project was supported by the Heritage Lottery Fund.

Date: 02 Oct 1999

Reference: IOE01/01880/01

Archive image, may not represent current condition of site.

Historic England

GRANARY NORTH EAST OF TYRELL'S HALL

Overview

Heritage Category:
Listed Building

Grade:
II

List Entry Number:
1330823

Date first listed:
18-Oct-1985

Statutory Address:
GRANARY NORTH EAST OF TYRELL'S HALL, FOWLMERE ROAD

Map

The above map is for quick reference purposes only and may not be to scale. For a copy of the full scale map, please see the attached PDF - **1330823.pdf**

The PDF will be generated from our live systems and may take a few minutes to download depending on how busy our servers are. We apologise for this delay.

This copy shows the entry on 25-Oct-2019 at 15:19:32.

Location

Statutory Address:
GRANARY NORTH EAST OF TYRELL'S HALL, FOWLMERE ROAD

The building or site itself may lie within the boundary of more than one authority.
County:
Cambridgeshire

District:
South Cambridgeshire (District Authority)

Parish:
Shepreth

National Grid Reference:
TL 39586 47641

Details

SHEPRETH FOWLMERE ROAD TL 3947 (South west side) 21/316 Granary, North east of Tyrell's s Hall GV II

Granary. C18. Timber framed, part weatherboarded and part plaster rendered. Tiled half hipped roof. Two storeys. Hoist openiny at first floor. The granary stands at the entrance to the stable yard and the gable end has a clock removed from the stable block, now demolished. There is a lean-to addition at one end.

Listing NGR: TL3958647641

Legacy

The contents of this record have been generated from a legacy data system.

Legacy System number:
52368

Legacy System:
LBS

Legal

This building is listed under the Planning (Listed Buildings and Conservation Areas) Act 1990 as amended for its special architectural or historic interest.

End of official listing

Images of England

Images of England was a photographic record of every listed building in England, created as a snap shot of listed buildings at the turn of the millennium. These photographs of the exterior of listed buildings were taken by volunteers between 1999 and 2008. The project was supported by the Heritage Lottery Fund.

Date: 03 May 2004

Reference: IOE01/10008/17

Archive image, may not represent current condition of site.

Historic England

LODGE AT ENTRANCE TO TYRELL'S HALL

Overview

Heritage Category:
Listed Building

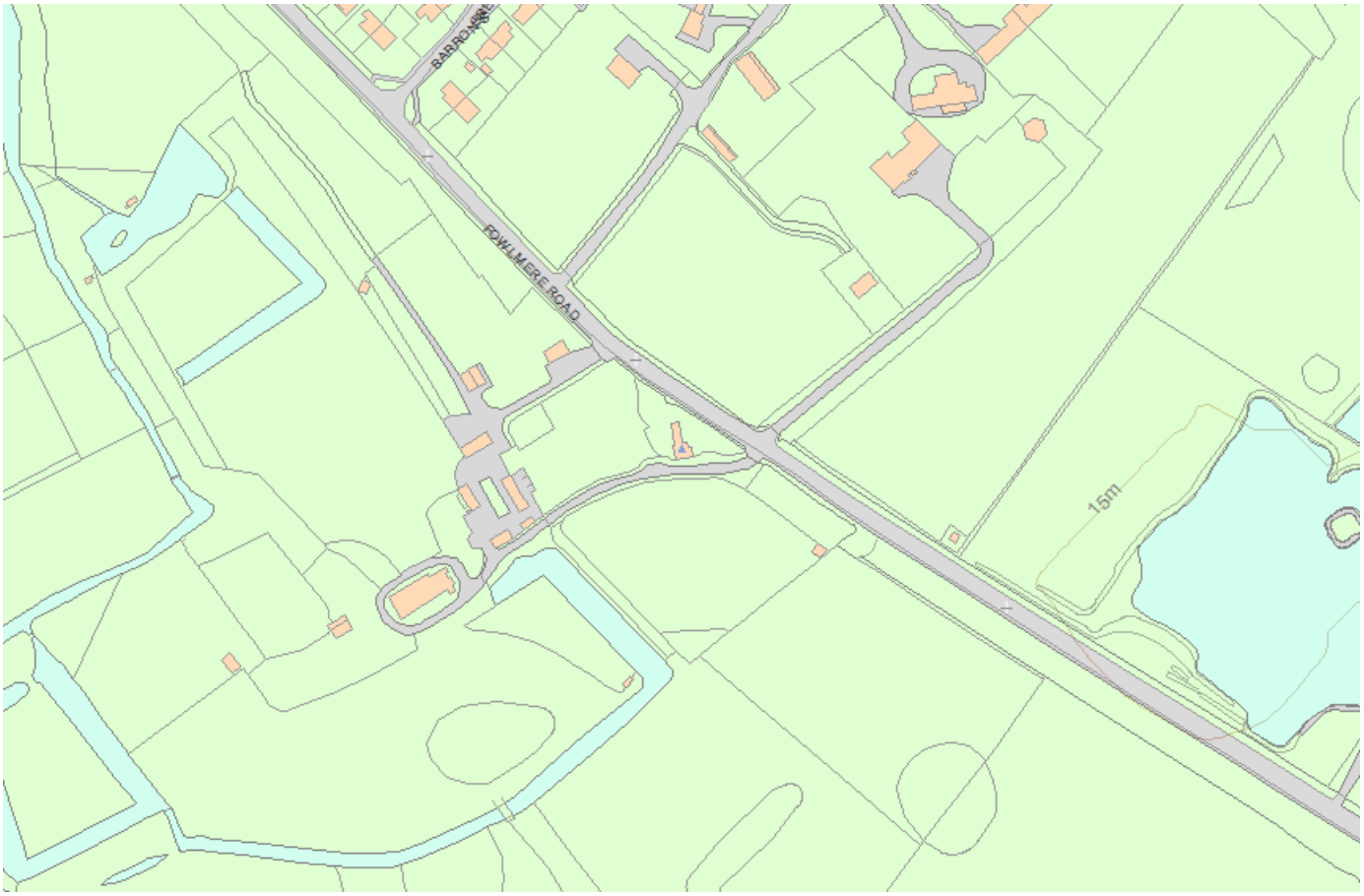
Grade:
II

List Entry Number:
1128326

Date first listed:
18-Oct-1985

Statutory Address:
LODGE AT ENTRANCE TO TYRELL'S HALL, 28, FOWLMERE ROAD

Map



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This copy shows the entry on 25-Oct-2019 at 15:19:18.

Location

Statutory Address:
LODGE AT ENTRANCE TO TYRELL'S HALL, 28, FOWLMERE ROAD

The building or site itself may lie within the boundary of more than one authority.
County:
Cambridgeshire

District:
South Cambridgeshire (District Authority)

Parish:
Shepreth

National Grid Reference:
TL 39662 47679

Details

SHEPRETH FOWLMERE ROAD TL 3947 (South west side) 21/317 Lodge at entrance to Tyrell's Hall(No. 28) LV II

Lodge. Early C19. Clay bat, plastered and long straw thatch, hipped roof with stack to rear wall. Cottage orne. One storey and attic. Two dormers. Pointed arches to two hung sashes with arched top panes. Doorway at east end. Lower kitchen wing at the rear is also thatched. Tithe Map, 1844. C.R.0. P.139/27/1

Listing NGR: TL3966247679

Legacy

The contents of this record have been generated from a legacy data system.

Legacy System number:
52369

Legacy System:
LBS

Legal

This building is listed under the Planning (Listed Buildings and Conservation Areas) Act 1990 as amended for its special architectural or historic interest.

End of official listing

Images of England

Images of England was a photographic record of every listed building in England, created as a snap shot of listed buildings at the turn of the millennium. These photographs of the exterior of listed buildings were taken by volunteers between 1999 and 2008. The project was supported by the Heritage Lottery Fund.

Date: 03 May 2004

Reference: IOE01/10008/21

Archive image, may not represent current condition of site.

Historic England

TYRELL'S HALL

Overview

Heritage Category:
Listed Building

Grade:
II

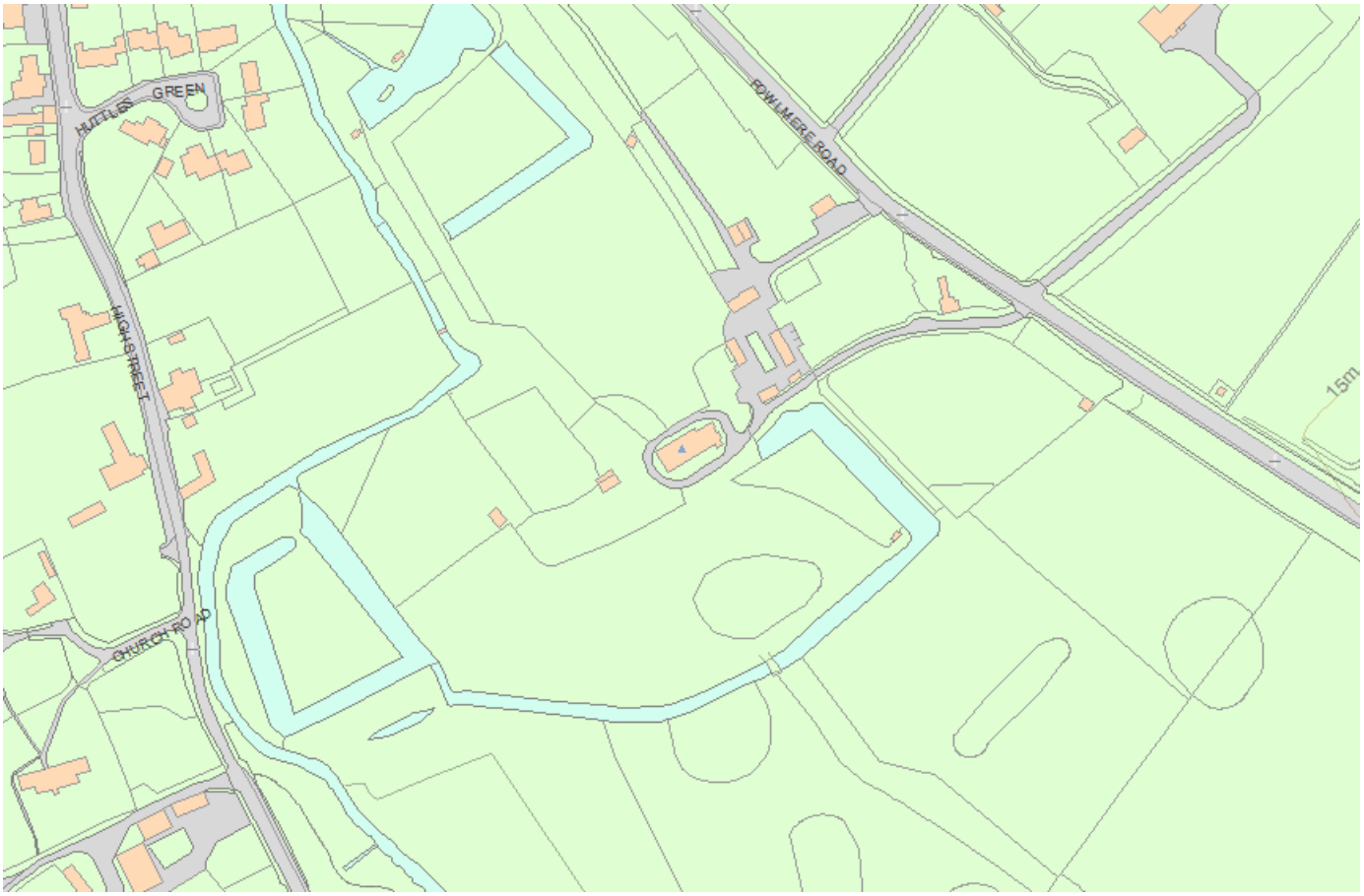
List Entry Number:
1165779

Date first listed:
22-Nov-1967

Date of most recent amendment:
18-Oct-1985

Statutory Address:
TYRELL'S HALL, 30, FOWLMERE ROAD

Map



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Location

Statutory Address:
TYRELL'S HALL, 30, FOWLMERE ROAD

The building or site itself may lie within the boundary of more than one authority.
County:
Cambridgeshire

District:
South Cambridgeshire (District Authority)

Parish:
Shepreth

National Grid Reference:
TL 39550 47618

Details

SHEPRETH FOWLMERE ROAD TL 39.47 (South west side) 21/315 Tyrell's Hall (No. lo) 22.11.67 GV II

Manor house. Mainly C18 but external appearance is now early C19 following an extensive remodelling by Thomas Nash of Cockett and Nash, architects of Royston, Herts. in 1825. North east end is probably C16. Part timber framed and part gault brick with the principal entrance front now on the north side, stuccoed. Hipped, early C19, slate roof with internal and end stacks of similar period. Two storeys. Symmetrical facade of four flush frame, twelve pane hung sashes on either side of taller central window of fifteen panes. Below is a central doorway with open modillion pediment on engaged Tuscan columns. Panelled door with fanlight and radial glazing bars. A lower service wing adjoins with two storey canted bays flanking the doorway in the end wall. Stuccoed and roughcast walls with slate roof. The garden front is of gault brick and has a range of five recessed hung sashes, shuttered, and a central glazed doorway flanked by full length hung sashes. The site is partly moated. The early C19 alterations to the house, the lodge, bridge, Gothick summer house and garden shelter (q.v.) reflect the taste of the Woodham family at the time. A bath house of similar period is now ruinous (1985). Plans and elevations for the proposed alterations to the house by Cockett and Nash are deposited in Cambridge Record Office. The original scheme shows that the main front was on the south side. The drawings also show that the bays at the east end of the service/office range were an alteration to the proposed scheme. Tyrell's manor was acquired by William Woodham in 1759. The Nash-Woodham family also owned Docwra's Manor, Shepreth (q.v.).

V.C.H. Cambs. Vol. 5 p.256 R.C.H.M. Record Card (1949) C.R.O.: 296/B.53

Listing NGR: TL3955047618

Legacy

The contents of this record have been generated from a legacy data system.

