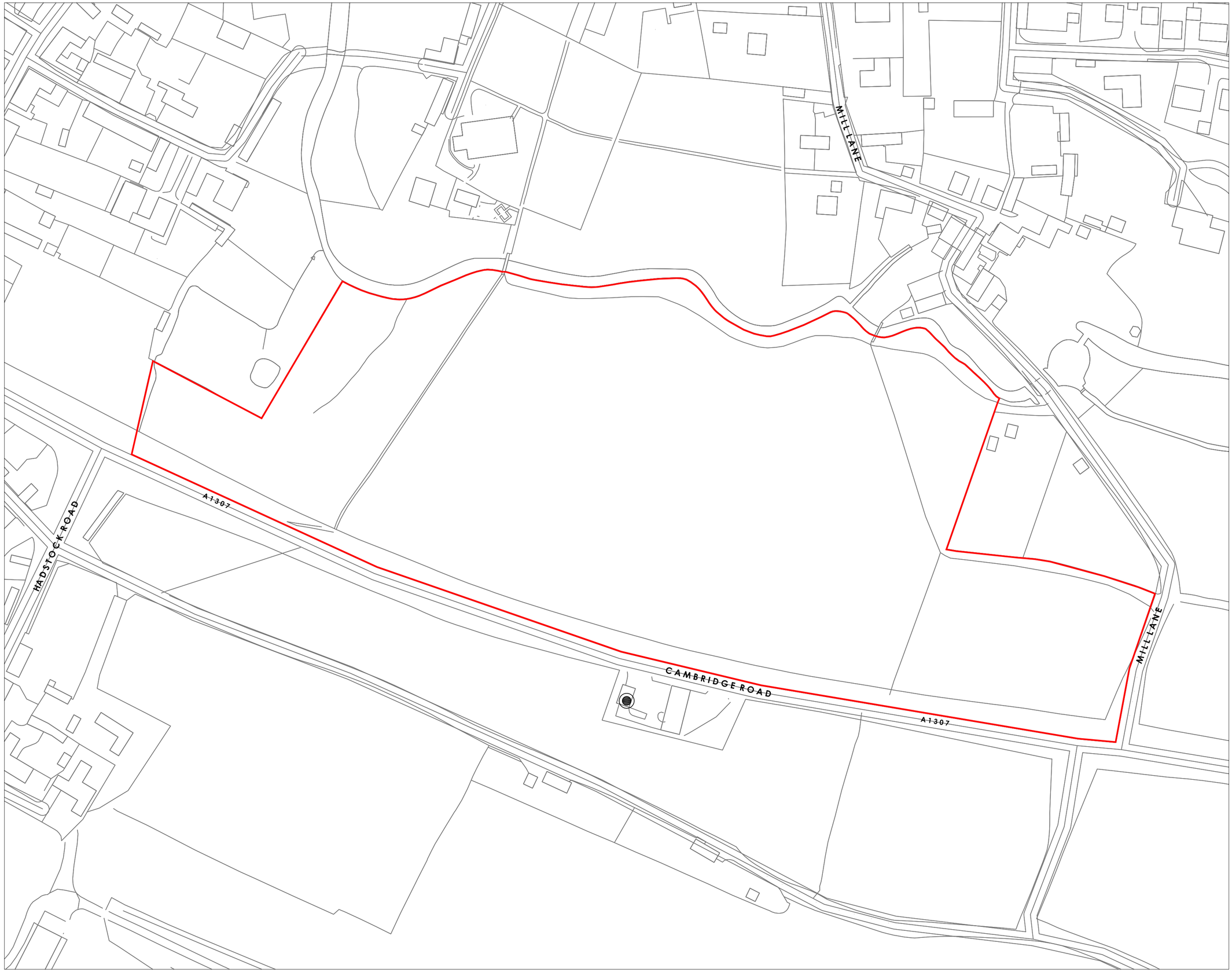
Appendix 1: Site Location Plan



N

0 10 20 30 40 50 m

Site Boundary: **Aprx. 6.80ha**

Rev	Date	By	Description

CSA environmental
Dikes Barns, High Street,
Ashwell, Hertfordshire SG7 5NT
t 01462 743647
e ashwell@csaenvironmental.co.uk
w csaenvironmental.co.uk

Project	Land North of Cambridge Road **LINTON**		
Title	Red Line Site Location Plan		
Client	Taylor Wimpey Strategic Land		
Scale	1:1250 @ A2	Drawn	JC
Date	Dec 2021	Checked	CS
Drawing No.	CSA/5653/108	Rev	A

Appendix 2: Heritage Note

Heritage Note

Land North of Cambridge Road, Linton, October 2021

This heritage note has been prepared by CSA Environmental on behalf of TW Strategic Land, in relation to land north of Cambridge Road, Linton (hereafter the 'Site'). It provides an initial review of potential heritage constraints and opportunities in relation to archaeology, built heritage and historic landscape.

1.0 Introduction

1.1 The Site comprises a field to the south of Linton. It abuts, and at its western extent is marginally within, Linton Conservation Area.

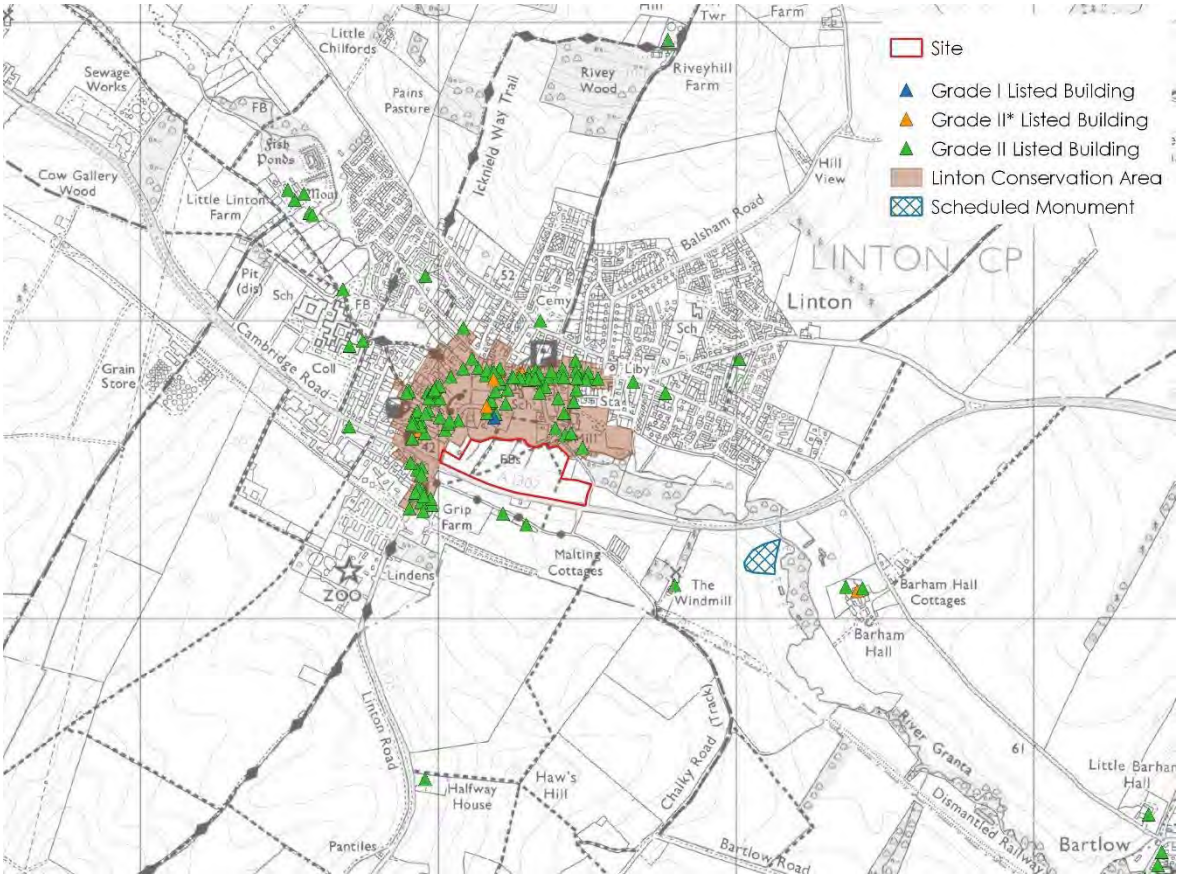


Plate 1: Site Location and Designated Heritage Assets (after NHLE/South Cambridgeshire District Council).

2.0 Methodology

2.1 This note has been informed by the following sources:

- The National Heritage List for England (NHLE), maintained by Historic England, for records of designated heritage assets (excluding conservation areas).
- The Historic Environment Record for details of recorded heritage and previous archaeological works.
- The Local Authority website for information on conservation areas.
- Selected online sources including historic Tithe and Ordnance Survey mapping.
- A site visit undertaken 15 September 2021.

2.2 This note is not intended as a full desk-based assessment or detailed setting assessment.

3.0 Legislation and Guidance

3.1 The Planning (Listed Buildings and Conservation Areas) Act 1990 (the 1990 Act) sets out legislation relating to listed buildings and conservation areas. With regards to listed buildings, Section 66 (1) of the 1990 Act states that:

"*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, 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*".

3.2 With regards to conservation areas, Section 72 (1) of the 1990 Act states that:

"*…with respect to any building or other land in a conservation area…special attention shall be paid to the desirability of preserving or enhancing the character or appearance of that area*".

3.3 With regards to potential impacts to heritage assets key relevant paragraphs of the NPPF comprise:

"*199. 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.*

200. Any harm to, or loss of, the significance of a designated heritage asset…should require clear and convincing justification…

201. Where a proposed development will lead to substantial harm (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 benefit…

202. 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…

203. The effect of an application on the significance of a non-designated heritage asset should be taken into account in determining the application…"

4.0 Designated Heritage Assets

4.1 The Site abuts, and at its far western extent is partially within, Linton Conservation Area (Plate 1, Plate 2). Listed buildings within the conservation area, close to the Site, include the Grade I listed Parish Church of St Mary the Virgin (NHLE ref. 1162094), as well as the Grade II listed Linton Mill (NHLE ref. 127651). Other designated heritage assets in the vicinity include Grade II listed cottages, The Boundaries and The Kyles, on Long Lane to the south of the Site (NHLE refs. 1331184 and 1127644). These are discussed in further detail below.

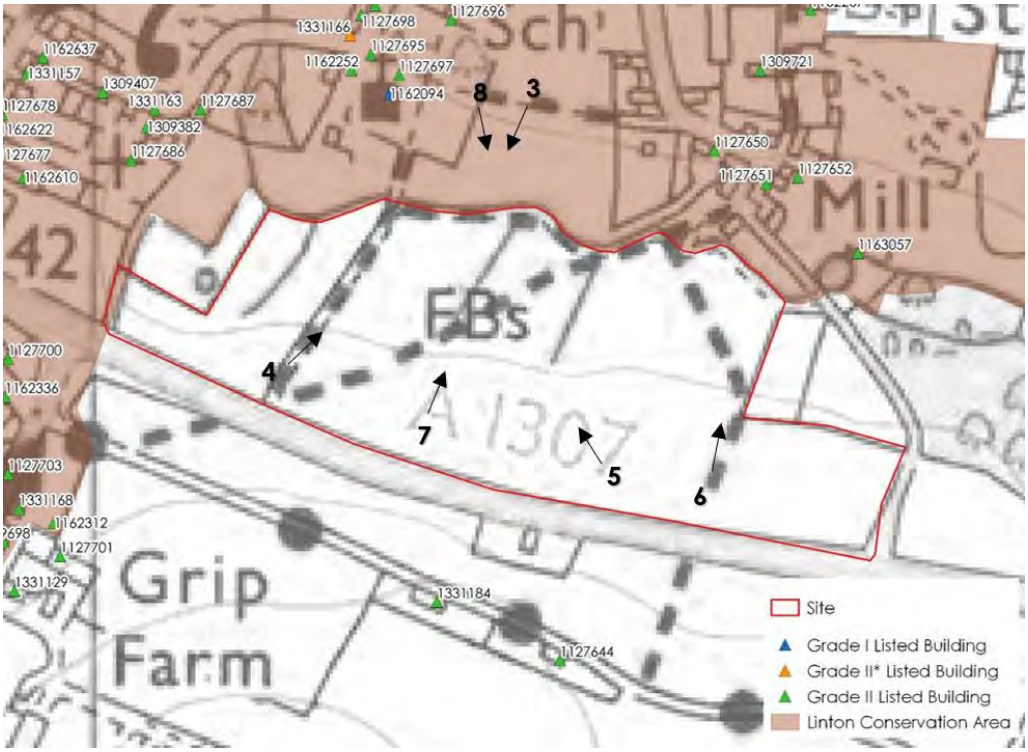


Plate 2: Adjacent designated heritage assets and location and direction of photo plates.

Linton Conservation Area

4.2 A draft Conservation Area Appraisal was prepared by South Cambridgeshire District Council in 2007[1] and is available on the Linton Parish Council website but no further update/adopted document was available on the South Cambridgeshire District Council website at the time of preparing this note. Linton Conservation Area encompasses the historic core of the settlement, surrounded to the north and west by later residential development.

4.3 There are views into the Site from the adjacent parts of the conservation area, including looking across the river from the footpath east of the church (Plate 3, Plate 8). Similarly, there are views into the conservation area from within the Site (Plate 4; Plate 7). At the time of the Site visit only the tower of the Church of St Mary, and the upper parts of Linton Mill were visible from the southern area of the Site, being otherwise screened by trees (Plate 5, Plate 6). There is potential for increased intervisibility in winter. The Site forms part of the adjacent agricultural setting to the conservation area and contributes to its significance. Development would alter this agricultural setting and introduce residential development in views south from adjacent parts of the conservation area. Harm can be reduced, but not wholly removed, through sensitive design. It is anticipated that harm will be minimised through the use of open space in the adjacent area of the Site along the river, with built form focused along Cambridge Road.

Plate 3: View towards the Site from within Linton Conservation Area, view to south

[1] South Cambridgeshire District Council 2007. *Linton Conservation Area: Character Appraisal and Management Proposals*. Pdf. report available at https://linton-pc.gov.uk/public-documents [accessed 2 November 2021]

Plate 4: View to Linton Conservation Area from the western area of the Site, view to north-east

Church of St Mary

Plate 5: View to the Church of St Mary from within the Site, view to north-west

4.4 The Grade I listed Church of St Mary is a medieval parish church, located on the southern side of Linton, north of the Site (NHLE ref. 1162094). At the time of the Site visit there were views to the church tower from the higher ground in the southern area of the Site (Plate 5), but not from the lower ground closer to the river although there may be increased intervisibility in winter; the Linton Conservation Area Appraisal map identifies views to the church from the adjacent area of the Site south

of the river[2]. Review of the mid-19th century Tithe survey indicates that the Site did not form part of the Glebe lands associated with the church at that time. The Site does however form part of the close agricultural lands which may be considered to make some contribution to the significance of the church. Development of the Site would alter this agricultural field to residential development and open space and would likely result in a reduction of views to the church tower along with the loss of the adjacent agricultural context, although it would not interrupt views from the river edge identified in the Linton Conservation Area appraisal.

Linton Mill

4.5 Linton Mill is a Grade II listed early-18th century watermill, partially rebuilt and extended in the 19th and early 20th century (NHLE ref. 127651). At the time of the site visit, views to the mill and adjacent listed buildings were screened by trees although there were glimpsed views to the upper part of the mill from parts of the Site (Plate 6). There is potential for greater intervisibility in winter; the Linton Conservation Area Appraisal map identifies views to the church from the adjacent area of the Site south of the river[2]. Development of the Site would not interrupt the relationship between the listed mill and the river, or views from the river edge. It is anticipated that proposed built form would be focused in the southern area of the Site, set back from the river by open space. Sensitive design may avoid adverse impacts to the Grade II listed Linton Mill. At most it is anticipated that any harm would be negligible, which is to say less than substantial harm at the very lowermost end of this harm spectrum.

Plate 6: View to Linton Mill from within the Site, view to north.

[2] South Cambridgeshire District Council, Linton Conservation Area – Map 1 available at https://linton-pc.gov.uk/public-documents [Accessed 2 November 2021]

Water Tower

4.6 From within the Site there are distant views to a Grade II listed Water Tower c. 1km north of the Site, an early-20th century water tower in the Art Deco style (NHLE ref. 1392652). This is a prominent feature visible from much of the surrounding landscape. Development may result in some reduction to views to the Water Tower but it is considered unlikely that this would adversely impact the significance of the listed building.

Plate 7: View to Linton Conservation Area and Grade II listed water tower from within the Site, view to north

The Boundaries and The Kyles

4.7 The Grade II listed cottages on Long Lane, The Boundaries (NHLE ref. 1331184) and The Kyles (NHLE ref. 1127644), are 17th-century timber-framed dwellings. These are separated from the Site by the A1307, a petrol station and intervening agricultural land. The site visit identified glimpsed viewed to The Kyles from Linton Conservation Area but these are not key to its significance (Plate 8). Assuming the well-vegetated boundary at the southern edge of the Site is retained, it is not anticipated that development would adversely impact the significance of these Grade II listed buildings.

Plate 8: View to The Kyles from Linton Conservation Area, looking across the Site.

Other designated heritage assets

4.8 A review of other designated heritage assets in the wider area did not identify any considered likely to be sensitive to adverse impacts as a result of development of the Site. This includes Linton Roman villa scheduled monument located c. 570m east of the Site (NHLE ref. 1461035).

5.0 Non-Designated Heritage Assets

5.1 The HER records Roman period remains and a medieval manorial dovecote within the Site (Plate 9; HER refs. 06121/06121A (same location), ECB6614). Antiquarian sources report "*In the meadow to the south of Linton church…are two low mounds, lying above the flood* line"[3]. One of the mounds was investigated in 1923 when it was described as measuring around 14m by 4m, and around 1.3m high. A trench excavated across the mound recorded residual Romano-British pottery within the mound, including imitation Samian, fine red ware, as well as domestic animal bones and oyster shell. Finds from below the mound included back ware and also a possible tile. The mound itself was interpreted as the manorial dovecote, with reference to a fieldname on a map of 1600 ('Berry meads alias Dovehouse Hills'). Field 307 on the Tithe Survey was named 'Dovehouse Hill Close' (Plate 10), which also suggests a dovecote in the vicinity. The manor house itself is thought to have been located c. 200m west of the Site (HER ref. 10848). The consulted sources do not give a suggestion as to the origin of the second mound. No extant mounds were visible at the time of the Site visit. The HER point is approximate. While the mounds may well

[3] Palmer W M 1923 'Excavations at Great and Little Linton in 1923', in *Proceedings of the Cambridge Antiquarian Society*, vol. 27, 84-85

have been located within the Site it is also possible they could have been further south; prior to the establishment of the A1307 fields here extended to Long Lane. In any event the HER record indicates potential for below-ground remains of archaeological interest.

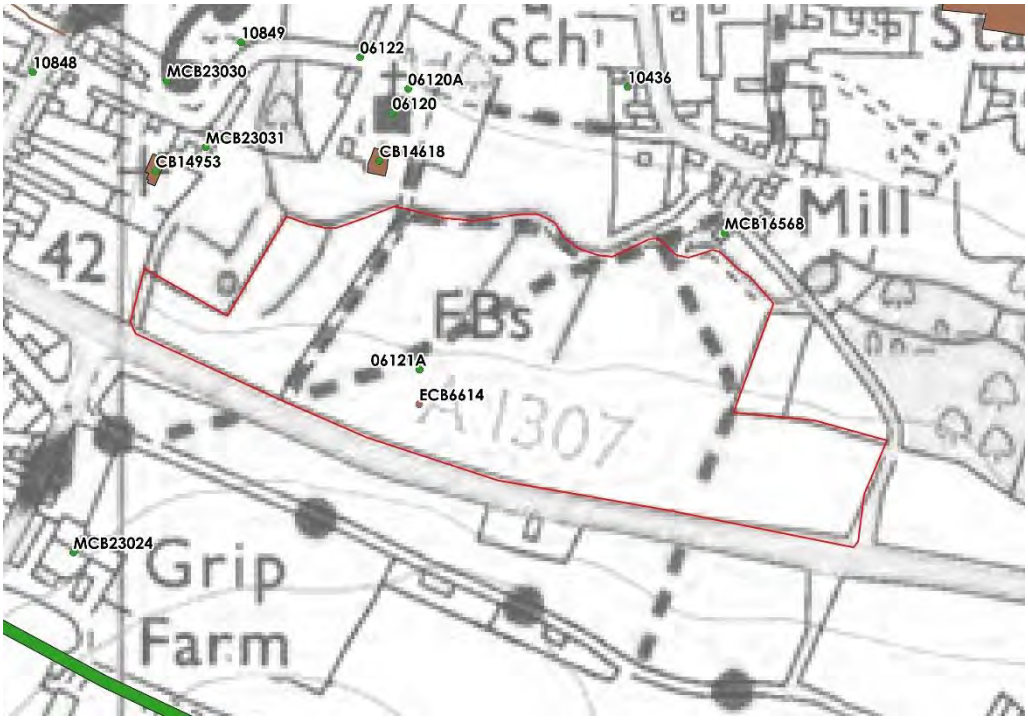


Plate 9: HER records within the Site (after Cambridgeshire HER)

Plate 10: Extract from the 1839 Linton Parish Tithe map

6.0 Conclusions

6.1 The Site forms part of the adjacent agricultural setting to Linton Conservation Area. It is anticipated that development would result in some adverse impact to this designated heritage asset through the alteration of adjacent agricultural land. Harm can be reduced, but not wholly removed, through sensitive design including use of open space to offset built form. It is also anticipated that development would result in some minimal adverse impact to the significance of the Grade I listed Church of St Mary through the loss of views to the church tower from the adjacent agricultural field. The potential for a negligible adverse impact to the Grade II listed Linton Mill is also identified. An assessment of winter intervisibility with adjacent designated heritage assets is recommended. A detailed setting assessment is recommended to inform any planning application. Under the NPPF less than substantial harm to a designated heritage asset should be weighed against the public benefit.

6.2 There is potential for below-ground remains of archaeological interest within the Site including finds/features of Roman date and below-ground remains of a medieval dovecote mound. It is likely that any below-ground archaeological remains could be appropriately addressed by way of a programme of archaeological recording. A full desk-based assessment should be prepared to inform any planning application. It is likely that further archaeological works, including trial trench evaluation, would also be required prior to determination.

Appendix 3: Preliminary Ecological Appraisal

CSA environmental

Land North of Cambridge Road, Linton

Preliminary Ecological Appraisal

Prepared by
CSA Environmental

on behalf of
Taylor Wimpey Strategic Land

Report Ref: CSA/5653/01

November 2021

urban design | ecology | landscape | heritage

This report may contain sensitive ecological information. It is the responsibility of the Local Authority to determine if this should be made publicly available.

Report Reference	Date	Revision	Prepared by	Approved by	Comments
CSA/5653/01	10/11/2021	-	AC/MD	JW	

CONTENTS Page

EXECUTIVE SUMMARY

Residential development is proposed at Land North of Cambridge Road, Linton, for which representations will be made to South Cambridgeshire District Council and Cambridge City Council as part of their Joint Local Plan for 'Greater Cambridge'.

CSA Environmental was instructed by Taylor Wimpey Strategic Land to undertake a Preliminary Ecological Appraisal (PEA) of the Site to identify ecological constraints to development, inform recommendations for design, highlight opportunities for ecological enhancement and determine any additional investigation/survey work necessary.

As part of this PEA, a desk study and extended Phase 1 Habitat survey of the Site were undertaken in August 2021. The Site comprises a large fallow arable field, with an area of tall ruderal/dense scrub and a block of woodland to the west. Additionally, a margin of tall ruderal runs along the northern Site boundary, south of the River Granta and hedgerows bound the Site to the south and east.

The River Granta County Wildlife Site bounds the Site to the north. This chalk stream habitat and its associated riparian corridor should be robustly buffered from development and measures are proposed to minimise any potential recreational and pollution impacts. Development should seek to improve the quality and extent of riparian corridor habitats through appropriate landscaping including riparian improvements, drainage and provision of open space. Controlled access to the river presents opportunities for existing and new residents to engage with nature, through dipping platforms, beaches and/or stepping stones.

Hedgerows and woodland bounding the Site should be retained and appropriately buffered from development edge effects. Enhancement of retained habitats and creation of new habitat within areas of open space will be required to ensure a net gain in biodiversity is achieved.

A range of protected and notable species could potentially make use of the Site. Further surveys to confirm the presence or likely absence of such species, and the nature of their use of the Site, are recommended to inform an evidence based Ecological Impact Assessment to be prepared for submission with a planning application.

Recommendations have been provided for ecological enhancement measures that could be delivered as part of the proposed development.

1.0 INTRODUCTION

1.1 This report has been prepared by CSA Environmental on behalf of Taylor Wimpey Strategic Land. It sets out the findings of a Preliminary Ecological Appraisal (PEA) of Land North of Cambridge Road, Linton (hereafter referred to as 'the Site'). Residential development is proposed at the Site, for which representations will be made to South Cambridgeshire District Council and Cambridge City Council as part of their Joint Local Plan for 'Greater Cambridge'.

1.2 The scope of this appraisal has been determined with due consideration for best-practice guidance provided by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2017), and to the *Biodiversity: Code of practice for planning and development* (BS 42020:2013) published by the British Standards Institution (2013).

1.3 The Site occupies an area of c. 6.8ha and is located around central grid reference TL 56200 46500, to the south of Linton. It consists of a large fallow arable field, with an area of tall ruderal/dense scrub and a block of woodland to the west. Additionally, a margin of tall ruderal runs along the northern Site boundary, south of the River Granta and hedgerows bound the Site to the south and east (see Habitats Plan in Appendix A).

1.4 A desk study and extended Phase 1 Habitat survey were undertaken of the Site, the findings of which are presented herein.

1.5 This PEA aims to:

- Identify any ecological constraints to development of the Site
- Inform design decisions
- Identify further ecological surveys and investigation necessary to inform a full Ecological Impact Assessment (EcIA) of the Site
- Highlight opportunities for ecological enhancement and Biodiversity Net Gain (BNG)

1.6 As set out in best practice guidelines (CIEEM, 2017) a PEA is typically only suitable for planning submission where there are no ecological constraints relating to the project. Where ecological constraints are identified, such as the presence of important ecological features, the effects of development on these features should be assessed within a separate EcIA report, which would supersede the PEA.

2.0 LEGISLATION, PLANNING POLICY & STANDING ADVICE

Legislation

2.1 Legislation relating to wildlife and biodiversity of particular relevance to this PEA includes:

- The Conservation of Habitats and Species Regulations 2017 (as amended)
- The Wildlife and Countryside Act 1981 (as amended)
- The Natural Environment and Rural Communities (NERC) Act 2006
- The Protection of Badgers Act 1992

2.2 This above legislation has been addressed, as appropriate, in the production of this report. Further information on the above legislation is provided in Appendix B.

National Planning Policy

2.3 The National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government, 2019) sets out the government planning policies for England and how they should be applied. Chapter 15: Conserving and Enhancing the Natural Environment, is of particular relevance to this report as it relates to ecology and biodiversity. Further details are provided in Appendix B.

2.4 The Government Circular 06/2005, which is referred to by the NPPF, provides further guidance in respect of statutory obligations for biodiversity and geological conservation and their effects within the planning system.

Local Planning Policy

2.5 A number of local planning policies relate to ecology, biodiversity and/or nature conservation. These are summarised in Table 1 of Appendix B. These policies have been addressed, as appropriate, in the production of this report.

Standing Advice

2.6 Natural England and Defra's Standing Advice (Natural England & Defra, 2014) regarding habitats and protected species aims to support local authorities and forms a material consideration in determining applications in the same way as any individual response received from Natural England following consultation. Standing advice has therefore been given due consideration, alongside other detailed guidance documents, in the production of this report.

3.0 METHODS

Desk Study

3.1 The Multi-Agency Geographic Information for the Countryside (MAGIC) online database was reviewed in August 2021 to identify nature conservation designations within the following search radii:

- Special Protection Areas (SPA), Special Areas of Conservation (SAC) and Ramsar sites within 10km of the Site (including possible/proposed sites)
- Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Local Nature Reserves (LNR) within 3km of the Site
- Other relevant data e.g. Ancient Woodland Inventory within 1km of the Site

3.2 A review was undertaken of the location of any such designations, their distance from and connectivity with the Site, and the reasons for their designation. This information was used to determine whether they may be within the Site's zone of influence.

3.3 Cambridgeshire and Peterborough Environmental Records Centre (CPERC) and Essex Wildlife Trust (EWT) were contacted for details of any non-statutory nature conservation designations and records of protected/notable habitats and species. This information was requested for an area encompassing the Site and adjacent land within c. 2km of its central grid reference. This search area was selected to include the likely zone of influence upon non-statutory designations and protected or notable habitats and species.

3.4 Further online resources were reviewed for information which may aid the identification of important ecological features. The Woodland Trust's online Ancient Tree Inventory was reviewed for known ancient or veteran trees within the Site and adjacent land. Interactive online mapping provided by the charity 'Buglife' was used to determine whether the Site falls within an Important Invertebrate Area.

3.5 In accordance with Natural England's Great Crested Newt Mitigation Guidelines (2001), a desktop search was undertaken to identify ponds within 500m of the Site which may have potential to support breeding great crested newts *Triturus cristatus*, using Ordnance Survey (OS) mapping, the MAGIC database and aerial photography.

3.6 Where possible under the terms of the data provider, relevant desk study data are presented in Appendix C.

Field Survey

Habitat Survey

3.7 An extended Phase 1 Habitat survey was carried out in fine and dry weather conditions on 13 August 2021 by Alexandra Cole MCIEEM, encompassing the Site and immediately adjacent habitats that could be viewed. In addition, habitats were categorised using the UK Habitat Classification methodology, with equivalent codes (where possible) provided within this report.

3.8 Phase 1 Habitat survey is a method of classification and mapping wildlife habitats in Great Britain. It was originally intended to provide "*…relatively rapidly, a record of the semi-natural vegetation and wildlife habitat over large areas of countryside.*" The Phase 1 Habitat survey method has been widely 'extended' beyond its original purpose to allow the capture of information at an intermediate level between Phase 1 and Phase 2 Habitat surveys, and here includes the following:

- More detailed floral species lists for each identified habitat
- Descriptions of habitat structure, the evidence of management and a broad assessment of habitat condition
- Mapping of additional habitat types (e.g. hardstanding)
- Identification of Priority Habitats under Section 41 of the NERC Act
- Identification of Habitats Directive Annex I habitat types
- Evidence of, or potential for, European Protected Species (EPS) (including bats, great crested newt, dormouse and otter)
- Evidence of, or potential for, other protected species (including birds, reptiles, water vole, badger and certain invertebrates)
- Evidence of, or potential for, other notable species (including S41 Species of Principal Importance as well as notable, rare, protected or controlled plants and invertebrates)

3.9 Results of the Habitat survey are presented on the Habitats Plan in Appendix A. Appendix D provides a list of floral species recorded in each habitat.

Limitations

3.10 There were no specific limitations to the desktop study. The Habitat survey was conducted at an optimum time of year and in good conditions. However, dense scrub and tall ruderal to the west of the Site limited access to this part of the Site.

Evaluation and Assessment

3.11 The evaluation and assessment of ecological features is beyond the scope of a PEA and has therefore not been undertaken here. Formal evaluation and assessment of any identified important ecological features should be undertaken as part of either a full EcIA, or receptor-

specific survey and assessment in accordance with the published CIEEM method (CIEEM, 2018).

4.0 BASELINE ECOLOGICAL CONDITIONS

Nature Conservation Designations

Statutory

4.1 There are no statutory designations covering any part of the Site and no international statutory designations were identified within 10km of the Site. No local statutory designations were identified within 3km of the Site.

4.2 Three national statutory designations were identified within 3km of the Site and are described in Table 1 below.

Non-Statutory

4.3 Five non-statutory designations were identified within 2km of the Site; four County Wildlife Sites (CWSs) and a single Local Nature Reserve (LNR). These non-statutory designations are described in Table 1 below.

Table 1. Statutory and Non-Statutory Designations within search radii

Site Name & Designation	Distance & Direction from Survey Area	Special Interests or Qualifying Features
International Designations within 10km		
-		
National Designations within 3km		
Furze Hill SSSI	c. 1.8km north-west	Grassland characteristic of the Breckland of East Anglia, holding both acidic and calcareous components. The site contains a number of rare and locally uncommon plants such as hoary cinquefoil *Potentilla argentea*, maiden pink *Dianthus deltoides*, and dyers greenweed *Genista tinctoria*.
Hildersham Wood SSSI	c. 2.5km south-west	Ancient woodland of ash-maple type lying on chalky boulder clay. The ground flora is noted for being rich and variable, containing ancient woodland indicator species such as dog's mercury *Mercurialis perennis* and bluebell *Hyacinthoides non-scripta*. Other species include locally rare species such as sweet woodruff *Asperula odorata* and broad-leaved helleborine *Epipactis helleborine*.
Alder Carr SSSI	c. 2.7km north-west	Wet woodland on fen peat dominated by common alder *Alnus glutinosa*. The ground flora consists of wet fen species of high value to invertebrates such as angelica *Angelica sylvestris*, meadowsweet *Filipendula ulmaria*, marsh marigold *Caltha palustris* and common reed *Phragmites australis*, with

		drier areas comprising dog's mercury and violets *Viola sp.*
Local Designations within 3km		
-		
Non-Statutory Designations within 2km		
River Granta CWS	Adjacent to northern site boundary	A major river with little modification by pollution or canalisation. Supports mature pollard willows *Salix* spp.
Shelford – Haverhill Disused Railway (Linton) CWS	c. 0.2km south	Supports at least 6 calcareous grassland indicators.
Shelford – Harverhill Disused Railway (Bartlow) CWS	c. 1.2km south-east	Supports a population of nationally scarce lesser calamint *Clinopodium calamintha*.
Furze Hills S21 RSV CWS	c. 1.3km north-west	A protected roadside verge of neutral/calcareous grassland. Supports a population of nationally scarce lesser calamint.
Hadstock Wood LNR	c. 1.9km south	Ancient woodland comprised mostly of ash *Fraxinus excelsior* and pedunculate oak *Quercus robur* over an understory of hazel Corylus avellana. Ground flora includes ancient woodland indicator species dog's mercury.

Ancient Woodland

4.4 There is no ancient woodland covering any part of the Site or immediately adjacent land. The closest designated ancient woodland is Rivey Wood, an ancient and semi-natural deciduous woodland located c. 1.1km north of the Site. No trees on or adjacent to Site are listed on the Ancient Tree Inventory. The closest veteran tree is a pedunculate oak *Quercus robur* located c. 3.4km north-west of the Site in Great Abington.

Habitats and Flora

4.5 Habitats recorded on-site were classified in line with current Phase 1 Habitat survey guidance (JNCC, 1990) and equivalent (where possible) UK Habitat Classification codes, as illustrated in Appendix A. Detailed species lists for each habitat are provided in Appendix D.

Notable Flora Records

4.6 CPERC provided 414 records of 45 notable plant species from within the search area. Two of these are S41 Species of Principal Importance; annual knawel *Scleranthus annuus* and pasqueflower *Pulsatilla vulgaris*. Other species of potential relevance to the Site include corn mint *Mentha arvensis*, field mouse-ear *Cerastium arvense*, meadow oat-grass *Helictotrichon pratense*, harebell *Campanula rotundifolia* and wild liquorice *Astragalus glycyphyllos*.

4.7 Also of note, are records of Japanese knotweed *Fallopia japonica*, giant hogweed *Heracleum mantegazzianum*, Japanese rose *Rosa rugosa*,

wall cotoneaster *Cotoneaster horizontalis* and yellow archangel *Lamiastrum galeobdolon* subsp. *argentatum* recorded between 1993 and 2014. These species are included within the Wildlife and Countryside Act's Schedule 9 list of invasive non-native species. None of these species were recorded on-site at the time of survey.

Arable (c1)

4.8 The Site is dominated by a single arable field of c. 4.9ha. The field is not currently under arable cultivation and has been left as fallow. Vegetation is dominated by common nettle *Urtica dioica* and dock *Rumex* sp. with common and broad-leaved grass species including perennial ryegrass *Lolium perenne*, rough meadow-grass *Poa trivialis*, cock's-foot *Dactylis glomerata*, Yorkshire fog *Holcus lanatus* and false-oat grass *Arrhenatherum elatius*. Herb species include willowherb *Epilobium* sp., forget-me-not *Myosotis* spp., dove's-foot crane's-bill *Geranium molle*, ragwort *Jacobaea vulgaris*, field speedwell *Veronica persica*, creeping thistle *Cirsium arvense*, smooth sow thistle *Sonchus oleraceus*, ground ivy *Glechoma hederacea*, hawkbit *Leontodon* sp., bristly ox-tongue *Helminthotheca echiodes*, garlic mustard *Alliaria petiolate* and slender speedwell *Veronica filiformis*. Vegetation height within the arable field is generally short, likely a reflection of recent/prior management and grazing by rabbits.

Tall Ruderal & Dense Scrub (h3h)

4.9 The south-west of the Site is dominated by tall ruderal with areas of dense bramble *Rubus fruticosus* agg. scrub and hedge bindweed *Calystegia sepium*. Common nettle and creeping thistle dominate, with a sward height of c. 1-1.5m across the majority of this area of the Site. Access to this area of the Site was limited due to the density of vegetation. However, other species recorded include spear thistle *Cirsium vulgare*, burdock *Arctium* sp., broad-leaved dock *Rumex obtusifolius*, ground ivy, elder *Sambucus nigra*, hogweed *Heracleum sphondylium*, white dead-nettle *Lamium album*, ragwort, teasel *Dipsacus fullonum*, cleavers *Galium aparine*, herb Robert *Geranium robertianum*, prickly sow thistle *Sonchus asper*, and perennial ryegrass.

4.10 A wide strip of ruderal vegetation c. 20m wide runs along the west of the arable field, up to a block of woodland. Species are mostly as above with dominant common nettle and creeping thistle, as well as patches of bramble, hedge bindweed and great willowherb *Epilobium hirsutum*. Other species include ragwort, Yorkshire fog, hogweed and fleabane *Pulicaria dysenterica*. Scattered elder scrub is also present.

4.11 Tall ruderal is also present along the northern boundary of the arable field, south of the River Granta. A public footpath runs west to east along the river and cuts through the ruderal vegetation which is encroaching on the southern bank of the river. Spear thistle dominates along the arable field edge, with common nettle and great willowherb along the

bank of the river. Other species include hogweed, ragwort, couch *Elytrigia repens*, knotgrass *Polygonum* sp., smooth sow thistle, creeping thistle, dove's-foot crane's-bill, soft brome *Bromus hordeaceus*, cock's-foot, bristly ox-tongue, perennial ryegrass, mallow *Malva* sp., greater plantain *Plantago major*, poppy *Papaver* sp. and white dead-nettle.

Woodland (w1h)

4.12 An area of woodland is located on the western Site boundary and continues off-site to the west. The woodland was not accessible at the time of survey and therefore detailed survey was not possible. The woodland is identified on MAGIC as 'broadleaved woodland' and whilst the majority of species identified were broadleaved; sycamore *Acer pseudoplatanus*, willow *Salix* spp., ash, alder, hawthorn *Crataegus monogyna*, lime *Tilia* sp. and silver birch *Betula pendula*, yew *Taxus baccata* was also identified indicating this is a mixed, mainly broadleaved woodland. Snowberry *Symphoricarpos albus* which is an invasive scrub species was also identified within the woodland.

4.13 The presence of willows and alder suggest the woodland is at least occasionally waterlogged, potentially from surface water run-off or fluvially from the River Granta.

4.14 The on-site woodland is not identified on historic maps, although the off-site pond and woodland to the west are shown on maps dating from 1888 to 1913. Aerial imagery dating from 2000 shows a woodland block running along a mapped ditch south of the River Granta. This woodland appears to increases in extent with time, and in recent aerial (2021) imagery meets the canopy of the adjacent woodland to the west in some places.

Hedgerows (h2)

4.15 A total of four hedgerows bound the south and east of the Site. Hedgerows H1 and H2 run along the length of the southern site boundary along the A1307. H1 is a line of mature trees comprising ash and sycamore with ivy *Hedera helix* growth. The trees are situated on a steep bank with sparse ground flora comprising common nettle, although a small number of lords-and-ladies *Arum maculatum* were also identified. H2 continues along the south of the Site, bounding the arable field. Additional species within this hedgerow include hawthorn, wayfaring tree *Viburnum lantana*, field maple *Acer campestre*, blackthorn *Prunus spinosa*, dog rose *Rosa canina* spp. and oak. Ground flora comprises nettle, spear thistle, burdock and bramble. This hedgerow is outgrown with mature trees along its length and does not show signs of recent management.

4.16 Hedgerow H3 runs along the east of the Site, parallel with Mill Lane. As with H2, this hedgerow is tall and outgrown although the width along the field edge has been recently trimmed. H3 is a dense, shrubby hedgerow

with blackthorn, hawthorn, field maple and hazel. A small number of standard trees are present including sycamore and oak. Ground flora is sparse with species including spear thistle, bramble, cock's-foot, cleavers and cow parsley *Anthriscus sylvestris*.

4.17 Hedgerow H4 runs along the remainder of the eastern Site boundary and is another shrubby outgrown hedgerow, with standard trees and no evidence of recent management. H4 is dominated by elm *Ulmus* spp. and blackthorn, with ivy, sycamore, ash, hawthorn, elder and holly *Ilex aquifolium*. Ground flora remains sparse with species including common nettle, ragwort, ground ivy, spear thistle, white bryony *Bryonia dioica*, burdock, creeping thistle, and teasel.

4.18 All hedgerows on-site are species-rich, containing five or more woody species and meet the criteria for the Section 41 Habitat of Principal Importance 'Hedgerows'.

Rivers (r2)

4.19 The River Granta, a chalk stream designated as a CWS runs east to west, beyond the northern Site boundary. At the time of survey, the river was shallow and clear with a gravel bottom. Vegetation along the bank of the river continues from the on-site ruderal with a number of mature trees including cherry *Prunus* sp., sycamore, alder, weeping willow *Salix babylonica*, oak and goat willow *Salix caprea*. Elder and dogwood *Cornus* sp. scrub are also present to the west.

4.20 The Greater Cambridge Chalk Streams Project Report lists water crowfoot *Ranunculus aquatilis*, starwort *Callitriche* sp. and lesser water parsnip *Berula erecta* as being present along the River Granta. However, limited aquatic vegetation was noted within the channel, potentially due to level of shading in the stretch adjacent to the Site. Pendulous sedge *Carex pendula* was frequent in some bankside areas.

Fauna

Bats

4.21 A total of 57 bat records were identified within the search area, dating from 1985 to 2018. These include the following species: common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus*, brown long-eared *Plecotus auritus*, serotine *Eptesicus serotinus* and unidentified *Myotis* sp. A number of records were also recorded for pipistrelle *Pipistrellus* sp. and 'bat' *Chiroptera* spp. which could not be identified to species level. The majority of records provided by CPERC were given to a 1km precision grid reference and therefore their location could not be accurately pinpointed within the 2km radius. EWT gave more detailed species records with all 17 records relating to roosts, including maternity and hibernation, identified within the village of Hadstock (c. 1. 3km south).

4.22 Areas of tall ruderal, dense scrub and, to a limited extent, arable habitats on-site provide suitable foraging habitat for bats. Hedgerows, mature trees and woodland on-site provide navigational features and potential roosting opportunities for bats with larger and ancient woodlands including Rivey Wood and Borley Wood to the north providing further opportunity for roosting bats within the wider landscape. The adjacent River Granta also provides a key navigational feature for bats.

Badger

4.23 CPERC have provided four records of badger *Meles meles* from within the search area, dating from 2003 to 2019. The closest record is of a deceased badger c. 1.0km west of the Site, likely the result of a collision with a vehicle on the A1307. A further record is located south-west of the Site and details both a deceased badger and the presence of a sett. No badger records were provided by EWT.

4.24 Hedgerows, woodland and field margins provide opportunities for badgers to dig setts, with arable and ruderal habitats providing some limited foraging opportunities for badgers. [redacted]. A deceased badger was also identified [redacted], likely the result of a collision with a vehicle on the adjacent A1307. No confirmed badger setts or further evidence of badgers was identified on-site.

Dormouse

4.25 No records of dormouse *Muscardinus avellanarius* were identified within the search area. Cambridgeshire is outside of the current distribution range for this species, although two re-introduction sites are located in the west of the county. The Site provides very limited suitable habitat for dormice with only small sections of hedgerow and woodland present which lack the species and structural diversity required to provide suitable foraging for dormice. The Site is also isolated from any areas of woodland which have potential to support this species in the wider landscape. Dormice are therefore considered absent from the Site.

Riparian Mammals

4.26 CPERC provided a total of two historic records of water vole *Arvicola amphibius* from within the search area, dating from 1996 and 1997. Records were provided to an accuracy of 100m, and appear to be associated with [redacted] No further details were given with regard to these records. EWT did not provide any records of water vole.

4.27 CPERC provided a total of two records of otter *Lutra lutra* from within the search area, dating from 2012 and 2017. Both records were of an otter spraint located [redacted]

[redacted]. No records of otter were provided by EWT.

4.28 The River Granta runs along the northern boundary of the Site and is known to historically support both water vole and otter. The river and its banks provide suitable habitat to support water vole and otter should they be present within the surrounding area. Additionally, areas of woodland within and adjacent to the Site boundary may provide suitable habitat for otter holts or lay-ups.

Other Mammals

Brown Hare

4.29 CPERC provided a single record of brown hare *Lepus europaeus* from within the search area, dating from 2014. This record was located c. 1.6km south-east of the Site within an area dominated by arable fields. No records of brown hare were provided by EWT.

4.30 The on-site arable field provides some limited opportunities for brown hare. However, this field alone does not provide a large enough area to support a brown hare's home range and is isolated by development and the A1207 from other arable and grassland habitats in the surrounding area, which provide larger and more suitable areas of potential habitat for this species. Given the isolation of the Site, brown hare are therefore considered likely absent.

Hedgehog

4.31 CPERC provided one record of hedgehog *Erinaceus europaeus* within the search area, dating from 2011. The record was identified from droppings and is located within the suburban area of Linton, c. 0.2km north-west of the Site. EWT provided five records of hedgehog dating from 2005 to 2019. Detailed information regarding the location of these records was not provided.

4.32 Garden habitats within Linton to the north of the Site, in addition to hedgerow and woodland habitats on and adjacent to the Site provide suitable foraging and hibernation opportunities for this species.

Birds

4.33 CPERC provided a total of 223 records of 44 bird species within the search area, dating from 1954 to 2014. Of these species, five are designated under the Wildlife and Countryside Act's Schedule 9 list of invasive non-native species and 35 are notable for their inclusion of the list of Birds of Conservation Concern (19 species red list, 16 species amber list). Those of potential relevance to the Site include fieldfare *Turdus pilaris*, barn owl *Tyto alba*, skylark *Alauda arvensis* and red kite *Milvus milvus*.

4.34 The adjacent River Granta also provides suitable habitat for kingfisher *Alcedo atthis*, for which a total of 13 records were identified within the search area. Most of the records were given to 1km accuracy so could not be accurately pinpointed, however one record was described from the River Granta. Eight records were identified to be on-Site/adjacent to Site boundary; four records of grey wagtail *Motacilla cinerea*, three of spotted flycatcher *Muscicapa striata* (both BCC red list species) and one kingfisher (BCC amber list species). These were all given to an accuracy of 100m. No records of birds were provided by EWT.

4.35 Habitats on-site provide foraging and nesting opportunities for a range of common bird species and are not likely to support a bird assemblage of significant importance.

Reptiles

4.36 No records of reptiles were provided by CPERC or EWT within the search area. Tall ruderal and scrub habitats in the west of the Site and along the northern Site boundary provide suitable habitat for reptile species. However, connectivity to suitable habitats in the wider area is limited.

Amphibians

4.37 CPERC provided a single historic record of a great crested newt *Triturus cristatus*, dating from 1984. Its location was given to an accuracy of 1km and therefore its precise location could not be identified. EWT did not provide any records of amphibians.

4.38 A more detailed appraisal of the Site in respect of great crested newt is provided below.

Great Crested Newt

4.39 Despite spending much of their annual lifecycle within the terrestrial environment, great crested newts are dependent upon the presence of suitable aquatic breeding habitat in order for a population to persist. No potential breeding ponds were identified on-site during the site survey, while a further eight appear to be present within 500m of the Site, based on OS mapping. As such, there is potential for these species to utilise the terrestrial habitats on-site.

Invertebrates

4.40 CPERC provided 54 records of 51 invertebrate species from within the search area. Those of potential relevance to the Site include white ermine *Spilosoma lubricipeda*, rosy rustic *Hydraecia micacea*, double dart *Graphiphora augur*, mouse moth *Amphipyra tragopoginis* and powdered quaker *Orthosia gracilis*. These species are all S41 Species of Principal Importance.

4.41 A single record was also provided for Roman snail *Helix pomatia* dating from 2015, and located in Linton Pocket Park c. 0.4km east of the Site.

Roman snail are listed within Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and are afforded protection against killing, injury, possession and sale under parts of sub-section 9(1), (2) and (5) of the Act. EWT provided a single record for a purple emperor butterfly *Apatura iris* from 2015.

4.42 The Greater Cambridge Chalk Streams Project Report records the River Granta as having 'good aquatic invertebrates'. Although it does also record the presence of signal crayfish which are included on the Wildlife and Countryside Act's Schedule 9 list of invasive non-native species.

4.43 The Site is not located within or close to an Important Invertebrate Area (IIA). The closest IIA is the Fens IIA which is c. 13.3km north of the Site.

4.44 Arable habitats on-site are unlikely to support a locally important assemblage of invertebrates. However, a record for Roman snail has been provided from Linton Pocket Park which is connected to the Site via a small area of woodland, with a single track road (Mill Lane) the only barrier to dispersal. Woodland and hedgerows provide some limited habitat for this species.

4.45 Additionally, woodland, hedgerows and extensive areas of tall ruderal and scrub have the potential to support a range of common invertebrate species. The adjacent River Granta also has the potential to support a range of freshwater invertebrate species, with the mosaic of habitats on-site providing opportunities for the terrestrial life stages of these species.

Bony Fish

4.46 No records for bony fish were provided by CPERC or EWT. However, the Greater Cambridge Chalk Streams Project Report confirms the presence of brown trout *Salmo trutta*, minnow *Phoxinus phoxinus* and brook lamprey *Lampetra planeri* along the River Granta. The section of the River Granta north of the Site has the potential to support all of the above listed species.

5.0 DISCUSSION AND RECOMMENDATIONS

Nature Conservation Designations

Statutory

Furze Hill SSSI

5.1 Furze Hill SSSI is a former quarry with varied soils and aspects supporting both acidic and calcareous grassland characteristic of the Breckland of East Anglia. The entirety of the Site (100%) is currently listed as being in 'unfavourable – recovering' condition, with the condition threat risk listed as 'high'. The condition of the SSSI is noted to be caused by ruderals and agricultural weeds which have become invasive in places, in addition to large numbers of rabbits which are causing damage to the notified plant communities.

5.2 There is no access to the Site via public footpaths and recreational impact is not identified as condition threat risk. Given the isolation of the SSSI from the Site with no access via public footpaths or other identified impact pathways, it is not considered that the proposed development will result in significant adverse effects.

Hildersham Wood SSSI

5.3 Hildersham Wood SSSI is an area of ancient woodland, 100% of which is in 'unfavourable – recovering' condition. No detail is provided with regard to the reason for the condition threat risk which is listed as 'medium'. No direct public access is available within the SSSI, although a public footpath runs along the northern boundary. Given the isolation of the SSSI from the Site with no public access or other identified impact pathways, it is not considered that the proposed development will result in significant adverse effects.

Alder Carr SSSI

5.4 Alder Carr SSSI comprises wet valley alderwood on fen peat. The SSSI is currently listed as being in 'unfavourable' condition 'no change', with adverse condition reasons listed as freshwater abstraction via existing permits. It is acknowledged that development of the Site would require freshwater abstraction, the control and permitting of abstraction is not directly related to development of the Site and should be considered on a wider strategic level by the relevant water authority and statutory bodies.

5.5 There is no access to this SSSI via public footpaths which is isolated from the Site. Given the isolation of the SSSI from the Site with no public access or other identified impact pathways, it is not considered that the proposed development will result in significant adverse effects.

Non-Statutory

River Granta CWS

5.6 The River Granta runs along the northern boundary of the Site. In its current condition this CWS has been subject to little modification by pollution or canalisation. Development adjacent to the River Granta has the potential to result in pollution via hydrological pathways during construction and operation. There is also the risk of increased disturbance due to recreational disturbance, particularly via dog fouling and dogs entering the river.

5.7 Proposed development is set well back from the river edge, beyond the flood plain which will be subject to new habitat creation including wildflower meadows, woodland, thicket and tree planting. This robust buffering is required to both ensure any potential adverse effects are limited, and to provide significant opportunities to improve the current condition, through cessation of arable cultivation adjacent to the watercourse and targeted riparian improvements.

5.8 Areas of public open space, including recreational routes are proposed at the Site which will draw recreation away from the river and thus reduce the impact of recreational pressure on the CWS. In addition to this appropriate signage encouraging the use of open space at the Site and information leaflets should be provided to educate new residents on the sensitive river habitats within the CWS and how to minimise their impacts. Dog waste bins could be provided within areas of open space/walking routes at the Site to prevent dog fouling and build-up of nutrients.

5.9 Opportunities to deliver improvements to the River Granta stretch adjacent to the site should be explored with local stakeholders and consultees, potentially including some daylighting of the river to increase aquatic plant growth, provision of backwaters or other associated floodplain features (ponds, wet grassland and/or carr). Riparian enhancement would also take into consideration any bony fish which might be present within the watercourse. Controlled access to the river for both new and existing residents should also be explored through provision of features such as dipping platforms, beaches and stepping stones to encourage engagement with nature.

County Wildlife Sites (3No.) & Hadstock Wood LNR

5.10 Two former disused railways, a protected roadside verge and ancient woodland are also located within 2km of the Site. Whilst it is acknowledged that these Sites are all vulnerable to an increase in recreational pressure, it is considered that the distance and lack of accessibility of these CWSs/LNR from the Site will prevent a significant increase in recreational pressure to these designations.

Habitats and Flora

5.11 Emerging legislative frameworks and policy seeks to leave biodiversity in a better state than prior to development, i.e. development should deliver a Biodiversity Net Gain (BNG).

5.12 The Site is dominated by arable habitats of limited ecological interest. However, hedgerows, woodland and areas of tall ruderal and scrub have at least some intrinsic ecological interest such that development of the Site, without significant habitat creation/restoration on-site and/or off-site, would likely result in a net loss of biodiversity. As such, the following step-wise approach should be taken to informing design and mitigation:

- Minimise as far as possible the loss of important habitat.
- Where loss is unavoidable, retained habitats should be appropriately managed in the long-term for biodiversity, with a robust mechanism to secure appropriate management.
- Where sufficient habitat on-site cannot be provided to ensure biodiversity interests are maintained a biodiversity net gain secured, off-site habitat creation/restoration would need to be undertaken, ideally in the local area and for equivalent habitats.

5.13 In line with the above approach it is recommended that the scheme design be informed by the application of a 'Biodiversity Impact Assessment Calculation', making use of the latest Biodiversity Metric (3.0 Beta at the time of writing) published by Natural England, to provide a quantitative assessment of losses or gains in biodiversity. This will enable future planning applications to be made in-line with emerging legislative frameworks and policy.

5.14 It should be noted that any metric calculation undertaken should consider, separately, area as well as linear habitats, with the latter including hedgerows and rivers (i.e. the River Granta) with separate surveys and condition assessments required.

Woodland (w1h)

5.15 A small section of woodland is located along the western Site boundary, with further woodland adjacent to the Site, where possible all woodland should be retained and protected.

5.16 In the absence of mitigation, retained woodland will be vulnerable to damage during the construction phase from passing construction traffic and ground compaction. Retained trees, including those off-site but adjacent to the construction zone will be protected during the construction phase through compliance with standard arboricultural practice (BS5837:2012).

Hedgerows (h2)

5.17 A total of four hedgerows are present across the Site, where possible hedgerows and mature trees should be retained and protected.

5.18 In the absence of mitigation, retained hedgerows will be vulnerable to damage during the construction phase from passing construction traffic and ground compaction. Retained trees, including those off-site but adjacent to the construction zone will be protected during the construction phase through compliance with standard arboricultural practice (BS5837:2012).

Fauna

Bats

5.19 The Site offers foraging opportunities for bats, with hedgerows, mature trees and the adjacent River Granta providing navigational features and connectivity to adjacent habitats. Given the presence of navigational features and potential foraging opportunities for bats at the Site, monitoring of bat activity is recommended to determine the species present, pattern of use and overall value of the Site to bats.

5.20 Woodland and mature trees on-site have the potential to provide roosts for bats. Therefore, if any tree is to be removed or is subject to significant arboricultural works it should first be subject to a Preliminary Roost Assessment to assess its potential to support roosting bats.

5.21 The proposals are likely to result in an increase in artificial lighting at the Site. New artificial lighting of retained habitat during construction and operational phases has the potential to disturb bats and other nocturnal wildlife. In order to ensure ecological functionality of new and retained hedgerows along Site boundaries for bats as well as woodland and the River Granta, a sensitive external lighting scheme will be prepared. The future lighting scheme will be developed in consultation with a bat ecologist to avoid/minimise light spill onto retained and created habitat. This is to maintain a dark corridor available for bats and other nocturnal wildlife.

Badger

5.22 Badgers are protected under the Protection of Badgers Act (1992). Killing or injury of a badger, or interference with a sett is prohibited. Mammal holes and evidence of use of the Site by badger have been identified on-site. Therefore, a full badger survey is recommended to identify and map any setts on-site.

5.23 Additionally, during the construction phase, badgers are at risk of falling into open excavations or entering open ended pipework (above 150mm diameter), risking an offence under the above legislation. Given the protection badgers received under the Protection of Badgers Act

1992, the following precautionary measures will be implemented which could be secured via a Planning Condition:

- Pre-construction badger survey and monitoring for signs of new sett digging
- Covering any open excavations with wooden boards, or fitting them with appropriate escape ramps, in order to prevent badgers falling into them and injuring themselves or becoming trapped.
- Monitoring of site for any new sett excavation during prolonged remediation, construction or landscaping works.

Riparian Mammals

5.24 The River Granta lies adjacent to the Site and is known to support otter and historically support water voles. It is therefore recommended that further survey work is undertaken to identify whether water vole and otter are present along the stretch of river adjacent to the Site, and to determine the scope of any mitigation or enhancement measures which are necessary.

Hedgehog

5.25 Given that hedgehog may make sure of the Site, appropriate design/enhancement measures should be considered for this species as detailed below.

Birds

5.26 All wild birds are protected from killing and injury, and their nests and eggs are protected from damage and destruction, under the Wildlife and Countryside Act 1981 (as amended). Therefore any vegetation clearance required to facilitate the development will avoid the period between March and August (inclusive) when nesting birds are most likely to be present. If this is not possible vegetation will need to be checked for nesting birds by a suitably qualified ecologist prior to clearance.

Reptiles

5.27 The Site provides some suitable habitat for reptiles. Most notably the areas of tall ruderal to the west of the Site and north of the arable field. These habitats are likely to be lost to development and/or subject to invasive management and therefore further survey work is recommended to determine the presence or likely absence of reptile species within the Site.

Amphibians

5.28 Great crested newts (GCN) and their habitats are strictly protected under the Wildlife and Countryside Act 1981 (as amended) and the conservation of Habitats and Species Regulations 2010. In combination this legislation protects great crested newts from deliberate capture, killing and injury, intentional or reckless disturbance, damage or

destruction of a resting site or breeding place, and intentional or reckless damage, destruction or obstruction of a breeding site or rest place.

5.29 No aquatic habitats are present on-site. However, terrestrial habitats on-site, notably hedgerows, woodland and areas of tall ruderal and scrub are suitable to support dispersal, refuge and foraging by great crested newts. Eight ponds are present within a potential dispersal range, sharing habitat connectivity with the Site. It is recommended that a Habitat Suitability Index (HSI) assessment of each pond be undertaken to determine their suitability to support great crested newt breeding. If suitable, further surveys would be recommended to determine presence or likely absence of GCN.

Invertebrates

5.30 Habitats on-site have the potential to support a range of common invertebrate species, with the River Granta having potential to support notable freshwater invertebrates. Additionally, Roman snail have been identified within habitats adjacent to the Site.

5.31 As such, it is recommended that a suitably experienced entomologist undertake an assessment of the Site, targeting freshwater invertebrates and Roman snail to inform an impact assessment of future development and to guide design of any mitigation and enhancements for invertebrates.

Summary of Recommendations

5.32 Based on the ecological constraints identified above, Table 2 summarises recommendations for further work necessary to determine the need for, and scope of, any avoidance, mitigation and/or compensation measures to address potential adverse effects of development. The outcome of this further work will inform an EcIA of the final scheme.

Table 2. Recommendations for further investigation/survey

Ecological Feature	Further Work	Applicable Timescales
Habitats	- Habitat Condition Assessments - River Habitat Survey & Condition Assessment - Hedgerow Survey & Condition Assessment - Biodiversity Net Gain (BNG) calculation	Appropriate seasonal surveys for habitats; BNG: early in design process
Bats	Seasonal walked transects and periods of automatic static monitoring	May - August
Badger	Badger survey	Anytime
Riparian Mammals	Water vole & otter survey, two visits	Mid-April to June and July-Sept, min. 2 months apart
Reptiles	Reptile survey, seven visits	March - October

Great Crested Newt	Habitat Suitability Index (HSI) assessment of identified ponds within 500m	Anytime
	eDNA or 'Standard' GCN presence/likely absence surveys	eDNA; single visit Apr to end-Jun 'Standard' surveys; 4-6 visits mid-Mar to mid-Jun, half of visits mid-Apr to mid-May
Invertebrates	Invertebrate survey to inc. Roman snail survey, two visits	April - August

Opportunities for Ecological Enhancement

5.33 To promote adherence to the NPPF and the South Cambridgeshire Local Plan (2018) the following opportunities for ecological enhancement have been identified:

- Habitat restoration/creation within floodplain south of River Granta.
- Incorporation of native plant species and those of wildlife importance within the landscaping scheme to provide foraging opportunities for birds, invertebrates and bats.
- Provision of wildlife ponds to increase availability of aquatic habitats for great crested newts and other amphibians within the area.
- Provision of orchards to provide foraging opportunities for birds, invertebrates and bats.
- Provision of new bat roosting and bird nesting opportunities within new buildings and retained mature trees (numbers and specification to be determined at detailed design stage).
- 13cm 'Hedgehog Cut-outs' will be cut/built into all new timber fencing erected between private gardens to enable small mammals and other wildlife to disperse through the Site and forage.

6.0 CONCLUSIONS

6.1 Confirmed ecological constraints to development at the Site have been identified as the presence of:

- River Granta CWS & associated riparian habitats
- Hedgerows
- Woodland

6.2 The following additional investigation/survey work is recommended to inform an evidence-based EcIA of the proposed development, such that suitable ecological impact avoidance, mitigation and/or compensation measures may be adopted:

- Habitat condition Assessments
- River Habitat Survey & Condition Assessment
- Hedgerows Survey & Condition Assessment
- Biodiversity Metric Assessment
- Bat surveys
- Badger surveys
- Water vole and otter surveys
- Reptile surveys
- Great crested newt surveys
- Invertebrate surveys, including freshwater invertebrates and Roman snail

6.3 Recommendations for ecological enhancement measures that could be delivered as part of development at the Site have been provided here-in, which will aid accordance with the South Cambridgeshire Local Plan (2018).

6.4 No overriding constraints to development have been identified subject to the implementation of appropriate mitigation measures in respect of confirmed ecological constraints, and further recommended survey work.

7.0 REFERENCES

British Standards Institution, 2013. *BS 42020:2013 Biodiversity — Code of practice for planning and development*. London: BSI.

British Standards Institution, 2012. *BS 5837:2012 Trees in relation to design, demolition and construction: Recommendations*. London: BSI.

Buglife, no date. *Important Invertebrate Areas*. [online] Available at: < https://www.buglife.org.uk/resources/important-invertebrate-areas/> [Accessed August 2021].

Chartered Institute of Ecology and Environmental Management, 2016. *Guidelines for Assessing and Using Biodiversity Data*. Winchester: CIEEM.

Chartered Institute of Ecology and Environmental Management, 2017. *Guidelines for Ecological Report Writing.* Winchester: CIEEM.

Chartered Institute of Ecology and Environmental Management, 2017. *Guidelines for Preliminary Ecological Appraisal*. 2nd ed. Winchester: CIEEM.

Chartered Institute of Ecology and Environmental Management, 2018. *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine.* Version 1.1. Winchester: CIEEM.

Chartered Institute of Ecology and Environmental Management, 2020. *Guidance on Ecological Survey and Assessment in the UK During the Covid-19 Outbreak*. Version 2, published 9 June 2020. Winchester: CIEEM.

Collins, J., ed., 2016. *Bat Surveys for Professional Ecologists: Good Practice Guidelines*. 3rd ed. London: The Bat Conservation Trust.

Defra, 2011. *Biodiversity 2020: A strategy for England's wildlife and ecosystem services*. London: Defra.

Eaton, M., Aebischer, N., Brown, A., Heam, R., Lock, L., Musgrove, A., Noble, D., Stroud, D. and Gregory, R., 2015. Birds of Conservation Concern 4: the population status of birds in the UK, Channel Islands and Isle of Man. British Birds, 108, pp.708-746.

English Nature, 2001. *Great Crested Newt Mitigation Guidelines*. Peterborough: EN.

Joint Nature Conservation Committee, 1990. *Handbook for Phase 1 habitat survey – a technique for environmental audit*. Revised reprint 2010. Peterborough: JNCC.

JNCC and Defra (on behalf of the Four Countries' Biodiversity Group), 2012. *UK Post-2010 Biodiversity Framework*. [pdf] Peterborough: JNCC. Available at: <http://jncc.defra.gov.uk/page-6189> [Accessed August 2021].

Ministry of Housing, Communities and Local Government, 2019. *National Planning Policy Framework (NPPF)*. London: Ministry of Housing, Communities and Local Government.

Multi-Agency Geographic Information for the Countryside (MAGIC), 2013. *Interactive Map*. [online] Available at: <http://www.magic.gov.uk/MagicMap.aspx> [Accessed August 2021].

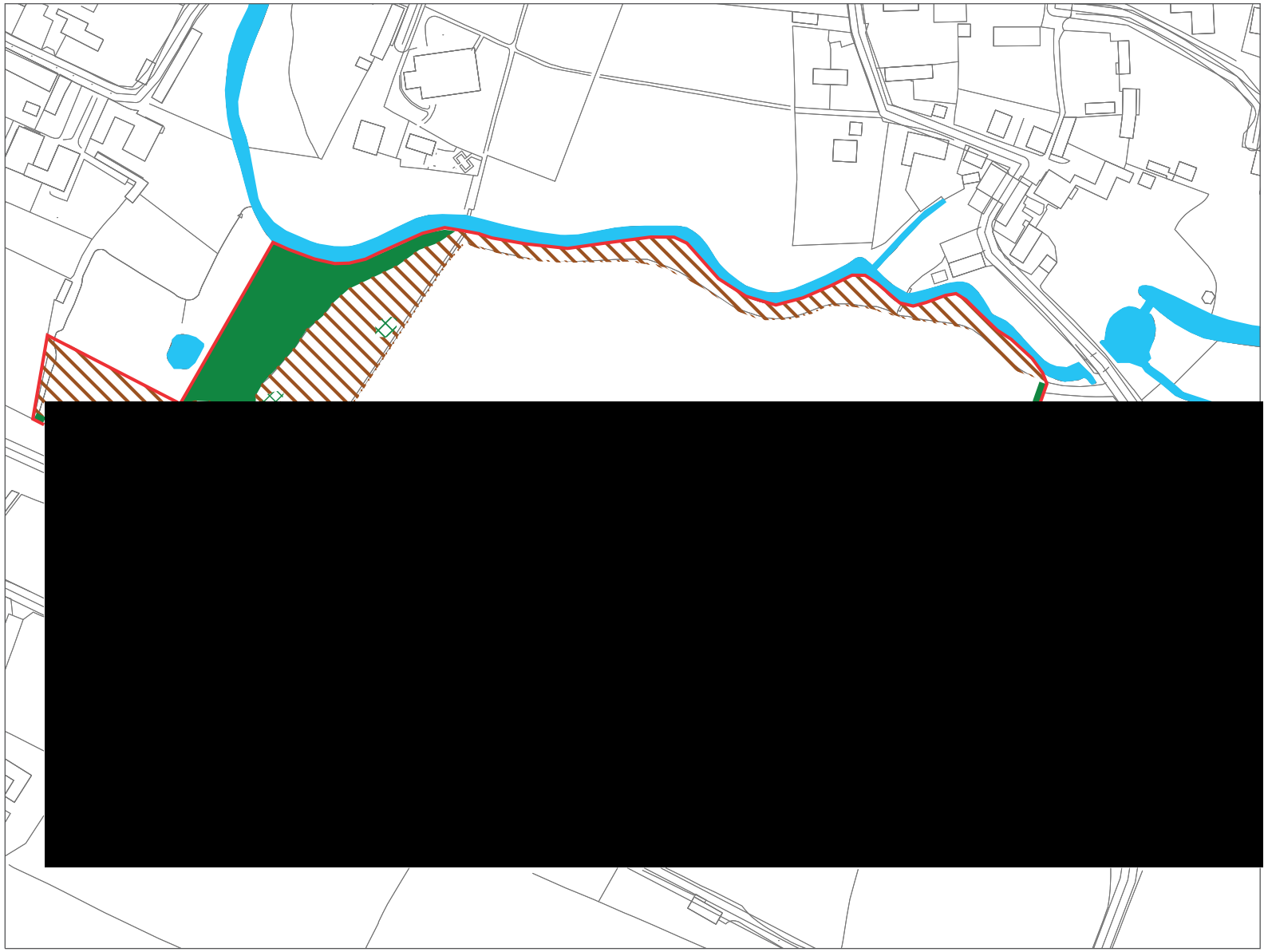
Natural England and Department for Environment, Food & Rural Affairs, 2014. *Protected species and development: advice for local planning authorities*. [online, last updated January 2021] Available at: <https://www.gov.uk/protected-species-and-sites-how-to-review-planning-proposals> [Accessed August 2021].

Oldham, R. S., Keeble, J., Swan, M. J. S. & Jeffcote, M., 2000. Evaluating the suitability of habitat for the Great Crested Newt (*Triturus cristatus*). *Herpetological Journal*, 10(4), pp.143-155.

The Woodland Trust, no date. *Ancient Tree Inventory*. [online] Available at: <https://ati.woodlandtrust.org.uk/> [Accessed August 2021].

Appendix A

Habitats Plan & Photographs



CSA environmental
Dixies Barns, High Street,
Ashwell, Hertfordshire SG7 5NT
t 01462 743647
e ashwell@csaenvironmental.co.uk
w csaenvironmental.co.uk

Project	Land North of Cambridge Road, Linton	Date	Nov 2021	Drawing No.	CSA/5653/107
Drawing Title	Habitats Plan	Scale	Refer to scale	Rev	-
Client	Taylor Wimpey Strategic Land	Drawn	LF	Checked	AC

Photograph 1. Arable field with fallow vegetation which dominates the Site. River Granta CWS in distance (north of Site).

Photograph 2. Arable field with fallow vegetation. H2 on south of Site (right of photo) and H3 in background.

Photograph 3. Tall ruderal vegetation at north of Site, south of River Granta.

Photograph 4. Tall ruderal and scattered scrub to west of arable field.

Photograph 5. Area of tall ruderal and dense scrub in the west of the Site, with H1 to the south (left of photo).

Photograph 6. River Granta CWS with the Site to the south (left of photo).

Appendix B

Legislation and Planning Policy

1.1. The Conservation of Habitats and Species Regulations 2017 (as amended) make prescriptions for the designation and protection of Sites of Community Importance ('European sites', i.e. Special Areas of Conservation and Special Protection Areas) and European Protected Species (EPS). The latter include all native bats, great crested newts, dormice, otters and certain reptiles, listed under Annex II of the Regulations. Following the UK's departure from the European Union, the provisions of the Regulations have been retained through enactment of the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019, which came into force on 31 December 2020.

1.2. The Wildlife and Countryside Act 1981 (as amended, principally by the Countryside and Rights of Way Act 2000) forms the basis for protection of statutory designated sites of national importance (e.g. Sites of Special Scientific Interest; SSSIs) and native species that are rare and vulnerable in a national context. Additionally, badgers are protected under the Protection of Badgers Act 1992.

1.3. Section 40(1) of the Natural Environment and Rural Communities (NERC) Act 2006 states that each public authority, "must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity." This legislation makes it clear that planning authorities should consider impacts to biodiversity when determining planning applications, with particular regard to the Section 41 (S41) lists of 56 habitats and 943 species of principal importance. The UK Biodiversity Action Plan (BAP) has been superseded by the Biodiversity 2020 Strategy, however Local BAPs continue to influence biodiversity management and conservation effort, including through the spatial planning system, at the local scale.

1.4. The National Planning Policy Framework (2019) (NPPF) sets out government planning policies for England and how they should be applied. With regards to ecology and biodiversity, Chapter 15: Conserving and Enhancing the Natural Environment, paragraph 170, states that the planning system and planning policies should minimise impacts on and provide net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures.

1.5. Paragraph 175 sets out the principles that local planning authorities should apply when determining planning applications:

- If significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts).
- 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.

- 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.
- 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.

1.6. The Government Circular 06/2005, which is referred to within the NPPF, defines statutory nature conservation sites and protected species as a material consideration in the planning process.

1.7. Local planning policies of relevance to ecology, biodiversity and/or nature conservation have been set out in Table 1 below.

Table 1. Summary of regional and local planning policy relating to ecology

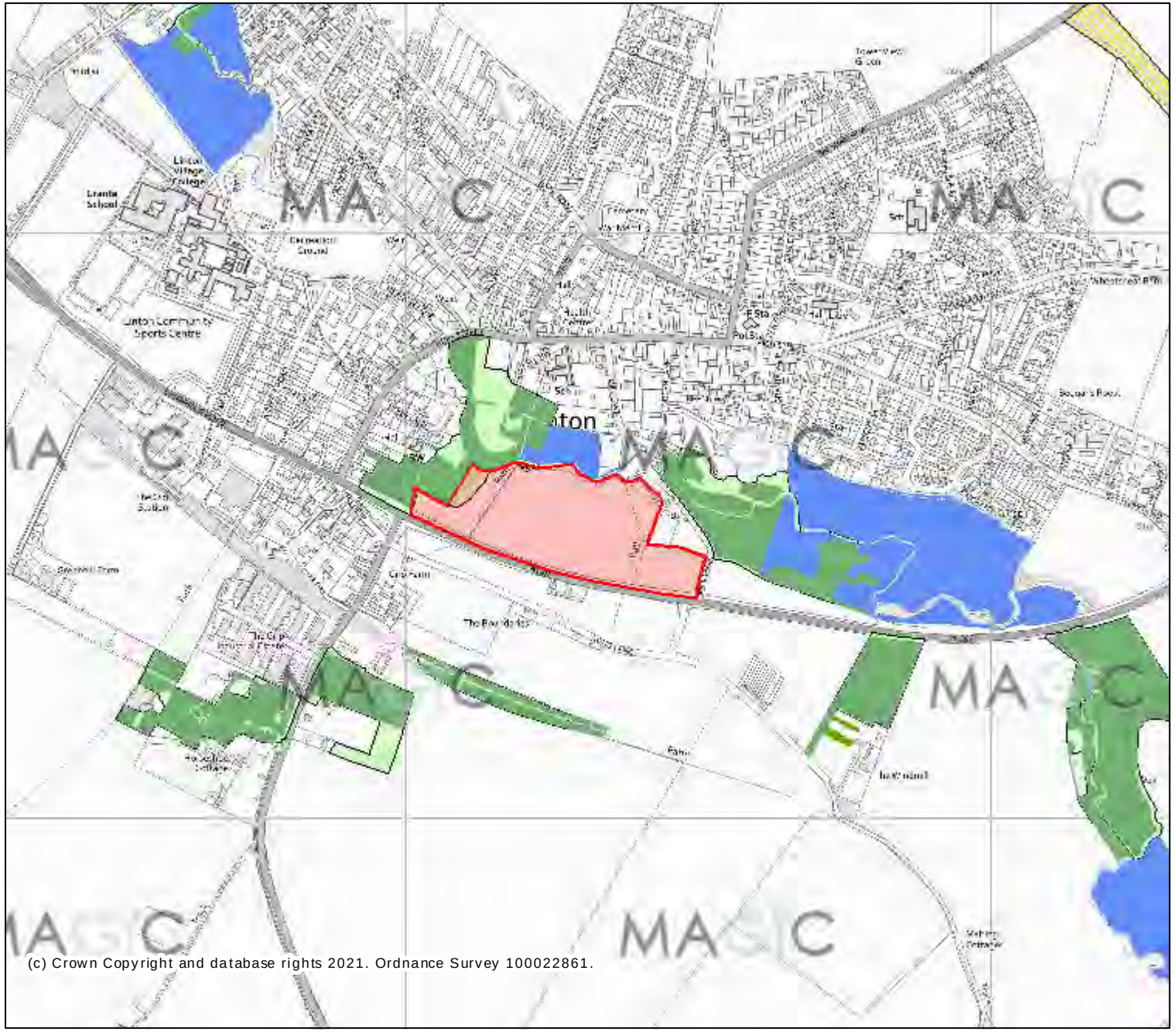
Policy	Summary
South Cambridgeshire Adopted Local Plan 2018	
Policy NH/4: Biodiversity	1. Development proposals where the primary objective is to conserve or enhance biodiversity will be permitted. 2. New development must aim to maintain, enhance, restore or add to biodiversity. Opportunities should be taken to achieve positive gain through the form and design of development. Measures may include creating, enhancing and managing wildlife habitats and networks, and natural landscape. The built environment should be viewed as an opportunity to fully integrate biodiversity within new development through innovation. Priority for habitat creation should be given to sites which assist in the achievement of targets in the Biodiversity Action Plans (BAPs) and aid delivery of the Cambridgeshire Green Infrastructure Strategy. 3. If significant harm to the population or conservation status of a Protected Species, Priority Species1 or Priority Habitat resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission will be refused. 4. Where there are grounds to believe that a proposal may affect a Protected Species, Priority Species or Priority Habitat, applicants will be expected to provide an adequate level of survey information and site assessment to establish the extent of a potential impact. This survey information and site assessment shall be provided prior to the determination of an application. 5. Previously developed land (brownfield sites) will not be considered to be devoid of biodiversity. The reuse of such sites must be undertaken carefully with regard to existing features of biodiversity interest. Development proposals on such sites will be expected to include measures that maintain and enhance

Policy	Summary
	important features and appropriately incorporate them within any development of the site. 6. Planning permission will be refused for development resulting in the loss, deterioration or fragmentation of irreplaceable habitats, such as ancient woodland, unless the need for, and benefits of, the development in that location clearly outweigh the loss.
Policy NH/5: Sites of Biodiversity or Geological Importance	In determining any planning application affecting Sites of Biodiversity or Geological Importance the Council will ensure that the intrinsic natural features of particular interest are safeguarded or enhanced having regard to: a. The international, national or local status and designation of the site; b. The nature and quality of the site's features, including its rarity value; c. The extent of any adverse impacts on the notified features; d. The likely effectiveness of any proposed mitigation with respect to the protection of the features of interest; e. The need for compensatory measures in order to re-create on or off the site features or habitats that would be lost to development.
Policy NH/7: Ancient Woodlands and Veteran Trees	1. Planning permission will be refused for development resulting in the loss or deterioration of ancient woodland (as shown on the Policies Map) or veteran trees found outside ancient woodland, unless the need for, and benefits of, the development in that location clearly outweigh the loss. 2. Development proposals affecting ancient woodland or veteran trees will be expected to mitigate any adverse impacts, and to contribute to the woodland's or veteran tree's management and further enhancement via planning conditions or planning obligations.

Appendix C

Desk Study Information

5653 Priority Habitats Inventory Map



Legend

- Priority Habitat Inventory - Coastal and Floodplain Grazing Marsh (England)

Ancient Woodland (England)

- Ancient and Semi-Natural Woodland
- Ancient Replanted Woodland
- Priority Habitat Inventory - Deciduous Woodland (England)

National Forest Inventory (GB)

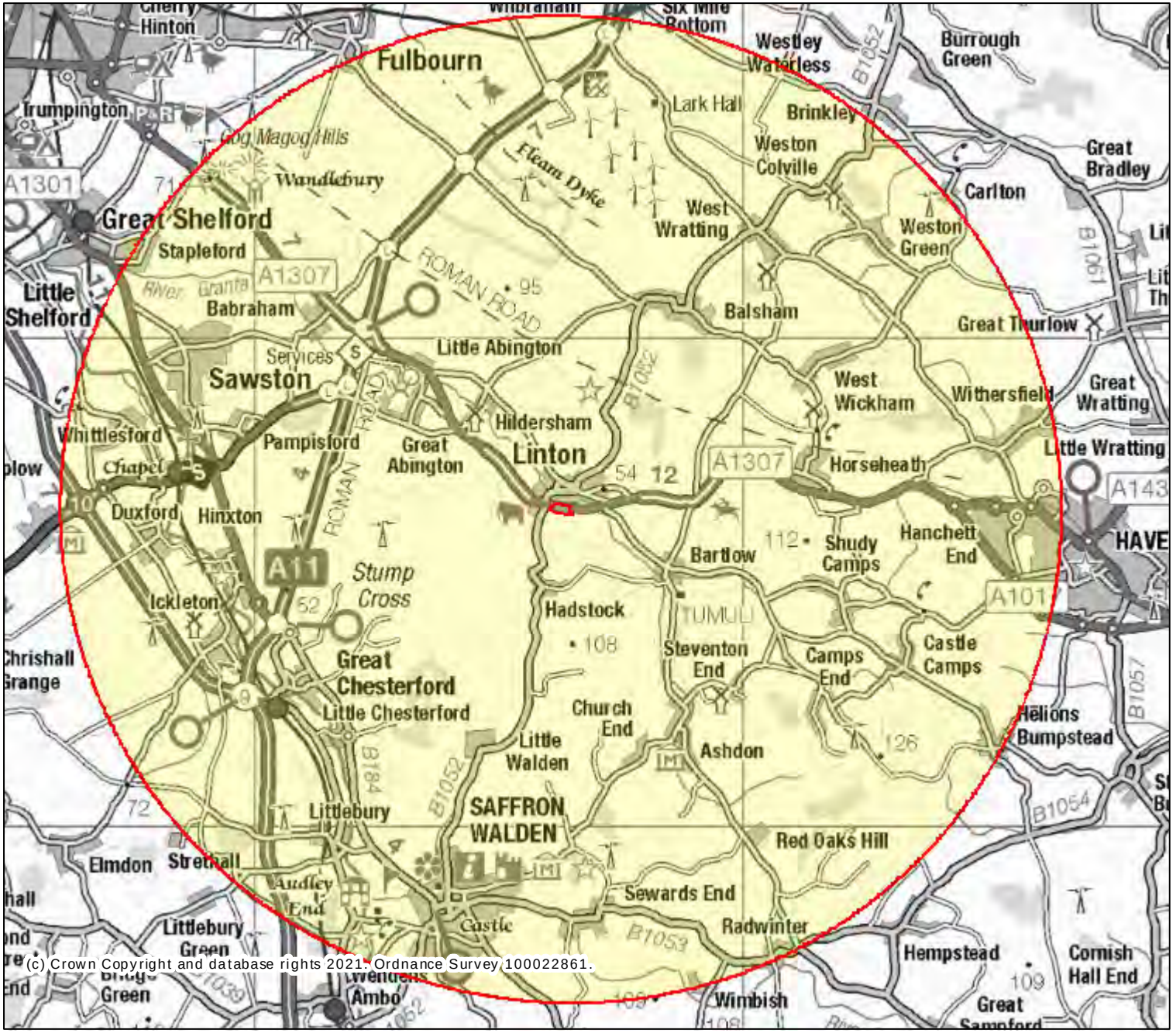
- Assumed woodland
- Broadleaved
- Cloud \ shadow
- Conifer
- Coppice
- Coppice with standards
- Failed
- Felled
- Ground prep
- Low density
- Mixed mainly broadleaved
- Mixed mainly conifer
- Shrub
- Uncertain
- Windthrow
- Young trees
- Priority Habitat Inventory - Traditional Orchards (England)

Projection = OSGB36
xmin = 553800
ymin = 245300
xmax = 558800
ymax = 247800

0 0.15 0.3
km

Map produced by MAGIC on 3 August, 2021.

5653 Designated Site Search 10km



(c) Crown Copyright and database rights 2021. Ordnance Survey 100022861.

Legend

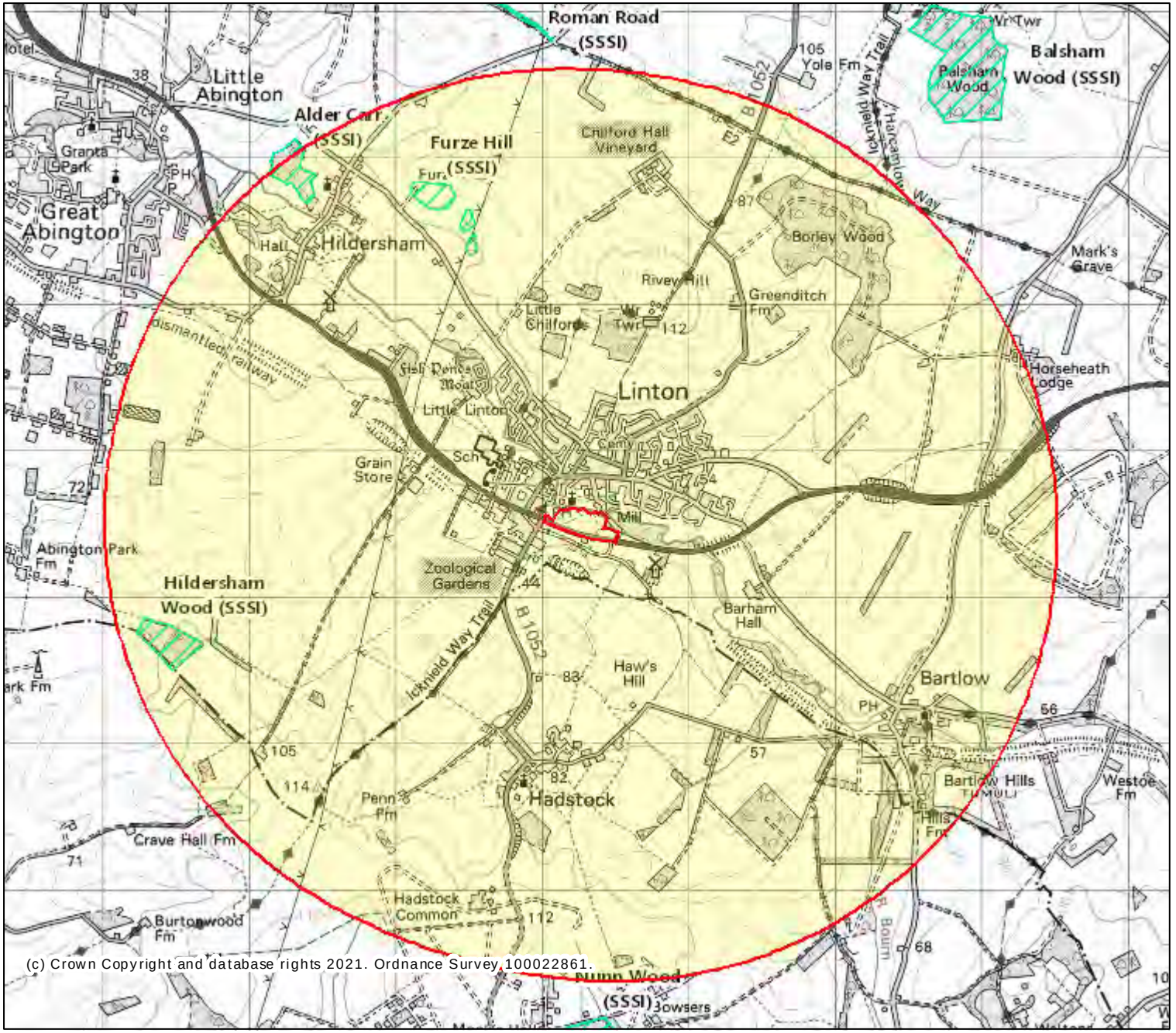
- Ramsar Sites (England)
- Proposed Ramsar Sites (England)
- Special Areas of Conservation (England)
- Possible Special Areas of Conservation (England)
- Special Protection Areas (England)
- Potential Special Protection Areas (England)

Projection = OSGB36
xmin = 526600
ymin = 231200
xmax = 587000
ymax = 261500

0 2 4
km

Map produced by MAGIC on 3 August, 2021.

