Issue Status

Revision	Drawn	Check	Date

PEDESTRIAN / CYCLE ACCESS - ROUTE TOWARDS CHURCH VIEW / REDENHALL ROAD

GREEN LANE

DRAIN

PEDESTRIAN / CYCLE ACCESS

LOVAT CLOSE

VEHICULAR ACCESS

Community Centre

JAY'S GREEN

POTENTIAL LAND FOR COMMUNITY USE APPROX 1.6HA

LB

MARTIN ROAD

El Sub Sta

HOWARD CLOSE

Pond

Pond

PUBLIC OPEN SPACE

PEDESTRIAN / CYCLE ACCESS - PROW (REDENHALL WITH HARLESTON FP18)

Reservoir

HARVEST WAY

THRESHER WAY

PEDESTRIAN / CYCLE ACCESS

BARLEY CLOSE

POTENTIAL ALLOTMENTS APPROX. 0.9HA

Briar Farm

VEHICULAR ACCESS

MENDHAM LANE

FULLERS PLACE DEVELOPMENT

A143

CARE 2.5HA

RETAIL 0.8HA

MAYFLOWER WAY

GP

41.0m

Track

Allotment Gardens

Drain

N

SCALE 1:1250
0 30 60 90

client
Scott Properties

project
Land off Mendham Lane
and Jay's Green,
Harleston, Norfolk

drawing
Proving Layout

date	Feb 20	scale	1:1250 @ A1
drawn	JDA	check	JSB

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19 | 201 | 04 | B

Issue Status			
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Revision	Drawn	Check	Date

PEDESTRIAN / CYCLE ACCESS - ROUTE TOWARDS CHURCH VIEW / REDENHALL ROAD

LOCATION OF BUNGALOWS

VEHICULAR ACCESS

PEDESTRIAN / CYCLE ACCESS

POTENTIAL LAND FOR COMMUNITY USE APPROX 1.6HA

PUBLIC OPEN SPACE

PEDESTRIAN / CYCLE ACCESS - PROW (REDENHALL WITH HARLESTON FP18)

POTENTIAL ALLOTMENTS APPROX. 0.9HA

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Allotment Gardens

GREEN LANE

JAY'S GREEN

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MARTIN ROAD

HOWARD CLOSE

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SCALE 1:1250

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client
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SCOTT PROPERTIES

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W471 Land at Briar Farm, Harleston, Norfolk
Technical Note 001 – Regulation 18 Stage C Highways and Transportation Representation Note
For M Scott Properties Ltd
March 2020

Introduction

1.1 Land at Briar Farm (Site GNLP2136) was considered as part of the Housing and Economic Land Availability Assessment (HELAA) Addendum, dated October 2018. In relation to highways and transportation matters for site GNLP2136 it concluded;

- Access – Green (There are no constraints and access by all means is possible);
- Accessibility to local services and facilities – Green (Four or more core services within 800m/10minutes walking distance of the site in town centres, 1,200m elsewhere and 2,000m for school access and employment).
- Transport and Roads – Green (development of the site will not have a detrimental impact on the function of trunk roads and/or local roads).

1.2 In summary the HELAA did not identify specific highways and transportation constraints to the development of site GNLP2136.

1.3 Consultation as part of Stage C Regulation 18 of the Greater Norwich Local Plan (GNLP) is currently ongoing (between 29th January and the 16th March 2020).

1.4 CCE has been requested to review the relevant wording proposed for site GNLP2136, which includes the following:

- Access (vehicular and pedestrian) to be via Mendham Lane with further pedestrian and cycle access from Barley Close;
- A new footpath connection to the existing Public Right of Way to the north of the site, creating a new link to the proposed open space to Angles Way;
- Safeguarding of existing Public Right of Way east of Mendham Lane.

1.5 This Technical Note has been prepared to present the current consideration in relation to the points identified above.