Legacy System number:
52367

Legacy System:
LBS

Sources

Books and journals

Salzman, L F, The Victoria History of the County of Cambridgeshire and the Isle of Ely, (1973), 256

Legal

This building is listed under the Planning (Listed Buildings and Conservation Areas) Act 1990 as amended for its special architectural or historic interest.

End of official listing

Historic England

WIMBISH MANOR

Overview

Heritage Category:
Listed Building

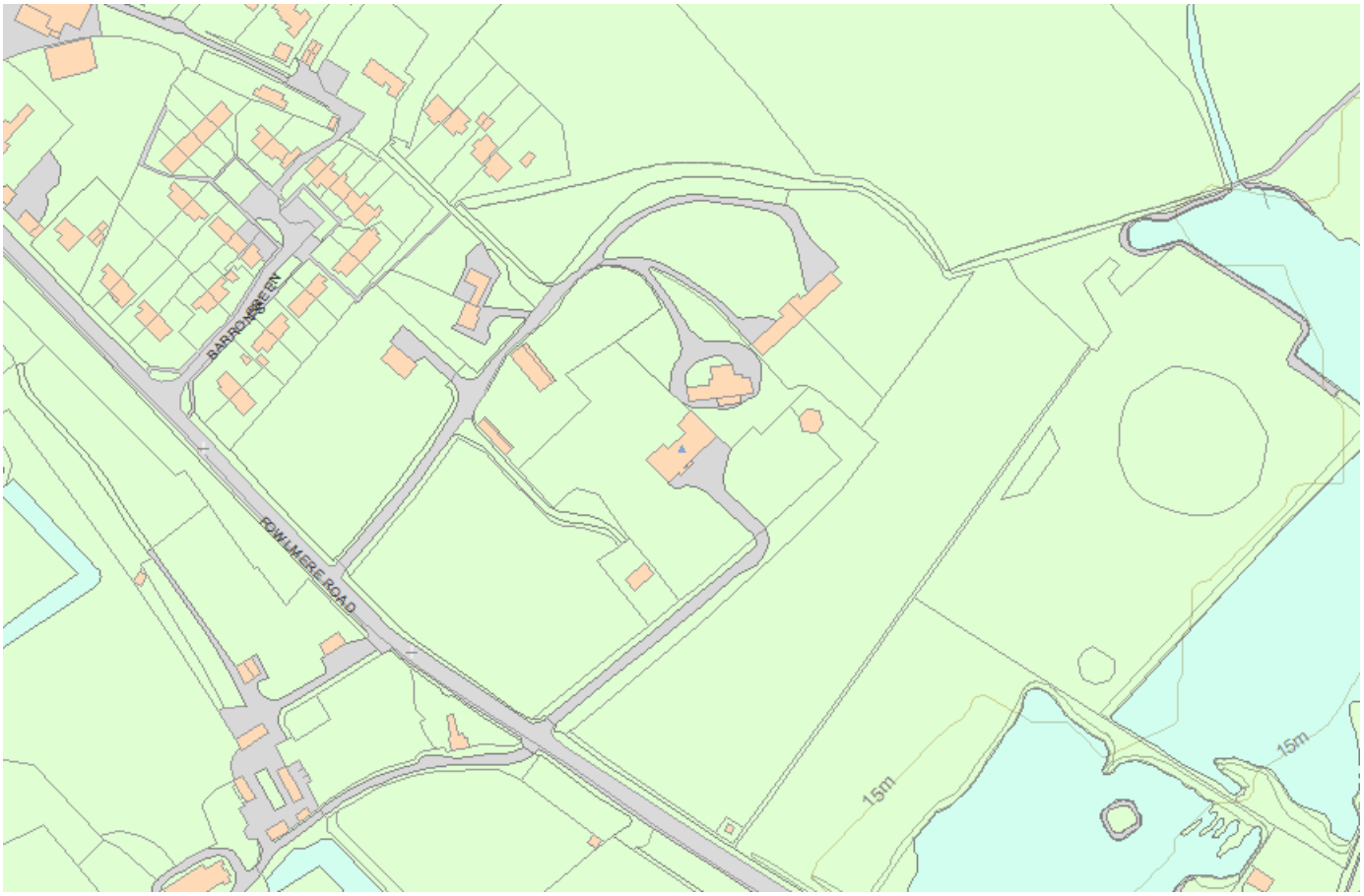
Grade:
II

List Entry Number:
1165841

Date first listed:
18-Oct-1985

Statutory Address:
WIMBISH MANOR, 29, FOWLMERE ROAD

Map



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This copy shows the entry on 25-Oct-2019 at 15:19:14.

Location

Statutory Address:
WIMBISH MANOR, 29, FOWLMERE ROAD

The building or site itself may lie within the boundary of more than one authority.
County:
Cambridgeshire

District:
South Cambridgeshire (District Authority)

Parish:
Shepreth

National Grid Reference:
TL 39756 47801

Details

SHEPRETH FOWLMERE ROAD TL 3947 (North east side) 21/322 Wimbish Manor(No. 29) II

Manor house. Early C18 and mid C19. Red brick with patterned red and burnt brickwork to mid C19 front wall and some timber framing from C18 or earlier house visible internally in the rear wall. Embattled, slate roofs with moulded brick eaves cornice to front. North range has C18 red brick ridge stack and range to south end stacks. Plan of two parallel linked ranges, with small extensions on the north side and ends. Three storeys. Range of three flush frame hung sashes with central glazing bars, in gauged brick arches. Central Roman Doric portico of Ketton stone but the entablature is wood and has a dentil cornice. Inside: one ground floor room has some raised and fielded panelling below the dado and to the overmantel and shutters. There is a cellar. Principal staircase of C19-C20 wrot-ironwork. The - principal front was originally on the north side.

R.C.H.M.: Record Card

Listing NGR: TL3975647801

Legacy

The contents of this record have been generated from a legacy data system.

Legacy System number:
52374

Legacy System:
LBS

Sources

Books and journals

Salzman, L F, The Victoria History of the County of Cambridgeshire and the Isle of Ely, (1973), 255

Legal

This building is listed under the Planning (Listed Buildings and Conservation Areas) Act 1990 as amended for its special architectural or historic interest.

End of official listing

Images of England

BIDWELLS

Station Fields, Foxton

Preliminary Acoustic Appraisal

On behalf of **Axis Land Partnerships Limited**

Project Ref: 47235/2502 | Rev: 01 | Date: February 2020

Registered Office: Buckingham Court Kingsmead Business Park, London Road, High Wycombe, Buckinghamshire, HP11 1JU
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Document Control Sheet

Project Name: Station Fields, Foxton

Project Ref: 47235/2502

Report Title: Noise Impact Assessment

Doc Ref: 01

Date: February 2020

	Name	Position	Signature	Date
Prepared by:	Zoe Richardson	Assistant Acoustic Engineer	ZR	February 2020
Reviewed by:	Matt Barlow	Senior Associate	MB	February 2020
Approved by:	Mark Brenton	Director	MB	February 2020
For and on behalf of Stantec UK Limited				

Revision	Date	Description	Prepared	Reviewed	Approved

Contents

Figures

Tables

Appendices

1 Introduction

1.1 Background

1.1.1 Stantec has been commissioned by Axis Land Partnerships Limited to undertake a preliminary acoustic appraisal of the development proposals to inform the Regulation 18 process of the Local Plan and also to inform the masterplan for the development of Land at Station Fields, Foxton.

1.1.2 The purpose of this report is to appraise the existing sound climate at the proposed development site, provide advice on the likely noise constraints and identify potential mitigation measures.

1.1.3 Environmental sound surveys have not been undertaken however noise maps produced by Defra (http://extrium.co.uk/noiseviewer.html) have been used to inform the appraisal.

1.1.4 The mitigation measures identified in this report are subject to the results of a detailed environmental sound survey and assessment of the site.

1.1.5 An explanation of the terminology used in this report is contained in Appendix A.

1.2 Site Location and Description

1.2.1 The site currently comprises arable farmland with the Great Northern Railway Line bisecting the development site in an east-west direction.

1.2.2 The site is bound by the A10 to the south, Barrington Road to the east, Foxton Road to the north, and arable land to the west. Existing residential dwellings are situated to the east of the site. Foxton Water Treatment Plant is situated in the northern section of the site.

1.2.3 Figure 1 details the proposed site location along with indicative masterplan layout.

Figure 1: Site Location and Indicative Masterplan

(Indicative Masterplan provided by Axis Land Partnerships Limited)

2 Legislation, Planning, Guidance and Criteria

2.1 Local Authority

2.1.1 South Cambridgeshire District Council adopted their Local Plan in September 2018.

2.1.2 Policy HQ/1: Design Principles states:

> *"1 . All new development must be of high quality design, with a clear vision as to the positive contribution the development will make to its local and wider context. As appropriate to the scale and nature of the development, proposals must:*
>
> *[…] n. Protect the health and amenity of occupiers and surroundings uses from development that is overlooking, overbearing or results in a loss of daylight or development which would create unacceptable impacts such as noise, vibration, odour, emissions and dust: […]*

2.2 National Policy

The National Planning Policy Framework (NPPF)

2.2.1 The revised NPPF was published in February 2019. In respect of noise, 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…*
>
> *e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of … noise pollution..."*

2.2.2 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…"

2.2.3 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."*

2.2.4 The NPPF indicates that the Noise Policy Statement for England (NPSE) should be used to define the *"significant adverse impacts"*.

Noise Policy Statement for England

2.2.5 The Noise Policy Statement for England (NPSE) was published in March 2010 and clarifies the underlying principles and aims of existing policy documents that relate to noise. It also sets out the long-term vision of Government noise policy which is: *"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"*.

2.2.6 The NPSE states 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 its effects as far as is reasonably practicable having regard to the underlying principles of sustainable development.

2.2.7 Paragraphs 2.20 and 2.21 define 'significant averse' and 'adverse' impacts as applied to noise as follows:

> *"There are two established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organisation. They are:*
>
> *NOEL – No Observed Effect Level*
>
> *This is 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.*
>
> *LOAEL – Lowest Observed Adverse Effect Level*
>
> *This is the level above which adverse effects on health and quality of life can be detected.*
>
> *Extending these concepts for the purpose of this NPSE leads to the concept of a significant observed adverse effect level.*
>
> *SOAEL – Significant Observed Adverse Effect Level*
>
> *This is the level above which significant adverse effects on health and quality of life occur."*

2.2.8 It is necessary to define the LOAEL and SOAEL for the potential source of noise to relate the potential impact to the aims and requirements of the NPSE

National Planning Practice Guidance

2.2.9 The National Planning Practice Guide (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.

2.2.10 The PPG provides guidance on the effects of noise exposure, relating these to people's perception of noise, and linking them to the NOEL and, as exposure increases, the LOAEL and SOAEL.

2.2.11 As exposure increases above the LOAEL, the noise begins to have an adverse effect and consideration needs to be given to mitigating and minimising those effects, taking account of the economic and social benefits being derived from the activity causing the noise. As the noise exposure increases, it will then at some point cross the SOAEL boundary.

2.2.12 The LOAEL is described in PPG (Paragraph: 005 Reference ID: 30-005-20190722) as the level above which *"noise starts to cause small changes in behaviour and/or attitude, for example, having to turn up the volume on the television or needing to speak more loudly to be heard. The noise therefore starts to have an adverse effect and consideration needs to be given to mitigating and minimising those effects (taking account of the economic and social benefits being derived from the activity causing the noise)."*

2.2.13 PPG identifies the SOAEL (Paragraph: 005 Reference ID: 30-005-20190722) as the level above which *"noise causes a material change in behaviour such as keeping windows closed for most of the time or avoiding certain activities during periods when the noise is present. If the exposure is predicted to be above this level the planning process should be used to avoid this effect occurring, for example through the choice of sites at the plan-making stage, or by*

use of appropriate mitigation such as by altering the design and layout. While such decisions must be made taking account of the economic and social benefit of the activity causing or affected by the noise, it is undesirable for such exposure to be caused."

2.3 Guidance

Professional Practice Guidance on Planning and Noise, 2017

2.3.1 The Professional Practice Guidance on Planning and Noise (ProPG) provides guidance on a recommended approach to the management of noise within the planning system in England.

2.3.2 The scope of ProPG is limited to new residential development that will be predominantly exposed to airborne noise from transport sources.

2.3.3 The guidance is mostly focused on new flats and houses, although there is some relevant content in regard to other types of residential units, such as care homes and residential institutions.

2.3.4 Noise sources other than airborne transport (i.e. industrial, commercial, entertainment, etc.) and ground-borne noise and vibration fall outside of the scope of ProPG.

2.3.5 ProPG details a two-stage approach to the consideration of noise issues including:

- Stage 1 – an initial noise risk assessment of the proposed development site; and
- Stage 2 – a systematic consideration of four key elements.

2.3.6 Table 2.1 summarises the noise risk categories as defined in ProPG for Stage 1 of the assessment process.

Table 2.1: Stage 1 ProPG Risk Categories

Site Noise Risk Level	Indicative Noise Levels excluding Mitigation (dB $L_{Aeq,T}$)		Pre-Planning Application Advice
	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)	
High	> 70	> 60	Increased risk that development may be refused on noise grounds. The risk may be reduced by following a good acoustic design process
Medium	60 – 70	50 - 60	The site is likely to be less suitable from a noise perspective and an application may be refused unless a good acoustic design process is followed
Low	50 – 60	40 – 50	The site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed
Negligible	< 50	< 40*	The site is likely to be acceptable from a noise perspective
* Site Noise Risk Level should not be considered negligible where there could be more than 10 noise events with $L_{Amax,f}$ > 60 dB			

British Standard 8233: 2014 'Guidance on Sound Insulation and noise reduction for buildings'

2.3.7 BS 8233 sets out desirable guideline values in habitable rooms, such as living rooms and bedrooms.

2.3.8 The guideline values relate to steady external noise without a specific character, previously termed 'anonymous noise'. According to the standard, noise has a specific character if it contains features such as a distinguishable, discrete and continuous tone, is irregular enough to attract attention, or has strong low-frequency content, in which case lower noise limits might be appropriate. Examples of noise with a character may include tonal/intermittent plant noise emissions, music playback, and workshop noise. Examples of external steady noise sources may include environmental noise sources such as busy road traffic.