5653 Designated Site Search 3km



(c) Crown Copyright and database rights 2021. Ordnance Survey 100022861.

Legend

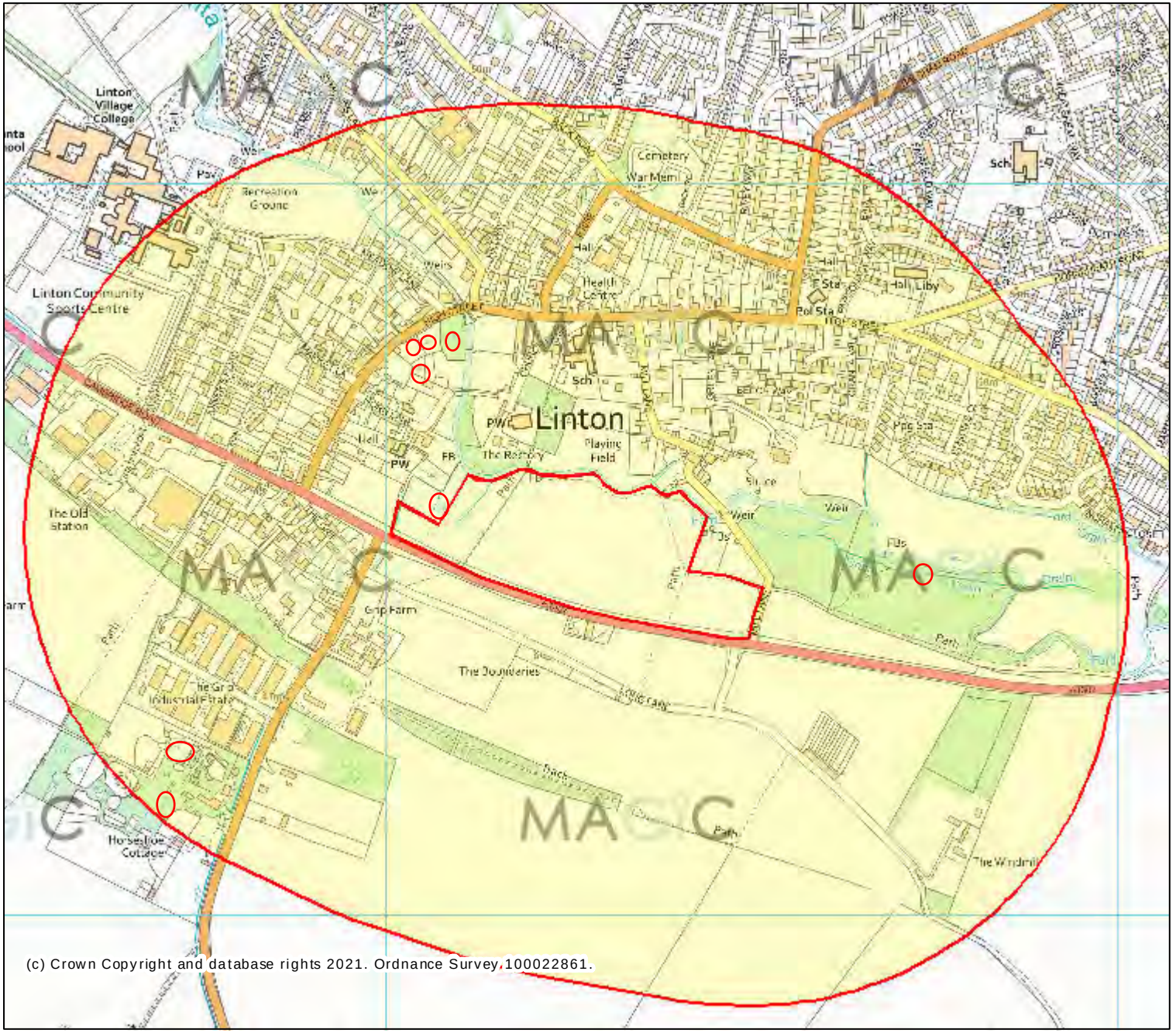
- Local Nature Reserves (England)
- National Nature Reserves (England)
- Sites of Special Scientific Interest (England)

Projection = OSGB36
xmin = 546200
ymin = 241500
xmax = 566400
ymax = 251600

0 0.75 1.5
km

Map produced by MAGIC on 3 August, 2021.

5653 Pond Search 500m



Projection = OSGB36
xmin = 554300
ymin = 245500
xmax = 558300
ymax = 247600

0 0.15 0.3
km

Map produced by MAGIC on 3 August, 2021.

Appendix D

Habitats and Flora Species List

Habitat	Flora	
	Common name	Latin name
Arable (c1)	Broadleaf dock	*Rumex obtusifolius*
	Cock's-foot	*Dactylis glomerata*
	Common nettle	*Urtica dioica*
	Creeping thistle	*Cirsium arvense*
	Bristly ox-tongue	*Helminthotheca echiodes*
	Dove's-foot crane's-bill	*Geranium molle*
	False oat-grass	*Arrhenatherum elatius*
	Field speedwell	*Veronica persica*
	Forget-me-not sp.	*Myosotis sp.*
	Garlic mustard	*Alliaria petiolata*
	Ground ivy	*Glechoma hederacea*
	Hawkbit sp.	*Leontodon sp.*
	Perennial ryegrass	*Lolium perenne*
	Ragwort	*Scrophularia nodosa*
	Rough meadow-grass	*Poa trivialis*
	Slender speedwell	*Veronica filiformis*
	Smooth sow thistle	*Sonchus oleraceus*
	Willowherb sp.	*Epilobium sp.*
	Yorkshire fog	*Holcus lanatus*
Tall Ruderal	Alder	*Alnus glutinosa*
	Bramble	*Rubus fruticosus agg.*
	Bristly ox-tongue	*Helminthotheca echiodes*
	Broad-leaved dock	*Rumex obtusifolius*
	Burdock	*Arctium sp.*
	Cleavers	*Galium aparine*
	Cock's-foot	*Dactylis glomerata*
	Common couch	*Elytrigia repens*
	Common mallow	*Malva sylvestris*
	Common nettle	*Urtica dioica*
	Creeping thistle	*Cirsium arvense*
	Dogwood	*Cornus sp.*
	Dove's-foot crane's-bill	*Geranium molle*
	Elder	*Sambucus nigra*
	Fleabane	*Pulicaria dysenterica*
	Goat willow	*Salix caprea*
	Great willowherb	*Epilobium hirsutum*
	Greater plantain	*Plantago major*
	Ground ivy	*Glechoma hederacea*
	Hedge bindweed	*Calystegia sepium*
	Herb Robert	*Geranium robertianum*
	Hogweed	*Heracleum sphondylium*
	Knotgrass	*Polygonum sp.*
	Oak sp.	*Quercus sp.*
	Pendulous sedge	*Carex pendula*
	Perennial ryegrass	*Lolium perenne*
	Poppy sp.	*Papaver rhoeas*
	Prickly sow thistle	*Sonchus asper*
	Ragwort	*Scrophularia nodosa*

	Sillverweed	*Potentilla anserina*
	Smooth sow thistle	*Sonchus oleraceus*
	Soft brome	*Bromus hordeaceus*
	Spear thistle	*Cirsium vulgare*
	Teasel	*Dipsacus fullonum*
	Wall barley	*Hordeum murinum*
	Weeping willow	*Salix babylonica*
	White dead-nettle	*Lamium album*
	Wild basil	*Clinopodium vulgare*
	Wild cherry	*Prunus* sp.
	Willow sp.	*Salix* spp.
	Yorkshire fog	*Holcus lanatus*
Dense Scrub (h3h)	Bramble	*Rubus fruticosus* agg.
	Common nettle	*Urtica dioica*
	Elder	*Sambucus nigra*
	Hedge bindweed	*Calystegia sepium*
Woodland (wh1)	Alder	*Alnus glutinosa*
	Ash	*Fraxinus excelsior*
	Bindweed	*Convoulvulus sp.*
	Bramble	*Rubus fruticosus agg.*
	Common nettle	*Urtica dioica*
	Creeping thistle	*Cirsium arvense*
	Fleabane	*Pulicaria dysenterica*
	Hawthorn	*Crataegus monogyna*
	Hogweed	*Heracleum sphondylium*
	Lime sp.	*Tilia sp.*
	Ragwort	*Scrophularia nodosa*
	Silver birch	*Betula pendula*
	Snowberry	*Symphoricarpos albus*
	Sycamore	*Acer pseudoplatanus*
	Wild basil	*Clinopodium vulgare*
	Willowherb sp.	*Epilobium sp.*
	Willow sp.	*Salix* spp.
	Yew	*Taxus baccata*
	Yorkshire fog	*Holcus lanatus*
Hedgerows & Mature Trees (h2)	Ash	*Fraxinus excelsior*
	Blackthorn	*Prunus spinosa*
	Bramble	*Rubus fruticosus* agg.
	Burdock	*Arctium sp.*
	Cleavers	*Galium aparine*
	Cock's-foot	*Dactylis glomerata*
	Common nettle	*Urtica dioica*
	Cow parsley	*Anthriscus sylvestris*
	Creeping thistle	*Cirsium arvense*
	Dog rose	*Rosa canina spp.*
	Elder	*Sambucus nigra*
	Elm	*Ulmus spp.*
	Field maple	*Acer campestre*
	Ground ivy	*Glechoma hederacea*
	Hazel	*Corylus avellana*

	Hawthorn	*Crataegus monogyna*
	Holly	*Ilex aquifolium*
	Ivy	*Hedera helix*
	Oak sp.	*Quercus sp.*
	Ragwort	*Jacobaea vulgaris*
	Rough chervil	*Chaerophyllum temulum*
	Spear thistle	*Cirsium vulgare*
	Sycamore	*Acer pseudoplatanus*
	Teasel	*Dipsacus fullonum*
	Wayfaring tree	*Viburnum lantana*
	White bryony	*Bryonia dioica*

CSA
environmental

Dixies Barns, High Street, Ashwell,
Hertfordshire SG7 5NT
t 01462 743647
e ashwell@csaenvironmental.co.uk
w csaenvironmental.co.uk

Suite 1, Deer Park Business Centre, Eckington,
Pershore, Worcestershire WR10 3DN
t 01386 751100
e pershore@csaenvironmental.co.uk
w csaenvironmental.co.uk

Office 20, Citibase, 95 Ditchling Road,
Brighton BN1 4ST
t 01273 573871
e brighton@csaenvironmental.co.uk
w csaenvironmental.co.uk

9/B.2 Southgate Chambers, 37-39 Southgate
Street, Winchester SO23 9EH
t 01962 587200
e winchester@csaenvironmental.co.uk
w csaenvironmental.co.uk

Appendix 4: Biodiversity Metric Assessment and Calculation

Biodiversity Net Gain Appraisal

December 2021

Introduction

1.1 This briefing note has been prepared by CSA Environmental on behalf of Taylor Wimpey Strategic Land, in relation to Land North of Cambridge Road, Linton. It provides an appraisal of the potential net effects of proposed residential development at the Site, and is intended to provide initial advice and guidance, in particular to ensure adherence to the '*mitigation hierarchy*'.

1.2 This document should be read in conjunction with the Preliminary Ecological Appraisal (PEA) prepared for the site (CSA/5653/01 November 2021), along with the completed Biodiversity Metric 3.0 (BM3.0) Calculation Tool. Headline results of the BM3.0 calculations are provided in Appendix A with full spreadsheet calculation provided separately for further interrogation.

1.3 It should be noted that this appraisal assesses 'Habitat Units' and does not address the net effect of proposed development upon linear habitat features including hedgerows and watercourses.

Extended Phase 1 Habitat Survey

1.4 Extended Phase 1 Habitat survey information was collected on 13 August 2021 by Alexandra Cole MCIEEM FISC (Level 4) as part of a Preliminary Ecological Appraisal (PEA). Habitats recorded are mapped on the Habitats Plan (CSA/5653/107) provided in Appendix A. Botanical species lists for each habitat identified are provided within the PEA (CSA/5653/01).

1.5 Findings of the above Phase 1 Habitat survey were translated into categories within the UK Habitats Classification system which forms the basis of the BM3.0 calculation tool.

Condition Assessment

1.6 Habitat condition was assigned following guidance from the 'Technical Supplement' document (Natural England, 2021) which accompanies BM3.0. Assessment criteria were followed for each broad habitat type, to determine the condition of each habitat within the Site.

Calculations

1.7 The BM3.0 calculation tool was used to quantify and assess the anticipated impact of the proposed development upon the biodiversity value of the Site, through change in biodiversity units (including habitat units only) and the overall percentage of gain/loss achieved. Metric calculations have been undertaken by Alexandra Cole MCIEEM FISC (Level 4).

Assumptions & Limitations

1.8 It should be noted that the accuracy of habitat area measurement is limited by the form of baseline data collection and resolution of development proposal drawings. In this instance baseline and post-development habitat areas have been calculated by cross referencing illustrative habitat and proposal plans with aerial imagery.

1.9 On-site condition assessments have not been conducted for this high level assessment, with the on-site woodland not accessible at the time of survey. Reasonable assumptions have been made with regard to the condition of existing habitats on-site. Additionally, in the absence of detailed planting plans, reasonable assumptions have been made with regard to the type/condition of habitats that could be created.

1.10 The net effect upon biodiversity of any development of the site will be dependent on further detailed botanical/habitat surveys and final scheme design, including detailed landscaping and management proposals.

Baseline

1.11 The Site is dominated by a large fallow arable field, with smaller areas of tall ruderal/dense scrub and a block of woodland to the west. Additionally, a margin of tall ruderal runs along the northern Site boundary, south of the River Granta and hedgerows bound the Site to the south and east.

1.12 Based on the metric adopted and utilising the Habitats Plan (CSA/5653/107), the on-site baseline is calculated as **18.19 habitat units.** The majority of these habitat units arise from habitats of low distinctiveness, principally arable land and tall ruderal, with a small contribution from scrub and woodland habitats of moderate distinctiveness.

1.13 No high or very high distinctiveness habitats are present on the Site. It should be noted that the River Granta to the north of the Site, and any hedgerow habitats are likely to be of greater distinctiveness, but have not been included within this appraisal upon 'Habitat Units'.

Proposed Development & Biodiversity Outcomes

1.14 The proposed development comprises up to 85 dwellings within a c. 2.75ha area of the wider 6.80ha site. This modest quantum of development allows for the following post-intervention scenario:

- Retention of all moderate distinctiveness habitats (scrub and woodland), with enhancement options available
- Reversion of arable land to a combination of grasslands, including formal amenity, wildflower and wet grassland
- Wetland habitats within SuDS features
- Community orchard creation
- Street and parkland tree planting
- Planting of native thicket/scrub habitats

1.15 Based on the metric adopted and taking measurements from the Concept Masterplan (CSA/5653/106/A) the on-site post-intervention 'habitat units' were calculated as 24.67 habitat units.

1.16 The net effect of biodiversity is therefore calculated as the following:

- Baseline: 18.19 Habitat Units
- Post-intervention: 24.67 Habitat Units
- Total Net Unit Change: 6.48 Habitat Units or +35.60% gain
- The proposals satisfy trading rules.

1.17 The calculation above and provided in Appendix C demonstrates that based on the current proposals a net gain in biodiversity is likely to be achievable alongside development in respect of habitat units.

1.18 Where the above BNG outcome is realised on-site, this would be in line with both the future 10% net gain objective as stated within schedule 14 of the Environment Act (2021) and potential future policy for Greater Cambridgeshire of 20% net gain.

Enhancement

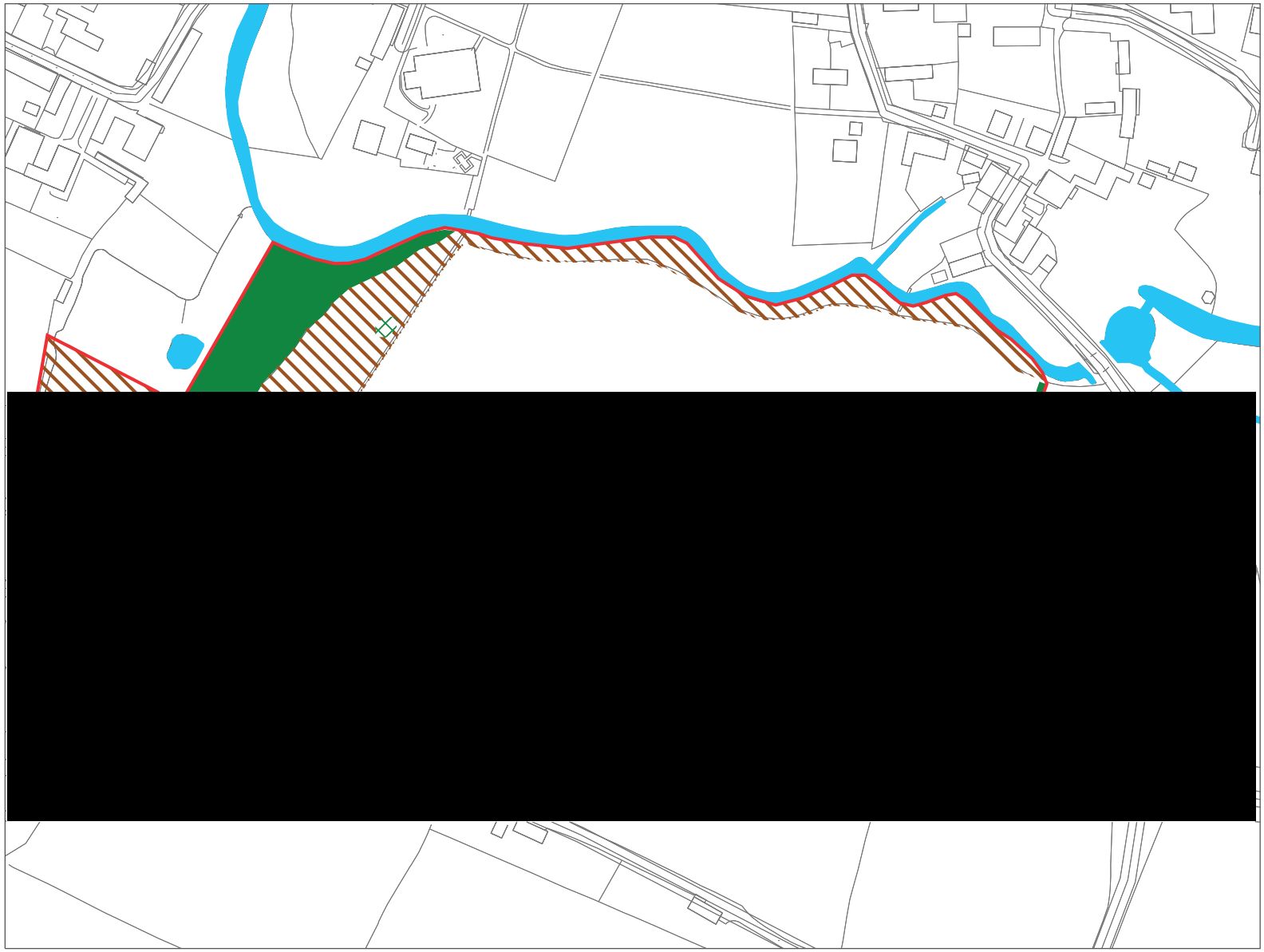
1.19 The following ecological enhancement measures, which sit outside of the Biodiversity Metric assessment, have been proposed within the PEA which would deliver wider qualitative gains for biodiversity:

- Habitat restoration/creation within floodplain south of River Granta.
- Incorporation of native plant species and those of wildlife importance within the landscaping scheme to provide foraging opportunities for birds, invertebrates and bats.
- Provision of wildlife ponds to increase availability of aquatic habitats for great crested newt and other amphibians within the area.
- Provision of orchards to provide foraging opportunities for birds, invertebrates and bats.

- Provision of new bat roosting and bird nesting opportunities within new buildings and retained mature trees (numbers and specification to be determined at detailed design stage).
- 13cm 'Hedgehog Cut-outs' will be cut/built into all new timber fencing erected between private gardens to enable small mammals and other wildlife to disperse through the Site and forage.

Appendix A

Habitats Plan



CSA environmental
Dixies Barns, High Street,
Ashwell, Hertfordshire SG7 5NT
t 01462 743647
e ashwell@csaenvironmental.co.uk
w csaenvironmental.co.uk

Project	Land North of Cambridge Road, Linton	Date	Nov 2021	Drawing No.	CSA/5653/107
Drawing Title	Habitats Plan	Scale	Refer to scale	Rev	-
Client	Taylor Wimpey Strategic Land	Drawn	LF	Checked	AC

Appendix B

Development Proposals

A children's play area at the centre of the development and set within the the public open space will be overlooked by the new residential development and extensive recreational routes. Its central location will ensure it is accessible to all and both new and existing residents of Linton, promoting an active and integrated community. The play area will be sympathetically designed with a natural characteristic to respect the edge of settlement location and the immediate character of the development.

MILL LANE north to HIGH STREET, LINTON

Potential location for two large SuDS basins designed to provide wildlife and habitat benefits forming an integral part of the Site's green infrastructure offering. The basins will be located at the end of the vista through the development and will create a link to the River Granta.

The new wetland meadow walk will utilise the flood plain, turning this constraint into an opportunity. Wetland habitats will be created, with new woodland, thicket and tree planting tolerant of wetter ground conditions, wetland wildflower meadow mixes and informal mown footways, will create a landscape which will have both social and environmental benefits. The recreational routes will connect into the public footpaths, linking the new homes with the open space and beyond to Linton. These spaces will link the woodland to the east and the west of the development and will provide the opportunity for informal play, dog walking and picknicking, with potential viewing platforms over the River Granta, further creating a holistic environment for both people and wildlife to flourish.

New recreational footways will meander through the open space and wetland meadows, providing opportunities for informal play and recreation. Trim-trail stations along these routes will also promote a healthy and active community, providing a range of play opportunities for all ages and abilities.

A1307 CAMBRIDGE RD north west to SAWSTON & CAMBRIDGE

B1052 HADSTOCK RD south to SAFFRON WALDEN

A1307 CAMBRIDGE RD east to HORSEHEATH & HAVERHILL

Retaining the woodland habitat in the western part of the Site, will form part of a wildlife area, where a number of ecological enhancements could be implemented to help the Site work towards achieving a biodiversity net gain. Wildlife ponds, bat and bird boxes, log piles and wildflower woodland meadows will create a space where wildlife can thrive. Interpretation boards will inform residents of the wildlife area's ecological offering. The wildlife area will also connect into the wetland meadows walk, creating a river corridor and connection into the heart of Linton.

Proposed vehicular access point to be taken from Cambridge Road.

New boundary planting will strengthen the existing vegetation along the Site's boundaries, and will enhance the development's strong green framework, befitting wildlife corridors and support its continued visual containment.

New community orchards will provide further habitat enhancements at the heart of the development, as well as social benefits, including a space to 'pick your own' and informal recreation.

Orientating the new homes to overlook the areas of more formal open space, strengthened with avenue tree planting, will frame the important vista across the Site towards Linton Water Tower.

New homes along the Site's southern boundary adjacent to Cambridge Road, will need to be designed to mitigate against any acoustic impacts associated with Cambridge Road. Fronting the road, deeper rear gardens and new tree and thicket planting will help in achieving this.

Potential landscaped area at the junction of Mill Lane and Cambirdge Road, will create a gateway feature into Linton when traveling west along the A1307. This space will provide glimpsed views across the development, creating a sense of arrival to Linton.

SUBJECT TO TECHNICAL INPUTS

+40m (AOD) +45m (AOD) +50m (AOD)

HORN LANE MILL LANE HADSTOCK ROAD LONG LANE CAMBRIDGE ROAD A1307

LINTON

PETROL STATION

WILDLIFE WOODLAND AREA WILDLIFE POND WETLAND MEADOW WALK LEAP SuDS Orchard

L1 L2 L3 L4 L5 L6 L7 L8 L9 L10 L11

N

0 10 20 30 40 50 m

Site Boundary: **Aprx. 6.80ha**

Potential vehicular access point

Developable area **Aprx. 2.75ha**
Up to 85 units @ 30dph

Public open space to include thicket, tree and wildflower planting

Orchard and wildlife areas

Location for children's play area

Location for Trim-trail stations

Potential location for sustainable drainage features (SuDS) with new habitats

Location for Wildlife Ponds

Viewing platforms over the River Granta

Primary street

Secondary streets within the development

Lanes and private drives

Avenue tree planting

Pedestrian and cycle routes
(Routes within wetland meadow to be boardwalks)

Landscped gateway feature

INFLUENCES & CONTEXT

Existing vegetation

Local road network

Public Rights of Way

Existing contours
(AOD: Above Ordnance Datum)

Water bodies and watercourses
River Granta

Listed Buildings:
L1. Osnaburgh house **(Grade II*)**
L2. United Reformed Church **(Grade II)**
L3. Springfield Cottage **(Grade II)**
L4. Barn & Pump to north of The Guildhall **(Grade II)**
L5. The Guildhall **(Grade II)**
L6. Church Cottage **(Grade II)**
L7. Parish Church of St Mary the Virgin **(Grade I)**
L8. Mill Brook **(Grade II)**
L9. Linton Mill **(Grade II)**
L10. The Manor House **(Grade II)**
L11. The Mill House **(Grade II)**

NOTE:
Please refer to ***CSA/5653/105*** for the Site Opportunities & Influences

Rev	Date	By	Description
A	19.10.21	JC	Amended with client comments

CSA environmental
Dixies Barns, High Street, Ashwell, Hertfordshire SG7 5NT
t 01462 743647
e ashwell@csaenvironmental.co.uk
w csaenvironmental.co.uk

Project	Land North of Cambridge Road **LINTON**		
Title	Concept Masterplan		
Client	Taylor Wimpey Strategic Land		
Scale	1:1250 @ A2	Drawn	JC
Date	October 2021	Checked	CS
Drawing No.	CSA/5653/106	Rev	A

Appendix C

Biodiversity Metric 3.0 Headline Results

Land North of Cambridge Road, Linton

Headline Results

Return to results menu

On-site baseline	*Habitat units*	**18.19**
	Hedgerow units	**0.00**
	River units	**0.00**
On-site post-intervention (Including habitat retention, creation & enhancement)	*Habitat units*	**24.67**
	Hedgerow units	**0.00**
	River units	**0.00**
On-site net % change (Including habitat retention, creation & enhancement)	*Habitat units*	**35.60%**
	Hedgerow units	**0.00%**
	River units	**0.00%**
Off-site baseline	*Habitat units*	**0.00**
	Hedgerow units	**0.00**
	River units	**0.00**
Off-site post-intervention (Including habitat retention, creation & enhancement)	*Habitat units*	**0.00**
	Hedgerow units	**0.00**
	River units	**0.00**
Total net unit change (including all on-site & off-site habitat retention, creation & enhancement)	*Habitat units*	**6.48**
	Hedgerow units	**0.00**
	River units	**0.00**
Total on-site net % change plus off-site surplus (including all on-site & off-site habitat retention, creation & enhancement)	*Habitat units*	**35.60%**
	Hedgerow units	**0.00%**
	River units	**0.00%**
Trading rules Satisfied?		**Yes**

Appendix 5: Flood Risk Assessment & Drainage Strategy Report

A Report for

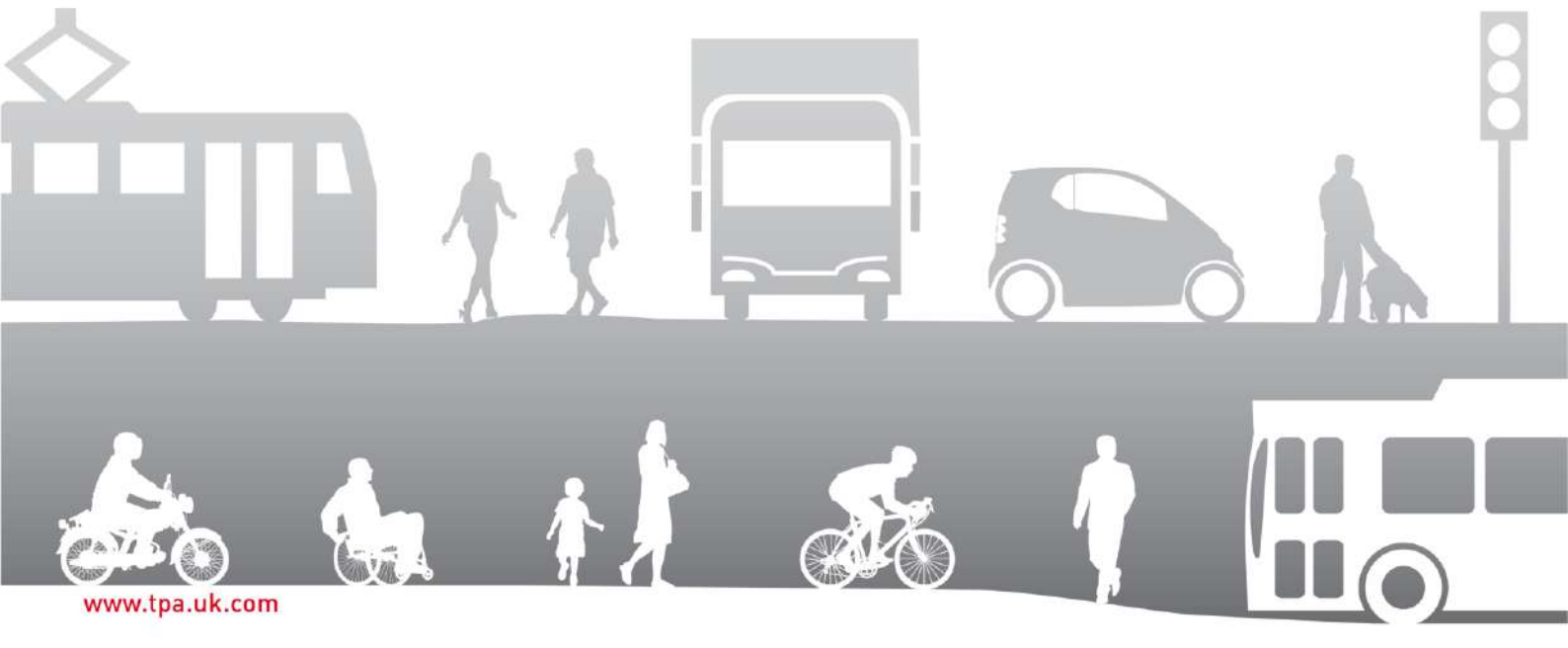
TAYLOR WIMPEY STRATEGIC LAND

In respect of

Land North of Cambridge Road (A1307), Linton

Flood Risk Assessment & Drainage Strategy Report

February 2020



www.tpa.uk.com

DOCUMENT SIGNATURE AND REVIEW SHEET

Project Details

Project Title:	Land North of Cambridge Road (A1307), Linton		
Project No.:	1902-05	**Report No.:**	1902-05/FRA/01
Client:	Taylor Wimpey Strategic Land		

	Prepared By:	Checked By:	Approved for issue
Name	Nauzet Rodriguez	Tim Hornby	Julian Clarke
Signature	NR	TH	JC
Date	February 20	February 20	February 20

Document Review

Revision	Date	Description	Checked By

Issued by:

Bristol
Cambridge
London
Manchester
Oxford
Welwyn Garden City

Transport Planning Associates
The Stables
7 Chesterton Mill
French's Road
Cambridge
CB4 3NP

01223 455385
cambridge@tpa.uk.com
www.tpa.uk.com

CONTENTS PAGE

LIST OF FIGURES

LIST OF APPENDICES

EXECUTIVE SUMMARY

Transport Planning Associates has been commissioned by Taylor Wimpey Strategic Land in collaboration with the landowner to support the promotion of 'Land North of Cambridge Road (A1307), Linton' to be referred to hereafter as 'the Site'.

The Site is identified as being within Flood Zones 1, 2 and 3, where there is less than 0.1%, between 0.1% and 1% and more than 1% annual probability of river or sea flooding respectively.

The Site superficial deposits are classified as part of Alluvium – Clay, Silt, Sand and Gravel and the River Terrace Deposits, 1 to 2 – Sand and Gravel. The bedrock deposits is underlain with the New Pit Chalk Formation – Chalk.

The nearest Main River to the Site is the River Granta, which is located to the north of the Site. There are also a number of minor drains within the Site and its immediate vicinity which currently discharge into the existing River Granta.

According to Anglian Water asset map, there is no surface water public sewer within the Site's vicinity. However, there is a foul water public sewer running to the west of the proposed development and to the north of the River Granta.

Following the hierarchy of the surface water disposal, stated within The Building Regulations approved documents Part H, there are three options for the management of surface water drainage at the Site:

- An adequate soakaway/infiltration system;
- Discharge into the nearest watercourse; or
- Discharge into the existing public sewer.

The underlying soil type is considered to be compatible for using infiltration techniques as a way to manage the surface water drainage runoff. However, specific on-site infiltration testing will be required in order to confirm whether the existing Site ground conditions are compatible for the storage of groundwater.

Should the on-site infiltration testing demonstrates that the storage of groundwater is not a viable method for the management of the surface water drainage runoff, attenuation and discharge within the nearest watercourse will be proposed as part of the overall surface water drainage strategy.

A pre-planning enquiry has been submitted to Anglian Water in order to receive further information with regards to how to deal with foul water drainage flows. As part of the Pre-Planning Enquiry, a confirmation of the current capacity within the existing foul water public sewer network and a proposed connection point will be provided.

The drainage strategy has been developed with reference to the relevant national and local guidance documents, including making adequate allowances for climate change (40%) and urban creep (10%), which is known as the loss of permeable surfaces within urban areas creating increased runoff which contributes to flooding and other problems.

It is considered that this assessment represents a comprehensive and robust analysis of the flood impact of the development upon other adjacent properties and of existing flood mechanisms on the development itself.

It demonstrates that the proposed development is sustainable in terms of flood risk and the management of foul and surface water drainage.

1 INTRODUCTION

1.1 Transport Planning Associates (TPA) has been instructed by Taylor Wimpey Strategic Land in collaboration with the landowner to support the promotion of Land North of Cambridge Road (A1307), Linton ('the Site'), for future residential development of circa 85 dwellings and assess its suitability in flood risk and drainage related terms.

1.2 The Site is an amended version of a previously submitted larger site which extended to land south of the A1307, and was originally submitted as part of the Greater Cambridge Local Plan: Call for sites 2019 consultation.

1.3 These submissions form part of a series of representations in response to the new Greater Cambridge Local Plan Issues and Options 2020 consultation which is seeking potential sites to be put forward and allocated for future development, in order to inform the upcoming Greater Cambridge Joint Local Plan.

1.4 As part of this call for sites, each site or location will be assessed on its suitability, availability and achievability for future development, with local planning constraints also considered.

1.5 In response to this criteria, key flood risk and drainage related matters will be addressed in relation to the Site. This will include the identification of achievable and appropriate methods for the delivery of the Site in terms of flood risk, foul and surface water drainage.

1.6 This report has been prepared to support the potential development of this Site and demonstrate that a development at this location is acceptable and also appropriate measures can be adopted to manage flood risk and drainage.

Flood Risk Assessment

1.7 The Flood Risk Assessment ('FRA') is a desktop study to ascertain potential flood risks to the development Site by gathering information from:

- The British Geological Survey ('BGS') 'Superficial' and 'Bedrock' maps;
- The Environment Agency ('EA') 'Flood Maps';
- The South Cambridgeshire District Council Strategic Flood Risk Assessment dated September 2010 ('SCDC SFRA'), and;
- Cambridgeshire Flood and Water Supplementary Planning Document.

Foul and Surface Water Management Strategy

1.8 The management of foul and surface water will be undertaken in accordance with the Sewers for Adoption ('SfA') (A Design and Construction Guide for Developers) to ensure that an appropriate system is developed for dealing with both foul and surface water generated by the Site.

1.9 The management of the surface water will acknowledge any sources of flooding discovered in the FRA, provide guidance to the developer on how to manage surface water runoff and provide evidence that the developed Site's surface water runoff will be managed, using the appropriate system to at least mimic the current flows.

2 EXISTING SITE

Site Location

2.1 The Site is located in Linton, Cambridgeshire. It is currently Greenfield and it is bounded to the west by a residential area, to the south by Cambridge Road (A1307), to the east by Mill Lane and to the north by the River Granta.

2.2 The nearest post code is CB21 4NL and the approximate grid reference for the centroid of the Site is X_556287, Y_246503.

2.3 A copy of the Site Location Plan is included in **Appendix A**.

Site Description

2.4 The total Site area is approximately 6.32 ha and it is currently Greenfield.

2.5 A topographical survey carried out by Survey Solutions shows that the Site falls naturally from south to north of the Site, with levels ranging from approximately 42.50 m AOD to the south and 38.00 m AOD to the north of the Site.

2.6 A copy of the topographical survey and the existing ground levels model have been included within **Appendix B**.

2.7 The nearest Main River to the Site is the River Granta, which is located to the north of the Site.

2.8 There are also a number of minor drains within the Site and its immediate vicinity which currently discharge into the existing River Granta.

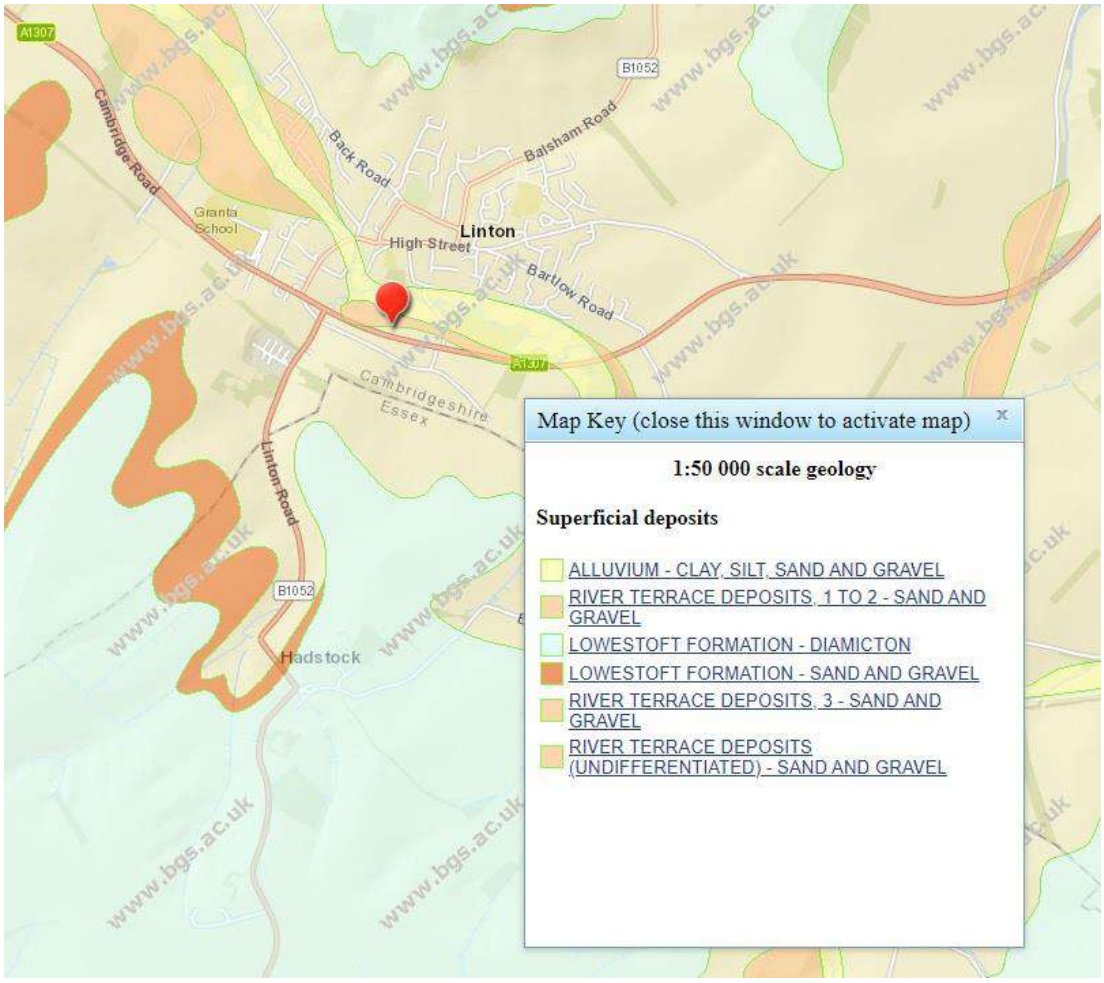
Site Geology

2.9 The BGS maps have been studied to identify the Site's geological properties. The following figures demonstrate the information extracted from BGS maps with the indicative Site location highlighted in red.

Geology

2.10 Figure 2.1 below shows the Site's superficial deposit geological information:

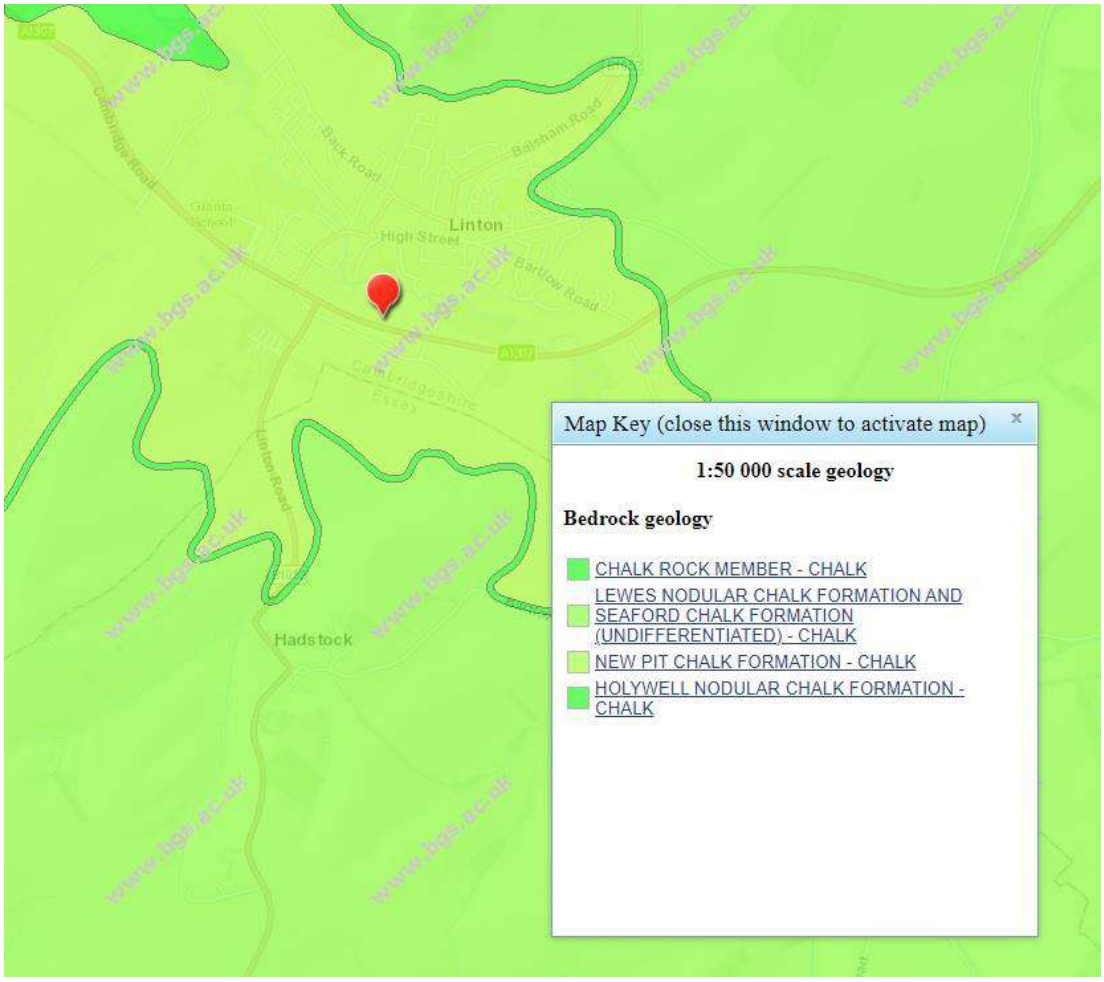
Figure 2.1 British Geological Surveys – Superficial Geology Map



2.11 Figure 2.1 shows that the Site's superficial deposits are classified as part of the Alluvium – Clay, Silt, Sand and Gravel and the River Terrace Deposits, 1 to 2 – Sand and Gravel.

2.12 Both superficial deposits, the Alluvium and the River Terrace Deposits were formed up to 2 million years ago in the Quaternary Period where the local environment was previously dominated by rivers. These sedimentary deposits are fluvial in origin. They are detrital, ranging from coarse to fine-grained and form beds and lenses of deposits reflecting the channels, floodplains and levees of a river or estuary (if in a coastal setting).

Figure 2.2 British Geological Surveys – Bedrock Geology Map



2.13 Figure 2.2 identifies that the Site is underlain by the New Pit Chalk Formation – Chalk. This soil type is considered to be a sedimentary bedrock formed approximately 90 to 94 million years ago in the Cretaceous Period where the local environment was previously dominated by warm chalk seas.

2.14 These sedimentary rocks are shallow-marine in origin. They are biogenic and detrital, generally comprising carbonate material forming distinctive beds of chalk.

Hydrogeology

2.15 The Magic Map Application, shows the Site to be entirely underlain by a Principal bedrock Aquifer which according to the BGS records, comprises the New Pit Chalk Formation – Chalk.

2.16 Such aquifers comprise layers of rock or drift deposits that have a high intergranular and/r fracture permeability, which usually provide a high level of water storage. As such, they may support water supply and river baseflow on a strategic scale.

2.17 The Site is designated as being in an area of medium-high groundwater vulnerability. Also, the SCDC SFRA Groundwater Source Protection Zones Map shows that the eastern area of the Site lies within Zone 2 'Outer Protection Zone' and the western area of the Site is within Zone 3 'Total Catchment'.

2.18 The Zone 2 'Outer Protection Zone' is defined by a 400 day travel time from a point below the water table. The previous methodology gave an option to define SPZ2 as the minimum recharge area required to support 25 per cent of the protected yield. This option is no longer available in defining new SPZs and instead this zone has a minimum radius of 250 or 500 metres around the source, depending on the size of the abstraction.

2.19 The Zone 3 'Total Catchment' is defined as the area around a source within which all groundwater recharge is presumed to be discharged at the source. In confined aquifers, the source catchment may be displaced some distance from the source. For heavily exploited aquifers, the final Source Catchment Protection Zone can be defined as the whole aquifer recharge area where the ratio of groundwater abstraction to aquifer recharge (average recharge multiplied by outcrop area) is >0.75. There is still the need to define individual source protection areas to assist operators in catchment management.

Hydrology

2.20 The nearest surface water feature is an existing off-site pond located to the west of the Site.

2.21 There are also a numbers of existing drains located within the Site and its surroundings and also there is a Main River, the River Granta, located alongside the northern boundary of the Site.

On-Site Soakaway Testing

2.22 According to the SDCD SFRA, the Site lies within an area designated as having a high potential for infiltration. However, specific on-site infiltration testing will be required in order to confirm whether the existing Site ground conditions are compatible for the storage of groundwater.

2.23 As part of the soakaway testing works, groundwater levels will be monitored within all trial pits, so there will be recorded evidence of the existing groundwater table levels.

2.24 It is recommended that this on-site intrusive works are undertaken prior to the submission of the planning application in order to provide the required evidences that infiltration is or is not a feasible option for the management of the proposed surface water drainage runoff.

3 FLOOD RISK

3.1 The EA Flood Maps for planning and the SCDC SFRA have been consulted to identify the flood zone for the Site, as well as potential sources of flooding facing the development. These potential sources of flooding may be categorised as follows:

- Flood risk from Rivers of the Sea;
- Flood risk from Surface Water;
- Flood risk from Reservoirs;
- Overland Flooding;
- Groundwater Flooding, and;
- Historic Flooding.

3.2 Each of the above sources of flooding with regards to their effect and proposed method of mitigation on the development is addressed below.

3.3 A copy of the Flood Mapping obtained from the EA web and the SCDC SFRA which identify the potential flooding issues in the area for each flood source is included in **Appendix C**.

Flood Risk from Rivers and the Sea

3.4 According to the EA Flood mapping, the Site lies within Flood Zones 1, 2 and 3:

- Flood Zone 1 extent is shown within the southern extent of the Site, where there is less than 0.1% of annual probability of river or sea flooding. Therefore, the probability of flooding by this means is considered to be negligible within this area.
- Flood Zone 2 is identified predominantly within the northern and western area of the Site, but also there is an area to the southern area where there is between 0.1% and 1% of annual probability of river or sea flooding. Therefore, the probability of flooding by this means is considered to be medium in this area.
- Flood Zone 3 is mainly highlighted within the northern area of the Site, where there is more than 1% of annual probability of river or sea flooding. Therefore, the probability of flooding by this means is considered to be high.

3.5 In principle, it seems that development proposal seeks for the construction for circa 85 residential dwellings. The approximate area within Flood Zone 1 is 3.90 ha and the standard development density in the UK is between 30-40 dwellings per hectare.

3.6 Based on the above parameters, the level of development identified can be accommodated within Flood Zone 1 and 2, where a residential use is always permitted according to the National Planning Policy Framework ('NPPF'), as the development density circa 85 residential dwellings and 3.90 ha is approximate 22 dwellings per hectare.

3.7 However, given that the northern Site area is affected by Flood Zone 3, it will be required to undertake a detailed hydraulic modelling, so the exact area affected by Flood Zone 3 and the predicted flooded volume can be accurately measured.

Flood Risk from Surface Water

3.8 Surface water flooding is caused when the volume of rainwater falling does not drain through the existing drainage systems or soak into the ground, but lies on or flows over the ground instead. This type of flooding is usually short lived and associated with heavy downpours of rain, thunder storms etc.

3.9 According to the EA Flood mapping, the southern area of the Site is identified as being at very low risk of surface water flooding, which means that each year this area has a chance of flooding of less than 0.1%.

3.10 However, the northern area of the Site is highlighted as being at low, medium and high risk of surface water flooding, which means that each year this area has a chance of flooding of between 0.1% and 1%, 1% and 3.3% and more than 3.3% respectively.

3.11 The ongoing risk of surface water flooding can be mitigated by using conveyance features, which will collect and convey this runoff to the final point of the discharge within the proposed SuDS features, where this extra volume will be accommodated.

Flood Risk from Reservoirs

3.12 The EA Flood mapping confirms that the Site is not at risk of flooding from reservoirs and therefore the probability of flooding by this source is considered to be negligible.

Overland Flooding

3.13 As previously mentioned, the Site is bounded to the west by a residential area, to the south by Cambridge Road (A1307), to the east by Mill Lane and to the north by the River Granta.

3.14 The Site falls naturally from south to north of the Site, with levels ranging from approximately 42.50 m AOD to the south and 38.00 m AOD to the north of the Site.

3.15 Overland flows from the proposed development are expected to be minimal as the land is currently Greenfield and these flows will drain away from the proposed development to the lowest point of the Site.

3.16 Therefore, it is proposed that overland flows run from south to north prior to being infiltrated within the ground or reaching the lowest point of the Site towards to the existing River Granta located to the northern area of the Site.

Groundwater Flooding

3.17 Groundwater flooding is defined here as the emergence of groundwater at the ground surface away from perennial river channels or the rising of groundwater into man-made ground, under conditions where the normal ranges of groundwater level and groundwater flow are exceeded.

3.18 Groundwater flooding is highly variable and dependant on localised ground conditions.

3.19 In accordance with the SCDC SFRA Groundwater Source Protection Zones Map, the eastern area of the Site lies within Zone 2 'Outer Protection Zone' and the western area of the Site is within Zone 3 'Total Catchment'.

3.20 Furthermore, the SDDC SFRA shows that the Site is designated as being in an area of medium-high groundwater vulnerability. However, there are no records of any historic flooding from groundwater within the Linton area.

3.21 As mentioned above on this report, groundwater levels will be monitored once the on-site soakaway testing is undertaken, which will confirm where the groundwater table level is and whether the Site is or is not at risk of groundwater flooding.

3.22 Therefore, at this stage, the risk of groundwater flooding within the Site is considered to be medium.

Historic Flooding

3.23 The SCDC SFRA identifies a number of recorded historic flood events, which are summarised within Table 4A &B included in **Appendix C**.

Residual Risk and Designing for Exceedance

3.24 It is recommended that the final layout uses the proposed road infrastructure to provide drainage exceedance (overland flood flow) routes through the development and towards to the River Granta for events more than the capacity of the drainage system.

3.25 If the capacity of the attenuated storage is exceeded, ground levels should be profiled to direct overland flows towards to the existing River Granta located to the northern area of the Site.

3.26 In order to mitigate the impact from Flood Zone 3, it will be proposed that a SuDS feature located alongside the southern extent of the River Granta will be provided in order to accommodate the predicted flooded volume resulting from extreme rainfall events obtained from the detailed hydraulic modelling. We can also provide an embankment between the northern area of the development and the southern side of this proposed SuDS feature as a flood defence to the future development.

Policy Guidance

3.27 The NPPF looks further into more community driven priorities. Its main driver is sustainability making developments concentrate on how the proposals impact upon the community in which it resides. It incorporates a number of key objectives including providing quality homes, improving quality of life and meeting the challenge of climate change, flooding and coastal change.

3.28 Where the NPPF relates to Flooding and Flood Risk it states:

> ***"155. Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere.***
>
> ***156. Strategic policies should be informed by a strategic flood risk assessment, and should manage flood risk from all sources. They should consider cumulative impacts in, or affecting, local areas susceptible to flooding, and take account of advice from the Environment Agency and other relevant flood risk management authorities, such as lead local flood authorities and internal drainage boards.***
>
> ***157. All plans should apply a sequential, risk-based approach to the location of development – taking into account the current and future impacts of climate change so as to avoid, where possible, flood risk to people and property. They should do this, and manage any residual risk, by:***
>
> - ***applying the sequential test and then, if necessary, the exception test as set out below;***
> - ***safeguarding land from development that is required, or likely to be required, for current or future flood management;***
> - ***using opportunities provided by new development to reduce the causes and impacts of flooding (where appropriate through the use of natural flood management techniques); and***
> - ***where climate change is expected to increase flood risk so that some existing development may not be sustainable in the long-term, seeking opportunities to relocate development, including housing, to more sustainable locations.***
>
> ***158. The aim of the sequential test is to steer new development to areas with the lowest risk of flooding. Development should not be allocated or permitted if there are reasonably available s appropriate for the proposed development in areas with a lower risk of flooding. The strategic flood risk assessment will provide the basis for applying this test. The sequential approach should be used in areas known to be at risk now or in the future from any form of flooding.***
>
> ***159. If it is not possible for development to be located in zones with a lower risk of flooding (taking into account wider sustainable development objectives), the exception test may have to be applied. The need for the exception test will depend on the potential vulnerability of the Site and of the development***

proposed, in line with the Flood Risk Vulnerability Classification set out in national planning guidance.

160. The application of the exception test should be informed by a strategic or specific flood risk assessment, depending on whether it is being applied during plan production or at the application stage. For the exception test to be passed it should be demonstrated that:

- ***the development would provide wider sustainability benefits to the community that outweigh the flood risk; and***
- ***the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.***

161. Both elements of the exception test should be satisfied for development to be allocated or permitted.

3.29 The Site is located within Flood Zones 1, 2 and 3. However, development proposal seeks for the construction of 85 residential dwellings which can be accommodated within the area highlighted as being located within Flood Zones 1 and 2. Flood Zones 1 and 2 comply with the Sequential Test and are therefore suitable for a Residential use. The proposed development meets the requirements of Sections 155 to 160 of the NPPF.

3.30 Based upon Tables 1-3 of the NPPF 'Technical Guidance' the Site is identified within the EA Flood Maps as being within Flood Zones 1, 2 and 3 (Table 1), the proposed residential land use is categorised as being 'More Vulnerable' from effects of flooding (Table 2). Table 3 indicates that a 'More Vulnerable' categorised Site, such as proposed for the Site, is an appropriate land use for a Flood Zones 1 and 2, and an Exception Test is not required.

4 DEVELOPMENT PROPOSALS

4.1 This representation is made in the context of promoting this Site for residential development of circa 85 dwellings, open space, landscaping and new vehicular access points from Cambridge Road.

4.2 The Site being promoted is a refined version of that which was previously submitted by Taylor Wimpey to the Greater Cambridge 2019 SHELAA Call for Sites consultation. The Site extent has been reduced from the previous larger 'Land at Mill Lane and Long Lane, Linton, CB21 4NL' and now simply comprises Land North of Cambridge Road (A1307), Linton. This smaller area is confined to land directly abutting the existing settlement boundary for Linton and now benefits from masterplanning and technical work to assess its suitability for residential development.

5 PROPOSED SURFACE WATER DRAINAGE STRATEGY

5.1 In order to demonstrate that all forms of flooding have been considered as required by the NPPF a drainage strategy has been developed. The aim of including this strategy as part of the flood risk assessment is so that it can easily be seen that the proposed development will not adversely affect the surface water regime in the area and that overall the current situation will be improved.

Existing Surface Water Drainage

5.2 According to the SCDC SFRA SuDS Infiltration Feasibility Plan, the Site lies within an area designated as having a high potential for infiltration, which allows for the basic assumption that the current runoff infiltrates within the ground.

5.3 The nearest Main River to the Site is the River Granta, which is located to the north of the Site.

5.4 There are also a number of minor drains within the Site and its immediate vicinity which currently discharge into the existing River Granta.

5.5 There are no foul, surface or combined sewers located within the Site. However, there is a foul water public sewer located mainly to the west and north of the proposed development.

5.6 As the Site is currently Greenfield, all flows from the Site would drain naturally to the lowest point of the Site prior to being infiltrated within the ground or reaching the lowest point of the Site towards to the existing River Granta.

5.7 The Greenfield runoff rate for the 1in1 year return period has been calculated as 12.6 l/s, for the Greenfield Site, as shown in **Appendix D**.

Proposed Surface Water Drainage Strategy

5.8 Findings from research have demonstrated that:

- The Site is located within Flood Zones 1, 2 and 3. However, it will be proposed that the residential development circa 85 dwellings will be located within the area identified as being at Flood Zone 1;
- The Site is underlain by bedrock which has potential for using infiltration techniques for the management of the surface water runoff;
- There are a number of drains within the Site and its surroundings and the River Granta is located alongside the northern Site boundary, and;
- There is no surface water public sewer within the immediate vicinity of the Site.

5.9 It is proposed that a Surface Water Management Plan ('SWMP') will use SuDS for the 1in100 years plus 40% climate change, in a manner which mimics the surface water flow rate and volume from the Site whilst providing water cleansing, through the provision of appropriate management trains.

5.10 The hierarchy of the surface water disposal, stated within the Building Regulation approved document Part H, is as follows:

- An adequate soakaway/infiltration system;
- Discharge into the nearest watercourse; and,
- Discharge into the existing public sewer.

5.11 The evidences collected from the BGS bedrock geology map and the SCDC SFRA allow for the basic assumption that the Site may have a high potential for using infiltration as part of the overall surface water drainage strategy.

5.12 However, in order to demonstrate and provide further evidences to the Local Lead Flood Authority ('LLFA') that infiltration is a viable method for the management of the surface water disposal, specific on-site infiltration testing will be required across the Site.

Surface Water Drainage Strategy – Option A – Infiltration

5.13 Should on-site infiltration testing results demonstrate that the rates achieved are within the range for using infiltration as part of the overall surface water drainage strategy, the SWMP recommends the following approach:

- Domestic drainage from roofs shall discharge into water butts located at the ends of rainwater downpipes. The water butts will have a high level overflow to take excess flows into the infiltration drainage solution associated with the property.
- The excess flows from roofs will be catered for by a private soakaway at the rear garden of each plot. The soakaway must be located at least 5 metres away from any building.
- Permeable paving granular filtration structures within private drives will accommodate runoff from driveways.
- The rest of the impermeable area (adoptable road and footpath) will be accommodated within infiltration trenches located alongside the adoptable highways area.
- Water cleansing will be provided within the SuDS features (soakaways, permeable paving and infiltration trenches) in order to remove pollutants before infiltrate the water within the ground.

5.14 It should be noted that the proposed surface water drainage strategy and calculated volumes are indicative only, as these will depend on the eventual impermeable area of the development and detailed drainage design and calculations will be completed at the planning stage.

5.15 In order to provide an initial idea of the storage estimate required for the proposed development, an indicative infiltration rate of $3x10^{-6}$ m/s has been utilised. This value has been obtained from the CIRIA C753 Manual.

5.16 Based on the above indicative infiltration rate and assuming that 50% of the total approximate Flood Zone 1 area will be considered as impermeable, the preliminary storage requirements are within the range of 877 – 1,788 m^3.

Surface Water Drainage Strategy – Option B – Attenuation & Discharge into Watercourse

5.17 Only if on-site infiltration testing demonstrates that the use of groundwater storage is not feasible, an alternative option based on attenuation within the Site and discharge into the River Granta at the Q1in1 year Greenfield runoff rate will be proposed.

5.18 In order to achieve this option, the SWMP suggests the following approach:

- Domestic drainage from roofs shall discharge into water butts (scope for rainwater recycling) located at the ends of rainwater downpipes, with a high level overflow to take the excess flows into the Site's surface water piped network drainage system.
- The runoff from driveways and adoptable road areas will be captured via gullies and conveyed through a surface water piped network system. This piped network will be also taking the excess flows from the roofs located to the south of the scheme prior being discharged into an attenuation basin located within the public open space at the western area of the Site.
- It is proposed that the surface water piped network system discharges into a proposed swale, which will be designed for conveyancing and treatment purposes, prior discharging the runoff into the attenuation basin.
- The attenuation basin has been designed to accommodate the full 1in100 years plus 40% climate change at a controlled rate of 12.6 l/s prior to being discharged into the existing River Granta located to the north of the Site.

5.19 Given that there is no a detailed Site layout for the proposed development, the storage estimate requirements for the proposed Site is based on an impermeable area of 50% of the total developable Site area and the Q1in1 year Greenfield runoff rate.

5.20 Based on the above parameters, the storage estimate requirements for the proposed Site is within the range of 1,064 – 1,389 m^3.

5.21 A copy of these preliminary storage requirements calculations and a indicative flood risk and surface water opportunities and constraints plan have been included within **Appendix E**.

Treatment Processes within SuDS

5.22 There are a range of water quality treatment processes that can be exploited within the design of a sustainable drainage system.

5.23 Treatment effectiveness is strongly linked to the hydraulic control of runoff, in particular:

- Velocity control: sediment depositions, filtration and other removal processes occurring at low flow velocities during regular rainfall events.
- Retention time: the removal of contaminants through settling, adsorption and other removal processes occurring over the period of time that the runoff is in contact with SuDS treatment media or held within a permanent water storage volume.

5.24 In order to provide water quality treatment for the proposed drainage system design, self-cleansing will be provided by designing the velocity higher than 1.0 m/s within the pipes as well as SuDS, which will be incorporated to the drainage layout to assure the water will be treated prior infiltrating within the ground or discharging within the existing River Granta.

Operation and Maintenance

5.25 The drainage network should be designed in accordance with adoptable standards to allow for potential adoption by Anglian Water and/or the LLFA.

5.26 If the drainage is not adopted, the requirements for ongoing maintenance of the drainage network should form part of the Operation and Maintenance manual for the Site and should be undertaken by the Site management. Any specialist or proprietary products that are specified at detailed design should have a manufacturer specific maintenance regime which should be included within the document.

5.27 If a manual is not yet available, it should be developed at the detailed design stage. Examples of details to consider include:

- All drainage features should be in open areas which are readily accessible.
- Pipes, manholes and silt traps should be inspected and de-silted at least once a year, where necessary.
- The surface water attenuation areas will be predominantly dry and the base should be seeded with a wildflower grass seed mix that can tolerate wet ground conditions.
- Flow controls should be inspected every 6 months, litter/debris and silt build up should be removed as necessary.

5.28 Infiltration systems will require regular maintenance to ensure continuing operation to design performance standards, and all designers should provide detailed specifications and frequencies for the required maintenance activities along with likely machinery requirements and typical annual costs – within the Maintenance Plan.

5.29 The following figures provide guidance on the type of operational and maintenance requirements that may be appropriate for soakaways, infiltration trenches, permeable paving, swales and attenuation basins respectively. The list of actions is not exhaustive and some actions may not always be required.

5.30 Property owners will be individually responsible for their own private soakaways. Figure 5.3 extracted from CIRIA C753 manual provides guidance on the type of operational and maintenance requirements that may be appropriate for soakaways and infiltration trenches:

Figure 5.3 Operation and Maintenance Requirements for Soakaways and Infiltration Trenches

TABLE 13.1 Operation and maintenance requirements for soakaways

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Inspect for sediment and debris in pre-treatment components and floor of inspection tube or chamber and inside of concrete manhole rings	Annually
	Cleaning of gutters and any filters on downpipes	Annually (or as required based on inspections)
	Trimming any roots that may be causing blockages	Annually (or as required)
Occasional maintenance	Remove sediment and debris from pre-treatment components and floor of inspection tube or chamber and inside of concrete manhole rings	As required, based on inspections
Remedial actions	Reconstruct soakaway and/or replace or clean void fill, if performance deteriorates or failure occurs	As required
	Replacement of clogged geotextile (will require reconstruction of soakaway)	As required
Monitoring	Inspect silt traps and note rate of sediment accumulation	Monthly in the first year and then annually
	Check soakaway to ensure emptying is occurring	Annually

Permeable Paving

5.31 Regular inspection and maintenance is important for the effective operation of pervious pavements. Maintenance responsibility for a pervious pavement and its surrounding area should be placed with an appropriate responsible organisation. Before handing over the pavement to the client, it should be inspected for clogging, litter, weeds and water ponding, and all failures should be rectified. After handover, the pavement should be inspected regularly, preferably during and after heavy rainfall to check effective operation and to identify any areas of ponding.

5.32 Figure 5.4 provides guidance for permeable paving on the type of operational and maintenance requirements that may be appropriate:

Figure 5.4 Operation and Maintenance Requirements for Permeable Paving

Operation and maintenance requirements for pervious pavements		
Maintenance schedule	**Required action**	**Typical frequency**
Regular maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment
Occasional maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphospate applied directly into the weeds by an applicator rather than spraying	As required – once per year on less frequently used pavements
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving	As required
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth – if required, take remedial action	Three-monthly, 48 h after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

Swales

5.33 Figure 5.5 shows the guidance for swales on the type of operational and maintenance requirements that may be appropriate.

5.34 Maintenance plan and schedules should be developed during the design phase. Specific maintenance needs of the swales should be monitored, and maintenance schedules adjusted to suit requirements:

Figure 5.5 Operation and Maintenance Requirements for Swales

TABLE 17.1 Operation and maintenance requirements for swales

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Remove litter and debris	Monthly, or as required
	Cut grass – to retain grass height within specified design range	Monthly (during growing season), or as required
	Manage other vegetation and remove nuisance plants	Monthly at start, then as required
	Inspect inlets, outlets and overflows for blockages, and clear if required	Monthly
	Inspect infiltration surfaces for ponding, compaction, silt accumulation, record areas where water is ponding for > 48 hours	Monthly, or when required
	Inspect vegetation coverage	Monthly for 6 months, quarterly for 2 years, then half yearly
	Inspect inlets and facility surface for silt accumulation, establish appropriate silt removal frequencies	Half yearly
Occasional maintenance	Reseed areas of poor vegetation growth, alter plant types to better suit conditions, if required	As required or if bare soil is exposed over 10% or more of the swale treatment area
Remedial actions	Repair erosion or other damage by re-turfing or reseeding	As required
	Relevel uneven surfaces and reinstate design levels	As required
	Scarify and spike topsoil layer to improve infiltration performance, break up silt deposits and prevent compaction of the soil surface	As required
	Remove build-up of sediment on upstream gravel trench, flow spreader or at top of filter strip	As required
	Remove and dispose of oils or petrol residues using safe standard practices	As required

Attenuation Basins

5.36 Figure 5.6 below provides guidance for attenuation basins on the type of operational and maintenance requirements that may be appropriate. The list of actions is not exhaustive and some actions may not always be required.

Figure 5.6 Operation and Maintenance Requirements for Attenuation Basins

TABLE 22.1 Operation and maintenance requirements for detention basins

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Remove litter and debris	Monthly
	Cut grass – for spillways and access routes	Monthly (during growing season), or as required
	Cut grass – meadow grass in and around basin	Half yearly (spring – before nesting season, and autumn)
	Manage other vegetation and remove nuisance plants	Monthly (at start, then as required)
	Inspect inlets, outlets and overflows for blockages, and clear if required.	Monthly
	Inspect banksides, structures, pipework etc for evidence of physical damage	Monthly
	Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies.	Monthly (for first year), then annually or as required
	Check any penstocks and other mechanical devices	Annually
	Tidy all dead growth before start of growing season	Annually
	Remove sediment from inlets, outlet and forebay	Annually (or as required)
	Manage wetland plants in outlet pool – where provided	Annually (as set out in Chapter 23)
Occasional maintenance	Reseed areas of poor vegetation growth	As required
	Prune and trim any trees and remove cuttings	Every 2 years, or as required
	Remove sediment from inlets, outlets, forebay and main basin when required	Every 5 years, or as required (likely to be minimal requirements where effective upstream source control is provided)
Remedial actions	Repair erosion or other damage by reseeding or re-turfing	As required
	Realignment of rip-rap	As required
	Repair/rehabilitation of inlets, outlets and overflows	As required
	Relevel uneven surfaces and reinstate design levels	As required

5.37 Maintenance plans and schedules should be developed during the design phase. Specific maintenance needs of the system should be monitored, and maintenance schedules adjusted to suit requirements.

6 PROPOSED FOUL WATER DRAINAGE STRATEGY

Existing Foul Water Drainage

6.1 A Pre-Planning Enquiry ('PPE') has been submitted to Anglian Water, where it has been confirmed that there is a foul water public sewer within the immediate vicinity of the Site, located to the west and north of the proposed development.

6.2 A copy of the PPE has been included within **Appendix F**.

Proposed Foul Water Drainage

6.3 Development proposals will comprise the construction of circa 85 residential dwellings.

6.4 The proposed foul flows calculations are based on 4,000 litres per dwelling per day, which is then divided by 86,400 (24 hours x 60 minutes x 60 seconds) to give a foul rate in litres per second. Based upon Sewers for Adoption, the foul flows for the residential dwellings have been calculated as 3.91 l/s.

6.5 The foul water drainage from the proposed development is in the catchment of Linton Water Recycling Centre, which currently has capacity to treat the flows from the proposed development site. Anglian Water cannot reserve capacity and the available capacity at the water recycling centre can be reduced at any time due to growth, environmental and regulation driven changes.

6.6 As the Site naturally falls from south to north, it is proposed that foul flows from the development will be conveyed via a new S104 foul sewerage system to the lowest point of the Site, where the flows will be discharged by gravity into the nearest foul water sewer point of connection located to the west of the Site at manhole 0501.

6.7 Anglian Water has assessed the impact of gravity flows from the planned development to the public foul sewerage network and confirmed that this connection is acceptable as the foul sewerage system, at present, has available capacity for the proposed Site.

6.8 The nearest practicable connection is to the 150mm diameter sewer at manhole 0501 at National Grid Reference ('NGR') TL 56030 46562. The cover levels is 39.28 m and the invert level is 37.52 m.

6.9 If for any reason a connection by gravity cannot be made into manhole 0501, there would be an alternative for making a connection into manhole 0601 with cover level 38.63 m and invert level 36.30 m. This change of point of connection must be agreed with Anglian Water.

Maintenance and Adoption

6.10 For a foul connection into the AWS public sewerage system, the developer will be required to make a formal application under Section 106 prior to commencement of works to agree the approved method and location of connection.

6.11 Sewers intended for future adoption by Anglian Water under Section 104 must be constructed in accordance with 'Sewers for Adoption'. At the detailed design stage it should be confirmed with AWS which version of Sewers for Adoption should be used.

7 CONCLUSIONS AND RECOMMENDATIONS

7.1 TPA has been commissioned by Taylor Wimpey Strategic Land to prepare a Flood Risk Assessment and Drainage Strategy report to support the promotion of prospective residential development circa 85 dwellings at 'Land North of Cambridge Road (A1307), Linton'.

7.2 The Site is located within Flood Zones 1, 2 and 3, therefore it is recommended that a detailed hydraulic flood modelling is undertaken to identify accurately the extent of Flood Zone 3 prior to the submission of a planning application. However, this report identifies that the development can be delivered by providing the mitigation measures proposed within this assessment.

7.3 Other origins of flooding have also been assessed and it has been found that even though there are some flood risks (surface water mainly), these can be mitigated by providing the right mitigation measures.

7.4 The total Site area is approximately 6.32 ha and it is currently Greenfield, where the Q1in1 year Greenfield runoff rate is 12.6 l/s.

7.5 According to the SCDC SFRA the Site lies within an area designated as having high potential for infiltration. Consequently, it is highly recommended that specific on-site infiltration testing is undertaken prior to the submission of a planning application.

7.6 Should these intrusive works demonstrate that the Site has no capacity for the storage of groundwater, the presence of existing drains and the River Granta allows the proposed development to discharge the attenuated flows into this Main River at the Q1in1 Greenfield runoff discharge rate.

7.7 The proposed on site drainage surface water drainage system will be suitable to attenuate flows up to and including the 1in100 year plus 40% climate change rainfall event.

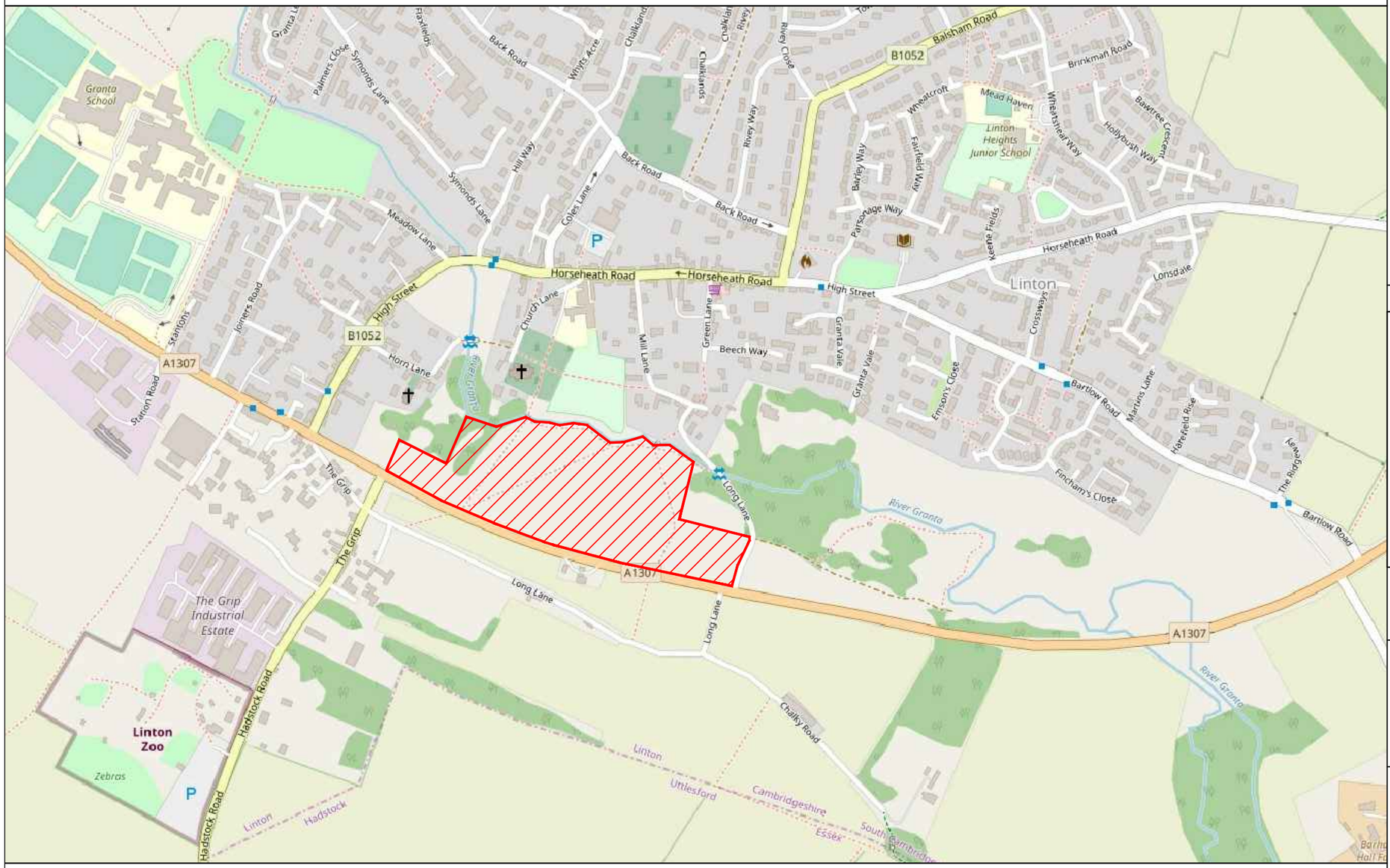
7.8 Proprietary treatment systems will be used in order to provide water cleansing so that remove the pollutants before infiltrating within the ground.

7.9 The foul discharge rate from the residential area of the development has been calculated as 3.91 l/s. It is proposed that the proposed foul flows from the development will be conveyed via a new S104 foul sewerage system to the lowest point of the Site prior to making a connection by gravity into the 150mm diameter sewer at manhole 0501 at NGR TL 56030 46562.

7.10 This report demonstrates that a development at this location is sustainable for a residential use in terms of flood risk and the management of foul and surface water drainage.

APPENDIX A

A3
ORIGINAL
PLOT SIZE



W E S

INDICATIVE

NOTES:
1. Based on OpenStreetMap.

KEY
- Indicative Site Boundary.

Rev	Date	Details	Drawn by	Checked by	Approved by
-	-	-	-	-	-

Bristol
Cambridge
London
Manchester
Oxford
Welwyn Garden City

Transport Planning Associates

The Stables
7 Chesterton Mill
French's Road
Cambridge
CB4 3NP
01223 455385
www.tpa.uk.com

CLIENT:
TAYLOR WIMPEY UK Ltd

PROJECT:
LAND AT LINTON, CAMBRIDGESHIRE

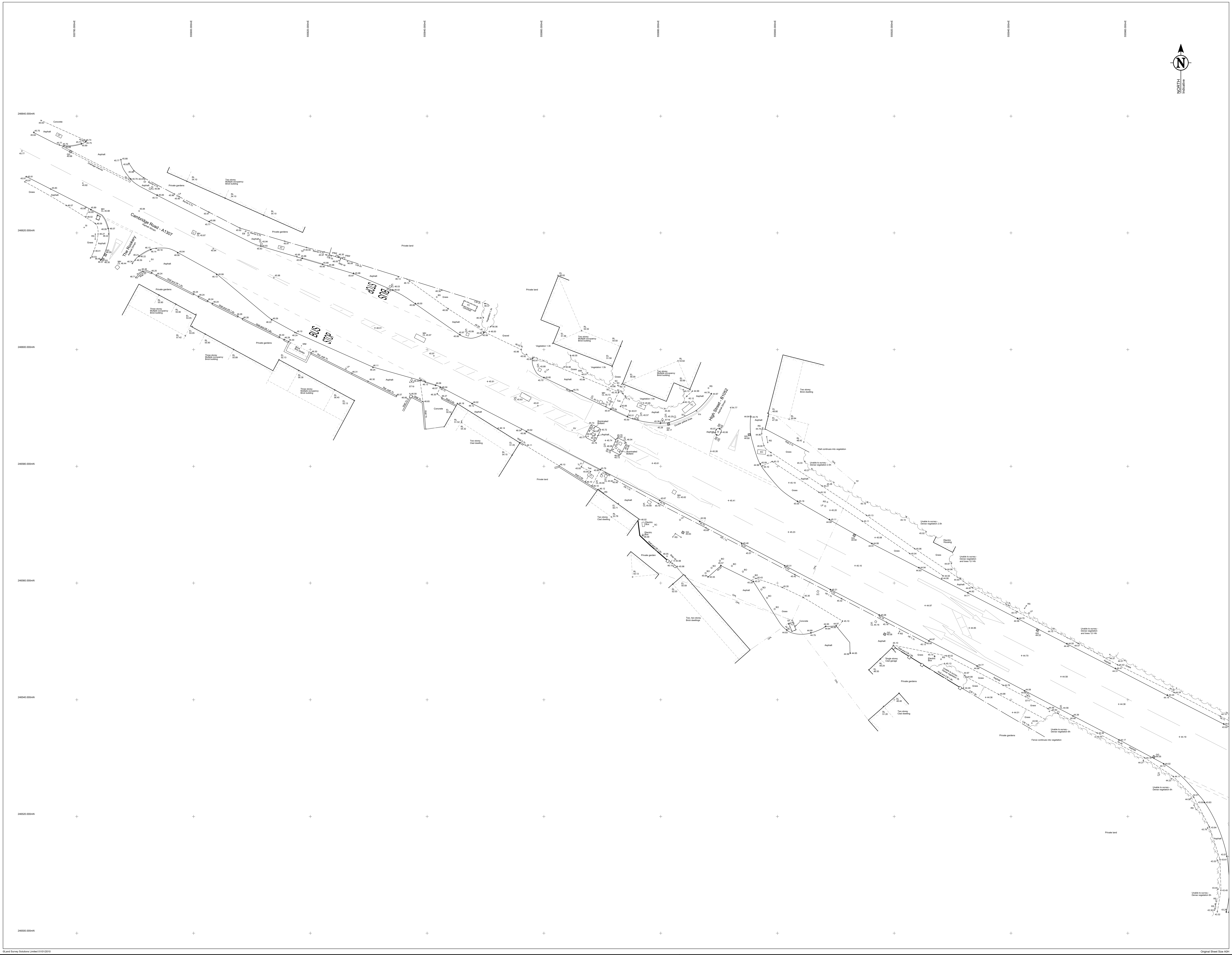
TITLE:
INDICATIVE SITE LOCATION PLAN

STATUS:
FOR INFORMATION

SCALE:	DATE:	DRAWN:	CHECKED:	APPROVED:
NTS	12.02.20	NR	TH	JH

JOB NO:	DRAWING NO:	REVISION:
1902-05	SL01	-

APPENDIX B



©Land Survey Solutions Limited 01/01/2010

Original Sheet Size A0H

TOPOGRAPHICAL & MEASURED BUILDING SURVEYS

ABBREVIATIONS & SYMBOLS

AH	Arch Head Height	FH	Fire Hydrant	RSJ	Rolled Steel Joist
AR	Assumed Route	FBD	Floor Board Direction	SI	Sign Post
AV	Air Valve	FH	Fire Hydrant	SP	Arch Spring Point Height
BB	Belisha Beacon	FL	Floor Level	SV	Stop Valve
BH	Bore Hole	FP	Flag Pole	SW	Surface Water
BL	Bed Level	FW	Foul Water	SY	Stay
BO	Bollard	GG	Gully Grate	Tac	Tactile Paving
BrP	Brace Post	GV	Gas Valve	TC	Telecom Cover
BS	Bus Stop	HH	Head Height	TH	Trial Pit
BU	Bush	IC	Inspection Cover	THL	Threshold Level
B/W	Barbed Wire Fence	IL	Invert Level	TL	Traffic Light
BX	Box (Utilities)	I/R	Iron Railings	ToW	Top of Wall
C/B	Close Board Fence	KO	Kerb Outlet	TP	Telegraph Pole
CH	Cill Height	LP	Lamp Post	TV	Cable TV Cover
CL	Cover Level	MH	Manhole	UB	Universal Beam
C/L	Chain Link Fence	MP	Marker Post	UC	Unknown Cover
C-Lev	Ceiling Level	NB	Name Board	UK	Unknown Tree
Col	Column	OHL	Overhead Line (approx)	USB	Under Side Beam
C/P	Chestnut Paling Fence	Pan	Panel Fence	UTL	Unable To Lift
CR	Cable Riser	PB	Post Box	VP	Vent Pipe
DC	Drainage Channel	PM	Parking Meter	WB	Waste Bin
DH	Door Head Height	PO	Post	WH	Weep Hole
DP	Down Pipe	P/R	Post & Rail Fence	WL	Water Level
DR	Drain	P/W	Post & Wire Fence	WM	Water Meter
EL	Eaves Level	P/Wall	Partition Wall	WO	Wash Out
EP	Electric Pole	RE	Rodding Eye	(x.xx)	Floor to Ceiling Height
ER	Earth Rod	RL	Ridge Level		
ET	EP+Transformer	RP	Reflector Post	(x.xx)F/C	Floor to False Ceiling Ht
FB	Flower Bed	RS	Road Sign		
FBD	Floor Board Direction	RSD	Roller Shutter Door	△	Survey Control Station

DRAWING NOTE

Topographical Surveys

Trees are drawn to scale showing the average canopy spread. Descriptions and heights should be used as a guide only.

All building names, descriptions, number of storeys, construction type including roof line details are indicative only and taken externally from ground level.

All below ground details including drainage, voids and services have been identified from above ground and therefore all details relating to these features including; sizes, depth, description etc will be approximate only. All critical dimensions and connections should be checked and verified prior to starting work.

Detail, services and features may not have been surveyed if obstructed or not reasonably visible at the time of the survey.

Measured Building Surveys

Measurements to internal walls are taken to the wall finishes at approx 1m above the floor level and the wall assumed to be vertical.

Cill heights are measured as floor to the cill and head heights are measured from cill to the top of window.

General

The contractor must check and verify all site and building dimensions, levels, utilities and drainage details and connections prior to commencing work. Any errors or discrepancies must be notified to Survey Solutions immediately.

The accuracy of the digital data is the same as the plotting scale implies. All dimensions are in metres unless otherwise stated.

The survey control listed is only to be used for topographical surveys at the stated scale. All control must be checked and verified prior to use.

Do not scale from this drawing.