Access – Mendham Lane

1.6 It is proposed to access the site via a new junction with Mendham Lane as illustrated on drawing W471_PL_SK201. The access is shown approximately midway between the existing roundabout junction (with Harvest Way) and the committed development access to the land

to the west of Mendham Lane. The proposed access will incorporate pedestrian footways on either side of the access road.

Access – Public Right of Way (east of Mendham Lane)

1.7 The fourth arm of the Mendham Lane / Harvest Way roundabout provides access to the existing Briar Farm dwelling and is also designated as a Public Right of Way Footpath (FP18). It is considered that the vehicular access along this route will not be maintained and vehicular access to the farmhouse will come from the proposed residential development. A shared footway / cycleway will be provided forming a dedicated link between the development and the existing facilities in the area.

1.8 The footway provision around the Mendham Lane Roundabout is considered to be good with dropped kerbs and tactile paving provided on all arms of the junction. There is an existing shared footway / cycleway on the eastern side of the Mendham Lane which runs between the existing employment area (to the south) and the existing settlement area (to the north).

1.9 Harvest Way is considered to be a relatively quiet road where there is a dedicated pedestrian / cycle connection between Harvest Way and Howard Close. Howard Close, Jay's Green and School Lane form the route to the Harleston CE Primary School from Harvest Way.

Access – Barley Close Pedestrian / Cycle Connection

1.10 The existing development to the north of the Mendham Lane roundabout forms part of a recent development, completed by Persimmon Homes. As part of the development a right for future connection between the Barley Close / Harvest Way boundary and the proposed GNLP2136 development site was retained.

1.11 The current draft policy wording specifies Barley Close as the connection point. Barley Close is a shared surface which meets Harvest Way at a turning head. Harvest Way and turning head have separate footway provision and therefore a connection to Harvest Way is being proposed to provide a continuous footway link as illustrated on drawing W471_202.

Existing PROW FP13 (Angles Way)

1.12 The proposed site forms a boundary to the south of Jay's Green / Green Lane. PROW FP13 is located on the northern side of Green Lane to the east of the existing settlement area (Lovat Close). The existing PROW is a track along the field edge.

1.13 Motorised vehicles are prohibited along Green Lane to the east of the existing PROW, which crosses the A143.

1.14 The layout proposes a secondary vehicular and pedestrian access from Jay's Green, which will provide connectivity between the site and the existing facilities. The accesses currently being considered are shown on drawing W471_PL_DR_200.

Summary

1.15 In summary it is considered that access by all modes can be provided from the site to the adjacent facilities and routes, as concluded as part of the HELAA.