2.3.9 The desirable internal ambient sound levels for dwellings are presented in Table 2.2.

Table 2.2: BS 8233 Desirable Internal Ambient Sound Levels for Dwellings

Activity	Location	Daytime 07:00 to 23:00 hours	Night-time 23:00 to 07:00
Resting	Living room	35 dB LAeq,16h	-
Dining	Dining room/area	40 dB LAeq,16h	-
Sleeping (daytime resting)	Bedroom	35 dB LAeq,16h	30 dB LAeq,8h
Note 4 Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or LAmax,f, depending on the character and number of events per night. Sporadic noise events could require separate values.			
Note 5 If relying on closed windows to meet the guide values, there needs to be an appropriate alternative source of ventilation that does not compromise the façade insulation or the resulting noise levels.			
Note 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.			

**A selection of the available notes*

2.3.10 The standard also provides advice in relation to design criteria for external sound. It states that:

> *"for traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable.*
>
> *In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.*
>
> *Other locations, such as balconies, roof gardens and terraces, are also important in residential buildings where normal external amenity space might be limited or not available, i.e. in flats, apartment blocks, etc. In these locations, specification of noise limits is not necessarily appropriate.*
>
> *Small balconies may be included for uses such as drying washing or growing pot plants, and noise limits should not be necessary for these uses. However, the general guidance on noise in amenity space is still appropriate for larger balconies, roof gardens and terraces, which might be intended to be used for relaxation.*

In high-noise areas, consideration should be given to protecting these areas by screening or building design to achieve the lowest practicable levels. Achieving levels of 55 dB $L_{Aeq,T}$ or less might not be possible at the outer edge of these areas, but should be achievable in some areas of the space."

2.4 Proposed Assessment Criteria

2.4.1 A stage 1 assessment of the site has been undertaken in general accordance with ProPG. In addition, based on the requirements of the Local Authority, national policy and relevant standards, adverse effect levels have been proposed.

2.4.2 Table 2.3 provides details of the proposed adverse effect levels.

Table 2.3: Proposed Assessment Criteria – Adverse Effect Level

Adverse Effect Level	Indicative Internal Noise Levels excluding Mitigation (dB $L_{Aeq,T}$)		External Noise Levels in Amenity Areas (dB $L_{Aeq,T}$)
	Daytime (07:00 – 23:00)	Night-time (07:00 to 23:00 hours)	Daytime (07:00 – 23:00)
LOAEL	35 $L_{Aeq,16h}$ (dB)	30 $L_{Aeq,8h}$ (dB) 45 dB $L_{Amax\ 10}$ times per night	55 $L_{Aeq,16h}$ (dB)
SOAEL	50 $L_{Aeq,16h}$ (dB)	45 $L_{Aeq,8h}$ (dB) 65 dB $L_{Amax\ 10}$ times per night	65 $L_{Aeq,16h}$ (dB)

3 Acoustic Constraints and Masterplan Development

3.1 Assessment Methodology

3.1.1 Defra noise maps[1] have been used to predict the likely noise levels across the site. The strategic noise maps of England are produced under the Environmental Noise (England) Regulations, 2006. The Regulation has three core objectives; to produce strategic noise maps, to produce noise action plans, and to make information available to the public.

3.1.2 The strategic noise maps are required to be produced every five years. They must be produced for agglomerations with a population of more than 100,00 people; for major roads with more than 3,000,000 vehicle passages per year, and for major railways with more than 30,000 train movements per year.

3.1.3 Figures 2 and 3 below show the Defra predicted noise levels during the daytime (07:00 – 23:00 hours) and night-time (23:00 – 07:00) periods respectively for road noise. Figures 4 and 5 show the same periods for rail noise.

3.2 External Noise Levels

3.2.1 The indicative masterplan has been overlaid onto the Defra noise contours to show the extent of potential noise in relation to the proposed development. Due to how the Defra noise maps are produced, road and rail contours are shown separately. It should be noted that road and rail sources are usually combined within the overall background sound climate and therefore levels may be higher than shown below.

3.2.2 Figures 2 and 3 show the indicative masterplan overlaid onto the daytime and night-time predicted road noise levels.

[1] http://www.extrium.co.uk/noiseviewer.html [Accessed 30/01/2020]

Road Traffic Noise

Figure 2: Defra Predicted Road Noise Levels (Daytime – 07:00 – 23:00 hours)

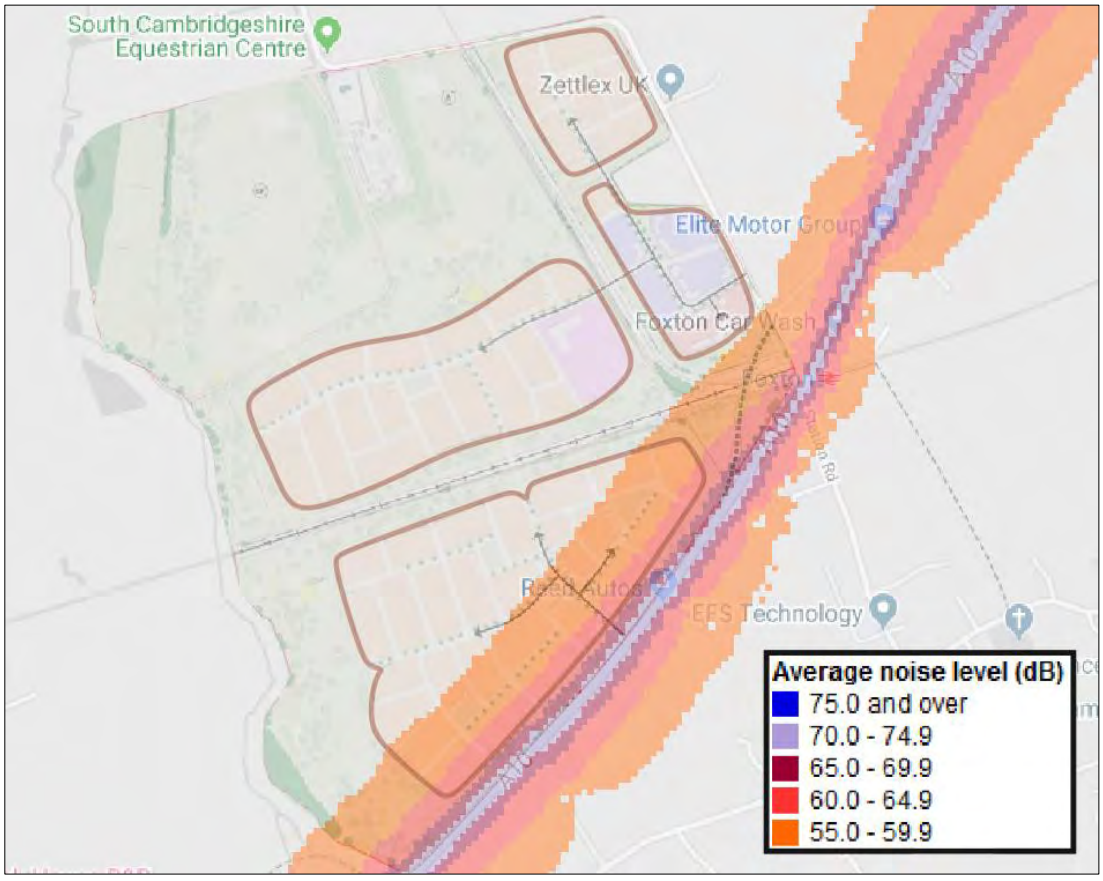
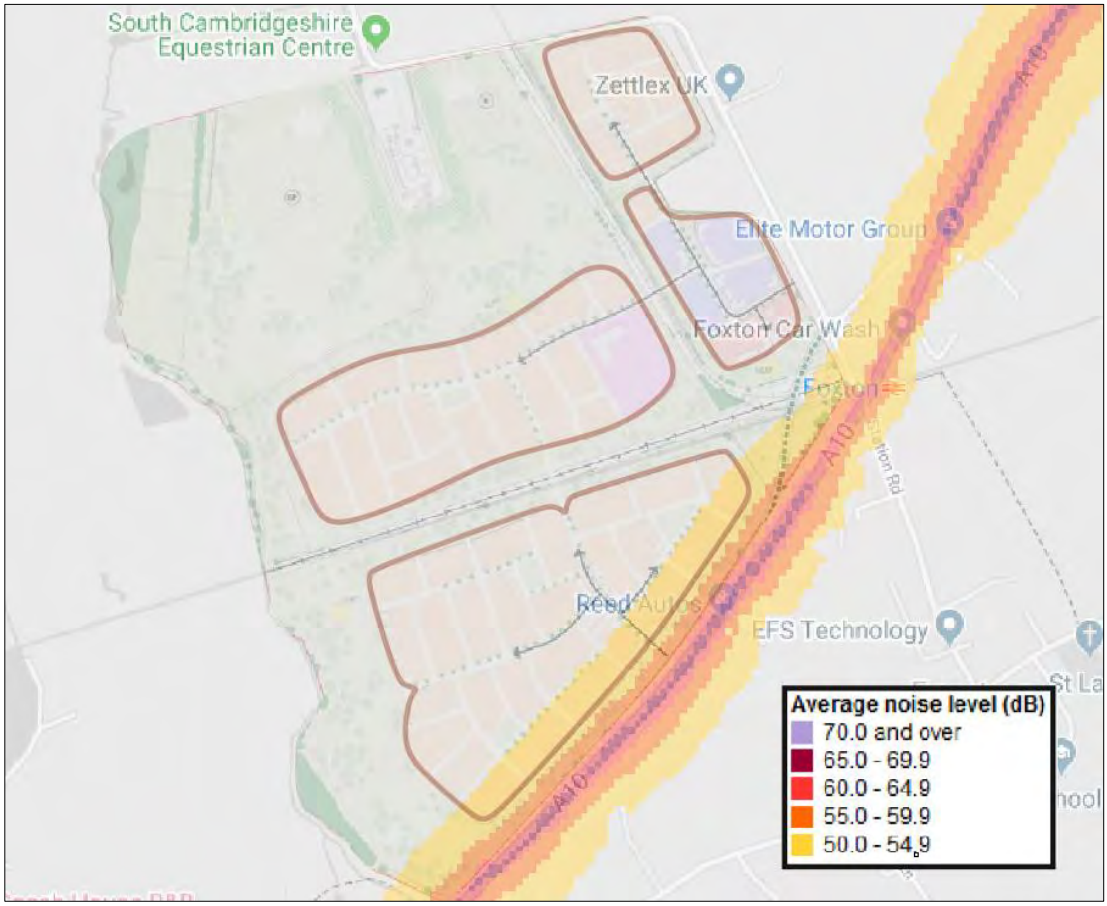


Figure 3: Defra Predicted Road Noise Levels (Night-time – 23:00 - 07:00)



3.2.3 For proposed residential areas directly adjacent to the A10 sound levels are likely to fall between 60 dBA and 70 dBA during the daytime (07:00 – 23:00 hours). During the night-time period (23:00 – 07:00 hours) sound levels are likely to fall between 50 dBA and 55 dBA.

Railway Noise

3.2.4 Figures 4 and 5 show the indicative masterplan overlaid onto the Defra daytime and night-time predicted rail noise levels.

Figure 4: Defra Predicted Rail Noise Levels (Daytime – 07:00 – 23:00 hours)