CONTROL CO-ORDINATES

STATIONS	EASTINGS	NORTHINGS	LEVEL	DESCRIPTION
ST01	556504.590	246407.639	41.235	Hilti nail
ST02	556497.859	246366.165	42.635	Peg + nail
ST03	556370.317	246387.746	42.850	Peg + nail
ST04	556284.460	246401.820	43.320	Peg + nail
ST05	556202.366	246428.586	43.396	Peg + nail
ST06	556106.862	246463.210	43.512	Peg + nail
ST07	556152.254	246533.813	38.951	Peg + nail
ST08	556216.128	246561.558	38.156	Peg + nail
ST09	556284.648	246560.812	37.989	Peg + nail
ST10	556354.652	246546.533	38.263	Peg + nail
ST11	556418.195	246547.406	38.332	Peg + nail
ST12	556473.787	246534.776	37.980	Hilti nail
ST13	556512.557	246480.535	39.246	Hilti nail
ST14	556523.071	246444.484	40.290	Hilti nail
ST15	556054.805	246496.130	43.245	Hilti Nail
ST16	556006.566	246521.000	43.586	Hilti Nail
ST17	555942.873	246540.736	44.672	Hilti Nail
ST18	555880.299	246587.796	45.382	Hilti Nail
ST19	555837.347	246594.579	46.262	Hilti Nail

SURVEY GRID AND LEVEL DATUM

The coordinate system established for this survey is related to Ordnance Survey (OS) national grid at a single point using Smartnet, then orientated to grid north with a scale factor of 1.000.

The level datum established for this survey is related to Ordnance Survey (OS) using GPS Smartnet.

To avoid discrepancies any coordinated data used in conjunction with this survey must be derived directly from this control data.

REV	DESCRIPTION	DRAWN	APPR	DATE

SURVEY SOLUTIONS

Ipswich Coventry Yeovil Norwich Perth Nottingham Brentwood

Tel No: 0845 0405 969
Fax No: 0845 0405 970
www.survey-solutions.co.uk
enquiries@survey-solutions.co.uk

LAND SURVEYING BUILDING SURVEYING UNDERGROUND SURVEYING

PROJECT TITLE A1307, LINTON, SOUTH CAMBRIDGESHIRE, CB21 4NL.				
DRAWING DETAIL TOPOGRAPHICAL SURVEY Sheet 1 of 8				
CLIENT TAYLOR WIMPEY STRATEGIC LAND				SCALE 1:200
SURVEYOR DWB/PMB	SURVEY DATE 29.01.2020	CHECKED BY PJR	APPROVED BY BTC	DWG STATUS FINAL
DRAWING NUMBER 25955se-01			REVISION	ISSUE DATE 10.02.2020

TOPOGRAPHICAL & MEASURED BUILDING SURVEYS

ABBREVIATIONS & SYMBOLS

AH	Arch Head Height	FH	Fire Hydrant	RSJ	Rolled Steel Joist
AR	Assumed Route	FBD	Floor Board Direction	SI	Sign Post
AV	Air Valve	FH	Fire Hydrant	SP	Arch Spring Point Height
BB	Belisha Beacon	FL	Floor Level	SV	Stop Valve
BH	Bore Hole	FP	Flag Pole	SW	Surface Water
BL	Bed Level	FW	Foul Water	SY	Slaty
BO	Bollard	GG	Gully Grate	Tac	Tactile Paving
BrP	Brace Post	GV	Gas Valve	TC	Telecom Cover
BS	Bus Stop	HH	Head Height	TH	Trial Pit
BU	Bush	IC	Inspection Cover	THL	Threshold Level
B/W	Barbed Wire Fence	IL	Invert Level	TL	Traffic Light
BX	Box (Utilities)	IR	Iron Railings	ToW	Top of Wall
C/B	Close Board Fence	KO	Kerb Outlet	TP	Telegraph Pole
CH	Cill Height	LP	Lamp Post	TV	Cable TV Cover
CL	Crown Level	MH	Manhole	UB	Universal Beam
CL	Chain Link Fence	MP	Marker Post	UC	Unknown Cover
C-Lev	Ceiling Level	NB	Name Board	UK	Unknown Use
Col	Column	OHL	Overhead Line (approx)	USB	Under Side Beam
C/P	Chestnut Paling Fence	Pan	Panel Fence	UTL	Unable To Lift
CR	Cattle Riser	PB	Post Box	VP	Vent Pipe
DC	Drainage Channel	PM	Parking Meter	WB	Waste Bin
DH	Door Head Height	PO	Post	WH	Weep Hole
DP	Down Pipe	P/R	Post & Rail Fence	WL	Water Level
DR	Drain	P/W	Post & Wire Fence	WM	Water Meter
EL	Eaves Level	P/Wall	Partition Wall	WO	Wash Out
EP	Electric Pole	RE	Rodding Eye		Floor to Ceiling Height
ER	Earth Rod	RL	Ridge Level		F/C Floor to False Ceiling Ht
ET	EP+Transformer	RP	Reflector Post		
FB	Flower Bed	RS	Road Sign		
FBD	Floor Board Direction	RSD	Roller Shutter Door		Survey Control Station

DRAWING NOTE

Topographical Surveys

Trees are drawn to scale showing the average canopy spread. Descriptions and heights should be used as a guide only.

All building names, descriptions, number of storeys, construction type including roof line details are indicative only and taken externally from ground level.

All below ground details including drainage, voids and services have been identified from above ground and therefore all details relating to these features including; sizes, depth, description etc will be approximate only. All critical dimensions and connections should be checked and verified prior to starting work.

Detail, services and features may not have been surveyed if obstructed or not reasonably visible at the time of the survey.

Measured Building Surveys

Measurements to internal walls are taken to the wall finishes at approx 1m above the floor level and the wall assumed to be vertical.

Cill heights are measured as floor to the cill and head heights are measured from cill to the top of window.

General

The contractor must check and verify all site and building dimensions, levels, utilities and drainage details and connections prior to commencing work. Any errors or discrepancies must be notified to Survey Solutions immediately.

The accuracy of the digital data is the same as the plotting scale implies. All dimensions are in metres unless otherwise stated.

The survey control listed is only to be used for topographical surveys at the stated scale. All control must be checked and verified prior to use.

Do not scale from this drawing.

CONTROL CO-ORDINATES

STATIONS	EASTINGS	NORTHINGS	LEVEL	DESCRIPTION
ST01	556504.590	246407.639	41.235	Hilti nail
ST02	556467.859	246366.165	42.635	Peg + nail
ST03	556370.317	246387.746	42.850	Peg + nail
ST04	556284.460	246401.820	43.320	Peg + nail
ST05	556202.366	246428.586	43.396	Peg + nail
ST06	556196.862	246463.210	43.512	Peg + nail
ST07	556152.254	246533.813	38.951	Peg + nail
ST08	556216.128	246561.558	38.156	Peg + nail
ST09	556284.648	246560.812	37.989	Peg + nail
ST10	556354.652	246546.533	38.353	**Peg + nail**
ST11	556418.195	246547.406	38.332	Peg + nail
ST12	556473.787	246534.776	37.980	Hilti nail
ST13	556512.557	246480.535	39.246	Hilti nail
ST14	556523.071	246444.484	40.290	Hilti nail
ST15	556054.805	246496.130	43.245	Hilti Nail
ST16	556006.566	246521.000	43.586	Hilti Nail
ST17	555942.873	246540.736	44.672	Hilti Nail
ST18	555880.299	246567.796	45.382	Hilti Nail
ST19	555837.347	246594.579	46.262	Hilti Nail

SURVEY GRID AND LEVEL DATUM

The coordinate system established for this survey is related to Ordnance Survey (OS) national grid at a single point using Smartnet, then orientated to grid north with a scale factor of 1.000.

The level datum established for this survey is related to Ordnance Survey (OS) using GPS Smartnet.

To avoid discrepancies any coordinated data used in conjunction with this survey must be derived directly from this control data.

REV	DESCRIPTION	DRAWN	APPR	DATE

SURVEY SOLUTIONS

Ipswich Coventry Yeovil Norwich Perth Nottingham Brentwood

Tel No: 0845 0405 969 Fax No: 0845 0405 970

www.survey-solutions.co.uk enquiries@survey-solutions.co.uk

LAND SURVEYING BUILDING SURVEYING UNDERGROUND SURVEYING

PROJECT TITLE: A1307, LINTON, SOUTH CAMBRIDGSHIRE, CB21 4NL.				
DRAWING DETAIL: TOPOGRAPHICAL SURVEY Sheet 2 of 8				
CLIENT: TAYLOR WIMPEY STRATEGIC LAND				SCALE: 1:200
SURVEYOR: DWB/PMB	SURVEY DATE: 29.01.2020	CHECKED BY: PJR	APPROVED BY: BTC	DWG STATUS: FINAL
DRAWING NUMBER: Z5955se-02			REVISION:	ISSUE DATE: 10.02.2020

Original Sheet Size A0H

TOPOGRAPHICAL & MEASURED BUILDING SURVEYS

ABBREVIATIONS & SYMBOLS

AH	Arch Head Height	FH	Fire Hydrant	RSJ	Rolled Steel Joist
AR	Assumed Route	FBD	Floor Board Direction	SI	Sign Post
AV	Air Valve	FH	Fire Hydrant	SP	Arch Spring Point Height
BB	Bellsha Beacon	FL	Floor Level	SV	Stop Valve
BH	Bore Hole	FP	Flag Pole	SW	Surface Water
BL	Bed Level	FW	Foul Water	SY	Slay
BO	Bollard	GG	Gully Grate	Tac	Tactile Paving
BrP	Brace Post	GV	Gas Valve	TC	Telecom Cover
BS	Bus Stop	HH	Head Height	TH	Trial Pit
BU	Bush	IC	Inspection Cover	THL	Threshold Level
B/W	Barbed Wire Fence	IL	Invert Level	TL	Traffic Light
BX	Box (Utilities)	IrR	Iron Railings	ToW	Top of Wall
C/B	Cross Board Fence	KO	Kerb Outlet	TP	Telegraph Pole
CH	Cill Height	LP	Lamp Post	TV	Cable TV Cover
CL	Close Level	MH	Manhole	UI	Universal Beam
CL	Close Mesh Fence	MP	Marker Post	UC	Unknown Cover
C-Lev	Ceiling Level	NB	Name Board	UK	Unknown Use
Col	Column	OHL	Overhead Line (approx)	USB	Under Side Beam
C/P	Chestnut Paling Fence	Pan	Panel Fence	UTL	Unable To Lift
CR	Cattle Rail	PB	Post Box	VP	Vent Pipe
DC	Drainage Channel	PM	Parking Meter	WB	Waste Bin
DH	Door Head Height	PO	Post	WH	Weep Hole
DP	Down Pipe	P/R	Post & Rail Fence	WL	Water Level
DR	Drain	P/W	Post & Wire Fence	WM	Water Meter
EL	Eaves Level	P/Wall	Partition Wall	WO	Wash Out
EP	Electric Pole	RE	Rodding Eye		Floor to Ceiling Height
ER	Earth Rod	RL	Ridge Level		F/C Floor to False Ceiling Ht
ET	EP+Transformer	RP	Reflector Post		
FB	Flower Bed	RS	Road Sign		
FBD	Floor Board Direction	RSD	Roller Shutter Door		Survey Control Station

DRAWING NOTE

Topographical Surveys

Trees are drawn to scale showing the average canopy spread. Descriptions and heights should be used as a guide only.

All building names, descriptions, number of storeys, construction type including roof line details are indicative only and taken externally from ground level.

All below ground details including drainage, voids and services have been identified from above ground and therefore all details relating to these features including; sizes, depth, description etc will be approximate only. All critical dimensions and connections should be checked and verified prior to starting work.

Detail, services and features may not have been surveyed if obstructed or not reasonably visible at the time of the survey.

Measured Building Surveys

Measurements to internal walls are taken to the wall finishes at approx 1m above the floor level and the wall assumed to be vertical.

Cill heights are measured as floor to the cill and head heights are measured from cill to the top of window.

General

The contractor must check and verify all site and building dimensions, levels, utilities and drainage details and connections prior to commencing work. Any errors or discrepancies must be notified to Survey Solutions immediately.

The accuracy of the digital data is the same as the plotting scale implies. All dimensions are in metres unless otherwise stated.

The survey control listed is only to be used for topographical surveys at the stated scale. All control must be checked and verified prior to use.

Do not scale from this drawing.

CONTROL CO-ORDINATES

STATIONS	EASTINGS	NORTHINGS	LEVEL	DESCRIPTION
ST01	556504.590	246407.639	41.235	Hilti nail
ST02	556487.859	246366.165	42.635	Peg + nail
ST03	556370.317	246387.746	42.850	Peg + nail
ST04	556284.460	246401.820	43.320	Peg + nail
ST05	556202.366	246428.586	43.396	Peg + nail
ST06	556136.862	246463.210	43.512	Peg + nail
ST07	556152.254	246533.813	38.951	Peg + nail
ST08	556216.128	246561.558	38.156	Peg + nail
ST09	556284.648	246560.812	37.989	Peg + nail
ST10	556354.652	246546.533	38.353	Peg + nail
ST11	556418.195	246547.406	38.332	Peg + nail
ST12	556473.787	246534.776	37.980	Hilti nail
ST13	556512.557	246480.535	39.246	Hilti nail
ST14	556523.071	246444.484	40.290	Hilti nail
ST15	556054.805	246496.130	43.245	Hilti Nail
ST16	556006.566	246521.000	43.586	Hilti Nail
ST17	555942.873	246540.736	44.672	Hilti Nail
ST18	555880.299	246587.796	45.382	Hilti Nail
ST19	555837.347	246594.579	46.262	Hilti Nail

SURVEY GRID AND LEVEL DATUM

The coordinate system established for this survey is related to Ordnance Survey (OS) national grid at a single point using Smartnet, then orientated to grid north with a scale factor of 1.000.

The level datum established for this survey is related to Ordnance Survey (OS) using GPS Smartnet.

To avoid discrepancies any coordinated data used in conjunction with this survey must be derived directly from this control data.

REV	DESCRIPTION	DRAWN	APPR.	DATE

SURVEY SOLUTIONS

Ipswich Coventry Yeovil Norwich Perth Nottingham Brentwood

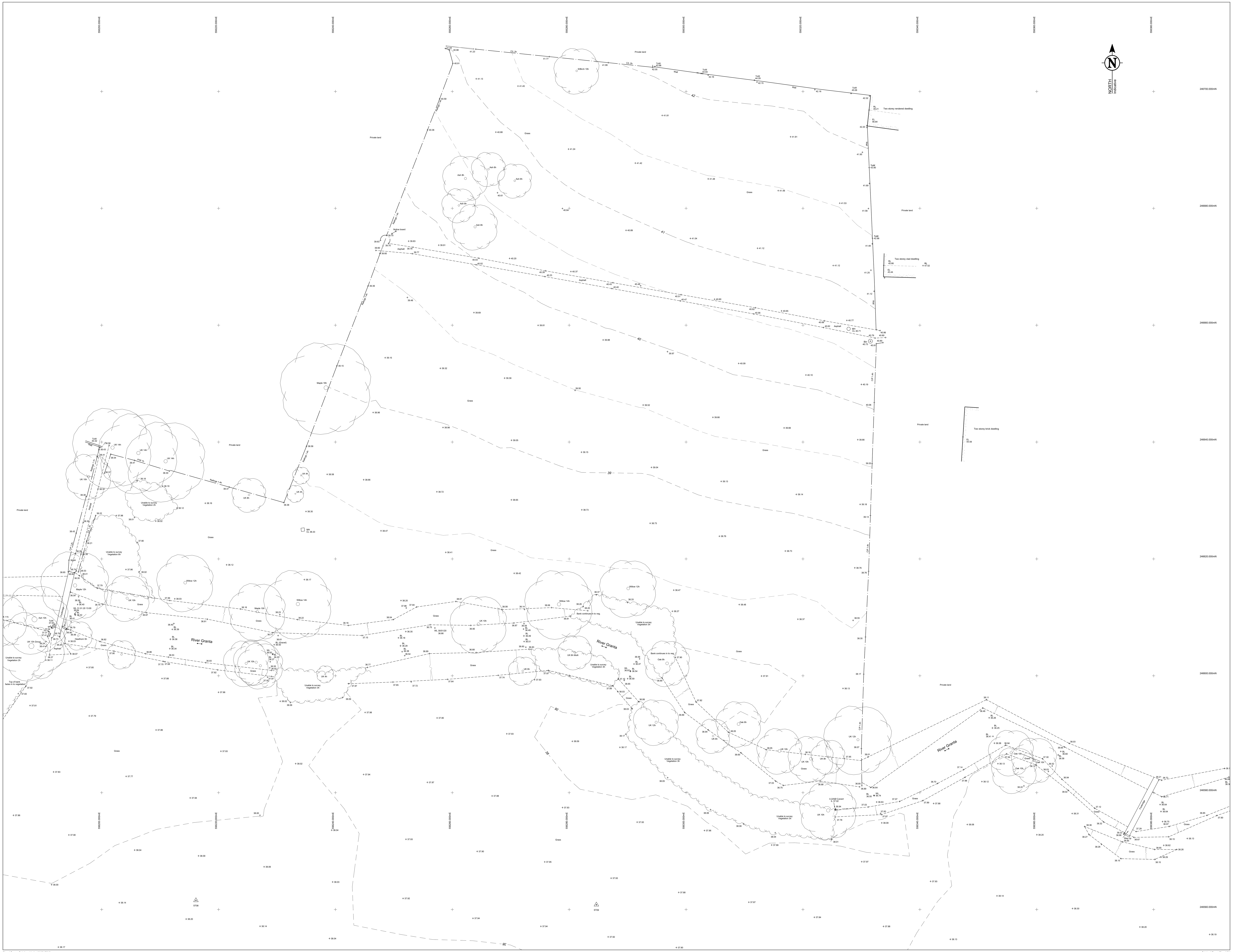
Tel No: 0845 0405 969 Fax No: 0845 0405 970

www.survey-solutions.co.uk enquiries@survey-solutions.co.uk

LAND SURVEYING BUILDING SURVEYING UNDERGROUND SURVEYING

PROJECT TITLE: A1307, LINTON, SOUTH CAMBRIDGSHIRE, CB21 4NL.				
DRAWING DETAIL: TOPOGRAPHICAL SURVEY Sheet 3 of 8				
CLIENT: TAYLOR WIMPEY STRATEGIC LAND				SCALE: 1:200
SURVEYOR: DWB/PMB	SURVEY DATE: 29.01.2020	CHECKED BY: PJR	APPROVED BY: BTC	DWG STATUS: FINAL
DRAWING NUMBER: 259555e-03			REVISION:	ISSUE DATE: 10.02.2020

Original Sheet Size A0H



Original Sheet Size A0H

TOPOGRAPHICAL & MEASURED BUILDING SURVEYS

ABBREVIATIONS & SYMBOLS

AH	Arch Head Height	FH	Fire Hydrant	RSJ	Rolled Steel Joist
AR	Assumed Route	FBD	Floor Board Direction	SI	Sign Post
AV	Air Valve	FH	Fire Hydrant	SP	Arch Spring Point Height
BB	Belisha Beacon	FL	Floor Level	SV	Stop Valve
BH	Bore Hole	FP	Flag Pole	SW	Surface Water
BL	Bed Level	FW	Foul Water	SY	Stay
BO	Bollard	GG	Gully Grate	Tac	Tactile Paving
BrP	Brace Post	GV	Gas Valve	TC	Telecom Cover
BS	Bus Stop	HH	Head Height	TH	Trial Pit
BU	Bush	IC	Inspection Cover	THL	Threshold Level
B/W	Barbed Wire Fence	IL	Invert Level	TL	Traffic Light
BX	Box (Utilities)	I/R	Iron Railings	ToW	Top of Wall
C/B	Close Board Fence	KO	Kerb Outlet	TP	Telegraph Pole
CH	Cill Height	LP	Lamp Post	TV	Cable TV Cover
CL	Cover Level	MH	Manhole	UB	Universal Beam
C/L	Chain Link Fence	MP	Marker Post	UC	Unknown Cover
C-Lev	Ceiling Level	NB	Name Board	UK	Unknown Tree
Col	Column	OHL	Overhead Line (approx)	USB	Under Side Beam
C/P	Chestnut Paling Fence	Pan	Panel Fence	UTL	Unable To Lift
CR	Cable Riser	PB	Post Box	VP	Vent Pipe
DC	Drainage Channel	PM	Parking Meter	WB	Waste Bin
DH	Door Head Height	PO	Post	WH	Weep Hole
DP	Down Pipe	P/R	Post & Rail Fence	WL	Water Level
DR	Drain	P/W	Post & Wire Fence	WM	Water Meter
EL	Eaves Level	P/Wall	Partition Wall	WO	Wash Out
EP	Electric Pole	RE	Rodding Eye	(X.XX)	Floor to Ceiling Height
ER	Earth Rod	RL	Ridge Level		
ET	EP+Transformer	RP	Reflector Post	(X.XX) F/C	Floor to False Ceiling Ht
FB	Flower Bed	RS	Road Sign		
FBD	Floor Board Direction	RSD	Roller Shutter Door	△	Survey Control Station

DRAWING NOTE

Topographical Surveys

Trees are drawn to scale showing the average canopy spread. Descriptions and heights should be used as a guide only.

All building names, descriptions, number of storeys, construction type including roof line details are indicative only and taken externally from ground level.

All below ground details including drainage, voids and services have been identified from above ground and therefore all details relating to these features including; sizes, depth, description etc will be approximate only. All critical dimensions and connections should be checked and verified prior to starting work.

Detail, services and features may not have been surveyed if obstructed or not reasonably visible at the time of the survey.

Measured Building Surveys

Measurements to internal walls are taken to the wall finishes at approx 1m above the floor level and the wall assumed to be vertical.

Cill heights are measured as floor to the cill and head heights are measured from cill to the top of window.

General

The contractor must check and verify all site and building dimensions, levels, utilities and drainage details and connections prior to commencing work. Any errors or discrepancies must be notified to Survey Solutions immediately.

The accuracy of the digital data is the same as the plotting scale implies. All dimensions are in metres unless otherwise stated.

The survey control listed is only to be used for topographical surveys at the stated scale. All control must be checked and verified prior to use.

Do not scale from this drawing.

CONTROL CO-ORDINATES

STATIONS	EASTINGS	NORTHINGS	LEVEL	DESCRIPTION
ST01	556504.590	246407.639	41.235	Hilti nail
ST02	556497.859	246366.165	42.635	Peg + nail
ST03	556370.317	246387.746	42.850	Peg + nail
ST04	556284.460	246401.820	43.320	Peg + nail
ST05	556202.366	246428.586	43.396	Peg + nail
ST06	556106.862	246463.210	43.512	Peg + nail
ST07	556152.254	246533.813	38.951	Peg + nail
ST08	556216.128	246561.558	38.156	Peg + nail
ST09	556284.648	246560.812	37.989	Peg + nail
ST10	556354.652	246546.533	38.263	Peg + nail
ST11	556418.195	246547.406	38.332	Peg + nail
ST12	556473.787	246534.776	37.980	Hilti nail
ST13	556512.557	246480.535	39.246	Hilti nail
ST14	556523.071	246444.484	40.290	Hilti nail
ST15	556054.805	246496.130	43.245	Hilti Nail
ST16	556006.566	246521.000	43.586	Hilti Nail
ST17	555942.873	246540.736	44.672	Hilti Nail
ST18	555880.299	246587.796	45.382	Hilti Nail
ST19	555837.347	246594.579	46.262	Hilti Nail

SURVEY GRID AND LEVEL DATUM

The coordinate system established for this survey is related to Ordnance Survey (OS) national grid at a single point using Smartnet, then orientated to grid north with a scale factor of 1.000.

The level datum established for this survey is related to Ordnance Survey (OS) using GPS Smartnet.

To avoid discrepancies any coordinated data used in conjunction with this survey must be derived directly from this control data.

REV	DESCRIPTION	DRAWN	APPR	DATE

SURVEY SOLUTIONS

Ipswich Coventry Yeovil Norwich Perth Nottingham Brentwood

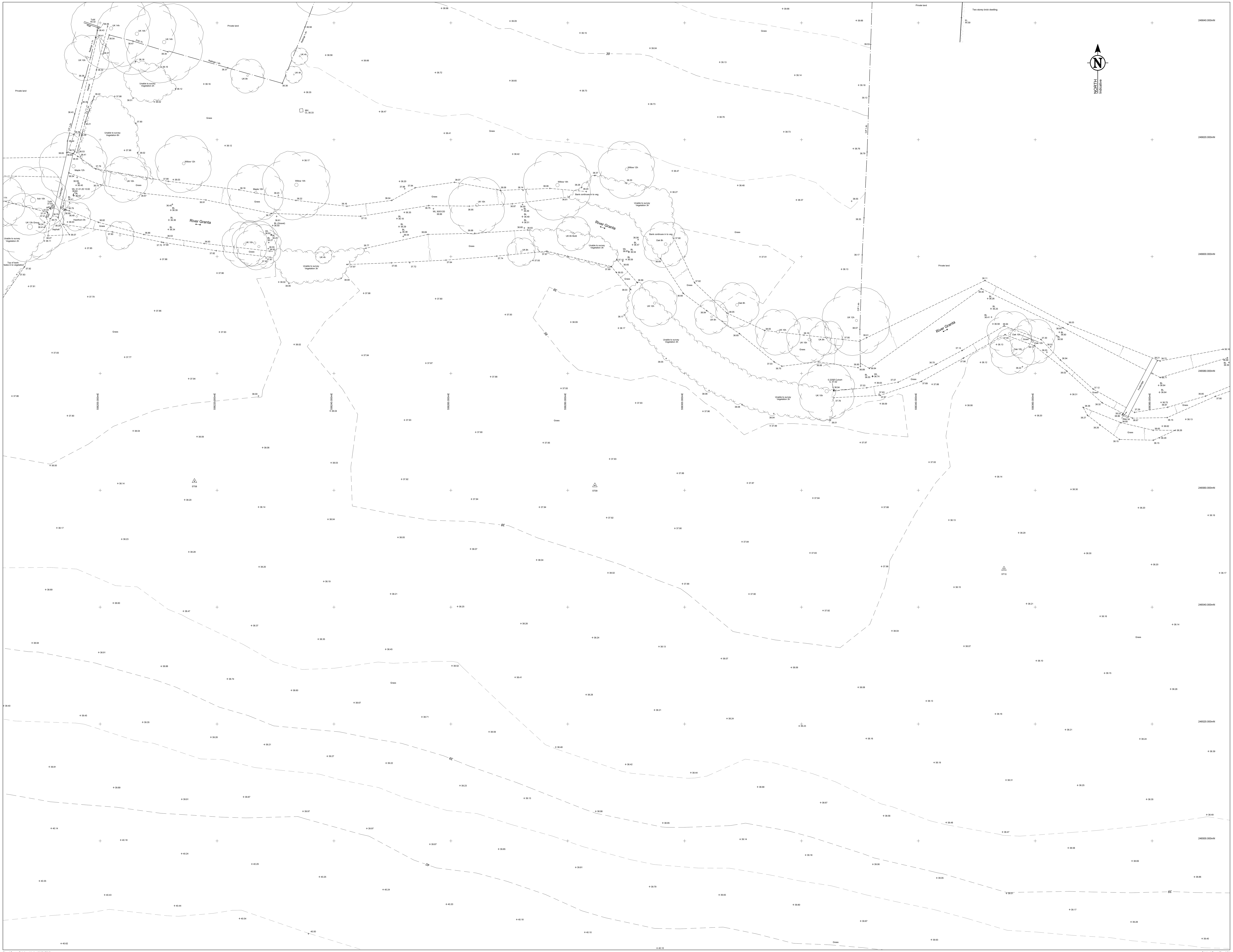
Tel No: 0845 0405 969 Fax No: 0845 0405 970
www.survey-solutions.co.uk enquiries@survey-solutions.co.uk

LAND SURVEYING BUILDING SURVEYING UNDERGROUND SURVEYING

PROJECT TITLE
A1307, LINTON,
SOUTH CAMBRIDGESHIRE, CB21 4NL.

DRAWING DETAIL
TOPOGRAPHICAL SURVEY
Sheet 4 of 8

CLIENT				SCALE
TAYLOR WIMPEY STRATEGIC LAND				1:200
SURVEYOR	SURVEY DATE	CHECKED BY	APPROVED BY	DWG STATUS
DWB/PMB	29.01.2020	PJR	BTC	FINAL
DRAWING NUMBER			REVISION	ISSUE DATE
25955se-04				10.02.2020



TOPOGRAPHICAL & MEASURED BUILDING SURVEYS

ABBREVIATIONS & SYMBOLS

AH	Arch Head Height	FH	Fire Hydrant	RSJ	Rolled Steel Joist
AR	Assumed Route	FBD	Floor Board Direction	SI	Sign Post
AV	Air Valve	FH	Fire Hydrant	SP	Arch Spring Point Height
BB	Belisha Beacon	FL	Floor Level	SV	Stop Valve
BH	Bore Hole	FP	Flag Pole	SW	Surface Water
BL	Bed Level	FW	Foul Water	SY	Stay
BO	Bollard	GG	Gully Grate	Tac	Tactile Paving
BrP	Brace Post	GV	Gas Valve	TC	Telecom Cover
BS	Bus Stop	HH	Head Height	TH	Trial Pit
BU	Bush	IC	Inspection Cover	THL	Threshold Level
B/W	Barbed Wire Fence	IL	Invert Level	TL	Traffic Light
BX	Box (Utilities)	I/R	Iron Railings	ToW	Top of Wall
C/B	Close Board Fence	KO	Kerb Outlet	TP	Telegraph Pole
CH	Cill Height	LP	Lamp Post	TV	Cable TV Cover
CL	Cover Level	MH	Manhole	UB	Universal Beam
C/L	Chain Link Fence	MP	Marker Post	UC	Unknown Cover
C-Lev	Ceiling Level	NB	Name Board	UK	Unknown Tree
Col	Column	OHL	Overhead Line (approx)	USB	Under Side Beam
C/P	Chestnut Paling Fence	Pan	Panel Fence	UTL	Unable To Lift
CR	Cable Riser	PB	Post Box	VP	Vent Pipe
DC	Drainage Channel	PM	Parking Meter	WB	Waste Bin
DH	Door Head Height	PO	Post	WH	Weep Hole
DP	Down Pipe	P/R	Post & Rail Fence	WL	Water Level
DR	Drain	P/W	Post & Wire Fence	WM	Water Meter
EL	Eaves Level	P/Wall	Partition Wall	WO	Wash Out
EP	Electric Pole	RE	Rodding Eye	(x.xx)	Floor to Ceiling Height
ER	Earth Rod	RL	Ridge Level		
ET	EP+Transformer	RP	Reflector Post	(x.xx)F/C	Floor to False Ceiling Ht
FB	Flower Bed	RS	Road Sign		
FBD	Floor Board Direction	RSD	Roller Shutter Door	(triangle)	Survey Control Station

DRAWING NOTE

Topographical Surveys

Trees are drawn to scale showing the average canopy spread. Descriptions and heights should be used as a guide only.

All building names, descriptions, number of storeys, construction type including roof line details are indicative only and taken externally from ground level.

All below ground details including drainage, voids and services have been identified from above ground and therefore all details relating to these features including; sizes, depth, description etc will be approximate only. All critical dimensions and connections should be checked and verified prior to starting work.

Detail, services and features may not have been surveyed if obstructed or not reasonably visible at the time of the survey.

Measured Building Surveys

Measurements to internal walls are taken to the wall finishes at approx 1m above the floor level and the wall assumed to be vertical.

Cill heights are measured as floor to the cill and head heights are measured from cill to the top of window.

General

The contractor must check and verify all site and building dimensions, levels, utilities and drainage details and connections prior to commencing work. Any errors or discrepancies must be notified to Survey Solutions immediately.

The accuracy of the digital data is the same as the plotting scale implies. All dimensions are in metres unless otherwise stated.

The survey control listed is only to be used for topographical surveys at the stated scale. All control must be checked and verified prior to use.

Do not scale from this drawing.

CONTROL CO-ORDINATES

STATIONS	EASTINGS	NORTHINGS	LEVEL	DESCRIPTION
ST01	556504.590	246407.639	41.235	Hilti nail
ST02	556497.859	246366.165	42.635	Peg + nail
ST03	556370.317	246387.746	42.850	Peg + nail
ST04	556284.460	246401.820	43.320	Peg + nail
ST05	556202.366	246428.586	43.396	Peg + nail
ST06	556106.862	246463.210	43.512	Peg + nail
ST07	556152.254	246533.813	38.951	Peg + nail
ST08	556216.128	246561.558	38.156	Peg + nail
ST09	556284.648	246560.812	37.989	Peg + nail
ST10	556354.652	246546.533	38.263	Peg + nail
ST11	556418.195	246547.406	38.332	Peg + nail
ST12	556473.787	246534.776	37.980	Hilti nail
ST13	556512.557	246480.535	39.246	Hilti nail
ST14	556523.071	246444.484	40.290	Hilti nail
ST15	556054.805	246496.130	43.245	Hilti Nail
ST16	556006.566	246521.000	43.586	Hilti Nail
ST17	555942.873	246540.736	44.672	Hilti Nail
ST18	555880.299	246587.796	45.382	Hilti Nail
ST19	555837.347	246594.579	46.262	Hilti Nail

SURVEY GRID AND LEVEL DATUM

The coordinate system established for this survey is related to Ordnance Survey (OS) national grid at a single point using Smartnet, then orientated to grid north with a scale factor of 1.000.

The level datum established for this survey is related to Ordnance Survey (OS) using GPS Smartnet.

To avoid discrepancies any coordinated data used in conjunction with this survey must be derived directly from this control data.

REV	DESCRIPTION	DRAWN	APPR	DATE

SURVEY SOLUTIONS

Ipswich Coventry Yeovil Norwich Perth Nottingham Brentwood

Tel No: 0845 0405 969 Fax No: 0845 0405 970
www.survey-solutions.co.uk enquiries@survey-solutions.co.uk

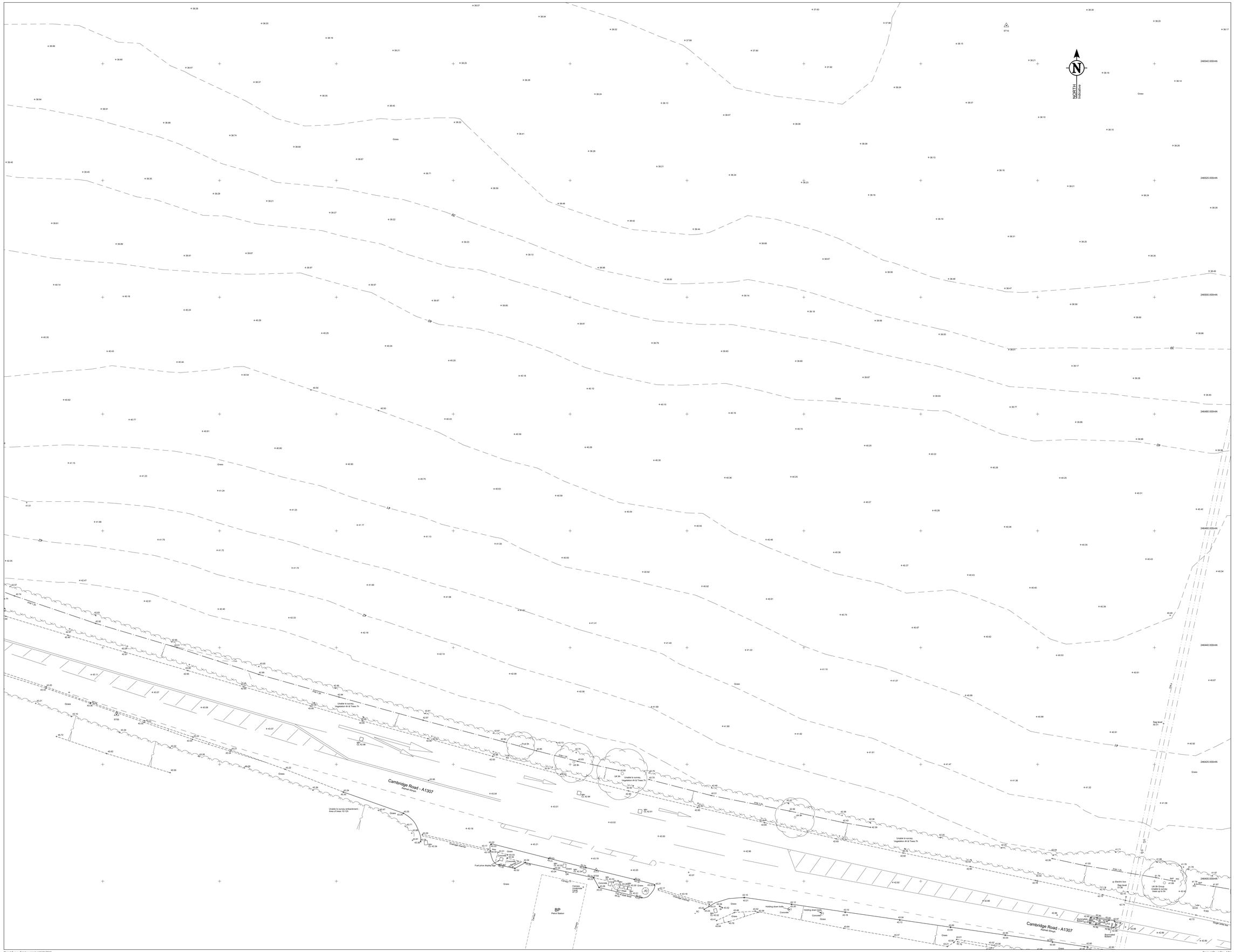
LAND SURVEYING BUILDING SURVEYING UNDERGROUND SURVEYING

PROJECT TITLE
A1307, LINTON,
SOUTH CAMBRIDGESHIRE, CB21 4NL.

DRAWING DETAIL
TOPOGRAPHICAL SURVEY
Sheet 5 of 8

CLIENT				SCALE
TAYLOR WIMPEY STRATEGIC LAND				1:200
SURVEYOR	SURVEY DATE	CHECKED BY	APPROVED BY	DWG STATUS
DWB/PMB	29.01.2020	PJR	BTC	FINAL
DRAWING NUMBER			REVISION	ISSUE DATE
25955se-05				10.02.2020

Original Sheet Size A0H



TOPOGRAPHICAL & MEASURED BUILDING SURVEYS

ABBREVIATIONS & SYMBOLS

AH	Arch Head Height	FH	Fire Hydrant	RSJ	Rolled Steel Joist
AR	Assumed Route	FBD	Floor Board Direction	SI	Sign Post
AV	Air Valve	FH	Fire Hydrant	SP	Arch Spring Point Height
BB	Belisha Beacon	FL	Floor Level	SV	Stop Valve
BH	Bore Hole	FP	Flag Pole	SW	Surface Water
BL	Bed Level	FW	Foul Water	SY	Slay
BO	Bollard	GG	Gully Grate	Tac	Tactile Paving
BrP	Brace Post	GV	Gas Valve	TC	Telecom Cover
BS	Bus Stop	HH	Head Height	TH	Trial Pit
BU	Bush	IC	Inspection Cover	THL	Threshold Level
B/W	Barbed Wire Fence	IL	Invert Level	TL	Traffic Light
BX	Box (Utilities)	IR	Iron Railings	ToW	Top of Wall
C/B	Close Board Fence	KO	Kerb Outlet	TP	Telegraph Pole
CH	Cill Height	LP	Lamp Post	TV	Cable TV Cover
CL	Cover Level	MH	Manhole	UB	Universal Beam
CL	Chain Link Fence	MP	Marker Post	UC	Unknown Cover
C-Lev	Ceiling Level	NB	Name Board	UC	Universal Column
Col	Column	OHL	Overhead Line (approx)	USB	Under Side Beam
C/P	Chestnut Paling Fence	Pan	Panel Fence	UTL	Unable To Lift
CR	Cattle River	PB	Post Box	VP	Vent Pipe
DC	Drainage Channel	PM	Parking Meter	WB	Waste Bin
DH	Door Head Height	PO	Post	WH	Weep Hole
DP	Down Pipe	P/R	Post & Rail Fence	WL	Water Level
DR	Drain	P/W	Post & Wire Fence	WM	Water Meter
EL	Eaves Level	P/Wall	Partition Wall	WO	Wash Out
EP	Electric Pole	RE	Rodding Eye	(+)	Floor to Ceiling Height
ER	Earth Rod	RL	Ridge Level		
ET	EP+Transformer	RP	Reflector Post	F/C	F/C Floor to False Ceiling Ht
FB	Flower Bed	RS	Road Sign		
FBD	Floor Board Direction	RSD	Roller Shutter Door		Survey Control Station

DRAWING NOTE

Topographical Surveys

Trees are drawn to scale showing the average canopy spread. Descriptions and heights should be used as a guide only.

All building names, descriptions, number of storeys, construction type including roof line details are indicative only and taken externally from ground level.

All below ground details including drainage, voids and services have been identified from above ground and therefore all details relating to these features including; sizes, depth, description etc will be approximate only. All critical dimensions and connections should be checked and verified prior to starting work.

Detail, services and features may not have been surveyed if obstructed or not reasonably visible at the time of the survey.

Measured Building Surveys

Measurements to internal walls are taken to the wall finishes at approx 1m above the floor level and the wall assumed to be vertical.

Cill heights are measured as floor to the cill and head heights are measured from cill to the top of window.

General

The contractor must check and verify all site and building dimensions, levels, utilities and drainage details and connections prior to commencing work. Any errors or discrepancies must be notified to Survey Solutions immediately.

The accuracy of the digital data is the same as the plotting scale implies. All dimensions are in metres unless otherwise stated.

The survey control listed is only to be used for topographical surveys at the stated scale. All control must be checked and verified prior to use.

Do not scale from this drawing.

CONTROL CO-ORDINATES

STATIONS	EASTINGS	NORTHINGS	LEVEL	DESCRIPTION
ST01	556504.590	246407.639	41.235	Hilti nail
ST02	556497.899	246366.165	42.635	Peg + nail
ST03	556370.317	246387.746	42.850	Peg + nail
ST04	556284.460	246401.820	43.320	Peg + nail
ST05	556202.366	246428.586	43.396	Peg + nail
ST06	556136.862	246463.210	43.512	Peg + nail
ST07	556152.254	246533.813	38.951	Peg + nail
ST08	556216.128	246561.558	38.156	Peg + nail
ST09	556284.648	246560.812	37.989	Peg + nail
ST10	556334.652	246546.533	38.353	**Peg + nail**
ST11	556418.195	246547.406	38.332	Peg + nail
ST12	556473.787	246534.779	37.980	Hilti nail
ST13	556512.557	246480.535	39.246	Hilti nail
ST14	556523.071	246444.484	40.250	Hilti nail
ST15	556034.805	246496.130	43.245	Hilti Nail
ST16	556006.566	246521.000	43.586	Hilti Nail
ST17	555942.873	246540.736	44.672	Hilti Nail
ST18	555880.299	246587.796	45.382	Hilti Nail
ST19	555837.347	246594.579	46.262	Hilti Nail

SURVEY GRID AND LEVEL DATUM

The coordinate system established for this survey is related to Ordnance Survey (OS) national grid at a single point using Smartnet, then orientated to grid north with a scale factor of 1.000.

The level datum established for this survey is related to Ordnance Survey (OS) using GPS Smartnet.

To avoid discrepancies any coordinated data used in conjunction with this survey must be derived directly from this control data.

REV	DESCRIPTION	DRAWN	APPR.	DATE

SURVEY SOLUTIONS

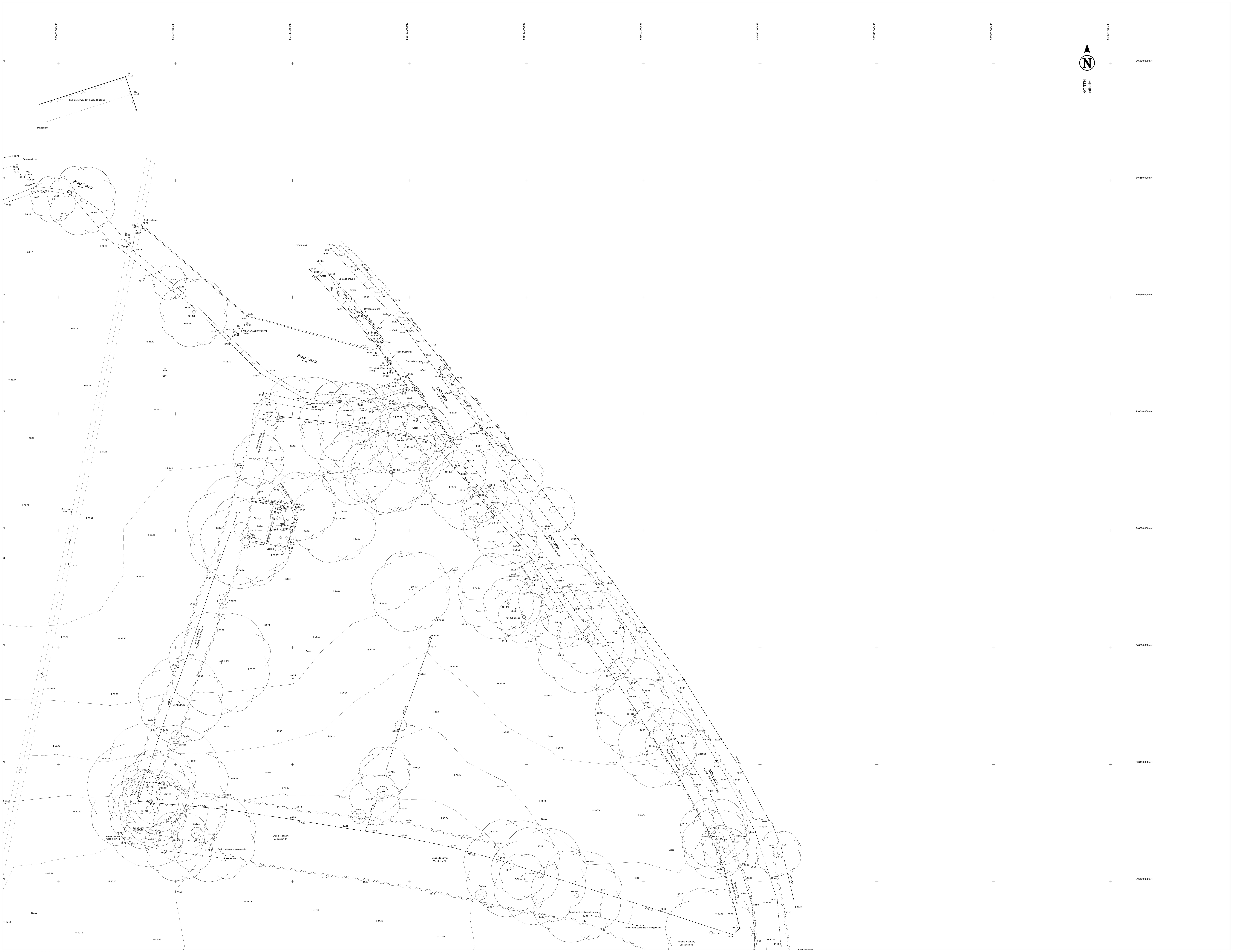
Ipswich Coventry Yeovil Norwich Perth Nottingham Brentwood

Tel No: 0845 0405 969 Fax No: 0845 0405 970

www.survey-solutions.co.uk enquiries@survey-solutions.co.uk

LAND SURVEYING BUILDING SURVEYING UNDERGROUND SURVEYING

PROJECT TITLE A1307, LINTON, SOUTH CAMBRIDGSHIRE, CB21 4NL.				
DRAWING DETAIL TOPOGRAPHICAL SURVEY Sheet 6 of 8				
CLIENT TAYLOR WIMPEY STRATEGIC LAND				SCALE 1:200
SURVEYOR DWB/PMB	SURVEY DATE 29.01.2020	CHECKED BY PJR	APPROVED BY BTC	DWG STATUS FINAL
DRAWING NUMBER 259555re-06			REVISION	ISSUE DATE 10.02.2020



©Land Survey Solutions Limited 01/01/2010

Original Sheet Size A0H

TOPOGRAPHICAL & MEASURED BUILDING SURVEYS

ABBREVIATIONS & SYMBOLS

AH	Arch Head Height	FH	Fire Hydrant	RSJ	Rolled Steel Joist
AR	Assumed Route	FBD	Floor Board Direction	SI	Sign Post
AV	Air Valve	FH	Fire Hydrant	SP	Arch Spring Point Height
BB	Belisha Beacon	FL	Floor Level	SV	Stop Valve
BH	Bore Hole	FP	Flag Pole	SW	Surface Water
BL	Bed Level	FW	Foul Water	SY	Stay
BO	Bollard	GG	Gully Grate	Tac	Tactile Paving
BrP	Brace Post	GV	Gas Valve	TC	Telecom Cover
BS	Bus Stop	HH	Head Height	TH	Trial Pit
BU	Bush	IC	Inspection Cover	THL	Threshold Level
B/W	Barbed Wire Fence	IL	Invert Level	TL	Traffic Light
BX	Box (Utilities)	I/R	Iron Railings	ToW	Top of Wall
C/B	Close Board Fence	KO	Kerb Outlet	TP	Telegraph Pole
CH	Cill Height	LP	Lamp Post	TV	Cable TV Cover
CL	Cover Level	MH	Manhole	UB	Universal Beam
C/L	Chain Link Fence	MP	Marker Post	UC	Unknown Cover
C-Lev	Ceiling Level	NB	Name Board	UK	Unknown Tree
Col	Column	OHL	Overhead Line (approx)	USB	Under Side Beam
C/P	Chestnut Paling Fence	Pan	Panel Fence	UTL	Unable To Lift
CR	Cable Riser	PB	Post Box	VP	Vent Pipe
DC	Drainage Channel	PM	Parking Meter	WB	Waste Bin
DH	Door Head Height	PO	Post	WH	Weep Hole
DP	Down Pipe	P/R	Post & Rail Fence	WL	Water Level
DR	Drain	P/W	Post & Wire Fence	WM	Water Meter
EL	Eaves Level	P/Wall	Partition Wall	WO	Wash Out
EP	Electric Pole	RE	Rodding Eye	(x.xx)	Floor to Ceiling Height
ER	Earth Rod	RL	Ridge Level		
ET	EP+Transformer	RP	Reflector Post	(x.xx) F/C	Floor to False Ceiling Ht
FB	Flower Bed	RS	Road Sign		
FBD	Floor Board Direction	RSD	Roller Shutter Door	△	Survey Control Station
		BoB	Bottom of bank	TB	Top of bank

DRAWING NOTE

Topographical Surveys

Trees are drawn to scale showing the average canopy spread. Descriptions and heights should be used as a guide only.

All building names, descriptions, number of storeys, construction type including roof line details are indicative only and taken externally from ground level.

All below ground details including drainage, voids and services have been identified from above ground and therefore all details relating to these features including; sizes, depth, description etc will be approximate only. All critical dimensions and connections should be checked and verified prior to starting work.

Detail, services and features may not have been surveyed if obstructed or not reasonably visible at the time of the survey.

Measured Building Surveys

Measurements to internal walls are taken to the wall finishes at approx 1m above the floor level and the wall assumed to be vertical.

Cill heights are measured as floor to the cill and head heights are measured from cill to the top of window.

General

The contractor must check and verify all site and building dimensions, levels, utilities and drainage details and connections prior to commencing work. Any errors or discrepancies must be notified to Survey Solutions immediately.

The accuracy of the digital data is the same as the plotting scale implies. All dimensions are in metres unless otherwise stated.

The survey control listed is only to be used for topographical surveys at the stated scale. All control must be checked and verified prior to use.

Do not scale from this drawing.

CONTROL CO-ORDINATES

STATIONS	EASTINGS	NORTHINGS	LEVEL	DESCRIPTION
ST01	556504.590	246407.639	41.235	Hilti nail
ST02	556497.859	246366.165	42.635	Peg + nail
ST03	556370.317	246387.746	42.850	Peg + nail
ST04	556284.460	246401.820	43.320	Peg + nail
ST05	556202.366	246428.586	43.396	Peg + nail
ST06	556106.862	246463.210	43.512	Peg + nail
ST07	556152.254	246533.813	38.951	Peg + nail
ST08	556216.128	246561.558	38.156	Peg + nail
ST09	556284.648	246560.812	37.989	Peg + nail
ST10	556354.652	246546.533	38.263	Peg + nail
ST11	556418.195	246547.406	38.332	Peg + nail
ST12	556473.787	246534.776	37.980	Hilti nail
ST13	556512.557	246480.535	39.246	Hilti nail
ST14	556523.071	246444.484	40.290	Hilti nail
ST15	556054.805	246496.130	43.245	Hilti Nail
ST16	556006.566	246521.000	43.586	Hilti Nail
ST17	555942.873	246540.736	44.672	Hilti Nail
ST18	555880.299	246587.796	45.382	Hilti Nail
ST19	555837.347	246594.579	46.262	Hilti Nail

SURVEY GRID AND LEVEL DATUM

The coordinate system established for this survey is related to Ordnance Survey (OS) national grid at a single point using Smartnet, then orientated to grid north with a scale factor of 1.000.

The level datum established for this survey is related to Ordnance Survey (OS) using GPS Smartnet.

To avoid discrepancies any coordinated data used in conjunction with this survey must be derived directly from this control data.

REV	DESCRIPTION	DRAWN	APPR	DATE

SURVEY SOLUTIONS

Ipswich Coventry Yeovil Norwich Perth Nottingham Brentwood

Tel No: 0845 0405 969 Fax No: 0845 0405 970
www.survey-solutions.co.uk enquiries@survey-solutions.co.uk

LAND SURVEYING BUILDING SURVEYING UNDERGROUND SURVEYING

PROJECT TITLE A1307, LINTON, SOUTH CAMBRIDGESHIRE, CB21 4NL.				
DRAWING DETAIL TOPOGRAPHICAL SURVEY Sheet 7 of 8				
CLIENT TAYLOR WIMPEY STRATEGIC LAND				SCALE 1:200
SURVEYOR DWB/PMB	SURVEY DATE 29.01.2020	CHECKED BY PJR	APPROVED BY BTC	DWG STATUS FINAL
DRAWING NUMBER 25955se-07			REVISION	ISSUE DATE 10.02.2020

TOPOGRAPHICAL & MEASURED BUILDING SURVEYS

ABBREVIATIONS & SYMBOLS

AH	Arch Head Height	FH	Fire Hydrant	RSJ	Rolled Steel Joist
AR	Assumed Route	FBD	Floor Board Direction	SI	Sign Post
AV	Air Valve	FH	Fire Hydrant	SP	Arch Spring Point Height
BB	Belisha Beacon	FL	Floor Level	SV	Stop Valve
BH	Bore Hole	FP	Flag Pole	SW	Surface Water
BL	Bed Level	FW	Foul Water	SY	Slay
BO	Bollard	GG	Gully Grate	Tac	Tactile Paving
BrP	Brace Post	GV	Gas Valve	TC	Telecom Cover
BS	Bus Stop	HH	Head Height	TH	Trial Pit
BU	Bush	IC	Inspection Cover	THL	Threshold Level
B/W	Barbed Wire Fence	IL	Invert Level	TL	Traffic Light
BX	Box (Utilities)	IR	Iron Railings	ToW	Top of Wall
C/B	Close Board Fence	KO	Kerb Outlet	TP	Telegraph Pole
CH	Cill Height	LP	Lamp Post	TV	Cable TV Cover
CL	Clear Level	MH	Manhole	UB	Universal Beam
CL	Corrugated Fence	MP	Marker Post	UC	Unknown Cover
C-Lev	Ceiling Level	NB	Name Board	UC	Universal Column
Col	Column	OHL	Overhead Line (approx)	USB	Under Side Beam
C/P	Chestnut Paling Fence	Pan	Panel Fence	UTL	Unable To Lift
CR	Cattle Riser	PB	Post Box	VP	Vent Pipe
DC	Drainage Channel	PM	Parking Meter	WB	Waste Bin
DH	Door Head Height	PO	Post	WH	Weep Hole
DP	Down Pipe	P/R	Post & Rail Fence	WL	Water Level
DR	Drain	P/W	Post & Wire Fence	WM	Water Meter
EL	Eaves Level	P/Wall	Partition Wall	WO	Wash Out
EP	Electric Pole	RE	Rodding Eye		Floor to Ceiling Height
ER	Earth Rod	RL	Ridge Level		F/C Floor to Fallow Ceiling Ht
ET	EP+Transformer	RP	Reflector Post		
FB	Flower Bed	RS	Road Sign		
FBD	Flour Board Direction	RSD	Roller Shutter Door		Survey Control Station

DRAWING NOTE

Topographical Surveys

Trees are drawn to scale showing the average canopy spread. Descriptions and heights should be used as a guide only.

All building names, descriptions, number of storeys, construction type including roof line details are indicative only and taken externally from ground level.

All below ground details including drainage, voids and services have been identified from above ground and therefore all details relating to these features including; sizes, depth, description etc will be approximate only. All critical dimensions and connections should be checked and verified prior to starting work.

Detail, services and features may not have been surveyed if obstructed or not reasonably visible at the time of the survey.

Measured Building Surveys

Measurements to internal walls are taken to the wall finishes at approx 1m above the floor level and the wall assumed to be vertical.

Cill heights are measured as floor to the cill and head heights are measured from cill to the top of window.

General

The contractor must check and verify all site and building dimensions, levels, utilities and drainage details and connections prior to commencing work. Any errors or discrepancies must be notified to Survey Solutions immediately.

The accuracy of the digital data is the same as the plotting scale implies. All dimensions are in metres unless otherwise stated.

The survey control listed is only to be used for topographical surveys at the stated scale. All control must be checked and verified prior to use.

Do not scale from this drawing.

CONTROL CO-ORDINATES

STATIONS	EASTINGS	NORTHINGS	LEVEL	DESCRIPTION
ST01	556504.590	246407.839	41.235	Hilti nail
ST02	556497.859	246366.165	42.635	Peg + nail
ST03	556370.317	246387.746	42.850	Peg + nail
ST04	556284.460	246401.820	43.320	Peg + nail
ST05	556202.396	246428.586	43.396	Peg + nail
ST06	556106.862	246463.210	43.512	Peg + nail
ST07	556152.254	246533.813	38.951	Peg + nail
ST08	556216.128	246561.558	38.156	Peg + nail
ST09	556284.648	246560.812	37.959	Peg + nail
ST10	556354.652	246546.533	38.263	**Peg + nail**
ST11	556418.195	246547.406	38.332	Peg + nail
ST12	556473.787	246534.776	37.980	Hilti nail
ST13	556512.557	246480.535	39.246	Hilti nail
ST14	556523.071	246444.484	40.290	Hilti nail
ST15	556504.805	246496.150	43.345	Hilti Nail
ST16	556006.566	246521.000	43.586	Hilti Nail
ST17	555942.873	246540.736	44.672	Hilti Nail
ST18	555880.299	246567.796	45.382	Hilti Nail
ST19	555837.347	246594.579	46.262	Hilti Nail

SURVEY GRID AND LEVEL DATUM

The coordinate system established for this survey is related to Ordnance Survey (OS) national grid at a single point using Smartnet, then orientated to grid north with a scale factor of 1.000.

The level datum established for this survey is related to Ordnance Survey (OS) using GPS Smartnet.

To avoid discrepancies any coordinated data used in conjunction with this survey must be derived directly from this control data.

REV	DESCRIPTION	DRAWN	APPR	DATE

SURVEY SOLUTIONS

Ipswich Coventry Yeovil Norwich Perth Nottingham Brentwood

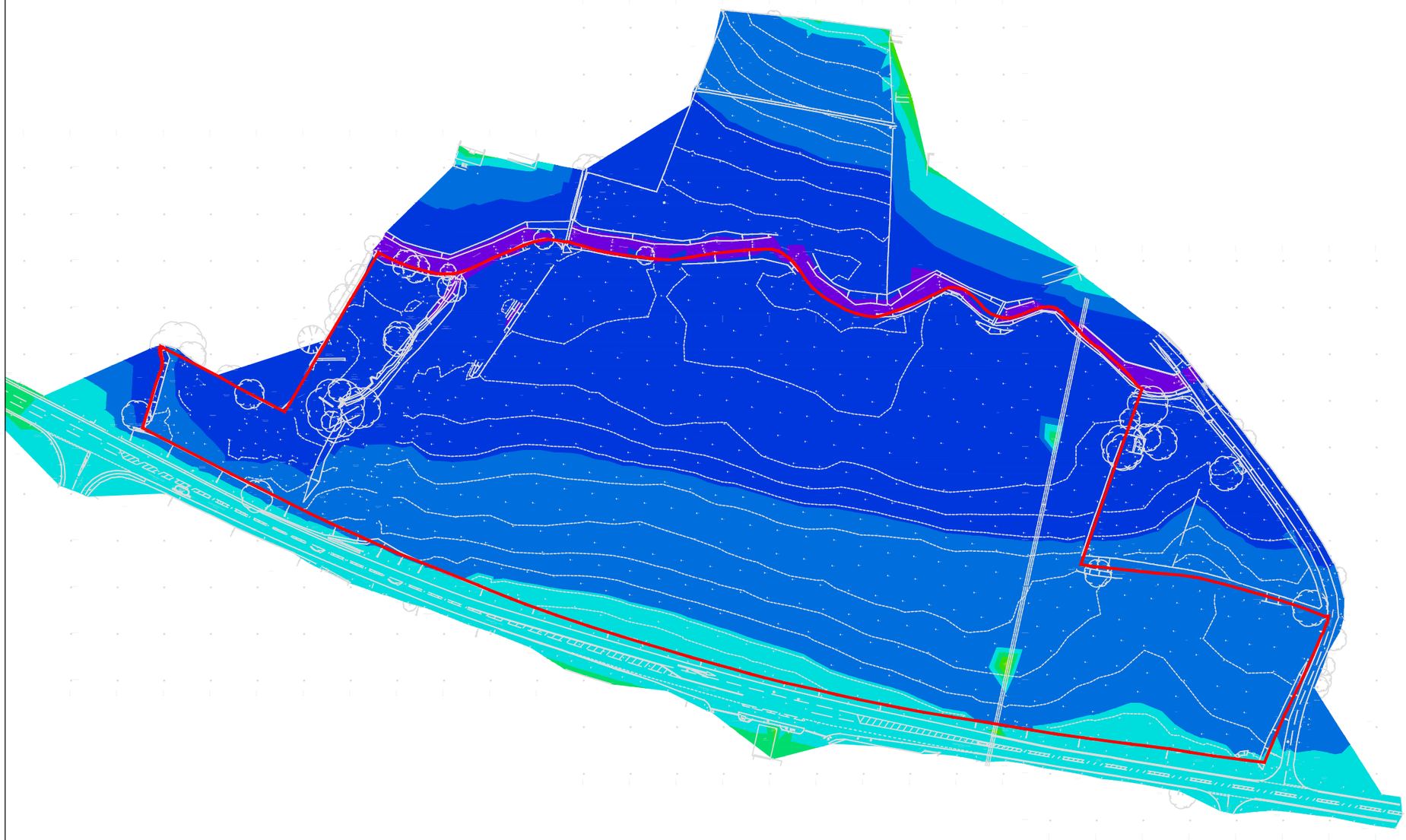
Tel No: 0845 0405 969 Fax No: 0845 0405 970
www.survey-solutions.co.uk enquiries@survey-solutions.co.uk

LAND SURVEYING BUILDING SURVEYING UNDERGROUND SURVEYING

PROJECT TITLE				
A1307, LINTON, SOUTH CAMBRIDGSHIRE, CB21 4NL.				
DRAWING DETAIL				
TOPOGRAPHICAL SURVEY Sheet 8 of 8				
CLIENT				SCALE
TAYLOR WIMPEY STRATEGIC LAND				1:200
SURVEYOR	SURVEY DATE	CHECKED BY	APPROVED BY	DWG STATUS
DWB/PMB	29.01.2020	PJR	BTC	FINAL
DRAWING NUMBER			REVISION	ISSUE DATE
25955se-08				10.02.2020

Original Sheet Size A0H

A3
ORIGINAL
PLOT SIZE



NOTES:
1. Based on "SURVEY SOLUTIONS" Drawing No. 25955se-01-08.

KEY

- Indicative Site Boundary.

Height Bands
- 55.7m - 58m
- 53.4m - 55.7m
- 51.1m - 53.4m
- 48.8m - 51.1m
- 46.5m - 48.8m
- 44.2m - 46.5m
- 41.9m - 44.2m
- 39.6m - 41.9m
- 37.3m - 39.6m
- 35m - 37.3m

Rev	Date	Details	Drawn by	Checked by	Approved by
-	-	-	-	-	-

Bristol
Cambridge
London
Manchester
Oxford
Welwyn Garden City

Transport Planning Associates

The Stables
7 Chesterton Mill
French's Road
Cambridge
CB4 3NP
01223 455385
www.tpa.uk.com

CLIENT:
TAYLOR WIMPEY UK Ltd

PROJECT:
LAND AT LINTON, CAMBRIDGESHIRE

TITLE:
EXISTING GROUND LEVELS MODEL LAYOUT

STATUS:
FOR INFORMATION

SCALE:	DATE:	DRAWN:	CHECKED:	APPROVED:
1:2,000	11.02.20	NR	TH	JH

JOB NO:	DRAWING NO:	REVISION:
1902-05	SK101	-

W E S

INDICATIVE

APPENDIX C

Environment Agency

Flood map for planning

Your reference
Linton

Location (easting/northing)
556255/246481

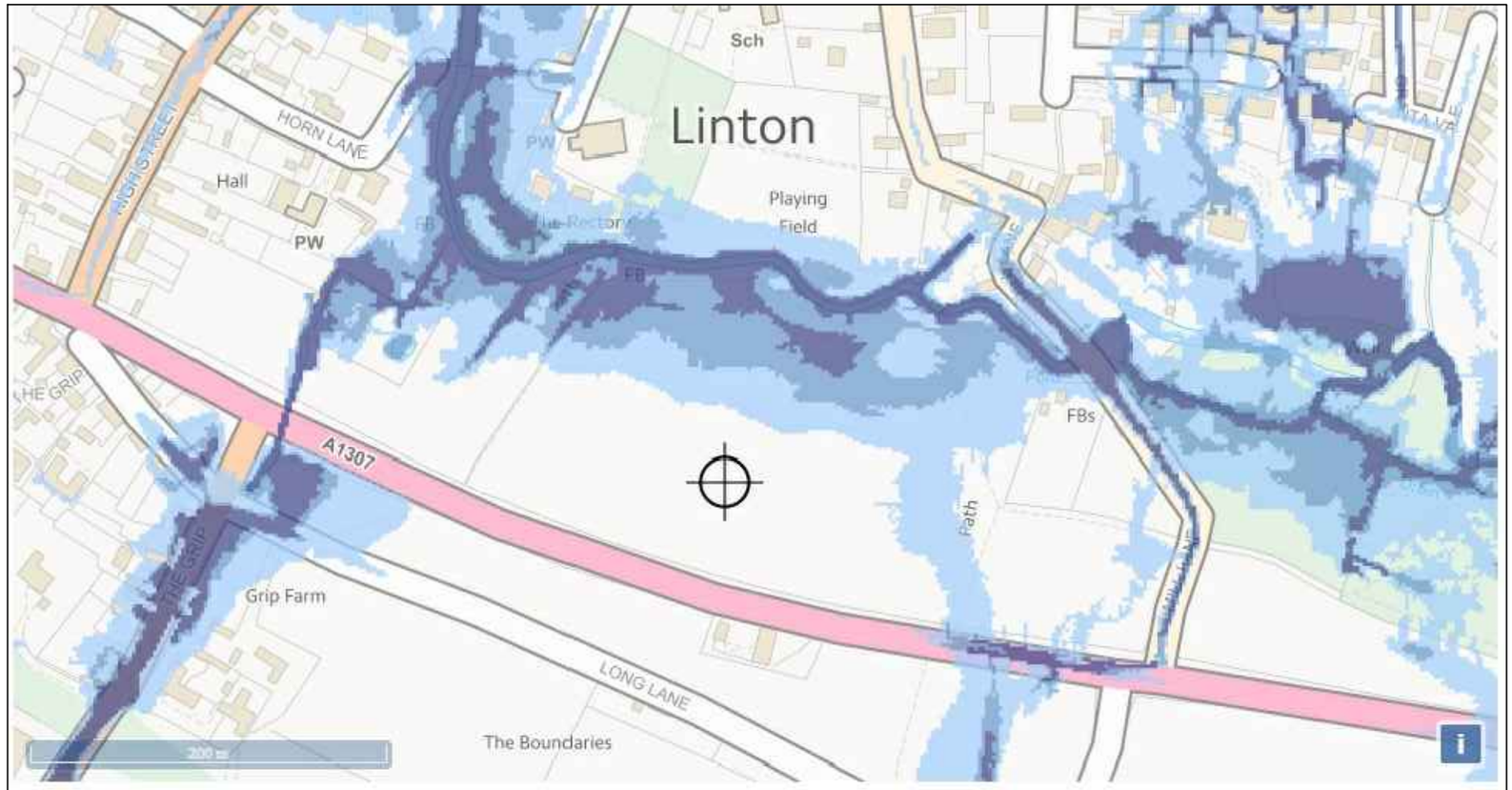
Scale
1:10000

Created
11 Feb 2020 11:37

- Selected point
- Flood zone 3
- Flood zone 3: areas benefitting from flood defences
- Flood zone 2
- Flood zone 1
- Flood defence
- Main river
- Flood storage area

0 100 200 300m

A3
ORIGINAL
PLOT SIZE



Extent of flooding from surface water

High Medium Low Very low Location you selected

NOTES:
1. Based on Environment Agency data.

Rev	Date	Details	Drawn by	Checked by	Approved by
-	-	-	-	-	-

Bristol
Cambridge
London
Manchester
Oxford
Welwyn Garden City

Transport Planning Associates

The Stables
7 Chesterton Mill
French's Road
Cambridge
CB4 3NP
01223 455385
www.tpa.uk.com

CLIENT:
TAYLOR WIMPEY UK Ltd

PROJECT:
LAND AT LINTON, CAMBRIDGESHIRE

TITLE:
ENVIRONMENT AGENCY FLOOD RISK FROM SURFACE WATER MAP

STATUS:
FOR INFORMATION

SCALE:	DATE:	DRAWN:	CHECKED:	APPROVED:
NTS	12.02.20	NR	TH	JH

JOB NO:	DRAWING NO:	REVISION:
1902-05	FM01	-

W E S

INDICATIVE

A3
ORIGINAL
PLOT SIZE

Extent of flooding from rerservoirs

Maximum extent of flooding Location you selected

NOTES:
1. Based on Environment Agency data.

Rev	Date	Details	Drawn by	Checked by	Approved by
-	-	-	-	-	-

Bristol
Cambridge
London
Manchester
Oxford
Welwyn Garden City

Transport Planning Associates

The Stables
7 Chesterton Mill
French's Road
Cambridge
CB4 3NP
01223 455385
www.tpa.uk.com

CLIENT:
TAYLOR WIMPEY UK Ltd

PROJECT:
LAND AT LINTON, CAMBRIDGESHIRE

TITLE:
ENVIRONMENT AGENCY FLOOD RISK FROM RESERVOIRS MAP

STATUS:
FOR INFORMATION

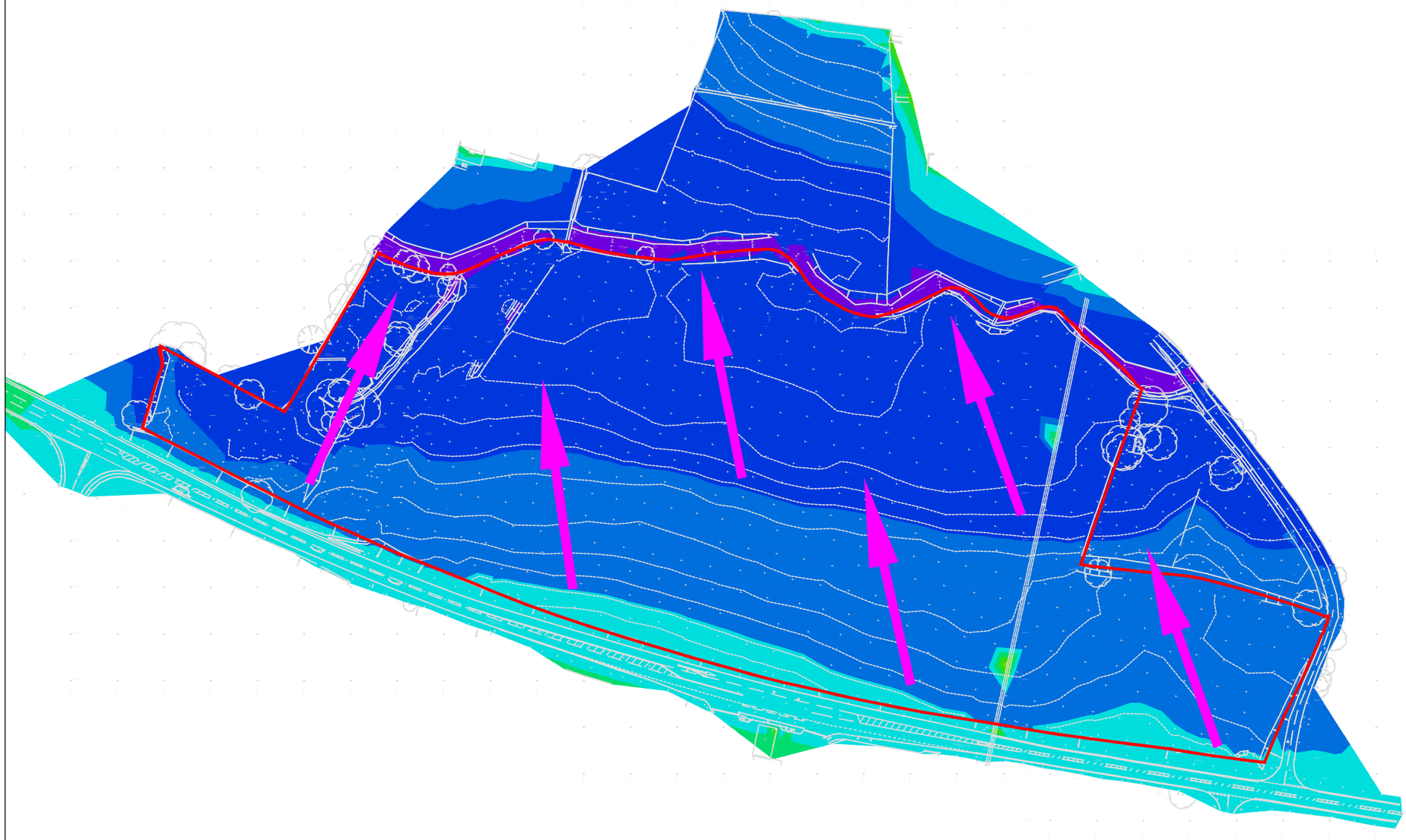
SCALE:	DATE:	DRAWN:	CHECKED:	APPROVED:
NTS	12.02.20	NR	TH	JH

JOB NO:	DRAWING NO:	REVISION:
1902-05	FM02	-

W E S

INDICATIVE

A3
ORIGINAL
PLOT SIZE



NOTES:
1. Based on "SURVEY SOLUTIONS" Drawing No. 25955se-01-08.

KEY

- Indicative Site Boundary.

Height Bands
- 55.7m - 58m
- 53.4m - 55.7m
- 51.1m - 53.4m
- 48.8m - 51.1m
- 46.5m - 48.8m
- 44.2m - 46.5m
- 41.9m - 44.2m
- 39.6m - 41.9m
- 37.3m - 39.6m
- 35m - 37.3m

- Indicative Exceedance Route.

Rev	Date	Details	Drawn by	Checked by	Approved by
-	-	-	-	-	-

Bristol
Cambridge
London
Manchester
Oxford
Welwyn Garden City

Transport Planning Associates

The Stables
7 Chesterton Mill
French's Road
Cambridge
CB4 3NP
01223 455385
www.tpa.uk.com

CLIENT:
TAYLOR WIMPEY UK Ltd

PROJECT:
LAND AT LINTON, CAMBRIDGESHIRE

TITLE:
INDICATIVE OVERLAND FLOODING ROUTE

STATUS:
FOR INFORMATION

SCALE:	DATE:	DRAWN:	CHECKED:	APPROVED:
1:2,000	12.02.20	NR	TH	JH

JOB NO:	DRAWING NO:	REVISION:
1902-05	FM03	-

W E S

INDICATIVE

Date Modified: 22/09/2010

Drawn By: ukdl001

KEY

South Cambridgeshire DC & Cambridge City Council Boundaries

Key Communities

OVER
WILLINGHAM
FEN DRAYTON
LONGSTANTON
COTTENHAM
WATERBEACH
OAKINGTON
BAR HILL
IMPINGTON
HISTON
MILTON
PAPWORTH EVERARD
GIRTON
MADINGLEY
CAMBOURNE
HARDWICK
CAMBRIDGE
FULBOURN
TRUMPINGTON
GAMLINGAY
GREAT SHELFORD
LITTLE SHELFORD
HARSTON
WEST WRATTING
ARRINGTON
BARRINGTON
SAWSTON
ABINGTON
WHITTLESFORD
GREAT ABINGTON
SHEPRETH
LINTON
DUXFORD
MELBOURN
GREAT CHISHILL

0 2 4 6 8 Kilometres

SCALE: 1:175,000

WSP

TITLE.

SOUTH CAMBRIDGESHIRE DC AND CAMBRIDGE CITY COUNCIL LEVEL 1 SFRA

FIGURE No:

ASSESSMENT AREA
1402 - A - 1

File: Q:\WSP_UK\WSP_D\Hertford\Cambridge SFRA\Cambridgeshire SFRA 2\DRAWINGS\A1 Assessment Area.mxd

Date Modified: 29/09/2010

Drawn By: ukdid001

KEY

South Cambridgeshire DC & Cambridge City Council Boundaries

EA Main River

Ordinary Watercourses

Old West Internal Drainage Board

Swaffam Internal Drainage Board

Waterbeach Level Internal Drainage Board

Beds and Ivel Internal Drainage Board

Swavesey Internal Drainage Board

Willingham and Over Internal Drainage Board

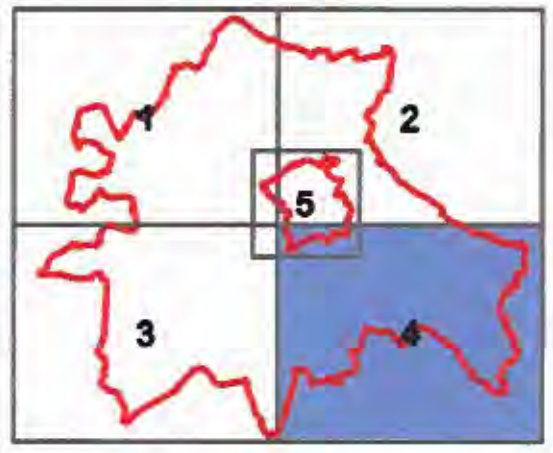
SCDC IDB areas

- Bedfordshire & River Ivel IDB
- Old West IDB
- Swaffam IDB
- Swavesey IDB
- Waterbeach IDB
- Willingham & Over IDB

WATERBEACH
IMPINGTON
HISTON
MILTON
CAMBRIDGE
Cam
Cherry Hinton Brook
Hobson's Brook
Quy Brook
FULBOURN
TRUMPINGTON
GREAT SHELFORD
LITTLE SHELFORD
Granta
SAWSTON
WHITTLESFORD
Cam
DUXFORD
ABINGTON
GREAT ABINGTON
LINTON
WEST WRATTING
SAFFRON WALDEN

0 1 2 3 4 Kilometres

SCALE: 1:90,000



WSP

TITLE:

SOUTH CAMBRIDGESHIRE DC AND CAMBRIDGE CITY COUNCIL LEVEL 1 SFRA

FIGURE No:

EXISTING WATERCOURSES
1402 - B - 1.4

File: Q:\WSP_UK\WSP_D\Hertford\Cambridge SFRA\Cambridgeshire SFRA 2\DRAWINGS\B1.4 Watercourses.mxd

Date Modified: 22/09/2010

Drawn By: ukald001

KEY

South Cambridgeshire DC & Cambridge City Council Boundaries

Reservoir Locations

RESERVOIR SCHEDULE

Ref	Reservoir Name
1	Babraham
2	Fen Drayton Lakes
3	Home Farm (Longstanton)
4	Park Lake - Gamlingay (ID388)
5	Pitt Dene
6	Wimpole Hall Estate

NOTES

1. This plan shows the locations of large raised reservoirs, as defined in the Reservoirs Act 1975.

2. Information and location of the reservoirs has been provided by the Environment Agency.

OVER
WILLINGHAM
FEN DRAYTON
LONGSTANTON
COTTENHAM
WATERBEACH
OAKINGTON
BAR HILL
IMPINGTON
HISTON
MILTON
PAPWORTH EVERARD
MADINGLEY
GIRTON
CAMBOURNE
HARDWICK
CAMBRIDGE
FULBOURN
TRUMPINGTON
GAMLINGAY
GREAT SHELFORD
WEST WRATTING
LITTLE SHELFORD
HARSTON
ARRINGTON
BARRINGTON
SAWSTON
ABINGTON
WHITTLESFORD
GREAT ABINGTON
SHEPRETH
LINTON
DUXFORD
MELBOURN
GREAT CHISHILL
STEVENAGE

1 2 3 4 5 6

0 2 4 6 8 Kilometres

SCALE: 1:175,000

WSP

TITLE.

SOUTH CAMBRIDGESHIRE DC AND CAMBRIDGE CITY COUNCIL LEVEL 1 SFRA

FIGURE No:

RESERVOIR LOCATIONS
1402 - B - 2

File: Q:\WSP_UK\WSP_D\Hertford\Cambridge SFRA\Cambridgeshire SFRA 2\DRAWINGS\B2 Reservoir Locations.mxd

Date Modified: 22/09/2010

Drawn By: ukdld001

File: Q:\WSP_UK\WSP_D\Hertford\Cambridge SFRA\Cambridgeshire SFRA 2\DRAWINGS\B5 STW Locations.mxd

KEY

South Cambridgeshire DC & Cambridge City Council Boundaries

Sewage Treatment Works (STW)

NOTES

1. Location of Sewage Treatment Works, as received from Anglian Water, 21 May 2010.

SEWAGE TREATMENT WORKS SCHEDULE

Ref	STW Name
1	Arrington STW
2	Balsham STW
3	Bassingbourn STW
4	Bourn STW
5	Cambridge STW
6	Camps STW
7	Coton STW
8	Duxford STW
9	Foxton STW (Cambs)
10	Gamlingay STW
11	Guilden Morden STW
12	Haslingfield STW
13	Hatley St George STW
14	Linton STW
15	Litlington STW
16	Melbourn STW
17	Over STW
18	Papworth Everard STW
19	Royston STW
20	Sawston STW
21	Tadlow STW
22	Teversham STW
23	Uttons Drove STW
24	Waterbeach STW
25	West Wickham STW

OVER
WILLINGHAM
FEN DRAYTON
LONGSTANTON
COTTENHAM
WATERBEACH
BAR HILL
OAKINGTON
IMPINGTON
HISTON
MILTON
PAPWORTH EVERARD
MADINGLEY
GIRTON
CAMBOURNE
HARDWICK
CAMBRIDGE
FULBOURN
TRUMPINGTON
GAMLINGAY
GREAT SHELFORD
LITTLE SHELFORD
WEST WRATTING
HARSTON
ARRINGTON
BARRINGTON
SAWSTON
SHEPRETH
WHITTLESFORD
GREAT ABINGTON
ABINGTON
LINTON
DUXFORD
MELBOURN
GREAT CHISHILL

Reproduced from Ordnance Survey data by permission of the Controller of Her Majesty's Stationary Office © Crown copyright (2008). All rights reserved. License No. 0100022500. © 2008 NAVTEQ

0 2 4 6 8 Kilometres

SCALE: 1:175,000

WSP

TITLE:

SOUTH CAMBRIDGESHIRE DC AND CAMBRIDGE CITY COUNCIL LEVEL 1 SFRA

FIGURE No

SEWAGE TREATMENT WORKS LOCATIONS 1402 - B - 5

Date Modified: 22/09/2010

Drawn By: ukld001

KEY

South Cambridgeshire DC & Cambndge City Council Boundaries

Historical Flooding Events

- Fluvial
- Ground Water
- Pluvial
- Sewer
- Oct 2001 Flooded Locations
- Oct 2001 Survey

Historical Flood Outlines

- March 1947
- September 1968
- May 1978
- May 1981
- October 1993
- Easter 1998
- October 2001

WATERBEACH
IMPINGTON
HISTON
MILTON
CAMBRIDGE
FULBOURN
TRUMPINGTON
GREAT SHELFORD
LITTLE SHELFORD
SAWSTON
WHITTLESFORD
DUXFORD
ABINGTON
GREAT ABINGTON
LINTON
WEST WRATTING
SAFFRON WALDEN

0 1 2 3 4 Kilometres

SCALE: 1:90,000

WSP

TITLE:

SOUTH CAMBRIDGESHIRE DC AND CAMBRIDGE CITY COUNCIL LEVEL 1 SFRA

FIGURE No:

HISTORICAL DATA
1402 - B - 3.4

File: Q:\WSP_UK\WSP_D\Hertford\Cambridge SFRA\Cambridgeshire SFRA 2\DRAWINGS\B3.4 Historical Data.mxd

TABLE 4A: FLOODING HISTORY

DATE	LOCATION	ADDRESS	SOURCES OF FLOODING/DETAILS	DATA SOURCE
21/10/2001	Abington Piggotts	Abington Church	Pluvial	SCDC
01/01/2010	Abington Piggotts	High Street	Pond	Cambs Police
21/10/2001	Babraham	High Street	River Granta	EA
01/11/2002	Bar Hill	Hollytrees	Local Stream	Bar Hill PC
21/10/2001 01/01/2003 10/02/2009 11/02/2009	Barrington	Foxton Road, High Street	River Cam and Groundwater	SCDC and EA and Cambs Police
11/02/2009 03/03/2010	Barrington	West Green, Shepreth Road	River Cam	EA
Unknown	Barrington	Church Road, Barrington Road	River Rhee	Barrington PC
21/10/2001	Bartlow	Throughout the village	River Granta, River Bourn	EA
01/03/2010	Barton	B1046 by Duck Pond	Pluvial	Barton PC
1960's 2001	Bassingbourn	Spring Lane, Shedbury Lane, Pepper Close	Groundwater in Fields	Bassingbourn-cum-Kneesworth PC
Oct 1993	Bourn	Throughout the village	Bourn Brook	EA
03/02/2001 07/02/2001 21/10/2001	Bourn	Caxton End, Alms Hill, Kingfisher Close, Riddy Lane	Bourn Brook	SCDC and Bourn PC
21/10/2001	Bourn	Riddly Lane	Pluvial	Bourn PC
01/05/1925	Cambridge	Cambridge University Botanical Gardens	River Cam	Historical Records
05/05/1978	Cambridge	Barton Road, Newnham Terrace	Bin Brook, River Cam	EA
2000 21/10/2001	Cambridge	Herschel Road, Gough Way, Grange Road	Bin Brook	Cambridge Federation of Residents' Association and EA

DATE	LOCATION	ADDRESS	SOURCES OF FLOODING/DETAILS	DATA SOURCE
03/02/2001	Cambridge	Manhattan Drive	River Cam	St Neots Library
21/10/2001	Cambridge	Jesus Green, University of Cambridge Colleges	River Cam	Cambridgeshire County Council
21/10/2001 02/04/2007	Cambridge	Wilberforce Road	Coton Stream	EA
Jan 2003 17/07/2009	Cambridge	Riverside	River Cam	Riverside RA and CCC
24/08/2004	Cambridge	Nuffield Road	Pluvial	Milton Road Library
10/02/2009	Cambridge	Grantchester Road	River Cam	Cambs Police
19/02/2010	Cambridge	Coleridge Road	Groundwater	EA
24/02/2010	Cambridge	Mawson Road	Groundwater	EA
Regularly in Winter	Cambridge	Stratfield Close, Tavistock Road, Woodlark Road	Pluvial	Windsor Road Residents' Association
Unknown	Cambridge	Bell School Playing Fields	Pluvial	Greenlands RA
Unknown	Cambridge	Junction of Queens Road/ Sidgwick Avenue	Pluvial	Pinehurst South Residents' Association
2003 Autumn 2009 March 2010	Cambridge	Eights Marina, Willobank, Cutter Ferry Bridge, Logan's Way, Mariners Way, Lynfield Lane, Camside, Fen Rd, Water Street	River Cam	Friends of Stourbridge Common and Old Chesterton Residents' Association

DATE	LOCATION	ADDRESS	SOURCES OF FLOODING/DETAILS	DATA SOURCE
21/10/2001	Cambridge	Logans Way, Water Lane, St Andrews Road, Lynfield Lane	River Cam	SCDC and EA
31/08/2004	Cambridge	Chesterton High Street	Pluvial	Milton Rd Library
21/10/2001	Caxton	Ermine Street, Brockholt Road, Royston Road, Gransden Road, Roman Road,	Bourn Brook	EA
1993 1998 Oct 2003	Caxton	Royston Road	Bourn Brook	Caxton PC
21/10/2001	Comberton	Village School, Swaynes Lane, Barton Road, The Kentings	Pluvial	EA
21/10/2001	Coton	Brook Lane, Brookfield Road	Bin Brook	EA
Unknown	Coton	Silverdale Avenue	Pluvial	Coton PC
21/10/2001	Cottenham	Broad Lane	Pluvial	SCDC
Annually	Cottenham	Broad Lane, Denmark Road, Twenty Pence Road (B1049)	Local Ditches	Cottenham PC
21/10/2001	Croxton	High Street	Pluvial	EA
28/02/2010 Annually	Dry Drayton	Junction of Madingly Street/ Park Street	Callow Brook	Dry Drayton PC and Cambs Police
Unknown	Dry Drayton	Scotland Farm	Pluvial	Dry Drayton PC
Various	Fen Drayton	High Street	Fluvial	SCDC
25/04/2001	Fowlmere	Mill Road	River Shep	EA
Unknown	Fulbourn	Unknown	Local Ditches	Fulbourn PC
2001	Fulbourn	Thomas Road	Groundwater	SCDC

DATE	LOCATION	ADDRESS	SOURCES OF FLOODING/DETAILS	DATA SOURCE
Unknown	Gamlingay	Station Road/ Hatley Road, Millbridge Brook Field	Millbridge Brook	Gamlingay PC
1978 21/10/2001	Girton	Dodford Lane, Fairway, Oakington Road, High Street, Northfield	Beck and Washpit Brooks	Girton PC and EA
12/1874	Grantchester	Grantchester Mill	River Cam	Historic Records
09/04/1998	Grantchester	Unknown	Pluvial	St Neots Library
10/02/2009 (Every 3 Years)	Grantchester	Grantchester Road	River Cam	Grantchester PC and Cambs Police
21/10/2001 17/07/2009	Great Eversden	Ivetts Close, High Street, Wimpole Road	Groundwater and Ditches	Great and Little Eversden PC and EA
22/10/2001	Great Shelford	Kings Mill Lane	River Granta, River Cam	Great Shelford PC and EA
Unknown	Harston	Haslingfield Road, Button End, Various Fields in the village	River Rhee, Rising Groundwater Table due to closing of Cement Works	Harston PC
17/07/2009	Haslingfield	Cantelupe Road	Pluvial	Haslingfield PC
Unknown	Hauxton	Meadows by High Street, Riddy Close	River Granta	Hauxton PC
3 per Year	Hinxton	Duxford Road	River Granta	Hinxton PC
09/09/2005	Histon	Lucketts Close, Park Lane	Pluvial	Histon & Impington PC
2005	Histon	High Street, Saffron Road, New School Road, School Hill	Pluvial	SCDC
2001 and 2005	Histon	Glebe Road, Station Road, The Green, Water Lane	Pluvial	SCDC

DATE	LOCATION	ADDRESS	SOURCES OF FLOODING/DETAILS	DATA SOURCE
Unknown	Horningsea	Area beside river, mostly fields	River Cam	Horningsea PC
1947/1968 severly	Ickleton PC	Mill Lane, Church Street	River Cam	Ickleton PC
Unknown	Ickleton PC	Copole Road, Abbey Street	River Cam	Ickleton PC
2005	Impington	Herward Close, Impington Lane	Pluvial	SCDC
09/09/2005	Impington	South Road, Impington Lane, Ambrose Way, Villa Road	Pluvial	Histon & Impington Parish Councils
15/08/2008	Kneesworth	Old North Road	Unnamed Brook	Bassingbourn-cum-Kneesworth PC
1947 1968 1974 21/10/2001	Linton	High Street, Meadow Lane, Church Lane, Green Lane, Horn Lane, Mill Lane	River Granta	SCDC and Linton PC and EA
21/10/2001	Linton	Green Lane, Flaxfields, The Grip, The Maltings, Back Lane, Horn Lane	Pluvial	EA
10/02/2009	Linton	Hadstock Road	River Granta	Atkins
Unknown	Litlington	Church Street, Steeple Morden Road, Malting Lane, Silver Street	Pluvial	Litlington PC
Unknown	Little Abington	Sluice Wood, Bourn Bridge, Village Recreation and Cricket Ground	River Granta	Little Abington PC
21/10/2001	Little Eversden	High Street, Lowfields	Ditches	EA
Unknown	Little Eversden	Church Lane	Groundwater	Great and Little Eversden PC

DATE	LOCATION	ADDRESS	SOURCES OF FLOODING/DETAILS	DATA SOURCE
1946 14/06/2007	Longstowe	Old North Road	Dene Brook	Lonstowe PC
2005	Madingley	A428	Ditches	Highways Agency
01/02/2010	Madingley	Church Lane	Groundwater	Madingley PC
Fall 2000 21/10/2001 01/01/2003	Meldreth	Elin Way, High Street, Whitecroft, Chiswick End	Pluvial	SCDC and EA
2001	Milton	Fields By Fenn Road, Hall End, Old School Lane Chesterton Fen Road	River Cam and local ditches	Milton PC and Historical Records
1947 1953 1978 1998	Oakington	Unknown	Oakington Brook	EA
05/05/1978	Oakington	Dry Drayton Road	Oakington Brook	EA
21/10/2001	Oakington	Orchard Way, Cambridge Road, The Drift, Longstanton Road, Station Road, Arcadia Gardens, The Broadway, Dry Drayton Road	Oakington Brook	SCDC and EA
21/10/2001	Orwell	Brookside, Town Green Road, Greenfield Close	Orwell Brook	EA
Unknown	Pampisford	Brewery Road, Church Lane	Unnamed Brook	Pampisford PC

DATE	LOCATION	ADDRESS	SOURCES OF FLOODING/DETAILS	DATA SOURCE
1918 1968	Sawston	Mill Lane, Springfield Road, Granta Road, meadowfield Road, Town Close	High Water Table	Sawston PC
23/10/2001	Sawston	Mill Lane	River Cam	SCDC
Unknown	Sawston	Paddock Way, High Street, Junction of Faulkner Road/ Sunderlands Avenue	Soakaways	Sawston PC
02/1795	Sawston	Kings Mill	River Cam	Historic Records
01/01/2003	Shepreth	Barrington Road	River Rhee	SCDC and Shepreth PC
Unknown	Shepreth	Church Lane, Barrington Road	Pluvial	Shepreth PC
21/10/2001	Six Mile Bottom	High Street, Delamere Close	Pluvial	Little Wilbraham PC
22/10/2001	Stapleford	London Road, Bury Road, Josceynes	River Granta	Stapleford PC and EA
Unknown	Stapleford	Aylesford Road	Pluvial	Stapleford PC
10/02/2009	Swavesey	Boxworth End	Local Ditches	Cambs Police
1947	Swavesey	Northern End of Swavesey: Whitegate Close, Over Road, Moat Way, Station Road, Taylors Lane	River Ouse	Swavesey PC
16/03/2005	Tadlow	Unknown	Perched Groundwater In the Till	EA
2009/10	Tadlow	Highstreet, B1042 opposite New England Farm.	Local Ditch	Tadlow PC

DATE	LOCATION	ADDRESS	SOURCES OF FLOODING/DETAILS	DATA SOURCE
2000	Thriplow	Farm Lane	Groundwater	SCDC
1974 22/10/2001	Toft	Brookside, Millers Road, High Street	Bourn Brook	Toft PC and EA
10/02/2009 28/02/2010	Toft	B1046	Bourn Brook	Cambs Police
07/1875	Waterbeach	Waterbeach Fields	River Cam	Historic Records
16/11/2004	Waterbeach	Waterbeach Railway Station	Pluvial	Milton Road Library
Feb 2001 22/10/2001	Waterbeach	Whitmore Way	River Cam	EA
21/10/2001 10/02/2009	Waterbeach	Clayhithe Bridge	River Cam	SCDC and Cambs Police and EA
Unknown	Waterbeach	Cambridge Road	Groundwater Levels Rising In Fields	Waterbeach PC
11/02/2009	Wendy	High Street	River Cam	Cambs Police
23/10/2001	Weston Colville	Weston Colville Road	River Stour	SCDC
Unknown	Weston Colville	Common Road, Church End, Chapel Road	River Stour	Weston Colville PC
2001	Willingham	Mill Field, Over Road, B1050, The Green	Pluvial	SCDC
1947	Willingham	West Fen, Cranes Fen	Unnamed Brook	Willingham PC
Unknown	Wimpole	Wimpole Old Road	Local Brook and Ditches	Wimpole PC

TABLE 4B: SEWER FLOODING HISTORY

DATE	LOCATION	ADDRESS	SOURCES OF FLOODING/DETAILS	DATA SOURCES
13/09/2008	A14	Junction 33	Highway Drainage	Highways Agency
06/08/2009	A14	Junction 31,34	Highway Drainage	Highways Agency
05/09/2005 16/09/2005 15/01/2008	A428	Junction for Cambourne	Highway Drainage	Highways Agency
13/09/2008 01/11/2008 10/11/2008	A428	Hardwick Junction	Highway Drainage	Highways Agency
Unknown	Arrington	Alms Houses on A1198	Blocked Culvert	Arrington PC
01/06/1985 21/10/2001	Balsham	High Street	Inadequate Drainage System	EA
21/10/2001	Barrington	Challis Green, West Green	Foul Sewer Overflow, Culverts	EA
01/03/2010	Barton	A603, Lords Bridge	Surface Water Sewers could not cope with rainfall	Barton Parish Council
01/10/2008	Bassingbourn	High Street, The Limes, Orchard Close	Blocked SW Drains	Bassingbourn – cum –Kneeswoth PC
01/06/2009	Bassingbourn	Church Close	Blocked Drain	Bassingbourn – cum –Kneeswoth PC
07/06/2009	Bassingbourn	A1198	Highway Drainage	Cambs Police
Unknown	Bassingbourn	Canberra Close	Foul Sewage Pumping Station	Bassingbourn – cum –Kneeswoth PC
Frequently	Bourn	Throughout the village	Sewerage System	EA
Unknown	Caldecote	Main Street	Foul and surface water flooding due to storms	Caldecote PC

DATE	LOCATION	ADDRESS	SOURCES OF FLOODING/DETAILS	DATA SOURCES
21/10/2001	Caldecote	Highfields, East Drive	Blocked Drains and Culverts	EA
Mar 2010	Cambourne	School Lane	Foul Sewer	SCDC
1978	Cambridge	Barton Road	Culverts	EA
01/07/1979	Cambridge	Gunhild Way, Bourne Road, Union Lane, Courtney Way, Windsor Road Playing Fields, Corona Road, Walpole Road Malta Road, Marlowe Road, Hobson Street.	Sewer Flooding Due to Storm	Cambridgeshire CC Weather Charts
1979-1982	Cambridge	Oxford Road, Windsor Road	Foul Sewer	Windsor Road Residents' Association
1978, Feb 2001, 21/10/2001	Cambridge	Riverside, Cutter Ferry Close, Acrefield Drive, Priory Road	Foul Sewer, Drainage Systems unable to discharge into River Cam due to heavy rainfall	EA; Riverside Area RA and Great Ouse CFMP (2010)
21/10/2001	Cambridge	Gough Way, Birdwood Road	Surface Water Sewer, Culverts	EA
Aug 2008, Summer 2009	Cambridge	Riverside	Inadequate Gulleys	Riverside Area Residents' Association
1 in 20yr	Cambridge	Glisson Road	Sewer Flooding	Anglian Water
1 in 20yr	Cambridge	Kingston Street	Sewer Flooding	Anglian Water

DATE	LOCATION	ADDRESS	SOURCES OF FLOODING/DETAILS	DATA SOURCES
1 in 20yr	Cambridge	Windsor Road	Sewer Flooding	Anglian Water
Unknown	Cambridge	Blossom Street, Norfolk Terrace	Blocked Drain	Norfolk Terrace & Blossom Street Residents' Association
30/08/2008	Cambridge	Trumpington Street	Blocked Runnels	Newton RA and Cambs Police
15/06/2009	Cambridge	Babraham Road	Highway Drainage	CCC
20/09/2009	Cambridge	Huntingdon Road	Burst Water Main	Cambs Fire and Rescue
31/10/2009	Cambridge	Madingley Road	Water Leak	Cambs Police
12/11/2009	Cambridge	Newmarket Road, Gonville Place	Highway Drainage	Cambs Police
11/07/2008	Caxton	A1198	Highway Drainage	CCC
Oct 2001 28/02/2010 Mar 2010 (frequently)	Comberton	Barton Road, Swaynes Lane, West Street, Thornbury, Royston Lane, South Street, The Green	Overflowing Surface and Foul Sewers	Comberton PC and Cambs Police
Oct 2001	Coton	The Footpath	Surface Water Sewer	Coton PC
1 in 20yr	Cottenham	Unknown	Sewer Flooding	Anglian Water
2003	Croxton	High Street	Foul and surface water flooding due to storms. Pumping Station Blocked when flooding occurs.	Croxton PC
Unknown	Duxford	Bustlers Rise	Surface water drainage	Duxford PC

DATE	LOCATION	ADDRESS	SOURCES OF FLOODING/DETAILS	DATA SOURCES
Unknown	Elitsley	Meadow View	Sewer Overflow	Elitsley PC
1993,1997, 21/10/2001	Elsworth	Boxworth Road, Brook Street, Paddock Row, Rogers Close, Fardells Lane	Culverts/Fluvial	EA
21/10/2001	Foxton	Foxton Sewage Works	Foxton Sewage Works	South Cambridgeshire DC
Unknown	Fowlmere	Chapel Lane, High Street, The Way	Drains Silted Up	Fowlmere PC
15/11/2009 28/02/2010	Gamlingay	The Cinques	Highway Drainage	Cambs Police
27/04/2005	Girton	Girton Road	Sewer overflowed due to heavy rainfall	Milton Road Library
05/05/1978	Girton	Oakington Road	Inadequate culverts	EA
01/06/2008	Great Chishill	Hall Lane	Inadequate Drainage System	Great & Little Chishill PC
Unknown	Great Shelford	Elms Avenue	Drain Blocked by Construction	Great Shelford PC
15/06/2009	Great Wilbraham	Angle End	Highway Drainage	CCC
Unknown	Guilden Morden	Church Street, Swan Lane, Potton Road	Culverts	Guilden Morden PC
1 in 20yr	Hardwick	St Neots Road	Sewer Flooding	Anglian Water
Unknown	Hardwick	Main Street	Blocked Drains	Hardwick PC
Unknown	Harlton	Eversden Road, Washpit Lane	Rainwater, plus blocked drains resulted in flooding	Harlton PC

DATE	LOCATION	ADDRESS	SOURCES OF FLOODING/DETAILS	DATA SOURCES
22/07/2009	Harston	High Street	Blocked Surface Water Drains	Harston PC
21/10/2001	Histon	Glebe Way, Station Road	Drains and Sewers	EA
09/09/2005	Histon	Kay Hitch Way	Sewer Overflowing	Histon & Impington PC
Multiple times a year	Horningsea	St John's Lane	Foul Sewer Overflowing	Horningsea PC
21/10/2001	Impington	South Road, Impington Lane	Drains and Sewers	EA
Unknown	Kingston	Throughout the Village	Poor Maintenance of Surface Water Sewers.	Kingston PC
Unknown	Knapwell	Manor Farm, High Street	Surface Water Sewer	Knapwell PC
17/07/2009	Linton	Chalklands	Highway Drainage	CCC
1 in 20yr	Linton	Granta Vale, Lonsdale	Sewer Flooding	Anglian Water
21/10/2001	Little Eversden	High Street	Surface Water Drainage	Great & Little Eversden PC
28/02/2010	Little Gransden	Main Road, Church Street	Blocked Drains, Drainage Ditch Blocked	Little Gransden PC and Cambs Police
07/06/2009	Little Wilbraham	High Street	Highway Drainage	Cambs Police
Unknown	Longstanton	Hatton's Park, Haddows Close, Station Road, Rampton Road, Wilsons Road	Blocked Sewer/ Inadequate Sewage System	Longstanton Parish Council
21/10/2001	Longstanton	Colesfield, High Street, Spiggots Close	Private culverts along award drain	EA
28/02/2010	Longstanton	School Lane	Highway Drainage	Cambs Police

DATE	LOCATION	ADDRESS	SOURCES OF FLOODING/DETAILS	DATA SOURCE
17/08/2005 28/02/2010	M11	Junction 14	Highway Drainage	Highways Agency
Unknown	Meldreth	Chiswick End	Blocked and Inadequate Culverts	Meldreth PC
Unknown	Melbourn	Back Lane, Moat Lane	Highway drains	SCDC
Unknown	Milton	Chesterton Fen Road	Inadequate Sewage System	Milton PC
09/02/2009	Nosterfield End (Castle Camps)	Unnamed Road	Highway Drainage	Sewer
05/05/1978	Oakington	Longstanton Road	Drains	EA
Unknown	Oakington	Throughout the village: Longstanton Road, The Drift, Mill Road, Cambridge Road, Water Lane	Insufficient Highway Gullies	Oakington & Westwick PC
11/02/2009	Orwell	Malton Road	Highway Drainage	Cambs Police
1 in 20yr	Orwell	Lotfield Road, Town Green Road, SG8 0HJ	Sewer Flooding	Anglian Water
Unknown	Over	Fen End	Highway flooding	SCDC
21/10/2001	Papworth Everard	Ermine Street South, Ermine Street North, Byfield Road/Hamden Way, Wood Lane	Culverts, Blocked Highway Drains	EA and Papworth Everard PC
21/10/2001	Rampton	King Street, Cow Lane, Church End, The Green	Blocked Drains, Highway Drains	EA, SCDC and Rampton PC

DATE	LOCATION	ADDRESS	SOURCES OF FLOODING/DETAILS	DATA SOURCE
07/08/2008	Shepreth	Fowlmere Road	Highway Drainage	Cambs Police
28/02/2010	Six Mile Bottom	Brinkley Road	Highway Drainage	Cambs Police
2009	Stapleford	Priam's Way	Culverts	Stapleford PC
2010	Stapleford	Crispin Cottage, London Road	Blocked Pumps at Effluent Pumping Station	Stapleford PC
Unknown	Stow cum Quy Fen	Browns Park	Foul and Surface Water Sewers Overflowing	Stow cum Quy PC
Unknown	Swavesey	Boxworth End, Wallmans Lane	Field Culverts, drains	Swavesey PC
Unknown	Toft	Brookside, Hardwick Road, High Street	Foul Sewer Emissions, Highway Drains Flood	Toft PC
Unknown	Waterbeach	Greenside, Whitmore Way, Car Dyke Road, Cambridge Road, Cow Hollow Wood, Clayhithe Road, Waterbeach Sailing Club	Surface Water Sewer Flooding – Lack of Maintenance of ditches	Waterbeach PC
2001/02 (occurs about twice a year)	Whaddon	Bridge Street	Blocked Drain	Whaddon Parish Council
15/06/2009 06/08/2009	Whittlesford	A505/Hunts Road	Highway Drainage	Cambs Police
21/10/2001	Willingham	Millfield, High Street, Station Road	Culverts	EA
2010	Willingham	Bourneys Manor, Brook Grove, West Meadow Close	Foul Sewer	Willingham Parish Council

Date Modified: 23/09/2010

Drawn By: ukdld001

WATERBEACH
IMPINGTON
HISTON
MILTON
CAMBRIDGE
FULBOURN
TRUMPINGTON
GREAT SHELFORD
LITTLE SHELFORD
SAWSTON
WHITTLESFORD
ABINGTON
GREAT ABINGTON
LINTON
DUXFORD
WEST WRATTING
SAFFRON WALDEN

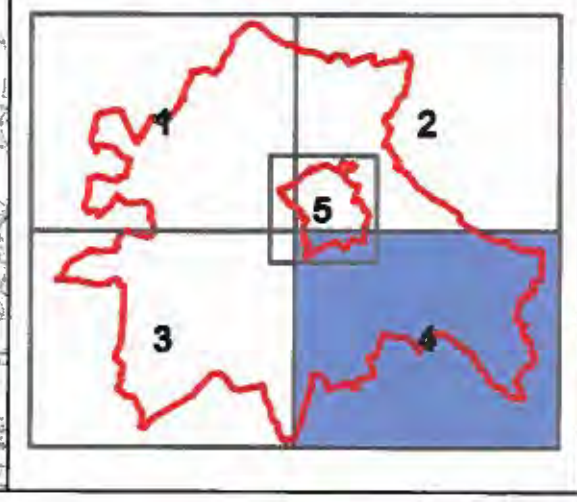
KEY

- South Cambridgeshire DC & Cambridge City Council Boundaries
- More
- Intermediate
- Less

NOTE: The maps only provide a general indication of areas which may be more likely to suffer from surface water flooding and have been produced by the Environment Agency using a strategic broad scale modelling approach assuming an extreme rainfall event. They do not show the susceptibility of individual properties to surface water flooding. They should not be used to substitute more detailed investigations at a site specific scale, that allow a more accurate assessment of surface water flooding to be made.

0 1 2 3 4 Kilometres

SCALE: 1:90,000



WSP

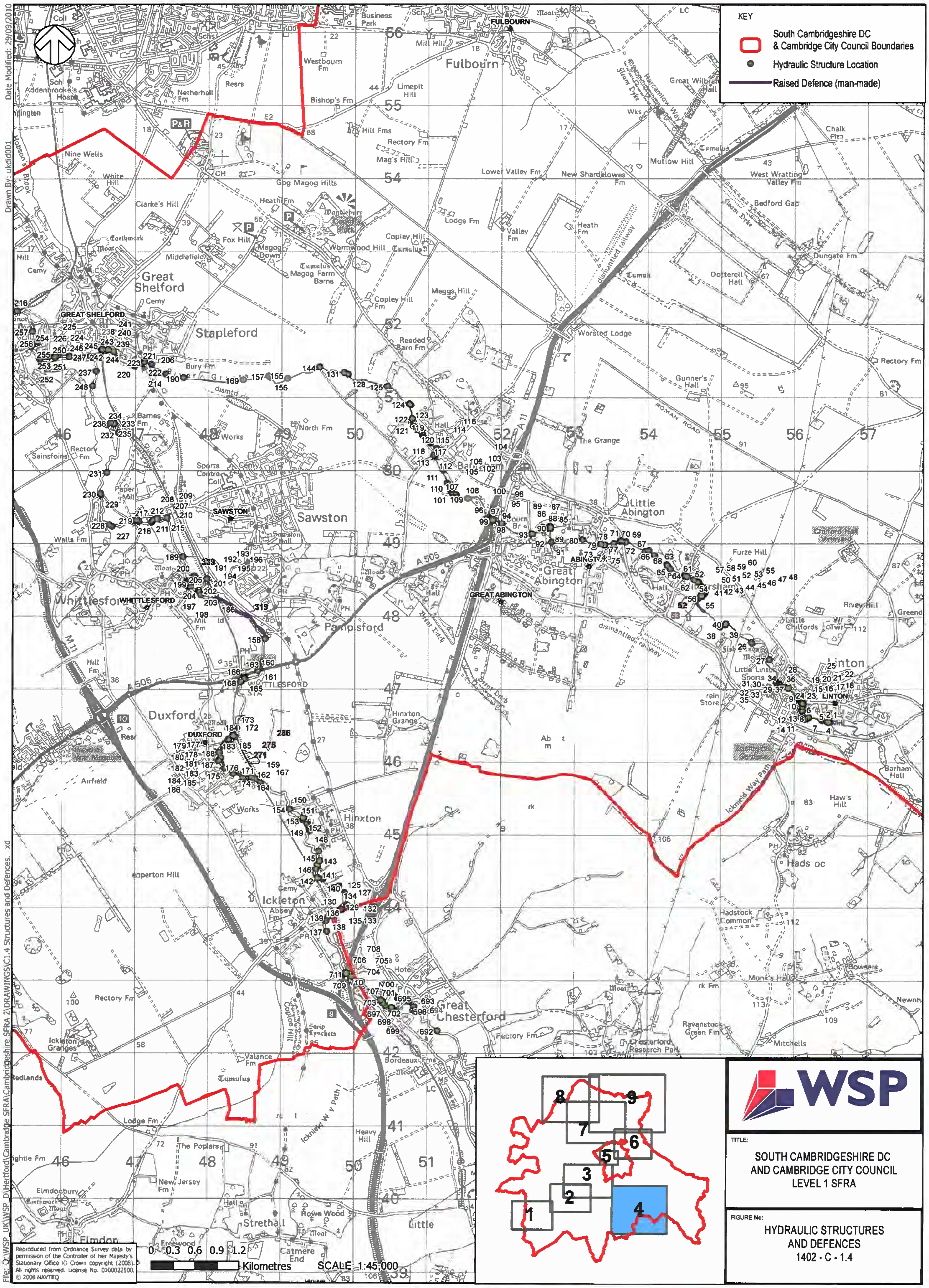
TITLE:

SOUTH CAMBRIDGESHIRE DC AND CAMBRIDGE CITY COUNCIL LEVEL 1 SFRA

FIGURE No:

SURFACE WATER FLOOD RISK
1402 - B - 4.4

File: Q:\WSP_UK\WSP_D\Hertford\Cambridge SFRA\Cambridgeshire SFRA 2\DRAWINGS\B4.4 Surface Water Flood Risk.mxd



KEY
South Cambridgeshire DC & Cambridge City Council Boundaries
Hydraulic Structure Location
Raised Defence (man-made)
FULBOURN
GREAT SHELFORD
SAWSTON
WHITTLESFORD
DUXFORD
GREAT ABINGTON
ABINGTON
LINTON
Fulbourn
Great Shelford
Stapleford
Sawston
Pampisford
Duxford
Hinxton
Ickleton
Great Chesterford
Little Abington
Great Abington
Linton
Strethall
0 0.3 0.6 0.9 1.2 Kilometres
SCALE: 1:45,000
Reproduced from Ordnance Survey data by permission of the Controller of Her Majesty's Stationary Office © Crown copyright (2008). All rights reserved. License No. 0100022500. © 2008 NAVTEQ
WSP
TITLE:
SOUTH CAMBRIDGESHIRE DC AND CAMBRIDGE CITY COUNCIL LEVEL 1 SFRA
FIGURE No:
HYDRAULIC STRUCTURES AND DEFENCES
1402 - C - 1.4
Date Modified: 29/09/2010
Drawn By: ukdid001
File: O:\WSP_UK\WSP_D\Hertford\Cambridge SFRA\Cambridgeshire SFRA 2\DRAWINGS\C1.4 Structures and Defences. xd

Date Modified: 22/09/2010

Drawn By: ukdid001

KEY

- South Cambridgeshire DC & Cambridge City Council Boundaries
- Low Potential for Infiltration
- Uncertain Potential for Infiltration
- High Potential for Infiltration

NOTES

1. This drawing looks at the infiltration potential within the South Cambridgeshire and Cambridge City Boundaries. SuDS hierarchy must be applied to all potential developments. Intrusive ground investigations to determine the viability of infiltration must still be undertaken as part of a site specific FRA. Should infiltration devices prove to be unviable based on intrusive ground investigations and BRE 365 Soakage Tests then alternative SuDS should be used.

2. In areas with potential infiltration, reference should be made to the location of the various Source Protection Zones, as shown in Appendix C.

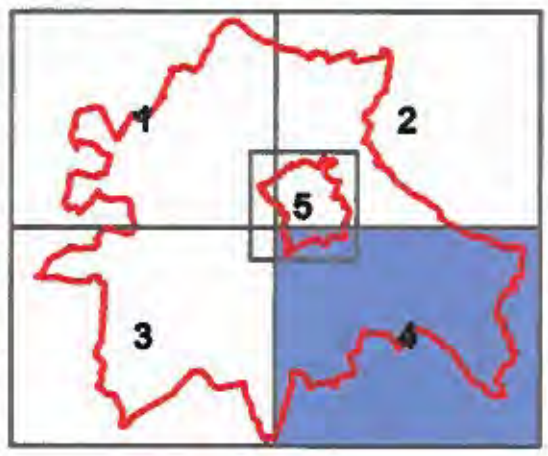
3. This plan has been produced using information transcribed from the British Geological Survey; Solid and Drift Editions 204, 205, 206, 187, 188, and 189.

4. This plan should be read in conjunction with Section 8 of the Cambridge City and South Cambridgeshire SFRA.

WATERBECK
IMPINGTON
HISTON
MILTON
CAMBRIDGE
FULBOURN
TRUMPINGTON
GREAT SHELFORD
LITTLE SHELFORD
SAWSTON
WHITTLESFORD
DUXFORD
ABINGTON
GREAT ABINGTON
LINTON
WEST WRATTING
Bottisham
Dullingham
Stetchworth
Castle Camps
Great Chesterford
Ashdon
Saffron Walden
Chrishall
Elmdon
Wendens Ambo
Clavering

0 1 2 3 4 Kilometres

SCALE: 1:90,000



WSP

TITLE:

SOUTH CAMBRIDGESHIRE DC AND CAMBRIDGE CITY COUNCIL LEVEL 1 SFRA

FIGURE No

SUDS INFILTRATION FEASIBILITY PLAN
1402 - C - 2.4

File: Q:\WSP_UK\WSP_D\Hertford\Cambridge SFRA\Cambridgeshire SFRA 2\DRAWINGS\C2.4 Suds Infiltration Feasibility.mxd

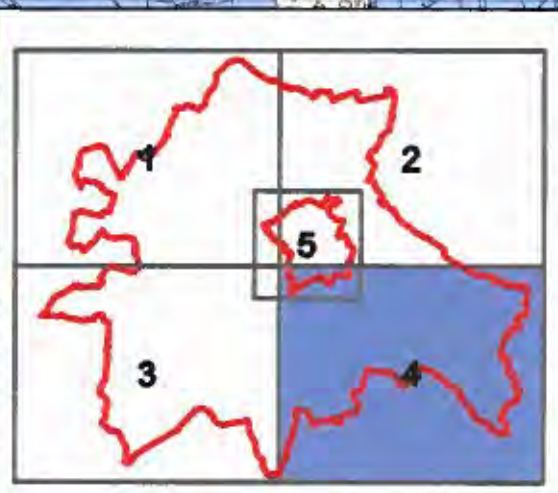
Date Modified: 22/09/2010

Drawn By: ukdld001

KEY

- South Cambridgeshire DC & Cambridge City Council Boundaries
- Groundwater Licenced Abstraction Points
- Zone 1: Inner Protection Zone
- Zone 2: Outer Protection Zone
- Zone 3: Total Catchment

WATERBEACH
IMPINGTON
HISTON
MILTON
CAMBRIDGE
FULBOURN
TRUMPINGTON
GREAT SHELFORD
LITTLE SHELFORD
SAWSTON
WHITTLESFORD
ABINGTON
GREAT ABINGTON
DUXFORD
LINTON
WEST WRATTING
SAFFRON WALDEN



WSP

TITLE:

SOUTH CAMBRIDGESHIRE DC AND CAMBRIDGE CITY COUNCIL LEVEL 1 SFRA

FIGURE No:

GROUNDWATER SOURCE PROTECTION ZONES 1402 - C - 3.4

0 1 2 3 4 Kilometres

SCALE: 1:90,000

File: Q:\WSP_UK\WSP_D\Hertford\Cambridge SFRA\Cambridgeshire SFRA 2\DRAWINGS\C3.4 Groundwater Source Protection Zones.mxd

Date Modified: 22/09/2010

Drawn By: ukdid001

KEY

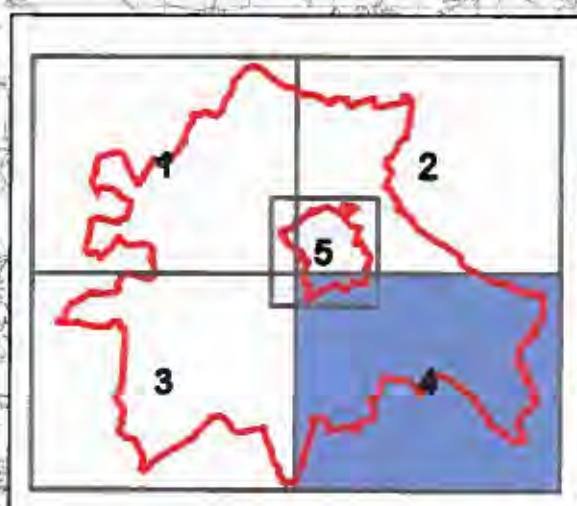
- South Cambridgeshire DC & Cambridge City Council Boundaries
- Fenstanton and Fen Drayton
- Old West Food Defence
- River Cam from Cambridge to Upware
- River Cam from Gt Chesterford to Hauxton
- River Granta from Linton to Stapleford

WATERBEACH
IMPINGTON
HISTON
MILTON
CAMBRIDGE
TRUMPINGTON
FULBOURN
GREAT SHELFORD
LITTLE SHELFORD
SAWSTON
WHITTLESFORD
DUXFORD
ABINGTON
GREAT ABINGTON
LINTON
WEST WRATTING

Reproduced from Ordnance Survey data by permission of the Controller of Her Majesty's Stationary Office © Crown copyright (2008). All rights reserved. License No. 0100032500. © 2008 NAVTEQ

0 1 2 3 4 Kilometres

SCALE: 1:90,000



WSP

TITLE.

SOUTH CAMBRIDGESHIRE DC AND CAMBRIDGE CITY COUNCIL LEVEL 1 SFRA

FIGURE No:

FLOOD WARNING AREAS
1402 - C - 4 4

File: Q:\WSP_UK\WSP_D\Hertford\Cambridge SFRA\Cambridgeshire SFRA 2\DRAWINGS\C4.4 Flood Warning Areas.mxd

APPENDIX D

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Nauzet Martel
Site name:	Land at Linton
Site location:	Cambridgeshire

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013) , the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	52.09480° N
Longitude:	0.28007° E
Reference:	2404953288
Date:	Feb 04 2020 11:34

Runoff estimation approach

IH124

Site characteristics

Total site area (ha): 6.315

Methodology

Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics

	Default	Edited
SOIL type:	3	3
HOST class:	N/A	N/A
SPR/SPRHOST:	0.37	0.37

Hydrological characteristics

	Default	Edited
SAAR (mm):	578	578
Hydrological region:	5	5
Growth curve factor 1 year:	0.87	0.87
Growth curve factor 30 years:	2.45	2.45
Growth curve factor 100 years:	3.56	3.56
Growth curve factor 200 years:	4.21	4.21

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

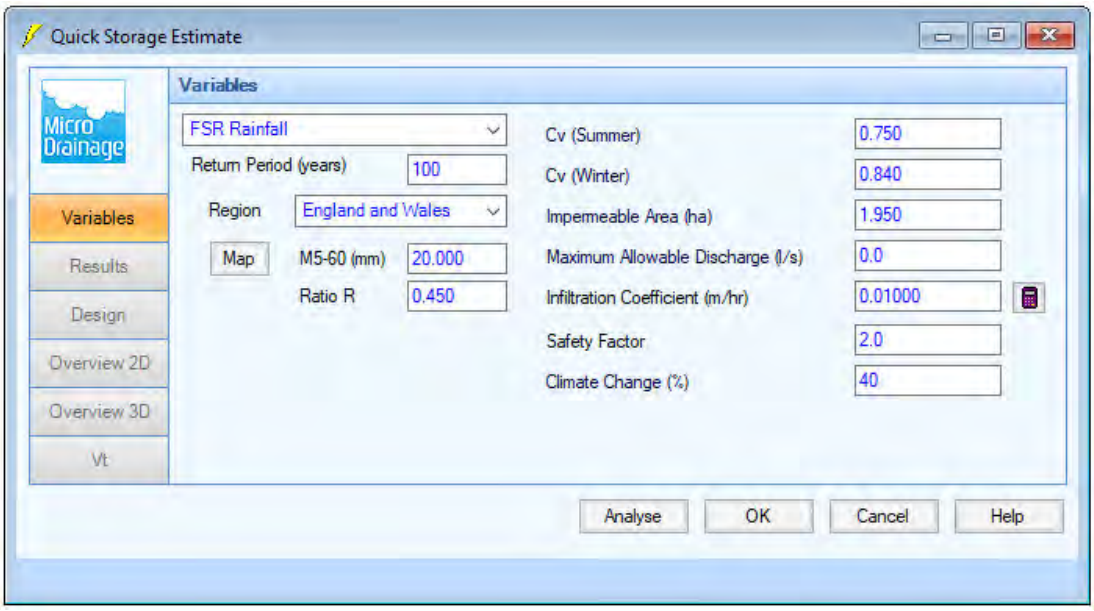
Greenfield runoff rates

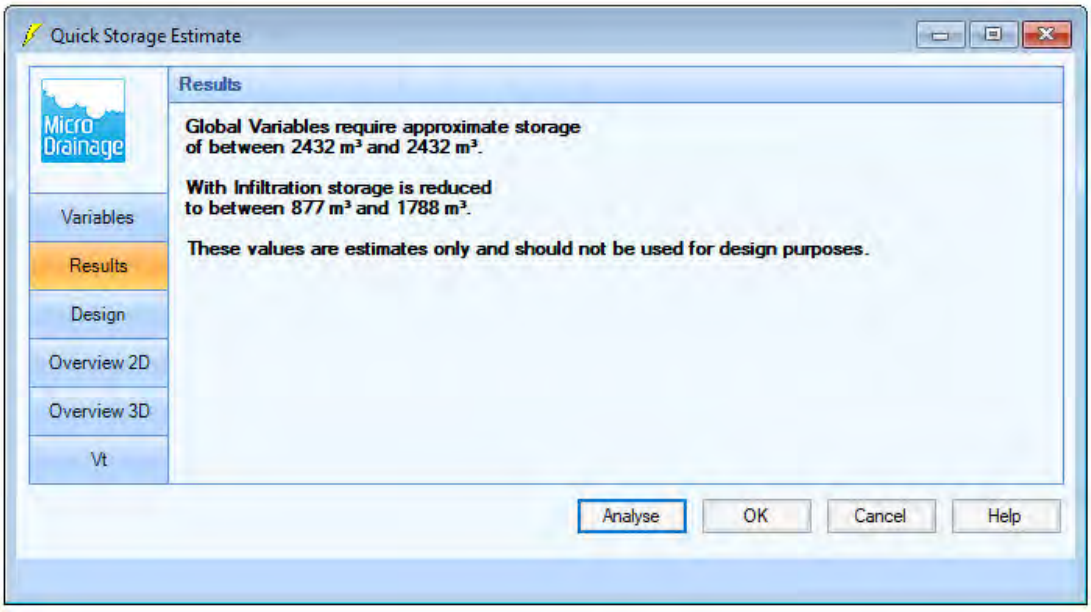
	Default	Edited
Q_{BAR} (l/s):	14.5	14.5
1 in 1 year (l/s):	12.61	12.61
1 in 30 years (l/s):	35.52	35.52
1 in 100 year (l/s):	51.62	51.62
1 in 200 years (l/s):	61.04	61.04

APPENDIX E

INDICATIVE SURFACE WATER DRAINAGE STORAGE

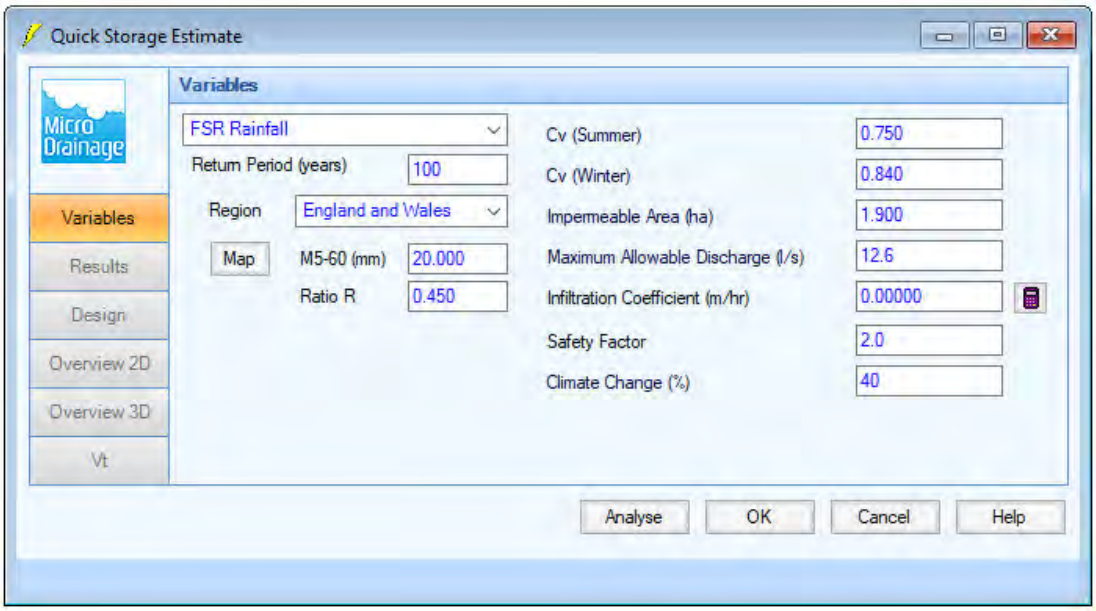
OPTION A – INFILTRATION

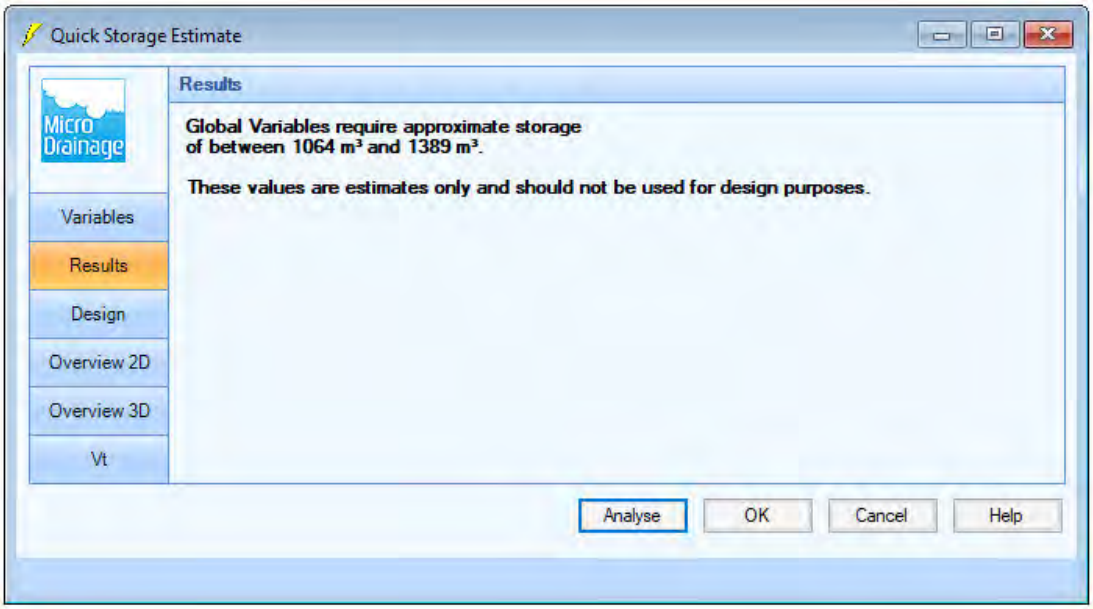




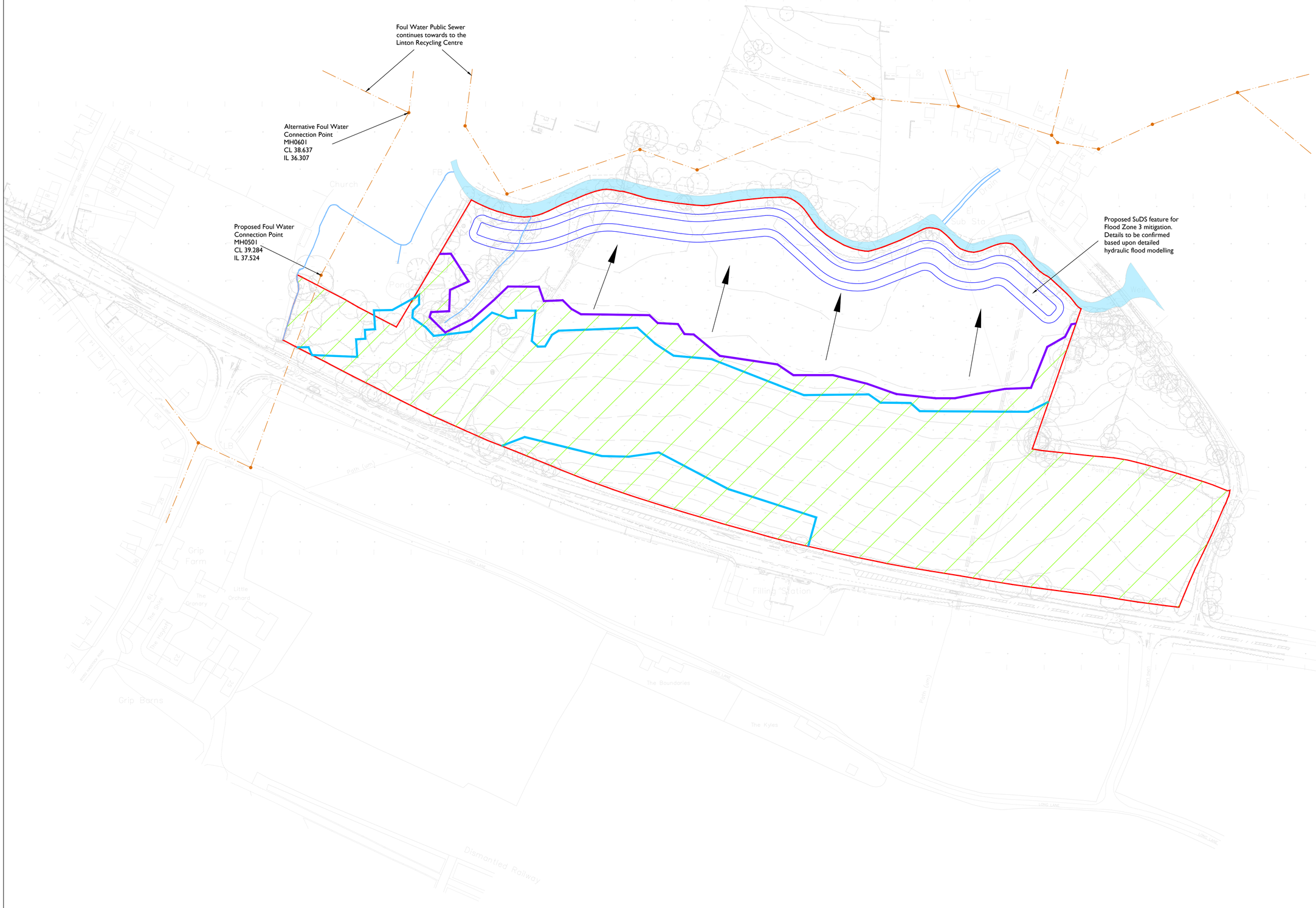
INDICATIVE SURFACE WATER DRAINAGE STORAGE

OPTION B – ATTENUATION & DISCHARGE





A1
ORIGINAL
PLOT SIZE



NOTES:
1. Indicative un-surveyed existing road markings.
2. Based on topographical survey produced by "SURVEY SOLUTIONS" Drawing No. 25955s01-08 .

KEY:

- Indicative Site Boundary
- Indicative Flood Zone 3 Extent
- Indicative Flood Zone 2 Extent
- Indicative Area Available for Residential Development within Flood Zones 1 & 2 where a Residential use is permitted (3.90ha)
- Existing Main River - River Granta
- Existing Drains
- Existing Foul Water Public Sewer
- Proposed 1in3 Embankment towards to the Main River to provide further protection against flooding to future Residential Development

Rev	Date	Details	Drawn by	Checked by	Approved by
-	-	-	-	-	-

Bristol
Cambridge
London
Manchester
Oxford
Welwyn Garden City

tpa Transport Planning Associates

The Stables
7 Chesterton Mill
French's Road
Cambridge
CB4 3NP
01223 455385
www.tpa.uk.com

CLIENT:
Taylor Wimpey UK Ltd

PROJECT:
Land north and south of the A1307, Linton

TITLE:
Indicative Flood Risk & Surface Water Opportunities and Constraints Plan

STATUS:
FEASIBILITY

SCALE:	DATE:	DRAWN:	CHECKED:	APPROVED:
1:1,000	20.02.20	NR	TH	JC

JOB NO:	DRAWING NO:	REVISION:
1902-05	SK100	-

INDICATIVE

APPENDIX F

Pre-Planning Assessment Report

LAND AT LINTON, CAMBRIDGESHIRE
155852/904071263/1/0077505

Report published 07/02/2020

Section 1: Proposed development

Thank you for submitting a pre-planning enquiry. This has been produced for Transport Planning Associates. Your reference number is **155852/904071263/1/0077505**. If you have any questions upon receipt of this report, please contact the Pre-Development team on 03456 066087 or email planningliaison@anglianwater.co.uk.

The response within this report has been based on the following information which was submitted as part of your application:

List of planned developments	
Type of development	**No. Of units**
Dwellings	85

The anticipated residential build rate is:

Year	Y1	Y2
Build rate	50	35

Site grid reference no.

TL5625946497

Development type

Greenfield

Planning application status

Unknown

The comments contained within this report relate to the public water mains and sewers indicated on our records. Your attention is drawn to the disclaimer in the useful information section of this report.

Section 2: Assets affected

Our records indicate that we have the following types of assets within or overlapping the boundary of your development site as listed in the table below.

Additionally, it is highly recommended that you carry out a thorough investigation of your proposed working area to establish whether any unmapped public or private sewers and lateral drains are in existence. We are unable to permit development either over or within the easement strip without our prior consent. The extent of the easement is provided in the table below. Please be aware that the existing water mains/public sewers should be located in highway or open space and not in private gardens. This is to ensure available access for any future maintenance and repair and this should be taken into consideration when planning your site layout.

Water and Used water easement information		
Asset type	Pipe size (mm)	Total easement required (m)
Sewer mains	375	3.00 m either side of the centre line
Sewer mains	150	3.00 m either side of the centre line
Sewer mains	150	3.00 m either side of the centre line

If it is not possible to avoid our assets then these may need to be diverted in accordance with Section 185 of the Water Industry Act (1991). You will need to make a formal application if you would like a diversion to be considered.

Due to the private sewer transfer in October 2011 many newly adopted public used water assets and their history are not indicated on our records. You also need to be aware that your development site may contain private water mains, drains or other assets not shown on our records. These are private assets and not the responsibility of Anglian Water but that of the landowner.

Section 3: Water recycling services

In examining the used water system we assess the ability for your site to connect to the public sewerage network without causing a detriment to the operation of the system. We also assess the receiving water recycling centre and determine whether the water recycling centre can cope with the increased flow and influent quality arising from your development.

Water recycling centre

The foul drainage from the proposed development is in the catchment of Linton Water Recycling Centre, which currently has capacity to treat the flows from your development site. Anglian Water cannot reserve capacity and the available capacity at the water recycling centre can be reduced at any time due to growth, environmental and regulation driven changes.

Used water network

Our assessment has been based on development flows connecting to the nearest foul water sewer of the same size or greater pipe diameter to that required to drain the site. The infrastructure to convey foul water flows to the receiving sewerage network is assumed to be the responsibility of the developer. Conveyance to the connection point is considered as Onsite Work and includes all work carried out upstream from of the point of connection, including making the connection to our existing network. This connection point has been determined in reference to the calculated discharge flow and on this basis, a 150mm internal diameter pipe is required to drain the development site. The nearest practicable connection is to the 150mm diameter sewer at manhole 0501 at National Grid Reference NGR TL 56030 46562. The cover level is 39.28m and the invert level is 37.52m. Anglian water has assessed the impact of gravity flows from the planned development to the public foul sewerage network. We can confirm that this is acceptable as the foul sewerage system, at present, has available capacity for your site. A gravity connection from the development should be possible, however if site levels require a pumped discharge, we can confirm that connection can be made via a pumped regime with an assumed rising main size of 90mm. Please note that Anglian Water will request a suitably worded condition at planning application stage to ensure this strategy is implemented to mitigate the risk of flooding.

It is assumed that the developer will provide the necessary infrastructure to convey flows from the site to the network. Consequently, this report does not include any costs for the conveyance of flows.

Surface water disposal

Unfortunately, There are no public surface water sewers within the vicinity of the proposed development. Therefore Anglian Water will be unable to provide the site with a feasible solution of surface water disposal within the current assets. Alternative methods of surface water disposal will need to be investigated such as infiltration techniques or a discharge to a watercourse in accordance with the surface water management hierarchy as outlined in Building Regulations Part H. We suggest investigating the possibility of a surface water connection to the adjacent watercourse. The alternative is that a new surface water sewer is constructed which is used to convey your surface water to a watercourse or as part of a SuDs scheme, where appropriate. Subject to the sewer being designed in accordance with the current version of Sewers For Adoption, the sewer can be put forward for adoption by Anglian Water under Section 104 of the Water Industry Act 1991. If the outfall is to a watercourse, the applicant will be required to obtain consent to discharge via the appropriate body. If your site has no means of drainage due to third party land then you may be able to requisition Anglian Water, under Section 98, to provide a connection to the public sewer for domestic drainage purposes. As part of this option, you may wish to enter into a works agreement in accordance with Section 30 of the Anglian Water Authority Act 1977. This will allow you to design and construct the public sewer using Anglian Waters' statutory powers in accordance with Section 159/168 of the Water Industry Act 1991.

As you may be aware, Anglian Water will consider the adoption of SuDs provided that they meet the criteria outline in our SuDs adoption manual. This can be found on our website at http://www.anglianwater.co.uk/developers/suds.aspx. We will adopt features located in public open space that are designed and constructed, in conjunction with the Local Authority and Lead Local Flood Authority (LLFA), to the criteria within our SuDs adoption manual. Specifically, developers must be able to demonstrate:

1. Effective upstream source control,
2. Effective exceedance design, and
3. Effective maintenance schedule demonstrating than the assets can be maintained both now and in the future with adequate access.

If you wish to look at the adoption of any SuDs then an expression of interest form can be found on our website at: http://www.anglianwater.co.uk/developers/suds.aspx

The proposed method of surface water disposal is not relevant to Anglian Water; we suggest that you contact the relevant Local Authority, Lead Local Flood Authority, the Environment Agency or the Internal Drainage Board, as appropriate.

Trade Effluent

We note that you do not have any trade effluent requirements. Should this be required in the future you will need our written formal consent. This is in accordance with Section 118 of the Water Industry Act (1991).

Used Water Budget Costs

As a result of the recent charging rules published by Ofwat, our charging regime has changed. Your development site will be required to pay a Zonal charge for each new property connecting to the public sewer that benefits from Full planning permission.

Payment of the Zonal charge must be made before premises are connected to the public sewer. More information on the Zonal charge can be found at http://www.anglianwater.co.uk/developers/charges

The Zonal charge consists of two elements. The first is called the 'Fixed Element' which is the same in nature to the Infrastructure charge applied prior to April 2018. The second is called the 'Variable Element' which may vary each financial year.

The elements are combined together to create the 2018/19 Zonal charge for Sewerage:

Fixed Element	£ 370
Variable Element	£ 101

In most circumstances zonal charges are raised on a standard basis of one charge per new connection (one for water and one for sewerage). However, if the new connection is to non-household premises, the fixed element is calculated according to the number and type of water fittings in the premises.This is called the "relevant multiplier" method of calculating the charge. Details of the relevant multiplier for each fitting can be found at our web-page: http://www.anglianwater.co.uk/developers/charges/

The total Zonal charge payable for your site for Sewerage is:

Zonal charge per new connection - Sewerage	No. Of Units	Total amount payable
£ 471	85	£ 40,035.00

It has been assumed that the onsite used water network will be provided under a section 104 Water Industry Act application.

It is recommended that you also budget for connection costs. Please note that we offer alternative types of connections depending on your needs and these costs are available at our website.

Section 4: Map of Proposed Connection Points

Figure 1:Showing your used water point of connection

Section 5: Useful Information

Used water

Water Industry Act – Key Used Water Sections:

Section 98:

This provides you with the right to requisition a new public sewer. The new public sewer can be constructed by Anglian Water on your behalf. Alternatively, you can construct the sewer yourself under section 30 of the Anglian Water Authority Act 1977.

Section 102:

This provides you with the right to have an existing sewerage asset vested by us. It is your responsibility to bring the infrastructure to an adoptable condition ahead of the asset being vested.

Section 104:

This provides you with the right to have a design technically vetted and an agreement reached that will see us adopt your assets following their satisfactory construction and connection to the public sewer.

Section 106:

This provides you with the right to have your constructed sewer connected to the public sewer.

Section 185:

This provides you with the right to have a public sewerage asset diverted.

Details on how to make a formal application for a new sewer, new connection or diversion are available on our website at http://www.anglianwater.co.uk/developers or via our Development Services team on 03456 066087.

Sustainable drainage systems:

Many existing urban drainage systems can cause problems of flooding, pollution or damage to the environment and are not resilient to climate change in the long term. Therefore our preferred method of surface water disposal is through the use of Sustainable Drainage Systems (SuDS). SuDS are a range of techniques that aim to mimic the way surface water drains in natural systems within urban areas. For more information on SuDS, please visit our website at http://www.anglianwater.co.uk/developers/suds.aspx . We also recommend that you contact the Local Authority and Lead Local Flood Authority (LLFA) for the area to discuss your application.

Private sewer transfers:

Sewers and lateral drains connected to the public sewer on the 1 July 2011 transferred into Water Company ownership on the 1 October 2011. This follows the implementation of the Floods and Water Management Act (FWMA). This included sewers and lateral drains that were subject to an existing Section 104 Adoption Agreement and those that were not. There were exemptions and the main non-transferable assets were as follows:

- Surface water sewers and lateral drains that did not discharge to the public sewer, e.g. those that discharged to a watercourse.
- Foul sewers and lateral drains that discharged to a privately owned sewage treatment/collection facility.
- Pumping stations and rising mains will transfer between 1 October 2011 and 1 October 2016.

The implementation of Section 42 of the FWMA will ensure that future private sewers will not be created. It is anticipated that all new sewer applications will need to have an approved section 104 application ahead of a section 106 connection.

Encroachment:

Anglian Water operates a risk based approach to development encroaching close to our used water infrastructure. We assess the issue of encroachment if you are planning to build within 400 metres of a water recycling centre or, within 15 metres to 100 metres of a pumping station. We have more information available on our website at http://anglianwater.co.uk/developers/encroachment.aspx

Locating our assets:

Maps detailing the location of our water and used water infrastructure including both underground assets and above ground assets such as pumping stations and recycling centres are available from . All requests from members of the public or non-statutory bodies for maps showing the location of our assets will be subject to an appropriate administrative charge. We have more information on our website at: http://www.anglianwater.co.uk/developers/our-assets/

Summary of charges:

A summary of this year's water and used water connection and infrastructure charges can be found at http://www.anglianwater.co.uk/developers/charges

Disclaimer:

The information provided in this report is based on data currently held by Anglian Water Services Limited ('Anglian Water') or provided by a third party. Accordingly, the information in this report is provided with no guarantee of accuracy, timeliness, completeness and is without indemnity or warranty of any kind (express or implied).

This report should not be considered in isolation and does not nullify the need for the enquirer to make additional appropriate searches, inspections and enquiries. Anglian Water supports the plan led approach to sustainable development that is set out in the National Planning Policy Framework ('NPPF') and any infrastructure needs identified in this report must be considered in the context of current, adopted and/or emerging local plans. Where local plans are absent, silent or have expired these needs should be considered against the definition of sustainability holistically as set out in the NPPF.

Whilst the information in this report is based on the presumption that proposed development obtains planning permission, nothing in this report confirms that planning permission will be granted or that Anglian Water will be bound to carry out the works/proposals contained within this report.

No liability whatsoever, including liability for negligence is accepted by Anglian Water, or its partners, employees or agents, for any error or omission, or for the results obtained from the use of this report and/or its content. Furthermore in no event will any of those parties be liable to the applicant or any third party for any decision made or action taken as a result of reliance on this report.

This report is valid for the date printed and the enquirer is advised to resubmit their request for an up to date report should there be a delay in submitting any subsequent application for water supply/sewer connection(s).

Appendix 6: Hydraulic Modelling

Hydraulic Modelling at Land off Linton Road

Final Report

December 2021

www.jbaconsulting.com

Travis Baker East Midlands Ltd
39 Stoney Street
NOTTINGHAM
Nottinghamshire
NG1 1LX

JBA Project Manager

Olivier Saillofest
The Library
St Philips Courtyard
Church Hill
Coleshill
Warwickshire
United Kingdom
B46 3AD

Revision History

Revision Ref / Date	Amendments	Issued to
10th November 2021	Draft Report	Henry McColl
10th December 2021	Final Report	Henry McColl Ted Wake

Contract

This report describes work commissioned by Henry McColl, on behalf of Travis Baker East Midland Ltd, by an email dated 08/09/2021. Travis Baker's representative for the contract was Henry McColl. Jack Richardson of JBA Consulting carried out this work.

Prepared by ..... Jack Richardson BSc

Assistant Analyst

Reviewed by ..... Olivier Saillofest BEng MSc CEng MCIWEM C.WEM

Technical Director

Purpose

This document has been prepared as a Final Report for Travis Baker East Midlands Ltd. JBA Consulting accepts no responsibility or liability for any use that is made of this document other than by the Client for the purposes for which it was originally commissioned and prepared.

JBA Consulting has no liability regarding the use of this report except to Travis Baker East Midlands Ltd.

Copyright

Carbon Footprint

A printed copy of the main text in this document will result in a carbon footprint of 58g if 100% post-consumer recycled paper is used and 73g if primary-source paper is used. These figures assume the report is printed in black and white on A4 paper and in duplex.

JBA is aiming to reduce its per capita carbon emissions.

Executive summary

JBA Consulting (JBA) were commissioned by Travis Baker Ltd to refine flood risk in relation to a proposed development site off Linton Road, Linton, Cambridgeshire.

To support this assessment, the existing Environment Agency 1D-2D Flood Modeller–TUFLOW hydraulic model was updated with additional channel survey in order to accurately represent flood levels, extents and hazards within the site boundary.

The model was run for the 20-year, 100-year, 100-year plus (9%) climate change, 100-year plus (19%) climate change and 1,000-year fluvial flood events.

The results of the baseline modelling show that:

- Flood flows exceed the channel capacity through the site in all modelled events.
- The Mill Lane culvert upstream of the site constricts flows. This results in exceedance flows spilling over Mill Lane and ultimately increasing overland flows converging towards the site in all modelled events.
- The peak water levels within the section of river channel crossing the site in the baseline scenario will range:
  - Between 37.90m AOD and 38.69m AOD during the 20-year (5% AEP) fluvial flood event;
  - Between 38.34m AOD and 38.89m AOD during the 100-year (1% AEP) fluvial flood event;
  - Between 38.42m AOD and 38.90m AOD during the 100-year (1% AEP) with 9% climate change fluvial flood event;
  - Between 38.50m AOD and 38.93m AOD during the 100-year (1% AEP) with 19% climate change fluvial flood event;
  - Between 38.76m AOD and 39.15m AOD during the 1,000-year (0.1% AEP) fluvial flood event.
- The 100-year with 9% climate change hazard-to-people classification ranges from' very low' to 'moderate' across the site (excluding the channel).
- Blockage Risk Analysis shows that flooding is not exacerbated when the Mill Lane culvert is blocked to 90%.

Peak water levels should be used to inform on-site finished floor levels. It is recommended the key findings of this hydraulic modelling study are taken into consideration when preparing a flood risk assessment for the site.

This modelling study is based on an existing Environment Agency owned hydraulic model which focuses on fluvial flood risk from the River Granta in Linton. Flood risk from the River Granta's tributaries is not represented.

Peak water levels should be used to inform on-site finished floor levels. It is recommended the key findings of this hydraulic modelling study are taken into consideration when preparing a flood risk assessment for the site.

Contents

List of Figures

List of Tables

Abbreviations

1D	One Dimensional
2D	Two Dimensional
CC	Climate Change
DTM	Digital Terrain Model
EA	Environment Agency
FEH	Flood Estimation Handbook
FFL	Finished Floor Levels
FM	Flood Modeller (1D modelling software)
GCS	Grantham Coates Surveyors
Ha	Hectares
HT	Head-Time
HQ	Head-Flow
JBA	Jeremy Benn Associates
LiDAR	Light Detection and Ranging
LLFA	Lead Local Flood Authority
m AOD	Metres Above Ordnance Datum
QMED	Median annual flow
QT	Flow-Time
ReFH	Revitalised Flood Hydrograph
RoFSW	Risk of Flooding from Surface Water
TUFLOW	2D Hydraulic Modelling Software

1 Introduction

1.1 Terms of reference

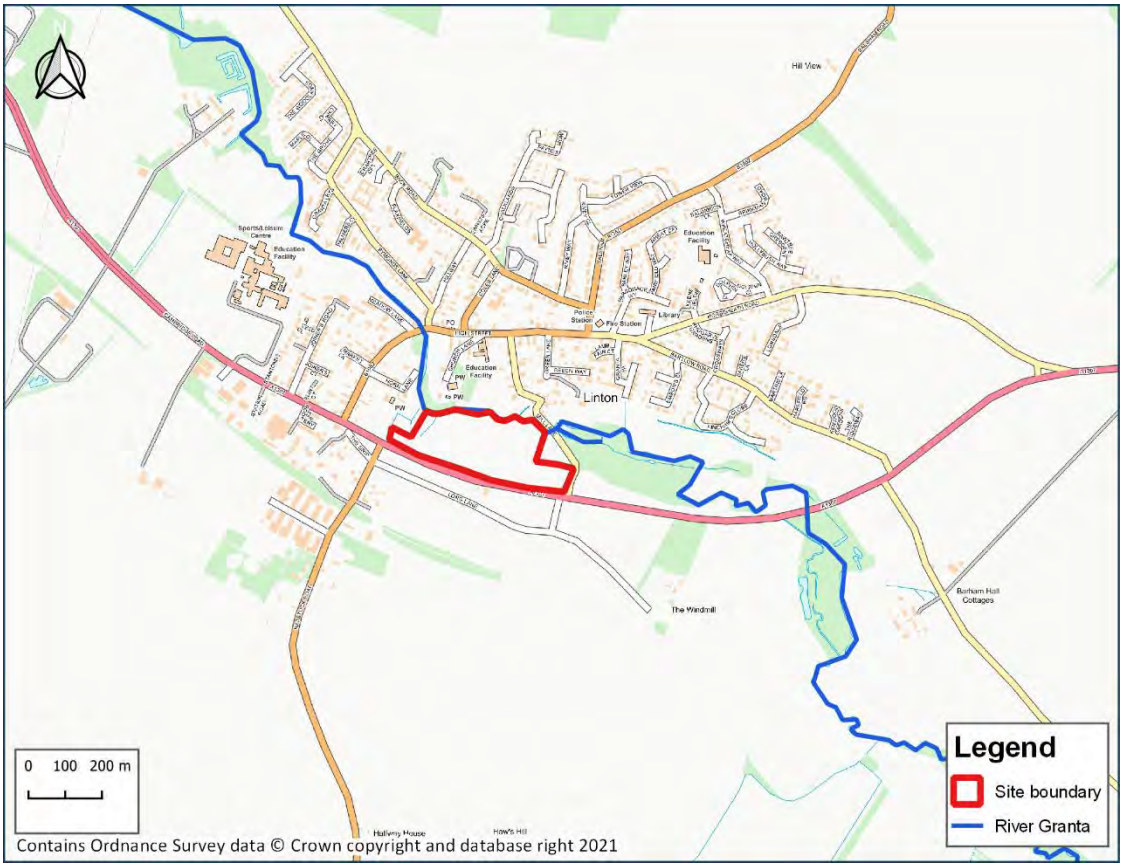
JBA Consulting (JBA) were commissioned by Travis Baker Ltd to update an existing hydraulic model of the River Granta in relation to a proposed development site off Linton Road, Linton, Cambridgeshire.

To support this assessment, the existing Environment Agency 1D-2D Flood Modeller–TUFLOW hydraulic model was updated with additional channel survey to allow accurate representation of the flood levels, extents and hazards within the site boundary.

1.2 Site details

Table 1-1: Site details

Site name	Land off Linton Road, Cambridgeshire
Existing land-use	Predominantly greenfield
OS NGR	556251 246526
County	Cambridgeshire
Country	England



1.3 Existing Flood Data

Flood Map for Planning Flood Zone 2 and 3 data is shown in Figure 1-1.

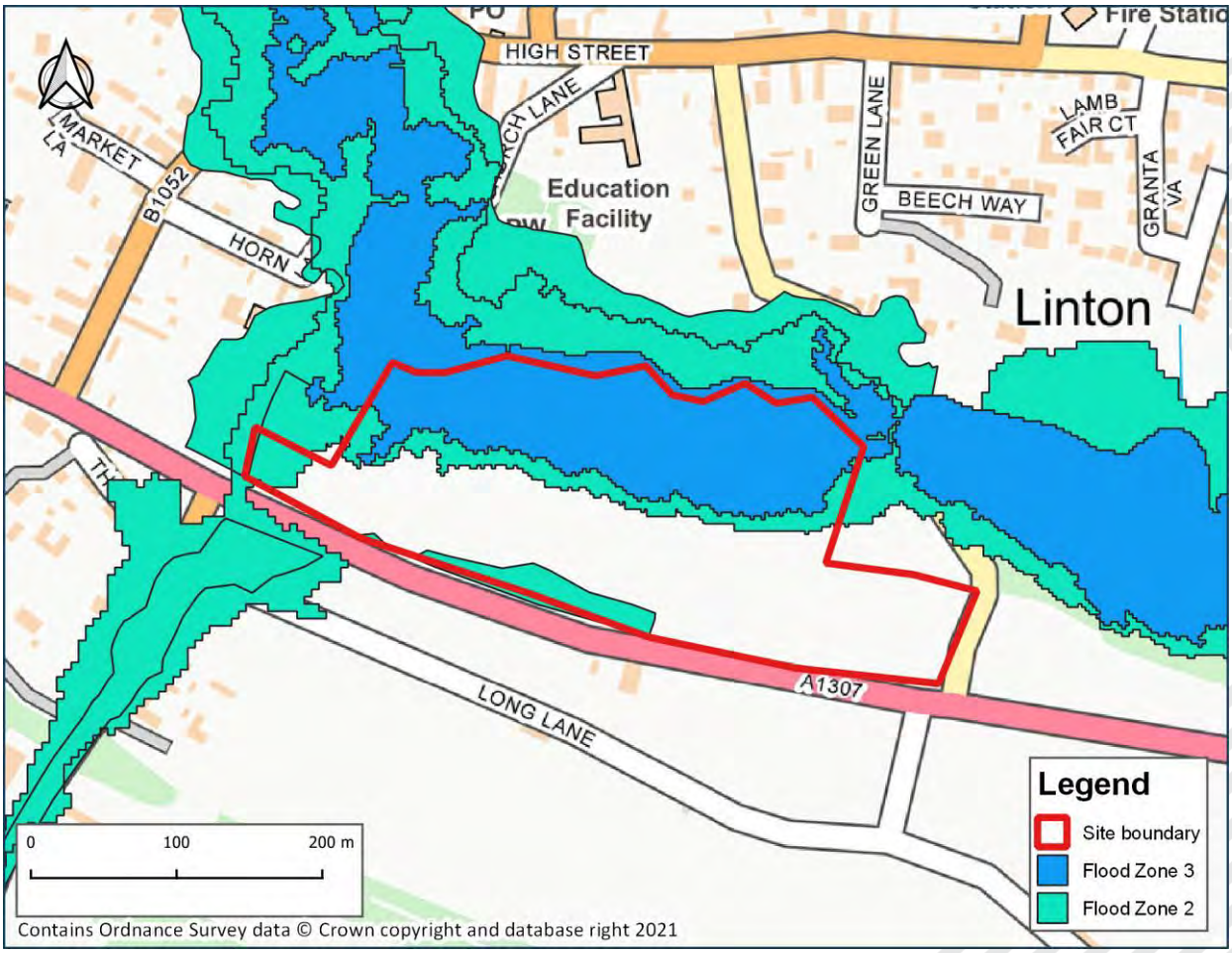


Figure 1-1: Flood Zone 2 and Flood Zone 3 extents

Flood Zone 2 data in the southern part of the site shown in Figure 1-1 originates from flood outlines recorded during the October 2001 flood event according to the Environment Agency OpenData dataset. Given the age of this information, the proximity to the A1307 and the local topography (which slopes towards the River Granta, not towards the A1307), it is considered that this information does not represent current-day flood conditions.

1.4 General Approach

New survey of the River Granta was commissioned in order to accurately represent the watercourse within the vicinity of the sites. A total of 11 cross-sections were surveyed across the channel of the watercourse.

A hydrological assessment was carried out following the Environment Agency's guidelines to derive fluvial flow estimates and the existing Environment Agency 1D-2D linked Flood Modeller-TUFLOW hydraulic model was trimmed and updated to allow a more accurate understanding of flood levels, depths and extents within the site boundary.

2 Model Approach

2.1 Model Extent

The updated Environment Agency model for the River Granta has a total length of 2.5km. The model extends from just south of the A1307, approximately 1.3km south-east of the site, to approximately 0.9km north-west adjacent to Symonds Lane. The 1D and 2D extents of the model are shown in Figure 2-1.

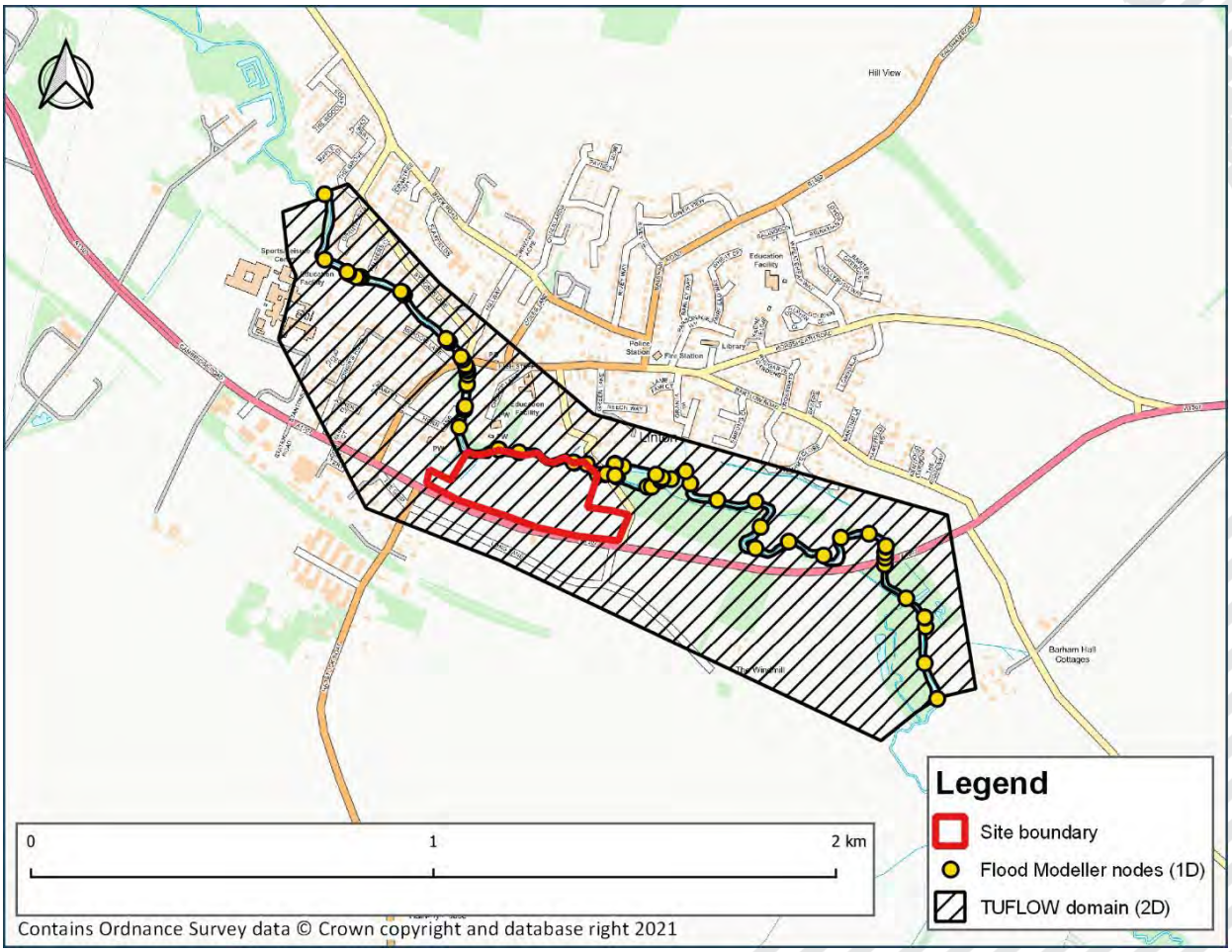


Figure 2-1: Model extent

2.2 Data Availability

The existing Environment Agency 2D TUFLOW domain was updated using DTM LIDAR data flown in 2017 at a 1m resolution. The 1D Flood Modeller domain was updated with 11 new channel cross sections collected by GCS in 2021. The location of channel survey sections and LIDAR coverage are shown in Figure 2-2.

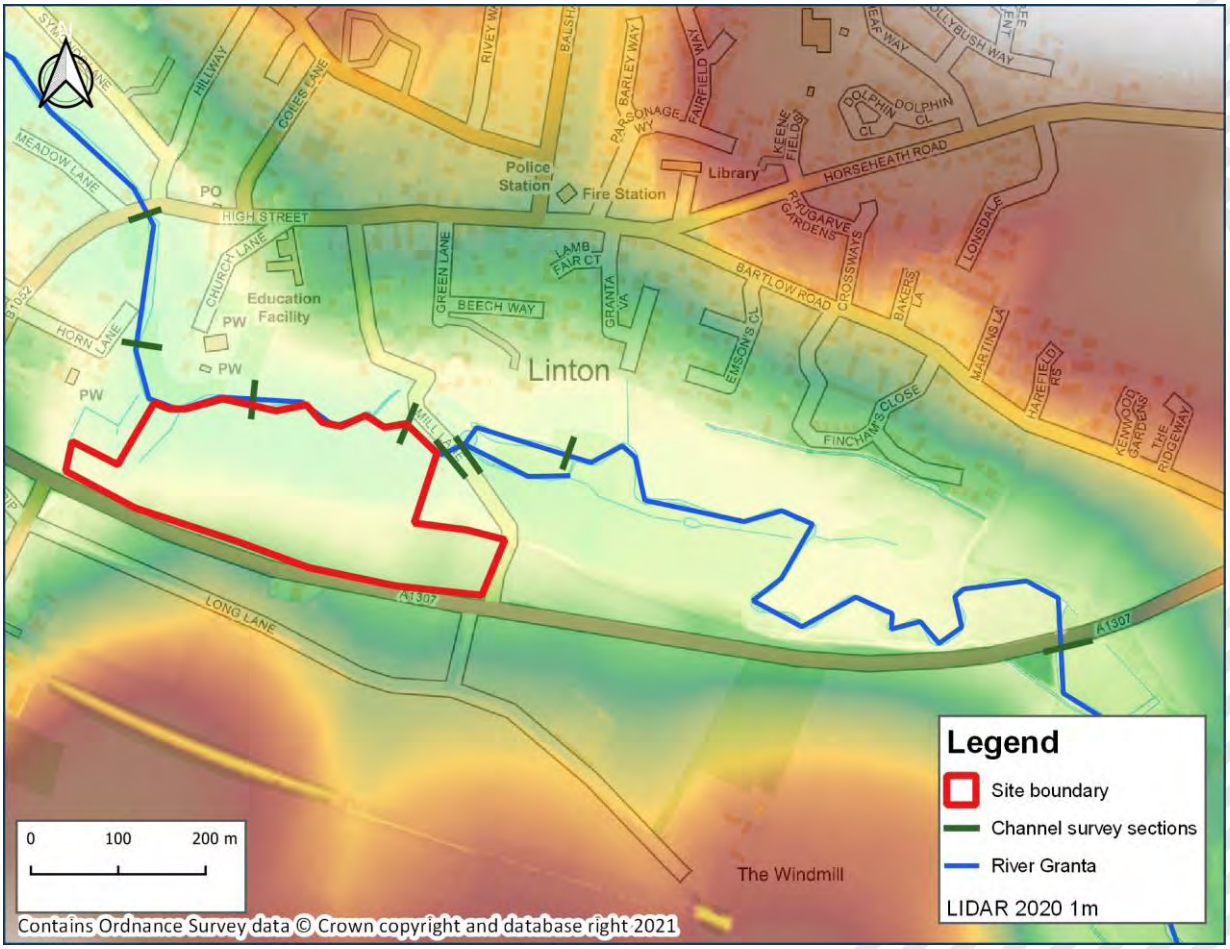


Figure 2-2: Survey coverage

2.3 Model boundary conditions

A new hydrological assessment was conducted to derive flows for the upstream extent of the model. Details of the hydrological assessment can be found in Appendix B. A single inflow point has been applied at the upstream node. There are no lateral inflows.

2.4 Model Runs

The following flood scenarios were simulated by the model:

- [Baseline scenario] 20-year (5% AEP) flood event - existing condition scenario;
- [Baseline scenario] 100-year (1% AEP) flood event - existing condition scenario;
- [Baseline scenario] 100-year (1% AEP) plus Climate Change (9%) flood event - existing condition scenario;
- [Baseline scenario] 100-year (1% AEP) plus Climate Change (19%) flood event - existing condition scenario;
- [Baseline scenario] 1000-year (0.1% AEP) flood event - existing condition scenario;
- [Blockage scenario] 100-year (1% AEP) plus Climate Change (9%) flood event – A blockage factor of 80% has been applied to the culvert immediately upstream of the site. The nearest culvert crossing High Street is located approximately 225m downstream of the site. As such, a blockage risk analysis at this location was not deemed necessary.

The results of the baseline and blockage scenarios are discussed in the following section.

3 Baseline Hydraulic Model Results

3.1 Baseline Flood Extents

Flood extents for the 20-year, 100-year and 1000-year fluvial flood events are shown in Figure 3-1.

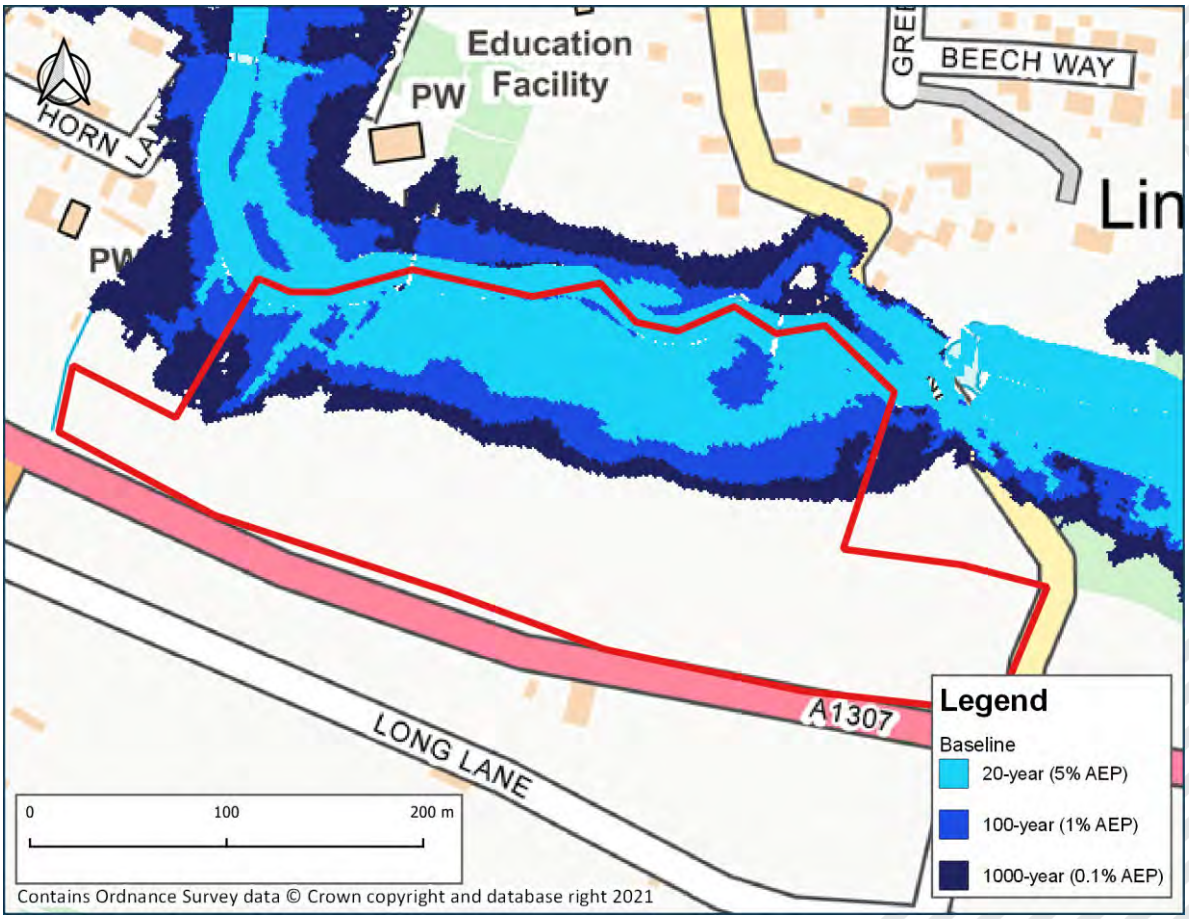


Figure 3-1: Baseline flood extents (20-year, 100-year and 1000-year)

Figure 3-1 shows that flooding covers the northern section of the site adjacent to the River Granta as a result of water levels exceeding the banks in the section of river channel crossing the site. In the 100-year and 1000-year flood events, an overland flow route exists across Mill Lane which enters the site.

Flood extents for the 100-year plus (9%) climate change and 100-year plus (19%) fluvial flood events are shown in Figure 3-2.