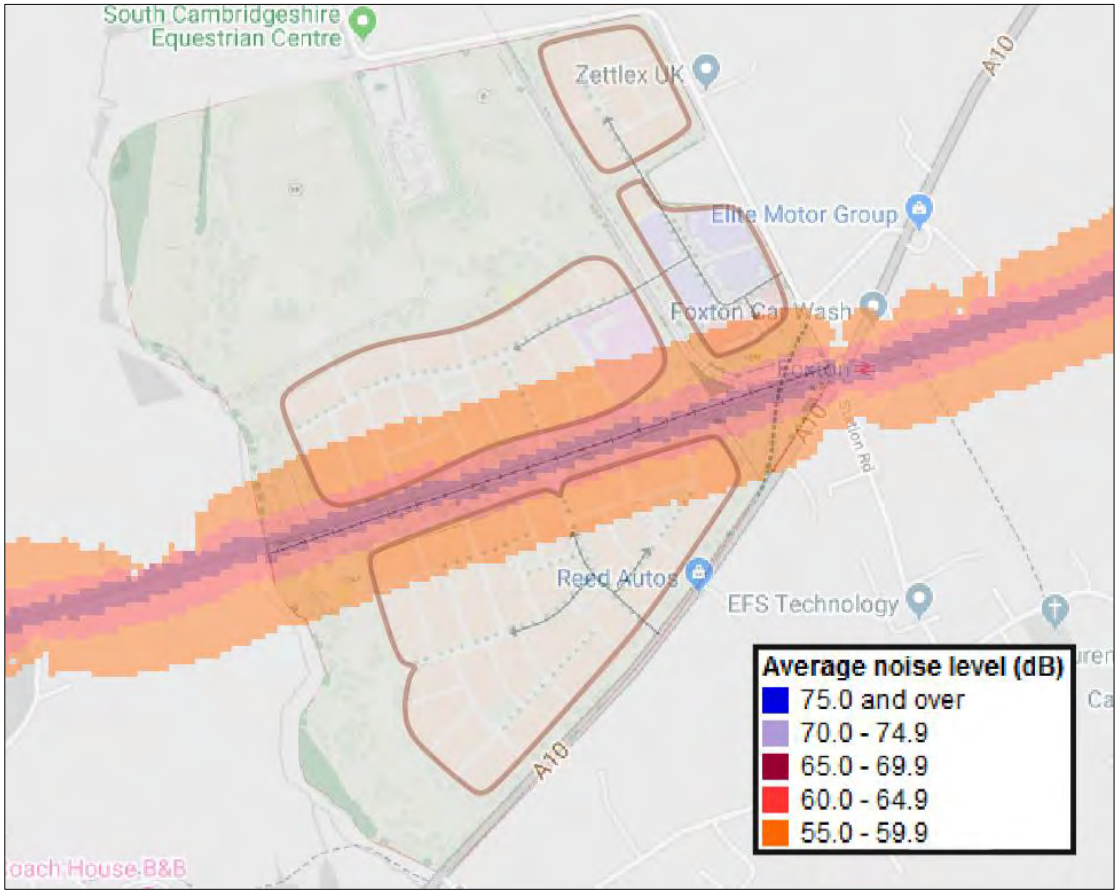
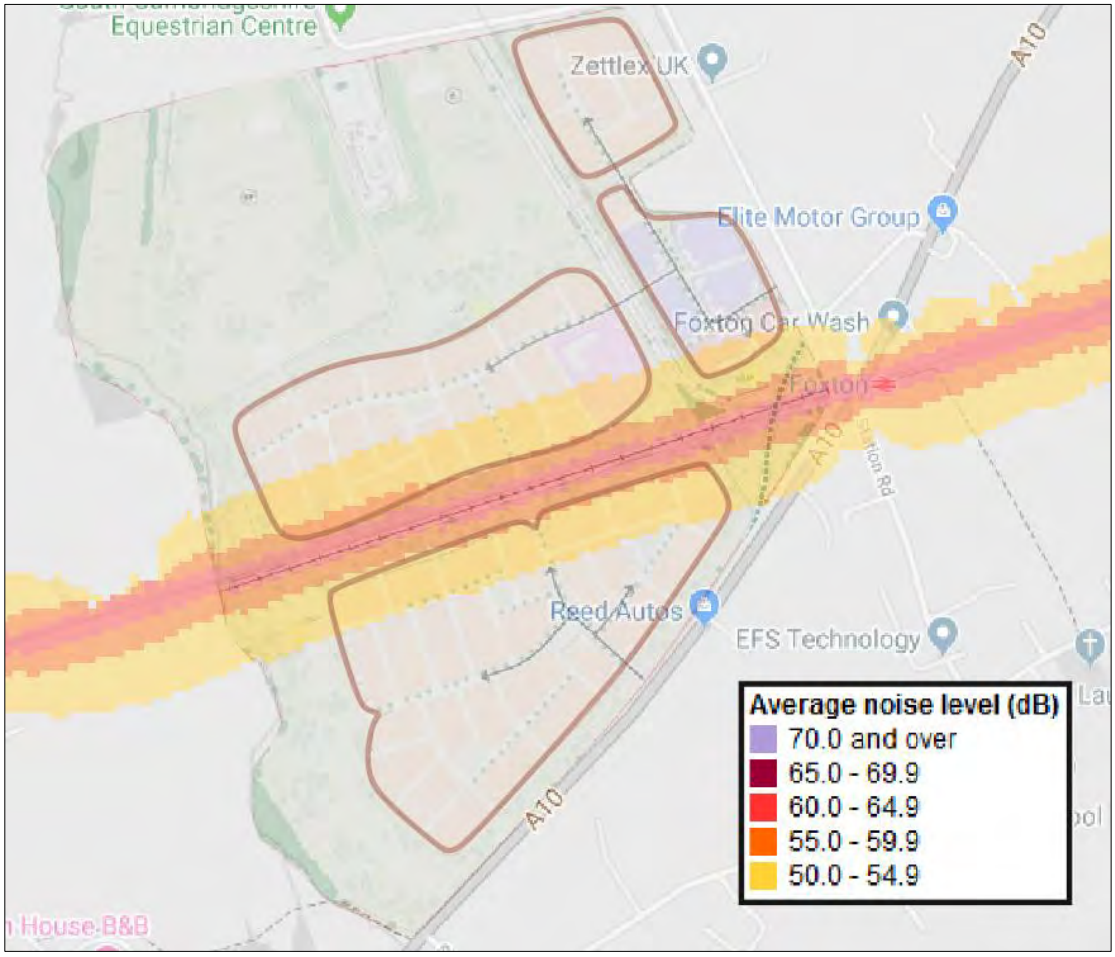


Figure 5: Defra Predicted Rail Noise Levels (Night-time – 23:00 - 07:00)



3.2.5 For proposed residential areas directly adjacent to the Great Northern Railway Line sound levels are likely to fall between 55 dBA and 70 dBA during the daytime (07:00 – 23:00 hours). During the night-time period (23:00 – 07:00 hours) sound levels are likely to fall between 50 dBA and 60 dBA.

Railway Vibration

3.2.6 It is typically advised that set back from railway tracks due to vibration is 30 m. However, with respect to vibration, a reduced setback of 15 m may be acceptable provided the buildings are large masonry set on piles.

3.2.7 It should be noted that the proposed illustrative masterplan (as shown in Figure 1) has provided a set back from the railway tracks which is likely to be considered suitable. However it is suggested that a baseline vibration survey is undertaken at the appropriate stage to confirm.

Discussion

3.2.8 With reference to BS 8233 guidance levels, unmitigated noise levels in external amenity spaces adjacent to the A10 and Great Northern Railway Line are likely to be above the proposed LOAEL of 55 dB $L_{Aeq,T}$. Amenity areas away from these noise sources are likely to be below the LOAEL of 55 dB $L_{Aeq, T}$.

3.2.9 In regards to ProPG (see Table 2.1) the majority of the site is considered to be a low to negligible risk. A small minority of properties adjacent to the A10 and the Great Northern Railway Line are considered to be a medium risk. For properties in the medium risk noise levels, good acoustic design process should be followed to allow suitable internal and external noise levels to be achieved.

3.2.10 It should be noted that the proposed illustrative masterplan (as shown in Figure 1) details buildings set back from both the A10 and Great Northern Railway Line, making use of good acoustic design.

3.2.11 We understand that the development proposals include for alignment changes to the A10. Detailed modelling would need to be undertaken as part of a future planning application to confirm the impacts. However, based on the illustrative alignment and the existing noise contours, the noise levels at the closest effected receptors are likely to be similar to receptors adjacent to the existing A10 and be categorised as being medium risk. Therefore, for receptors adjacent to the changed alignment are likely to also require good acoustic design process to be followed to allow suitable internal and external noise levels to be achieved.

3.3 Good Acoustic Design

Internal Noise Levels

3.3.1 Suitable internal noise levels with windows closed and alternative ventilation being provided are achievable with appropriate specification of glazing and ventilators. In this instance, it is likely that uprated acoustic double glazing with acoustic trickle ventilators will be required for properties within close proximity of the A10 and Great Northern Railway Line. Mechanical ventilation may be required to some dwellings.

3.3.2 Consideration should also be given to the internal layout of properties. Habitable rooms located on the façades fronting onto noise sources should be avoided. Rooms such as bedrooms and living rooms should ideally be placed onto quieter facades so as to reduce disturbance.

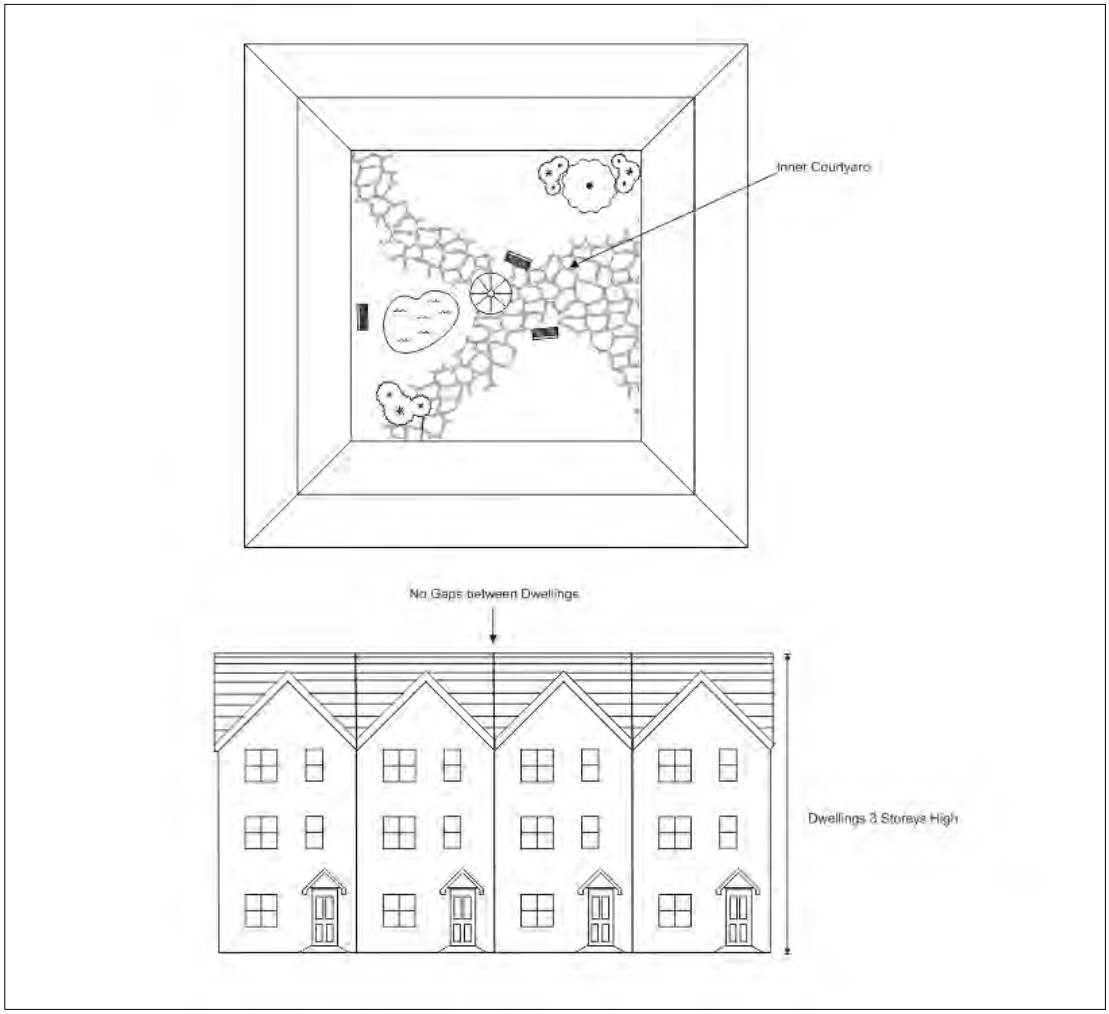
External Noise Levels

3.3.3 The existing proposed illustrative masterplan already details the use of set back distances from both the A10 and Great Northern Railway Line.

3.3.4 Mitigation in the form of building orientation and acoustic barrier may be implemented.

3.3.5 Buildings may be orientated to ensure gaps between dwellings are reduced such that no garden area has a direct line-of-sight/overlooks the A10/Great Northern Railway. Terraced buildings adjacent to these noise sources may be implemented to provide a screening effect to the rest of the Site. Courtyard style development may also be implemented to provide shielded amenity space as presented in Figure 6.

Figure 6: Illustrative 3 Storey Terraced House Design and Courtyard Style Buildings



3.3.6 The use of acoustic barriers may also be implemented to reduce noise levels, however due to the relatively small size of the site, and the size of the A10 and Great Northern Railway, a detailed assessment would be required to determine whether a barrier led approach would be suitable.

3.3.7 With regards to external amenity spaces, ProPG does advise the following where guidance levels cannot be met:

"*Where, despite following good design process, significant adverse noise impacts remain on any private external amenity space (e.g. garden or balcony) then that impact may be partially off-set if the residents are provided, through the design of the development or the planning process, with access to:*

- *A relatively quiet façade (containing openable windows to habitable rooms) or a relatively quiet externally ventilated space (i.e. enclosed balcony) as part of their dwelling; and/or*
- *A relatively quiet alternative or additional external amenity space for sole use by a household, (e.g. a garden, roof garden or large open balcony in a different, protected location); and/or*
- *A relatively quiet, protected, nearby, external amenity space for sole use by a limited group of residents as part of the amenity of their dwellings; and/or*
- *A relatively quiet, protected, publicly accessible, external amenity space (e.g. a public park or a local green space designated because of its tranquillity) that is nearby (e.g. within a 5 minutes walking distance). The local planning authority could link such*

provision to the definition and management of Quite Areas under the Environmental Noise Regulations."

3.3.8 We would highlight that during the detailed design of the scheme the effect of acoustic barriers and site layout on noise levels in external amenity areas should be explored in more detail.

3.3.9 The ProPG also recommends:

"*Developers are particularly encouraged to enter into pre-application discussions with the LPA* (Local Planning Authority) *where noise levels in proposed amenity spaces are likely to be above 55 dB* $L_{Aeq,\ 16\ hr}$ *during a reasonably foreseeable worst case day. […] This judgement will partly depend on the type of residential development and the intended occupancy, which, in turn, may need to be secured by condition."*

3.3.10 It should also be noted that the ProPG states:

"*Good acoustic design is not just compliance with recommended internal and external noise exposure standards. Good acoustic design should provide an integrated solution whereby the optimum acoustic outcome is achieved, without design compromises that will adversely affect living conditions and the quality of life of the inhabitants or other sustainable design objectives and requirements."*

4 Summary and Conclusions

4.1.1 Stantec has been commissioned to provide a noise impact assessment of the development proposals to inform the regulation 18 process of the Local Plan and also inform masterplan proposals for a proposed residential led mixed-use development at Station Fields, Foxton.

4.1.2 Defra noise maps have been utilised to aid the assessment.

4.1.3 Adequate internal noise levels with windows closed and alternative ventilation provided are achievable with appropriate specification of glazing and ventilators. In this instance, it is likely that uprated acoustic double glazing with acoustic trickle ventilators will be required for properties within close proximity of the A10 and Great Northern Railway Line. Mechanical ventilation may be required to some dwellings.

4.1.4 Noise levels in external amenity areas directly adjacent to the A10 and Great Northern Railway Line are likely to exceed the proposed LOAEL. Mitigation measures to reduce noise levels in external amenity areas will therefore be required.