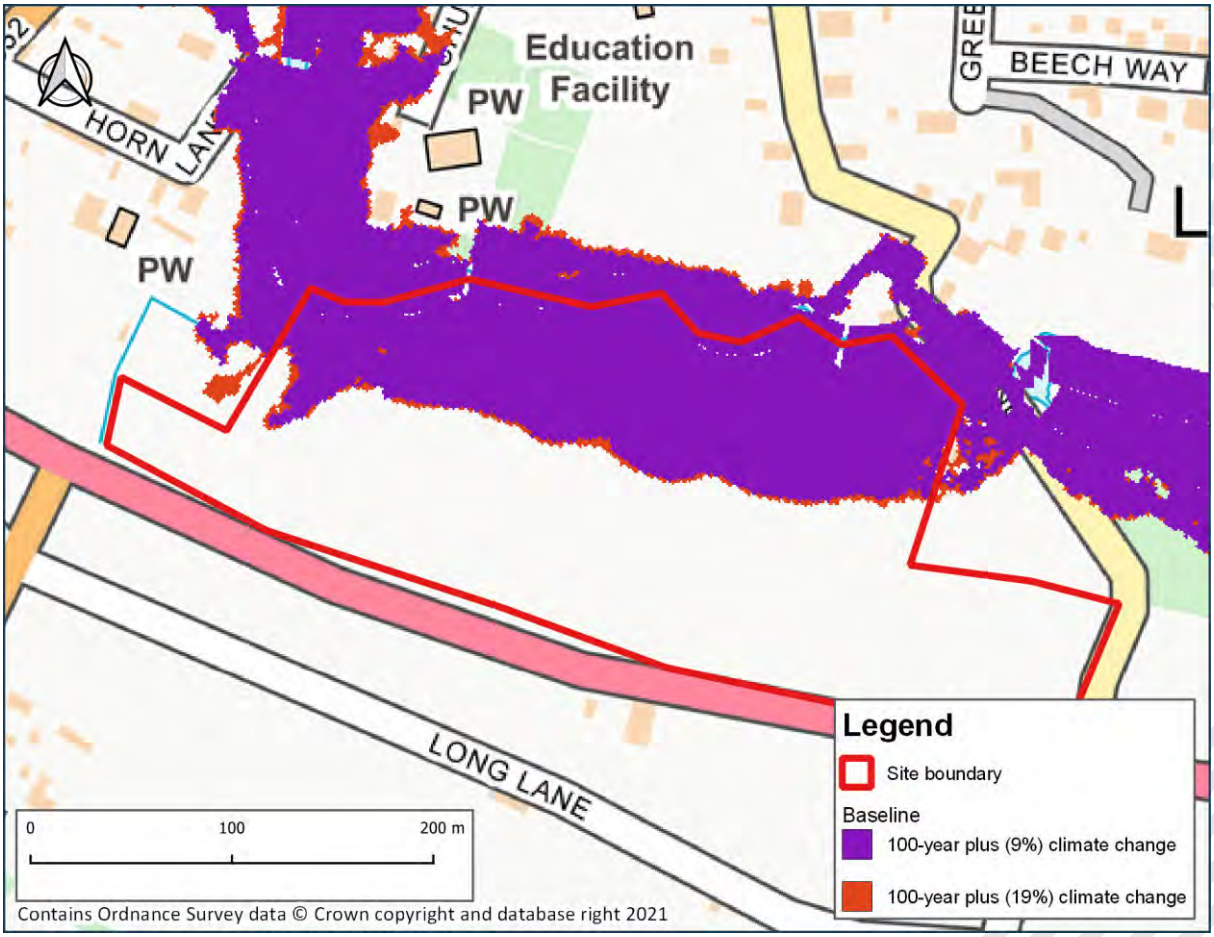


Figure 3-2: Baseline 100-year plus climate change flood extents

Figure 3-2 shows that flooding during the 100-year plus climate change events covers the northern section of the site adjacent to the River Granta. The same overland flow route previously mentioned also exists in the 100-year plus (9%) and 100-year plus (19%) climate change events. Flood mechanisms on site are primarily driven by water levels exceeding the channel capacity through the site. Flooding is also exacerbated by the Mill Lane culvert upstream of the site which exceeds capacity during the 100-year plus (9%) climate change event, causing flooding across Mill Lane and into the site.

3.2 Baseline Flood Levels

Table 3-1: Baseline peak water levels (channel)

Node (see Figure 3-3 for location)	Peak Flood Levels (m AOD)				
	20-year (5% AEP)	100-year (1% AEP)	100-year plus (9%) climate change	100-year plus (19%) climate change	1000-year (0.1% AEP)
GR14074	38.69	38.89	38.90	38.93	39.15
GR14069	38.58	38.74	38.77	38.81	39.00
GR14330	38.45	38.63	38.67	38.73	38.97
GR14292	38.35	38.59	38.63	38.69	38.95
GR14255u/d	38.27	38.55	38.60	38.67	38.94
GR14102	38.22	38.51	38.57	38.64	38.90
GR14051u/d	38.16	38.49	38.55	38.62	38.90
GR13901	37.90	38.34	38.42	38.50	38.76

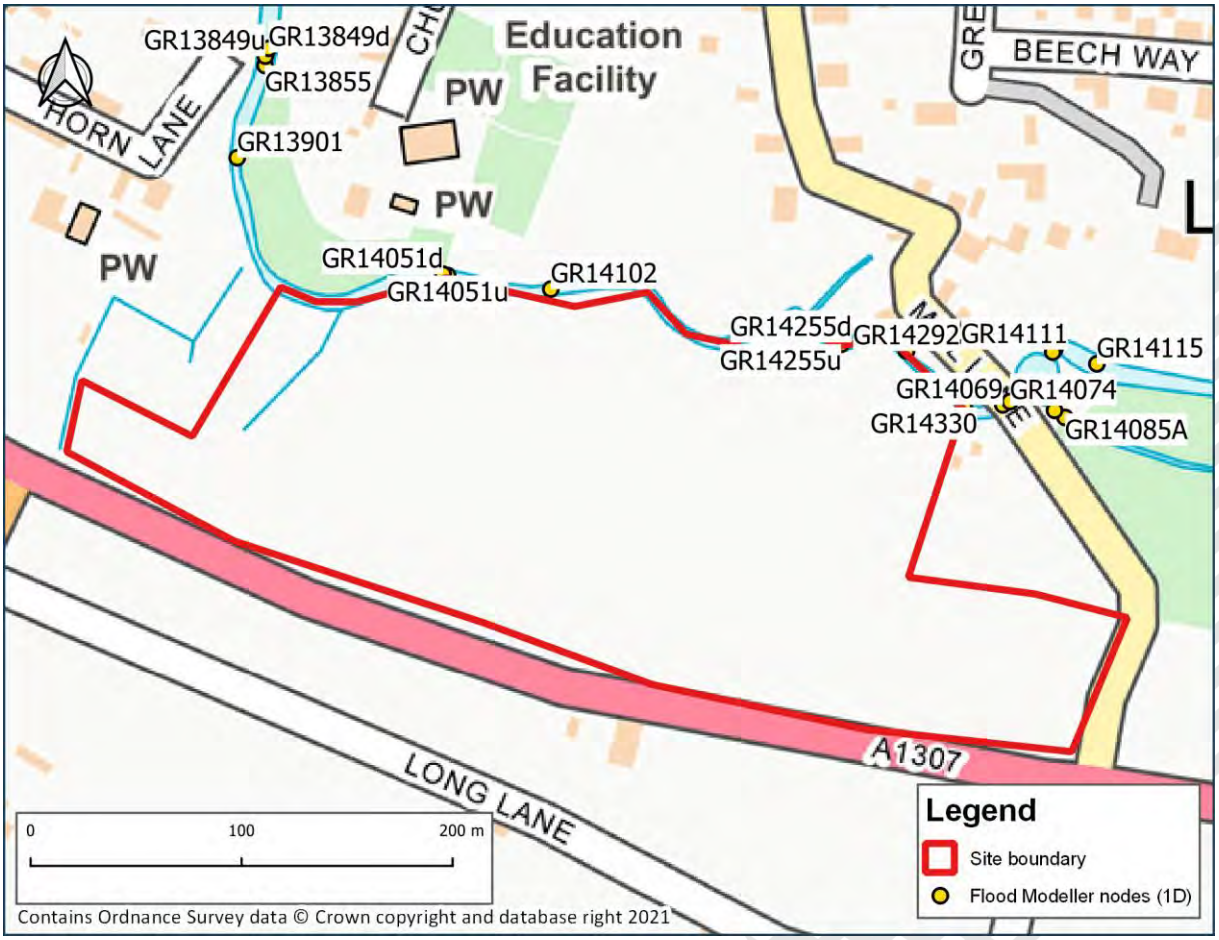


Figure 3-3: Node locations

Table 3-1 shows that the peak water level within the section of river channel crossing the site will range:

- Between 37.90m AOD and 38.69m AOD during the 20-year (5% AEP) fluvial flood event;
- Between 38.34m AOD and 38.89m AOD during the 100-year (1% AEP) fluvial flood event;
- Between 38.42m AOD and 38.90m AOD during the 100-year (1% AEP) with 9% climate change fluvial flood event;
- Between 38.50m AOD and 38.93m AOD during the 100-year (1% AEP) with 19% climate change fluvial flood event;
- Between 38.76m AOD and 39.15m AOD during the 1,000-year (0.1% AEP) fluvial flood event.

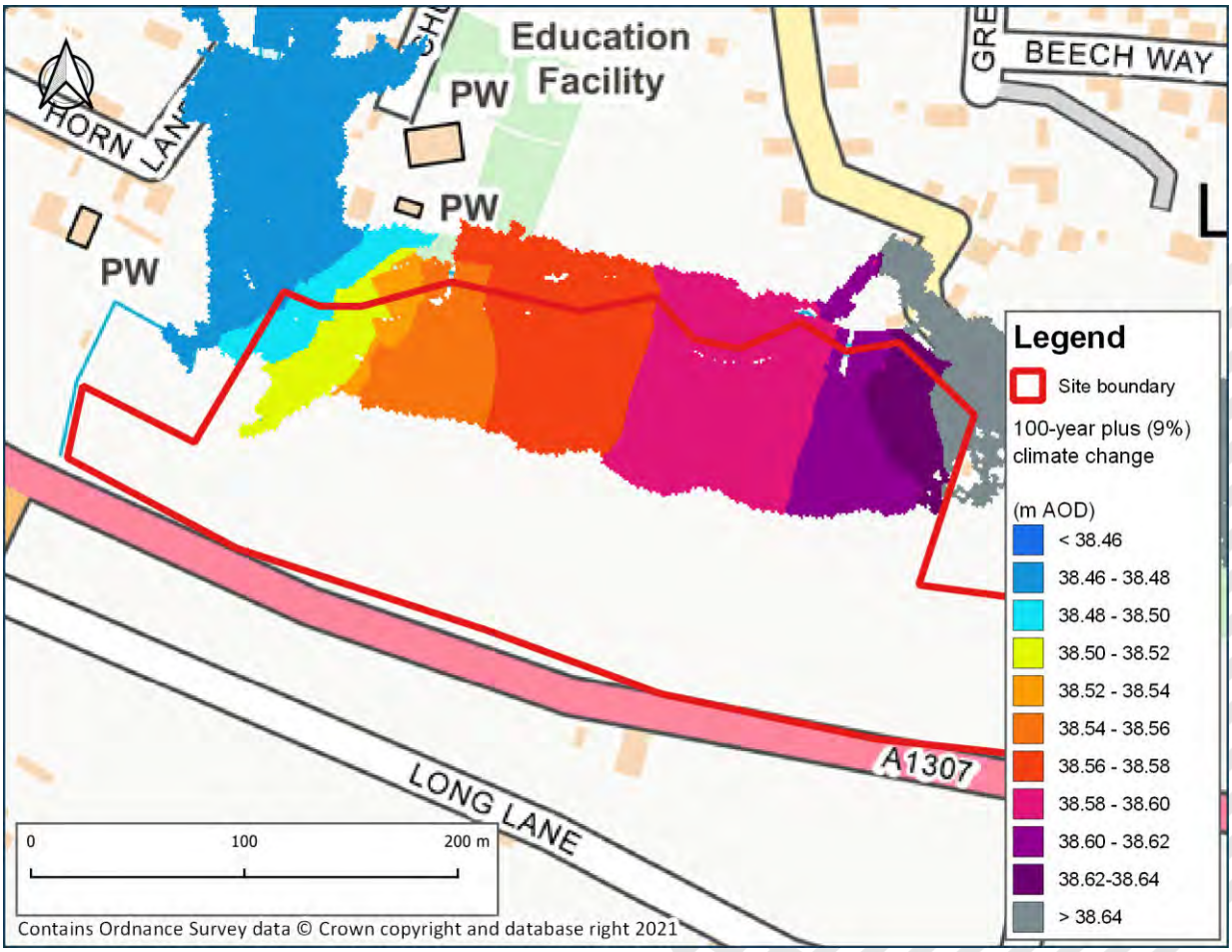


Figure 3-4: Baseline peak water levels on site

3.3 Hazard-to-people classification

The hazard-to-people classification was assessed for the 100-year plus (9%) climate change fluvial flood event. The classification for this site is represented in Figure 3-5.

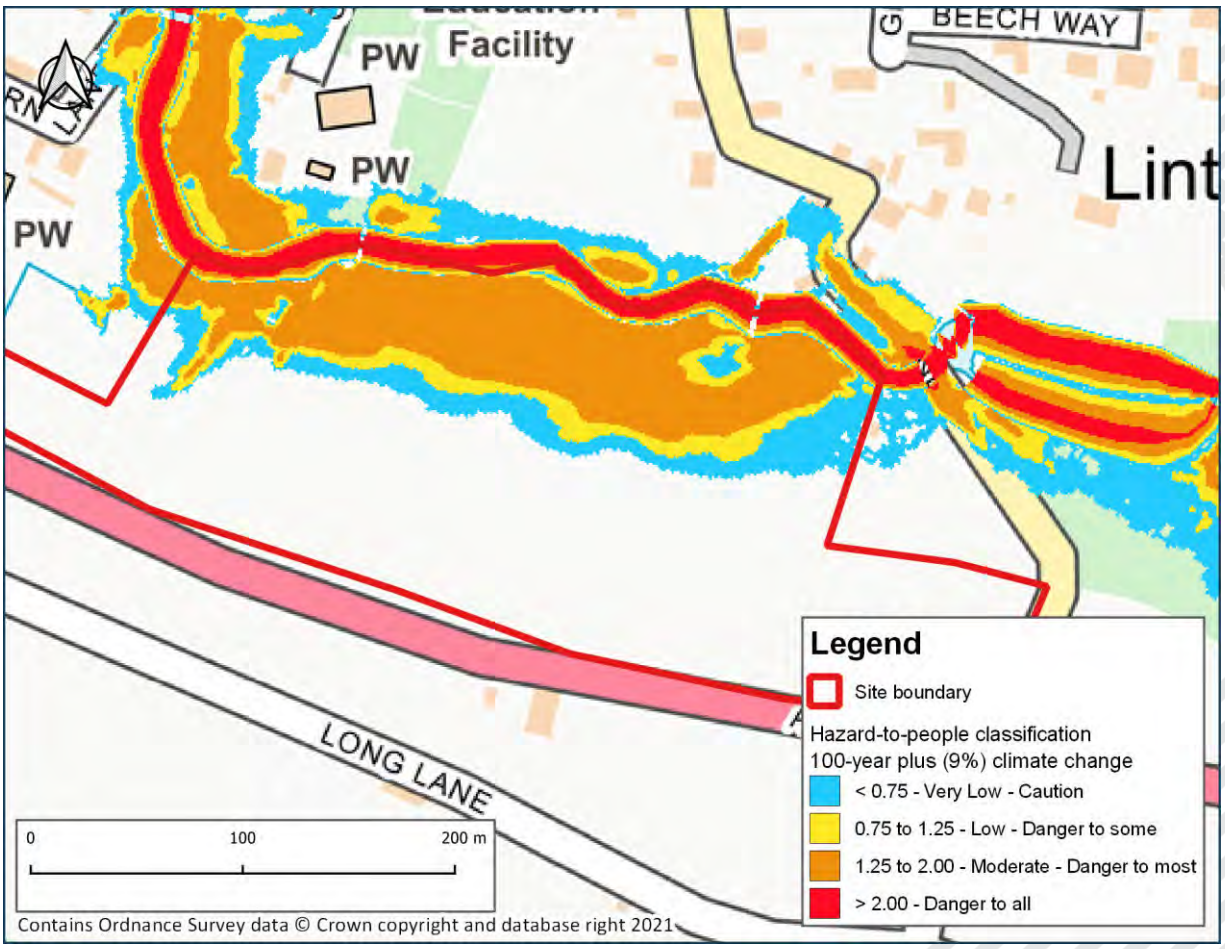


Figure 3-5: Hazard-to-people classification (100-year plus (9%) climate change)

Table 3-2: Flood hazard-to-people classification

Flood Hazard Rating (HR)	Hazard-to-people classification
Less than 0.75	Very low hazard - caution
0.75-1.25	Danger for some – includes children, the elderly and the infirm
1.25-2.00	Danger for most – includes the general public
More than 2.00	Danger for all – includes the emergency services

Figure 3-5 shows the hazard-to-people classification within the site boundary ranges from 'very low' to 'moderate' (excluding the channel).

3.4 Blockage Risk Analysis

The blockage risk has been assessed for the Mill Lane culvert immediately upstream of the site. The results of the blockage analysis are shown in Figure 3-6.

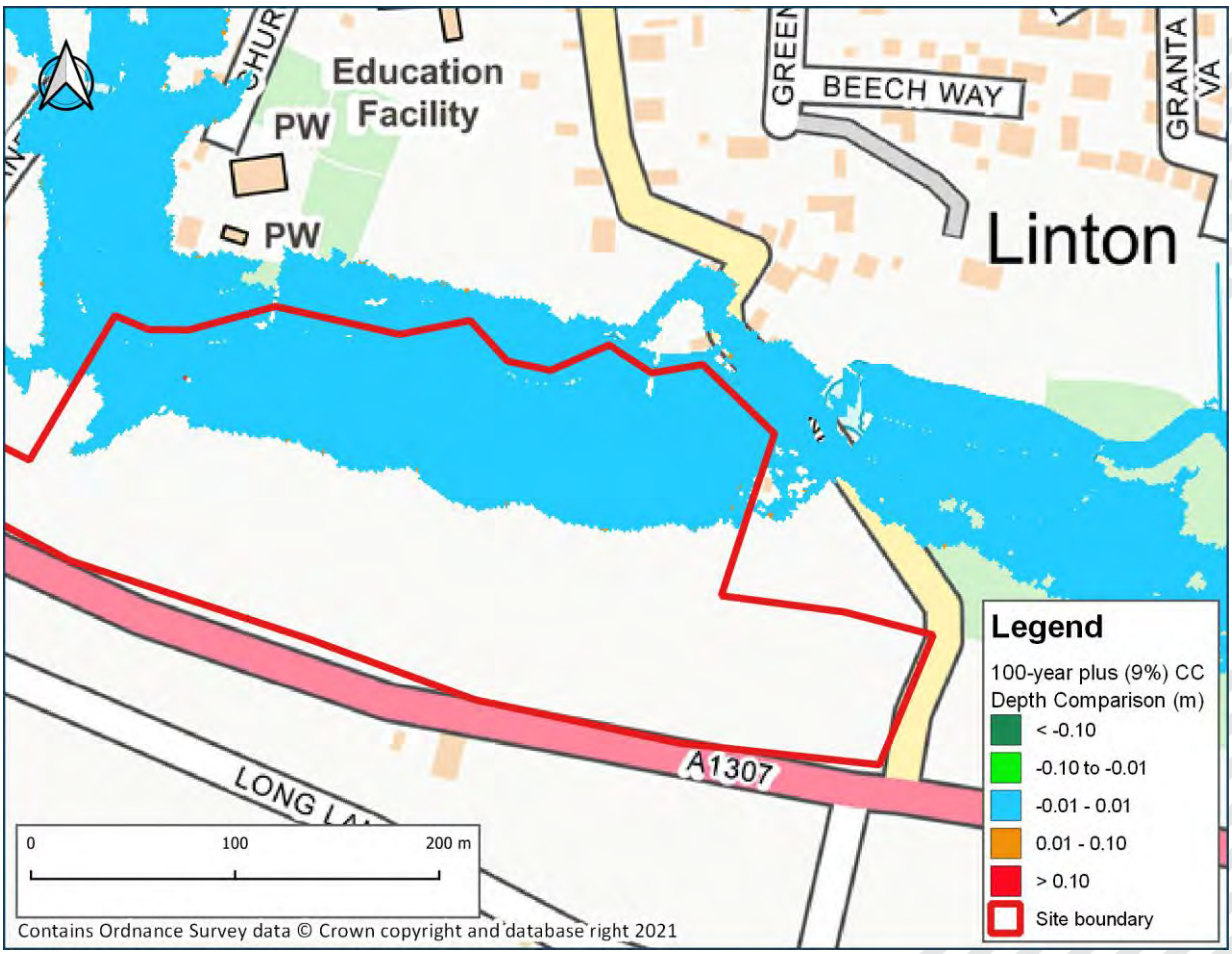


Figure 3-6: Blockage Risk Analysis – 100-year plus (9%) climate change

Figure 3-6 shows that blockage of the culvert would not have a significant impact on flood depths across the site in the 100-year plus (9%) climate change event. As Mill Lane acts as a ford during flood events, blockage of the culvert pipes does not have an impact on conveyance of flows over the road towards the site.

4 Conclusions and Recommendations

4.1 Conclusions

- JBA Consulting (JBA) were commissioned by Travis Baker Ltd to refine flood risk in relation to a proposed development site off Linton Road, Linton, Cambridgeshire.
- The model was run for the 20-year, 100-year, 100-year plus (9%) climate change, 100-year plus (19%) climate change and 1,000-year fluvial flood events.

The results of the baseline modelling show that:

- Flood flows exceed the channel capacity through the site in all modelled events.
- The Mill Lane culvert upstream of the site constricts flows. This results in exceedance flows spilling over Mill Lane and ultimately increasing overland flows converging towards the site in all modelled events.
- The peak water levels within the section of river channel crossing the site in the baseline scenario will range:
    - Between 37.90m AOD and 38.69m AOD during the 20-year (5% AEP) fluvial flood event;
    - Between 38.34m AOD and 38.89m AOD during the 100-year (1% AEP) fluvial flood event;
    - Between 38.42m AOD and 38.90m AOD during the 100-year (1% AEP) with 9% climate change fluvial flood event;
    - Between 38.50m AOD and 38.93m AOD during the 100-year (1% AEP) with 19% climate change fluvial flood event;
    - Between 38.76m AOD and 39.15m AOD during the 1,000-year (0.1% AEP) fluvial flood event.
- The 100-year with 9% climate change hazard-to-people classification ranges from 'very low' to 'moderate' across the site (excluding the channel).
- Blockage Risk Analysis shows that flooding is not exacerbated when the Mill Lane culvert is blocked to 90%.

4.2 Limitations

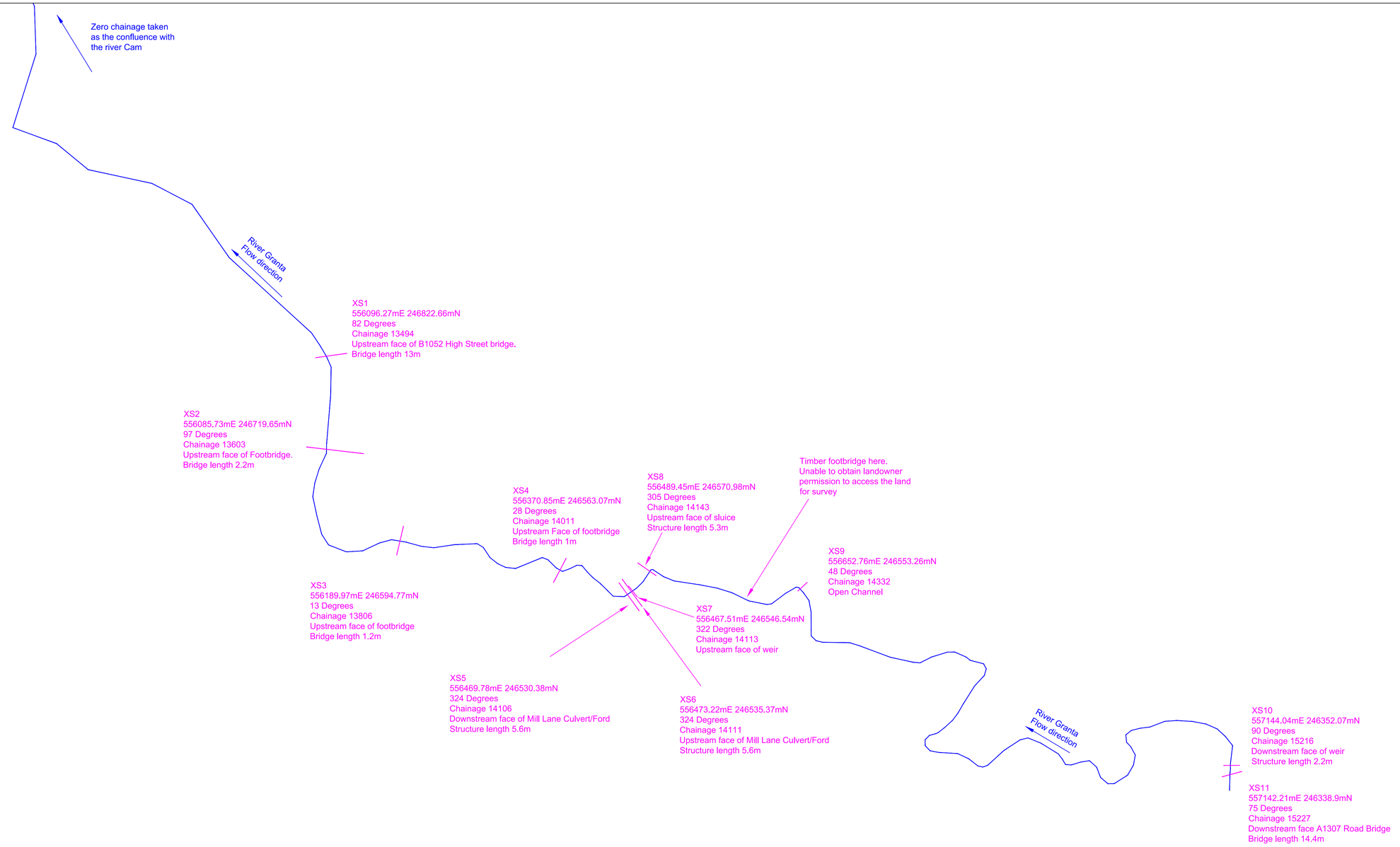
This modelling study is based on an existing Environment Agency owned hydraulic model which focuses on fluvial flood risk from the River Granta in Linton. Flood risk from the River Granta's tributaries is not represented.

4.3 Recommendations

Peak water levels should be used to inform on-site finished floor levels. It is recommended the key findings of this hydraulic modelling study are taken into consideration when preparing a flood risk assessment for the site.

Appendices

A Channel Survey Data



Notes

This survey should only be relied upon for its original purpose. Grantham Coates Surveys Limited accepts no responsibility for use of this plan outside of the original remit, or by use of any party other than the original client.

Whilst every effort has been made to identify all above ground details, it should be noted that some items may have been obscured at time of survey.

Below ground drainage information as been visually inspected from the surface and should therefore be treated as approximate only.

Where this survey has been carried out for the purpose of enabling trackside drainage design. The position of any running rail has been surveyed in line with a general topographic survey and should not be used for the purpose of track design.

All dimensions to be checked on site prior to design and construction.

Legend

AIR VALVE	AV	WATER TAP	TAP		
BOLLARD	BD	TEMPORARY BENCH MARK	TBM		
BORE HOLE	BHL	TELEPHONE CALL BOX	TCB		
BUS STOP	BS	TELEPHONE POST	TEL		
BT INSPECTION COVER	BT	THRESHOLD LEVEL	THL		
BT BOX	BTB	TRAFFIC LIGHT	TL		
CABLE TV INSPECTION COVER	CTV	TOP OF WALL	TOW		
COVER LEVEL	CL	TELEGRAPH POLE	TP		
DOWN PIPE	DP	UNABLE TO LIFT	UTL		
DROPPED KERB	DK	VENT PIPE	VP		
ELECTRICITY CONTROL BOX	ECB	RAIL WELD	WE		
EAVES HEIGHT	EH	WATER METER	WM		
ELECTRICITY MANHOLE	EM	WASHOUT	WO		
ELECTRICITY POLE	EP				
EARTH ROD	ER				
FINISHED FLOOR LEVEL	FFL				
FIRE HYDRANT	FH	SURVEY STATION	GCS1		
FOUL WATER	FW				
GULLY	GY				
GATE POST	GP	BUSHES			
GAS VALVE	GV				
INSULATED BLOCK JOINT	IBJ				
INSPECTION COVER	IC	HEDGES			
INVERT LEVEL	IL				
KERB OUTLET	KO				
LAMPPOST	LP				
LITTER BIN	LB	TREES	Height Species (Spread to scale)		
MARKER POST	MK				
MILE POST	MP				
POST	PO				
RODDING EYE	RE	GATE			
RIDGE HEIGHT	RH				
ROAD NAMEPLATE	RN				
ROAD SIGN	RS	SECURITY FENCE	X X		
STUMP	SP	FENCE	/ /		
SOFFIT LEVEL	SF	OVERHEAD CABLES	OH OH		
SIGNAL POST	SIG	FOUL WATER	FW FW		
RAIL SLEEPER LEVEL	SLP	GAS MAIN	GM GM		
SIGNALS AND TELECOMS BOX	STB	U/G POWER LINE	PL PL		
SIGNALS AND TELECOMS CABLE	STC	STORM WATER	SW SW		
SIGNALS AND TELECOMS POST	STP	U/G TELEPHONE	TEL TEL		
SIGN POST	SN	WATER MAIN	WM WM		
STOP TAP	ST				
STOP VALVE	SV				
STAY	SY				
STORM WATER	SW				

Control Table

Station	Description	Eastings	Northings	Height

Grid and Datum

Grid: ***OS National Grid*** **Datum:** ***Ordnance Datum Newlyn***

Survey related to Ordnance Survey National Grid (OSGB36) via GPS and the OS Active Network.
A National Grid (OSGB36) coordinate has been established on site via Transformation OSTN15 and Geoid Model OSGM15, a further OS coordinate was used to orientate the survey to Ordnance Grid.
No scale factor has been applied to the survey

Title:

WATERCOURSE SURVEY AT
River Granta
(Key Plan)

Client:

JBA CONSULTING
The Library
St. Philip's Courtyard
Coleshill
Warwickshire B46 3AD

Grantham Coates Surveys Ltd

Land - Engineering - Building Surveyors

2 Arden Court, Arden Road, Alcester
Warwickshire, B49 6HN

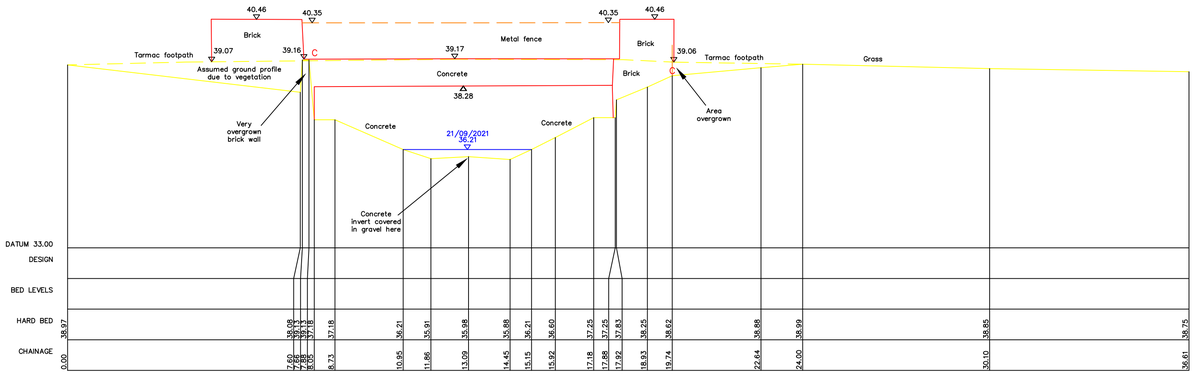
Tel: 01789 764420

E-Mail: info@gcsurveys.co.uk
Web Site: www.gcsurveys.co.uk

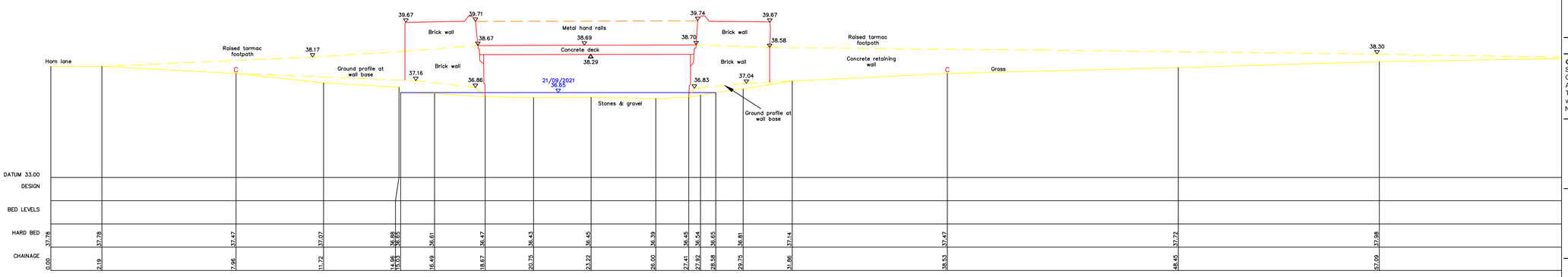
Drawing No:	Rev:
GCS/JBA/1173/1	-

Date:	Notes:	Name:	Rev:

Drawn:	Checked:	Scale:	Date:
MC	JMG	1:2500	24/09/21
File Name:		Sheet size:	Sheet:
GCS-JBA-1173-1		A1	1 of 5



XS1
556096.27mE 246822.66mN Brg 82
Chainage 13494.1
Upstream face of B1052 High Street bridge. Bridge length 13m



XS2
556085.73mE 246719.65mN Brg 97
Chainage 13602.9
Upstream face of Footbridge. Bridge length 2.2m

Notes

This survey should only be relied upon for its original purpose. Grantham Coates Surveys Limited accepts no responsibility for use of this plan outside of the original remit, or by use of any party other than the original client.

Whilst every effort has been made to identify all above ground details, it should be noted that some items may have been obscured at time of survey.

Below ground drainage information has been visually inspected from the surface and should therefore be treated as approximate only.

Where this survey has been carried out for the purpose of enabling trackside drainage design. The position of any running rail has been surveyed in line with a general topographic survey and should not be used for the purpose of track design.

All dimensions to be checked on site prior to design and construction.

Legend

AIR VALVE	AV	WATER TAP	TAP		
BOLLARD	BD	TEMPORARY BENCH MARK	TBM		
BORE HOLE	BHL	TELEPHONE CALL BOX	TCB		
BUS STOP	BS	TELEPHONE POST	TEL		
BT INSPECTION COVER	BT	THRESHOLD LEVEL	THL		
BT BOX	BTB	TRAFFIC LIGHT	TL		
CABLE TV INSPECTION COVER	CTV	TOP OF WALL	TOW		
COVER LEVEL	CL	TELEGRAPH POLE	TP		
DOWN PIPE	DP	UNABLE TO LIFT	UTL		
DROPPED KERB	DK	VENT PIPE	VP		
ELECTRICITY CONTROL BOX	ECB	RAIL WELD	WE		
EAVES HEIGHT	EH	WATER METER	WM		
ELECTRICITY MANHOLE	EM	WASHOUT	WO		
ELECTRICITY POLE	EP				
EARTH ROD	ER				
FINISHED FLOOR LEVEL	FFL				
FIRE HYDRANT	FH	SURVEY STATION	GCS1		
FOUL WATER	FW				
GULLY	GY				
GATE POST	GP	BUSHES			
GAS VALVE	GV				
INSULATED BLOCK JOINT	IBJ				
INSPECTION COVER	IC	HEDGES			
INVERT LEVEL	IL				
KERB OUTLET	KO				
LAMPPOST	LP				
LITTER BIN	LB	TREES	Height / Species / (Spread to scale)		
MARKER POST	MK				
MILE POST	MP				
POST	PO				
RODDING EYE	RE	GATE			
RIDGE HEIGHT	RH				
ROAD NAMEPLATE	RN				
ROAD SIGN	RS	SECURITY FENCE	x—x		
STUMP	SP	FENCE	—/—/—		
SOFFIT LEVEL	SF	OVERHEAD CABLES	OH—OH		
SIGNAL POST	SIG	FOUL WATER	FW—FW		
RAIL SLEEPER LEVEL	SLP	GAS MAIN	GM—GM		
SIGNALS AND TELECOMS BOX	STB	U/G POWER LINE	PL—PL		
SIGNALS AND TELECOMS CABLE	STC	STORM WATER	SW—SW		
SIGNALS AND TELECOMS POST	STP	U/G TELEPHONE	TEL—TEL		
SIGN POST	SN	WATER MAIN	WM—WM		
STOP TAP	ST				
STOP VALVE	SV				
STAY	SY				
STORM WATER	SW				

Control Table

Station	Description	Eastings	Northings	Height

Grid and Datum

Grid: ***OS National Grid*** **Datum:** ***Ordnance Datum Newlyn***

Survey related to Ordnance Survey National Grid (OSGB36) via GPS and the OS Active Network.
A National Grid (OSGB36) coordinate has been established on site via Transformation OSTN15 and Geoid Model OSGM15, a further OS coordinate was used to orientate the survey to Ordnance Grid.
No scale factor has been applied to the survey

Title:

WATERCOURSE SURVEY AT
River Granta
(Cross Sections)

Client:

JBA CONSULTING
The Library
St. Philip's Courtyard
Coleshill
Warwickshire B46 3AD

Grantham Coates Surveys Ltd

Land - Engineering - Building Surveyors

2 Arden Court, Arden Road, Alcester
Warwickshire, B49 6HN

Tel: 01789 764420

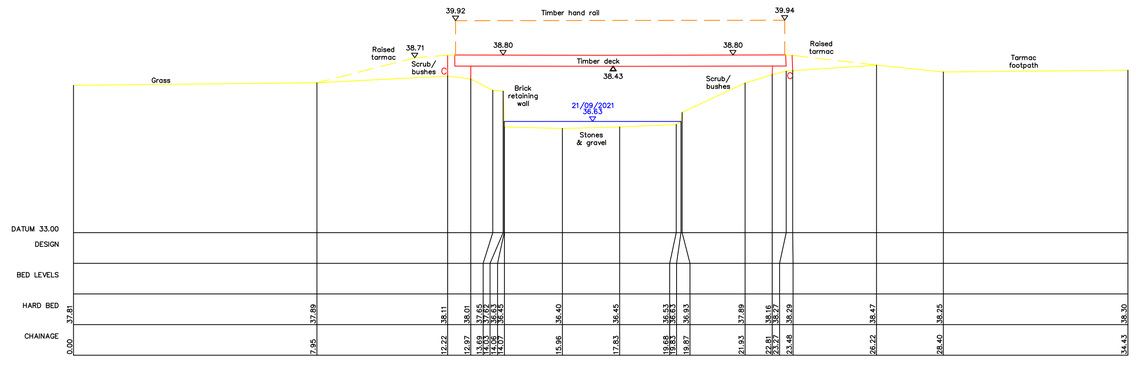
E-Mail: info@gcsurveys.co.uk
Web Site: www.gcsurveys.co.uk

Drawing No:	Rev:
GCS/JBA/1173/1	-

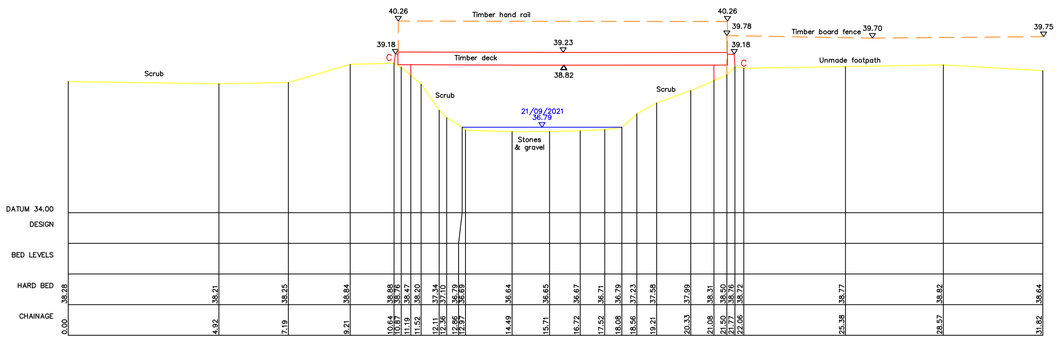
Date:	Notes:	Name:	Rev:

Drawn:	Checked:	Scale:	Date:
MC	JMG	1:100	24/09/21

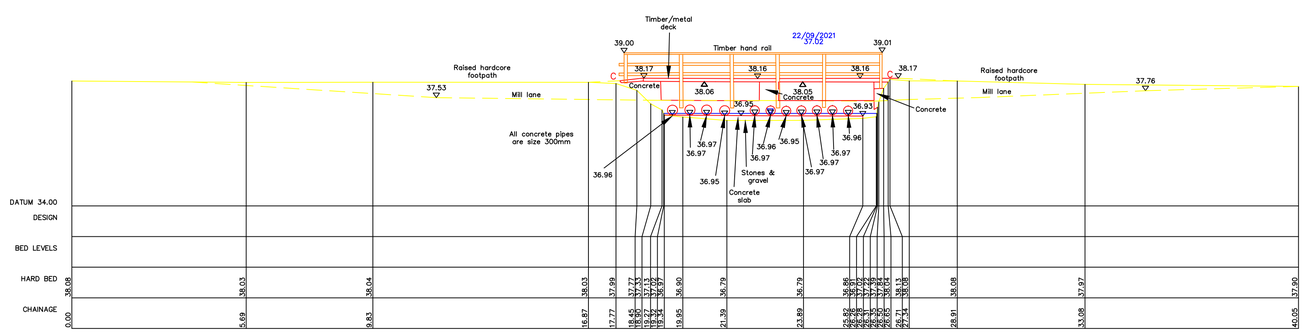
File Name:	Sheet size:	Sheet:
GCS-JBA-1173-1	A1	2 of 5



XS3
556189.97mE 246594.77mN Brg 13
Chainage 13806.3
Upstream face of footbridge. Bridge length 1.2m



XS4
556370.85mE 246563.07mN Brg 28
Chainage 14010.5
Upstream face of footbridge. Bridge length 1m



XS5
556469.78mE 246530.38mN Brg 324
Chainage 14105.6
Downstream face of Mill Lane Culvert/Ford. Structure length 5.6m

Notes

This survey should only be relied upon for its original purpose. Grantham Coates Surveys Limited accepts no responsibility for use of this plan outside of the original remit, or by use of any party other than the original client.

Whilst every effort has been made to identify all above ground details, it should be noted that some items may have been obscured at time of survey.

Below ground drainage information has been visually inspected from the surface and should therefore be treated as approximate only.

Where this survey has been carried out for the purpose of enabling trackside drainage design. The position of any running rail has been surveyed in line with a general topographic survey and should not be used for the purpose of track design.

All dimensions to be checked on site prior to design and construction.

Legend

AIR VALVE	AV	WATER TAP	TAP		
BOLLARD	BD	TEMPORARY BENCH MARK	TBM		
BORE HOLE	BHL	TELEPHONE CALL BOX	TCB		
BUS STOP	BS	TELEPHONE POST	TEL		
BT INSPECTION COVER	BT	THRESHOLD LEVEL	THL		
BT BOX	BTB	TRAFFIC LIGHT	TL		
CABLE TV INSPECTION COVER	CTV	TOP OF WALL	TOW		
COVER LEVEL	CL	TELEGRAPH POLE	TP		
DOWN PIPE	DP	UNABLE TO LIFT	UTL		
DROPPED KERB	DK	VENT PIPE	VP		
ELECTRICITY CONTROL BOX	ECB	RAIL WELD	WE		
EAVES HEIGHT	EH	WATER METER	WM		
ELECTRICITY MANHOLE	EM	WASHOUT	WO		
ELECTRICITY POLE	EP				
EARTH ROD	ER				
FINISHED FLOOR LEVEL	FFL				
FIRE HYDRANT	FH	SURVEY STATION	GCS1		
FOUL WATER	FW				
GULLY	GY				
GATE POST	GP	BUSHES			
GAS VALVE	GV				
INSULATED BLOCK JOINT	IBJ				
INSPECTION COVER	IC	HEDGES			
INVERT LEVEL	IL				
KERB OUTLET	KO				
LAMPPOST	LP				
LITTER BIN	LB	TREES	Height / Species (Spread to scale)		
MARKER POST	MK				
MILE POST	MP				
POST	PO				
RODDING EYE	RE	GATE			
RIDGE HEIGHT	RH				
ROAD NAMEPLATE	RN				
ROAD SIGN	RS	SECURITY FENCE	X X		
STUMP	SP	FENCE	/ /		
SOFFIT LEVEL	SF	OVERHEAD CABLES	OH OH		
SIGNAL POST	SIG	FOUL WATER	FW FW		
RAIL SLEEPER LEVEL	SLP	GAS MAIN	GM GM		
SIGNALS AND TELECOMS BOX	STB	U/G POWER LINE	PL PL		
SIGNALS AND TELECOMS CABLE	STC	STORM WATER	SW SW		
SIGNALS AND TELECOMS POST	STP	U/G TELEPHONE	TEL TEL		
SIGN POST	SN	WATER MAIN	WM WM		
STOP TAP	ST				
STOP VALVE	SV				
STAY	SY				
STORM WATER	SW				

Control Table

Station	Description	Eastings	Northings	Height

Grid and Datum

Grid: ***OS National Grid*** **Datum:** ***Ordnance Datum Newlyn***
Survey related to Ordnance Survey National Grid (OSGB36) via GPS and the OS Active Network.
A National Grid (OSGB36) coordinate has been established on site via Transformation OSTN15 and Geoid Model OSGM15, a further OS coordinate was used to orientate the survey to Ordnance Grid.
No scale factor has been applied to the survey

Title:
WATERCOURSE SURVEY AT
River Granta
(Cross Sections)

Client:
JBA CONSULTING
The Library
St. Philip's Courtyard
Coleshill
Warwickshire B46 3AD

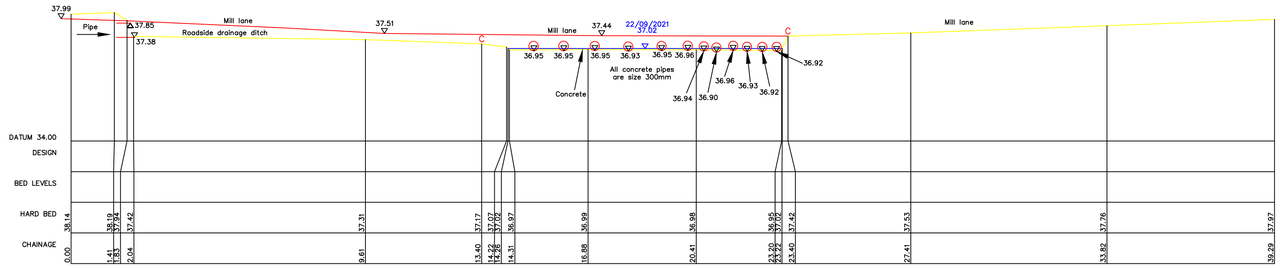
Grantham Coates Surveys Ltd
Land - Engineering - Building Surveyors
2 Arden Court, Arden Road, Alcester
Warwickshire, B49 6HN
Tel: 01789 764420
E-Mail: info@gcsurveys.co.uk
Web Site: www.gcsurveys.co.uk
THE SURVEY ASSOCIATION FULL MEMBER
chartered ices

Drawing No:	Rev:
GCS/JBA/1173/1	-

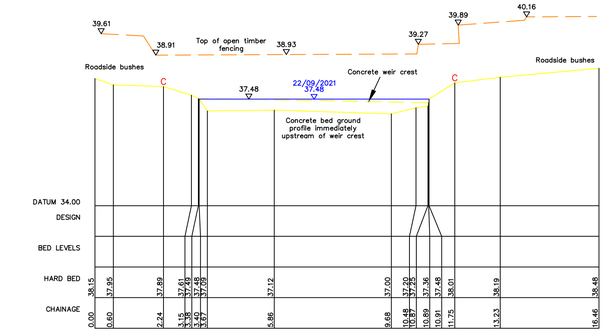
Date:	Notes:	Name:	Rev:

Drawn:	Checked:	Scale:	Date:
MC	JMG	1:100	24/09/21

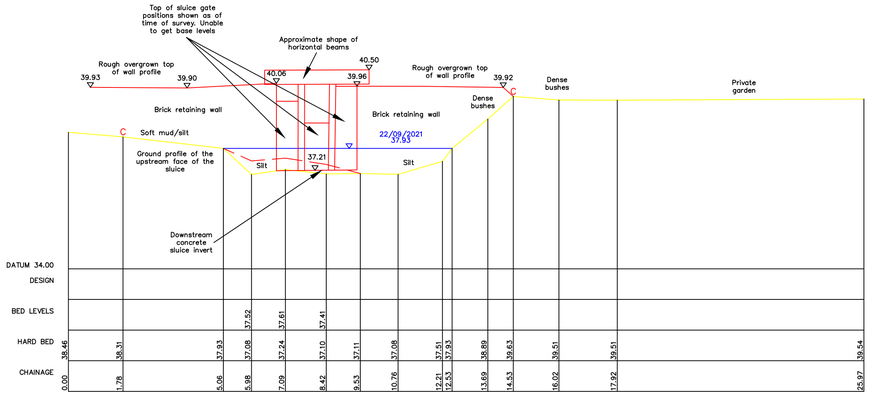
File Name:	Sheet size:	Sheet:
GCS-JBA-1173-1	A1	3 of 5



XS6
556473.22mE 246535.37mN Brg 324
Chainage 14111.1
Upstream face of Mill Lane Culvert/Ford. Structure length 5.6m



XS7
556467.51mE 246546.54mN Brg 322
Chainage 14112.7
Upstream face of weir



XS8
556489.45mE 246570.98mN Brg 305
Chainage 14143.3
Upstream face of sluice. Structure length 5.3m

Notes

This survey should only be relied upon for its original purpose. Grantham Coates Surveys Limited accepts no responsibility for use of this plan outside of the original remit, or by use of any party other than the original client.

Whilst every effort has been made to identify all above ground details, it should be noted that some items may have been obscured at time of survey.

Below ground drainage information has been visually inspected from the surface and should therefore be treated as approximate only.

Where this survey has been carried out for the purpose of enabling trackside drainage design. The position of any running rail has been surveyed in line with a general topographic survey and should not be used for the purpose of track design.

All dimensions to be checked on site prior to design and construction.

Legend

AIR VALVE	AV	WATER TAP	TAP		
BOLLARD	BD	TEMPORARY BENCH MARK	TBM		
BORE HOLE	BHL	TELEPHONE CALL BOX	TCB		
BUS STOP	BS	TELEPHONE POST	TEL		
BT INSPECTION COVER	BT	THRESHOLD LEVEL	THL		
BT BOX	BTB	TRAFFIC LIGHT	TL		
CABLE TV INSPECTION COVER	CTV	TOP OF WALL	TOW		
COVER LEVEL	CL	TELEGRAPH POLE	TP		
DOWN PIPE	DP	UNABLE TO LIFT	UTL		
DROPPED KERB	DK	VENT PIPE	VP		
ELECTRICITY CONTROL BOX	ECB	RAIL WELD	WE		
EAVES HEIGHT	EH	WATER METER	WM		
ELECTRICITY MANHOLE	EM	WASHOUT	WO		
ELECTRICITY POLE	EP				
EARTH ROD	ER				
FINISHED FLOOR LEVEL	FFL				
FIRE HYDRANT	FH	SURVEY STATION	GCS1		
FOUL WATER	FW				
GULLY	GY				
GATE POST	GP	BUSHES			
GAS VALVE	GV				
INSULATED BLOCK JOINT	IBJ				
INSPECTION COVER	IC	HEDGES			
INVERT LEVEL	IL				
KERB OUTLET	KO				
LAMPPOST	LP				
LITTER BIN	LB	TREES	Height / Species / (Spread to scale)		
MARKER POST	MK				
MILE POST	MP				
POST	PO				
RODDING EYE	RE	GATE			
RIDGE HEIGHT	RH				
ROAD NAMEPLATE	RN				
ROAD SIGN	RS	SECURITY FENCE	x—x—		
STUMP	SP	FENCE	—/—/—		
SOFFIT LEVEL	SF	OVERHEAD CABLES	OH—OH—		
SIGNAL POST	SIG	FOUL WATER	FW—FW—		
RAIL SLEEPER LEVEL	SLP	GAS MAIN	GM—GM—		
SIGNALS AND TELECOMS BOX	STB	U/G POWER LINE	PL—PL—		
SIGNALS AND TELECOMS CABLE	STC	STORM WATER	SW—SW—		
SIGNALS AND TELECOMS POST	STP	U/G TELEPHONE	TEL—TEL—		
SIGN POST	SN	WATER MAIN	WM—WM—		
STOP TAP	ST				
STOP VALVE	SV				
STAY	SY				
STORM WATER	SW				

Control Table

Station	Description	Eastings	Northings	Height

Grid and Datum

Grid: ***OS National Grid*** **Datum:** ***Ordnance Datum Newlyn***
Survey related to Ordnance Survey National Grid (OSGB36) via GPS and the OS Active Network.
A National Grid (OSGB36) coordinate has been established on site via Transformation OSTN15 and Geoid Model OSGM15, a further OS coordinate was used to orientate the survey to Ordnance Grid.
No scale factor has been applied to the survey

Title:
WATERCOURSE SURVEY AT
River Granta
(Cross Sections)

Client:
JBA CONSULTING
The Library
St. Philip's Courtyard
Coleshill
Warwickshire B46 3AD

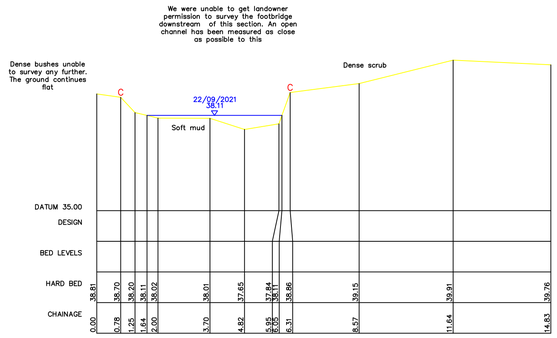
Grantham Coates Surveys Ltd
Land - Engineering - Building Surveyors
2 Arden Court, Arden Road, Alcester
Warwickshire, B49 6HN
Tel: 01789 764420
E-Mail: info@gcsurveys.co.uk
Web Site: www.gcsurveys.co.uk

Drawing No:	Rev:
GCS/JBA/1173/1	-

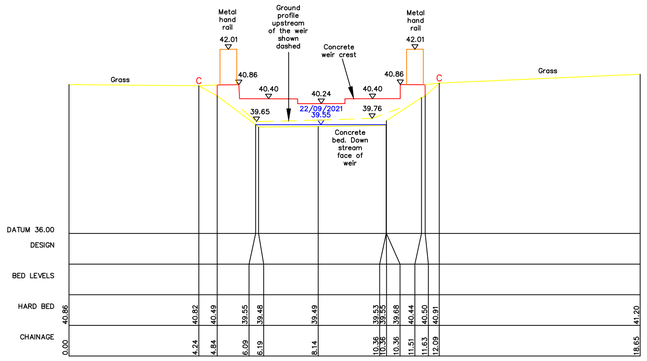
Date:	Notes:	Name:	Rev:

Drawn:	Checked:	Scale:	Date:
MC	JMG	1:100	24/09/21

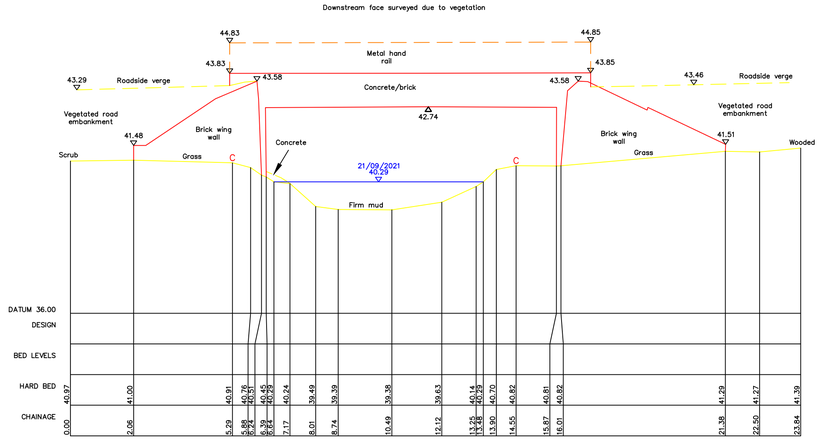
File Name:	Sheet size:	Sheet:
GCS-JBA-1173-1	A1	4 of 5



XS9
556652.76mE 246553.26mN Brg 48
Chainage 14331.8
Open Channel



XS10
557144.04mE 246352.07mN Brg 90
Chainage 15216.2
Downstream face of weir. Structure length 2.2m



XS11
557142.21mE 246338.9mN Brg 75
Chainage 15226.9
Downstream face A1307 Road Bridge. Bridge length 14.4m

Notes

This survey should only be relied upon for its original purpose. Grantham Coates Surveys Limited accepts no responsibility for use of this plan outside of the original remit, or by use of any party other than the original client.

Whilst every effort has been made to identify all above ground details, it should be noted that some items may have been obscured at time of survey.

Below ground drainage information has been visually inspected from the surface and should therefore be treated as approximate only.

Where this survey has been carried out for the purpose of enabling trackside drainage design. The position of any running rail has been surveyed in line with a general topographic survey and should not be used for the purpose of track design.

All dimensions to be checked on site prior to design and construction.

Legend

AIR VALVE	AV	WATER TAP	TAP		
BOLLARD	BD	TEMPORARY BENCH MARK	TBM		
BORE HOLE	BHL	TELEPHONE CALL BOX	TCB		
BUS STOP	BS	TELEPHONE POST	TEL		
BT INSPECTION COVER	BT	THRESHOLD LEVEL	THL		
BT BOX	BTB	TRAFFIC LIGHT	TL		
CABLE TV INSPECTION COVER	CTV	TOP OF WALL	TOW		
COVER LEVEL	CL	TELEGRAPH POLE	TP		
DOWN PIPE	DP	UNABLE TO LIFT	UTL		
DROPPED KERB	DK	VENT PIPE	VP		
ELECTRICITY CONTROL BOX	ECB	RAIL WELD	WE		
EAVES HEIGHT	EH	WATER METER	WM		
ELECTRICITY MANHOLE	EM	WASHOUT	WO		
ELECTRICITY POLE	EP				
EARTH ROD	ER				
FINISHED FLOOR LEVEL	FFL				
FIRE HYDRANT	FH	SURVEY STATION	GCS1		
FOUL WATER	FW				
GULLY	GY				
GATE POST	GP	BUSHES			
GAS VALVE	GV				
INSULATED BLOCK JOINT	IBJ				
INSPECTION COVER	IC	HEDGES			
INVERT LEVEL	IL				
KERB OUTLET	KO				
LAMPPOST	LP				
LITTER BIN	LB	TREES	Height / Species / (Spread to scale)		
MARKER POST	MK				
MILE POST	MP				
POST	PO				
RODDING EYE	RE	GATE			
RIDGE HEIGHT	RH				
ROAD NAMEPLATE	RN				
ROAD SIGN	RS	SECURITY FENCE	X—X		
STUMP	SP	FENCE	—/—/—		
SOFFIT LEVEL	SF	OVERHEAD CABLES	OH—OH		
SIGNAL POST	SIG	FOUL WATER	FW—FW		
RAIL SLEEPER LEVEL	SLP	GAS MAIN	GM—GM		
SIGNALS AND TELECOMS BOX	STB	U/G POWER LINE	PL—PL		
SIGNALS AND TELECOMS CABLE	STC	STORM WATER	SW—SW		
SIGNALS AND TELECOMS POST	STP	U/G TELEPHONE	TEL—TEL		
SIGN POST	SN	WATER MAIN	WM—WM		
STOP TAP	ST				
STOP VALVE	SV				
STAY	SY				
STORM WATER	SW				

Control Table

Station	Description	Eastings	Northings	Height

Grid and Datum

Grid: ***OS National Grid*** **Datum:** ***Ordnance Datum Newlyn***

Survey related to Ordnance Survey National Grid (OSGB36) via GPS and the OS Active Network.
A National Grid (OSGB36) coordinate has been established on site via Transformation OSTN15 and Geoid Model OSGM15, a further OS coordinate was used to orientate the survey to Ordnance Grid.
No scale factor has been applied to the survey

Title:

WATERCOURSE SURVEY AT River Granta (Cross Sections)

Client:

JBA CONSULTING
The Library
St. Philip's Courtyard
Coleshill
Warwickshire B46 3AD

Grantham Coates Surveys Ltd

Land - Engineering - Building Surveyors

2 Arden Court, Arden Road, Alcester
Warwickshire, B49 6HN

Tel: 01789 764420

E-Mail: info@gcsurveys.co.uk
Web Site: www.gcsurveys.co.uk

Drawing No:	Rev:
GCS/JBA/1173/1	-

Date:	Notes:	Name:	Rev:

Drawn:	Checked:	Scale:	Date:
MC	JMG	1:100	24/09/21

File Name:	Sheet size:	Sheet:
GCS-JBA-1173-1	A1	5 of 5

B Hydrological Assessment

Flood estimation report

Introduction

This report template is based on a supporting document to the Environment Agency's flood estimation guidelines (Version 5, 2015). It provides a record of the hydrological context, the method statement, the calculations and decisions made during flood estimation and the results.

Contents

Approval

	Name and qualifications	Date
Method statement prepared by:	Rhiannon Bryan BSc	
Method statement reviewed by:	Eva Kordomenidi BSc MSc CIWEM C.WEM CSci	
Calculations prepared by:	Rhiannon Bryan BSc	
Calculations reviewed by:	Eva Kordomenidi BSc MSc CIWEM C.WEM CSci	

Abbreviations

AM ..... Annual Maximum
AREA ..... Catchment area (km^2)
BFI ..... Base Flow Index
BFIHOST ..... Base Flow Index derived using the HOST soil classification
CFMP ..... Catchment Flood Management Plan
CPRE ..... Council for the Protection of Rural England
FARL ..... FEH index of flood attenuation due to reservoirs and lakes
FEH ..... Flood Estimation Handbook
FSR ..... Flood Studies Report
HOST ..... Hydrology of Soil Types
NRFA ..... National River Flow Archive
POT ..... Peaks Over a Threshold
QMED ..... Median Annual Flood (with return period 2 years)
ReFH ..... Revitalised Flood Hydrograph method
SAAR ..... Standard Average Annual Rainfall (mm)
SPR ..... Standard percentage runoff
SPRHOST ..... Standard percentage runoff derived using the HOST soil classification
Tp(0) ..... Time to peak of the instantaneous unit hydrograph
URBAN ..... Flood Studies Report index of fractional urban extent
URBEXT1990 ..... FEH index of fractional urban extent
URBEXT2000 ..... Revised index of urban extent, measured differently from URBEXT1990
WINFAP-FEH ..... Windows Frequency Analysis Package – used for FEH statistical method

1 Method statement

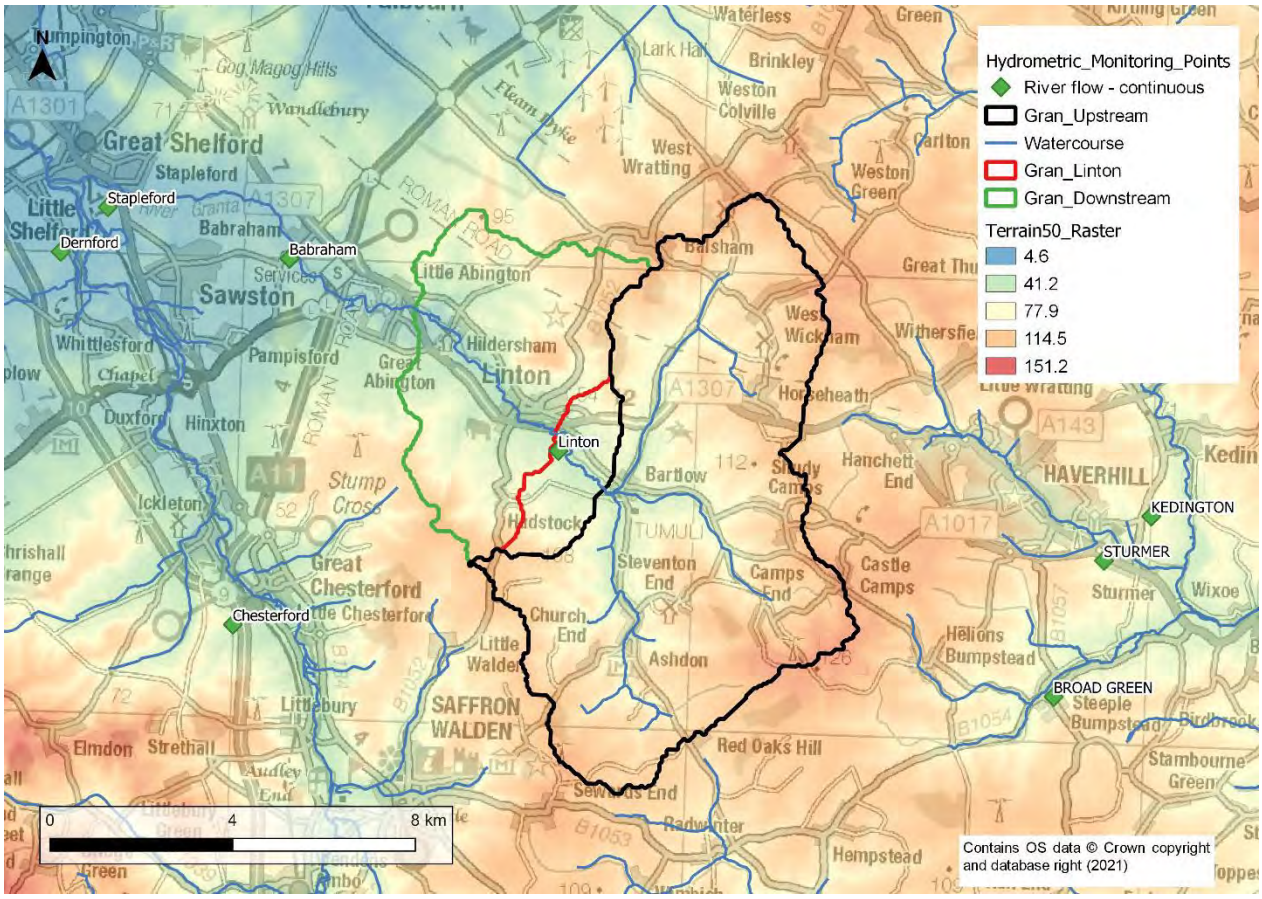
1.1 Requirements for flood estimates

Item	Comments
Overview • Purpose of study • Peak flows or hydrographs? • Range of return periods and locations	**Background:** The site at Cambridge Road, Linton in Cambridgeshire is a proposed site to be utilised for residential development. The site is located adjacent to the River Granta, a major tributary of the River Cam, and a large proportion of the site lies within Flood Zones 2 and 3. Current local policy is not to allow residential schemes within Flood Zone 2. The Environment Agency's Flood map at the site is informed by old historical flood maps pre-dating 2001. Detailed hydraulic modelling is therefore required to investigate the accuracy of the flood maps at the site and to determine how much of the site is suitable for residential development. The study will use the existing EA model (Cam Rural 2014) to investigate flood risk at the site. **Objectives:** This study seeks to provide a hydrological assessment to quantify flood risk from the River Granta, providing an update to the current model inflows derived in 2014. Peak flow estimates and hydrographs have been derived for the following annual exceedance probabilities (AEPs) at three Flood Estimation Points (FEP) – one to represent the inflow into the River Granta at the model upstream section, one at the model downstream boundary to act as a check flow point and one at the EA gauge Granta @ Linton to check the model flows are sensible: • 20-year flood event; • 100-year flood event; • 100-year plus climate change flood event; and • 1000-year flood event. Based on July 2021 EA climate change allowance guidance[1], The River Granta is located within the Anglian basin district and the Cam and Ely Ouse Management Catchment. For the '2080' scenario, the climate change uplift is 9%. Peak flows for the Higher Central allowance have also been provided (19%). Flow estimates and hydrographs derived from the hydrological analysis will subsequently be incorporated into an 1D-2D hydraulic model capable of simulating flood extents, levels and flows through time in relation to the site.

1 Environment Agency (2021). Guidance: Flood risk assessments: climate change allowances. [Source: https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#Select-the-peak-river-flow-allowances-to-use-for-your-assessment].

1.2 The catchment

Item	Comments
Map (Include river network, catchment boundary and gauging stations)	



Description Include topography, climate, geology, soils, land use and any unusual features that may affect the flood hydrology.	The Granta flows north west from its catchment headwaters to the confluence with the River Cam just south of Shelford. The river drains an area of approximately 85.8 km^2 at the downstream model extent. The catchment is underlain by the White Chalk Subgroup, with Lewes Nodular Chalk Formation And Seaford Chalk Formation in the upper catchment and New Pit Chalk Formation and Holywell Nodular Chalk Formation in the mid to lower catchment reaches[2]. The BFI Host value for the catchments increases downstream from 0.526 to 0.644 indicating increasing permeability with geology downstream. Soil types vary widely across the catchment including Lime-rich loamy and clayey soils with impeded drainage, Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils, Slightly acid loamy and clayey soils with impeded drainage, Freely draining lime-rich loamy soils and Freely draining slightly acid but base-rich soils[3]. The average FEH SPRHOST value across the catchments is 34%. The average PROPWET value across the study catchments is 0.26. Land use within the catchment is predominantly agricultural with some areas of grassland and woodland. The catchment is largely rural with an URBEXT2000 value of 0.009. Main settlements in the catchment include Bartlow and Linton.

[2] British Geological Society (2021). Geology of Britain viewer. [Source: https://www.bgs.ac.uk/map-viewers/geology-of-britain-viewer/].
3 British Geological Society (2021). UK Soil Observatory Map Viewer. [Source: mapapps2.bgs.ac.uk/ukso/home.html].

1.3 Source of flood peak data

Source Record any changes made	NRFA peak flows dataset, Version 10, August 2021. This contains additional water year for all active peak flow stations in the UK, up to the end of September 2020. It also includes period-of-record review of data and metadata for 94 stations in the UK.

1.4 Gauging stations

(at or very near to the sites of flood estimates)

Water-course	Station name	Gauging authority number	NRFA number	Catchment area (km²)	Type (rated / ultrasonic / level…)	Start of record and end if station closed
Granta	Linton		33066	62.24 km²	Rated	1981–Present
Granta	Babraham		33055	98.7 km²	Rated	1976 - Present

1.5 Data available at each flow gauging station in Table Error! Reference source not found.

Station name	Start and end of NRFA flood peak record	Update for this study?	OK for QMED?	OK for pooling?	Data quality check needed?	Other comments on station and flow data quality
Granta @ Linton	-	-	No	No	No	Structure drowns when u/s water level exceeds about 0.46m.
Granta @ Barbraham	1976-Present	-	Yes	No	No	Gauged to within 17% of QMED. Gaugings fit well to rating.
Tabulate any updated or revised flood peak series in the Annex. Give link/reference to any further data quality checks carried out.						

1.6 Other data available and how it has been obtained

Type of data	Data relevant to this study?	Data available ?	Source of data	Details
Check flow gaugings (if planned to review ratings)	No	No	-	No rating review within scope
Historic flood data Include chronology and interpretation of flood history in Annex or separate report.	Yes	Yes	-	No specific information for the site. Online research suggests that there has been flooding from the Granta at various locations in Linton. Includes events in 1947, 1968, 1974, 2001, 2009.
Flow or river level data for events	No	No	-	No flood event analysis in scope.
Rainfall data for events	No	No	-	No flood event analysis in scope.
Potential evaporation data	No	No	-	No flood event analysis in scope.
Results from previous studies	Yes	Yes	2021s6028 Appendix A FEH calculation	2014 model hydrology made available for this assessment
Other data or information (e.g. groundwater, tides, channel widths, low flow statistics)	-	-	-	-

1.7 Hydrological understanding of catchment

Outline the conceptual model, addressing questions such as: • Where are the main sites of interest? • What is likely to cause flooding at those locations? (peak flows, flood volumes, combinations of peaks, groundwater, snowmelt, tides…) • Might those locations flood from runoff generated on part of the catchment only, e.g. downstream of a reservoir? • Is there a need to consider temporary debris dams that could collapse?	The site of interest is located adjacent to the left bank of the River Granta off Cambridge Road and is currently a greenfield plot of land. The most likely cause of flooding in Linton is fluvial from peak flows on the Granta.
Any unusual catchment features to take into account? e.g. • highly permeable – avoid ReFH if BFIHOST>0.65, consider permeable catchment adjustment for statistical method if SPRHOST<20% • highly urbanised – seek local flow data; consider method that can account for differing sewer and topographic catchments • pumped watercourse – consider lowland catchment version of rainfall-runoff method • major reservoir influence (FARL<0.90) – consider flood routing, extensive floodplain storage – consider choice of method carefully	BFIHOST19 for the catchment is 0.644. While this value is below 0.65 it does indicate the catchment is relatively permeable and should be considered when selecting the appropriate methodology.

1.8 Initial choice of approach

Is FEH appropriate? (it may not be for extremely heavily urbanised or complex catchments) If not, describe other methods to be used.	Yes
Initial choice of method(s) and reasons How will hydrograph shapes be derived if needed? Will the catchment be split into sub-catchments? If so, how?	Peak flow estimates for ungauged inflows from the River Granta will be derived from application of FEH methods. ReFH2 methodology will be compared with FEH Statistical for estimating peak flows. The favoured peak flow estimates are provided alongside justification for their adoption in subsequent sections. Hydrographs for the model will be derived using the ReFH2 model. ReFH2 hydrographs will be scaled to the selected peak flow estimates chosen within this study. The intervening areas between flow estimation points at the upstream, and downstream model extents will be used to derive lateral flows which, although not natural catchments, are required to generate model inflows.
Software to be used (with version numbers)	FEH Web Service, ReFH2,[4], WINFAP-FEH v3[5].

[4] ReFH 2 Calibration Utility. © Wallingford HydroSolutions 2019

[5] WINFAP-FEH v3© Wallingford HydroSolutions Limited and NERC (CEH) 2018.

2 Locations where flood estimates required

The table below lists the locations of subject sites. The site codes listed below are used in all subsequent tables to save space.

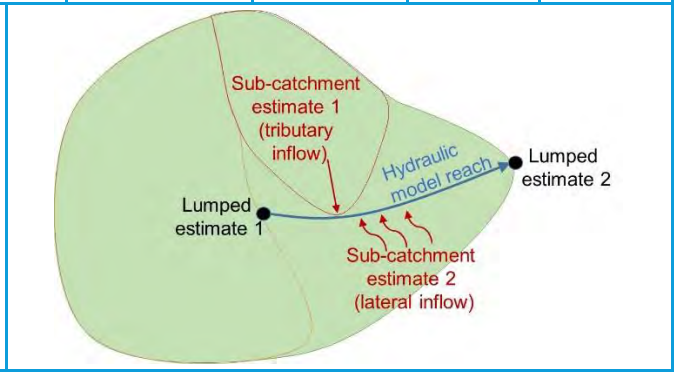
2.1 Summary of subject sites

Site code	Type of estimate L: lumped catchment S: Sub-catchment	Watercourse	Name or description of site	Easting	Northing	AREA on FEH CD-ROM (km^2)	Revised AREA if altered
GRAN_ Upstream	L	River Granta	River Granta at upstream model extent	558050	245200	57.03	-
GRAN_ Linton	L	River Granta	River Granta at the gauging station at Linton	556950	246400	62.24	-
GRAN_ Downstream	L	River Granta	River Granta at downstream model extent	553800	249000	85.82	-

Note: Lumped catchments (L) are complete catchments draining to points at which design flows are required.

Sub-catchments (S) are catchments or intervening areas that are being used as inputs to a semi-distributed model of the river system. There is no need to report any design flows for sub-catchments, as they are not relevant: the relevant result is the hydrograph that the sub-catchment is expected to contribute to a design flood event at a point further downstream in the river system. This will be recorded within the hydraulic model output files. However, catchment descriptors and ReFH model parameters should be recorded for sub-catchments so that the results can be reproduced.

The schematic diagram illustrates the distinction between lumped and sub-catchment estimates.



2.2 Important catchment descriptors at each subject site (incorporating any changes made)

Site code	FARL	PROPWET	BFIHOST	DPLBAR (km)	DPSBAR (m/km)	SAAR (mm)	URBEXT 2000	FPEXT
GRAN_ Upstream	1.000	0.26	0.526	5.27	35.7	589	0.007	0.047
GRAN_ Linton	1.000	0.26	0.555	6.95	35.9	589	0.008	0.047
GRAN_ Downstream	0.999	0.26	0.644	9.98	37.5	584	0.011	0.051

2.3 Checking catchment descriptors

Record how catchment boundary was checked and describe any changes (add maps if needed)	The catchment boundaries have been reviewed against Ordnance Survey mapping and 50m contours. Default catchment boundaries have been retained.
Record how other catchment descriptors were checked and describe any changes. Include before/after table if necessary.	A qualitative sense check was carried out for BFIHOST and FARL. Values were found consistent with top and BGS maps.
Source of URBEXT	URBEXT2000
Method for updating of URBEXT	CPRE formula from FEH Volume 4 / CPRE formula from 2006 CEH report on URBEXT2000

3 Statistical method

3.1 Overview of estimation of QMED at each subject site

Site code	QMED from CDs (m^3/s)	Final method	Data transfer						Final estimate of QMED (m^3/s)
			NRFA numbers for donor sites used (see 3.3)	Distance between centroids d_{ij} (km)	Power term, a	Moderated QMED adjustment factor, $(A/B)^a$	If more than one donor		
							Weight	Weighted ave. adjustment	
GRAN_ Upstream	4.6	DT	33055	2.667	0.587	0.898	1		4.1
GRAN_ Linton	4.5	DT	33055	2.453	0.605	0.895	1		4.0
GRAN_ Downstream	4.1	DT	33055	1.100	0.769	0.868	1		3.6
Are the values of QMED spatially consistent?						QMED decreases with distance downstream. However, whilst this is not normally expected, the Granta catchment does become more permeable with distance downstream. The subtle changes in catchment descriptors result in QMED values decreasing.			

Notes

Methods: AM – Annual maxima; POT – Peaks over threshold; DT – Data transfer (with urban adjustment); CD – Catchment descriptors alone (with urban adjustment); BCW – Catchment descriptors and bankfull channel width (add details); LF – Low flow statistics (add details).

When QMED is estimated from POT data, it should also be adjusted for climatic variation. Details should be added below.

The QMED adjustment factor A/B for each donor site is given in Table 3.2. This is moderated using the power term, a, which is a function of the distance between the centroids of the subject catchment and the donor catchment. The final estimate of QMED is $(A/B)^a$ times the initial estimate from catchment descriptors.

If more than one donor has been used, use multiple rows for the site and give the weights used in the averaging. Record the weighted average adjustment factor in the penultimate column.

Important note on urban adjustment

The method used to adjust QMED for urbanisation, for both subject sites and donor sites, is that published in Kjeldsen (2010)[6] in which PRUAF is calculated from BFIHOST. The result will differ from that of WINFAP-FEH v3.0.003 which does not correctly implement the urban adjustment of Kjeldsen (2010). Significant differences will occur only on urban catchments that are highly permeable.

[6] Kjeldsen, T. R. (2010). Modelling the impact of urbanization on flood frequency relationships in the UK. Hydrol. Res. **41**. 391-405.

3.2 Search for donor sites for QMED (if applicable)

Comment on potential donor sites	Whilst there are three gauging stations on the River Granta, only one is classed as suitable for QMED, 33055 (Babraham), which is located further downstream of the study area.
Mention: • Number of potential donor sites available • Distances from subject site • Similarity in terms of AREA, BFIHOST, FARL and other catchment descriptors • Quality of flood peak data Include a map if necessary. Note that donor catchments should usually be rural.	

Donor	33055
Area (km2)	98.7 km^2
BFIHOST	0.64
SAAR	579
FARL	1.00

3.3 Donor sites chosen and QMED adjustment factors

NRFA no.	Reasons for choosing	Method (AM or POT)	Adjust-ment for climatic variation?	QMED from flow data (A)	QMED from catchment descriptors (B)	Adjust-ment ratio (A/B)
33055	Within the same catchment	AM	No	4.76	3.96	0.832

3.4 Derivation of pooling groups

Several subject sites may use the same pooling group.

Name of group	Site code from whose descriptors group was derived	Subject site treated as gauged? (enhanced single site analysis)	Changes made to default pooling group, with reasons	Weighted average L-moments, L-CV and L-skew, (before urban adjustment)
Granta_ PG	GRAN_ Linton	No	Removed: • 20013- chalk catchment with high BFI Included: • 54036 - to increase station years.	L-CV 0.312, L-SKEW 0.144.
Notes Pooling groups were derived using the procedures from Science Report SC050050 (2008).				

3.5 Derivation of flood growth curves at subject sites

Site code	Method (SS, P, ESS, J)	If P, ESS or J, name of pooling group (Error! Reference source not found.)	Distribution used and reason for choice	Note any urban adjustment or permeable adjustment	Parameters of distribution (location, scale and shape after adjustments)	Growth factor for 100-year return period
GRAN_ Upstream	P	Granta_PG	GL	Urban adjustment – Kjeldsen (2010)	Location: 1 Scale: 0.326 Shape: -0.155	3.19
GRAN_ Linton						
GRAN_ Downstream						

Notes

Methods: SS – Single site; P – Pooled; ESS – Enhanced single site; J – Joint analysis

A pooling group (or ESS analysis) derived at one gauge can be applied to estimate growth curves at a number of ungauged sites. Each site may have a different urban adjustment, and therefore different growth curve parameters.

Urban adjustments are all carried out using the v3 method: Kjeldsen (2010). Growth curves were derived using the procedures from Science Report SC050050 (2008).

3.6 Flood estimates from the statistical method

Site code	Flood peak (m^3/s) for the following return periods (in years)				
	20 Year	100 Year	100 Year + 9% Climate change allowance Central	100 Year + 19% Climate change allowance Higher Central	1000 Year
GRAN_ Upstream	9.3	13.3	14.5	17.2	26.1
GRAN_ Linton	9.0	13.0	14.2	16.8	25.8
GRAN_ Downstream	8.1	11.7	12.8	15.2	23.6

Please note: to derive the 1000-year flood estimates the Q100 flows have been scaled by ratios for 1000-year flow over 100-year flow from the ReFH2 results. This is because the FEH statistical methods are not suitable for deriving flows greater than the 150-year flood.

4 Revitalised flood hydrograph 2 (ReFH2) method

4.1 Parameters for ReFH2 model (rural catchments)

Site code	Method OPT: Optimisation BR: Baseflow recession fitting CD: Catchment descriptors DT: Data transfer (give details)	Tp (hours) Time to peak	C_{max} (mm) Maximum storage capacity	BL (hours) Baseflow lag	BR Baseflow recharge
GRAN_ Upstream	CD	7.395	462.43	55.84	2.67
GRAN_ Linton	CD	8.648	498.61	61.27	2.34
GRAN_ Downstream	CD	10.49	628.3	72.60	2.25
Brief description of any flood event analysis carried out (further details should be given in the annex)		N/A			

4.2 Design events for ReFH2 method

Site code	Urban or rural	Season of design event (summer or winter)	Storm duration (hours)	Storm area for ARF (if not catchment area)	Source of design rainfall statistics (FEH99 or FEH13)
GRAN_ Upstream	Rural	Winter	11	n/a	FEH13
GRAN_ Linton	Rural	Winter	13	n/a	FEH13
GRAN_ Downstream	Rural	Winter	18	n/a	FEH13
Are the storm durations likely to be changed in the next stage of the study, e.g., by optimisation within a hydraulic model?				Estimates are based on critical duration for each catchment to compare against FEH Stat peaks. During modelling one representative storm duration is applied.	

4.3 Flood estimates from the ReFH2 method

Note: This table is for recording results for lumped catchments. There is no need to record peak flows from sub-catchments or intervening areas that are being used as inputs to a semi-distributed model of the river system.

Site code	Flood peak (m^3/s) for the following return periods (in years)				
	20 Year	100 Year	100 Year + 9% Climate change allowance Central	100 Year + 19% Climate change allowance Higher Central	1000 Year
GRAN_ Upstream	12.5	18.2	19.8	21.6	35.7
GRAN_ Linton	10.8	15.8	17.2	18.8	31.4
GRAN_ Downstream	4.2	13.4	14.6	16.0	27.1

5 Discussion and summary of results

4.4 Comparison of results from different methods

This table compares the peak flows derived from the FEH statistical method and ReFH2 method

Methodology	Site code	Flood peak (m^3/s) for the following return periods (in years)				
		20 Year	100 Year	100 Year + 9% Climate change allowance Central	100 Year + 19% Climate change allowance Higher Central	1000 Year
FEH statistical	GRAN_ Upstream	9.3	13.3	14.5	17.2	26.1
	GRAN_ Linton	9.0	13.0	14.2	16.8	25.8
	GRAN_ Downstream	8.1	11.7	12.8	15.2	23.6
REFH2	GRAN_ Upstream	12.5	18.2	19.8	21.6	35.7
	GRAN_ Linton	10.8	15.8	17.2	18.8	31.4
	GRAN_ Downstream	4.2	13.4	14.6	16.0	27.1

This table compares peak flows from various methods with those from the FEH Statistical method at example sites for two key return periods. Blank cells indicate that results for a particular site were not calculated using that method.

Site code	Ratio of peak flow to FEH Statistical peak	
	Return period 20 years	Return period 100 years
	ReFH2	ReFH2
GRAN_ Upstream	1.35	1.37
GRAN_ Linton	1.20	1.22
GRAN_ Downstream	0.52	1.15

4.5 Final choice of method

Choice of method and reasons Include reference to type of study, nature of catchment and type of data available.	Flows derived through the application of the ReFH2 model were compared with those derived from the FEH statistical method. Peak flows derived FEH statistical method are generally lower than those derived using ReFH2. Although the catchment includes a gauge, this is not suitable for high flow estimation. Therefore, the conservative approach has been taken to use ReFH2 peak flow estimates as inputs to the hydraulic model. It is intended that ReFH2 will be used to provide hydrograph shapes.
How will the flows be applied to a hydraulic model? If relevant. Will model inflows be adjusted to achieve a match with lumped flow estimates, or will the model be allowed to route inflows?	Peak flow estimates Gran_Upstream will be applied to the upstream model extent to represent an inflow into the model. Peak flow estimates decrease downstream due to catchment geology (i.e., the river loses water moving downstream) instead of replicating this in the model it is recommended that no lateral inflows be applied to the model to be conservative.

4.6 Assumptions, limitations and uncertainty

List the main assumptions made (specific to this study)	The main assumptions are: -The design peak flows derived are representative of those that would be observed during flood events; -The catchment boundaries and descriptors have been assumed to be representative; -The pooling group used is to derive peak flow estimates is representative of the subject catchment; and -Design hydrographs generated using the ReFH2 model are representative of those that would be observed during typical flood events.
Discuss any particular limitations, e.g. applying methods outside the range of catchment types or return periods for which they were developed.	Limitations are generic to the methods used.
Give what information you can on uncertainty in the results, e.g. confidence limits from Kjeldsen (2014).	No published methods of calculating confidence intervals exist for ReFH hydrological models; therefore, the uncertainty for each of these watercourses is difficult to quantify. The uncertainty will depend on many factors, for example, how unusual the study catchment is relative to the pooling group and donor catchment, and the uncertainty in flow measurement at other gauges. However, a UK average measure of uncertainty has been produced by Kjeldsen (2014). The 95% confidence limits for a 1% AEP flood estimate are: • Without donor adjustment of QMED: 0.42 – 2.37 times the best estimate • With donor adjustment of QMED: 0.45 – 2.25 times the best estimate A recently published R&D project into FEH, local data and uncertainty (Environment Agency funded consortium of JBA, CEH and others) established that the following range of a 95% confidence interval is to be expected per design flood for a rural site (numbers quoted are multipliers):

AEP	No donor	1 donor
50%	0.48 – 2.10	0.50 – 2.02

	1%	0.45 – 2.23	0.47 – 2.12
Comment on the suitability of the results for future studies, e.g. at nearby locations or for different purposes.	These flow estimates were derived specifically for this study. They should not be used elsewhere without at least being reviewed for suitability.		
Give any other comments on the study, e.g. suggestions for additional work.	Confidence could be improved through installation of hydrometric monitoring and event hydrometric data.		

4.7 Checks

Are the results consistent, for example at confluences?	N/a
What do the results imply regarding the return periods of floods during the period of record?	No data is available in regards to flood events applicable to the site.
What is the range of 100-year growth factors? Is this realistic?	The 1% AEP growth factor for each of the methods are: • FEH Statistical: 3.19 The typical range is 2.1 to 4.0 (based on FSR regional growth curves) therefore the 1% AEP growth factor for all FEP's are inside the typical range for both flow estimation methodologies.
If 1000-year flows have been derived, what is the range of ratios for 1000-year flow over 100-year flow?	The 0.1%/ 1% AEP event growth factor for each of the methods are: GRAN_ Upstream = 1.96 GRAN_ Linton = 1.98 GRAN_ Downstream = 2.01
How do the results compare with those of other studies? Explain any differences and conclude which results should be preferred.	The previous modelling study estimated a Q100 flow of 16.7 m^3/s at the upstream catchment boundary of the Granta Model. The difference between these estimates is due to the different methodology used to derive the flows (ReFH2 compared to FEH_ and also different catchment descriptors (new hydrology makes use of the new BFIHOST19 values). It is recommended the results from this study be carried forward as a conservative approach.
Are the results compatible with the longer-term flood history?	No flood history at the site
Describe any other checks on the results	-

4.8 Final results

Site code	Flood peak (m^3/s) for the following return periods (in years)				
	20 Year	100 Year	100 Year + 9% Climate change allowance Central	100 Year + 19% Climate change allowance Higher Central	1000 Year
GRAN_ Upstream	12.5	18.2	19.8	21.6	35.7
GRAN_ Linton	10.8	15.8	17.2	18.8	31.4
GRAN_ Downstream	4.2	13.4	14.6	16.0	27.1

If flood hydrographs are needed for the next stage of the study, where are they provided? (e.g. give filename of spreadsheet, hydraulic model, or reference to table below)	Design Hydrographs: \\COL-RDC01\Live Data\2021\Projects\2021s1203 - Travis Baker East Midlands Ltd - Land off Linton Rd Model\1_WIP\HO\Non_Graphical\ Gran_Upstream_Hydrographs_Final.xlsx

5 Annex A: Pooling Group Details

Initial Pooling Group

Station	Distance	Years of data	QMED AM	L-CV	L-SKEW	Discordancy
37016 (Pant @ Copford Hall)	0.247	55	7.47	0.287	0.104	0.171
38002 (Ash @ Mardock)	0.33	79	6.735	0.299	0.076	0.594
30004 (Lymn @ Partney Mill)	0.356	58	7.184	0.224	0.03	1.61
36004 (Chad Brook @ Long Melford)	0.356	53	4.938	0.304	0.167	0.291
36007 (Belchamp Brook @ Bardfield Bridge)	0.378	55	4.63	0.378	0.112	1.129
36003 (Box @ Polstead)	0.539	60	3.875	0.314	0.088	0.209
20006 (Biel Water @ Belton House)	0.569	28	11.748	0.375	0.128	1.061
20007 (Gifford Water @ Lennoxlove)	0.581	46	16.895	0.319	0.188	0.059
39033 (Winterbourne Stream @ Bagnor)	0.605	58	0.401	0.342	0.383	2.414
26013 (Driffield Trout Stream @ Driffield)	0.635	10	2.685	0.292	0.281	2.463

Final Pooling Group

Station	Distance	Years of data	QMED AM	L-CV	L-SKEW	Discordancy
37016 (Pant @ Copford Hall)	0.247	55	7.47	0.287	0.104	0.219
38002 (Ash @ Mardock)	0.33	79	6.735	0.299	0.076	1.661
30004 (Lymn @ Partney Mill)	0.356	58	7.184	0.224	0.03	2.058
36004 (Chad Brook @ Long Melford)	0.356	53	4.938	0.304	0.167	0.289
36007 (Belchamp Brook @ Bardfield Bridge)	0.378	55	4.63	0.378	0.112	1.123
36003 (Box @ Polstead)	0.539	60	3.875	0.314	0.088	0.35
20006 (Biel Water @ Belton House)	0.569	28	11.748	0.375	0.128	1.191
20007 (Gifford Water @ Lennoxlove)	0.581	46	16.895	0.319	0.188	0.725
39033 (Winterbourne Stream @ Bagnor)	0.605	58	0.401	0.342	0.383	1.537
54036 (Isbourne @ Hinton on the Green)	0.699	48	13.578	0.329	0.324	0.847

Offices at

Coleshill
Doncaster
Dublin
Edinburgh
Exeter
Haywards Heath
Limerick
Newcastle upon Tyne
Newport
Saltaire
Skipton
Tadcaster
Thirsk
Wallingford
Warrington

Registered Office
South Barn
Broughton Hall
SKIPTON
North Yorkshire
BD23 3AE

t:+44(0)1756 799919
e:info@jbaconsulting.com

Jeremy Benn Associates Ltd
Registered in England
3246693

Visit our website
www.jbaconsulting.com

Offices at

Coleshill
Doncaster
Dublin
Edinburgh
Exeter
Haywards Heath
Isle of Man
Limerick
Newcastle upon Tyne
Newport
Peterborough
Saltaire
Skipton
Tadcaster
Thirsk
Wallingford
Warrington

Registered Office
1 Broughton Park
Old Lane North
Broughton
SKIPTON
North Yorkshire
BD23 3FD
United Kingdom

+44(0)1756 799919
info@jbaconsulting.com
www.jbaconsulting.com
Follow us:

Jeremy Benn Associates Limited

Registered in England 3246693

JBA Group Ltd is certified to:
ISO 9001:2015
ISO 14001:2015
ISO 27001:2013
ISO 45001:2018

Appendix 7: Noise Technical Note

Technical Note

Project:	**Cambridge Road, Linton**
Client:	**Taylor Wimpey UK Ltd**
Subject:	**Scoping / Noise Input to Vision Document**
Prepared:	**Jonathan Mart**
Date:	**30 November 2021**
Reference:	**2060666-RSKA-TN-001** **Revision:** **1** **Approved:** **Federico Gottardo**

1 Introduction

1.1 RSK Acoustics has been instructed by Taylor Wimpey UK Ltd to carry out an initial desktop appraisal of their proposed development site off Cambridge Road, Linton. The outcomes of this appraisal (from a noise perspective) are likely to feed into the 'Vision Document' for the site, to be prepared by Taylor Wimpey UK Ltd.

1.2 The area of proposed development is situated on the outskirts of Linton village, approximately 16 kilometres to the south-east of Cambridge city centre. The site is situated in the south portion of the village, in a predominantly residential area which extends towards the north and west, followed by open land adjoining the east and south of the site.

1.3 Based on the location of the proposed development site, the likely sources of noise impacting the site are limited to road traffic along the A1307 Cambridge Road (south of the site) and to a lesser extent, Mill Lane (east of the site). Given the existing distance from The Grip industrial estate (light industrial and warehouses), situated approximately 400 metres to the south-west of the site, it is unlikely that industrial noise would significantly impact future residents. Similarly, noise arising from the petrol station facilities (e.g. car wash) situated opposite the site on A1307 would be of occasional use and therefore not acoustically relevant in the context of the local noise environment.

1.4 A red line boundary provided by Taylor Wimpey UK Ltd is reproduced (and annotated) below:

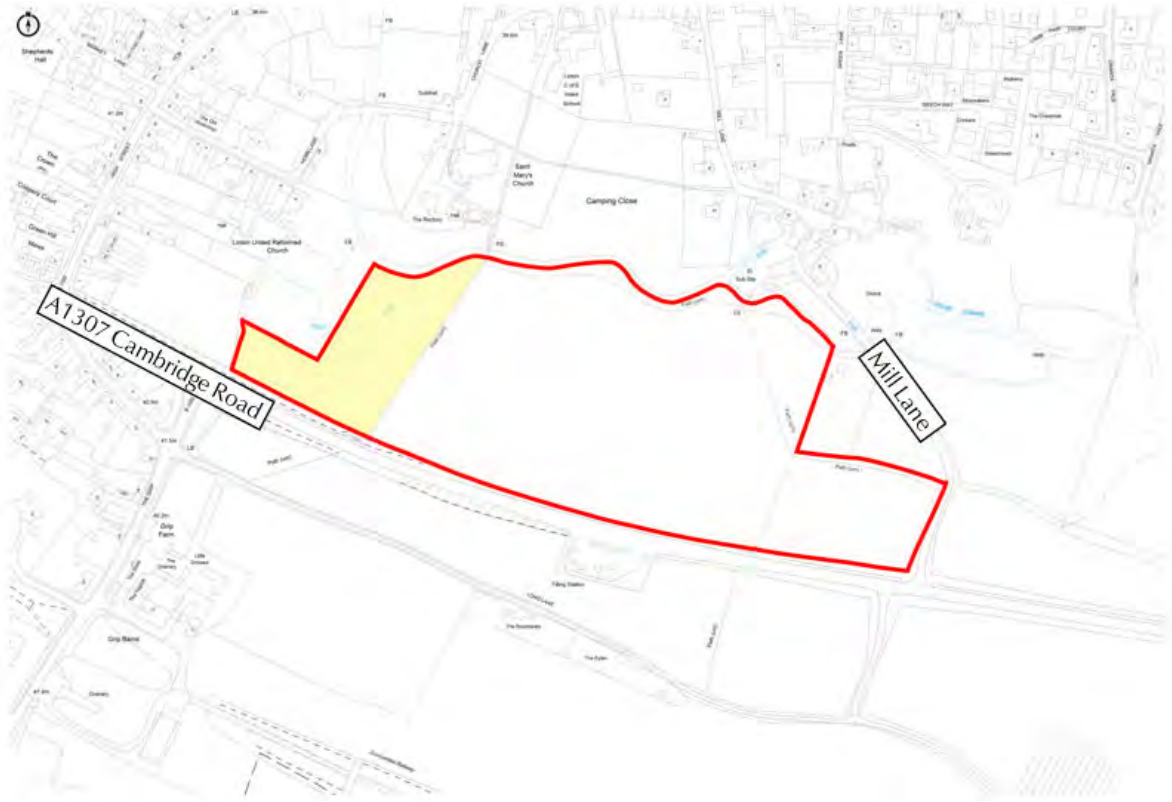


Figure 1.1 – Proposed red line boundary (extracted from Taylor Wimpey UK Ltd drawing)

1.5 This desktop appraisal would take into account the following sources of online information:

- Extrium – Defra strategic noise maps, associated with road and rail activity - http://extrium.co.uk/noiseviewer.html

2 Relevant Design Target Criteria

2.1 Based on the appropriate guidance, and subject to confirmation with the Environmental Health department at South Cambridgeshire District Council, the following noise design targets would apply:

Activity	Location	07:00 to 23:00	23:00 to 07:00	Source
Resting	Living room	35 dB $L_{Aeq,16h}$	30 dB $L_{Aeq,8h}$	BS 8233: 2014
Dining	Dining room/area	40 dB $L_{Aeq,16h}$	---	BS 8233: 2014
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16h}$	30 dB $L_{Aeq,8h}$	BS 8233: 2014
Outdoor Living Area	Serious annoyance, daytime and evening	55 dB $L_{Aeq,16h}$	---	BS 8233: 2014
	Moderate annoyance, daytime and evening	50 dB $L_{Aeq,16h}$	---	BS 8233: 2014
Inside bedrooms	Sleep disturbance, night-time	---	30 dB $L_{Aeq,8h}$ 45 dB L_{AFmax} [(a)]	WHO, 1999 ProPG, 2017

[(a)] *Should not exceed 45 dB L_{AFmax} more than 10-15 times a night*

Table 2.1 – Proposed assessment criteria

2.2 A full appraisal of the regulatory framework and appropriate British and International guidance documents would be provided in the final technical report submission.

3 Likely Baseline Noise Environment

3.1 The likely baseline noise environment would be the result of transportation sources, primarily the A1307 Cambridge Road. Utilising those online sources discussed in Section 1, the likely existing steady-state external noise on the proposed development site at positions north, central and south, are detailed in Table 3.1 below:

Position	Likely Daytime Noise Level, dB $L_{Aeq, 16hr}$	Likely Night-time Noise Level, dB $L_{Aeq, 8hr}$
South	65 – 70	60 – 65
Central	60 – 65	55 – 60
North	55 - 60	50 - 55

Table 3.1 – Likely baseline noise environment

3.2 It should be noted that the above indicative noise levels quoted utilise freely available online sources and should not be used as a definitive guide of noise levels (daytime and night) within the proposed development site. Furthermore, the noise levels included in Table 3.1 do not account for maximum noise level (L_{max}) events, which are likely to be significant as a result of

frequent vehicle pass-bys along the A1307 Cambridge Road. The assessment of maximum noise levels would be required to be included in the final assessment report.

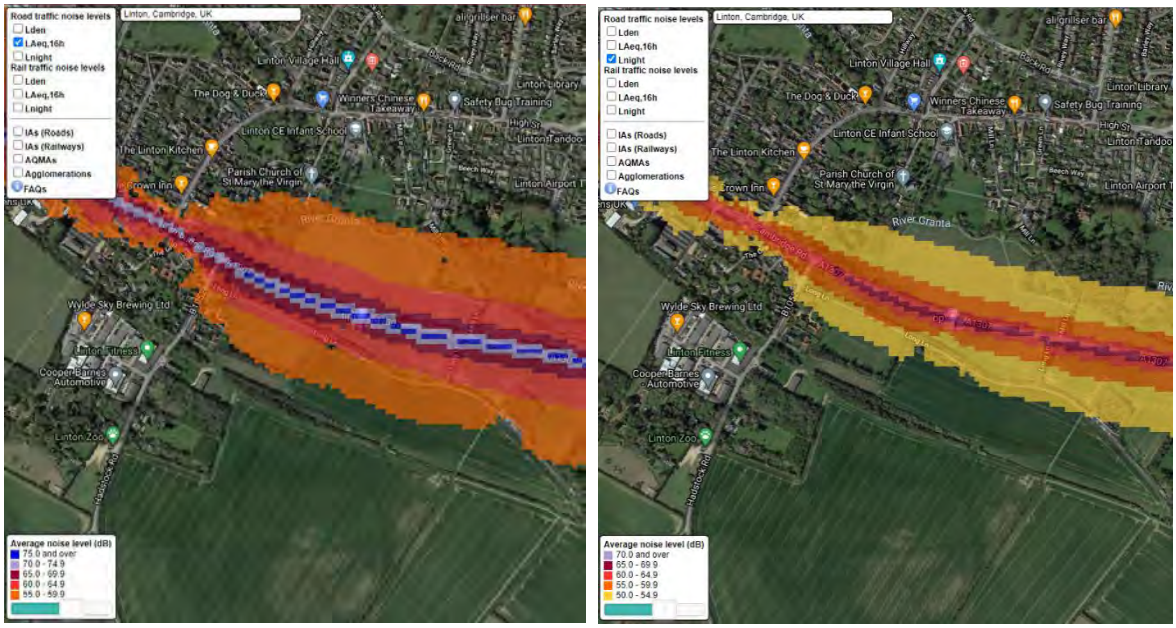


Figure 3.1 – Daytime and night-time noise contours extracted from Extrium website (http://extrium.co.uk/noiseviewer.html)

4 Potential Mitigation Options

4.1 The Professional Practice Guidance (ProPG) encourages the use of acoustic design as a means to inform the site masterplans and is key to avoiding or reducing to a minimum any adverse effects on any sensitive internal or external amenity spaces. Consideration should be given by the developer to the management of noise through a hierarchy of potential mitigation measures which may include:

- Maximising the separation distance between source and receiver;
- Incorporate noise barriers (where applicable) to screen the development site (or individual plots) from significant sources of noise;
- Use existing features to reduce noise propagation across the site;
- Orientate the buildings in a manner which reduces the noise levels within habitable rooms (particularly bedrooms);
- Building envelope design to mitigate the noise to acceptable levels, whilst providing adequate ventilation.

Internal Noise

4.2 To ensure an appropriate internal acoustic standard within residential properties during normal conditions (non-overheating), the likely level of mitigation afforded by the building envelope (based on simple level difference, in dB) to ensure the design targets within relevant guidance/legislation (i.e. BS 8233: 2014 and WHO, 1999) are achieved, would likely be in the order of 35 dB(A) towards the south of the site, reducing to 25 dB(A) for those building plots positioned to the north of the site. This level of noise reduction does not account for the impact of maximum noise levels at night.

4.3 It is likely that those facades facing the A1307 Cambridge Road would be required to close their windows to ensure suitable internal noise levels are met. Appropriate glazing specifications should be accompanied by trickle ventilators and where necessary, by additional forms of comfort cooling should the risk of overheating be deemed as high (in line with Acoustics Ventilation and Overheating Guidance, 2020).

External Noise

4.4 It is likely, based on guidance within BS 8233: 2014, that external noise levels in garden amenity areas would be required to achieve as a minimum, the upper design target of 55 dB $L_{Aeq,16hr}$. The development site has the potential to exceed this design target however, this does not account for actual measured baseline noise levels within the development site or inclusion of potential boundary treatments such as noise barriers/fencing.

4.5 It is recommended that the principals of good acoustic design (in ProPG) be taken into account as part of the ongoing design of the site. A practical solution would be to position garden amenity areas away from the primary noise source (the A1307) in order for the building to act as a barrier between the road and garden area.

5 Appraisal and Recommendations

5.1 A desktop appraisal, using online sources concerning the potential noise environment on land off Cambridge Road, Linton has been undertaken. The appraisal includes the likely ambient noise levels across the development site based on declared noise emissions available online from the adjacent transport infrastructure.

5.2 An assessment of the likely noise levels against the appropriate standards has been provided along with guidance on good acoustic design in accordance with ProPG. Development plots towards the southern portion of the site would be subject to the highest levels of mitigation, both to the design of the building façade and external boundaries. Based on the use of those previously discussed online sources and relevant design target criteria, façade treatments may need to provide in the order of 35 dB(A) reduction.

5.3 The orientation of the building plots to reduce levels within garden amenity areas has been discussed; it is recommended that the development incorporate those principles of good acoustic design included within this document.

5.4 Mitigation measures and recommendations contained within this technical note are subject to confirmation through a comprehensive baseline noise survey and final assessment of the proposals.

End of Section

Appendix 8: Air Quality Feasibility Assessment

Taylor Wimpey Strategic Land

Linton, South Cambridgeshire

Air Quality Feasibility Assessment

Report No. 444621-01 (00)

DECEMBER 2020

RSK GENERAL NOTES

Project No.: 444621-01 (00)

Title: Air Quality Feasibility Assessment

Client: Taylor Wimpey Strategic Land

Date: 6th December 2021

Office: Hemel Hempstead

Status: Draft for client comments

Author	MacKenzie Russell Air Quality Consultant	**Technical reviewer**	Erin Zhang Senior Air Quality Consultant
Signature	[redacted]	Signature	[redacted]
Date:	6th December 2021	Date:	6th December 2021

Abbreviations

AADT	Annual Average Daily Traffic
ADMS-Roads	Atmospheric Dispersion Modelling System – Roads (a dispersion modelling software application)
AQAP	Air Quality Action Plan
AQMA	Air Quality Management Area
AQO	Air Quality Objective
AQS	Air Quality Standard
ASR	Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMP	Dust Management Plan
EC	European Commission
EPUK	Environmental Protection UK
EU	European Union
HDV	Heavy Duty Vehicle
IAQM	Institute of Air Quality Management
LAQM	Local Air Quality Management
LAQM TG.16	Local Air Quality Management Technical Guidance (2016)
LDV	Light Duty Vehicle
NPPF	National Planning Policy Framework
NO_2	Nitrogen dioxide
NO_x	Oxides of nitrogen
$PM_{2.5}$	Particulate matter of size fraction approximating to <2.5mm diameter
PM_{10}	Particulate matter of size fraction approximating to <10mm diameter
RSK	RSK Environment Limited
SPG	Supplementary Planning Guidance
TG	Technical Guidance
UK-AIR	UK Atmospheric Information Resource
SCDC	South Cambridgeshire District Council

Contents

1 INTRODUCTION

1.1 Background

RSK Environment Ltd (RSK) was commissioned to undertake an air quality feasibility study of the proposed residential development comprising 85 units at land off the A1307 in Linton, South Cambridgeshire. **Figure 1-1** shows the location and redline boundary of the proposed development site. The application site lies within the jurisdiction of South Cambridgeshire District Council (SCDC).

This report presents the findings of a desk-based review of the existing baseline air quality conditions in the local area and consideration of potential air quality impacts or constraints during the construction and operational phase of the proposed development.

Figure 1-1: Proposed Development Site Location Plan

2 LEGISLATION, PLANNING POLICY & GUIDANCE

2.1 Key Legislation

2.1.1 Air Quality Strategy

UK air quality policy is published under the umbrella of the Environment Act 1995, Part IV and specifically Section 80, the National Air Quality Strategy. The latest *Air Quality Strategy for England, Scotland, Wales and Northern Ireland – Working Together for Clean Air*, published in July 2007 sets air quality standards and objectives for ten key air pollutants to be achieved between 2003 and 2020.

The EU Air Quality Framework Directive (1996) established a framework under which the EU could set limit or target values for specified pollutants. The directive identified several pollutants for which limit or target values have been, or will be set in subsequent 'daughter directives'. The framework and daughter directives were consolidated by Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe, which retains the existing air quality standards and introduces new objectives for fine particulates ($PM_{2.5}$).

2.1.2 Air Quality Standards

The air quality standards (AQSs) in the United Kingdom are derived from EC directives and are adopted into English law via the Air Quality (England) Regulations 2000 and Air Quality (England) Amendment Regulations 2002. The Air Quality Limit Values Regulations 2003 and subsequent amendments implement the Air Quality Framework Directive into English Law. Directive 2008/50/EC was translated into UK law in 2010 via the Air Quality Standards Regulations 2010.

The relevant[1] standards for England and Wales to protect human health are summarised in **Table 2-1**.

Table 2-1: Air Quality Standards Relevant to the Proposed Development

Substance	Averaging period	Exceedances allowed per year	Ground level concentration limit (µg/m^3)
Nitrogen dioxide (NO_2)	1 calendar year	-	40
	1 hour	18	200
Fine particles (PM_{10})	1 calendar year	-	40
	24 hours	35	50
Fine particles ($PM_{2.5}$)	1 year	-	25

[1] Relevance, in this case, is defined by the scope of the assessment.

2.1.1 The Environment Act

These objectives are to be used in the review and assessment of air quality by local authorities under Section 82 of the Environment Act (1995). If exceedances are measured or predicted through the review and assessment process, the local authority must declare an Air Quality Management Area (AQMA) under Section 83 of the act, and produce an Air Quality Action Plan (AQAP) to outline how air quality is to be improved.

On the 10th of November 2021, the new Environment Act (2021) passed royal assent, which amends the Environment Act (1995) to reinforce the local air quality management (LAQM) framework in order to encourage cooperation at the local level and broaden the range of organisations that play a role in improving local air quality.

2.2 Planning Policy

The land use planning process is a key means of improving air quality, particularly in the long term, through the strategic location and design of new developments. Any air quality concern that relates to land use and its development can, depending on the details of the proposed development, be a material consideration in the determination of planning applications.

2.2.1 National Planning Policy Framework

In July 2021, the revised National Planning Policy Framework (NPPF) was published, superseding the previous 2012 NPPF (revised in July 2018 and updated in February 2019) with immediate effect. The revised NPPF aims to "place greater emphasis on beauty, place-making, the environment, sustainable development and underlines the importance of local design codes."

Section 15 of the NPPF deals with Conserving and Enhancing the Natural Environment, and states that the intention is that the planning system should prevent '*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*' and goes on to state that '*new development* [should be] *appropriate for its location' and 'the effects (including cumulative effects) of pollution on health, the natural environment or general amenity, and the potential sensitivity of the area or proposed development to adverse effects from pollution, should be taken into account*.'

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

2.2.2 Local Planning Policy

South Cambridgeshire Local Plan

Policy SC/12: *Air Quality* of the SCDC's Local Plan states that:

"1. Where development proposals would be subject to unacceptable air quality standards or would have an unacceptable impact on air quality standards they will be refused.

2. Where emissions from the proposed development are prescribed by EU limit values or national objectives, the applicant will need to assess the impact on local air quality by undertaking an appropriate air quality assessment and detailed modelling exercise having regard to guidance current at the time of the application to show that the national objectives will still be achieved.

3. Development will not be permitted where it would adversely affect air quality in an Air Quality Management Area (AQMA); or lead to the declaration of a new AQMA through causing a significant deterioration in local air quality by increasing pollutant levels either directly or indirectly; or if it would expose future occupiers to unacceptable pollutant levels.

4. Larger development proposals that require a Transport Assessment and a Travel Plan as set out in Policy TI/2 will be required to produce a site based Low Emission Strategy. This will be a condition of any planning permission given for any proposed development which may result in the deterioration of local air quality and will be required to ensure the implementation of suitable mitigation measures.

5. Development will be permitted where:

a. It can be demonstrated that it does not lead to significant adverse effects on health, the environment or amenity from emissions to air; or

b. Where a development is a sensitive end use, that there will not be any significant adverse effects on health, the environment or amenity arising from existing poor air quality.

6. Specifically applicants must demonstrate that:

c. There is no adverse effect on air quality in an Air Quality Management Area (AQMA) from the development;

d. Pollution levels within the AQMA will not have a significant adverse effect on the proposed use / users;

e. The development will not lead to the declaration of a new AQMA;

f. The development will not interfere with the implementation of and should be consistent with the current Air Quality Action Plan;

g. The development will not lead to an increase in emissions, degradation of air quality or increase in exposure to pollutants at or above the health based air quality objective;

h. Any impacts on the proposed use from existing poor air quality, are appropriately mitigated;

i. The development promotes sustainable transport measures and use of low emission vehicles in order to reduce the air quality impacts of vehicles.

7. Applicants shall, where appropriate, prepare and submit with their application, a relevant assessment, taking into account guidance current at the time of the application."

Furthermore, Policy TI/2: *Planning for Sustainable Travel* of the SCDCs Local Plan states that:

"1. Development must be located and designed to reduce the need to travel, particularly by car, and promote sustainable travel appropriate to its location.

2. Planning permission will only be granted for development likely to give rise to increased travel demands, where the site has (or will attain) sufficient integration and accessibility by walking, cycling or public and community transport, including:

a. Provision of safe, direct routes within permeable layouts that facilitate and encourage short distance trips by walking and cycling between home and nearby centres of attraction, and to bus stops or railway stations, to provide real travel choice for some or all of the journey, in accordance with Policy HQ/1;

b. Provision of new cycle and walking routes that connect to existing networks, including the wider Rights of Way network, to strengthen connections between villages, Northstowe, Cambridge, market towns, and the wider countryside;

c. Protection and improvement of existing cycle and walking routes, including the Rights of Way network, to ensure the effectiveness and amenity of these routes is maintained, including through maintenance, crossings, signposting and waymarking, and, where appropriate, widening and lighting;

d. Provision of secure, accessible and convenient cycle parking in accordance with Policy TI/3;

e. Securing appropriate improvements to public and community transport (including infrastructure requirements) in accordance with the aims of the Cambridgeshire Local Transport Plan and South Cambridgeshire Community Transport Strategy.

3. Developers will be required to demonstrate they will make adequate provision to mitigate the likely impacts (including cumulative impacts) of their proposal including environmental impacts (such as noise and pollution) and impact on amenity and health. This will be achieved through direct improvements and Section 106 contributions and/or the Community Infrastructure Levy (CIL), to address transport infrastructure in the wider area including across the district boundary.

4. Developers of 'larger developments'[1] or where a proposal is likely to have 'significant transport implications'[2] will be required to demonstrate they have maximised opportunities for sustainable travel and will make adequate provision to mitigate the likely impacts through provision of a Transport Assessment and Travel Plan. All other developments will be required to submit a Transport Statement. Where a Transport Assessment / Statement or Travel Plan is required, a Low Emissions Strategy Statement should be integrated.

5. Travel Plans must have measurable outputs, be related to the aims and objectives in the Local Transport Plan and provide monitoring and enforcement arrangements. Planning obligations may be an appropriate means of securing the provision of some or all of a Travel Plan, including the requirement for an annual monitoring and progress report. Submission of area-wide Travel Plans will be considered in appropriate situations. Outline planning applications are required to submit a framework for the preparation of a Travel Plan.

[1] Larger development includes proposals of over 20 dwellings or 0.5 hectares for residential development and over 1,000m2 or 1 hectares for other development.

[2] Developments with 'significant transport implications' are those:

- *In particularly congested locations and/or generating larger numbers of trips;*

- *Where there are particular local travel problems;*
- *That will have an adverse impact on an existing, or will result in the declaration of new, Air Quality Management Area or an unacceptable adverse impact on local air quality."*

2.3 Best Practice Guidance Documents

2.3.1 Guidance on the Assessment of Dust from Demolition and Construction

The Institute of Air Quality Management (IAQM) published a guidance document in 2014 (Holman *et al*., 2014) on the assessment of construction phase impacts. The guidance was produced to provide advice to developers, consultants and environmental health officers on how to assess the impacts arising from construction activities. The emphasis of the methodology is on classifying sites according to the risk of impacts (in terms of dust nuisance, PM_{10} impacts on public exposure and impact upon sensitive ecological receptors) and to identify mitigation measure appropriate to the level of risk identified.

2.3.2 Local Air Quality Management Review and Assessment Technical Guidance

The Department for Environment, Food and Rural Affairs (Defra) has published technical guidance for use by local authorities in their air quality review and assessment work. This guidance, referred to in this document as the Local Air Quality Management Technical Guidance (Defra, 2016) ('LAQM TG.16')

2.3.3 Land-Use Planning & Development Control: Planning for Air Quality

Environmental Protection UK's (EPUK) and the IAQM jointly published a revised version of the guidance note 'Land-Use Planning & Development Control: Planning for Air Quality' in 2017 (herein the 'EPUK-IAQM guidance') to facilitate consideration of air quality within local development control processes. It provides a framework for air quality considerations, promoting a consistent approach to the treatment of air quality issues within development control decisions.

The guidance includes methods for undertaken an air quality assessment and an approach for assessing the significance of effects. The guidance note is widely accepted as an appropriate reference method for this purpose.

3 STUDY APPROCH

3.1 Overall Approach

The approach taken for assessing the potential air quality impacts of the proposed development may be summarised as follows:

- Baseline characterisation of local air quality;
- Identification of potential construction and operational phase constraints related to air quality;
- High level consideration of possible mitigation measures, where appropriate; and
- Recommendation for any further work.

3.2 Baseline Characterisation

Existing or baseline air quality refers to the concentrations of relevant substances that are already present in ambient air. These substances are emitted by various sources, including road traffic, industrial, domestic, agricultural and natural sources.

A desk-based study has been undertaken using data obtained from continuous monitoring stations and diffusion tube monitoring sites maintained by SCDC. Estimated background data from the LAQM Support website maintained by Defra are also included. Detailed baseline background air quality characterisation is included in Section 4.

3.3 Construction Phase and Operation Phase

The development site is bounded by existing residential units to the north and east and the A1307 to the south. During construction phase, construction works for the proposed development have the potential to lead to the release of fugitive dust and particulate matter. it is considered that likely that the proposed development may have a potential impact on these residential receptors during construction phase.

The A1307 borders the southern boundary of the proposed development. Across the A1307 from the proposed development site is a small petrol station. Therefore, the proposed development may have the potential be affected by traffic emissions from the A1307 and the petrol station.

Further discussions of the potential construction and operational phase constraints are included in Section 5.

4 BASELINE AIR QUALITY CHARACTERISATION

4.1 Emission Sources and Key Air Pollutants

The proposed development site is located in an area where the main source of air pollution is likely to be road traffic exhaust emissions (especially from the A1307) and emissions from the petrol station across the road from the proposed development. There are no known industrial installation sites in the immediate vicinity of the application site likely to have a significant impact on local air quality. Thus, the principal pollutants relevant to this assessment are considered to be NO_2, PM_{10} and $PM_{2.5}$, generally regarded as the most significant air pollutants released by vehicular combustion processes, or subsequently generated by vehicle emissions in the atmosphere through chemical reactions.

4.2 Presence of AQMAs

The proposed development is located within the administrative area of SCDC. Following a review of local air quality, it is understood that there is currently one Air Quality Management Area (AQMA) within SCDC, due to exceedances of the annual mean NO_2 annual mean and PM_{10} 24-hour mean AQS. However, in the 2021 Annual Status Report (ASR), SCDC proposed to revoke this AQMA as there had been consistent compliance with the national objectives since 2014. The AQMA is located in an area along the A14 between Bar Hill and Milton, approximately 17km to the northeast of the proposed development. The nearest AQMA to the development is the Uttlesford District Council AQMA Saffron Walden, which was declared within the neighbouring council, Uttlesford District Council (UDC). The Uttlesford District Council AQMA Saffron Walden is located approximately 7.5km from the proposed development site. Therefore, the proposed development is not adjacent to or within an AQMA.

4.3 Baseline Monitoring Data

According to the 2021 SCDC Air Quality ASR there were three automatic monitoring stations and a diffusion tube network of 31 locations in 2020. There were no automatic monitors within 1km of the proposed development site. However, there was one diffusion tube within 1km of the proposed development site (SCDC ref: DT-6N) located at 22 High Street, Linton approximately 0.4km from the proposed development site.

The annual average NO_2 concentrations for the diffusion tube site within 1km from the proposed development site is reproduced in **Table 4-1**. It is noted that the measured annual mean NO_2 concentrations at this diffusion tube monitoring location are below the annual mean NO_2 AQS for years 2018 – 2020.

Table 4-1: Annual Average Measured Pollutant Concentrations at the Monitoring Locations

Site ID	Site Type	Approx. distance from proposed development (km)	Annual Average NO_2 (µg/m^3)		
			2018	2019	2020
DT-6N	Roadside	0.4	20.2	21.0	15.1

4.4 LAQM Background Data

In addition to the local monitoring data, estimated background air quality data available from the LAQM-Tools website, may also be used to establish likely background air quality conditions at the proposed development site.

This website provides estimated annual average background concentrations of nitrogen oxide (NO_x), NO_2, PM_{10} and $PM_{2.5}$ on a 1km^2 grid basis. **Table 4-2** identifies estimated annual average background concentrations for the grid square containing the proposed development site for years 2021-2023. No exceedances of the NO_2, PM_{10} or $PM_{2.5}$ air quality objectives (AQO) are predicted at the development site. As background concentrations are predicted to fall with time, background concentrations in future years would not be expected to exceed their respective annual mean standards

Table 4-2: Estimated Background Annual Average NO_2, PM_{10} and $PM_{2.5}$ Concentrations at the Proposed Development Site

Assessment Year	Estimated Annual Average Pollutant Concentrations Derived from the LAQM Support Website (µg/m^3)		
	NO_2	PM_{10}	$PM_{2.5}$
2021	7.5	15.3	9.3
2022	7.2	15.1	9.2
2023	7.0	15.0	9.0
Air Quality Objective	**40**	**40**	**25**

Notes: Presented concentrations for 1km^2 grid centred on 556500, 246500; approximate centre of development site is 556286, 246484.

5 IDENTIFICATION OF POTENTIAL IMPACTS ON LOCAL AIR QUALITY

5.1 Construction Phase

5.1.1 Exhaust Emissions from Plant and Vehicles

The operation of vehicles and equipment powered by internal combustion engines results in the emission of exhaust gases containing the pollutants NO_x, PM_{10}, volatile organic compounds, and carbon monoxide. The quantities emitted depend on factors such as engine type, service history, pattern of usage and fuel composition.

Based on the temporary nature of the construction activities, it is considered unlikely that vehicle movements associated with staff commutes to and from the site would have a significant impact on local air quality. Moreover, plant would be used to facilitate earthworks and construction. The operation of site equipment and machinery will result in emissions to atmosphere of exhaust gases, but with suitable controls and site management such emissions are unlikely to be significant.

5.1.2 Fugitive Construction Dust and Particulate Matter

Fugitive dust emissions arising from construction activities are likely to be variable in nature and will depend upon the type and extent of the activity, soil type and moisture, road surface conditions and weather conditions. Periods of dry weather combined with higher than average wind speeds have the potential to generate more dust.

Fugitive dust arising from construction is mainly of a particle size greater than the PM_{10} fraction (which can potentially impact upon human health), however it is noted that construction activities may contribute to local PM_{10} concentrations. Appropriate dust control measures can be highly effective for controlling emissions from potentially dust generating activities identified above, and adverse effects can be greatly reduced or eliminated.

As discussed in section 3.3, due to the proximity of the proposed development to existing nearby residential units, it is considered that an assessment of construction phase impacts (following the 2014 IAQM construction dust guidance) will be required to be carried out to support the planning application, and appropriate mitigation measures should be identified based on the assessment results.

5.2 Operational Phase

5.2.1 Emissions to Air from Operational Phase Traffic

Table 5-1 presents the EPUK-IAQM screening criteria for when an air quality assessment might be required. Should the criteria within **Table 5-1** be exceeded then it is likely that a detailed assessment of operational phase impacts will be required.

During the operational phase, air quality impacts are likely to be associated with traffic emissions as a result of any changes in traffic flows or flow composition the development may bring. Detailed information regarding development traffic generation is not available at this stage. However, based on the size of the development, it is considered unlikely that the proposed development will generate traffic flows exceeding the screening criteria as below, on the surrounding road network and cause a significant adverse air quality impact.

Table 5-1: Air Quality Screening Criteria from EPUK-IAQM Guidance

The Development will	Indicative Criteria to Proceed to an Air Quality Assessment
Cause a significant change in Light Duty Vehicle (LDV) traffic flows on local roads with relevant receptors.	A change of LDV flows of: - more than 100 AADT within or adjacent to an AQMA - more than 500 AADT elsewhere.
Cause a significant change in Heavy Duty Vehicle (HDV) flows on local roads with relevant receptors.	A Change of HDV flows of: - more than 25 AADT within or adjacent to an AQMA - more than 100AADT elsewhere.
Realign roads, i.e. changing the proximity of receptors to traffic lanes.	Where the change is 5m or more and the road is within an AQMA
Introduce a new junction or remove an existing junction near to relevant receptors.	Applies to junctions that cause traffic to significantly change vehicle accelerate/decelerate, e.g. traffic lights, or roundabouts.
Introduce or change a bus station.	Where bus flows will change by: - more than 25 AADT within or adjacent to an AQMA - more than 100AADT elsewhere.
Have an underground car park with extraction system.	The ventilation extract for the car park will be within 20m of a relevant receptor. Coupled with the car park having more than 100 movements per day (total in and out).
Have one or more substantial combustion processes, where there is a risk of impacts at relevant receptors.	Typically, any combustion plant where the single or combined NO_x emission rate is less than 5 mg/sec is unlikely to give rise to impacts, provided that the emissions are released from a vent or stack in a location and at a height that provides adequate dispersion. - In situations where the emissions are released close to buildings with relevant receptors, or where the dispersion of the plume may be adversely affected by the size and/or height of adjacent buildings (including situations where the stack height is lower than the receptor) then consideration will need to be given to potential impacts at much lower emission rates. Conversely, where existing nitrogen dioxide concentrations are low, and where the dispersion conditions are favourable, a much higher emission rate may be acceptable.

5.2.2 Exposure of Future Occupants to Air Pollution

The potential exposure of future users of the proposed development to poor air quality has been considered by undertaking a qualitative review of the baseline conditions

(**Section 4**) and considering the presence of sensitive receptors within the proposed development.

The application site is located along the A1307 across from a petrol station. As discussed in Section 4, the nearest diffusion tube (i.e. DT-6N) to the development site, monitored annual mean NO_2 concentrations of 15.1 µg/m^3 in 2020, which is well below the annual mean NO_2 objective (i.e. 40 µg/m^3). Thus, future occupants are unlikely to be exposed to high levels of air pollution.

The EPUK-IAQM 2017 guidance indicates with the use of the equation available in LAQM.TG16, the annual mean PM_{10} concentrations tend to be greater than ~31µg/m^3 for an exceedance of the daily mean PM_{10} AQS to be likely. LAQM TG.16 indicates that the annual mean NO_2 concentrations tend to be greater than 60µg/m^3 for an exceedance of the hourly mean NO_2 AQS to be likely. Based on the monitoring data available and the estimated background concentrations of NO_2 and PM_{10}, it is considered unlikely that short-term NO_2 and PM_{10} AQSs would be exceeded at or in close proximity to the redevelopment site.

Overall, exceedances of any of the relevant AQSs are not anticipated at the development site.

6 POTENTIAL MITIGATION MEASURES, OPPORTUNITIES AND FUTURE

6.1 Construction Phase

The dust emitting activities can typically be effectively controlled by appropriate dust control measures and any adverse effects can be greatly reduced or eliminated. It is expected that once specific information related to construction work is available, a risk impact assessment from construction dust for demolition, earthworks, construction and trackout is assessed with reference to the IAQM criteria and appropriate mitigation identified.

A dust management plan (DMP), which may be part of a Construction Environmental Management Plan (CEMP), for the construction phase should be prepared and agreed with the local authority to ensure that the potential for adverse environmental effects on local receptors is minimised.

The DMP should include *inter alia*, measures for controlling dust and general pollution from site construction operations, and include details of any monitoring scheme, if appropriate. Controls should be applied throughout the construction period to ensure that emissions are mitigated.

6.2 Operational Phase

As identified in Section 5.2, it is considered unlikely that the proposed development site will cause any significant increase in terms of traffic associated with the site. However, per Policy TI/2 of SCDCs Local Plan, a residential development of more than 20 dwellings is considered a 'larger development' and "*will be required to demonstrate they have maximised opportunities for sustainable travel and will make adequate provision to mitigate the likely impacts through provision of a Transport Assessment and Travel Plan… Where a Transport Assessment / Statement or Travel Plan is required, a Low Emissions Strategy Statement should be integrated."* Furthermore, Policy SC/12 states, "*Where emissions from the proposed development are prescribed by EU limit values or national objectives, the applicant will need to assess the impact on local air quality by undertaking an appropriate air quality assessment and detailed modelling exercise having regard to guidance current at the time of the application to show that the national objectives will still be achieved."*

Therefore, it is considered likely that an operational phase air quality impact assessment will be required to support the planning application and site specific mitigation measures are likely to be required by the local council.

It is recommended that mitigation measures to support low or zero emissions vehicles and encourage sustainable transport choices should be included. Domestic space and water heating should be low or zero emissions, with all gas-fired boilers to meet a minimum standard of <40mgNO_x/kWh.

At the planning application stage, once further details are available, a screening level air quality assessment should be undertaken using the EPUK-IAQM 2017 guidance to confirm no significant impacts from the operational phase.

7 CONCLUSIONS

An air quality feasibility study for a proposed residential development of approximately 85 dwellings in Linton, South Cambridgeshire has been undertaken with reference to existing air quality in the area and relevant air quality legislation, policy and guidance.

Construction phase impacts of the proposed development may potentially arise due to fugitive dust emissions. It is recommended that the risk of dust impacts is assessed according to a widely used method published by the IAQM as part of any future application for planning consent. With implementation of appropriate mitigation measures, significant residual effects are not anticipated.

During the operational phase, air quality impacts are likely to be associated with traffic emissions as a result of any changes in traffic flows or flow composition the development may bring. It is recommended that operational phase air quality impacts of development at the proposed site are qualitatively assessed with reference to the '*Land-Use Planning & Development Control: Planning for Air Quality*' guidance published by EPUK-IAQM as part of any future application for planning consent, to confirm no significant impacts from the operational phase.

Current air quality in the area of the proposed development site has been characterised using publicly available data. No exceedances of any of the relevant AQSs are captured at nearby monitoring locations. Overall, exceedances of any of the relevant AQSs are not anticipated at the development site.

However, due to the close proximity of the development to the A1307 and the petrol station, it is considered possible that an more detailed air quality modelling assessment could be required by SCDC to assess air quality at the site and the potential for the introduction of new exposure to poor air quality; and (where the screening criteria are exceeded) the impact of increased road traffic exhaust emissions on local air quality.

It is recommended that mitigation measures to support low or zero emissions vehicles and encourage sustainable transport choices should be included. Domestic space and water heating should be low or zero emissions, with all gas-fired boilers to meet a minimum standard of <40mgNO_x/kWh.

8 REFERENCES

Air Quality (England) Regulations 2000, 928. London, Her Majesty's Stationery Office.

Air Quality (England) (Amendment) Regulations 2002, 3043. London, Her Majesty's Stationery Office.

Communities and Local Government, 2019. National Planning Policy Framework, London: Crown. Department of Environment, Food and Rural Affairs, 2007. The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (Volume 1). London, Her Majesty's Stationary Office.

Department of Environment, Food and Rural Affairs, 2007. The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (Volume 2). London, Her Majesty's Stationary Office.

Department of Environment, Food and Rural Affairs, 2016. Part IV of the Environment Act 1995: Local Air Quality Management: Technical Guidance LAQM.TG(16).

Department of Environment, Food and Rural Affairs, 2018. UK-AIR Atmospheric Information Resource [online] Available at: http://uk-air.defra.gov.uk.

Environment Act 1995. London, Her Majesty's Stationery Office.

Her Majesty's Stationery Office, 2010. Environmental Protection: The Air Quality Standards Regulations 2010, [online] Available at: http://www.legislation.gov.uk/uksi/2010/1001/pdfs/uksi_20101001_en.pdf.

Institute of Air Quality Management, 2014. Guidance on the assessment of dust from demolition and construction.

Moorcroft et al. 2017. Land-Use Planning & Development Control: Planning for Air Quality. Environmental Protection UK and Institute of Air Quality Management, London.

South Cambridgeshire District Council, September 2018. South Cambridgeshire Local Plan.

South Cambridgeshire District Council, June 2021. 2021 Air Quality Annual Status Report (ASR).

Appendix 9: Landscape and Visual Impact Assessment

CSA environmental

Land North of Cambridge Road, Linton

Landscape and Visual Impact Assessment

Prepared by
CSA Environmental

on behalf of
Taylor Wimpey Strategic Land

Report No: CSA/5653/01

November 2021

urban design | ecology | landscape | heritage

Report Reference	Revision	Date	Prepared by	Approved by	Comments
CSA/5653/01	-	25/11/2021	SG	CS	Draft issue for comment
	A	29/11/2021	SG	CS	Client comment

CONTENTS Page

1.0 INTRODUCTION

1.1 CSA Environmental has been appointed by Taylor Wimpey Strategic Land to undertake a landscape and visual impact assessment of Land North of Cambridge Road, Linton (the 'Site'). The Site is being promoted for allocation within the Greater Cambridge Joint Local Plan, for a residential development of up to 85 dwellings, public open space and associated infrastructure.

1.2 The Site lies within the administrative area of South Cambridgeshire District Council. The location and extent of the Site is shown on the Location Plan at Appendix A and on the Aerial Photograph at Appendix B.

1.3 This assessment describes the existing landscape character and quality of the Site and the surrounding area. The report then goes on to discuss the suitability of the Site to accommodate the development proposals, and the potential landscape and visual effects on the wider area.

Methodology

1.4 This assessment is based on a site visit undertaken by a suitably qualified and experienced Landscape Architect in November 2021. The weather conditions at the time were cloudy, with good visibility.

1.5 In landscape and visual impact assessments, a distinction is drawn between landscape effects (i.e. effects on the character or quality of the landscape irrespective of whether there are any views of the landscape, or viewers to see them) and visual effects (i.e. effects on people's views of the landscape from public vantage points, including public rights of way and other areas with general public access, as well as effects from residential properties). This report therefore considers the potential impact of the development on both landscape character and visibility. The methodology utilised in this report is contained in Appendix G.

1.6 Photographs contained within this document (Appendix C) were taken using a digital camera with a lens focal length approximating to 50mm, to give a similar depth of vision to the human eye. In some instances images have been combined to create a panorama. The photographs and visualisations within this report have been prepared in general conformance with the Landscape Institute's Technical Guidance Note 06/19, as set out in the Methodology in Appendix G.

2.0 LANDSCAPE POLICY CONTEXT

National Planning Context

2.1 National planning policy is set out in the National Planning Policy Framework ('NPPF'). Section 15 of the NPPF deals with conserving and enhancing the natural environment. Paragraph 174 of the document states that the planning system should contribute to the protection and enhancement of the natural and local environment through, among other things, protecting and enhancing valued landscapes, *'… (in a manner commensurate with their statutory status or identified quality in the development plan)'*. The paragraph also outlines that the planning system should recognise the, *'…intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland.'*

2.2 The Planning Practice Guidance ('PPG') adds further context to the policies contained in the NPPF. The guidance as relevant to this assessment covers landscape and the natural environment, and the design of new developments.

2.1 The National Design Guide (2019) has been produced as part of the PPG. It provides guidance to *illustrate '… how well-designed places that are beautiful, enduring and successful can be achieved in practice.'* The National Model Design Code (July, 2021) expands upon the ten characteristics of good design providing an overarching framework for design;

- Context
- Identity
- Built form
- Movement
- Nature
- Public places
- Uses
- Homes and buildings
- Resources
- Lifespan

2.2 Those sections of the NPPF and PPG relevant to this assessment are summarised in Appendix E.

Local Policy Context

2.3 Planning policy for the Site is set out in The South Cambridgeshire Local Plan (adopted September 2018) which covers a period between 2011

and 2031. Those parts relevant to the landscape and the Site are summarised below.

The South Cambridgeshire Local Plan 2018

2.4 Policy S/2: Objectives of the Local Plan - the objectives of relevance to the Site and this assessment, include:

- To protect South Cambridgeshire's built and natural character and heritage, and the Cambridge Green Belt, with new development being expected to enhance the area and its biodiversity; and
- To deliver developments which are reflective of the location, distinctive in character, and respond robustly to climate change.

2.5 Policy S/3: Presumption in favour of Sustainable Development states that the Council will take a positive approach when considering proposals, reflecting the presumption in favour of sustainable development set out in the NPPF.

2.6 Policy HQ/1: Design Principles states that '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:

(a) Preserve of enhance the character of the local urban and rural area and respond to its context in the wider landscape;

(b) Conserve or enhance important natural and historic assets and their setting;

(c) ...responding to the local context and respecting local distinctiveness.'

2.7 Policy NH/2: Protecting and Enhancing Landscape Character states that '*Development will only be permitted where it respects and retains, or enhances the local character and distinctiveness of the local landscape and of the individual National Character Area in which is it located.'*

2.8 Policy NH/4: Biodiversity states, amongst other things, that '*New development must aim to maintain, enhance, restore or add to biodiversity. Opportunities should be taken to achieve positive gain through the form and design of development...'*

2.9 Policy NH/6: Green Infrastructure states that the Council will aim to conserve and enhance green infrastructure within the District, noting

that '*Proposals that cause loss or harm to this network will not be permitted unless the need for and benefits of the development demonstrably and substantially outweigh any adverse impacts on the district's green infrastructure network'.*

2.10 Policy NH/14: Heritage Assets states that '*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 responding to local heritage character including in innovatory ways.'

2.11 The policy also states *'Development proposals will be supported when they sustain and enhance the significant 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...'

Supplementary Planning Documents ('SPD')

Greater Cambridge Sustainable Design and Construction (January 2020)

2.12 The SPD has been prepared to provide additional technical guidance on the implementation of the 2018 Local Plan policies, setting out the information that should be submitted with planning applications to demonstrate how schemes meet the Council's requirements. In providing such guidance, the SPD will ensure that new development contributes to meeting the challenges posed by the changing climate including:

- Contributing to carbon reduction targets and reducing fuel poverty;
- Ensuring that new development is adaptable to our changing climate;
- Ensuring that new development makes efficient use of resources; and
- Ensuring that new development contributes to the health and well-being of new and existing residents.

South Cambridgeshire District Design Guide (March 2010)

2.13 This document was written to support the previous development plans but remains a material consideration in the planning process. The aim of the document is to assist applicants to achieve a high quality environment that integrates housing, employment and community uses, with infrastructure and green areas and the wider landscape; assist in the understanding of the importance of local context; and to assist in what information is required to accompany planning applications.

Open Space in New Developments (January 2009)

2.14 This SPD provides detail on our quantitative, qualitative and accessibility standards for children's play space, outdoor sport, and informal open space for new developments. It also provides clear guidance on how to calculate the requirements of individual developments.

Landscape in New Developments (March 2010)

2.15 The SPD notes that landscaping should not be peripheral to the planning process, but fully integrated into the design stages. The SPD seeks to ensure consideration is given, wherever possible, to the retention of landscaping features within developments, or to incorporating new planting into new designs.

Trees and Development Sites (January 2009)

2.16 This SPD provides guidance on preparing development proposals that may impact on trees.

3.0 SITE CONTEXT

Site Context

3.1 The Site lies along the southern edge of Linton, to the immediate north of the A1307, Cambridge Road. It comprises a single arable field, irregularly shaped, with a further parcel of scrub/woodland located within the west of the Site, and extends to 6.8ha in size. The Site location and its immediate context are illustrated on the Location Plan and Aerial Photograph in Appendices A and B, and on the photographs contained within Appendix C.

3.2 The Site is bound to the south by the A1307, with a petrol filling station located south of the road, opposite the centre of the Site. An arable field surrounds the filling station, and separates the Site and the A1307 in the north, from Long Lane to the south. Further arable fields with dense hedgerows and tree belts occur further south, along the gently rising land.

3.3 To the south west of the Site, west of the junction of the B1052 with the A1307, lies an area of housing which is within the Conservation Area. Beyond these to the south is an industrial/employment area, with Linton Zoo located beyond this to the south. The village of Hadstock lies around 1.3km south of the A1307 and the Site.

3.4 An area of woodland and scrub lies to the west of the Site, with the housing along the High Street and beyond, located further west.

3.5 The Parish Church of St Mary the Virgin lies to the north west of the Site, on the opposite side of the River Granta. There is a residential property just to the south west of the church, and a dense tree belt, as well as the trees within the church yard, which separate the Site from the church building.

3.6 To the north, the Site is bound by the River Granta, with the Village Green (Camping Close) located to the north of the river and the tree belts along it, and to the east of the church yard. Further north of the Village Green is the Linton C of E Infant School, as well as the rear gardens of the houses along Mill Lane. The High Street and development within Linton extends beyond to the north.

3.7 The housing along Mill Lane, including the Listed mill and surrounding Listed Buildings, lie to the north east of the Site on the opposite side of the river and its adjoining tree belts, and to the east of the Village Green. Garden areas/small grassed fields bound the Site to the north east, to the south of the housing along Mill Lane, and west of Mill Lane. A ford lies at the crossing of Mill Lane and the river, to the north east of the Site.

Beyond Mill Lane to the north east is an area of woodland, with the Pocket Park area of public open space located beyond. This park is linked to Mill Lane via a permitted path which runs along the southern edge of the woodland. To the south of the woodland and park, and to the east of the Site and Mill Lane, is a further area of arable land, with the A1307 located beyond.

Landscape Character Assessments

National Character Areas

3.8 Natural England has produced profiles for England's National Character Areas ('NCAs'), which divides England into 159 distinct natural areas, defined by a unique combination of landscape, biodiversity, geodiversity and cultural and economic activity. The Site lies within the East Anglian Chalk Character Area, NCA 87.

3.9 The National Character Area profile describes the East Anglia Chalk as a visually simple and uninterrupted landscape of rolling chalkland hills with large regular fields enclosed by hedgerows, few trees, straight roads and expansive views to the north. The generally open rolling countryside is in arable production and trees and copses on hilltops are a distinct characteristic of the area. The chalkland hills are dissected by two valleys of the rivers Granta and Rhee which converge to form the River Cam, south of Cambridge. Settlement is focused in small towns and villages, which have expanded significantly over the past 50 years with the pressure for new housing. The NCA profile notes that remnant chalk grassland, including road verges support rare chalkland flora and populations of invertebrates. A number of ancient routes pass through the area which includes the Icknield Way, now a public right of way that stretches from the south west to the north east of the East Anglian Chalk NCA.

Landscape East

3.10 Landscape East is an online resource that has categorised the landscape of the East of England region into a series of Landscape Character Types ('LCT'). The Site is identified as falling into the Chalk Hills and Scarps and Lowland Village Chalkland LCT's.

3.11 The Chalk Hills and Scarps LCT is described as prominent chalk hills, forming a distinct edge in places and elsewhere incised by valleys which create rolling landforms. A large scale landscape that is often well-wooded with a regular pattern of fields and woodland.

3.12 The Lowland Village Chalkland is described as low lying, gently rolling arable landscape dissected by small streams with a distinctive pattern of nucleated villages and patchwork of woodland and shelterbelts.

Greater Cambridge Landscape Character Assessment (February 2021)

3.13 This study has been prepared to provide an up-to-date and consistent landscape character area of the whole Greater Cambridge area.

3.14 The Site lies within the River Valleys LCT, with the key characteristics of this LCT described as:

- Intimate, small-scale riverine landscape;
- Flat, low-lying, broad valleys cut through the chalkland landscape;
- Shallow river valleys have a rich mosaic of grazing meadow and wet woodlands with lines of willows along the rivers;
- Clusters of deciduous woodland scattered through the valleys, including willow and poplar along the course of the rivers;
- Generally unsettled landscape, with occasional mill buildings providing local features and historic village edges on the lower river terraces;
- Remnants of historic parkland, former mills, manor houses and moated sites dispersed along the rivers; and
- Generally strong rural character that is occasionally disrupted by major roads that cut across the valleys in places.

3.15 Key landscape features are set out as follows:

- Intimate, small-scale pastoral landscape;
- Largely unsettled with distinctive former mill buildings, manor houses and moated sites;
- Tranquil rural qualities created by the presence of water through the unsettled meadowlands; and
- Rich mosaic of grazing meadow and wet woodlands of high ecological value.

3.16 Forces for change set out within the study for this LCT, include:

- Pressure for development, particularly for new housing including expansion of existing villages in adjoining LCTs that would intrude on the valley landscape and weaken the historic character of existing settlements; and
- Increasing road use which will diminish the rural tranquillity of the

valleys.

3.17 The study notes the condition of this LCT is overall 'good' with a 'strong' sense of character. The landscape guideline for the LCT is to 'conserve' the tranquil, intimate rural character of the landscape, although there are opportunities to 'enhance' the management and restoration of meadowland and grassland, and replanting and management of hedgerows and riparian woodland.

3.18 Guidance for landscape management for this LCT is set out as:

- Conserve and enhance the tranquillity and rural qualities of the river landscape;
- Conserve and enhance existing hedgerows;
- Consider opportunities for re-planting hedgerows and woodland where these have been lost/become fragmented;
- Protect sites and features of historic and cultural value; and
- Identify, conserve and consider opportunities for restoring wetland habitats such as wet woodland, grazing marsh, grasslands and lowland meadows.

3.19 Guidance for integrating development into the landscape are set out as follows:

- Ensure built form and associated changes to roads are well integrated with the existing character and structure of settlements, and do not disrupt visual unity along the valleys;
- Ensure any extensions to river valley villages are located along the line of the river, or at right angles to it, depending on the direction of the main transport route;
- Maintain the linear, or rectilinear form of the settlements;
- Ensure density and pattern of new developments reflect that of existing villages and hamlets;
- Avoid backland and cul-de-sac developments where possible;
- Ensure buildings are arranged in continuous frontages within village cores and are arranged in loose knit patterns facing the street on more peripheral sites;
- Ensure new developments are integrated with sufficient space for garden and street tree planting where applicable;

- Enhance village gateways and, where appropriate, consider provision of appropriate planting on village approaches;
- Take opportunities to create new village greens and/or wildlife areas within new developments;
- Ensure new developments integrate/connect with existing Public Rights of Way (PROW) within development layout;
- Ensure new developments reflect the form, scale and proportions of the existing vernacular buildings and pick up on traditional local building styles, height, materials, colours and textures;
- Enclose boundaries facing the street in village cores by low, or high, flint walls with brick detailing, simple decorative railings, picket fencing or hedging;
- Retain hedges along roads;
- Enclose boundaries facing the street on village peripheries with hedge and tree planting;
- Avoid the use of standardised and intrusive urban materials, street furniture, lighting and signage as part of traffic calming measures wherever appropriate; and
- Ensure new agricultural buildings, such as large storage sheds, are sited and designed to reduce their apparent mass, minimising their impact on the wider landscape by the appropriate use of texture, colour and planting.

3.20 The Site lies within LCA 9D, the Granta River Valley, with key characteristics, as set out within the study, being:

- Designed parkland landscapes, including modern development at Granta Park;
- Sense of separation between villages on elevated land in the neighbouring Lowland Farmlands; and
- Time depth associated with historic routes into Cambridge, the Icknield Way and designed parkland.

3.21 The study notes that this is a small scale, enclosed, balanced rural landscape, and that views are generally short, visually enclosed, and occasionally framed by individual trees. It notes that the edges of Linton lies within this LCA, and that this LCA provides a sense of separation between villages within LCA 8A: Pampisford Lowland Farmlands (with

LCA 8A located to the south of the Site). The study notes that there are also scattered mills and occasional industrial developments within the LCA, and that vertical structures, including pylons and poles, are occasional features which interrupt the flat skyline. It notes that the A1307, amongst other roads, introduces localised road noise into this LCA. It also mentions the road bridge over the river at Linton, which is decorative and which makes a positive contribution to the character.

3.22 The study sets out specific landscape sensitivities for the LCA, as follows:

- Designed parkland landscapes, including modern development at Granta Park;
- Sense of separation between villages on elevated land in the neighbouring Lowland Farmlands; and
- Time depth associated with historic routes into Cambridge and the Icknield Way.

3.23 We would note that the Site does not form part of a designed parkland landscape, nor is it on the Icknield Way. It serves no specific purpose in separating villages.

3.24 The study includes a consideration of the Chalkland Villages (which includes Linton's west and south eastern sectors). Typical characteristics are given as:

- In the chalklands to the south and east of Cambridge, both small and large villages generally have a strong historic, linear form, though extensive modern estate developments have occurred in some villages close to Cambridge; others, such as Bassingbourn, are the result of amalgamation of older hamlets;
- These linear villages widen out in places to include village greens, such as the large, oval green at Barrington and the smaller, triangular one at Heydon;
- A few villages, such as Little Shelford, have a rectangular form of looser structure with a number of important open spaces included;
- The village edges are varied, typically abutted by a mix of open fields, woodland, or smaller fields;
- Long back gardens also help to form a transition to the surrounding countryside;
- A wide variety of materials are used in walls, including plastered

timber-frame constructions (weatherboarded or rough-cast render on laths) clunch, clay bat, knapped flint, plain gault brick, red and yellow gault brick;

- Farm buildings are typically black-tarred weatherboarding;
- Colours of buildings are generally light and warm, often pale cream, but some are painted pale pink or yellow and, occasionally, earthy red;
- Roofs of vernacular buildings are typically of longstraw, thatch and plain clay tiles and pan-tiles, with some more recent use of Welsh slate and reed thatch;
- Plastered timber-framed building details include; high-pitched roofs, drip-boards set in the gable ends and over windows, four or six panelled or planked doors, and with chimneys set laterally on the ridge to roofs; and
- Eighteenth and nineteenth century house details include; low-pitched roofs, vertical sliding sash windows set in deep reveals over shallow stone sills, with gauged or segmental brick arched lintels and chimneystacks incorporated within the building at the gables

3.25 LCA 8A: Pampisford Lowland Chalklands, lies to the south of the Site, south of the A1307. The study notes that linear belts of trees line the A1307, Cambridge Road. It also notes that villages within this LCA, notably Linton, are generally linear, with some 20th Century estate development (with Linton having grown substantially since the 1950s). It notes that the villages have varied edges, typically abutted by a mix of open fields, mature trees, hedgerows, woodland, or smaller fields. Villages are generally well integrated into the landscape in views, with church spires occasionally providing landmarks, and built form appearing in a wooded context. It notes that several busy main roads, including the A1307, fragment the LCA, locally eroding the rural character.

3.26 From our assessment of the Site and surroundings, we would concur that the adjoining A1307 is busy and noisy, and detracts from the tranquillity and rurality of this area, as does the petrol filling station to the south of the Site. The area around the mill and church are however attractive, with the intervening Village Green providing public open space next to the river.

South Cambridgeshire District Design Guide (March 2010)

3.27 Chapter 3 of the SPD Divides the district into five distinctive Landscape Character Areas ('LCA'), with the Site falling within LCA B: Chalklands, which has the following key characteristics:

- Smooth, rolling chalk hills and gently undulating chalk plateau;
- Mostly large-scale arable fields; low hedges, few trees, giving it an open, spacious quality;
- Remnant chalkland grassland occurs on road verges and along tracks;
- Shallow valleys of the River Granta and River Rhee have a mosaic of grazing meadows and parkland;
- Small beech copses on top of hills and occasional shelterbelts which form important features; and
- Mostly strong rural character, though this is disrupted immediately adjacent to major roads such as the A505 and the M11.

3.28 Key design guides for the LCA include:

- Maintain the distinctive, settlement pattern of the area and its local context.
- Ensure any extensions to springline villages are located along the bottom of steeper slopes and along lanes.
- Ensure any extensions to river valley villages are located along the line of the river, or at right angles to it, depending on the direction of the main transport route.
- Maintain the linear, or rectilinear form of the settlements.
- Ensure density and pattern of new developments reflect that of existing villages and hamlets. Avoid backland and cul-de-sac developments where possible.
- Ensure buildings are arranged in continuous frontages within village cores and are arranged in loose knit patterns facing the street on more peripheral sites.
- Ensure new developments are integrated with sufficient space for garden and street tree planting where applicable.
- Enhance village gateways and, where appropriate, consider provision of avenue planting on village approaches.

- Take opportunities to create new village greens and/or wildlife areas within new developments.

- Ensure new developments reflect the form, scale and proportions of the existing vernacular buildings of the area and pick up on the traditional building styles, materials, colours and textures of the locality.

- Retain hedges along roads.

- Enclose boundaries facing the street on village peripheries with hedge and tree planting.

- Avoid the use of standardised and intrusive urban materials, street furniture, lighting and signage as part of traffic calming measures wherever appropriate.

Designations

3.29 The Multi Agency Graphic Information for the Countryside Map (using GIS mapping) and the Policies Map (adopted in 2018) indicate that, except for a narrow strip along the western boundary, the Site is not covered by any statutory or non-statutory designations for landscape character or quality (please refer to the Designations and Local Plan Map in Appendix D).

3.30 The Linton Conservation Area adjoins the Site to the north and the west, with a narrow strip in the far west of the Site located within the Conservation Area boundary. There are approximately 96 Listed Buildings located within a 500m radius of the Site. These include the Grade I Listed Parish Church of St Mary the Virgin Church, located a short distance north west of the Site (but screened/filtered in intervening views, dependant on the season). To the north east are the Grade II Listed Mill House, Grade II Listed Sluice Gates to the south east the Mill House, Grade II Listed Linton Mill, and the Grade II Listed Mill Brook house.

3.31 To the south of the Site along Long Lane are the Grade II Listed The Boundaries House, and the Grade II Listed The Kyles. Further Listed Buildings occur within the Conservation Area to the south west of the Site.

3.32 The River Granta is designated as a County Wildlife Site, as is a part of the disused railway line a short distance south of the A1307, south of the Site. The Village Green to the north of the river and the Site, at Camping Close, is designated as a Local Green Space.

Public Rights of Way

3.33 There are four public rights of way that lie within the Site:

- Public footpath 146/13 cuts diagonally through the centre of the Site, from the south western part to roughly centrally along the northern Site boundary, connecting Cambridge Road to Mill Lane.
- Public footpath 146/14 crosses the west of the Site on the edge of the current arable land boundary, and connects Cambridge Road to the church.
- Public footpath 146/15 lies on the northern Site boundary, following the path of the River Granta, and connects footpaths 13, 14 and 16 to Mill Lane.
- Public footpath 146/16 crosses the east of the Site, connecting Long Lane in the south to Mill Lane in the north.

3.34 Further public rights of way in the area are shown on the OS map in Appendix A.

3.35 The Icknield Way long distance footpath runs along the B1053 to the south west of the Site and the A1307, before heading north along the High Street. It then leads west and north through the village, climbing up Rivey Hill to the north of the settlement, before continuing down the northern slope of the hill, away from Linton.

Tree Preservation Orders

3.36 There are no trees on the Site covered by a Tree Preservation Order ('TPO'). This was confirmed by the examination of the South Cambridgeshire District Council's online planning map on 20 November 2021.

4.0 SITE DESCRIPTION AND VISIBILITY

Site Description

4.1 The Site extends to 6.8ha, and comprises an irregularly shaped arable field, with an area of scrub and woodland located in the east of the Site.

4.2 The south western Site boundary along the A1307 is formed by a steep bank, with a hedgerow of ash and sycamore trees along it. An outgrown hedgerow, with several mature trees within it, forms the southern boundary. A dense, scrubby hedgerow forms the eastern and north eastern Site boundaries adjacent to Mill Lane and the indented plots between the lane and the Site, with some mature oak and sycamore trees located within the hedge. An area of ruderal separates the arable field from the River Granta, which forms the Site's northern boundary. Mature trees line the river on both sides, including cherry, alder, sycamore and willow species.

4.3 The largest part of the Site comprises an arable field which has recently been left fallow.

4.4 The Site is crossed by several public rights of way, as set out in Section 3.33 earlier.

Topography

4.5 The Site slopes up gently from the River Granta in the north, at around 38 metres Above Ordnance Datum ('AOD'), to a high point along the southern boundary of approximately 42m AOD. The northern part of the Site is relatively level, and forms the floodplain of the river, with the southern part of the Site located at a higher elevation.

4.6 To the south of the Site, the land rises gradually to a high point of 82m AOD north of Hadstock. The land to the north of the Site and the river rises gradually, and then more steeply, to a high point of 112m AOD at Rivey Hill to the north of Linton, with the landmark Grade II Listed water tower located on this high point.

Visibility

4.7 An assessment of the visibility of the Site was undertaken and a series of photographs taken from public vantage points, rights of way and public highways. The viewpoints are illustrated on the Location Plan and Aerial Photograph contained Appendices A and B and on the photographs in Appendix C.

4.8 From our assessment, it is apparent that the Site is visible from the public footpaths which cross it, but is well contained from beyond the Site boundaries, with further views of the Site mostly screened or heavily filtered in the summer, and filtered during the winter. The key views of the Site are set out below.

Near and Middle Distance Views

4.9 From the south, the Site is partially visible in winter views from the A1307 Cambridge Road, through the intervening vegetation, with a framed view available in the far east at the field access (photographs 12, 13). Summer views are expected to be screened from here. From further east along the road on the approach to the settlement from here, the Site's boundary vegetation is partially visible, seen behind the intervening vegetation within the field to the east of the Site (photograph 22). The interior of the Site is screened from view.

4.10 From south of the A1307 along public footpaths 146/13 and 146/16, the winter views are more heavily filtered due to additional intervening vegetation (photograph 14). Winter views from Long Lane are very heavily filtered by the hedgerow along the lane, and summer views will be screened, although there are limited gaps in the hedgerow, from where the Site is partially visible, with the mill and Rivey Hill visible beyond it (photographs 15, 24, 25). Views from the north-south section of Long Lane opposite the south eastern corner of the Site, are framed towards this part of the Site by the roadside vegetation (photograph 23). There will be partial, heavily filtered views of the Site from the westernmost house at the Malting Cottages along Long Lane.

4.11 From the B1052 to the south west of the Site, views are heavily filtered by the intervening vegetation, with summer views expected to be screened (photograph 26). From the junction of the B1052 and the A1307, and also from further west along the A1307, the Site's southern boundary vegetation is visible, but the interior of the Site is screened by this vegetation (photograph 16).

4.12 During the winter, from the southern end of public footpath 146/14 within the Site, the interior of the Site is partially visible through the intervening vegetation, with the mill and adjoining development seen in more heavily filtered views behind the Site (photograph 13). Summer views of the Site will be very heavily filtered and/or screened, with only the tops of the development behind the Site remaining visible over the intervening vegetation, in places where gaps in the vegetation allows.

4.13 The Site is visible from public footpath 146/14 where it crosses the Site, with the existing built form around the mill partially visible in the background (photograph 2). From the northern part of the path within

the Site, there are very heavily filtered views of the church beyond the river when looking northwards (photograph 3). When looking towards the south, the Site is visible, with the petrol filling station partially visible behind it through the intervening vegetation (photograph 4). It is expected that the filling station will be screened from views in the summer, although the lights may still be visible at night. Views from public footpath 146/15 are similar (photograph 5).

4.14 Views of the Site from the adjoining properties to the west of the Site are prevented by the intervening vegetation, although there may be heavily filtered winter views from their gardens (photograph 1).

4.15 Views of the Site from the southern part of the churchyard are filtered by the intervening vegetation, with partial views available (photograph 17). Summer views will be restricted to a narrow framed view along the public footpath. Views from the Village Green and public footpath which crosses it are mostly heavily filtered in the winter, or screened in the summer, by the intervening vegetation (photograph 19). There is however a framed view available of part of the Site, through a gap in the intervening vegetation along the river (photograph 18). There will be very heavily filtered views of the Site from the properties on Mill Lane which back onto the river, including from the mill (as seen in reciprocal views in photographs 2, 3, 8, 11), although summer views are likely to be screened. Views from public footpath 146/16 to the north of the Site, are available when alongside the river, with the Site and the petrol station beyond, partially visible through the intervening vegetation (photograph 1).

4.16 Views from Mill Lane are heavily filtered by the intervening vegetation, with summer views expected to be screened (photographs 10, 20). Views from the ford over the river are partially screened by the intervening vegetation too, although it is more open right along the river (photograph 7).

4.17 Views from Pocket Park to the east are screened by the intervening vegetation, with the Site's eastern boundary vegetation becoming visible from further west along the permitted path between the park and Mill Lane (photograph 21).

Longer Distance Views

4.18 Longer distance views from the east, south and west are prevented by the intervening topography and due to the level landform here.

4.19 Long distance views towards the Site are available from the higher ground to the north of Linton. From bridleway 146/20 which leads up to Rivey Hill from Linton, views are prevented by the intervening vegetation

along the path. A view has been included at photograph 27, which has been taken just off the main path, to illustrate potential worst-case scenario winter views, showing that the Site is not readily identifiable in views from here.

4.20 From further west along the high ground along the Icknield Way (bridleway 146/21), there are views across Linton, the Site is partially visible behind the existing settlement, seen adjacent to the church and its vegetated church yard (photograph 28).

Landscape Quality, Value and Sensitivity

4.21 Except for a narrow strip along the western boundary (which lies within the Conservation Area boundary), the Site is not covered by any statutory or non-statutory designations for landscape character or quality. It comprises ordinary arable land which has recently been left fallow, as well as an area of scrub and woodland. Several public footpaths cross the Site. The structural vegetation on the Site is contained to its boundaries. During the summer, there are views from within the Site to the top of the church and the top of the mill, as well as views from parts of the Site to the water tower on the hill to the north of the settlement. However, during the winter months, views towards the settlement edge to the north, including the church and mill, as well as towards the road and petrol station to the south, are more porous, with filtered views available towards these areas. The northern part of the Site is well related to the adjoining river corridor, as well as to the settlement beyond to the north. The character of the southern part of the Site is influenced by the busy A1307 along its south, and in parts by the adjoining petrol station, with these elements detracting from the rurality and tranquillity of the area. The western part of the Site is overgrown and inaccessible.

4.22 The Site's landscape quality is assessed as medium, and it has a good ability to accommodate residential development.

4.23 The landscape/townscape to the north and north west of the Site is of high quality, and includes the Conservation Area as well as the many Listed Buildings, and also the River Granta and Village Green. The landscape to the north is assessed as being of high quality, value and sensitivity, and constitutes a valued landscape in relation to the NPPF paragraph 174.

4.24 The landscape to the south is ordinary in character, and reflective of the wider landscape character in this area, although as mentioned, it is affected by the busy A1307 and the petrol filling station.

4.25 A green corridor, which includes the river, trees and woodland, and public access, occurs within the north of the Site, and extends eastwards towards Pocket Park, where further public access is available.

4.26 The Site's landscape value, as well as its sensitivity to the proposed development, is therefore also affected by its surroundings, with the northern part of the Site assessed as having a high landscape value and sensitivity, and the southern part as having a moderate landscape value and sensitivity.

5.0 SUITABILITY OF THE SITE TO ACCOMMODATE DEVELOPMENT

5.1 This section provides a brief appraisal of the suitability of the Site to accommodate a residential-led development, in terms of the landscape and visual constraints, and potential effects.

5.2 A Concept Masterplan (in Appendix F) has been prepared for the Site, showing how approximately 85 dwellings and a large area of public open space, can be accommodated on the Site. The key proposals are as follows:

- Creating a new vehicular access point from Cambridge Road, with a resultant loss of a small section of hedgerow here;
- Approximately 85 new dwellings on 2.75ha of land, located within the south and east of the Site;
- The remaining approximately 4ha of land will become a large area of public open space (a river-side park forming a continuation of the landscape at Pocket Park to the east, and the Village Green to the north), located within the north of the Site along the river corridor, and within the west of the Site (where the landscaping will be more focused on ecological and biodiversity benefits);
- New woodland, thicket and tree planting, as well as wetland meadows and orchards, are proposed to be incorporated within the parkland in the north;
- The existing public footpaths within the Site will be retained along their current alignment, and incorporated in to the development area within green corridors. A network of new recreational footways will be created, leading around the new homes and within the river-side park, and linking to the public rights of way;
- A view corridor can be created within the proposed development area, to frame views towards the water tower on Rivey Hill, thereby anchoring the development within its context and setting, and creating a specific sense of place;
- The existing structural vegetation will be retained wherever possible, and enhanced with additional tree and native hedgerow and thicket planting, especially along the A1307 to the south; and

- A landscaped entrance feature could be created within the south western corner of the Site adjacent to the A1307, to attractively mark the entrance to Linton from the south east.

5.3 The key landscape and visual effects are described below.

Landscape Features

5.4 The structural landscape features on the Site are contained to the edges around the main arable field, and are proposed to be retained wherever possible. The exception to this is the requirement for the removal of a section of hedgerow along the A1307 in the south west of the Site, to create the new vehicular access.

5.5 The existing boundary vegetation, especially the hedgerow along the south of the Site, is proposed to be strengthened and enhanced with additional native tree and thicket planting, to further filter views and to ensure a firm, vegetated settlement edge here.

5.6 The proposed river-side park within the west and north of the Site, will provide the opportunity for large amounts of new native tree, thicket, and woodland planting, as well as for the creation of wetland areas, SuDS basins, wildflower meadows, and new orchards. These areas will be landscaped and designed to increase habitats and species diversity on the Site, as well as to provide recreational benefits to new and existing residents, while creating an attractive landscaped environment along the river, which respects and highlights the heritage assets to the north.

Relationship to Settlement

5.7 Development at the Site would be well related to the adjoining settlement to the north, and west along the High Street and the A1307 Cambridge Road, and will be contained from the wider countryside to the south and east by the A1307 and Mill Lane respectively. The development will not extend further south or east than the existing built form within the settlement.

5.8 When approaching the development from the west along the A1307, the development at the Site will be seen as an extension of that which currently occurs along Cambridge Way, and to the north and south of it. It will not appear incongruous or out of character, with views of the new homes partially screened and/or filtered by the intervening vegetation along the A1037.

5.9 When approaching from the east along the A1307, the development at the Site will form a new entrance point to the settlement to the south east. The proposed development can be designed to create an

attractive outlook to the south east, as well as a focal green entrance feature, to announce the entrance to the settlement from here. The homes will be screened and/or filtered along the approach from the east, with the roofs of the houses (and filtered winter views) becoming available once the viewer is adjacent to the Site. The built form on the edge of the settlement will be seen within the context of the clearly visible (and lit) petrol station opposite the Site, with the existing housing visible from a short distance beyond.

5.10 The proposed river-side park within the north of the development will form an extension of the Pocket Park to the east, as well as the Village Green and church yard to the north. The park will create an attractive area of open space to the south of the river, mirroring the open space and public access available to the north. The park can be attractively designed to provide a range of access and walking options, as well as to create a range of habitats, characters, and landscape features.

Public Rights of Way

5.11 The four public footpaths which cross the Site are proposed to be retained along their current alignment, within green corridors through the proposed built development, or within the new areas of public open space along the river-side park. The paths may be surfaced to allow for an expected increase in use. Additional recreational routes will be created to link to these footpaths, and to allow wider access to the open space within the development.

5.12 The character along the southern parts of the paths will significantly change, however, within the north of the Site, the paths will remain within an area of open landscape.

Visual Effects

5.13 As discussed in Section 4, the Site is visible from the public footpaths which cross it, but well contained from beyond the Site boundaries, with further views of the Site mostly screened or heavily filtered in the summer, and filtered during the winter. The key views and the visual effects of development at the Site are discussed below.

Near and Middle Distance Views

5.14 The proposed development will be visible from public footpaths which cross the Site. These paths are proposed to be retained along their current alignment, within green corridors through the built development. New tree planting alongside the paths will filter and soften the views of the built form. The views from within the northern part of the Site will

become partially filtered by the proposed new planting within the north of the Site.

5.15 The proposed development will be partially visible through the intervening vegetation, in views from the A1307 adjacent to the Site. The new access will also be visible, and there will be framed views available of the new houses along this access road. Views from further east and west along the road will quickly become screened by the intervening vegetation. A landscaped entrance feature could be incorporated within the south eastern corner of the Site, to create an attractive entrance point to the settlement here.

5.16 The development will mostly be heavily filtered in winter views, and screened during the summer, in views from the public footpaths south of the A1307, and the majority of Long Lane. The roofs of the new homes may be visible over the intervening boundary vegetation in views from here. Views from the B1052 will be similar.

5.17 From the junction of the B1052 and the A1037, the new access into the development will be visible, however, the houses beyond will be heavily filtered and/or screened by the intervening and proposed vegetation.

5.18 Views from the rear gardens and facades of the properties that bound the Site to the west, will become screened by the existing and proposed vegetation within the woodland area in the west of the development.

5.19 Filtered views of the proposed housing, which may be visible from the churchyard to the north, will become screened by the proposed new planting within the open space in the north of the development. View corridors can be designed in the open space, in order to create vistas towards the church tower from within the Site. Views from the houses along Mill Lane, as well as from the mill, will be similar to those from the churchyard.

5.20 The new homes will be partially visible in filtered views, from the Village Green and public footpath within it.

5.21 The new homes will be partially visible through the intervening vegetation, in views from Mill Lane to the east, however, additional planting within the Site will further filter and/or screen these views as it matures.

5.22 Views from Pocket Park will remain screened by the intervening vegetation, although the tops of the new homes will become visible from further west along the permitted path that leads to Mill Lane.

Longer Distance Views

5.23 The tops of the new homes will be partially visible in long distance views from the Icknield Way path along Rivey Hill. They will be seen as a small extension to the rear of the existing settlement, and the built form will be broken up by the proposed vegetation within the northern area of open space.

Landscape Effects

5.24 As set out in Section 4, except for a narrow strip along the western boundary, the Site is not covered by any statutory or non-statutory designations for landscape character or quality. It is assessed as being of overall medium to high landscape sensitivity (high in the north, and medium in the south).

5.25 The proposed residential development on the Site will change the character of the Site from a predominantly agricultural field, to a housing development with generous new areas of public open space. The Concept Masterplan in Appendix F responds to the varying landscape sensitivities of the Site and its surroundings, by locating the proposed residential development and access within the south of the Site, and by creating a publically accessible river-side park within the north and west of the Site, adjacent to the river and the Conservation Area. The new areas of public open space will create a separation between the proposed built form and the more sensitive landscape in the north, and can include structural, native vegetation to screen, filter, or direct views between the landscape/townscape to the north, and the proposed housing to the south within the development.

5.26 The new homes can be designed to form an attractive addition to Linton, which reflects its rich historic vernacular. The proposed development can be designed to form an attractive entrance point, marking the entrance to the settlement from the south east.

5.27 The proposed development will be well related to the existing settlement form of Linton, with the proposed open space areas forming a continuation of that which occurs to the east and north, and the housing forming a continuation of the built form evident further west along Cambridge Road/A1307. Development here will form a logical extension to the settlement.

5.28 Overall, development at the Site can be accommodated without resulting in significant landscape effects on the character of Linton, its heritage assets, or the surrounding landscape. There will be no material effects on the wider landscape around Linton. The proposed development will create an attractive new community asset in the form

of the public open space in the north and west, which will benefit both wildlife, the environment, and the community in terms of recreation and well-being.

6.0 CONCLUSION

6.1 CSA Environmental has been appointed by Taylor Wimpey Strategic Land to undertake a landscape and visual impact assessment of Land North of Cambridge Road, Linton. The Site is being promoted for allocation within the Greater Cambridge Joint Local Plan, for a residential development of up to 85 dwellings, public open space and associated infrastructure.

6.2 The Site lies along the southern edge of Linton, to the immediate north of the A1307, Cambridge Road. It comprises a single arable field, irregularly shaped, with a further parcel of scrub/woodland located within the west of the Site, and extends to 6.8ha in size. Four public footpaths cross the Site.

6.3 An area of woodland and scrub lies to the west of the Site, with the housing along the High Street and beyond, located further west. The River Granta forms the northern Site boundary, with the Parish Church of St Mary the Virgin located to the north of it, north west of the Site. The Village Green lies to the north of the Site, and the housing along Mill Lane, including the Listed mill and surrounding Listed Buildings, lie to the north east of the Site on the opposite side of the river and its adjoining tree belts. Gardens and Mill Lane adjoin the Site to the east.

6.4 The Site is visible from the public footpaths which cross it, but well contained from beyond the Site boundaries, with further views of the Site mostly screened or heavily filtered in the summer, and filtered during the winter.

6.5 Except for a narrow strip along the western boundary, the Site is not covered by any statutory or non-statutory designations for landscape character or quality. The structural vegetation on the Site is contained to its boundaries. The northern part of the Site is well related to the adjoining river corridor, as well as to the settlement beyond to the north. The character of the southern part of the Site is influenced by the busy A1307 along its south, and in parts by the adjoining petrol station, with these elements detracting from the rurality and tranquillity of the area. The western part of the Site is overgrown and inaccessible.

6.6 The Site's landscape value, as well as its sensitivity to the proposed development, is affected by its surroundings, with the northern part of the Site assessed as having a high landscape value and sensitivity, and the southern part as having a moderate landscape value and sensitivity.