4.1.5 The development already includes the use of setback distances from the existing noise sources. It is recommended that the design of the scheme should further consider the principles of good acoustic design and include:

- Consideration of the layout of the scheme (including the internal layout of dwellings);
- Targeted use of acoustic barriers (where deemed effective).

4.1.6 Based on a review the acoustic climate and incorporation of good acoustic design, the site is considered suitable for residential development.

Appendix A Glossary of Acoustic Terminology

Parameter	Description
Daytime	The period 07:00-23:00 hours.
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s^1 and s^2 is given by 20 $\log^{10}$ (s^1/s^2). The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is 20µPa. The threshold of normal hearing is in the region of 0 dB and 140 dB is the threshold of pain. A change of 1 dB is only perceptible under controlled conditions.
dB(A), L_{Ax}	Decibels measured on a sound level meter incorporating a frequency weighting (A weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB(A) broadly agree with people's assessment of loudness. A change of 3 dB(A) is the minimum perceptible under normal conditions, and a change of 10 dB(A) corresponds roughly to halving or doubling the loudness of a sound. The background noise in a living room may be about 30 dB(A); normal conversation about 60 dB(A) at 1 metre; heavy road traffic about 80 dB(A) at 10 metres; the level near a pneumatic drill about 100 dB(A).
$L_{Aeq,T}$	A noise level index called the equivalent continuous noise level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
$L_{max,T}$	A noise level index defined as the maximum noise level recorded during a noise event with a period T. L_{max} is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
$L_{10,T}$	A noise level index. The noise level exceeded for 10% of the time over the period T. L_{10} can be considered to be the "average maximum" noise level. Generally used to describe road traffic noise. $L_{A10,18h}$ is the A –weighted arithmetic average of the 18 hourly $L_{A10,1h}$ values from 06:00-24:00.
$L_{90,T}$ or Background Noise Level	A noise level index. The noise level exceeded for 90% of the time over the period T. L_{90} can be considered to be the "average minimum" noise level and is often used to describe the background noise.
LOAEL	Lowest Observed Adverse Effect Level. This is the noise level above which adverse effects on health and quality of life can be detected.
Night-time	The period 23:00-07:00 hours.
NOEL	No Observed Effect Level. This is 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.
Noise Indices	Noise levels usually fluctuate over time, so it is often necessary to consider an average or statistical noise level. This can be done in several ways, so a number of different noise indices have been defined, according to how the averaging or statistics are carried out.
SOAEL	Significant Observed Adverse Effect Level. This is the level above which significant adverse effects on health and quality of life occur.
Sound Pressure	Sound, or sound pressure, is a fluctuation in air pressure over the static ambient pressure.
Sound Pressure Level, L_p	The sound pressure level, L_p is the sound pressure relative to a standard reference pressure of 20µPa ($20x10^{-6}$ Pascals) on a decibel scale.

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DRAFT

Report

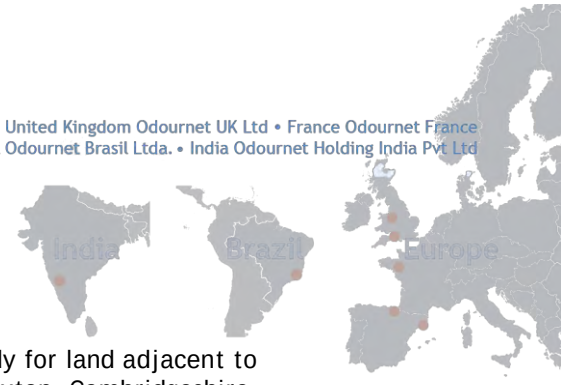
Odour impact assessment study for land adjacent to sewage treatment works in Foxton, Cambridgeshire

Client: Axis Land Partnerships
Eaton Court, Maylands Avenue,
Hemel Hempstead
Hertfordshire, HP2 7TR

Report number: AXIS19A_04_DRAFT

Project code: AXIS19A

Date: 3rd September 2019 (September 2019)



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project code: AXIS19A

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Paul Ottley, principal consultant

date: 3rd September 2019

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Executive Summary

Odournet UK Ltd were commissioned by Axis Land Partnerships Ltd to undertake an odour impact assessment for proposed development land which is located adjacent to an Anglian Water sewage treatment works (STW) in Foxton, Cambridgeshire. The overall aim of the study was to determine the extent to which odours from the STW are likely to pose a risk of odour impact on the proposed development land.

The specific scope of the study was as follows:

1. To liaise with Anglian Water and review the current STW configuration and operations and define the scope of the odour survey.
2. To undertake an odour survey and define odour emission estimates for each element of the treatment process at the STW.
3. To undertake odour dispersion modelling of the STW under the current operational conditions and assess the extent of potential odour impact risk across the development land.

An odour impact assessment was undertaken using an approach based on assessment techniques that are presented within guidance published by the Environment Agency[1] and the Institute of Air Quality Management (IAQM)[2]. On-site measurement data was collected in July 2019 and this was supplemented with data collected by Odournet at works of a similar size and configuration to Foxton STW, and with information provided by Anglian Water. Dispersion modelling was used to assess how odours from the works are likely to disperse and to predict odour exposure levels across the development site.

The study was undertaken by specialist consultants drawn from Odournet's UK consultancy team which has extensive experience (in excess of 20 No. years) in assessing the odour impact of sewage treatment operations, including those of a comparable size and configuration to Foxton STW.

The key findings of the study are summarised as follows:

1. A range of activities were identified at Foxton STW that have the potential to generate odorous emissions. These include processes within the preliminary treatment, primary treatment, secondary treatment and sludge handling stages of the works.
2. Under the current operational conditions at the works the estimated total time weighted summer odour emission is approximately 5,500 ou_E/s. Of these emissions approximately 53% are released from the sludge handling operations, 30% from the preliminary treatment stage, 10% from the secondary treatment, 6 % from primary treatment, 1% from the humus tanks and the remaining 1% from the non-operational storm tank. The two largest individual contributors to emissions from the works are the new sludge holding tank and the sludge transfer well (both assumed to be in constant use for this assessment), which together account for approximately 49% of the total time weighted emissions.
3. Emissions from Foxton STW are predicted to result in odour exposure levels across the proposed development land that range from below $C_{98,\ 1\text{-hour}} = 3\ ou_E/m^3$ to greater than $C_{98,\ 1\text{-hour}} = 5\ ou_E/m^3$. The highest exposure levels are predicted in locations adjacent to the STW boundaries. The areas of the proposed development land where exposure levels are predicted to exceed $C_{98,\ 1\text{-hour}} = 3\ ou_E/m^3$ are at risk of odour impact.

[1] IPPC H4 Technical Guidance Note "H4 Odour Management", published by the Environment Agency, March 2011.

[2] Guidance on the assessment of odour for planning, published by IAQM: April 2014, reissued July 2018.

A reduction in odour emissions from the STW, and impact risk across the development site, could in principal be achieved through the application of cover and treat odour mitigation measures to the open sludge holding tank and transfer well. Site operational staff have however indicated that the transfer well may be taken out of use in the future however.

Table of Contents

1 Introduction and scope

1.1 Introduction

Odournet UK Ltd were commissioned by Axis Land Partnerships Ltd to undertake an odour impact assessment for proposed development land which is located adjacent to an Anglian Water sewage treatment works (STW) in Foxton, Cambridgeshire. The overall aim of the study was to determine the extent to which odours from the STW are likely to pose a risk of odour impact on the proposed development land.

The specific objectives of the study were as follows:

1. To liaise with Anglian Water and review the current STW configuration and operations and define the scope of the odour survey.
2. To undertake an odour survey and define odour emission estimates for each element of the treatment process at the STW.
3. To undertake odour dispersion modelling of the STW under the current operational conditions and assess the extent of potential odour impact risk across the development land.

An odour impact assessment was undertaken using an approach based on assessment techniques that are presented within guidance published by the Environment Agency[3] and the Institute of Air Quality Management (IAQM)[4]. The on-site measurement data was supplemented with data collected by Odournet at works of a similar size and configuration to Foxton STW, and with information provided by Anglian Water.

This report provides the findings of this assessment.

1.2 Structure of report

The report is structured as follows:

- Section 1 outlines the scope of the assessment.
- Section 2 describes the methodology undertaken to conduct the assessment.
- Section 3 provides an overview of current site operations and the proposed development site
- Section 4 identifies the odour sources associated within Foxton STW under the current operational conditions.
- Section 5 presents the results of the odour survey.
- Section 6 summarises the assumptions applied to define emissions from the odour sources at the works.
- Section 7 reviews the odour impact of Foxton STW on the proposed development land.
- Section 8 summarises the findings of the study.

Supporting information is provided in the Annex.

[3] IPPC H4 Technical Guidance Note "H4 Odour Management", published by the Environment Agency, March 2011.

[4] Guidance on the assessment of odour for planning, published by IAQM: April 2014, reissued July 2018.

1.3 Quality Control and Assurance

Odournet's odour measurement, assessment and consultancy services are conducted to the highest possible quality criteria by highly trained and experienced specialist staff. All activities are conducted in accordance with quality management procedures that are certified to ISO9001 (Certificate No. A13725).

All sensory odour analysis and odour sampling services are undertaken using UKAS accredited procedures (UKAS Testing Laboratory No. 2430) which comply fully with the requirements of the international quality standard ISO 17025: 2005 and the European standard for olfactometry EN13725: 2003. Where required, Odournet are accredited to conduct odour sampling from stacks and ducts in accordance to ISO 17025: 2005 and EN13725: 2003 under the MCERTS scheme. Odournet is the only company in the UK to have secured UKAS accreditation for all elements of the odour measurement and analysis procedure. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

The Odournet laboratory is recognised as one of the foremost laboratories in Europe, consistently out performing the requirements of the British Standard for Olfactometry in terms of accuracy and repeatability of analysis results.

2 Description of approach

2.1 Site review

A site visit was undertaken to the sewage treatment works on 8th May 2019, in the company of Anglian Water's odour specialist. The aim of the visit was to establish the current STW configuration and operations and identify all potential sources of odour.

2.2 Odour survey

An odour sampling program was conducted at the works on 17th July 2019 using Odournet's UKAS accredited procedures which comply fully with the requirements of the international quality standard ISO 17025: 2005[5] and the European standard for olfactometry BS EN 13725: 2003[6].

Samples were collected in triplicate from the locations defined in table 1 below.

Table 1: Odour sampling locations

Stage of treatment process	Process/odour source
Preliminary	Inlet balance tank
Primary	Primary settlement tank
Secondary	Filter bed
	Filter distribution chamber
	Humus tank
Sludge	Sludge storage tank

The collected samples were transported to the Odournet UK laboratory in Bristol for the following analysis:

- Determination of the odour concentration in terms of European odour units in accordance with the British Standard for Olfactometry BS EN 13725: 2003. The analysis was conducted using Odournet's internal quality management procedures which are accredited by the UK accreditation services (UKAS) under certificate No. 2430.
- Determination of the hydrogen sulphide concentration using a calibrated Jerome gold film analyser.

During the survey the ambient temperature and weather conditions were recorded. All sources were sampled following a period of dry weather conditions (3 days prior with less than 5mm of rainfall).

2.3 Estimation of emissions

The results of the odour survey were used alongside information obtained during the site audit and reference odour emissions data held within Odournet's data library (and additional information provided by Anglian Water), to define odour emission rates for each stage of the sewage treatment process. Odournet's odour emissions data has been collected at UK sewage treatment works (including those of a comparable size and design to Foxton STW) over a period in excess of 20 years and allows robust and defensible odour emission rates to be defined.

In defining emissions from each area of the works, the following factors were considered:

[5] ISO/IEC 17025:2005, General requirements for the competence of testing and calibration laboratories.

[6] BS EN 13725:2003, Air quality - Determination of odour concentration by dynamic olfactometry.

- The dimensions and release height of each odour source.
- The frequency of use of each aspect of the plant.
- The potential effects of sludge/sewage turbulence.

2.4 Odour dispersion modelling

2.4.1 Assessment of odour impact

On the basis that odour annoyance or 'nuisance' is a symptom that develops through intermittent exposure to odours over extended time periods (see Section 2.4.2 below), the study focused on assessing the long-term odour exposure levels which may occur across the proposed development land under the current operational conditions.

This assessment was performed using mathematical atmospheric dispersion modelling techniques which provided a statistical analysis of the odour exposure levels that are likely to occur around the site. The model was run using five separate years of meteorological data (2012 - 2016), and the worst case results for each specific receptor from across the five years were used to create an overall worst case model output.

Meteorological data from Cambridge International Airport was used following a review of the available data. The output of the model was presented as isopleths of equal odour concentration and plotted on a plan of the area surrounding the STW.

The dispersion modelling was conducted using the US Environmental Protection Agency (US EPA) AERMOD dispersion model (version 8.1). The model was run in accordance with guidance issued by the US EPA and the Environment Agency. Suitable meteorological data was used by the model to simulate the dispersion and dilution effects generated by the atmosphere. Data describing the topography of the local area was obtained from Ordnance Survey. The locations of the odour sources at the STW were defined from maps of the site obtained from aerial imagery, as well as notes and photographs from the site audit.

The model was run to investigate the odour exposure levels in the potential development land surrounding the STW which are predicted to be generated from the STW under the current operational regime.

2.4.2 Odour exposure criteria

In general terms, odour annoyance is recognised as a symptom that develops as a result of intermittent but regular exposure to odours that are recognisable and have an offensive character. The key factors that contribute to the development of odour annoyance can be usefully summarised by the acronym FIDOL:

- Frequency of exposure.
- Intensity or strength of exposure.
- Duration of exposure.
- Offensiveness.
- Location sensitivity.

In acknowledgement of these factors, a number of odour impact criteria have been developed that enable the odour impact risk of facilities to be predicted using dispersion modelling techniques. These criteria are generally defined in terms of a minimum concentration of odour (reflecting the intensity/strength element of FIDOL) that occurs for a defined minimum period of time (reflecting

duration and frequency element of FIDOL) over a typical meteorological year. The concentration element of these criteria can be increased or lowered to reflect variations in the offensiveness of the odours released from a specific type of facility, and the sensitivity of nearby sensitive locations.