6.7 The Concept Masterplan in Appendix F responds to the varying landscape sensitivities of the Site and its surroundings, by locating the proposed residential development and access within the south of the

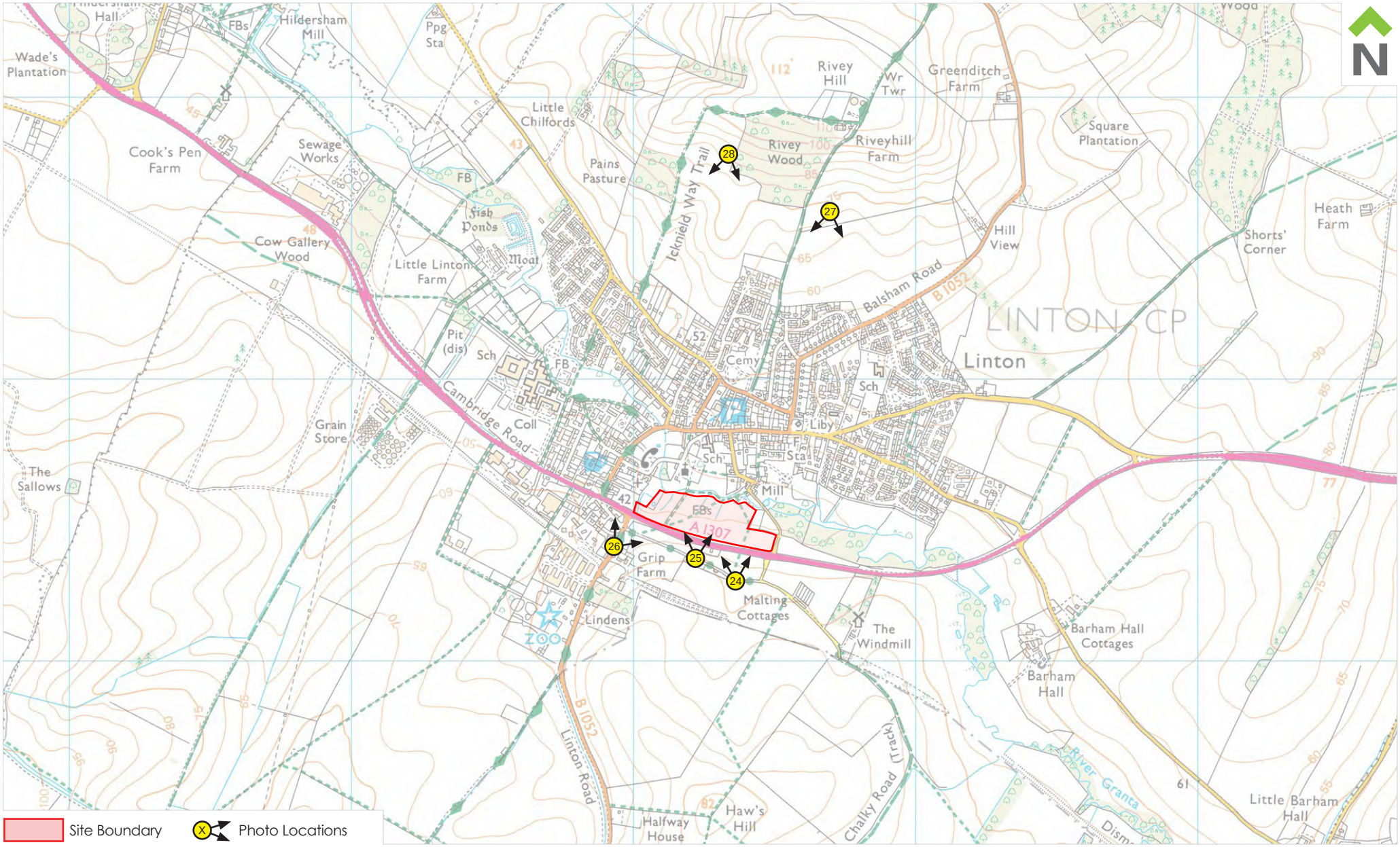
Site, and by creating a publically accessible river-side park within the north and west of the Site, adjacent to the river and the Conservation Area. The new homes can be designed to form an attractive addition to the Linton, which reflects its rich historic vernacular.

6.8 The proposed development will be well related to the existing settlement form of Linton, with the proposed open space areas forming a continuation of that which occurs to the east and north, and the housing forming a continuation of the built form evident further west along Cambridge Road/A1307.

6.9 Overall, development at the Site can be accommodated without resulting in significant landscape effects on the character of Linton, its heritage assets, or the surrounding landscape. There will be no material effects on the wider landscape around Linton. The proposed development will create an attractive new community asset in the form of the public open space in the north and west, which will benefit both wildlife, the environment, and the community in terms of recreation and well-being.

Appendix A

Site Location Plan



CSA environmental

Dixies Barns, High Street,
Ashwell, Hertfordshire SG7 5NT

t 01462 743647
e ashwell@csaenvironmental.co.uk
w csaenvironmental.co.uk

Project	Land North of Cambridge Road, Linton	Date November 2021	Drawing No. CSA/5653/100
Drawing Title	Site Location Plan	Scale @ A4 NTS	Rev -
Client	Taylor Wimpey Strategic Land	Drawn HG	Checked SG

Appendix B

Aerial Photograph

CSA environmental
Dixies Barns, High Street,
Ashwell, Hertfordshire SG7 5NT
t 01462 743647
e ashwell@csaenvironmental.co.uk
w csaenvironmental.co.uk

Project	Land North of Cambridge Road, Linton	Date November 2021	Drawing No. CSA/5653/101
Drawing Title	Aerial Photograph	Scale @ A4 NTS	Rev -
Client	Taylor Wimpey Strategic Land	Drawn HG	Checked SG

Appendix C

Photosheets

Photograph 01 View from public footpath 146/14 within Site, looking west across Site.

Photograph 02 View from public footpath 146/14 within Site, looking north east across Site.

CSA environmental
Dixies Barns, High Street,
Ashwell, Hertfordshire SG7 5NT
t 01462 743647
e ashwell@csaenvironmental.co.uk
w csaenvironmental.co.uk

Project	Land North of Cambridge Road, Linton	Drawing No.	CSA/5653/102
Drawing Title	Photosheets	Date	November 2021
Client	Taylor Wimpey Strategic Land	Drawn HG / Checked SG / Rev -	

Photograph 03 View from public footpath 146/14 within Site, looking north east across Site.

Photograph 04 View from public footpath 146/15 on northern boundary, looking south east across Site.

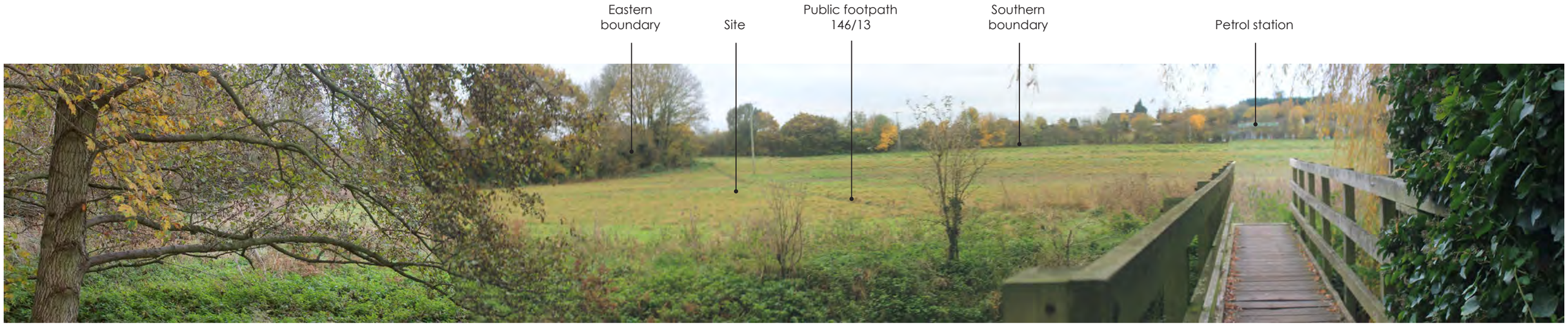
CSA environmental

Dixies Barns, High Street,
Ashwell, Hertfordshire SG7 5NT
t 01462 743647
e ashwell@csaenvironmental.co.uk
w csaenvironmental.co.uk

Project	Land North of Cambridge Road, Linton	Drawing No.	CSA/5653/102
Drawing Title	Photosheets	Date	November 2021
Client	Taylor Wimpey Strategic Land	Drawn HG / Checked SG / Rev -	

Photograph 05 View from public footpath 146/15 on northern boundary, looking south across Site.

Approximate extent of Site



Photograph 06 View from public footpath 146/13, looking south towards Site.

CSA environmental

Dixies Barns, High Street,
Ashwell, Hertfordshire SG7 5NT
t 01462 743647
e ashwell@csaenvironmental.co.uk
w csaenvironmental.co.uk

Project	Land North of Cambridge Road, Linton	Drawing No.	CSA/5653/102		
Drawing Title	Photosheets	Date	November 2021		
Client	Taylor Wimpey Strategic Land	Drawn	HG	Checked	SG	Rev	-

Approximate extent of Site

Photograph 07

View from Mill Lane, looking north west.

Visualisation Type 1
Planar projection
75% @ A3, 150% @ A1
19.11.2021, 12:!4
Canon EOS 1100D 1.6x, Canon EF-S 18-55mm
HfoV 40°
Looking direction: North west

CSA environmental
Dixies Barns, High Street,
Ashwell, Hertfordshire SG7 5NT
t 01462 743647
e ashwell@csaenvironmental.co.uk
w csaenvironmental.co.uk

Project	Land North of Cambridge Road, Linton	Drawing No.	CSA/5653/102	
Drawing Title	Photosheets	Date	November 2021	
Client	Taylor Wimpey Strategic Land	Drawn HG	Checked SG	Rev -

Photograph 08 View from public footpath 146/16, looking north west across Site.

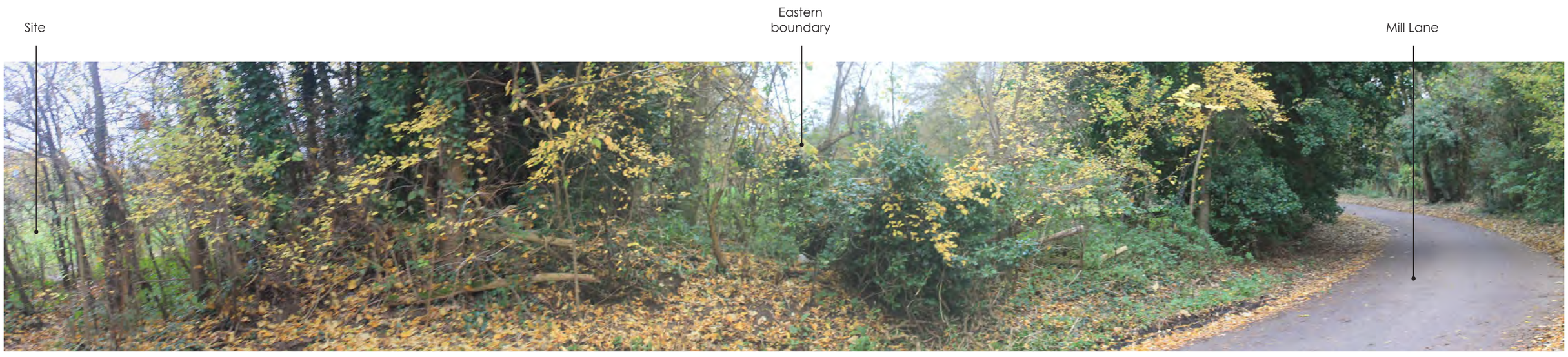
CSA environmental

Dixies Barns, High Street,
Ashwell, Hertfordshire SG7 5NT
t 01462 743647
e ashwell@csaenvironmental.co.uk
w csaenvironmental.co.uk

Project	Land North of Cambridge Road, Linton	Drawing No.	CSA/5653/102	
Drawing Title	Photosheets	Date	November 2021	
Client	Taylor Wimpey Strategic Land	Drawn HG	Checked SG	Rev -

Photograph 09 View from eastern boundary, looking west across Site.

Approximate extent of Site



Photograph 10 View from Mill Lane, looking west towards Site.

CSA environmental
Dixies Barns, High Street,
Ashwell, Hertfordshire SG7 5NT
t 01462 743647
e ashwell@csaenvironmental.co.uk
w csaenvironmental.co.uk

Project	Land North of Cambridge Road, Linton	Drawing No.	CSA/5653/102
Drawing Title	Photosheets	Date	November 2021
Client	Taylor Wimpey Strategic Land	Drawn HG / Checked SG / Rev -	

Photograph 11 View from southern boundary, looking north across Site.

Approximate extent of Site

Photograph 12 View from Cambridge Road A1307, looking north towards Site.

CSA environmental
Dixies Barns, High Street,
Ashwell, Hertfordshire SG7 5NT
t 01462 743647
e ashwell@csaenvironmental.co.uk
w csaenvironmental.co.uk

Project	Land North of Cambridge Road, Linton	Drawing No.	CSA/5653/102	
Drawing Title	Photosheets	Date	November 2021	
Client	Taylor Wimpey Strategic Land	Drawn HG	Checked SG	Rev -

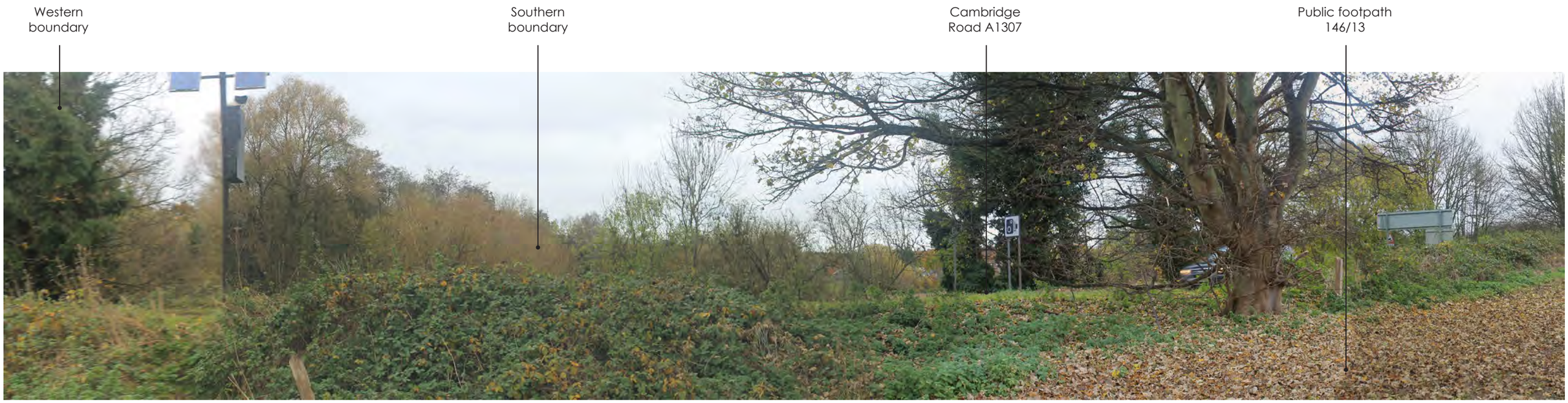
Photograph 13 View from public footpath 146/14 on southern boundary, looking east across Site.

Visualisation Type 1
Cylindrical projection
48% @ A3, 96% @ A1
19.11.2021, 11:47
Canon EOS 1100D 1.6x, Canon EF-S 18-55mm
HfoV 90°
Looking direction: East

CSA environmental
Dixies Barns, High Street,
Ashwell, Hertfordshire SG7 5NT
t 01462 743647
e ashwell@csaenvironmental.co.uk
w csaenvironmental.co.uk

Project	Land North of Cambridge Road, Linton	Drawing No.	CSA/5653/102		
Drawing Title	Photosheets	Date	November 2021		
Client	Taylor Wimpey Strategic Land	Drawn	HG	Checked	SG	Rev	-

Approximate extent of Site



Photograph 14 View from public footpath 146/13, looking north east towards Site.

Visualisation Type 1
Cylindrical projection
48% @ A3, 96% @ A1
19.11.2021, 11:45
Canon EOS 1100D 1.6x, Canon EF-S 18-55mm
HfoV 90°
Looking direction: North east

CSA environmental
Dixies Barns, High Street,
Ashwell, Hertfordshire SG7 5NT
t 01462 743647
e ashwell@csaenvironmental.co.uk
w csaenvironmental.co.uk

Project	Land North of Cambridge Road, Linton	Drawing No.	CSA/5653/102		
Drawing Title	Photosheets	Date	November 2021		
Client	Taylor Wimpey Strategic Land	Drawn	HG	Checked	SG	Rev	-

Approximate extent of Site

Photograph 15 View from public footpath 146/13, looking north east towards Site.

Visualisation Type 1
Cylindrical projection
48% @ A3, 96% @ A1
19.11.2021, 11:40
Canon EOS 1100D 1.6x, Canon EF-S 18-55mm
HfoV 85°
Looking direction: North east

CSA environmental
Dixies Barns, High Street,
Ashwell, Hertfordshire SG7 5NT
t 01462 743647
e ashwell@csaenvironmental.co.uk
w csaenvironmental.co.uk

Project	Land North of Cambridge Road, Linton	Drawing No.	CSA/5653/102		
Drawing Title	Photosheets	Date	November 2021		
Client	Taylor Wimpey Strategic Land	Drawn	HG	Checked	SG	Rev	-

Approximate extent of Site

Eastern boundary

Southern boundary

Cambridge Road A1307

The Grip B1052

Photograph 16 View from Cambridge Road A1307, looking east towards Site.

Visualisation Type 1
Cylindrical projection
48% @ A3, 96% @ A1
19.11.2021, 11:42
Canon EOS 1100D 1.6x, Canon EF-S 18-55mm
HfoV 90°
Looking direction: East

CSA environmental
Dixies Barns, High Street,
Ashwell, Hertfordshire SG7 5NT
t 01462 743647
e ashwell@csaenvironmental.co.uk
w csaenvironmental.co.uk

Project	Land North of Cambridge Road, Linton	Drawing No.	CSA/5653/102		
Drawing Title	Photosheets	Date	November 2021		
Client	Taylor Wimpey Strategic Land	Drawn	HG	Checked	SG	Rev	-

Approximate extent of Site

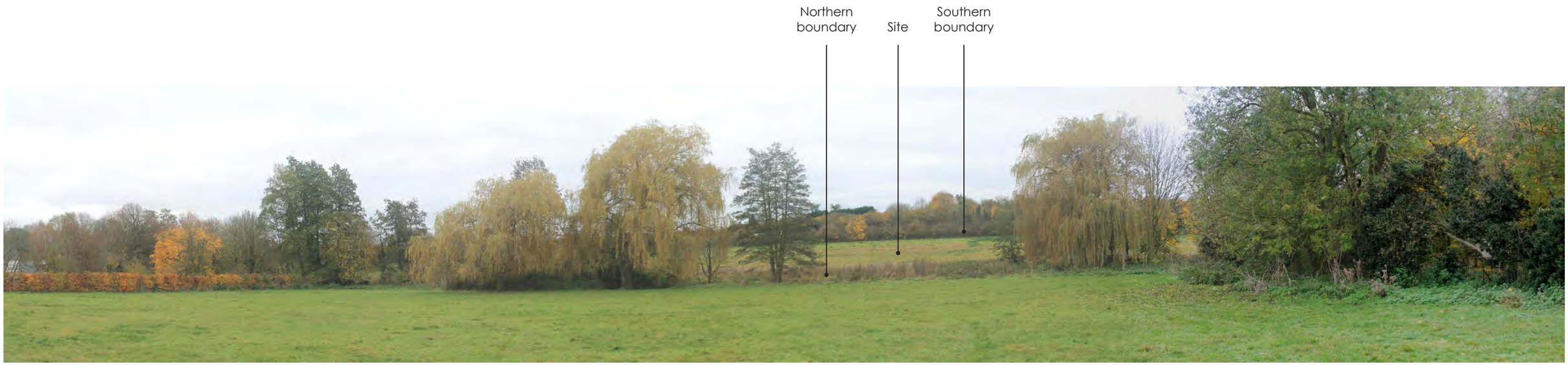
Photograph 17 View from public footpath 146/14 within Parish Church of St Mary the Virgin, looking south towards Site.

Visualisation Type 1
Cylindrical projection
48% @ A3, 96% @ A1
19.11.2021, 11:51
Canon EOS 1100D 1.6x, Canon EF-S 18-55mm
HfoV 90°
Looking direction: South

CSA environmental
Dixies Barns, High Street,
Ashwell, Hertfordshire SG7 5NT
t 01462 743647
e ashwell@csaenvironmental.co.uk
w csaenvironmental.co.uk

Project	Land North of Cambridge Road, Linton	Drawing No.	CSA/5653/102	
Drawing Title	Photosheets	Date	November 2021	
Client	Taylor Wimpey Strategic Land	Drawn HG	Checked SG	Rev -

Approximate extent of Site



Photograph 18 View from public footpath 146/18, looking south towards Site.

Visualisation Type 1
Cylindrical projection
48% @ A3, 96% @ A1
19.11.2021, 11:55
Canon EOS 1100D 1.6x, Canon EF-S 18-55mm
HfoV 90°
Looking direction: South

CSA environmental
Dixies Barns, High Street,
Ashwell, Hertfordshire SG7 5NT
t 01462 743647
e ashwell@csaenvironmental.co.uk
w csaenvironmental.co.uk

Project	Land North of Cambridge Road, Linton	Drawing No.	CSA/5653/102		
Drawing Title	Photosheets	Date	November 2021		
Client	Taylor Wimpey Strategic Land	Drawn	HG	Checked	SG	Rev	-

Approximate extent of Site

Photograph 19 View from public footpath 146/18, looking south towards Site.

Visualisation Type 1
Cylindrical projection
48% @ A3, 96% @ A1
19.11.2021, 11:57
Canon EOS 1100D 1.6x, Canon EF-S 18-55mm
HfoV 90°
Looking direction: South

CSA environmental
Dixies Barns, High Street,
Ashwell, Hertfordshire SG7 5NT
t 01462 743647
e ashwell@csaenvironmental.co.uk
w csaenvironmental.co.uk

Project	Land North of Cambridge Road, Linton	Drawing No.	CSA/5653/102		
Drawing Title	Photosheets	Date	November 2021		
Client	Taylor Wimpey Strategic Land	Drawn	HG	Checked	SG	Rev	-

Approximate extent of Site

Eastern boundary

Mill Lane

Photograph 20 View from Mill Lane, looking south west towards Site.

Visualisation Type 1
Cylindrical projection
48% @ A3, 96% @ A1
19.11.2021, 12:13
Canon EOS 1100D 1.6x, Canon EF-S 18-55mm
HfoV 90°
Looking direction: South west

CSA environmental
Dixies Barns, High Street,
Ashwell, Hertfordshire SG7 5NT
t 01462 743647
e ashwell@csaenvironmental.co.uk
w csaenvironmental.co.uk

Project	Land North of Cambridge Road, Linton	Drawing No.	CSA/5653/102		
Drawing Title	Photosheets	Date	November 2021		
Client	Taylor Wimpey Strategic Land	Drawn	HG	Checked	SG	Rev	-

Photograph 21 View from west of Pocket Park, looking west towards Site.

Visualisation Type 1
Cylindrical projection
48% @ A3, 96% @ A1
19.11.2021, 11:25
Canon EOS 1100D 1.6x, Canon EF-S 18-55mm
HfoV 86°
Looking direction: West

CSA environmental
Dixies Barns, High Street,
Ashwell, Hertfordshire SG7 5NT
t 01462 743647
e ashwell@csaenvironmental.co.uk
w csaenvironmental.co.uk

Project	Land North of Cambridge Road, Linton	Drawing No.	CSA/5653/102	
Drawing Title	Photosheets	Date	November 2021	
Client	Taylor Wimpey Strategic Land	Drawn HG	Checked SG	Rev -

Approximate extent of Site

Photograph 22 View from Cambridge Road A1307, looking west towards Site.

Visualisation Type 1
Cylindrical projection
48% @ A3, 96% @ A1
19.11.2021, 11:28
Canon EOS 1100D 1.6x, Canon EF-S 18-55mm
HfoV 74°
Looking direction: West

CSA environmental
Dixies Barns, High Street,
Ashwell, Hertfordshire SG7 5NT
t 01462 743647
e ashwell@csaenvironmental.co.uk
w csaenvironmental.co.uk

Project	Land North of Cambridge Road, Linton	Drawing No.	CSA/5653/102		
Drawing Title	Photosheets	Date	November 2021		
Client	Taylor Wimpey Strategic Land	Drawn	HG	Checked	SG	Rev	-

Approximate extent of Site

Photograph 23 View from Long Lane, looking north towards Site.

Visualisation Type 1
Cylindrical projection
48% @ A3, 96% @ A1
19.11.2021, 11:30
Canon EOS 1100D 1.6x, Canon EF-S 18-55mm
HfoV 56°
Looking direction: North

CSA environmental
Dixies Barns, High Street,
Ashwell, Hertfordshire SG7 5NT
t 01462 743647
e ashwell@csaenvironmental.co.uk
w csaenvironmental.co.uk

Project	Land North of Cambridge Road, Linton	Drawing No.	CSA/5653/102		
Drawing Title	Photosheets	Date	November 2021		
Client	Taylor Wimpey Strategic Land	Drawn	HG	Checked	SG	Rev	-

Approximate extent of Site

Petrol station on Cambridge Road

Parish Church of St Mary the Virgin

Southern boundary

Photograph 24 View from Long Lane, looking north.

Visualisation Type 1
Cylindrical projection
48% @ A3, 96% @ A1
19.11.2021, 11:33
Canon EOS 1100D 1.6x, Canon EF-S 18-55mm
HfoV 90°
Looking direction: North

CSA environmental
Dixies Barns, High Street,
Ashwell, Hertfordshire SG7 5NT
t 01462 743647
e ashwell@csaenvironmental.co.uk
w csaenvironmental.co.uk

Project	Land North of Cambridge Road, Linton	Drawing No.	CSA/5653/102		
Drawing Title	Photosheets	Date	November 2021		
Client	Taylor Wimpey Strategic Land	Drawn	HG	Checked SG	Rev -

Approximate extent of Site

Southern boundary

Site

Rivey Lane Water Tower

Housing on Mill Lane

Cambridge Road A1307

Photograph 25 View from Long Lane, looking north towards Site.

Visualisation Type 1
Cylindrical projection
48% @ A3, 96% @ A1
19.11.2021, 11:35
Canon EOS 1100D 1.6x, Canon EF-S 18-55mm
HfoV 61°
Looking direction: North

CSA environmental
Dixies Barns, High Street,
Ashwell, Hertfordshire SG7 5NT
t 01462 743647
e ashwell@csaenvironmental.co.uk
w csaenvironmental.co.uk

Project	Land North of Cambridge Road, Linton	Drawing No.	CSA/5653/102	
Drawing Title	Photosheets	Date	November 2021	
Client	Taylor Wimpey Strategic Land	Drawn HG	Checked SG	Rev -

Approximate extent of Site

Hadstock
Road B1052

Photograph 26 View from Hadstock Road B1052, looking north east.

Visualisation Type 1
Cylindrical projection
48% @ A3, 96% @ A1
19.11.2021, 11:41
Canon EOS 1100D 1.6x, Canon EF-S 18-55mm
HfoV 90°
Looking direction: North east

CSA environmental
Dixies Barns, High Street,
Ashwell, Hertfordshire SG7 5NT
t 01462 743647
e ashwell@csaenvironmental.co.uk
w csaenvironmental.co.uk

Project	Land North of Cambridge Road, Linton	Drawing No.	CSA/5653/102		
Drawing Title	Photosheets	Date	November 2021		
Client	Taylor Wimpey Strategic Land	Drawn	HG	Checked	SG	Rev	-

Photograph 27 View from public bridleway 146/20, looking south.

Visualisation Type 1
Cylindrical projection
48% @ A3, 96% @ A1
19.11.2021, 12:43
Canon EOS 1100D 1.6x, Canon EF-S 18-55mm
HfoV 52°
Looking direction: South

CSA environmental
Dixies Barns, High Street,
Ashwell, Hertfordshire SG7 5NT
t 01462 743647
e ashwell@csaenvironmental.co.uk
w csaenvironmental.co.uk

Project	Land North of Cambridge Road, Linton	Drawing No.	CSA/5653/102		
Drawing Title	Photosheets	Date	November 2021		
Client	Taylor Wimpey Strategic Land	Drawn	HG	Checked	SG	Rev	-

Photograph 28 View from Rivey Wood, looking south towards Site.

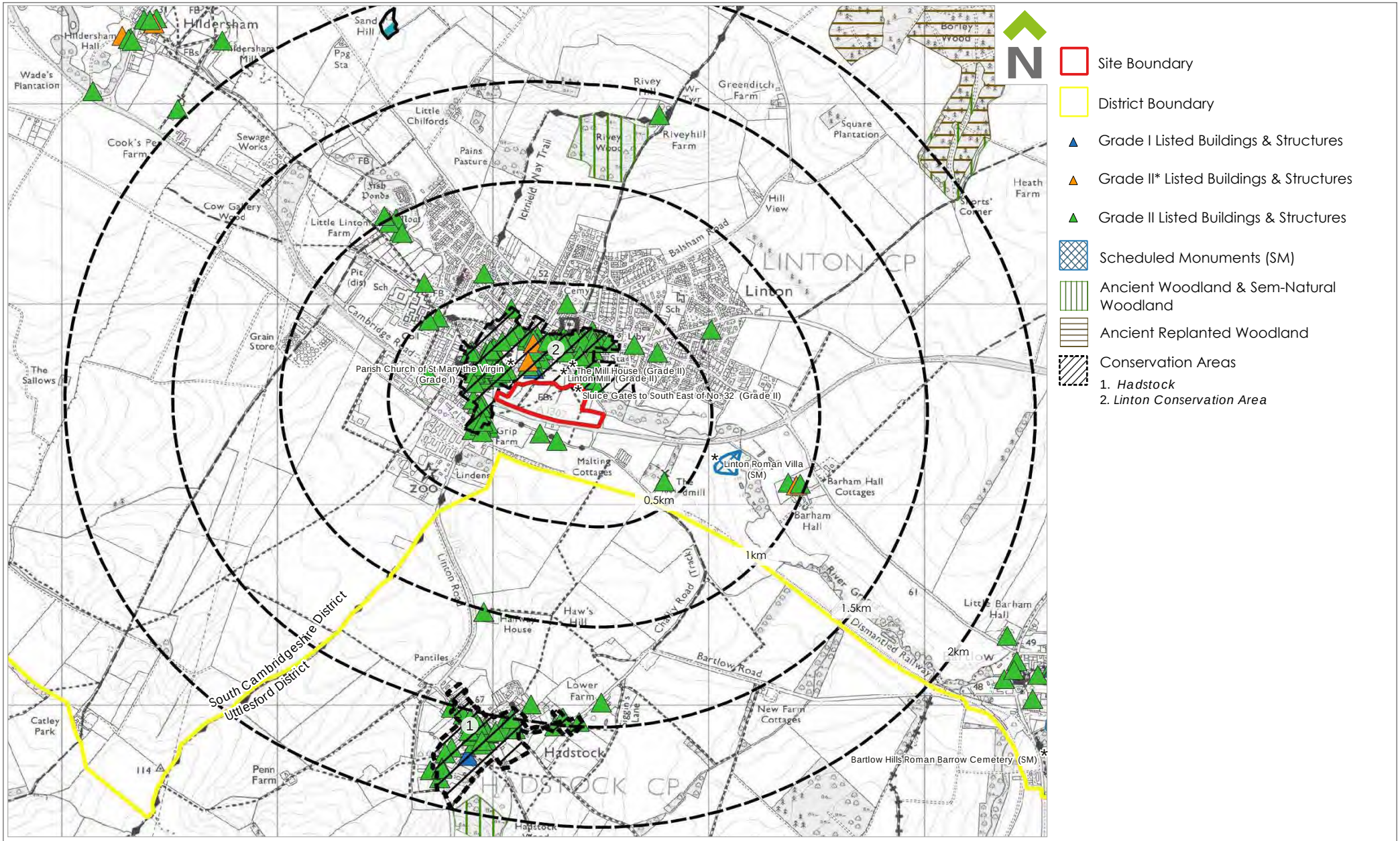
Visualisation Type 1
Cylindrical projection
48% @ A3, 96% @ A1
19.11.2021, 12:54
Canon EOS 1100D 1.6x, Canon EF-S 18-55mm
HfoV 88°
Looking direction: South

CSA environmental
Dixies Barns, High Street,
Ashwell, Hertfordshire SG7 5NT
t 01462 743647
e ashwell@csaenvironmental.co.uk
w csaenvironmental.co.uk

Project	Land North of Cambridge Road, Linton	Drawing No.	CSA/5653/102		
Drawing Title	Photosheets	Date	November 2021		
Client	Taylor Wimpey Strategic Land	Drawn	HG	Checked	SG	Rev	-

Appendix D

Designations and Local Plan Map



CSA environmental

Dixies Barns, High Street,
Ashwell, Hertfordshire SG7 5NT

t 01462 743647
e ashwell@csaenvironmental.co.uk
w csaenvironmental.co.uk

Project	Land North of Cambridge Road, Linton	Date October 2021	Drawing No. CSA/5653/103
Drawing Title	Designations and Local Policy Plan	Scale @ A4 NTS	Rev -
Client	Taylor Wimpey Strategic Land	Drawn AM	Checked SG

Appendix E

National Landscape Policy Context

1.0 APPENDIX E – NATIONAL LANDSCAPE POLICY CONTEXT

National Planning Policy Framework (July 2021)

1.1 National policy is set out in the National Planning Policy Framework ('NPPF') and those parts relevant to this assessment are summarised below.

1.2 Paragraphs 10 and 11 of the NPPF state that at the heart of the Framework is a presumption in favour of sustainable development, which should be applied in relation to both plan-making and decision-taking.

1.3 Paragraph 20 of the NPPF states that strategic policies should set out an overall strategy for the pattern, scale and design quality of places, and make sufficient provision for, among other elements, the *'(d) conservation and enhancement of the natural, built and historic environment, including landscapes and green infrastructure, and planning measures to address climate change mitigation and adaptation.'*

1.4 Section 12 of the NPPF sets out that planning policies and decisions should support the creation of high quality, beautiful and sustainable buildings and places. Paragraph 127 states that '*... design policies should be developed with local communities so they reflect local aspirations, and are grounded in an understanding and evaluation of each area's defining characteristics*.' Paragraph 128 requires local authorities to prepare design guides and codes which act as a framework to reflect local character and design preferences to create high quality designed places which are beautiful and distinctive.

1.5 Paragraph 130 states that planning policies and decisions, should ensure that developments, amongst others:

- '*will function well and add to the overall quality of the area, not just for the short term but over the lifetime of the development;*
- *are visually attractive as a result of good architecture, layout and effective landscaping;*
- *are sympathetic to local character and history, including the surrounding built environment and landscape setting, while not preventing or discouraging appropriate innovation or change...*'

1.6 Paragraph 131 highlights the importance of new and retained trees to the character and quality of urban environments, with appropriate species choice for the location and the needs of all users.

1.7 Paragraph 132 states that the design quality should be integral to the evolution and assessment of proposals, and paragraph 134 goes on to state that poorly

designed development should be refused, particularly where it does not follow local or government design guidance.

1.8 Section 15 of the NPPF deals with conserving and enhancing the natural environment. Paragraph 174 of the document states that the planning system should contribute to the protection and enhancement of the natural and local environment through, among other things, protecting and enhancing valued landscapes, '*… (in a manner commensurate with their statutory status or identified quality in the development plan)*'. The paragraph also outlines that the planning system should recognise the, '*… intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland.'*

1.9 Paragraph 175 highlights that plans should:

'*… distinguish between the hierarchy of international, national and locally designated sites; allocate land with the least environmental or amenity value, where consistent with other policies in this Framework; 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.*'

1.10 Paragraph 180 notes that in the process of determining planning applications, local planning authorities should apply several principles. Among these, the paragraph notes that, '*(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*'.

Planning Practice Guidance

1.11 The Planning Practice Guidance ('PPG') as relevant to this assessment covers landscape and the natural environment, and the design of new developments. The PPG may be out of date in its reference to NPPF paragraph numbers, and where this is the case, the latest paragraph number has been included in the text in square brackets.

1.12 Paragraph 001 (ID 26-001-20191001) of the Design: process and tools section sets out the purpose of the guidance, which aims to explain the process and tools that can be employed to achieve well-designed places. The guidance refers to paragraph 130 [134] of the NPPF which relates to ensuring good design, and states that the section should be read in conjunction with the National Design Guide (published Oct, 2019), which it notes should be used in both plan-making and decision making. Ten good design characteristics are

identified in the National Design Guide, and these are set out as follows in the PPG:

- Context
- Identity
- Built form
- Movement
- Nature
- Public places
- Uses
- Homes and buildings
- Resources
- Lifespan.

1.13 Paragraphs 006 and 007 deal with masterplans, stating that they should be site specific and should '*... set the vision and implementation strategy for a development...* '. Paragraph 006 notes that they may need to be accompanied by other technical reports including landscape assessment and proposals for securing biodiversity net gain.

1.14 The Natural environment section of the guidance aims to explain the key issues to consider in relation to the implementation of policies to protect and enhance the natural environment, including local requirements.

1.15 Paragraph 004 defines Green Infrastructure, while in paragraph 005 it explains its importance as a natural capital asset that provides multiple benefits, including enhanced biodiversity, landscapes and urban cooling. In paragraph 006 the guidance sets out the planning goals green infrastructure can assist in achieving, and these are:

- *Building a strong, competitive economy;*
- *Achieving well-designed places;*
- *Promoting healthy and safe communities;*
- *Mitigating climate change, flooding and coastal change;*
- *Conserving and enhancing the natural environment.*

1.16 The final paragraph (008) in the green infrastructure sub-section notes that:

'*Green infrastructure opportunities and requirements need to be considered at the earliest stages of development proposals, as an integral part of development and infrastructure provision, and taking into account existing natural assets and the most suitable locations and types of new provision.*'

1.17 Within the Biodiversity, geodiversity and ecosystems section, the topic of net gain has been included. Paragraph 020 describes net gain as '*… an approach to development that leaves the natural environment in a measurably better state than it was beforehand. Net gain is an umbrella term for both biodiversity net gain and wider environmental net gain*.'

1.18 In the Landscape section of the guidance, paragraph 036 refers to that part of paragraph 170 [174] of the NPPF which deals with the recognition of the intrinsic character and beauty of the countryside in local plans, and the need for strategic policies to '*… provide for the conservation and enhancement of landscapes. This can include nationally and locally-designated landscapes but also the wider countryside*.' Paragraph 036 goes on to note that:

'*Where landscapes have a particular local value, it is important for policies to identify their special characteristics and be supported by proportionate evidence. Policies may set out criteria against which proposals for development affecting these areas will be assessed. Plans can also include policies to avoid adverse impacts on landscapes and to set out necessary mitigation measures, such as appropriate design principles and visual screening, where necessary. The cumulative impacts of development on the landscape need to be considered carefully*.'

National Design Guide

1.19 The National Design Guide (2019) provides guidance to illustrate '*… how well-designed places that are beautiful, enduring and successful can be achieved in practice*.'

1.20 The guidance identifies ten good design characteristics and the following are of most relevance to landscape and visual assessment (our emphasis):

- Context is described as *'… the location of the development and the attributes of its immediate, local and regional surroundings.'* The Guide goes on to state that,

  'An understanding of the context, history and cultural characteristics of a site, neighbourhood and region influences the location, siting and design of new developments. It means they are well grounded in their locality and more likely to be acceptable to existing communities. Creating a positive sense of place helps to foster a sense of belonging and contributes to well-being, inclusion and community cohesion.

- *The identity or character of a place comes from the way that buildings, streets and spaces, landscape and infrastructure combine together and how people experience them. It is not just about the buildings and how a place looks, but how it engages with all of the senses. Local character*

makes places distinctive. Well-designed, sustainable places with a strong identity give their users, occupiers and owners a sense of pride, helping to create and sustain communities and neighbourhoods.

- *<u>Nature</u> contributes to the quality of a place, and to people's quality of life, and it is a critical component of well-designed places. Natural features are integrated into well-designed development. They include natural and designed landscapes, high quality public open spaces, street trees, and other trees, grass, planting and water.'*

1.21 The National Model Design Code (July, 2021) expands upon the ten characteristics of good design providing an overarching framework for design.

Appendix F

Concept Masterplan

A children's play area at the centre of the development and set within the the public open space will be overlooked by the new residential development and extensive recreational routes. Its central location will ensure it is accessible to all and both new and existing residents of Linton, promoting an active and integrated community. The play area will be sympathetically designed with a natural characteristic to respect the edge of settlement location and the immediate character of the development.

MILL LANE north to HIGH STREET, LINTON

Potential location for two large SuDS basins designed to provide wildlife and habitat benefits forming an integral part of the Site's green infrastructure offering. The basins will be located at the end of the vista through the development and will create a link to the River Granta.

The new wetland meadow walk will utilise the flood plain, turning this constraint into an opportunity. Wetland habitats will be created, with new woodland, thicket and tree planting tolerant of wetter ground conditions, wetland wildflower meadow mixes and informal mown footways, will create a landscape which will have both social and environmental benefits. The recreational routes will connect into the public footpaths, linking the new homes with the open space and beyond to Linton. These spaces will link the woodland to the east and the west of the development and will provide the opportunity for informal play, dog walking and picknicking, with potential viewing platforms over the River Granta, further creating a holistic environment for both people and wildlife to flourish.

New recreational footways will meander through the open space and wetland meadows, providing opportunities for informal play and recreation. Trim-trail stations along these routes will also promote a healthy and active community, providing a range of play opportunities for all ages and abilities.

A1307 CAMBRIDGE RD north west to SAWSTON & CAMBRIDGE

B1052 HADSTOCK RD south to SAFFRON WALDEN

A1307 CAMBRIDGE RD east to HORSEHEATH & HAVERHILL

Retaining the woodland habitat in the western part of the Site, will form part of a wildlife area, where a number of ecological enhancements could be implemented to help the Site work towards achieving a biodiversity net gain. Wildlife ponds, bat and bird boxes, log piles and wildflower woodland meadows will create a space where wildlife can thrive. Interpretation boards will inform residents of the wildlife area's ecological offering. The wildlife area will also connect into the wetland meadows walk, creating a river corridor and connection into the heart of Linton.

Proposed vehicular access point to be taken from Cambridge Road.

New boundary planting will strengthen the existing vegetation along the Site's boundaries, and will enhance the development's strong green framework, befitting wildlife corridors and support its continued visual containment.

New community orchards will provide further habitat enhancements at the heart of the development, as well as social benefits, including a space to 'pick your own' and informal recreation.

Orientating the new homes to overlook the areas of more formal open space, strengthened with avenue tree planting, will frame the important vista across the Site towards Linton Water Tower.

New homes along the Site's southern boundary adjacent to Cambridge Road, will need to be designed to mitigate against any acoustic impacts associated with Cambridge Road. Fronting the road, deeper rear gardens and new tree and thicket planting will help in achieving this.

Potential landscaped area at the junction of Mill Lane and Cambirdge Road, will create a gateway feature into Linton when traveling west along the A1307. This space will provide glimpsed views across the development, creating a sense of arrival to Linton.

SUBJECT TO TECHNICAL INPUTS

+40m (AOD) +45m (AOD) +50m (AOD)

HORN LANE MILL LANE HADSTOCK ROAD LONG LANE CAMBRIDGE ROAD A1307 LINTON

L1 L2 L3 L4 L5 L6 L7 L8 L9 L10 L11

WETLAND MEADOW WALK WILDLIFE WOODLAND AREA WILDLIFE POND LEAP SuDS Orchard PETROL STATION

N 0 10 20 30 40 50 m

- Site Boundary: **Aprx. 6.80ha**
- Potential vehicular access point
- Developable area **Aprx. 2.75ha** **Up to 85 units @ 30dph**
- Public open space to include thicket, tree and wildflower planting
- Orchard and wildlife areas
- Location for children's play area
- Location for Trim-trail stations
- Potential location for sustainable drainage features (SuDS) with new habitats
- Location for Wildlife Ponds
- Viewing platforms over the River Granta
- Primary street
- Secondary streets within the development
- Lanes and private drives
- Avenue tree planting
- Pedestrian and cycle routes **(Routes within wetland meadow to be boardwalks)**
- Landscped gateway feature

INFLUENCES & CONTEXT

- Existing vegetation
- Local road network
- Public Rights of Way
- Existing contours (AOD: Above Ordnance Datum) +35m +40m
- Water bodies and watercourses **River Granta**
- Listed Buildings:
  - L1. Osnaburgh house **(Grade II*)**
  - L2. United Reformed Church **(Grade II)**
  - L3. Springfield Cottage **(Grade II)**
  - L4. Barn & Pump to north of The Guildhall **(Grade II)**
  - L5. The Guildhall **(Grade II)**
  - L6. Church Cottage **(Grade II)**
  - L7. Parish Church of St Mary the Virgin **(Grade I)**
  - L8. Mill Brook **(Grade II)**
  - L9. Linton Mill **(Grade II)**
  - L10. The Manor House **(Grade II)**
  - L11. The Mill House **(Grade II)**

NOTE:
Please refer to ***CSA/5653/105*** for the Site Opportunities & Influences

Rev	Date	By	Description
A	19.10.21	JC	Amended with client comments

CSA environmental
Dixies Barns, High Street, Ashwell, Hertfordshire SG7 5NT
t 01462 743647
e ashwell@csaenvironmental.co.uk
w csaenvironmental.co.uk

Project	Land North of Cambridge Road **LINTON**		
Title	Concept Masterplan		
Client	Taylor Wimpey Strategic Land		
Scale	1:1250 @ A2	Drawn	JC
Date	October 2021	Checked	CS
Drawing No.	CSA/5653/106	Rev	A

Appendix G

Methodology

METHODOLOGY FOR LANDSCAPE AND VISUAL OVERVIEW

M1 In landscape and visual impact assessment, a distinction is normally drawn between *landscape/townscape effects* (i.e. effects on the character or quality of the landscape (or townscape), irrespective of whether there are any views of the landscape, or viewers to see them) and *visual effects* (i.e. effects on people's views of the landscape, principally from public rights of way and areas with public access, but also private views from residential properties). Thus, a development may have extensive landscape effects but few visual effects if, for example, there are no properties or public viewpoints nearby. Or alternatively, few landscape effects but substantial visual effects if, for example, the landscape is already degraded or the development is not out of character with it, but can clearly be seen from many residential properties and/or public areas.

M2 The assessment of landscape & visual effects is less amenable to scientific or statistical analysis than some environmental topics and inherently contains an element of subjectivity. However, the assessment should still be undertaken in a logical, consistent and rigorous manner, based on experience and judgement, and any conclusions should be able to demonstrate a clear rationale. To this end, various guidelines have been published, the most relevant of which, for assessments of the effects of a development, rather than of the character or quality of the landscape itself, form the basis of the assessment and are as follows:

- 'Guidelines for Landscape & Visual Impact Assessment', produced jointly by the Institute of Environmental Assessment and the Landscape Institute (GLVIA 3rd edition 2013); and
- 'An Approach to Landscape Character Assessment', October 2014 (Christine Tudor, Natural England) to which reference is also made. This stresses the need for a holistic assessment of landscape character, including physical, biological and social factors.

LANDSCAPE/TOWNSCAPE EFFECTS

M3 Landscape/townscape quality is a subjective judgement based on the condition and characteristics of a landscape/townscape. It will often be informed by national, regional or local designations made upon it in respect of its quality e.g. AONB. Sensitivity relates to the inherent value placed on a landscape / townscape and the ability of that landscape/townscape to accommodate change.

Landscape sensitivity can vary with:

(i) existing land uses;
(ii) the pattern and scale of the landscape;
(iii) visual enclosure/openness of views, and distribution of visual receptors;
(iv) susceptibility to change;
(v) the scope for mitigation, which would be in character with the existing landscape; and
(vi) the condition and value placed on the landscape.

M4 The concept of landscape/townscape value is considered in order to avoid consideration only of how scenically attractive an area may be, and thus to avoid undervaluing areas of strong character but little scenic beauty. In the process of

making this assessment, the following factors, among others, are considered with relevance to the site in question: landscape quality (condition), scenic quality, rarity, representativeness, conservation interest, recreation value, perceptual aspects and associations.

M5 Nationally valued landscapes are recognised by designation, such as National Parks and Areas of Outstanding Natural Beauty ('AONB') which have particular planning policies applied to them. Nationally valued townscapes are typically those covered by a Conservation Area or similar designation. Paragraph 174 of the current NPPF outlines that planning policies and decisions should contribute to and enhance the natural and local environment by protecting and enhancing valued landscapes *'…in a manner commensurate with their statutory status or identified quality in the development plan'.*

M6 There is a strong inter-relationship between landscape/townscape quality, value and sensitivity as high quality/value landscapes/townscapes usually have a low ability to accommodate change.

M7 For the purpose of our assessment, landscape/townscape quality, value and sensitivity is assessed using the criteria in Tables LE1 and LE2. Typically, landscapes/townscapes which carry a quality designation and which are otherwise attractive or unspoilt will in general be more sensitive, while those which are less attractive or already affected by significant visual detractors and disturbance will be generally less sensitive.

M8 The magnitude of change is the scale, extent and duration of change to a landscape arising from the proposed development and was assessed using the criteria in Table LE3.

M9 Landscape/townscape effects were assessed in terms of the interaction between the magnitude of the change brought about by the development and the quality, value & sensitivity of the landscape resource affected. The landscape/townscape effects can be either beneficial, adverse or neutral. Landscape effects can be direct (i.e. impact on physical features, e.g. landform, vegetation, watercourses etc.), or indirect (i.e. impact on landscape character as a result of the introduction of new elements within the landscape). Direct visual effects result from changes to existing views.

M10 In this way, landscapes/townscapes of the highest sensitivity, when subjected to a high magnitude of change from the proposed development, are likely to give rise to 'substantial' landscape/townscape effects which can be either adverse or beneficial. Conversely, landscapes of low sensitivity, when subjected to a low magnitude of change from the proposed development, are likely to give rise to only 'slight' or neutral landscape effects. Beneficial landscape effects may arise from such things as the creation of new landscape features, changes to management practices and improved public access. For the purpose of this assessment the landscape/townscape effects have been judged at completion of the development and in year 15. This approach acknowledges that landscape/townscape effects can reduce as new planting/mitigation measures become established and achieve their intended objectives.

VISUAL EFFECTS

M11 Visual effects are concerned with people's views of the landscape/townscape and the change that will occur. Like landscape effects, viewers or receptors are categorised by their sensitivity. For example, views from private dwellings are generally of a higher sensitivity than those from places of work.

M12 In describing the content of a view the following terms are used:

- No view - no views of the development;
- Glimpse - a fleeting or distant view of the development, often in the context of wider views of the landscape;

- Partial - a clear view of part of the development only;
- Filtered - views to the development which are partially screened, usually by intervening vegetation - the degree of filtering may change with the seasons;
- Open - a clear view to the development.

M13 The sensitivity of the receptor varies according to its susceptibility to a particular type of change, or the value placed on it (e.g. views from a recognised beauty spot will have a greater sensitivity). Visual sensitivity was assessed using the criteria in Table VE1.

M14 The magnitude of change is the degree in which the view(s) may be altered as a result of the proposed development and will generally decrease with distance from its source, until a point is reached where there is no discernible change. The magnitude of change in regard to the views was assessed using the criteria in Table VE2.

M15 Visual effects were then assessed in terms of the interaction between the magnitude of the change brought about by the development and also the sensitivity of the visual receptor affected.

M16 As with landscape effects, a high sensitivity receptor, when subjected to a high magnitude of change from the proposed development, is likely to experience 'substantial' visual effects which can be either adverse or beneficial. Conversely, receptors of low sensitivity, when subjected to a slight magnitude of change from the proposed development, are likely to experience only 'slight' or neutral visual effects, which can be either beneficial or adverse.

M17 Unless specific slab levels of buildings have been specified, the assessment has assumed that slab levels will be within 750mm of existing ground level.

MITIGATION AND RESIDUAL EFFECTS

M18 Mitigation measures are described as those measures, including any process or activity, designed to avoid, reduce and compensate for adverse landscape and/or visual effects resulting from the proposed development.

M19 In situations where proposed mitigation measures are likely to change over time, as with planting to screen a development, it is important to make a distinction between any likely effects that will arise in the short-term and those that will occur in the long-term or 'residual effects' once mitigation measures have established. In this assessment, the visual effects of the development have been considered at completion of the entire project and at 15 years thereafter.

M20 Mitigation measures can have a residual, positive impact on the effects arising from a development, whereas the short-term impact may be adverse.

ASSESSMENT OF EFFECTS

M21 The assessment concisely considers and describes the main landscape/townscape and visual effects resulting from the proposed development. The narrative text demonstrates the reasoning behind judgements concerning the landscape and visual effects of the proposals.

CUMULATIVE EFFECTS

M22 Cumulative effects are *'the additional changes caused by a proposed development in conjunction with other similar developments or as the combined effect of a set of developments, taken together.'*

M23 In carrying out landscape assessment it is for the author to form a judgement on whether or not it is necessary to consider any planned developments and to form a judgement on how these could potentially affect a project.

Table LE 1

LANDSCAPE / TOWNSCAPE QUALITY AND VALUE

Description of Landscape/Townscape Quality and Value

Very High	High	Medium	Low
Landscape Quality: Intact and very attractive landscape which may be nationally recognised/designated for its scenic beauty. e.g. National Park, Area of Outstanding Natural Beauty or World Heritage Site. **Townscape Quality**: A townscape of very high quality which is unique in its character, and recognised nationally/internationally, e.g. World Heritage Site **Value**: Very high quality landscape or townscape with Statutory Designation for landscape/townscape quality/ value, e.g. National Park, World Heritage Site, Registered Park or Garden. Contains rare elements or significant cultural/historical associations.	**Landscape Quality**: A landscape, usually combining varied topography, historic features and few visual detractors. A landscape known and cherished by many people from across the region. e.g. County Landscape Site such as a Special Landscape Area. **Townscape Quality**: A well designed townscape of high quality with a locally recognised and distinctive character e.g. Conservation Area **Value**: High quality landscape/townscape or lower quality landscape with un-fettered public access, (e.g. commons, public park) or with strong cultural associations. May have important views out to landmarks/designated landscapes and few detracting features. May possess perceptual qualities of tranquility or wildness.	**Landscape Quality**: Non-designated landscape area, generally pleasant but with no distinctive features, often displaying relatively ordinary characteristics. May have detracting features. **Townscape Quality**: A typical, pleasant townscape with a coherent urban form but with no distinguishing features or designation for quality. **Value**: An ordinary landscape/townscape of local value which may have some detracting features. No recognised statutory designations for landscape/townscape quality. A landscape which may have limited public access and/ or have pleasant views out, or be visible in public views.	**Landscape / Townscape Quality**: Unattractive or degraded landscape/townscape, affected by numerous detracting elements e.g. industrial areas, infrastructure routes and un-restored mineral extractions. **Value**: Landscape/townscape generally of lower quality. A landscape with limited public access, no designations or recognised cultural significance. Limited public views.

CSA environmental

Table LE 2

LANDSCAPE / TOWNSCAPE SENSITIVITY

Description of Sensitivity	Very High	High	Medium	Low
	A landscape/townscape with a very low ability to accommodate change such as a nationally designated landscape.	A landscape/townscape with limited ability to accommodate change because such change may lead to some loss of valuable features or elements. Development of the type proposed could potentially be discordant with the character of the landscape/townscape.	A landscape/townscape with reasonable ability to accommodate change. Change may lead to a limited loss of some features or characteristics. Development of the type proposed would not be discordant with the character of the landscape/ townscape.	A landscape/townscape with good ability to accommodate change. Change would not lead to a significant loss of features or characteristics, and there would be no significant loss of character or quality. Development of the type proposed would not be discordant with the landscape/ townscape in which it is set and may result in a beneficial change.

CSA environmental

Table LE 3 LANDSCAPE / TOWNSCAPE MAGNITUDE OF CHANGE

Description of the Change predicted	Substantial	Moderate	Slight	Negligible	Neutral
	Total loss of or significant impact on key characteristics, features or elements	Partial loss of or impact on key characteristics, features or elements	Minor loss of or alteration to one or more key landscape/ townscape characteristics, features or elements	Very minor loss or alteration to one or more key landscape/ townscape characteristics, features or elements	No loss or alteration of key landscape/ townscape characteristics, features or elements

Table LE 4 LANDSCAPE / TOWNSCAPE EFFECTS

Description of the Effect	Substantial	Moderate	Slight	Negligible	Neutral
	The proposals will alter the landscape/ townscape in that they: • will result in substantial change in the character, landform, scale and pattern of the landscape/townscape; • are visually intrusive and would disrupt important views; • are likely to impact on the integrity of a range of characteristic features and elements and their setting; • will impact a high quality or highly vulnerable landscape; • cannot be adequately mitigated.	The proposals: • noticeably change the character, scale and pattern of the landscape/townscape; • may have some impacts on a landscape/townscape of recognised quality or on vulnerable and important characteristic features or elements. • are a noticable element in key views; • not possible to fully mitigate.	The proposals: • do not quite fit the landform and scale of the landscape/townscape and will result in relatively minor changes to existing landscape character; • will impact on certain views into and across the area; • mitigation will reduce the impact of the proposals but some minor residual effects will remain.	The proposals: • complement the scale, landform and pattern of the landscape/townscape; • development may occupy only a relatively small part of the Site; • maintain the majority of landscape features; • incorporates measures for mitigation to ensure the scheme will blend in well with the landscape/townscape and mitigates any loss of vegetation.	The proposals: • maintain existing landscape/townscape character; • has no impact on landscape features, such as trees, hedgerows, watercourses, etc.; • utilises a highly degraded landscape or brownfield site.

Footnote:
1. Each level (other than neutral) of change identified can be either regarded as 'beneficial' or 'adverse'. The above table relates to adverse landscape effects, however where proposals complement or enhance landscape character, these will have a comparable range of benefical landscape effects.

Table VE 1

VISUAL SENSITIVITY

Description of the Receptor	High	Medium	Low
	Residential properties with predominantly open views from windows, garden or curtilage. Views will normally be from ground and first floors and from two or more windows of rooms mainly in use during the day. Users of Public Rights of Way in sensitive or generally unspoilt areas. Predominantly non-motorised users of minor or unclassified roads in the countryside. Views from within an Area of Outstanding Natural Beauty, National Park, World Heritage Ste or Conservation Area and views for visitors to recognised viewpoints or beauty spots. Users of outdoor recreational facilities with predominantly open views where the purpose of that recreation is enjoyment of the countryside - e.g. Country Parks, National Trust or other access land etc.	Residential properties with partial views from windows, garden or curtilage. Views will normally be from first floor windows only, or an oblique view from one ground floor window, or may be partially obscured by garden or other intervening vegetation. Users of Public Rights of Way in less sensitive areas or where there are significant existing intrusive features. Users of outdoor recreational facilities with restricted views or where the purpose of that recreation is incidental to the view e.g. sports fields. Schools and other institutional buildings, and their outdoor areas. Users of minor or unclassified roads in the countryside, whether motorised or not.	People in their place of work. Users of main roads or passengers in public transport on main routes. Users of outdoor recreational facilities with restricted views and where the purpose of that recreation is unrelated to the view e.g. go-karting track.

CSA environmental

Table VE 2 VISUAL MAGNITUDE OF CHANGE

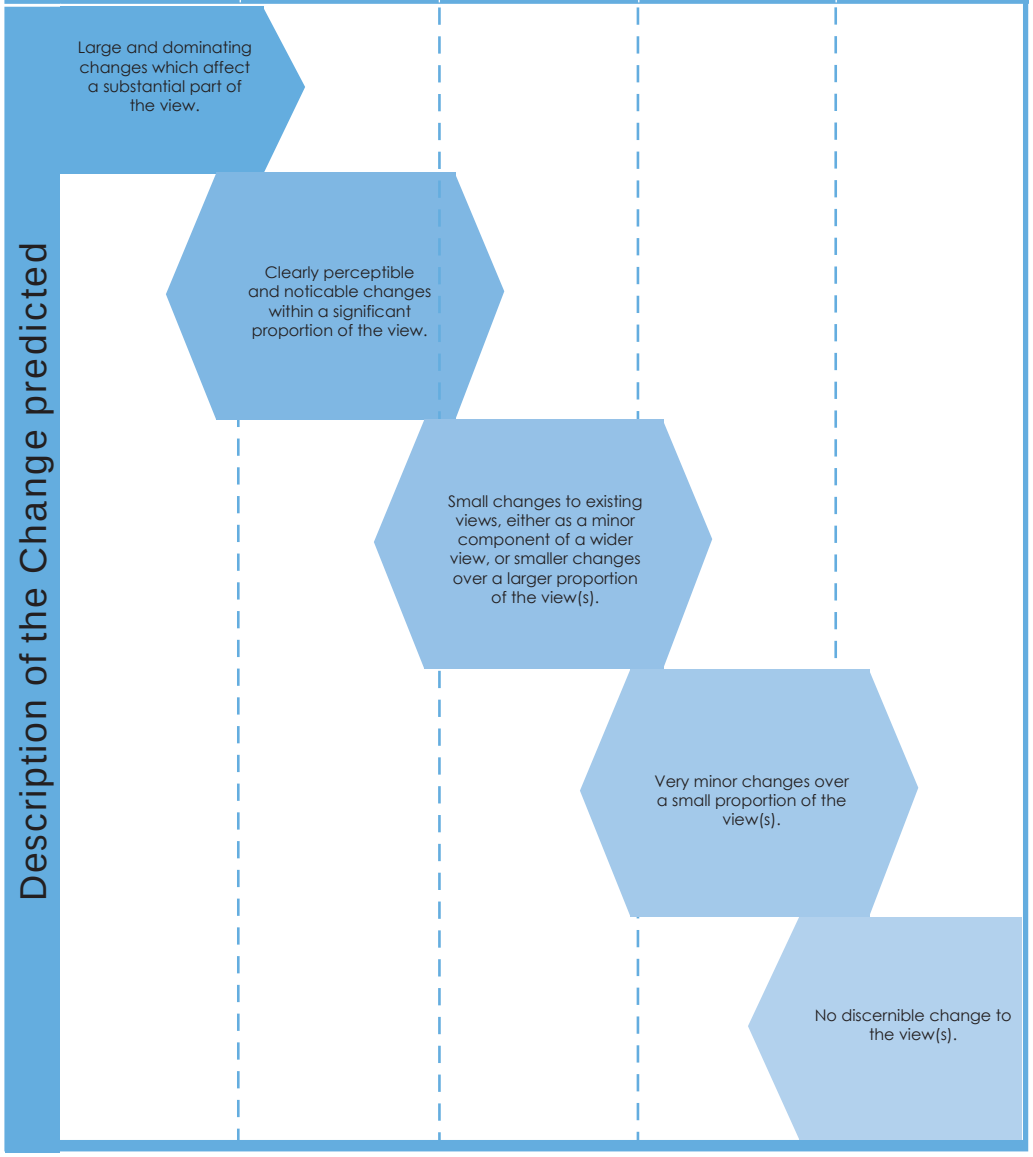
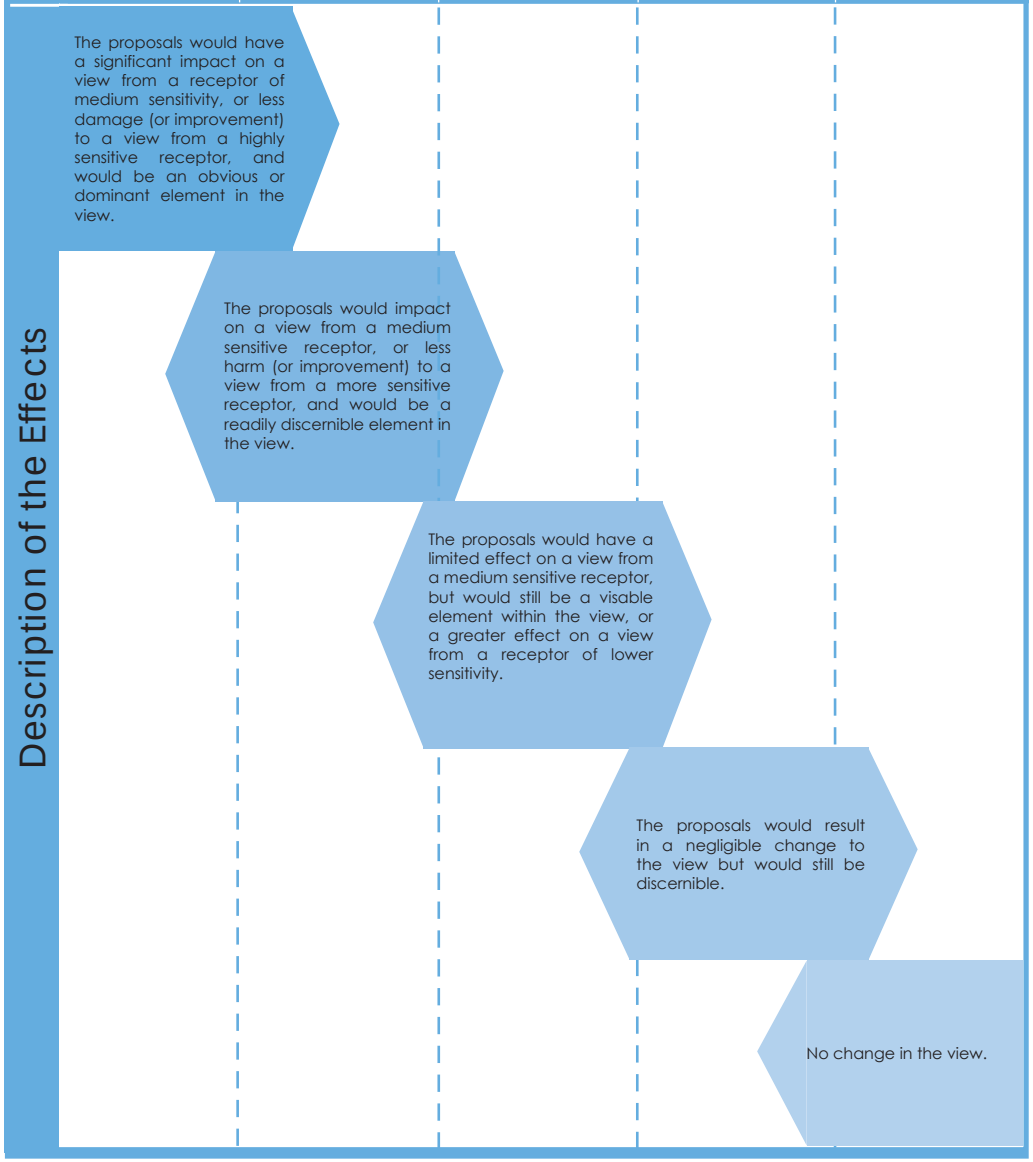


Table VE 3 VISUAL EFFECTS



CSA environmental

Footnote:
1. Each level (other than neutral) of change identified can be either regarded as 'beneficial' or 'adverse'.

CSA
environmental

Dixies Barns, High Street, Ashwell,
Hertfordshire SG7 5NT
t 01462 743647
e ashwell@csaenvironmental.co.uk
w csaenvironmental.co.uk

Suite 1, Deer Park Business Centre, Eckington,
Pershore, Worcestershire WR10 3DN
t 01386 751100
e pershore@csaenvironmental.co.uk
w csaenvironmental.co.uk

Office 21, Citibase, 95 Ditchling Road,
Brighton BN1 4ST
t 01273 573871
e brighton@csaenvironmental.co.uk
w csaenvironmental.co.uk

9/B.2 Southgate Chambers, 37-39 Southgate
Street, Winchester SO23 9EH
t 01962 587200
e winchester@csaenvironmental.co.uk
w csaenvironmental.co.uk

Appendix 10: Transport Strategy

A Transport Strategy prepared on behalf of

TAYLOR WIMPEY UK LIMITED

In respect of

Land to the north of A1307, Cambridge Road, LINTON

Transport Strategy

December 2021

Document Management

Document Review

	Status	Author	Checker	Approver	Date
-	Draft				
02	Issue	PK	JC	JC	09 | 12 | 21

Issued by:

Bristol
Cambridge
London
Manchester
Oxford
Welwyn Garden City

Transport Planning Associates
The Stables
7 Chesterton Mill
French's Road
Cambridge
CB4 3NP

01223 455385
cambridge@tpa.uk.com
www.tpa.uk.com

Contents Page

List of Tables

List of Figures

List of Appendices

1 Introduction

1.1 Transport Planning Associates ("TPA") is advising Taylor Wimpey UK Limited in collaboration with the landowner to support the promotion of land to the north of Cambridge Road, Linton ('the Site') to promote land north of the A1307 (Cambridge Road), for inclusion in the emerging Greater Cambridge Joint Local Plan. The Site has the potential for development for up to 85 dwellings and these submissions form part of a series of representations, presenting a vision for the development of the site. In particular these submissions consider the Sites suitability for development, demonstrating that a development would be sustainable and meet objectives to deliver inclusive communities that meet the needs of local residents.

1.2 In response to the 'call for sites' process, the Greater Cambridge Council prepared a Site Assessment proforma for all HELAA sites and in respect of the land north of Cambridge Road, presented its assessment under Site Reference: 51721. In respect of transport matters, the Greater Cambridge Council considered three topic specific issues:

- Access to Services and Facilities;
- Site Access; and,
- Transport and Roads.

1.3 Each topic specific issue is considered against a Red, Amber and Green assessment, which taken together with other topic matters, presents an overall assessment outcome.

1.4 Overall, these submissions demonstrate that in transport terms the site can be accessed by all necessary transport modes, will integrate into the local setting of Linton and is appropriately located to local amenities, facilities and services to encourage travel by sustainable modes.

1.5 These representations, consider the Access to Services and Facilities, Site Access and Transport and Roads as part of a contextual assessment of highway and transport matters.

1.6 In the following section of these representations, it is demonstrated that the Sites development is entirely consistent with the sustainable transport objectives of the National Planning Policy Framework ("NPPF") and will meet the requirements of the emerging Joint Local Plan to encourage sustainable development.

1.7 Confirming the Sites '*Green*' assessment as part of the HELAA exercise, section three will examine further the context of the Site, demonstrating that the Site will support the principle of 20-minute neighbourhoods, where the day-to-day needs of residents can be met within Linton. This is further supported through an examination of the local travel patterns of the community of Linton that are contained in section 4.

1.8 Section 5, presents a proposed means of access and, although the HELAA review provides an assessment rating of 'Amber', it is suggested that ***"there are access constraints, but these could be over through assessment"***. In addition, in section 5, a response is presented to the Transport and Road topic issue and again, whilst the assessment rating is 'Amber' it is accepted that ***"There are existing capacity issues on the A1307 which cause rat running onto other roads, the applicant must undertake cumulative junction capacity analysis along the A1307. Any potential impact on the functioning of trunk roads and/or local roads could be reasonably mitigated."***

1.9 A short conclusion is presented in section 6.

2 The National Planning Policy Framework ("NPPF")

2.1 The purpose of the planning system is to contribute to the achievement of sustainable development and the NPPF defines three overarching objectives:

a) **an economic objective** – to help build a strong, responsive and competitive economy, by ensuring that sufficient land of the right types is available in the right places and at the right time to support growth, innovation and improved productivity; and by identifying and coordinating the provision of infrastructure;
b) **a social objective** – to support strong, vibrant and healthy communities, by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations; and by fostering well-designed, beautiful and safe places, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being; and
c) **an environmental objective** – to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.

2.2 The NPPF advises that "***transport issues should be considered from the earliest stages of planning-making and development proposal, so that***:

d) the potential impacts of development on transport networks can be addressed;
e) opportunities from existing or proposed transport infrastructure, and changing transport technology and usage, are realised – for example in relation to the scale, location or density of development that can be accommodated;
f) opportunities to promote walking, cycling and public transport use are identified and pursued;
g) the environmental impacts of traffic and transport infrastructure can be identified, assessed and taken into account – including appropriate opportunities for avoiding and mitigating any adverse effects, and for net environmental gains; and,
h) patterns of movement, streets, parking and other transport considerations are integral to the design of schemes, and contribute to making high quality places."

2.3 It goes on to advise that "***The planning system should actively manage patterns of growth in support of these objectives. Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions, and improve air quality and public health. However, opportunities to maximise sustainable transport solutions will vary between urban and rural areas, and this should be taken into account in both plan-making and decision-making.***" (Paragraph 105)

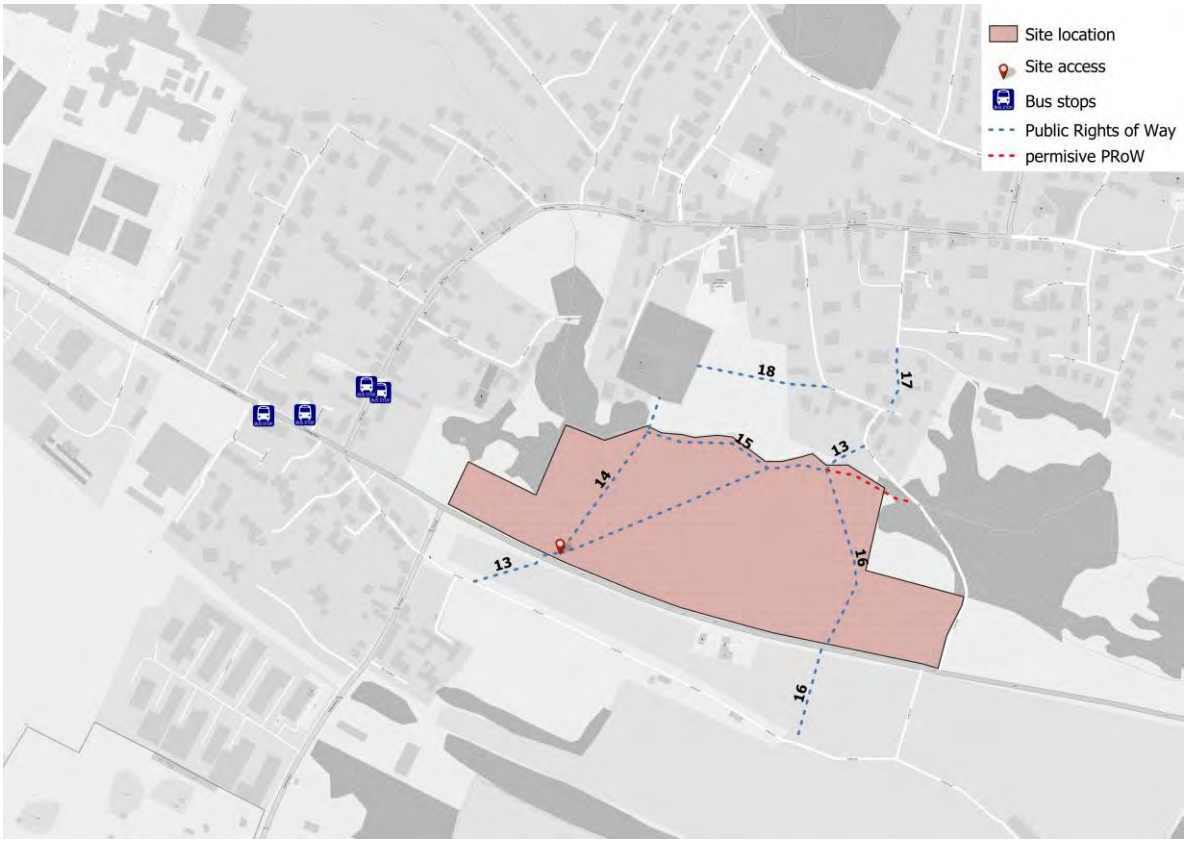
3 Site Context

3.1 The context of the Site from a transport perspective is summarised below.

Site Location

3.2 The site location is shown **Figure 3.1** below.

Figure 3.1 Site location



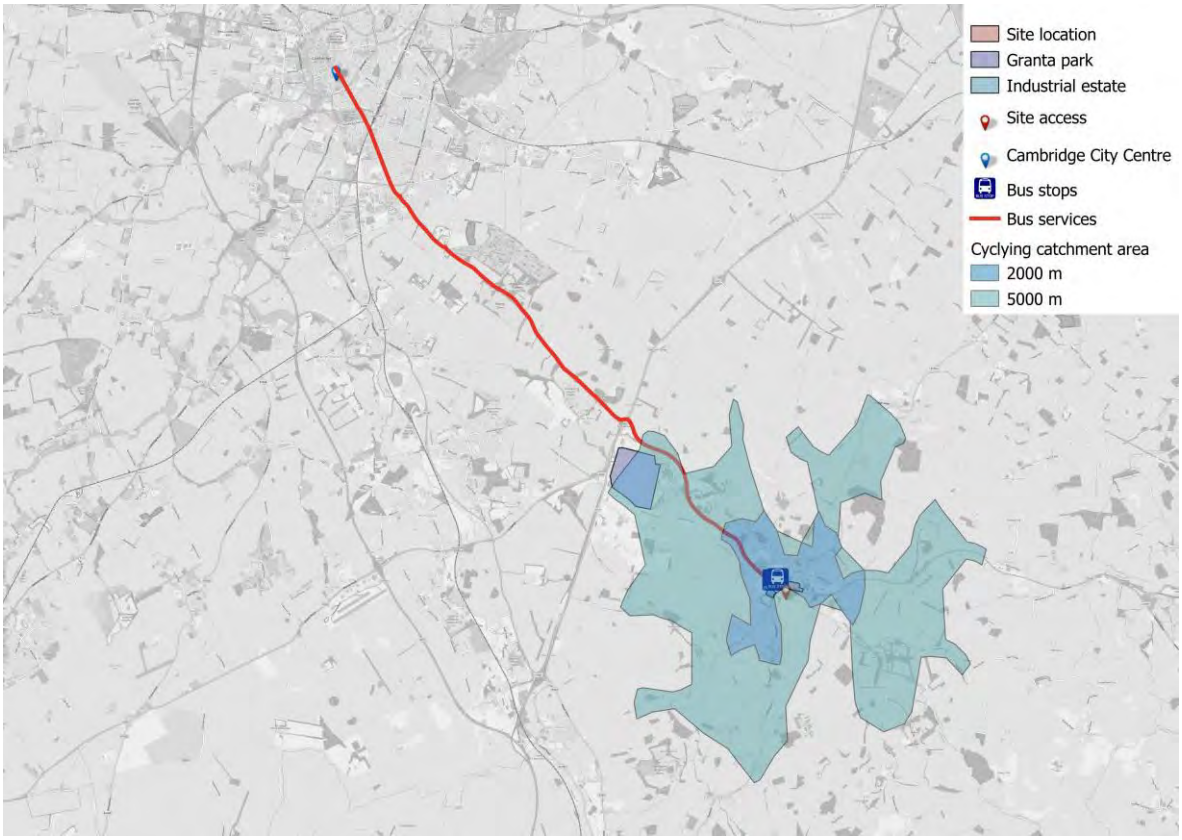
3.3 The Site is located to the north of Cambridge Road, approximately 300m to the east of the junction with the High Street, on the southern edge of Linton. It comprises two irregular shaped fields bounded by hedgerows and hedgerow trees, a large proportion of which are mature. The Site is dominated by arable fields, with the scrubland/woodland to the west of the Site making up around one quarter of the Site.

3.4 The Site has a very gradual sloping topography with the lowest point being to the north near the River Granta at 38 metres Above Ordnance Datum ('AOD') and the highpoint in the south of the Site of 42m AOD. To the south of the Site there is a gradual incline after Cambridge Road rising to a gradual high

point of 82m AOD before Hadstock. The land to the north of the Site rises steadily to a highpoint of 112m AOD at Rivey Hill, with Linton Water Tower located at this high point.

3.5 Given the pressing need for additional housing within the South Cambridgeshire District, Linton is clearly a sustainable location to accommodate additional housing growth. Combining Linton's geographic location **Figure 3.2** and wide-range of services and facilities, means that it could support the allocation of land north of Cambridge Road. The village, it's services and larger employment and retail destinations such as Cambridge are all easily accessible via sustainable travel options, reducing the need for car travel.

Figure 3.2 Accessibility map



3.6 The accessibility map provided above presents the broad route alignment of the 13 Gold bus service, that provides for journeys between Haverhill and Cambridge, via Linton and Granta Park. This route provides a convenient service for residents of Linton to travel to work at Granta park; an employment site that is subject to significant growth and investment.

Local Facilities

3.7 Around the world, there is growing interest in creating places whereby the daily needs of residents can be met by active travel, in particular, by a 20-minute walk or cycle. The benefits of this approach are:

- people become more active, improving their mental and physical health;
- traffic and congestion is reduced;
- air quality is improved;
- local shops and businesses thrive; and
- community bonds are strengthened.

3.8 Linton offers a range of services and facilities that someone would expect to find in any large village or settlement. Linton High Street has a bustling atmosphere and vibrant community, supported by a selection of independent and high street shops, including gift and coffee shops, a Post Office, a farm shop and butchers, takeaway establishments and a medical practice. Linton also has a numerous recreation opportunities and protected green spaces.

3.9 Linton's education offering is also extensive, being home to a nursery, infant and primary, and a secondary college meaning there are options for all ages within the community. There are also employment opportunities, including the services within the industrial estate off Hadstock Road, which include a fitness centre and light industrial practices. Another unique facility Linton has to offer is Linton Zoo, which attracts visitors from all over and provides an intimate, family-run spot that allows visitors to get up close to hundreds of exotic creatures.

3.10 The local facilities accessible from the site within an active travel trip are summarised in Table 3.1 and are shown in **Figure 3.3**.

Table 3.1 Local facilities and amenities

Local facilities	Distance (m)	Time taken on foot (min)	Time taken on bike (min)
The Crown Inn Public House	400	5	1
Nearest bus stop	400	5	1
The Grip Industrial Estate	500	6	2
Linton Church of England Infant School	500	6	2
Linton Post Office	550	7	2
Village Pharmacy	600	8	2
Linton Health Centre	650	8	4
Linton Zoo	650	8	2
Co-operative Food	700	9	4
Linton Community Sports Centre	800	10	2
Linton Village College	1100	14	4
Linton Heights Junior School	1500	19	7

3.11 Table 3.1 and **Figure 3.3** show that the promotional site can work within the principles of 20-minute neighbourhood concept, with multiple day to day facilities within walking and cycling distance.

Figure 3.3 Local facilities and services

3.12 It is evident based upon the information above that it is correct to provide an assessment rating of '*Green*' in the HELAA proforma of Site: 51721.

Walking and cycling accessibility

Walking

3.13 Ensuring that availability for journey to be undertaken by foot or by cycle provide realistic opportunities to replace short distance journeys. Therefore, to demonstrate the Site accessibility and therefore suitability for prospective residential development, a review of surrounding pedestrian and cyclist access has been undertaken. This will demonstrate the achievability of the Site in aiding journeys to be undertaken easily and directly to nearby facilities and amenities via active modes of travel through the integration with existing cycling and walking infrastructure.

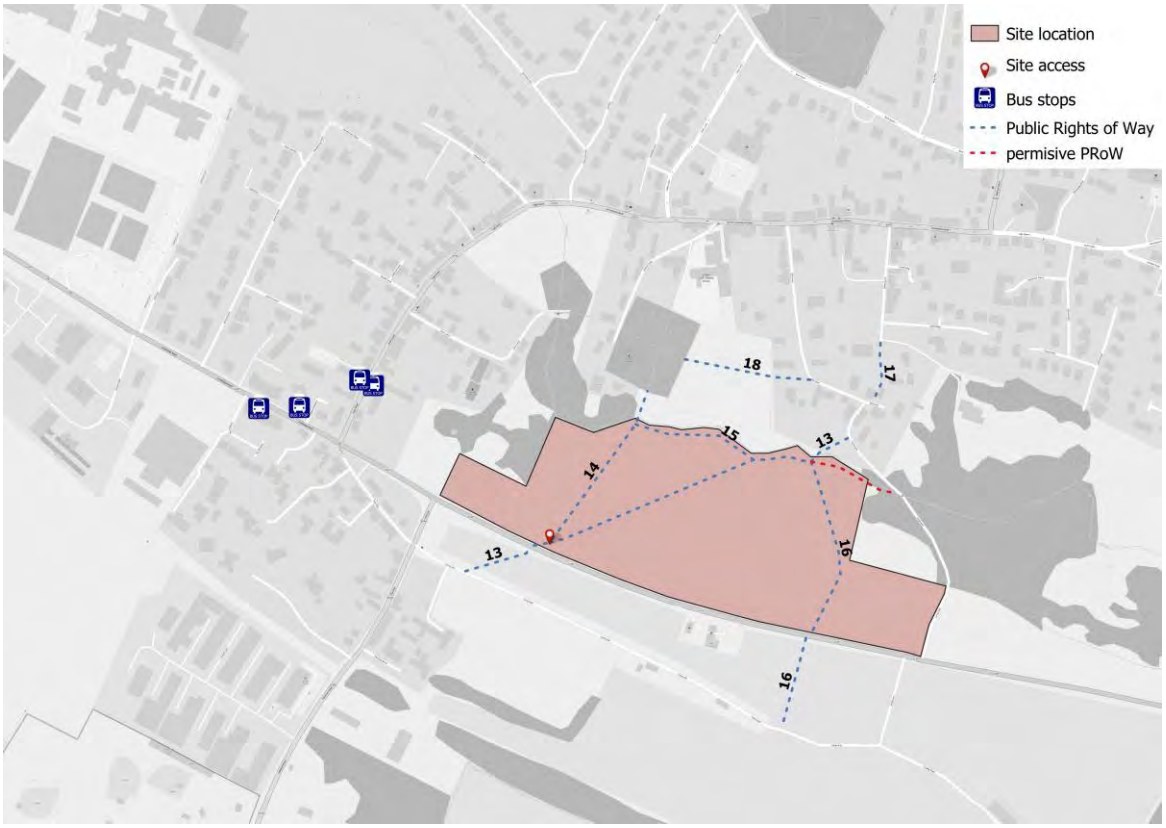
3.14 Currently within the Site there are three Public Rights of Way which cross through the centre of the Site. These include, Public Footpath 146/13 which cuts through the Site from the south west to a central north point, and connects Long Lane to Public Footpath 146/15 onto Mill Lane, in the east. Public Footpath 146/14 lies in the west side of the Site on the edge of the current arable land boundary

and connects Cambridge Road to the church. Public Footpath 146/16 lies in the Site, running through the south east of the Site and connects Cambridge Road to Mill Lane.

3.15 Furthermore a 3 metre wide pedestrian access will be delivered to connect into the existing public right of way extending up the western boundary of the site.

3.16 The existing public rights of the way within the Site are illustrated in **Figure 3.4**

Figure 3.3 Public rights of way plan



3.17 The existing pedestrian infrastructure in proximity of the Site is deemed to be good, and highly appropriate by enabling direct access to key facilities located within Linton, including the nearby schools and local shops, therefore, reinforcing the accessibility of the Site.