There are currently a range of odour criteria applied in the UK to attempt to gain an insight into the probability of odour annoyance developing at a given location. However, there is no firm consensus on which odour impact criteria should be applied for sewage treatment works and the issue is currently a matter of debate.

In the UK, odour impact criteria are generally expressed in terms of a European odour unit concentration that occurs for more than 2% of the hours of a typical meteorological year and have been designed for application to permanent residential properties, which are considered to be the most sensitive from an impact risk perspective.

Historically, the most commonly applied criterion from this perspective is the 'Newbiggin criterion'. This criterion was originally introduced into a public inquiry for a new sewage works at Newbiggin-by-the-sea in 1993, and equates to an odour exposure level of 5 European odour units per cubic meter ($C_{98,\ 1\text{-hour}} > 5\ ou_E/m^3$). The Newbiggin criterion has been successfully applied during numerous planning and odour nuisance assessment studies since 1993 for sewage, waste, food and a range of other industrial and agricultural activities.

Since 2002, a range of indicative odour annoyance criteria have also been applied to assess odour impact risk from residential properties, which have supplemented the use of the Newbiggin criterion. These criteria were introduced in the Horizontal Guidance Note for Odour Management H4 issued by the Environment Agency[7] and define three different levels of exposure at which odour impact or annoyance could potentially be expected to occur, for odours with high, moderate and low offensiveness. The indicative criteria are presented in the table below:

Table 2: Odour impact criteria

Relative offensiveness	Indicative criterion	Typical processes
Most offensive	1.5 ou_E/m^3 98th percentile (hourly average)	Processes involving decaying animals or fish remains; septic effluent or sludge; biological landfill odours
Moderately offensive	3 ou_E/m^3 98th percentile (hourly average)	Intensive livestock rearing; sugar beet processing; fat frying (food processing); well aerated green waste composting
Less offensive	6 ou_E/m^3 98th percentile (hourly average)	Brewery; coffee roasting; confectionary; bakery

Odour guidance published by DEFRA in March 2010[8] also refers to these criteria but in less specific terms. The guidance does not state which criterion should be applied for assessing impact but does suggest that typical criteria fall within the range of $C_{98,\ 1\text{-hour}} = 3\ ou_E/m^3$ to $C_{98,\ 1\text{-hour}} = 5\ ou_E/m^3$. Similarly, guidance published by the Institute of Air Quality Management (IAQM)[9] in May 2014 and reissued in July 2018 also refers to these criteria. This guidance does however state that odour impact may occur between $C_{98,\ 1\text{-hour}} = 1\ ou_E/m^3$ and $C_{98,\ 1\text{-hour}} = 10\ ou_E/m^3$ and that professional judgement should be applied to determine criteria on a case by case basis by considering the underlying science, sensitivity of local receptors and developing case law.

[7] IPPC H4 Technical Guidance Note "H4 Odour Management", published by the Environment Agency, March 2011.

[8] Odour Guidance for Local Authorities, published by DEFRA, March 2010 (now revoked)

[9] Guidance on the assessment of odour for planning, published by IAQM: April 2014, reissued July 2018.

There is currently some debate as to which odour criteria is the most appropriate for assessing the risk of impact of odorous industries such as sewage treatment, and to what extent the criteria are able to predict the occurrence of odour annoyance for different odour types. Whilst there appears to be a substantial body of evidence to support the Newbiggin-by-the-Sea impact criterion for assessing the development of odour annoyance from the sewage sector, the availability of such evidence for the EA criteria is currently somewhat lacking. There is therefore a developing view within the UK odour community that the most stringent EA criteria (i.e. $C_{98,\ 1\text{-hour}}$ = 1.5 ou_E/m^3) may represent an overly cautious standard in many cases even for highly offensive odours.

Odournet's general experience based on assessment of odours which could generally be classified as moderate to highly offensive (e.g. odours from waste water and sludge handling operations) generally supports this view, and indicates that odour annoyance is a symptom that is less likely to develop at exposure levels below $C_{98,\ 1\text{-hour}}$ = 3 ou_E/m^3, and is more likely to develop at levels between $C_{98,\ 1\text{-hour}}$ = 3 and 5 ou_E/m^3, with the risk of annoyance increasing at higher exposure levels. However, the possibility of occurrence of adverse odour impact and complaints at odour exposure levels below $C_{98,\ 1\text{-hour}}$ = 3 ou_E/m^3 cannot be completely excluded.

This observation is supported to some extent by the findings of recent legal cases relating to odours from sewage treatment works (and a policy statement issued by the Chartered Institute of Water and Environmental Management) as indicated below, although from review of these it is clear that the use of the most stringent criteria EA cannot necessarily be discounted.

- Appeal by Sherborne School, CRUK, CLIC Sargent, Mencap and British Heart Foundation against North Dorset District Council (January 2016). The District Council originally refused outline planning permission for the erection of homes on land in proximity to Gillingham sewage treatment works on the basis that the proposed development would have an adverse impact on the general amenity of the future occupants due to odours from the sewage treatment works. Odour dispersion modelling was undertaken on behalf of the appellant, and the inspector concluded that "the appropriate parameter to apply in this case is the 3 ou_E/m^3 contour line".

- Appeal by Abbey Homes against St Edmundsbury Borough Council (March 2012). The Borough Council originally refused planning permission for the erection of 101 dwellings on land between Upthorne Road and Hepworth Road, Stanton, Suffolk, for reasons including the proximity of the site to an existing small rural sewage treatment works and the potential effects on the living conditions of future residents of the dwellings. On the basis of odour dispersion modelling submitted by experts acting for both parties, the inspector considered $C_{98,\ 1\text{-hour}}$ 3 - 5 ou_E/m^3 an appropriate threshold, allowed the appeal and planning permission was granted.

- Appeal against Corby Borough Council (2012). This appeal concerned land at Ashley Road, Middleton, Leicestershire. The inspector concluded in this case "I believe that it is reasonable to take account of the 1.5 ou_E/m^3 contour map in determining odour impact. In my view areas subject to such concentrations are unlikely to provide a reasonable permanent living environment."

- Appeal by Lakeland Leisure Ltd. against Allerdale Borough Council, 2012. This appeal concerned the development of dwellings in Cockermouth, Cumbria in the vicinity of a sewage treatment works. The inspector concluded that development within the area predicted to experience odour exposure levels of $C_{98,\ 1\text{-hour}}$ = 3 ou_E/m^3 or less would be appropriate due to the anticipated medium offensive nature of the odours from the sewage works.

- Thames Water vrs Dobson 2011. This nuisance action was brought against Thames Water Mogden Sewage Treatment Works by a group of residents claiming odour nuisance caused by this large municipal sewage works in London. The inspector concluded that he would be reluctant to

find nuisance if the modelled odour concentration was only $C_{98,\ 1\text{-hour}} > 1.5\ ou_E/m^3$ but as the odour concentration rises to $C_{98,\ 1\text{-hour}} = 5\ ou_E/m^3$ he considered that this was the area where nuisance from the works would start and that by the time that $C_{98,\ 1\text{-hour}} > 5\ ou_E/m^3$ or above is reached nuisance would certainly be established.

- Appeal by JS Bloor (Northampton) Ltd 2010. This appeal concerned a proposed residential development on land near an existing sewage treatment works in Leighton Linslade. The inspector noted that the water company used a standard of $C_{98,\ 1\text{-hour}} > 5\ ou_E/m^3$ which they indicated would be a "concentration level above which odour might be a potential nuisance", and stated that the approach seemed reasonable and had been accepted at a previous appeal.
- Extract from CIWEM policy statement. CIWEM issued a position statement on odour in 2012 stating that the following framework is the most reliable that can be defined on the basis of the limited research undertaken in the UK at the time of writing:
    - $C_{98,\ 1\text{-hour}} > 10\ ou_E/m^3$ - complaints are highly likely and odour exposure at these levels represents an actionable nuisance;
    - $C_{98,\ 1\text{-hour}} > 5\ ou_E/m^3$, - complaints may occur and depending on the sensitivity of the locality and nature of the odour this level may constitute a nuisance;
    - $C_{98,\ 1\text{-hour}} < 3\ ou_E/m^3$, - complaints are unlikely to occur and exposure below this level are unlikely to constitute significant pollution or significant detriment to amenity unless the locality is highly sensitive or the odour highly unpleasant in nature.

On this basis, the assessment of risk to the development land has been conducted by consideration of the $C_{98,\ 1\text{-hour}} = 3\ ou_E/m^3$ and $5\ ou_E/m^3$ criteria.

It is however very important to note that the choice of criteria for planning and development purposes would ultimately be defined on the basis of the risk appetite of the parties involved.

3 Overview of operations and proposed development

3.1 Locations of works and development site

Foxton sewage treatment works is located in the rural town of Foxton, bordering the towns of Barrington and Shepreth, to the south of Cambridge.

Figure 1 below shows the STW situated within the development land (extents supplied by Axis). The STW is outlined in red and the potential development land is outlined in blue.

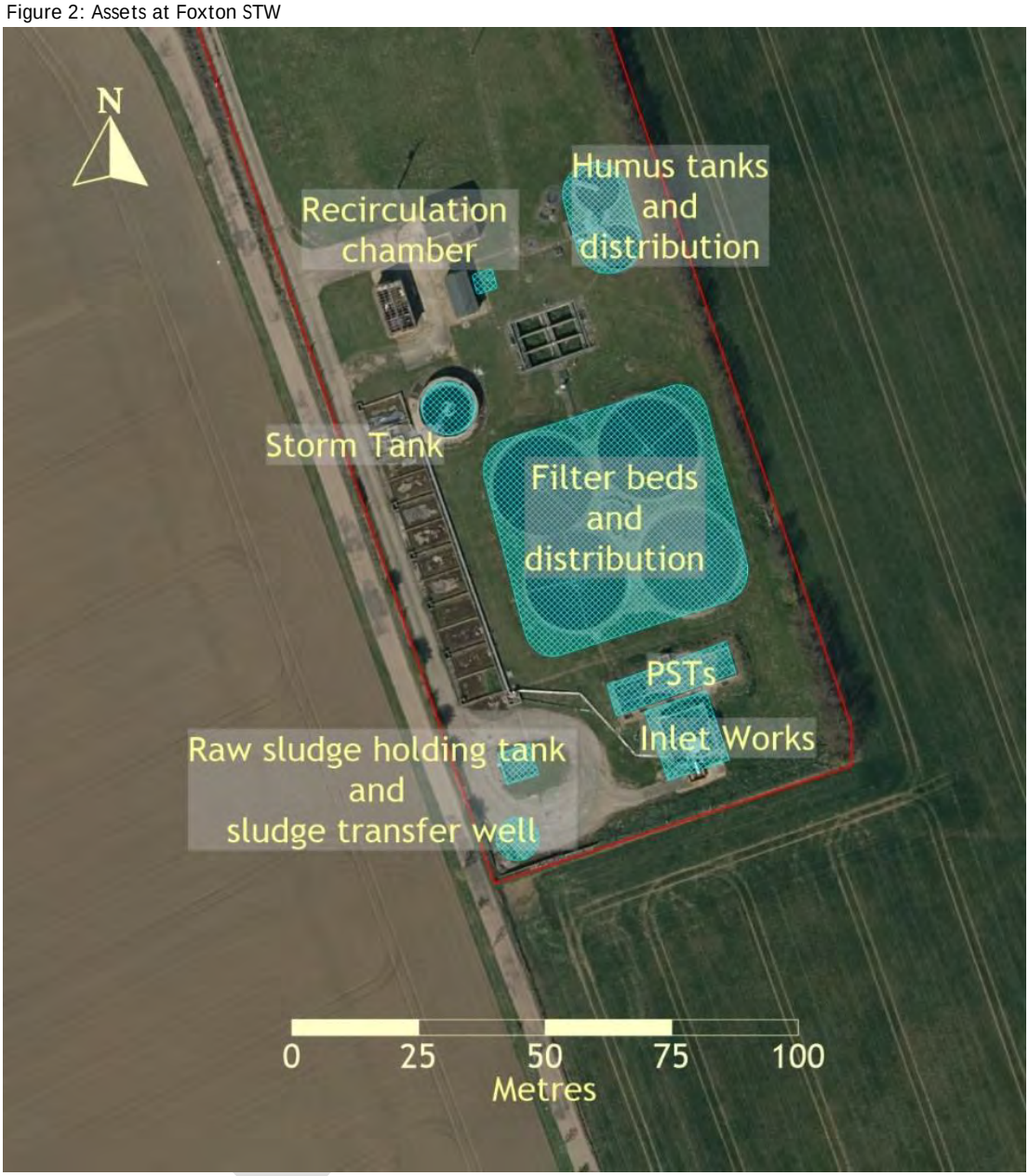
Figure 1: Map of the STW and development land

3.2 Overview of current sewage treatment works operation

Foxton sewage treatment works serves a population equivalent of approximately 5,800 with an average incoming flow rate of 14 l/s with a maximum discharge recorded in the past year (2018) of 50 l/s. The works comprises of preliminary treatment (for screenings removal), primary treatment (for sludge settlement), secondary treatment and sludge storage assets.

The layout of the STW is shown in Figure 2.

Figure 2: Assets at Foxton STW



3.2.1 Sewage treatment

Incoming sewage received at the works discharges into the inlet reception chamber where (operationality permitting) it is fed through an enclosed screening chamber for the removal of screenings/rags before being passed through 4 No. balance tanks. Removed screenings are deposited into a skip prior to removal from site for disposal.

A non-operational storm tank was previously used during times of high influent flows, however discussions with Anglian Water staff during the audit indicated that this tank is no longer in operational

use. However due to the retention of material within the disused tank (aged storm materials and rainwater) it is still believed to contribute to site odours to some extent.

From the inlet works balance tanks the influent is gravity fed to into 4 No. rectangular PSTs which cause sludge to be removed from the flow and settled in the tank bases.

Following primary treatment, the settled sewage combines within a filter bed distribution chamber where flows are split and conveyed to 4 No. filter beds where biological treatment takes place.

The flows from the filter beds then recombine and pass through 2 No. humus tanks before the treated effluent is discharged to the River Rhee.

3.2.2 Sludge treatment

Sludge settled within the PSTs is transferred via 5 No. de-sludge pumps into an open raw sludge holding tank via enclosed pipework. An open sludge transfer well is also in use, although site operators indicated that this may be taken out of use in the future.

Solid materials which accumulate in the base of the inlet balance tanks is periodically removed via 2 No. open desludging chambers and pumped to the raw sludge holding tank.

Indigenous raw sludge from the humus tanks is recirculated (via an open recirculation chamber and underground pipework) for settlement within the PSTs.

Sludge from the site is periodically removed from the site by tankers.

4 Identification of odour sources

4.1 Overview of the mechanisms for odour generation from sewage treatment operations

The generation of odour from the processing of sewage is primarily associated with the release of odorous Volatile Organic Compounds (VOCs) that are generated as a result of the anaerobic breakdown of organic matter by micro-organisms. Anaerobic breakdown starts within the human bowel and may continue within the sewerage network and treatment works if conditions (i.e. a lack of oxygen) allow.

The key objectives of the sewage treatment process are to remove solid organic matter which is responsible for the generation of the majority of sewage odours and to provide treatment to remove any residual contaminants from the wastewater so that it can be returned back into the environment.

Since the main source of odour and VOCs is the solid organic matter, the most intense and offensive odours tend to be generated from the operations involving the handling of sludge i.e. the processes applied to dewater, treat and store raw sludge. These processes are generally considered to present the greatest risk of odour impact offsite, unless adequate controls are put in place. Depending upon the quality of the sewage presented to the works, the aspects of the treatment process involved in the handling of raw sewage (e.g. preliminary and primary treatment stages) may also generate significant levels of offensive odours.

The rate of odour release from sewage and sludge sources is primarily dependent upon temperature of the material, and the surface area exposed to the atmosphere. As a result, odorous emissions from sewage treatment operations tend to be highest during the summer months. Furthermore, activities that lead to increase in the surface area of odorous material exposed to the atmosphere (e.g. due to turbulence generated by sewage handling processes and agitation of sludge) will inevitably lead to an increase in the magnitude of odour released.

4.2 Identification of sources of odour emission.

On the basis of the findings of the site audit and information provided by Anglian Water, a range of odour sources were identified at Foxton STW. These sources are summarised in Table 3 below.

Table 3: Identification of odour sources

Stage of treatment	Source	Nature of odorous material/level of enclosure	Frequency and duration of release
Preliminary treatment	Inlet reception chamber	Raw sewage - open chamber	Continuous
	Inlet screen chamber	Raw screening - enclosed chamber	Continuous
	Inlet balance tanks (4)	Raw sewage - open tanks	Continuous
	Screening skip	Screenings/rag - open skip	Continuous
Storm water handling	Storm tank (non-operational)	Storm material/rain water - open tank	Continuous
Primary treatment	Primary settlement tanks (4)	Raw sewage - open tanks	Continuous
Secondary treatment	Filter distribution chamber	Settled sewage - open chamber	Continuous
	Filter beds (4)	Partially treated sewage - open beds	Continuous
	Filter effluent channel	Partially treated sewage - open channel	Continuous
	Humus tank distribution chamber	Partially treated sewage - open chamber	Continuous
	Humus tanks (2)	Partially treated sewage - open tanks	Continuous

Sludge handling and treatment	Inlet balance tanks desludge chamber (2)	Raw sludge - open chambers	Intermittent - only 1 in operation at a time for 2 hours per day
	Raw sludge holding tank	Raw sludge - open tank	Continuous
	Sludge transfer well	Raw sludge - open well	Continuous
	Humus tank desludging chamber	Secondary treatment sludge - open tank	Continuous
	Recirculation chamber	Secondary treatment sludge	Continuous
	Sludge tanker	Raw sludge - enclosed tanker (emissions from displaced air)	Intermittent - operational for 1 hour 20 minutes/ week - 3-4 tanker/ week

5 Odour survey results

5.1 Olfactometry and hydrogen sulphide measurement results

The data obtained from the odour survey conducted on the 16th July 2019 is summarised in Table 4 below. The results are presented in full in Annex B.

Table 4: Emission measurements from open sources

Source	Measured geomean odour emission rate ($ou_E/m^2/s$)	Measured average H_2S emission rate ($\mu g/m^2/s$)
Inlet balance tank	16.0	<LLOD
Primary settlement tank	1.0	<LLOD
Filter distribution chamber	0.9	<LLOD
Filter bed	0.4	<LLOD
Humus tank	0.3	<LLOD
Sludge transfer well	50.5	0.010

LLOD = ≤0.005 $\mu g/m^3$

5.2 Discussion

Review of the odour measurement results presented in the table above prompts the following observations:

- The odour emission rate measured from the influent at the inlet works is indicative of a relatively low odour influent, which can be typically expected from a sewage treatment works of this size. The low hydrogen sulphide emission rates measured across the sewage treatment assets is likely to be associated with the anticipated relatively fresh (non-septic) nature of influent received.
- The odour emission rates measured from the PSTs, filter distribution chamber, filter bed and humus tanks fall at the middle to lower end of the normal range of emissions which are typically observed from PSTs, filter effluent and humus tanks at STWs of a similar size and configuration.
- The odour emission rate measured from the surface of the sludge transfer well was elevated in comparison to the other sources onsite, as were the hydrogen sulphide measurements. This is an expected result as odour and hydrogen sulphide emissions from sludge operations tend to be greater than those from the processes which handle raw or treated sewage.

6 Estimation of odour emissions

6.1 Assumptions applied to odour emissions

A summary of the key assumptions applied to derive emission estimates are presented below:

- The odour emission rate for the majority of open odour sources for summer conditions were calculated by multiplying the plan area of the treatment process by the estimated odour emission rate. Emission rates for sources not sampled by Odournet were estimated using information obtained during the site audit as well as reference odour emissions data held within Odournet's data library and information provided by Anglian Water.

Table 5: Identification of odour sources.

Stage of treatment	Source	Estimated odour emission rate ($ou_E/m^2/s$)	Turbulence factors applied
Preliminary treatment	Inlet - reception chamber	16	6
	Inlet - screen chamber	*8	3
	Inlet - balance tanks (4)	16	1-6
	Inlet - screening skip	35	1
Storm water handling	Storm tank (non-operational)	0.5	1
Primary treatment	Primary settlement tanks (4)	3	1
Secondary treatment	Filter distribution chamber	0.9	1
	Filter beds (4)	0.4	1
	Filter effluent channel	1	1
	Humus tank distribution chamber	0.4	12
	Humus tanks (2)	0.3	1
Sludge handling and treatment	Inlet - balance tank desludge chamber (1)	50.5	12
	Raw sludge holding tank	50.5	1
	Sludge transfer well	50.5	1
	Humus tank desludging chamber	8	1
	Recirculation chamber	8	1

*includes 50% abatement provided by non-extracted covers

- For turbulent sources, a multiplier was applied to the emission rate to reflect the elevation in emissions that occurs due to the increase in surface area exposed to the atmosphere. The following turbulence factors were used which are based on Odournet's broader experience in the wastewater sector and the findings of research:

Table 6: Turbulence factors

Level of turbulence	Turbulence multiplier
Low	3
Medium	6
High	12
Extreme	20

- Of the two inlet balance tank desludge chambers at the works, only one chamber is assumed to be operational for 2 hours each day.
- The enclosure on the inlet works screen chamber is assumed to provide a 50% abatement of odorous emissions.
- It is assumed that the storm tank continuously contains low odorous material (aged storm materials and rainwater)
- It is assumed that the sludge transfer well is in continuous use.
- The emission rates from filling of sludge tankers were estimated assuming an outlet odour concentration of 200,000 ou_E/m^3. 3 No. tankers were assumed to be filled per week, with each 30 m^3 tanker taking approximately 20 minutes to fill.

6.2 Breakdown of estimated emissions

A breakdown of the summer odour emissions generated from each aspect of the sewage treatment process under the current operational conditions is presented in the table below. The emission rates presented in the table have been adjusted to reflect the frequency of occurrence of each odour source, and are thus time weighted.

Table 7: Time weighted emissions from each aspect of the treatment process (summer conditions).

Stage of treatment	Source	Time weighted odour units ($ou_E/m^2/s$)	Time weighted percentage of total emissions (%)	Time weighted percentage of total emissions by treatment stage (%)
Preliminary Treatment	Inlet reception chamber	192	3.5	30.2
	Inlet screen chamber	180	3.3	
	Inlet balance tanks	1130	20.5	
	Screening skip	158	2.9	
Storm water handling	Storm tank (non-operational)	39	0.7	0.7
Primary treatment	Primary settlement tanks	337	6.1	6.1
Secondary treatment	Filter distribution chamber	23	0.4	9.6
	Filter beds	503	9.1	
	Filter effluent channel	8	0.1	
	Humus tank distribution chamber	10	0.2	0.9
	Humus tanks	38	0.7	
Sludge handling and treatment	Inlet balance tanks desludge chambers	114	2.1	52.5

	Raw sludge holding tank	1428	26.0	
	Sludge transfer well	1263	23.0	
	Humus tank desludging chamber	25	0.5	
	Recirculation chamber	24	0.4	
	Sludge tanker	30	0.5	
Total		5,500	100	100

Review of Table 7 above indicates that the total time weighted summer odour emissions from the works are approximately 5,500 ou_E/s.

The emission breakdown indicates that approximately 30% of emissions are generated by the preliminary treatment stage, 1% by the non-operational storm tank, 6% by primary treatment, 10% by the trickling filter stage, 1% by the humus tanks and the remainder (approximately 53%) by the sludge handling processes.

The single largest contributor to site emissions is the new sludge holding tank which accounts for approximately 26% of total time weighted emissions. This is due to the relatively high odour emission rate of the material which is stored within the open tank when in use. Emissions from the sludge transfer well account for approximately 23% of emissions (again due to the odorous nature of the material) and the balance tanks account for approximately 21%, although this is predominantly due to the large surface area and high levels of turbulence within two of the tanks, rather than the odour emission rate of the material in the tank which is relatively low for an inlet works.

7 Dispersion modelling

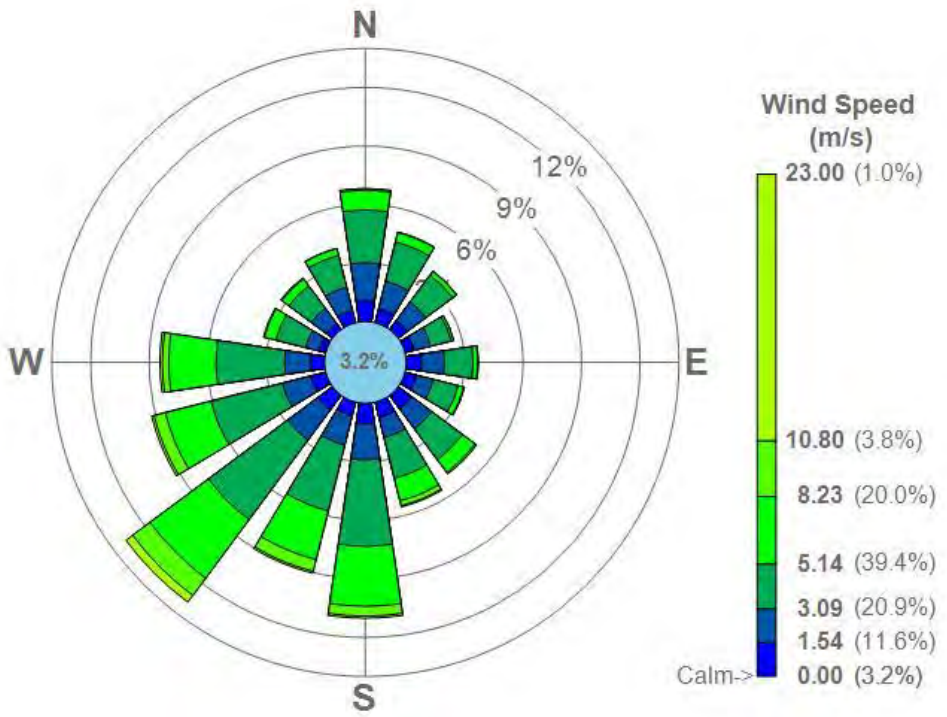
7.1 Dispersion modelling assumptions

The model was applied to visualise the likely extent of impact from the existing site operations in relation to the development site.

The following assumptions have been applied for the dispersion modelling study;

- A review was undertaken of available meteorological data that could potentially be used by the model to simulate the dispersion and dilution effects generated by the atmosphere. It is normal practice to use the most representative meteorological dataset available, and this will be influenced by proximity of the measurement location to the study site, the quality of the data and the representativeness of the surface characteristics of the area surrounding the meteorological station in comparison to the study site (in this case a largely rural location near to a small town).
- On the basis of review of the available meteorological stations, sequential hourly average meteorological data from Cambridge airport meteorological station was utilised for the years 2012, 2013, 2014, 2015 and 2016. Cambridge International Airport is located approximately 13 km to the North East of Foxton STW and is considered to be the most suitable source of data for the study site. The meteorological data was adjusted to reflect the surface characteristics of the study site in accordance with the guidelines issued in the AERMOD User Guide issued by the US EPA. The wind rose for the meteorological data is presented below.

Figure 3: Wind rose of Cambridge International Airport meteorological data 2012-2016



- Data describing the topography of the area surrounding the works was obtained from Ordnance Survey in Landform Panorama™ format.

- A 1km by 1km uniform Cartesian receptor grid was defined for the study area with a receptor spacing of 20m and a receptor height of 1.5m.
- The model was run assuming rural dispersion characteristics.
- The model only considers normal operational occurrences (as discussed with Anglian Water). Short term events such as plant breakdown, maintenance and repair may impact considerably on the odorous emissions from time to time. Such short term variations have not been considered within the model.