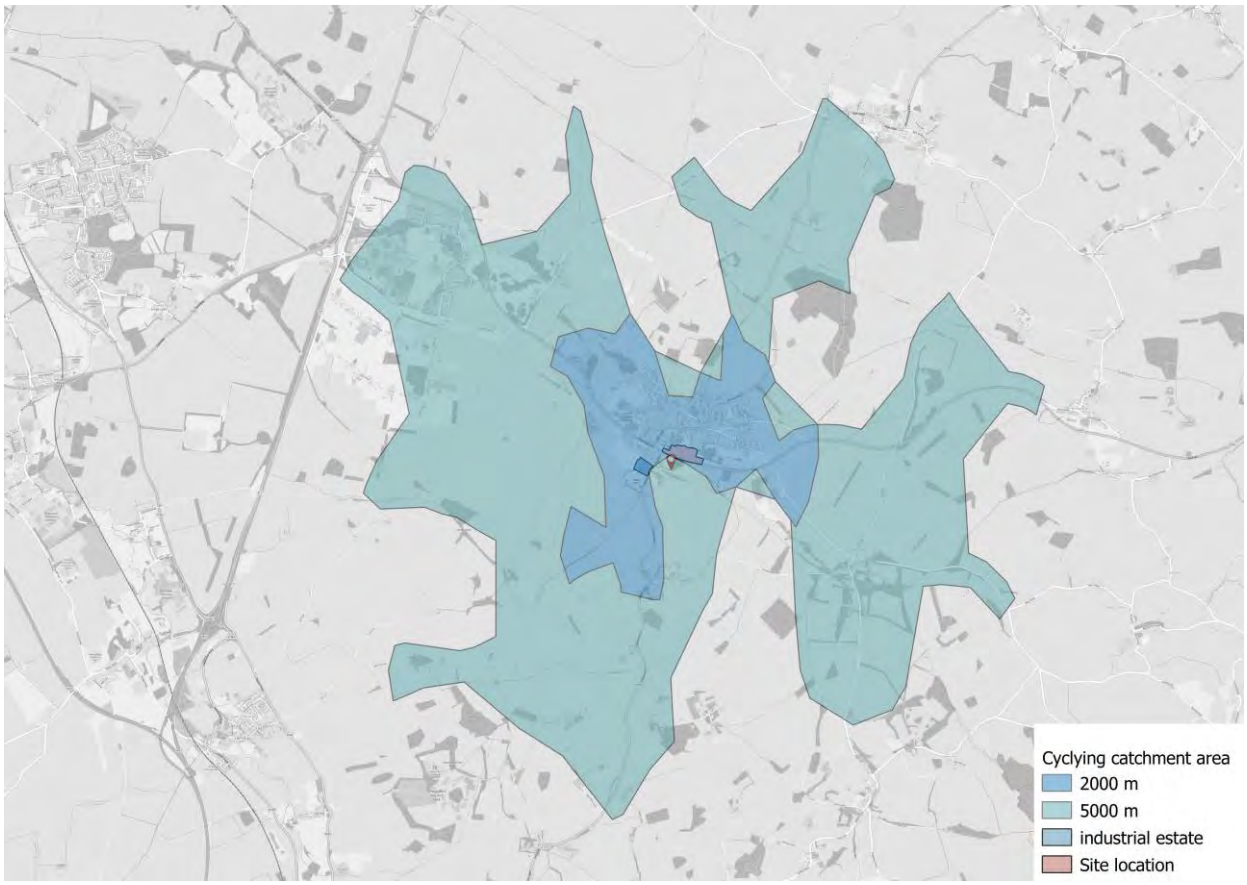
Cycling

3.18 Whilst, there are no formal cycling facilities or cycle routes provided within Linton, given the residential character of the village with low speed limits, it is deemed that journeys by bike if pursued would be achievable and suitable, for example accessing the village amenities.

3.19 Additionally, as part of the wider A1307 improvements, the Greater Cambridgeshire Partnership Greenways project seeks to provide a continuous shared-use path for pedestrians, cyclists and horse riders between Cambridge to Linton which will directly enhance and prove better opportunities for users of the Site to travel by sustainable transport modes.

3.20 The cycling catchment area from the Site are illustrated in **Figure 3.5**.

Figure 3.4 Cycling catchment area



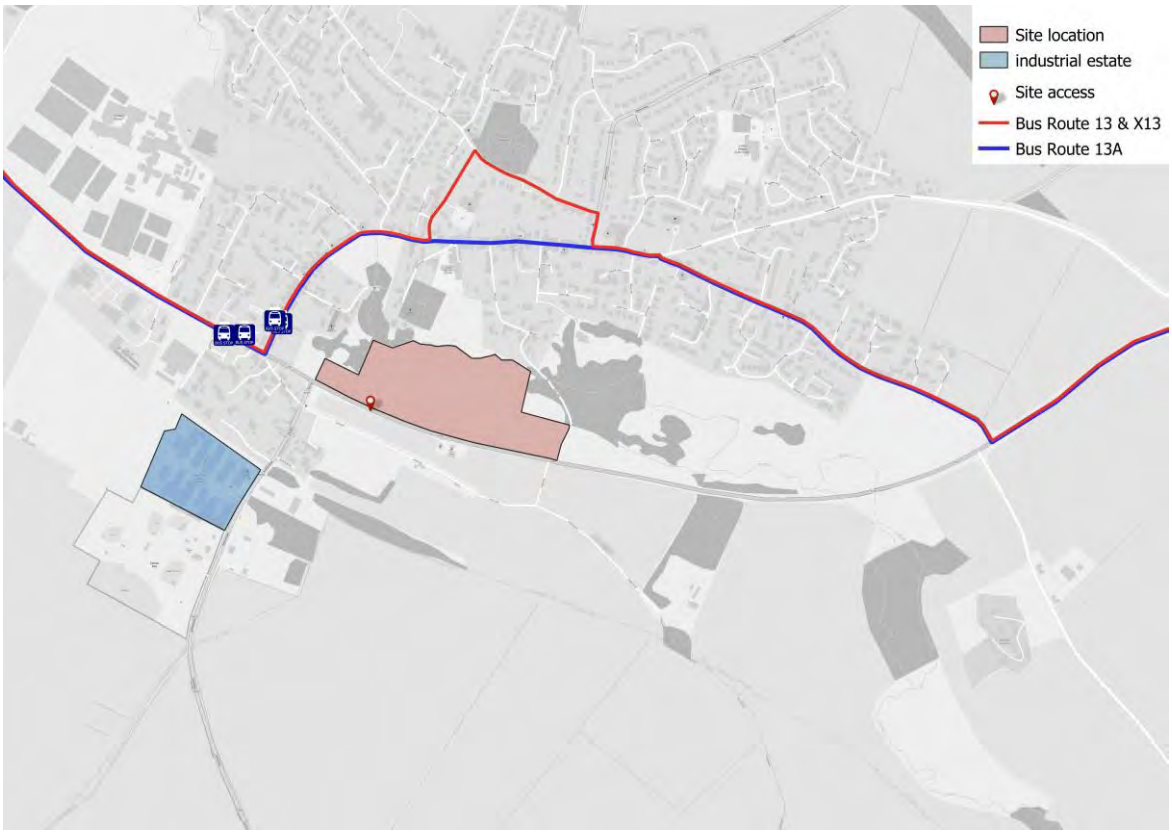
Public transport accessibility

Bus services

3.21 The village has good public transport connections and is served via a number of bus services, including the 13 Gold, 13A Gold, 613, X13 Gold, 19, and the number 46. These routes provide connections to Haverhill and Cambridge and the villages in between, which is illustrated in **Figure 3.4**.

3.22 The nearest bus stops to the site are located approximately 400 metres west of the site, accessible via a 5 minute walk or 1 minute cycle, located on the A1307. These benefit from a bus flag pole and a timetable information board with on carriageway bus laybys.

Figure 3.4 Bus services routes



3.23 Table 3.2 summarises the local bus services that serve these stops.

Table 3.2 Local bus services

Service No.	Route	Frequency		
		Monday - Friday	Saturday	Sunday
13	Cambridge - The Abingtons - Linton - Haverhill	Hourly service	Hourly service	Hourly service
13A	Haverhill - Linton - The Abingtons - Cambridge	Hourly service	Hourly service	No service
X13	Cambridge - Linton - Haverhill	7 daily services	Single service daily	No service

3.24 Currently, there is a direct footway provision from the Site to the nearby bus stops, however it is limited in width. As part of the development, footway improvements would be provided and connect into the existing footway along the northern side of the A1307 to ensure direct access to the bus stops.

3.25 Via the routes set out in Table 3.2 and **Figure 3.4**, the following key destinations and times are achievable from the bus stops nearby to the Site on the A1307 Cambridge Road:

- Granta Park – 4 minutes bus journey time
- Babraham Research Institute – 9 minutes bus journey time
- Haverhill – 18 minutes bus journey time
- Cambridge Biomedical Campus/ Addenbrooke's Hospital – 22 minutes bus journey time
- Cambridge City Centre – 35 minutes bus journey time

Rail services

3.26 Although Linton is not served by its own railway, the nearest station is located at Whittlesford Parkway, approximately 6 miles (9.6km) to the west of Linton. The Abellio Greater Anglia service provides connections to Cambridge, Peterborough, and London Liverpool Street. London Stansted Airport is also located within 20 miles of Linton to the south and is accessible via the railway network.

3.27 Additionally, Whittlesford Parkway Station is located approximately 9.4km west of the Site and is run by Greater Anglia, equipped with cycle parking facilities and car park enhancing multimodal traveling. The station operates services to Cambridge North, Stansted Airport, Norwich, Ely, with 4 hourly peak services to London Liverpool Street, which is accessible via an approximate 60-80 minute journey, and to Cambridge, reachable by a 10-15 minute journey.

3.28 Therefore, in regards to the Site location, it is regarded that journeys to work commuting by train would be a viable option.

Summary

3.29 This section has demonstrated that the Site is well connected in terms of walking, cycling and public transport. The proposed Site can work within the principles of 20 minute neighbourhood concept, with multiple day-to-day facilities within walking and cycling distance.

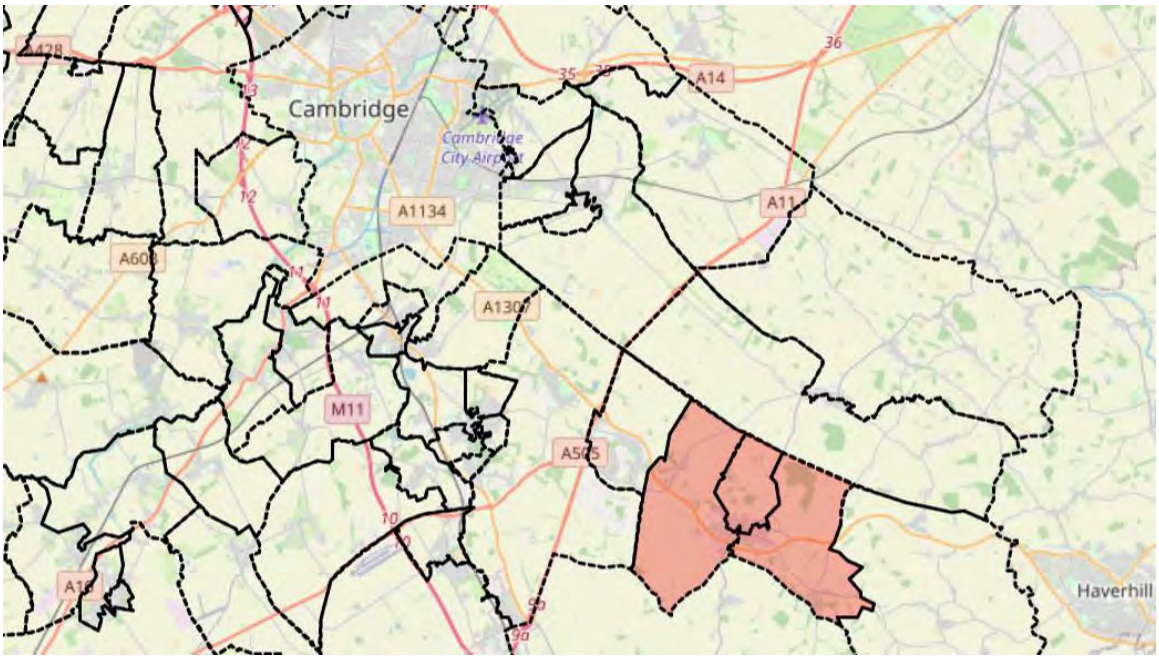
4 Existing local travel behaviour

4.1 This section provides an overview of local travel behaviour, based on Census 2011 data.

4.2 The Census of 2011 provides a proxy to understand how local residents within Linton travel to work. Future travel patterns however are likely to be different due to the effects and changing mind-sets brought about by the Covid-19 pandemic and subsequent lockdown. Therefore, whilst the information set out below provides a useful indication of how residents at the promotional site might have travelled in 2011, it is likely that changes will occur in the future.

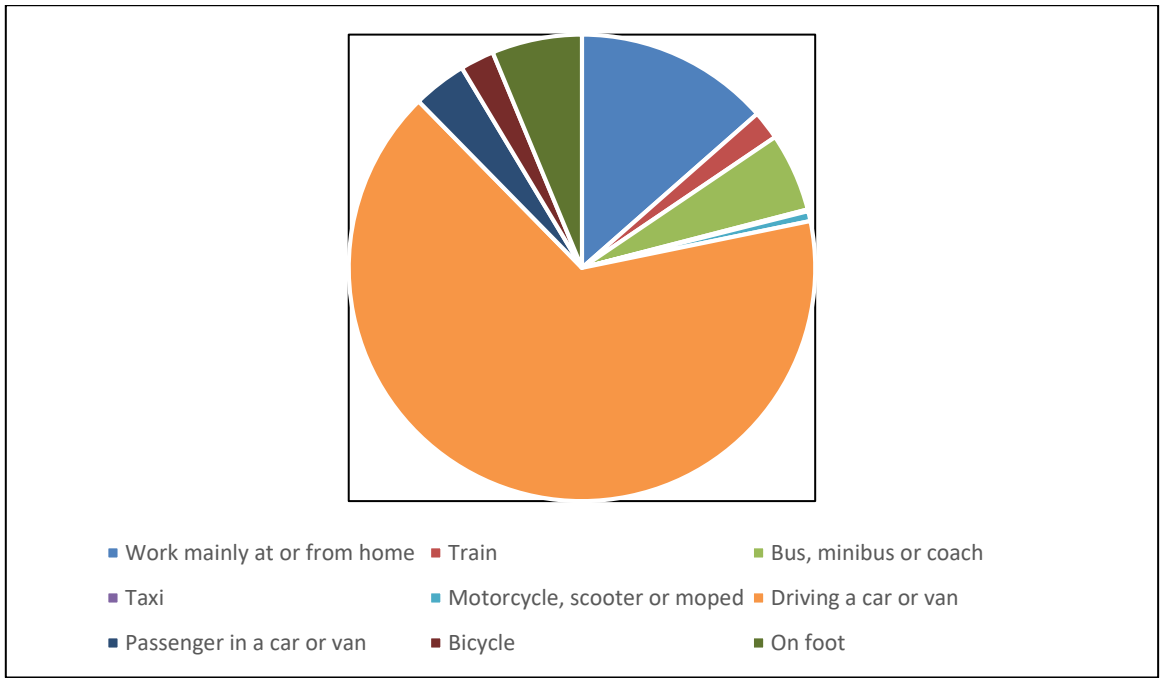
4.3 The lower layer super output areas (LSOA) 'South Cambridgeshire 016D, 016E and 016F' have been reviewed to understand local travel behaviour. The location of these LSOAs are identified in **Figure 4.1** below.

Figure 4.1 'South Cambridgeshire 016D, 016E and 016F' LSOA locations



4.4 **Figure 4.2** below displays the method of travel to work for residents in 'South Cambridgeshire 016D, 016E and 016F' LSOAs, based on the 2011 Census data.

Figure 4.2 Method of Travel to Work – 'South Cambridgeshire 016D, 016E and 016F' LSOAs



4.5 At the time of the 2011 Census, 66% of people drove to work with 4% travelling as a car passenger. In addition, 2% travelled by train, 5% by bus, 1% by motorcycle, 2% by bicycle, and 6% on foot.

4.6 It is noted that the 2011 Census data shows that 13% of people worked from home. At this stage, it is not clear what the long-term effects of the Covid-19 pandemic will be on travel patterns, however, there is a consensus that the proportion of the population working from home, for at least part of the week, will increase significantly compared to pre-pandemic.

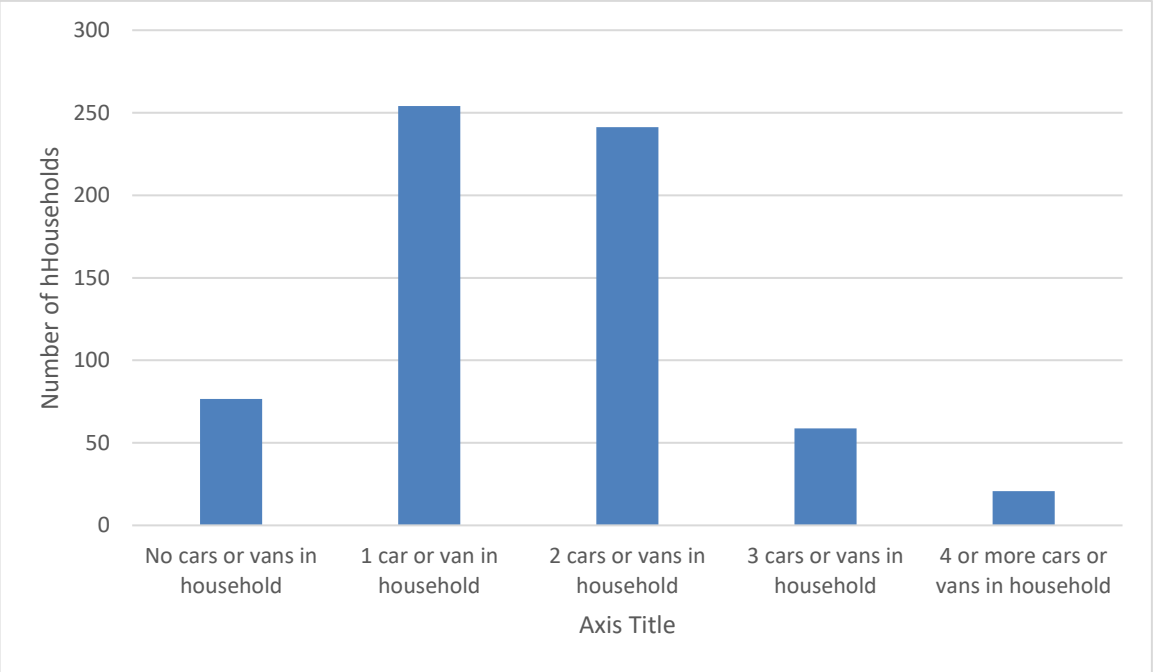
4.7 According to the Office of National Statistics (ONS), in 2019, 12.9% of people completed some employment duties from their place of residence during the week and doubled to 25.9% in 2020. The ONS also reports that 85% of working adults who worked from home during the pandemic wanted to use a hybrid approach to home and office working in the future.

4.8 Walking and cycling trips increased during the pandemic, and there was an emphasis on active travel to improve the health of individuals and the local air quality. In addition, since the 2011 Census, there has been an emphasis on the improvement of infrastructure for walking and cycling, in order to reduce the reliance on the private vehicle. Therefore, the mode share for walking and cycling is also likely to have increased since the 2011 Census.

Car ownership data

4.9 **Figure 4.3** sets out the average car ownership per household for residents in 'South Cambridgeshire 016D, 016E and 016F' LSOAs, based on the 2011 Census.

Figure 4.3 Average Car Ownership – 'South Cambridgeshire 016D, 016E and 016F' LSOAs

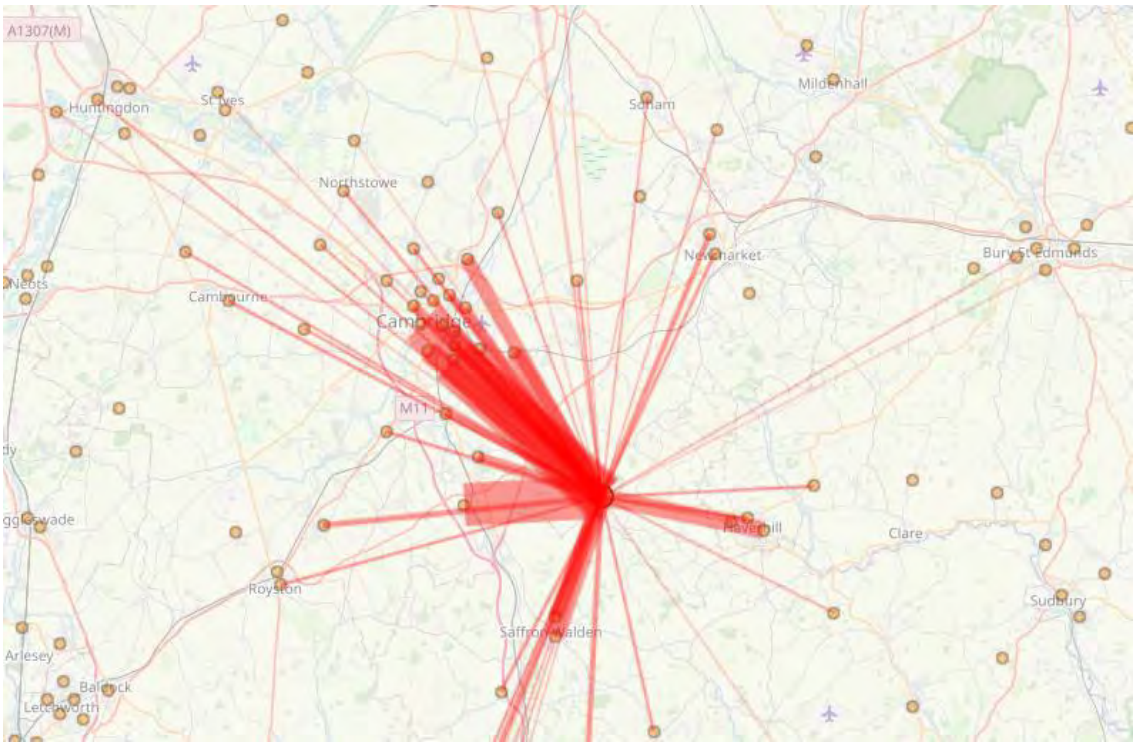


4.10 The 2011 Census data shows that the average household in the 'South Cambridgeshire 016D, 016E and 016F' LSOAs owns 1.5 vehicles. This is comparable to an average of 1.2 vehicles per household in England and Wales. The data shows 12% of households within Linton do not own a vehicle, and that 39% of households own one vehicle only.

Origin/Destination (Travel to Work) Data

4.11 The Census 2011 tool, 'Datashine' has been used to establish where people in the Mid-Level Super Output Area (MSOA), 'South Cambridgeshire 016', which covers Linton, travel to for work. This is shown in **Figure 4.4**.

Figure 4.4 Resident Travel Origin/Destination Data (Datashine,2021)



4.12 The information shows that 37% of people living within the 'South Cambridgeshire 016' MSOA work within South Cambridgeshire. Therefore, there are opportunities for these people to travel to work via sustainable transport modes, in particular walking, cycling and bus.

4.13 In addition, approximately 32% of residents in the area work in Cambridge which can be accessed by rail and/or bus. Additionally, sustainable multimodal journeys can be achieved utilising the park and ride facility which serves the City of Cambridge and it is located 7 miles or it is approachable with a 14-minute drive along the A1307 to the north west of Linton.

Summary

4.14 The data from the 2011 Census shows that 66% of the local population drove to work in 2011.

4.15 However, it also shows that 37% of people work within South Cambridgeshire and an additional 32% within Cambridge. The majority of the workplaces are accessible via walking, cycling, and bus hence, high quality facilities encouraging sustainable multimodal travel reducing the environmental impact of travel.

4.16 With the right transport strategy for the Site, more residents could be encouraged to travel to work via sustainable modes of transport, which would bring car use at the development down. In addition, the proportion of residents working from home, at least for part of the working week, is likely to

increase significantly in light of changing travel patterns following the Covid-19 Pandemic and subsequent lockdown.

5 The Proposed Means of Access

5.1 The Greater Cambridge Joint Local Plan HELAA analysis of the land to the north of Linton Road provides an assessment rating of 'Amber', despite commenting that ***"The proposed site is acceptable in principle subject to detailed design. There are potential access constraints, but these could be overcome through development."***

Vehicle Access

5.2 A traffic signal-controlled site access is proposed with a right turn lane will be implemented, narrowing to the carriageway within the Site to 5.5 metres wide. The proposed access arrangement is shown in drawing number 190205/SK04 contained in **Appendix A**.

Pedestrian Access

5.3 There is no existing footway provision along the site frontage on the A1307. However, as part of transport and pedestrian improvements a wider footway will be provided to connect into the existing Linton footway network to the west of the site consistent with the objectives of Local Transport Note 1/20 (LTN1/20).

5.4 There is no pedestrian infrastructure to facilitate pedestrian crossings across the Grip / A1307 junction; therefore, an uncontrolled pedestrian crossing point will be implemented immediately before the Grip junction with the A1307, benefitting from tactile paving and dropped kerbs. This will also facilitate access to the industrial/ employment area situated to the southwest of the site.

5.5 The proposed access and pedestrian improvements have been designed based upon topographical survey data and are deliverable. The HELAA assessment for Access, should therefore be rated '*Green*'.

Transport and Roads

5.6 It is noted that the HELAA assessment provides an 'Amber' rating in respect of Transport and Road, albeit that it is acknowledged that the Site would benefit from the Greater Cambridge Partnerships Linton Greenway proposals and the Cambridge Autonomous Metro and albeit that there is a suggestion that the Site might impact on the Greenway proposals, no development is likely to do so.

5.7 It is further suggested that "there are existing capacity issues on the A1307 which cause rat running onto other roads, the applicant must undertake cumulative junction capacity analysis along the A1307. Any potential impact on the functioning of trunk roads and/or local roads could be reasonably

mitigated." A future planning application, if the Site is allocated will include a detailed transport scoping study in discussion with the highway authority and any work presented in a Transport Assessment can respond accordingly to any potential; concerns surrounding local 'rat-running' and cumulative junction analysis along the A1307.

5.8 Previous submissions demonstrated that the development would attract a modest volume of vehicle trips and this was supported by analysis of the Site access junction presented previously. The Site is accessible and highly permeable with off-carriageway, traffic-free routes available as part of journeys to the local primary school and village centre. Reliance on the car for local journey can be considered low.

5.9 The previous trip generation and highway analysis is presented below for completeness.

Forecast trip generation

5.10 Table 5.1 summarises the total vehicular trip rates derived from TRICS during the morning and evening peak hour periods that would be generated for up to the maximum capacity of 85 units.

Table 5.1 Forecast vehicular trip generation

	Morning peak (08:00 – 09:00)		Evening peak (17:00 – 18:00)	
	Arrivals	**Departures**	**Arrivals**	**Departures**
Total vehicular trip rates	0.119	0.323	0.289	0.137
Total trips	10	27	25	12
Total	38		36	

5.11 The vehicular trip rates presented in Table 5.1 indicate that in the morning peak hour period a total of 38 two way trips can be anticipated and a total of 36 two way trips forecast for the evening peak hour period. This approximately equates to a vehicle generation every 2 minutes, which is considered a minimal increase on the local highway network.

Junction analysis

5.12 The JCT software package LinSig Version 3 has been used to test the performance of the traffic signal controlled junctions within the study area, which requires traffic flow information to be entered as Passenger Car Units (PCU) values. The critical outputs from the model are the Practical Reserve Capacity (PRC) for the junction as a whole, the Degree of Saturation (DoS) for each individual link or lane and the corresponding Mean Maximum Queue (MMQ). The MMQ represents the length of the

queue after which the approach to the junction would operate under free-flow conditions and accounts for vehicles queueing during the red phase and those that join the back of the queue whilst the front is discharging on a green signal.

5.13 Typically for the purposes of capacity analysis, an arm, link or lane of a junction is identified to be operating within capacity when the model forecasts a DoS of less than 100%. A junction is considered to be operating within normal free flow conditions / theoretical capacity when the arm, link or lanes of a junction are operating with a DoS of less than 90%.

5.14 Table 5.2 presents the summary of the output modelling results of the operation of the junction under the loading of projected traffic along the A1307 and the proposed development traffic flows for a future year of 2025.

Table 5.2 Proposed site access highway capacity analysis

	Morning Peak		**Evening Peak**	
	DoS (%)	MMQ	DoS (%)	MMQ
A1037 Cambridge Road (West) left and ahead	47.0	6.2	85.7	24.3
Proposed Site Access	17.6	0.7	7.9	0.3
A1037 Cambridge Road (East) ahead and right	77.8	17.5	50.4	6.6
Westbound Bus Gate	4.0	0.2	3.0	0.2
Westbound A1307 Cambridge Road at bus gate	77.3	3.4	49.3	1.4
Practical Reserve Capacity	15.6%		5.0%	
Total Delay over all arms	6.75 pcuHr		7.12 pcuHr	
Cycle Time	90 seconds		90 seconds	

5.15 The results presented within Table 5.2 identify that the junction would continue to operate within capacity on all approached to the junction, with no approach operating with a DoS greater that 90%.

6 Conclusion

6.1 These representations form part of a Vision for the development of land north of Cambridge Road at Linton.

6.2 They demonstrate that the village of Linton is a highly sustainable settlement both in terms providing access to public transport, walking and cycling infrastructure to undertake daily local and regional trips for a range of journey needs.

6.3 An effective and safe means of access can be achieved that will not detrimentally affect the free-flow of traffic on the local highway. A series of localised improvements can be implemented to improve access along Cambridge Road for cyclists and pedestrians and new infrastructure can be brought forwards to accommodate journeys on-foot to local areas of employment, leisure and recreation.

6.4 The development of the land north of Linton Road will support the ethos of 2 minute neighbourhoods with both primary and secondary schools within a short walk distance of the Site, along with a series of local amenities and day to day facilities that meet residents needs.

6.5 In transport terms, there is nothing in the HELAA assessment that would prevent this land being brought forward for development, as part of the emerging Joint Local Plan.

APPENDIX A

A1
ORIGINAL
PLOT SIZE

Church

Additional topo survey required to confirm a suitably graded embankment is achievable within the highway boundary

Proposed
3.5m wide shared use footway / cycleway

Existing Public Footpath to tie into new shared use route

Proposed
Signal controlled junction

A

A

THE GRIP

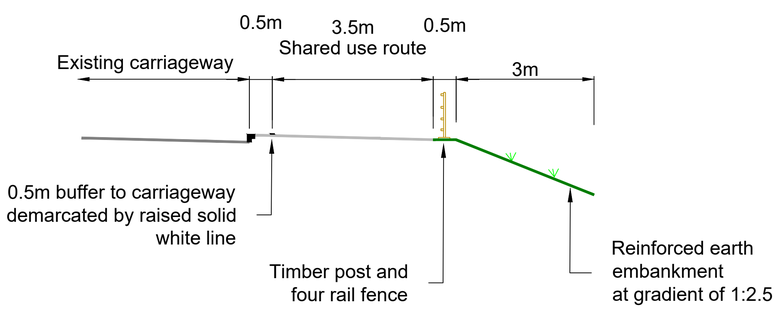
LONG LANE

Path (um)

LB

The Boundaries

SECTION A - A
[INDICATIVE - NTS]



INDICATIVE

NOTES:
1. Based on topographical survey and OS Mapping Data.
2. Highway Boundary interpreted from Greater Cambridge Partnership, A1307 Haverhill To Cambridge Scheme 14, Drawing No. 396909-MMD-HWA-14-DR-HW-4001.

KEY:

- Indicative Site Boundary.
- Highway Boundary maintainable at publics expense.

Rev	Date	Details	Drawn by	Checked by	Approved by

Bristol
Cambridge
London
Manchester
Oxford
Welwyn Garden City

tpa Transport Planning Associates

The Stables
7 Chesterton Mill
French's Road
Cambridge
CB4 3NP
01223 455385
www.tpa.uk.com

CLIENT:
Taylor Wimpey UK Ltd

PROJECT:
Land north and south of the A1307, Linton

TITLE:
Proposed Shared Use Footway / Cycleway Arrangement

STATUS:
FEASIBILITY

SCALE:	DATE:	DRAWN:	CHECKED:	APPROVED:
1:500	10.09.21	RC	RC	JC

JOB NO:	DRAWING NO:	REVISION:
1902-05	SK04	-

Appendix 11: Arboricultural Survey Report, and Tree Survey & Constraints Plan

ARBORICULTURAL SURVEY REPORT

Land North of
Cambridge Road,
Linton

December 2021

Barton Hyett Associates
Arboricultural Consultants

CSA
environmental

Summary table		
Site Name:	Land North of Cambridge Road	
Project reference:	4749	
Site Address:	Linton, Cambridgeshire	
Nearest Postcode:	CB21 4NL	
Central Grid reference:	TL 56270 46510	
Local Planning Authority:	South Cambridgeshire District Council	
Relevant planning policies:	South Cambridgeshire Local Plan Adopted September 2018 - Chapter 6 Protecting and Enhancing the Natural and Historic Environment (Policy NH/7)	
Statutory Controls:	**Tree Preservation Order**	**Conservation Area**
	None	No - however, the Linton Conservation Area borders the western and part of the northern boundary of the site
Soil Type: (Source: BGS online soils map © NERC 2021)	**Superficial/Drift**	**Bedrock**
	Alluvium - Clay, Silt, Sand And Gravel	New Pit Chalk Formation - Chalk
Topographical Survey:	Yes - drwg ref: 25955se-01-08	
Notes:	None	
Report author:	Richard Hyett *MSc, BSc (Hons), MICFor, MArborA*	
Date of issue:	2nd December 2021	

Arboricultural ASSOCIATION Professional Member

PR3525

Institute of Chartered Foresters registered

REPORT CONTENTS:

1. INSTRUCTION

1.1. I am Richard Hyett. I am an arboriculturist with 17 years of experience, and a Chartered Arboriculturist.

1.2. Barton Hyett Associates have been instructed by CSA Environmental on behalf of Taylor Wimpey Strategic Land to survey trees located on land ('the site') in accordance with the recommendations of British Standard 5837:2012 '*Trees in relation to design, demolition and construction - recommendations*'.

1.3. The scope of the instruction was to inspect trees relevant to potential residential development at the site and provide written advice on how they inform feasibility and design options. This report is intended for use by the design team and as part of the site promotion.

2. SITE DESCRIPTION

2.1. The site is located to the north of Cambridge Road and to the south of the settlement of Linton.

2.2. The southern and eastern boundaries of the site are formed by hedgerows and tree groups. The northern boundary is formed by a water course. The western boundary of the site was inaccessible at the time of the survey.

2.3. There is water course, the River Granta, running along the northern boundary of the site.

2.4. The site is broadly flat with limited variation in topography. The most significant change in ground level is along the western end of the southern boundary of the site where there is an embankment leading down from Cambridge Road.

2.5. Vehicle access into the site is currently gained from Mill Lane via an un-gated agricultural access located in the south-east corner of the site.

2.6. There are a number of Public Rights of Way (PRoW's) crossing the site. These footpaths are referenced as, 146/13, 146/14, 146/15 and 146/16. There are also a number of informal 'desire line' paths within the site.

3. TREE SURVEY FINDINGS

3.1. A total of 43 trees, groups of trees, hedgerows and woodlands were surveyed. These are summarised in terms of their quality in accordance with the recommendations of BS5837 below, and shown in more detail on the Tree Survey and Constraints Plan (Section 2) and within the Tree Survey Schedule (Section 3).

	Total	A - High quality trees whose retention is most desirable.	B - Moderate quality trees whose retention is desirable.	C - Low quality trees which could be retained but should not significantly constrain the proposal.	U - Very poor quality trees that should be removed unless they have high conservation value.
Trees	**20**	-	13	7	-
Groups	**18**	-	11	7	-
Hedgerows	**4**	-	1	3	-
Woodlands	**1**	-	1	-	-
Total	**43**	**0**	**26**	**17**	**0**

Table 1: Summary of arboricultural features of each BS5837 quality category

4. KEY ARBORICULTURAL FEATURES

4.1. The main arboricultural features identified within the site are the linear belt of sycamores (G6) along the south western boundary of the site and the trees on the north eastern boundary of the site (T15, T16, G14 and G17).

4.2. The remainder of the significant trees associated to the site are located beyond the site boundary to the west and north.

5. CONSTRAINTS

5.1. None of the trees identified within the the tree survey are protected by Tree Preservation Order.

5.2. No Ancient or Veteran trees were identified at the site, and as such, it will not be necessary to consider paragraph 180 of the NPPF 2021.

5.3. In addition, there are no areas of Ancient Semi-Natural Woodland (ASNW) or Replanted Ancient Woodland (ARW) associated to the site. The nearest area of ASNW is Rivey Wood that is located 1km north of the site. Again, it will therefore not be necessary to consider paragraph 180.

5.4. The main arboricultural constraints to potential development include the root protection areas (RPAs) associated to trees located around the sites perimeter. The RPAs of retained trees should be kept free form development. The concept design demonstrates that this is possible.

5.5. A further consideration that will need to inform the detailed design of the site layout, is the potential for shade to be cast (current and future) by trees on the southern boundary of the site. Significant amounts of shading within residential dwellings and gardens can lead to pressure to prune or fell retained trees. Whilst this is a consideration, the detailed layout and building design can adequately address any potential shading impacts.

5.6. The absence of any significant arboricultural constraints demonstrates how the site could be brought forward as a comprehensively planned development to deliver a high quality, and sustainable new neighbourhood for around 85 new homes.

5.7. Please see Section 5 for further advice and guidance on designing new developments near to trees.

6. ENHANCEMENTS

6.1. A series of potential enhancements to the arboricultural resource of the site could be provided through the delivery of the development. These are summarised in the non-exhaustive list below:

- Management of the Cambridgeshire Road frontage trees to improve appearance and longevity
- Supplementary planting along the Cambridgeshire Road and Mill Lane frontages
- New tree planting within the western part of the site using appropriate, ecologically valuable tree and shrub species. Including the provision of varied vertical and lateral structure
- Delivery of appropriate high quality new amenity tree planting within the interior of the site.

7. SUMMARY AND CONCLUSION

7.1. In my opinion, the potential development at the site in the form indicated in the concept design, is feasible from an arboricultural perspective. All trees of value could be retained and adequately protected during construction activities in order to sustain their health and longevity.

7.2. All trees worthy of retention can be incorporated into the concept design, and all the prominent trees along the Cambridgeshire Road boundary can be retained.

7.3. All likely tree losses (minimal loss for the potential highway access into the site) can be mitigated through new diverse tree and shrub planting. New trees are likely to have an extended useful life expectancy compared to those which will likely be removed. In addition, enhancement planting beyond that required to mitigate the losses could be easily provided

7.4. As the development progresses to the planing stages an arboricultural impact assessment, as well an arboricultural method statement and finalised tree protection plan, will need to be produced.

7.5. On the basis that the recommendations and advice contained within this report are adhered to, the potential development of the site is, in my opinion and subject to detailed design, acceptable from an arboricultural perspective

[redacted]

Richard Hyett
MSc, BSc (Hons), MICFor, MArborA
Chartered Arboriculturist
Director

TS - 'Section 2'

Ref	Species	Height (m)	Life Stage	RPA Radius (m)	RPA (m2)
T1	Ash (Common)	8	SM	4.8	72
T2	Oak (English)	8	EM	4.8	72
T3	Oak (English)	11	EM	8.2	209
T4	Oak (English)	10	EM	6.6	137
T5	Poplar (Lombardy)	10	EM	6	113
T6	Willow	16	M	8.4	222
T7	Willow	9	M	8.4	222
T8	Elder	3	M	2.4	18
T9	Birch (Silver)	15	EM	4.8	72
T10	Hawthorn	4	SM	1.8	10
T11	Cherry (Wild)	8	SM	3	28
T12	Alder (Common)	10	EM	8.5	228
T13	Cherry (Wild)	6	EM	3.6	41
T14	Alder (Common)	12	EM	6.8	147
T15	Sycamore	16	M	13.3	557
T16	Oak (English)	9	M	6.8	147
T17	Sycamore	12	EM	5.4	92
T18	Oak (Turkey)	15	EM	5.4	92
T19	Sycamore	10	EM	5.4	92
T20	Alder (Common)	8	SM	1.8	10
G1	Field maple; common hawthorn; blackthorn.	2-8	SM	2.4	-
G2	Common hawthorn	2.5-3	Y	1	-
G3	Sycamore	10-12	EM	5.4	-
G4	Common ash	7-8	SM	1.8	-
G5	Sycamore	8-10	SM	6.6	-
G6	Sycamore; field maple	5-11	EM	7.2	-
G7	Elder	4-4.5	M	2.4	-
G8	Birch; yew; cypress; ash	10-15	M	7.2	-
G9	Elder	3-4	M	2.4	-
G10	Common alder; sycamore	9-12	SM	4.8	-
G11	Weeping willow; walnut; silver maple etc	8-13	M	8.4	-
G12	Weeping willow; common alder; oak; willow	5-14	EM	7.8	-
G13	Goat willow; blackthorn; ash; alder; willow	3-7	EM	3.6	-
G14	Sycamore	12-15	EM	6.6	-
G15	Sycamore	10-12	EM	4.8	-
G16	Mixed species - predominantly common alder	8-14	EM	5.4	-
G17	Mixed species - predominantly sycamore	8-12	EM	6	-
G18	Common alder; weeping willow	8-14	EM	7.8	-
W1	Sycamore; willow common alder	12-14	EM	4.8	-
H1	Common hawthorn; blackthorn; field maple; hazel	4.5	SM	1	-
H2	Hawthorn; sycamore; field maple; oak	4	EM	1.3	-
H3	Blackthorn; hazel; hawthorn; cherry	5	EM	1.3	-
H4	Blackthorn; with hawthorn; hazel and field maple;	4	SM	1.3	-

KEY

- Category A Tree - High quality (Retention highly desirable)
- Category A - Hedgerow, Group, Woodland - High quality (Retention highly desirable)
- Category B Tree - Moderate quality (Retention desirable)
- Category B - Hedgerow, Group, Woodland - Moderate quality (Retention desirable)
- Category C Tree - Low quality (May be retained but should not constrain development)
- Category C - Hedgerow, Group, Woodland - Low quality (May be retained but should not constrain development)
- Category U Tree - Very low quality (Mostly unsuitable for retention)
- Category U - Hedgerow, Group, Woodland - Very low quality (Mostly unsuitable for retention)
- Root Protection Area (RPA) - Layout design tool indicating the minimum area around a tree deemed to contain sufficient roots and soil volume to maintain the tree's viability
- Areas of out of scope bramble and ruderal vegetation

Note: The original of this drawing was produced in colour – a monochrome copy should not be relied upon. This drawing should be interpreted with reference to the accompanying tree schedule and written advice

N
GRID NORTH

PROJECT TITLE
Cambridgeshire Road, Linton

DRAWING TITLE
Tree Survey & Constraints Plan

SCALE		DRAWING NUMBER
1:1750 @ A3		BHA_4749_01

DRAWN BY	APPROVED BY	REVISION	SHEET	DATE
DV	RH	-	-	02/12/2021

LAYOUT USED WITHIN DRAWING **xxxxxxxxxx**

CLIENT **Taylor Wimpey Strategic Land**

COORDINATE SYSTEM / DATUM **British National Grid / Newlyn Datum (AOD)**

Barton Hyett Associates
Arboricultural Consultants
In association with CSA environmental
Tel: 01386 576161 Website: www.barton-hyett.co.uk
Address: Barn 2,Oxpens Farm,Yanworth,
Cheltenham,Gloucestershire,GL54 3QE

BS5837:2012 TREE SURVEY SCHEDULE

CAMBRIDGE ROAD, LINTON

PROJECT NO: 4749

SURVEYOR: RH

CLIENT: TAYLOR WIMPEY STRATEGIC LAND

SURVEY DATE: 23/11/2021

Barton Hyett Arboricultural Consultants

INDIVIDUAL TREES

Ref	Species	On/off site	Top Height (m)	No. of Stems	Est diam?	Calc. / Actual Stem Dia. (mm)	Crown radii (m) N-E-S-W	Avg. low crown height (m)	1st branch ht (m)	1st branch dir.	Life Stage	Special importance	General Observations	Health & vitality	Structural condition	Estimated Remaining Contribution (Years)	BS5837 Category	RPA Radius (m)	RPA m²	TPO?
T1	Ash (Common)	On	8.0	1	Yes	400	4-4-4-3	1.5	1.0	S	SM	None	Typical for species and age. No signs of ash die back.	Fair	Fair	20	B1	4.8	72	None
T2	Oak (English)	On	8.0	1	Yes	400	7-7-4-5	1.2	1.0	W	EM	None	Squat form. Typical for species and age.	Good	Fair	20	B1	4.8	72	None
T3	Oak (English)	On	11.0	2	Yes	680	6-7-5-7	1.2	1.0	SE	EM	None	Twin stemmed from ground level. Typical for species and.	Good	Fair	20	B1	8.2	209	None
T4	Oak (English)	On	10.0	1	Yes	550	7-8-5-7	1.0	1.5	W	EM	None	Poor primary and secondary limb structure. Overall typical for species and age.	Good	Fair	20	B1	6.6	137	None
T5	Poplar (Lombardy)	Off	10.0	1	Yes	500	2-2-2-2	4.0	4.0	S	EM	None	Offsite tree. Topped in past.	Fair	Poor	10	C1	6.0	113	None
T6	Willow	Off	16.0	3	Yes	700	5-7-6-7	5.0	4.0	SW	M	None	Typical for species and age. Offsite. No access to stem. Small ash growing at base.	Good	Poor	20	B2	8.4	222	None
T7	Willow	On	9.0	1	Yes	700	4-8-12-4	0.5	1.0	SE	M	None	Collapsed willow; starting to layer. Many crack and splits in limbs. Good potential habitat.	Fair	Poor	20	C3	8.4	222	None
T8	Elder	On	3.0	7	Yes	200	2-2-2-2	0.5	0.5	S	M	None	Typical for species and age. In decline.	Poor	Poor	<10	C1	2.4	18	None
T9	Birch (Silver)	On	15.0	1	Yes	400	3-4-4-4	4.0	3.0	W	EM	None	Good form. No access to stem.	Good	Good	20	B2	4.8	72	None
T10	Hawthorn	On	4.0	1	Yes	150	3-3-4-3	1.0	1.0	S	SM	None	Good form; typical for species and age. Downgraded on basis of small size only.	Fair	Fair	20	C1	1.8	10	None
T11	Cherry (Wild)	On	8.0	1	Yes	250	3-4-4-3	1.5	1.5	S	SM	None	Good form; typical for species and age.	Good	Fair	20	B1	3.0	28	None
T12	Alder (Common)	On	10.0	4	Yes	710	5-5-6-7	1.5	1.0	S	EM	None	Multistemmed from ground level. On riverbank. Typical crown form.	Good	Fair	20	B1	8.5	228	None

BS5837:2012 TREE SURVEY SCHEDULE

CAMBRIDGE ROAD, LINTON

PROJECT NO: 4749

SURVEYOR: RH

CLIENT: TAYLOR WIMPEY STRATEGIC LAND

SURVEY DATE: 23/11/2021

Barton Hyett Arboricultural Consultants

Ref	Species	On/off site	Top Height (m)	No. of Stems	Est diam?	Calc. / Actual Stem Dia. (mm)	Crown radii (m) N-E-S-W	Avg. low crown height (m)	1st branch ht (m)	1st branch dir.	Life Stage	Special importance	General Observations	Health & vitality	Structural condition	Estimated Remaining Contribution (Years)	BS5837 Category	RPA Radius (m)	RPA m²	TPO?
T13	Cherry (Wild)	On	6.0	1	Yes	300	3-3-3-3	1.0	1.0	W	EM	None	No access to stem. Close to river bank. Typical for species and age. Minor branch tip die back.	Fair	Fair	10	C2	3.6	41	None
T14	Alder (Common)	On	12.0	2	Yes	570	4-4-5-5	3.0	1.5	S	EM	None	Offsite tree on other side of river. Typical for species and age.	Good	Fair	20	B1	6.8	147	None
T15	Sycamore	Off	16.0	10	Yes	1110	6-6-6-7	3.0	3.0	N	M	None	Multistemmed from ground level. Ivy on stems. Typical for species and age.	Good	Fair	20	B1	13.3	557	None
T16	Oak (English)	Off	9.0	2	Yes	570	5-8-7-7	3.0	4.0	E	M	None	Twin stemmed from ground level. Offsite and no access to stem.	Good	Fair	40	B1	6.8	147	None
T17	Sycamore	Off	12.0	1	Yes	450	5-4-4-4	3.0	3.0	S	EM	None	Offsite; no access to stem. Ivy throughout crown.	Fair	Fair	20	C2	5.4	92	None
T18	Oak (Turkey)	On	15.0	1	Yes	450	4-6-5-5	3.0	4.0	S	EM	None	Major codominant stem lost on north side in past. Wound on stem. No signs of significant decay. Crown shape recovering well.	Good	Fair	20	B1	5.4	92	None
T19	Sycamore	On	10.0	1	Yes	450	5-5-6-5	2.5	1.5	NW	EM	None	On river bank. No access to stem. Good crown form but poor primary branch structure.	Good	Fair	20	B1	5.4	92	None
T20	Alder (Common)	On	8.0	1	Yes	150	2-2-2-2	2.0	1.5	W	SM	None	On river bank. No access to stems. Typical for species and age. Downgraded only on basis of small size.	Good	Fair	20	C1	1.8	10	None

B2
B2

BS5837:2012 TREE SURVEY SCHEDULE

CAMBRIDGE ROAD, LINTON

PROJECT NO: 4749

SURVEYOR: RH

CLIENT: TAYLOR WIMPEY STRATEGIC LAND

SURVEY DATE: 23/11/2021

Barton Hyett Arboricultural Consultants

GROUPS OF TREES

Ref	Species	On/off site	Height range (m)	No. of trees	Est diam?	Max stem diam (mm)	Av. Crown radius (m)	Avg. low crown height (m)	Life Stage	Special importance	General Observations	Health & vitality	Structural condition	Estimated Remaining Contribution (Years)	BS5837 Category	RPA Radius (m)	TPO?
G1	Field maple; common hawthorn; blackthorn.	On	2-8	5	Yes	200	3.0	1.0	SM	None	Drawn up field maple from coppice stools with understorey of younger hawthorn and blackthorn.	Fair	Fair	20	C2	2.4	None
G2	Common hawthorn	On	2.5-3	6	Yes	75	1.0	0.5	Y	None	Relatively young hedgerow planting beneath larger trees.	Fair	Fair	10	C2	1.0	None
G3	Sycamore	On	10-12	4	Yes	450	5.0	4.0	EM	None	Close grown trees with single crown. Westernmost tree covered in dense Ivy.	Fair	Fair	20	B2	5.4	None
G4	Common ash	On	7-8	4	Yes	150	3.0	1.5	SM	None	Four close grown trees with single crown; relatively young trees downgraded on the basis of small size only.	Fair	Fair	20	C2	1.8	None
G5	Sycamore	On	8-10	7	Yes	550	4.0	4.0	SM	None	Close grown trees of Multistemmed form. Typical for species and age.	Fair	Fair	20	C2	6.6	None
G6	Sycamore; field maple	On	5-11	15	Yes	600	5.0	2.5	EM	None	Linear group of sycamore with occasional hawthorn understorey. All sycamores are Multistemmed and located on steep embankment down from adjacent highway. Prominent tree group adjacent highway.	Good	Fair	20	B2	7.2	None
G7	Elder	On	4-4.5	8	Yes	200	2.5	0.5	M	None	Typical for species and age. In decline. Ivy dominating in parts.	Poor	Poor	<10	C2	2.4	None
G8	Birch; yew; cypress; ash	Off	10-15	15	Yes	600	5.0	4.0	M	None	Offsite trees; no access to stems. Dense mixed species group in adjacent garden.	Good	Fair	20	B2	7.2	None
G9	Elder	On	3-4	5	Yes	200	3.0	0.5	M	None	Typical for species and age. In decline; dominated by Ivy in parts.	Poor	Fair	<10	C2	2.4	None
G10	Common alder; sycamore	On	9-12	10	Yes	400	3.5	2.0	SM	None	Close ground trees with single crown. No access to stems. Typical for species and growing conditions. Most trees have drawn up form.	Good	Fair	20	B2	4.8	None
G11	Weeping willow; walnut; silver maple etc	Off	8-13	6	Yes	700	5.0	2.0	M	None	No access to stems. Number of trees estimated. Good overall form.	Good	Fair	20	B2	8.4	None
G12	Weeping willow; common alder; oak; willow	Off	5-14	7	Yes	650	5.0	2.0	EM	None	Offsite group; no access to stems. Number of trees estimated. Trees appear typical for species and age.	Fair	Fair	20	B2	7.8	None
G13	Goat willow; blackthorn; ash; alder; willow	On	3-7	6	Yes	300	3.0	1.0	EM	None	No access to trees as within dense undergrowth. Goat willows collapsed in past - typical for species. Number of trees estimated.	Fair	Fair	20	C2	3.6	None

BS5837:2012 TREE SURVEY SCHEDULE

PROJECT NO: 4749

CAMBRIDGE ROAD, LINTON

SURVEYOR: RH

CLIENT: TAYLOR WIMPEY STRATEGIC LAND

SURVEY DATE: 23/11/2021

Ref	Species	On/off site	Height range (m)	No. of trees	Est diam?	Max stem diam (mm)	Av. Crown radius (m)	Avg. low crown height (m)	Life Stage	Special importance	General Observations	Health & vitality	Structural condition	Estimated Remaining Contribution (Years)	BS5837 Category	RPA Radius (m)	TPO?
G14	Sycamore	Off	12-15	8	Yes	550	5.0	3.0	EM	None	Close grown trees with single crown. Offsite; no access to stems. Multistemmed trees. Ivy on stem.	Fair	Fair	20	B2	6.6	None
G15	Sycamore	Off	10-12	10	Yes	400	4.0	3.0	EM	None	Close grown group of trees. Ivy on many stems. No access to stems.	Fair	Fair	20	B2	4.8	None
G16	Mixed species - predominantly common alder	Off	8-14	15	Yes	450	4.0	4.0	EM	None	Offsite trees on river bank. No access to stems. Typical for species and age. Number of trees estimated.	Good	Fair	20	B2	5.4	None
G17	Mixed species - predominantly sycamore	Off	8-12	20	Yes	500	4.0	4.0	EM	None	Offsite trees. No acres to stems. Close grown with drawn up form. Number of trees estimated.	Good	Fair	20	B2	6.0	None
G18	Common alder; weeping willow	Off	8-14	15	Yes	650	5.0	3.0	EM	None	Cohesive offsite group along river banks. Some smaller trees to south of river. Weeping willow at western end. Trees managed for overhead powerline clearance at eastern end.	Good	Fair	20	B2	7.8	None

WOODLANDS

Ref	Species	On/off site	Height range (m)	No. of trees	Est diam?	Max stem diam (mm)	Av. Crown radius (m)	Avg. low crown height (m)	Life Stage	Special importance	General Observations	Health & vitality	Structural condition	Estimated Remaining Contribution (Years)	BS5837 Category	RPA Radius (m)	TPO?
W1	Sycamore; willow common alder	On	12-14	50	Yes	400.0	3.0	4.0	EM	None	Woodland group; part offsite. No access to stems. Ivy on most stem; water course present within.	Fair	Fair	40	B2	4.8	None

BS5837:2012 TREE SURVEY SCHEDULE

CAMBRIDGE ROAD, LINTON

PROJECT NO: 4749

SURVEYOR: RH

CLIENT: TAYLOR WIMPEY STRATEGIC LAND

SURVEY DATE: 23/11/2021

Barton Hyett Arboricultural Consultants

HEDGEROWS

Ref	Species	On/off site	Av. Height (m)	Av. width (m)	Av. Stem diam (mm)	Avg. low crown height (m)	Life Stage	General Observations	Health & vitality	Structural condition	Estimated Remaining Contribution (Years)	BS5837 Category	RPA Radius (m)
H1	Common hawthorn; blackthorn; field maple; hazel	On	4.5	3	80	0.5	SM	Relatively young hedge planted along former hedgerow line. Some older stems previously. Side flailed on road side to south. Occasional field maple and ash to 6-8m.	Fair	Fair	20	B2	1.0
H2	Hawthorn; sycamore; field maple; oak	On	4.0	2.5	100	0.5	EM	Boundary hedgerow. Side flailed on site side in past.	Fair	Fair	20	C2	1.3
H3	Blackthorn; hazel; hawthorn; cherry	On	5.0	4	100	0.0	EM	Thicket appearance with occasional cherry to 6m. Side flailed on site side in past.	Fair	Fair	20	C2	1.3
H4	Blackthorn; with hawthorn; hazel and field maple;	On	4.0	4	100	0.5	SM	Relatively young hedgerow planting along old hedgerow line. Blackthorn dominates in parts. Northern end is a blackthorn thicket. Provides visual screen to adjacent lane. Could be improved with management and supplementary planting.	Fair	Fair	20	C2	1.3

IMAGE 1: Looking south west along the northern side of the sites southern boundary. The larger trees to the left of centre frame are within G5.

IMAGE 2: looking west in to the western end of the site (a likely ecological enhancement area). G6 can be seen to the left of centre frame, located on an embankment down from Cambridge Road.

IMAGE 3: Looking north along footpath 146/14. G10 can be seen to the left of centre frame and G11/T12 at approximately centre frame.

IMAGE 4: a wide view looking eastwards across the centre of the site from the western boundary.

IMAGE 5: looking north east along the northern boundary of the site.

IMAGE 6: Looking east towards the north east corner of the site with T15 to the left of centre frame and T16 to the right of centre frame.

- The tree survey was carried out with reference to the methodology set out in BS5837:2012 'Trees in relation to design, demolition and construction – Recommendations'.
- Trees were surveyed individually or as groups where it was considered that they had grown together to form cohesive arboricultural features either aerodynamically (trees that provide companion shelter), visually (e.g. avenues or screens) or culturally (including for biodiversity). However, where it was considered that there was an arboricultural need to differentiate between attributes trees within groups and / or woodlands were also surveyed as individuals.
- The full tree survey findings are recorded in the following tree survey schedule.
- Within the tree survey schedule, each surveyed TREE (T), GROUP (G), HEDGEROW (H), WOODLAND (W) or SHRUB MASS on or adjacent to the site is given a reference number which refers to its position on the tree survey and constraints plan.
- TREE SPECIES are listed by common name.

The **DIMENSIONS** taken are:

- STEM-No. Indicates the number of main stems (i.e. whether the trunk divides at or below 1.5m; (Used in the calculation of RPA.) "m-s" = Multi-stemmed.
- STEM DIAMETER (measured in millimetres), obtained from the girth measured at approx. 1.5m. For trees with 2 to 5 sub-stems a notional figure is derived from the sum of their cross-sectional areas. For multi-stemmed trees, the notional diameter may be estimated on the basis of the average stem size x the number of stems. (A notional diameter may be estimated where measurement is not possible.)
- HEIGHT (measured in metres), recorded to the nearest half metre for dimensions up to 10m and to the nearest whole metre for dimensions over 10m.
- The CROWN SPREAD, taken at the four cardinal points to derive an accurate representation of the tree crown, recorded up to the nearest half metre for dimensions up to 10m and to up the nearest whole metre for dimensions over 10m.
- CROWN CLEARANCES are expressed both as existing height above ground level of first significant branch along with its direction of growth (e.g. 2.5m-N), and also in terms of the overall crown e.g. the average height of the crown above ground level. Measurements are recorded to the nearest half metre for dimensions up to 10m and to the nearest whole metre for dimensions over 10m.
- ESTIMATES. Where any measurement has had to be estimated, due to inaccessibility for example, this is indicated by a "#" suffix to the measurement as shown in the tree survey schedule.

LIFE STAGE is defined as follows:

Y Young: Normally stake dependent, establishing trees. Should be growing fast, usually primarily increasing in height more than spread but as yet making limited impact upon the landscape.

SM Semi-mature: Established young trees, normally of good vigour and still increasing in height but beginning to spread laterally. Beginning to make an impact upon the local landscape and environment. Semi-Mature (still capable of being transplanted without preparation, up to 30cm girth and not yet sexually mature).

EM Early-mature: Not yet having reached 75% of expected mature size. Established young trees, normally of good vigour and still increasing in height but beginning to spread laterally. Beginning to make an impact upon the local landscape and environment.

M Mature: Well-established trees, still growing with some vigour but tending to fill out and increase spread. Bark may be beginning to crack and fissure. In the middle half of their safe, useful life expectancies.

LM Late-Mature: In full maturity but possibly beyond mature and in a state of natural decline). Still retaining some vigour but any growth is slowing.

A Ancient: A tree that has passed beyond maturity and is old/aged compared with other trees of the same species. Typically having a very wide trunk and a small canopy.

PHYSIOLOGICAL CONDITION (HEALTH & VITALITY):

Essentially a snapshot of the general health of the tree based upon its general appearance, it's apparent vigour and the presence or absence of symptoms associated with poor health, physiological stress etc. (Fungal infections may be recorded here but decay giving rise to structural weakness would be recorded under 'Structural Condition' – see next parameter):

Good: No significant health issues.
Fair: Indications of slight stress or minor disease (e.g. the presence of minor dieback/deadwood or of epicormic shoot growth).
Poor: Significant stress or disease noted; larger areas of dieback than above.
Dead: (or Moribund).

STRUCTURAL CONDITION:

Defects affecting the structural stability of the tree including decay, significant dead wood, root-plate instability or significant damage to structural roots, weak forks (e.g. those where bark is included between the members) etc. Classified as:

Good: No obvious structural defects: basically sound.
Fair: Minor, potential or incipient defects.
Poor: Significant defect(s) likely to lead to actual failure in the medium to long-term.
Dead: (or Moribund).

ESTIMATED REMAINING CONTRIBUTION:

An estimate of the length of time in years that a tree might be expected to continue to make a useful contribution to the locality at an acceptable level of risk (based on an assumption of continued routine maintenance):

- Less than 10 years
- 10+ years
- 20+ years
- 40+ years

SPECIAL IMPORTANCE:

Trees that are particularly notable as high value trees such as ancient trees/woodland or veteran trees. Such trees may be regarded as the principal arboricultural features of a site and pose a significant constraint to potential development.

An *ancient* tree is one that has passed beyond maturity and is very old compared with other trees of the same species. Very few trees reach the ancient life-stage.

Veteran trees are often very old but not necessarily so; they may be regarded as 'survivors' that have developed some of the characteristic features of an ancient tree but have not necessarily lived as long. All ancient trees are veterans but not all veteran trees are ancient.

An ancient woodland is an area that has been wooded continuously since at least 1600 AD. It includes ancient semi-natural woodland (ASNW), plantations on ancient woodland sites (PAWS) and ancient replanted woodland (ARW)

QUALITY CATEGORY:

Trees are classed as category U, A, B or C, based on criteria given in BS5837:2012; summary definitions as follows (see BS5837 for further details). Categories A, B and C are further characterised by the use of sub-categories, which attempt to identify what aspect of the tree is the main source of its perceived value, These are:

(1) arboricultural qualities
(2) landscape qualities, and
(3) cultural, historic or ecological/conservation qualities.

Examples of these qualities for each of the three categories are given below, although these are indicative only.

Note: This is NOT a health and safety classification; the classification does not take into account any requirement for remedial tree care or ongoing maintenance apart from that which may affect the trees' general suitability for retention.

CATEGORY A: HIGH QUALITY:

Trees or groups whose retention should be given a particularly high priority within the design process. Normally with an expected useful life expectancy of at least 40 years.

A1: Notably fine specimens; rare or unusual specimens; essential component trees within groups, semi-formal or formal plantings (e.g. dominant trees within an avenue etc.).
A2: Trees, groups or woodlands of particular visual importance as landscape features.
A3: Trees, groups or woodlands of particular significance by virtue of their conservation, historical, commemorative or other value (e.g. veteran trees or wood pasture.)

CATEGORY B: MODERATE QUALITY:

Trees or groups of some importance with a likely useful life expectancy in excess of 20 years. Their retention would be desirable; selective removal of certain individuals may be acceptable but only after full consideration of all alternative courses of action.

B1: Fair quality but not exceptional; good specimens showing some impairment (e.g. remediable defects, minor storm damage or poor past management.)
B2: Acceptable trees situated such as to have little visual impact within the wider locality. Also numbers of trees, perhaps in groups or woodlands, whose value as landscape features is greater collectively than would warrant as individuals (such that the selective removal of an individual would not impact greatly upon the trees' overall, collective value).
B3: Trees, groups or woodlands with clearly identifiable conservation or other cultural benefits.

CATEGORY C: LOW QUALITY:

Trees or groups of rather low quality, although potentially capable of retention for at least approx. 10 years. Also small trees with stems below 15cm diameter.

Potentially retainable, but not of sufficient value to be regarded as a significant planning constraint.

C1: Unremarkable trees of very limited merit or of significantly impaired condition.
C2: Trees offering only low or short-term landscape benefits; also secondary specimens within groups or woodlands whose loss would not significantly diminish their landscape value.
C3: Trees with extremely limited conservation or other cultural benefit.

CATEGORY U:

Trees likely to prove to be unsuitable for retention for longer than 10 years should any significant increase in site usage arise as a result of development.

E.g. dead or moribund trees; those at risk of collapse or in terminal decline; trees that will be left unstable by other essential works such as the removal of nearby category U trees; trees infected by pathogens that could materially affect other trees; low quality trees that are suppressing better specimens.

(Category U trees may have conservation values that it might be desirable to preserve. This category may also include trees that should be removed irrespective of any development proposals.)

ROOT PROTECTION AREA (RPA):

These are normally represented as a circle centred on the base of each tree stem with a radius of 12 times stem diameter, measured at 1.5m above ground level. The shape of the RPA may be altered where site conditions dictate that there are sound reasons to do so.

VETERAN OR ANCIENT TREE BUFFER (VTB/ATB)

In line with the Standing Advice produced by the Forestry Commission and Natural England this is a buffer zone (in metres) around an ancient or veteran tree that should be at least 15 times larger than the diameter of the tree. The buffer zone should be 5m from the edge of the tree's canopy if that area is larger than 15 times the tree's stem diameter.

ANCIENT WOODLAND BUFFER (FOR ASNW, PAWS OR ARW)

In line with the Standing Advice produced by the Forestry Commission and Natural England this is a buffer zone of at least 15 metres to avoid root damage. Where assessment shows other impacts are likely to extend beyond this distance, a larger buffer zone may be required.

THE IMPORTANCE OF TREES

Wider benefits:

There is a growing body of evidence that trees bring a wide range of benefits to the places people live.

Some *Economic* benefits of trees include:

- Trees can increase property values
- As trees grow larger, the lift they give to property values grows proportionately
- They can improve the environmental performance of buildings by reducing heating and cooling costs, thereby cutting bills
- Mature landscapes with trees can be worth more as development sites
- Trees create a positive perception of a place for potential property buyers
- Urban trees improve the health of local populations, reducing healthcare costs

Some *Social* benefits of trees include:

- Trees help create a sense of place and local identity
- They benefit communities by increasing pride in the local area
- They can create focal points and landmarks
- They have a positive impact on people's physical and mental health
- They can have a positive impact on crime reduction

Some *Environmental* benefits of trees include:

- Urban trees reduce the 'urban heat island effect' of localised temperature extremes
- They provide shade, making streets and buildings cooler in summer
- They help remove dust and particulates from the air
- They help to reduce traffic noise by absorbing and deflecting sound
- They help to reduce wind speeds
- By providing food and shelter for wildlife, they help increase biodiversity
- They can reduce the effects of flash flooding by slowing the rate at which rainfall reaches the ground
- They can help remediate contaminated soil

On new development sites:

Trees bring many benefits to new development. Where retained successfully they can form important and sustainable elements of green infrastructure, contribute to urban cooling and reduce energy demands in buildings. Their importance is acknowledged in relation to adaptation to the effects of climate change. Other benefits brought by trees include:

- Increasing property values
- Visual amenity
- Softening, complementing and adding maturity to built form
- Displaying seasonal change
- Increasing wildlife opportunities in built-up areas
- Contributing to screening and shade
- Reducing wind speed and turbulence

NATIONAL PLANNING POLICY

The National Planning Policy Framework 2021 (NPPF paragraph 180) states that, when determining planning applications, local planning authorities should apply the following principle:

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.'

In this respect the following definitions apply:

'Ancient woodland: An area that has been wooded continuously since at least 1600 AD. It includes ancient semi-natural woodland and plantations on ancient woodland sites (PAWS)', and

'Ancient or veteran tree: A tree which, because of its age, size and condition, is of exceptional biodiversity, cultural or heritage value. All ancient trees are veteran trees. Not all veteran trees are old enough to be ancient, but are old relative to other trees of the same species. Very few trees of any species reach the ancient life-stage.'

Note: Further information from the National Planning Policy Guidance Suite and Standing Advice is provided in the design guidance section.

Other paragraphs of the NPPF 2021 of relevance to this report are:

Paragraph 131: *'Trees make an important contribution to the character and quality of urban environments, and can also help mitigate and adapt to climate change. Planning policies and decisions should ensure that new streets are tree-lined, that opportunities are taken to incorporate trees elsewhere in developments (such as parks and community orchards), that appropriate measures are in place to secure the long-term maintenance of newly-planted trees, and that existing trees are retained wherever possible. Applicants and local planning authorities should work with highways officers and tree officers to ensure that the right trees are planted in the right places, and solutions are found that are compatible with highways standards and the needs of different users.'*

Paragraph 174: *'Planning policies and decisions should contribute to and enhance the natural and local environment by:*
b) recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland.'

STATUTORY CONTROLS

Statutory tree protection

Works to trees which are covered by Tree Preservation Orders (TPOs) or are within a Conservation Area (CA) require permission or consent from the Local Planning Authority. Where information is available on any Statutory designations such as this they are identified within the summary table in Section 1 and on the Tree Survey and Constraints Plan at Section 2.

Notwithstanding specific exceptions and in general terms, a TPO prevents the cutting down, uprooting, topping, lopping, wilful damage or wilful destruction of protected trees or woodlands without the prior written consent of the LPA.

Penalties for contravention of a TPO tend to reflect the extent of damage caused but can, in the event of a tree being destroyed, result in a fine of up to £20,000 if convicted in a Magistrates' Court, or an unlimited fine is the matter is determined by the Crown Court.

Similarly, and again notwithstanding specific exceptions, it is an offence to carry out any works to a tree in a Conservation Area with a trunk diameter greater than 75mm diameter at 1.5 height without having first provided the LPA with 6 weeks written notification of intent to carry out the works.

On many non-residential sites (excluding specific exemptions) there is also a statutory restriction relating to tree felling that relates to quantities of timber that can be removed within set time periods. In basic terms, it is an offence to remove more than 5 cubic metres of timber in any one calendar quarter without having first obtained a felling licence from the Forestry Commission.

Any proposed tree works that are planned to be carried out on site must be carried out in accordance with the statutory controls outlined.

Statutory Wildlife Protection

Although preliminary visual checks from ground level of likely wildlife habitats are made at the time of surveying, detailed ecological assessments of wildlife habitats are not made by the arboriculturist and fall outside of the scope for this report.

Trees which contain holes, splits, cracks and cavities could potentially provide a habitat for protected species such as bats in addition to birds and small mammals. It is advised that in some instances specialist ecological advice may be required. This may result in tree works being carried out following a detailed climbing inspection to the tree to ensure that protected species or their nests/roosts are not disturbed. If any are found, the site manager, site owner or consulting arboriculturist should be informed and appropriate action taken as recommended by the appointed Ecologist or the relevant Statutory Nature Conservation Organisation (SNCO): Natural England, Scottish Natural Heritage or Natural Resources Wales.

It is advised that tree/hedgerow works are carried out with the understanding that birds will generally nest in trees, hedges and shrubs between March and August. This time period only provides an indication of likely nesting times and as such diligence is required when undertaking tree works at all times.

Irrespective of the time of year and other than any actions approved under General Licence, it is an offence to intentionally kill, injure or take any wild bird or to intentionally take, damage or destroy the nest or eggs of any wild bird. Ideally, tree operations should be avoided during the likely bird nesting period. However, any tree works should always only be carried out following a preliminary visual check of the vegetation.

For information, the Wildlife and Countryside Act 1981 (as amended), The Countryside and Rights of Way Act 2000 (as amended) and the Conservation of Habitat and Species Regulations 2010, form the basis of the statutory legislation for flora and fauna in England and Wales. A different legislative framework applies in Scotland and Northern Ireland.

Any proposed tree works that are planned to be carried out on site must be carried out in accordance with any relevant statutory controls, outlined above.

DESIGN GUIDANCE

Approach

The approach adopts the guidelines set out in the British Standard BS 5837:2012 Trees in relation to design, demolition and construction – Recommendations. The process is broken down to coordinate with the key elements within both the RIBA Plan of Work (2013) and British Standard 5837:2012 as set out in the table below:

Information Stage	RIBA Stage	BS5837:2012
Stage A – Tree Survey	2: Concept	4: Feasibility
Stage B – Arboricultural Impact Assessment	3: Developed design	5: Proposals
Stage C – Arboricultural Method Statement	4: Technical design	6: Technical Design
Stage D – Arboricultural Site Supervision	5: Construction	7: Demolition and construction

A hierarchical approach is adopted in order to achieve optimum use of the site and location of built structures. This is set out below:

Avoid

The starting point of Site layout design should be to avoid the RPA of retained trees and provide suitable clearance from above ground constraints [tree canopies]. Where possible building lines should be at least 2m outside the RPA to provide working space for construction. However, protection measures can be taken if such clearance is not achievable.

Mitigate

Where intrusion within the RPA is unavoidable then its impact on the tree can be mitigated by specialist measures:

Foundations that avoid trenching e.g. screw piles, suspended floor slabs or casting at ground level for lightweight structures such as bin and cycle stores.

Limited use may be made for parking, drives or hard surfaces within the root protection areas, subject to advice from a qualified arboriculturist. Cellular confinement systems that enable hard surfaces to be built above existing soil levels are acceptable methods subject to site-specific soil conditions.

Service runs that cannot be routed outside the RPA(s) can be installed by, for example, thrust boring, directional drilling, air excavation or hand digging. These operations often require supervision by the project arboriculturist.

Compensate

Replacement planting can ensure the continuity of tree cover where tree removal is unavoidable or desirable. Off-site provision may be considered in some circumstances but this will require negotiation with the local planning authority.

Considerations:

For proposed residential developments, consideration must be given to numerous factors future tree growth and orientation.

Tree constraints

Root Protection Areas:

With reference to BS5837:2012, a root protection area (RPA) is defined as "a layout design tool indicating the minimum area around a tree deemed to contain sufficient roots and rooting volume to maintain the tree's viability, and where the protection of the roots and soil structure should be treated as a priority". "**The default position [when considering design layout in relation to RPAs] should be that structures are located outside the RPAs of trees to be retained**".

BS5837:2012 states (4.6.2) that, "where pre-existing site conditions or other factors indicate that rooting has occurred asymmetrically, a polygon of equivalent area should be produced." The BS goes on to state that, "modifications to the shape of the RPA should reflect a soundly based arboricultural assessment of likely root distribution," and that any deviation from the original circular plot should take into account:

- Morphology and disposition of roots;
- topography and drainage;
- soil type and structure;
- the likely tolerance of the tree to root damage/disturbance.

Additional buffer zones beyond the RPA:

The following text is taken from the Standing Advice produced by the Forestry Commission and Natural England as included in the National Planing Policy Guidance:

'A buffer zone's purpose is to protect ancient woodland and individual ancient or veteran trees. The size and type of buffer zone should vary depending on the scale, type and impact of the development'.

Ancient woodland buffer:

'For ancient woodlands, you should have a buffer zone of at least 15 metres to avoid root damage. Where assessment shows other impacts are likely to extend beyond this distance, you're likely to need a larger buffer zone. For example, the effect of air pollution from development that results in a significant increase in traffic'.

Ancient and veteran tree buffer:

'A buffer zone around an ancient or veteran tree should be at least 15 times larger than the diameter of the tree. The buffer zone should be 5m from the edge of the tree's canopy if that area is larger than 15 times the tree's diameter'.

Above ground:

Above ground constraints posed by trees describe the capacity for trees to have an overbearing or dominating effect on new developments; usually post occupancy. Typical above ground constraints include a number or combination of inconveniences including shading, branch spread, movement of trees during strong winds and so on. If not adequately considered, above ground constraints can lead to repeated requests to fell or heavily prune retained and protected trees.

Shade:

Adverse shading and blocked views from windows raise concerns for incoming residents, which may lead to pressure to fell or remove trees in the future. Wherever possible it is advisable to arrange fenestration away from tree canopies to lessen the conflict, or increase window size to accommodate ambient light.

Conversely, appropriate designed development can use existing or new trees to create necessary and welcome shade and screening.

As part of the adopted approach the above considerations and constraints are assessed cumulatively in order to provide clear and site-specific advice on the areas of a site most suitable for the location of development.

Dependent on the site and nature of the proposed development, the Tree Survey and Constraints Plans may show the following:

Recommended Developable area - an advisory area defined in order to minimise arboricultural impacts using standard approaches to construction. Restricting proposed development to this area will limit the risk of harm to retained trees and of the Local Planning Authority objecting to the proposed development. It may be possible to propose development outside of this area but specific 'low impact' construction techniques may be needed recommended.

Recommended Buffer to development - similar to the Recommend Developable Area but defined as a line marking a suitable buffer to retained trees. More commonly used on large sites or sites where the presence of trees is localised.

Tree Opportunities

Depending on the scale of developments existing trees can often provide opportunities to enhance the existing arboricultural resource of a site by bringing it into good management or by putting in place remedial measures e.g. soil amelioration.

Appropriately designed new tree planting is extremely important in maintaining healthy and sustainable tree populations. For the reasons highlighted, new trees can bring many benefits to new developments. It is critical to the establishment of new tree planting that the locations, species and specification of new trees is appropriate. Subsequently the sourcing of high-quality stock, suitable planting and the provision of post planting maintenance are essential to allow new trees to establish and to allow them to mature.

TS - 'Section 2'

Ref	Species	Height (m)	Life Stage	RPA Radius (m)	RPA (m2)
T1	Ash (Common)	8	SM	4.8	72
T2	Oak (English)	8	EM	4.8	72
T3	Oak (English)	11	EM	8.2	209
T4	Oak (English)	10	EM	6.6	137
T5	Poplar (Lombardy)	10	EM	6	113
T6	Willow	16	M	8.4	222
T7	Willow	9	M	8.4	222
T8	Elder	3	M	2.4	18
T9	Birch (Silver)	15	EM	4.8	72
T10	Hawthorn	4	SM	1.8	10
T11	Cherry (Wild)	8	SM	3	28
T12	Alder (Common)	10	EM	8.5	228
T13	Cherry (Wild)	6	EM	3.6	41
T14	Alder (Common)	12	EM	6.8	147
T15	Sycamore	16	M	13.3	557
T16	Oak (English)	9	M	6.8	147
T17	Sycamore	12	EM	5.4	92
T18	Oak (Turkey)	15	EM	5.4	92
T19	Sycamore	10	EM	5.4	92
T20	Alder (Common)	8	SM	1.8	10
G1	Field maple; common hawthorn; blackthorn.	2-8	SM	2.4	-
G2	Common hawthorn	2.5-3	Y	1	-
G3	Sycamore	10-12	EM	5.4	-
G4	Common ash	7-8	SM	1.8	-
G5	Sycamore	8-10	SM	6.6	-
G6	Sycamore; field maple	5-11	EM	7.2	-
G7	Elder	4-4.5	M	2.4	-
G8	Birch; yew; cypress; ash	10-15	M	7.2	-
G9	Elder	3-4	M	2.4	-
G10	Common alder; sycamore	9-12	SM	4.8	-
G11	Weeping willow; walnut; silver maple etc	8-13	M	8.4	-
G12	Weeping willow; common alder; oak; willow	5-14	EM	7.8	-
G13	Goat willow; blackthorn; ash; alder; willow	3-7	EM	3.6	-
G14	Sycamore	12-15	EM	6.6	-
G15	Sycamore	10-12	EM	4.8	-
G16	Mixed species - predominantly common alder	8-14	EM	5.4	-
G17	Mixed species - predominantly sycamore	8-12	EM	6	-
G18	Common alder; weeping willow	8-14	EM	7.8	-
W1	Sycamore; willow common alder	12-14	EM	4.8	-
H1	Common hawthorn; blackthorn; field maple; hazel	4.5	SM	1	-
H2	Hawthorn; sycamore; field maple; oak	4	EM	1.3	-
H3	Blackthorn; hazel; hawthorn; cherry	5	EM	1.3	-
H4	Blackthorn; with hawthorn; hazel and field maple;	4	SM	1.3	-

KEY

- Category A Tree - High quality (Retention highly desirable)
- Category A - Hedgerow, Group, Woodland - High quality (Retention highly desirable)
- Category B Tree - Moderate quality (Retention desirable)
- Category B - Hedgerow, Group, Woodland - Moderate quality (Retention desirable)
- Category C Tree - Low quality (May be retained but should not constrain development)
- Category C - Hedgerow, Group, Woodland - Low quality (May be retained but should not constrain development)
- Category U Tree - Very low quality (Mostly unsuitable for retention)
- Category U - Hedgerow, Group, Woodland - Very low quality (Mostly unsuitable for retention)
- Root Protection Area (RPA) - Layout design tool indicating the minimum area around a tree deemed to contain sufficient roots and soil volume to maintain the tree's viability
- Areas of out of scope bramble and ruderal vegetation

Note: The original of this drawing was produced in colour – a monochrome copy should not be relied upon. This drawing should be interpreted with reference to the accompanying tree schedule and written advice

N
GRID NORTH

PROJECT TITLE
Cambridgeshire Road, Linton

DRAWING TITLE
Tree Survey & Constraints Plan

SCALE		DRAWING NUMBER
1:1750 @ A3		BHA_4749_01

DRAWN BY	APPROVED BY	REVISION	SHEET	DATE
DV	RH	-	-	02/12/2021

LAYOUT USED WITHIN DRAWING **xxxxxxxxxx**

CLIENT **Taylor Wimpey Strategic Land**

COORDINATE SYSTEM / DATUM **British National Grid / Newlyn Datum (AOD)**

Barton Hyett Associates
Arboricultural Consultants
In association with CSA environmental
Tel: 01386 576161 Website: www.barton-hyett.co.uk
Address: Barn 2,Oxpens Farm,Yanworth,
Cheltenham,Gloucestershire,GL54 3QE

Appendix 12: Concept Masterplan

A children's play area at the centre of the development and set within the the public open space will be overlooked by the new residential development and extensive recreational routes. Its central location will ensure it is accessible to all and both new and existing residents of Linton, promoting an active and integrated community. The play area will be sympathetically designed with a natural characteristic to respect the edge of settlement location and the immediate character of the development.

MILL LANE north to HIGH STREET, LINTON

Potential location for two large SuDS basins designed to provide wildlife and habitat benefits forming an integral part of the Site's green infrastructure offering. The basins will be located at the end of the vista through the development and will create a link to the River Granta.

The new wetland meadow walk will utilise the flood plain, turning this constraint into an opportunity. Wetland habitats will be created, with new woodland, thicket and tree planting tolerant of wetter ground conditions, wetland wildflower meadow mixes and informal mown footways, will create a landscape which will have both social and environmental benefits. The recreational routes will connect into the public footpaths, linking the new homes with the open space and beyond to Linton. These spaces will link the woodland to the east and the west of the development and will provide the opportunity for informal play, dog walking and picknicking, with potential viewing platforms over the River Granta, further creating a holistic environment for both people and wildlife to flourish.

New recreational footways will meander through the open space and wetland meadows, providing opportunities for informal play and recreation. Trim-trail stations along these routes will also promote a healthy and active community, providing a range of play opportunities for all ages and abilities.

A1307 CAMBRIDGE RD north west to SAWSTON & CAMBRIDGE

B1052 HADSTOCK RD south to SAFFRON WALDEN

A1307 CAMBRIDGE RD east to HORSEHEATH & HAVERHILL

Retaining the woodland habitat in the western part of the Site, will form part of a wildlife area, where a number of ecological enhancements could be implemented to help the Site work towards achieving a biodiversity net gain. Wildlife ponds, bat and bird boxes, log piles and wildflower woodland meadows will create a space where wildlife can thrive. Interpretation boards will inform residents of the wildlife area's ecological offering. The wildlife area will also connect into the wetland meadows walk, creating a river corridor and connection into the heart of Linton.

Proposed vehicular access point to be taken from Cambridge Road.

New boundary planting will strengthen the existing vegetation along the Site's boundaries, and will enhance the development's strong green framework, befitting wildlife corridors and support its continued visual containment.

New community orchards will provide further habitat enhancements at the heart of the development, as well as social benefits, including a space to 'pick your own' and informal recreation.

Orientating the new homes to overlook the areas of more formal open space, strengthened with avenue tree planting, will frame the important vista across the Site towards Linton Water Tower.

New homes along the Site's southern boundary adjacent to Cambridge Road, will need to be designed to mitigate against any acoustic impacts associated with Cambridge Road. Fronting the road, deeper rear gardens and new tree and thicket planting will help in achieving this.

Potential landscaped area at the junction of Mill Lane and Cambirdge Road, will create a gateway feature into Linton when traveling west along the A1307. This space will provide glimpsed views across the development, creating a sense of arrival to Linton.

SUBJECT TO TECHNICAL INPUTS

+40m (AOD) +45m (AOD) +50m (AOD)

HORN LANE MILL LANE HADSTOCK ROAD LONG LANE CAMBRIDGE ROAD A1307 LINTON

L1 L2 L3 L4 L5 L6 L7 L8 L9 L10 L11

WETLAND MEADOW WALK WILDLIFE WOODLAND AREA WILDLIFE POND LEAP SuDS Orchard PETROL STATION

N 0 10 20 30 40 50 m

- Site Boundary: **Aprx. 6.80ha**
- Potential vehicular access point
- Developable area **Aprx. 2.75ha** **Up to 85 units @ 30dph**
- Public open space to include thicket, tree and wildflower planting
- Orchard and wildlife areas
- Location for children's play area
- Location for Trim-trail stations
- Potential location for sustainable drainage features (SuDS) with new habitats
- Location for Wildlife Ponds
- Viewing platforms over the River Granta
- Primary street
- Secondary streets within the development
- Lanes and private drives
- Avenue tree planting
- Pedestrian and cycle routes **(Routes within wetland meadow to be boardwalks)**
- Landscped gateway feature

INFLUENCES & CONTEXT

- Existing vegetation
- Local road network
- Public Rights of Way
- Existing contours (AOD: Above Ordnance Datum) +35m +40m
- Water bodies and watercourses **River Granta**
- Listed Buildings:
  - L1. Osnaburgh house **(Grade II*)**
  - L2. United Reformed Church **(Grade II)**
  - L3. Springfield Cottage **(Grade II)**
  - L4. Barn & Pump to north of The Guildhall **(Grade II)**
  - L5. The Guildhall **(Grade II)**
  - L6. Church Cottage **(Grade II)**
  - L7. Parish Church of St Mary the Virgin **(Grade I)**
  - L8. Mill Brook **(Grade II)**
  - L9. Linton Mill **(Grade II)**
  - L10. The Manor House **(Grade II)**
  - L11. The Mill House **(Grade II)**

NOTE:
Please refer to ***CSA/5653/105*** for the Site Opportunities & Influences

Rev	Date	By	Description
A	19.10.21	JC	Amended with client comments

CSA environmental
Dixies Barns, High Street, Ashwell, Hertfordshire SG7 5NT
t 01462 743647
e ashwell@csaenvironmental.co.uk
w csaenvironmental.co.uk

Project	Land North of Cambridge Road **LINTON**		
Title	Concept Masterplan		
Client	Taylor Wimpey Strategic Land		
Scale	1:1250 @ A2	Drawn	JC
Date	October 2021	Checked	CS
Drawing No.	CSA/5653/106	Rev	A