7.2 Modelling results

7.2.1 Output of dispersion model

The dispersion model output is presented below. The model was run using five separate years of meteorological data (2012 - 2016), and the worst case results for each specific receptor from across the five years were used to create an overall worst case model output. The model outputs for each of the individual years are presented in Annex C.

The figure presents the isopleths (i.e. lines of equal odour exposure) which correspond to the impact criterion of $C_{98,\ 1\text{-hour}} \geq 3\ ou_E/m^3$ and $C_{98,\ 1\text{-hour}} \geq 5\ ou_E/m^3$. The STW site boundary is shown in red and the extents of the development land are presented in blue.

Figure 4: Output of current baseline dispersion model (worst case output)

7.2.2 Discussion of results

From review of the figure above it is apparent that under the current operational conditions, emissions from Foxton STW are predicted to result in odour exposure levels across the proposed development land that range from below $C_{98,\ 1\text{-hour}}$ = 3 ou_E/m^3 to greater than $C_{98,\ 1\text{-hour}}$ = 5 ou_E/m^3. The highest exposure levels are predicted in locations adjacent to the STW boundaries.

Taking into account the above model output and the discussion of suitable odour impact criteria presented in section 2.4.2 of this report, it can be concluded that the areas of the proposed development land where exposure levels are predicted to exceed $C_{98,\ 1\text{-hour}}$ = 3 ou_E/m^3 are at risk of odour impact.

When reviewing the model output, it should be noted that odour emissions associated with the loading of sludge tankers for offsite export is unlikely to be reflected in the model output due to the very infrequent occurrence (approximately 3 No. tankers per week lasting approximately 20 minutes per tanker) of the operation. On the basis of Odournet's experience, the emissions from the tanker during these times are likely to be high in magnitude and detectable at locations some distance from the STW. However due to the short duration and very infrequent nature of these events the long term odour impact risk associated with this operation is anticipated to be low.

A reduction in odour emissions from the STW could in principal be achieved by the application of cover and treat odour mitigation measures to the open sludge holding tank and transfer well (although site operational staff have indicated that the transfer well may be taken out of use).

8 Summary of findings

The key findings of the study are summarised as follows:

1. A range of activities were identified at Foxton STW that have the potential to generate odorous emissions. These include processes within the preliminary treatment, primary treatment, secondary treatment and sludge handling stages of the works.

2. Under the current operational conditions at the works the estimated total time weighted summer odour emission is approximately 5,500 ou_E/s. Of these emissions approximately 53% are released from the sludge handling operations, 30% from the preliminary treatment stage, 10% from the secondary treatment, 6 % from primary treatment, 1% from the humus tanks and the remaining 1% from the non-operational storm tank. The two largest individual contributors to emissions from the works are the new sludge holding tank and the sludge transfer well (both assumed to be in constant use for this assessment), which together account for approximately 49% of the total time weighted emissions.

3. Emissions from Foxton STW are predicted to result in odour exposure levels across the proposed development land that range from below $C_{98,\ 1\text{-hour}} = 3\ ou_E/m^3$ to greater than $C_{98,\ 1\text{-hour}} = 5\ ou_E/m^3$. The highest exposure levels are predicted in locations adjacent to the STW boundaries. The areas of the proposed development land where exposure levels are predicted to exceed $C_{98,\ 1\text{-hour}} = 3\ ou_E/m^3$ are at risk of odour impact.

4. A reduction in odour emissions from the STW, and impact risk across the development site, could in principal be achieved through the application of cover and treat odour mitigation measures to the open sludge holding tank and transfer well. Site operational staff have however indicated that the transfer well may be taken out of use in the future however.

Annex A Odour sampling and analysis

A.1 Collection of odour samples from sources with no measurable flow

Collection of samples from area sources where there is no measurable flow such as open liquid tanks or channels and piles of sludge cake was conducted using a ventilated canopy known as a 'Lindvall hood'. The canopy was placed on the odorous material and ventilated at a known rate with clean odourless air. A sample of odour was collected from the outlet port of the hood using the 'Lung' principle.

The rate of air blown into the hood was monitored for each sample and used to calculate a specific odour emission rate per unit area per second (E_{sp}) as follows:

- Odour emission rates for sources where a Lindvall sampling hood was used were calculated in odour units per square metre per second ($ou_E/m^2/s$) using the following equation:

  E_{sp} ($ou_E/m^2/s$) = C_{hood} x L x V

  Where:

  C_{hood} is the concentration result from the laboratory analysis.

  V is the flow presented to the hood.

  L is the $\frac{\text{flow path cross section of the hood } (m^2)}{\text{Covered area } (m^2)}$

- Odour emission rates for sources where a sampling sheet was used were calculated in odour units per square metre per second ($ou_E/m^2/s$) by multiplying the geometric mean odour concentration of the samples (from the laboratory analysis) by the air volume flow rate of air from the fan presented under the sheet, and dividing this figure by the area of the sheeted section of material.

A.2 Measurement of odour concentration using olfactometry

Odour measurement is aimed at characterising environmental odours, relevant to human beings. As no methods exist at present that simulates and predicts the responses of our sense of smell satisfactorily, the human nose is the most suitable 'sensor'. Objective methods have been developed to establish odour concentration, using human assessors. A British standard applies to odour concentration measurement:

- BSEN 13725:2003, *Air quality - Determination of odour concentration by dynamic olfactometry.*

The odour concentration of a gaseous sample of odorants is determined by presenting a panel of selected and screened human subjects with that sample, in varying dilutions with neutral gas, in order to determine the dilution factor at the 50% detection threshold (D_{50}). The odour concentration of the examined sample is then expressed as multiples of one European Odour Unit per cubic meter [ou_E/m^3] at standard conditions.

Annex B Odour measurement results

Odour and H_2S measurement results

Table 8: Odour emission measurements from open sources

Source	Measured odour emission rate [$ou_E/m^2/s$]			
	Geomean	S.1	S.2	S.3
Inlet balance tank	16.0	28.8	14.7	9.6
Primary settlement tank	1.0	1.0	1.1	1.1
Filter distribution chamber	0.9	0.8	0.9	1.1
Filter bed	0.4	0.3	0.4	0.4
Humus tank	0.3	0.7	0.2	0.2
Sludge transfer well	50.5	69.5	49.1	37.6

Table 9: Hydrogen sulphide emission measurements from open sources

Source	Measured hydrogen sulphide [$\mu g/m^2/s$]			
	Average	S.1	S.2	S.3
Inlet balance tank	0.003	0.006	0.001	0.001
Primary settlement tank	<LLOD	<LLOD	<LLOD	<LLOD
Filter distribution chamber	<LLOD	<LLOD	<LLOD	<LLOD
Filter bed	<LLOD	<LLOD	<LLOD	<LLOD
Humus tank	<LLOD	<LLOD	<LLOD	<LLOD
Sludge transfer well	0.010	0.016	0.007	0.006

LLOD = ≤0.005 $\mu g/m^3$

Annex C Description of AERMOD dispersion modelling software

AERMOD is a steady-state Gaussian plume model which is designed to assess short-range (up to 50 kilometres) dispersion of air pollutant emissions. The model was developed by the US Environment Protection Agency and the American Meteorological Society. Algorithms within the model consider a number of elements when assessing how pollutants will disperse, including the following:

- Dispersion in both the convective and stable boundary layers;
- Plume rise and buoyancy;
- Plume penetration into elevated inversions;
- Computation of vertical profiles of wind, turbulence, and temperature;
- The urban night-time boundary layer;
- The treatment of building wake effects;
- The treatment of plume meander.

The model has 2 No. important pre-processors, AERMET and BPIPPRIME. AERMET is a meteorological data pre-processor that calculates the atmospheric parameters needed by the dispersion model, such as atmospheric turbulence characteristics, mixing heights, friction velocity, Monin-Obukov length and surface heat flux. Unlike with earlier, more basic dispersion models, vertical profiles of wind, turbulence and temperature are created. BPIPPRIME is a dispersion algorithm used in AERMOD to factor in the effect of turbulence in the wake regions of buildings. BPIPPRIME calculates turbulence intensity and wind fields as a function of the building dimension, these are then used in AERMOD to alter the downwind plume.

Annex D Dispersion model outputs for individual years

Figure 5: Dispersion model output for current operations, 2012 meteorological data

Contours of the areas are presented in which odour concentrations of 3 ou_E/m^3, and 5 ou_E/m^3 are exceeded for more than 175 hours per year.

Figure 6: Dispersion model output for current operations, 2013 meteorological data

Contours of the areas are presented in which odour concentrations of 3 ou_E/m^3, and 5 ou_E/m^3 are exceeded for more than 175 hours per year.

Figure 7: Dispersion model output for current operations, 2014 meteorological data

Contours of the areas are presented in which odour concentrations of 1.5 ou_E/m^3, 3 ou_E/m^3, and 5 ou_E/m^3 are exceeded for more than 175 hours per year.

Figure 8: Dispersion model output for current operations, 2015 meteorological data

Contours of the areas are presented in which odour concentrations of 3 ou_E/m^3, and 5 ou_E/m^3 are exceeded for more than 175 hours per year.

Figure 9: Dispersion model output for current operations, 2016 meteorological data

Contours of the areas are presented in which odour concentrations of 3 ou_E/m^3, and 5 ou_E/m^3 are exceeded for more than 175 hours per year.

TECHNICAL NOTE

Job Name: Station Fields, Foxton

Job No: 47235

Note No: AQ01

Date: 28th January 2020

Prepared By: Kiri Heal, Senior Associate

Subject: **Air Quality Constraints**

Item	Subject
1.	**Introduction** This note addresses the likely environmental constraints with respect to air quality relating to the proposed development at Station Fields, Foxton, located in the administrative boundary of South Cambridgeshire District Council (SCDC).
2.	**Baseline Conditions** The site is located between the villages of Foxton, Barrington and Shepreth. The A10 runs adjacent to the south-eastern boundary. Residential properties are located to the southeast of the site, whilst to the north and west, the area is primarily agricultural. A rail line runs east/west across the site; the rail line is electrified and therefore not considered an issue for air quality. SCDC has declared an Air Quality Management Area (AQMA) in the District due to exceedances of both the annual mean nitrogen dioxide (NO_2) and particulate matter (PM_{10}) objective of 40 µg/m^3. The AQMA is located over 11 km north of the site. Cambridge City Council have also declared an AQMA for exceedances of the NO_2 objective, located in central Cambridge, over 9km northeast of the proposed development site. SCDC undertake air quality monitoring across the district, the closest monitoring site is an NO_2 diffusion tube, located in Harston approximately 2.5 km northeast of the site. Measured annual mean concentrations ranged from 14.4 -17.8 µg/m^3 between 2014 and 2018, well below the objective of 40 µg/m^3. Concentrations at the proposed development site are also expected to be well below the air quality objectives.
3.	**Potential Constraints** Based on a desktop review of the site location, the following potential air quality issues have been identified: • the impact of existing local pollution sources, in particular local road traffic emissions, on the development site itself; and • the impact of the development on the surrounding area, during both the construction and operational phases. The principal air pollutants of concern with respect to the development will be: • NO_2; • fine airborne particles (PM_{10} and $PM_{2.5}$); and • construction dust. The main sources of these pollutants are likely to be a result of road vehicles (NO_2, PM_{10} and $PM_{2.5}$) and construction activities (dust and PM_{10}). Professional experience indicates that other sources of pollutants will not be significant from this type of development.

Item	Subject
	Constraints due to Baseline The site is not located within an AQMA and monitoring of NO_2 concentrations in the area indicate that concentrations are well below the annual mean objectives. In relation to potential constraints due to existing transportation sources, the A10 border the site's southern boundary and is likely to dominate pollutant concentrations within close proximity to the road. Whilst some separation from the A10 to residential properties would be beneficial, it is considered that noise related setbacks would provide adequate protection in relation to air quality. **Constraints due to Potential Development Impacts** When considering the potential impacts of dust during construction, it is standard practice to undertake a qualitative assessment of the risk of dust impacts. Mitigation would be secured by planning condition and with appropriate mitigation in place, the effects of construction dust are not considered to be significant. Operational phase effects will primarily be associated with road traffic emissions, traffic from the proposed development has the potential to impact on existing residential receptors in the vicinity of the site. Impacts at existing receptor locations, particularly in relation to properties in close proximity to the A10 and potentially in the AQMAs within Cambridge, will need to be quantified using detailed dispersion modelling. The incorporation of a wide range of low emission and sustainable transport measures to reduce development related traffic generation is likely to be required to ensure the Site complies with current and emerging planning policies (local and national) and relevant regulations. This should not ultimately constrain the development provided appropriate and adequate measures can be identified. These measures will likely include optimisation of existing infrastructure (such as access to Railway Station), provision of active travel corridors and supporting facilities (sustainable transport hubs), and internalisation of travel requirements (i.e. onsite provision of amenities). Additionally, consideration will need to be given to measures to minimise emissions to air both from individual vehicles (such as through provision of Electric Vehicle charging infrastructure) and onsite heating plant (such as heat-pumps instead of gas fired boilers). The location of sensitive land-uses (i.e. schools and residential) and areas likely to experience high levels of human exposure (i.e. shopping streets, outdoor recreation) away from sources of pollution, and incorporation of green infrastructure will all assist with reducing the potential adverse health effects of exposure to air pollution. A Low Emissions Strategy (LES), detailing the package of measures to help mitigate the impacts of development on local air quality, is likely to be required during the planning application stage. The LES may require financial investments in and contributions to the delivery of onsite or offsite low emission transport projects and plans, including strategic monitoring and assessment activities.
4.	**Next Steps** An air quality impact assessment will be required to accompany the planning application for the development. Quantification of development impacts will be required using the ADMS Roads detailed dispersion model in order to further define the acceptability of air quality impacts from road traffic associated with the development. Mitigation, in the form of a Low Emissions Strategy outlining measures to reduce the air quality impacts of development on local air quality, is likely to be required.

TECHNICAL NOTE

DOCUMENT ISSUE RECORD

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