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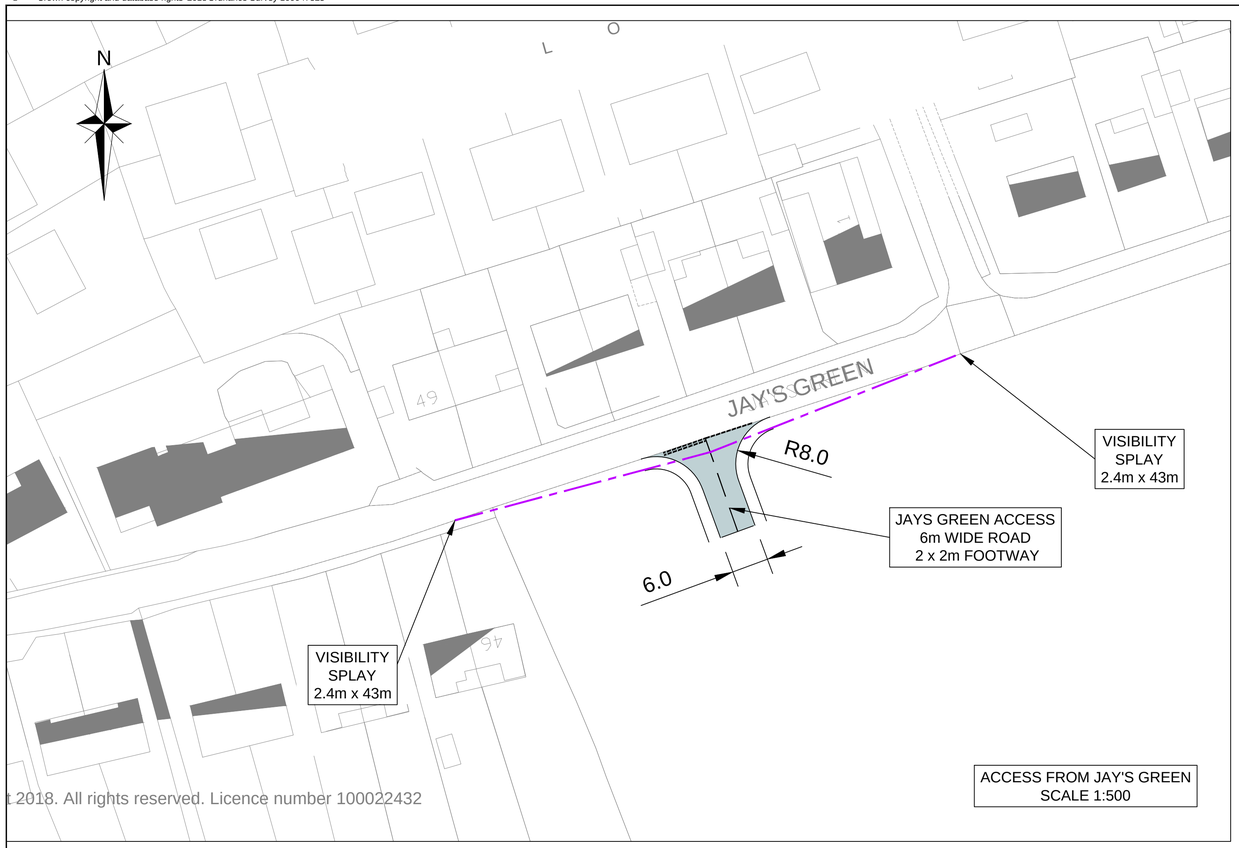
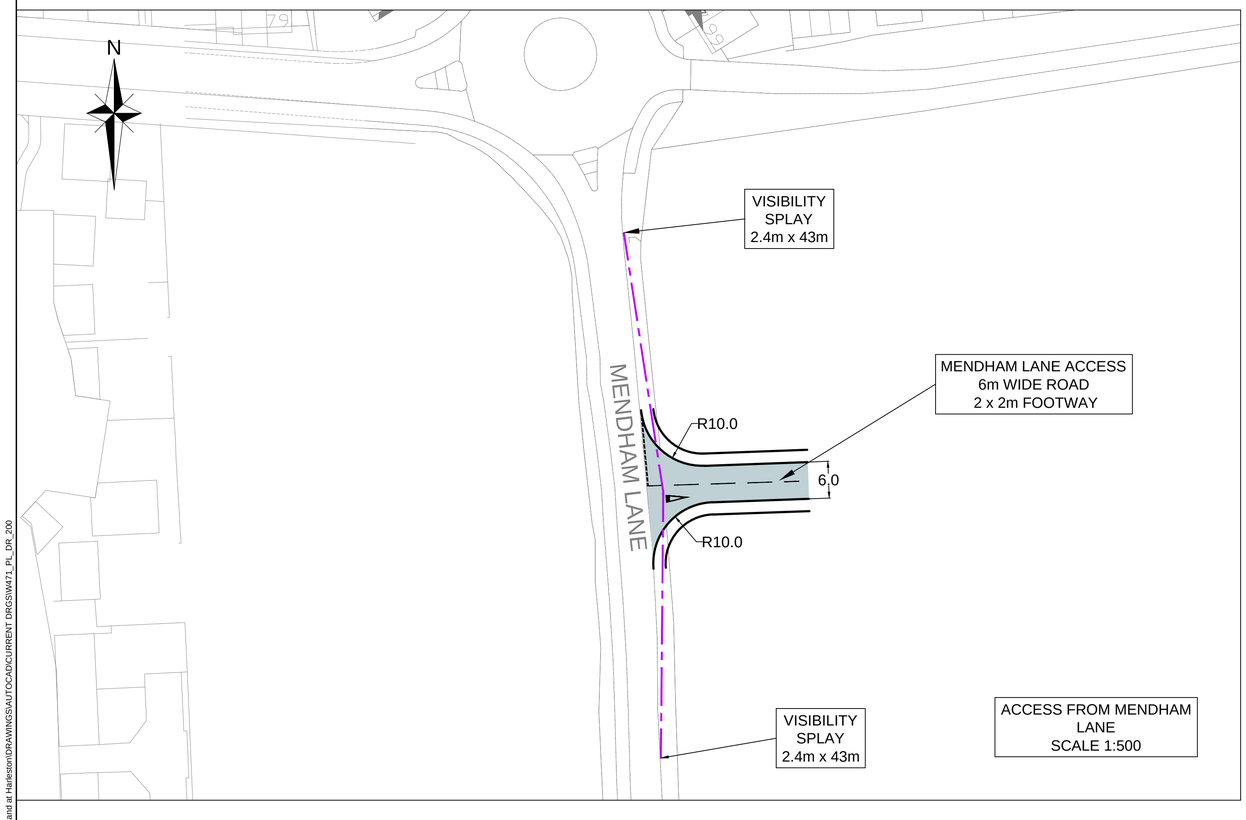
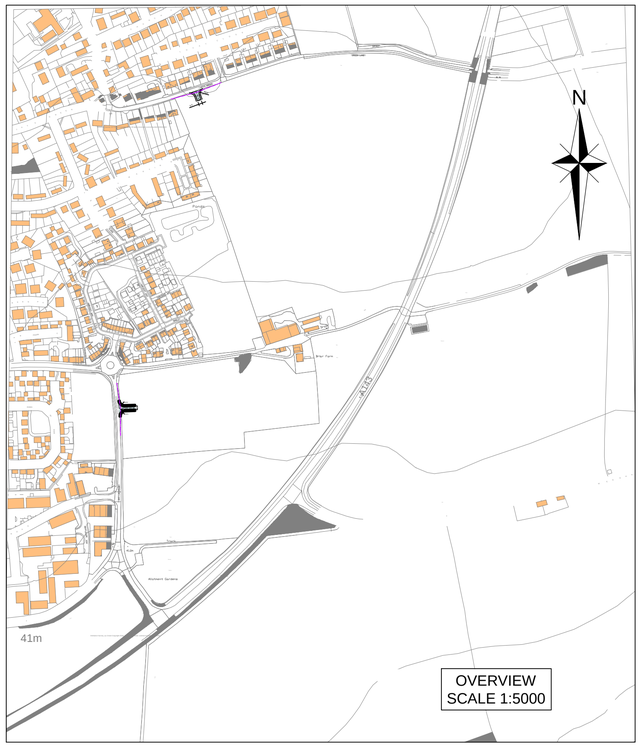
Drawings



ACCESS FROM JAY'S GREEN
SCALE 1:500



ACCESS FROM MENDHAM LANE
SCALE 1:500



OVERVIEW
SCALE 1:5000

DEVELOPMENT PLAN
SCALE 1:2500

KEY

NOTES

REV	DESCRIPTION	DE	DR	CH	DATE

DESIGNED BY	DRAWN BY	CHECKED BY
DWR	DWR	DS

SCALE @ A1 SIZE	DATE
AS SHOWN	24/10/2018

PROJECT TITLE
LAND WEST OF A143
HARLESTON NORFOLK

DRAWING TITLE
ACCESS PROPOSALS

CLIENT
M SCOTT PROPERTIES

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Tel: 020 70021156
info@cannonce.co.uk

Cambridge House, Lanwades
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Newmarket, CB8 7PN
Tel: 01638 555107
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DRAWING NUMBER	REV.
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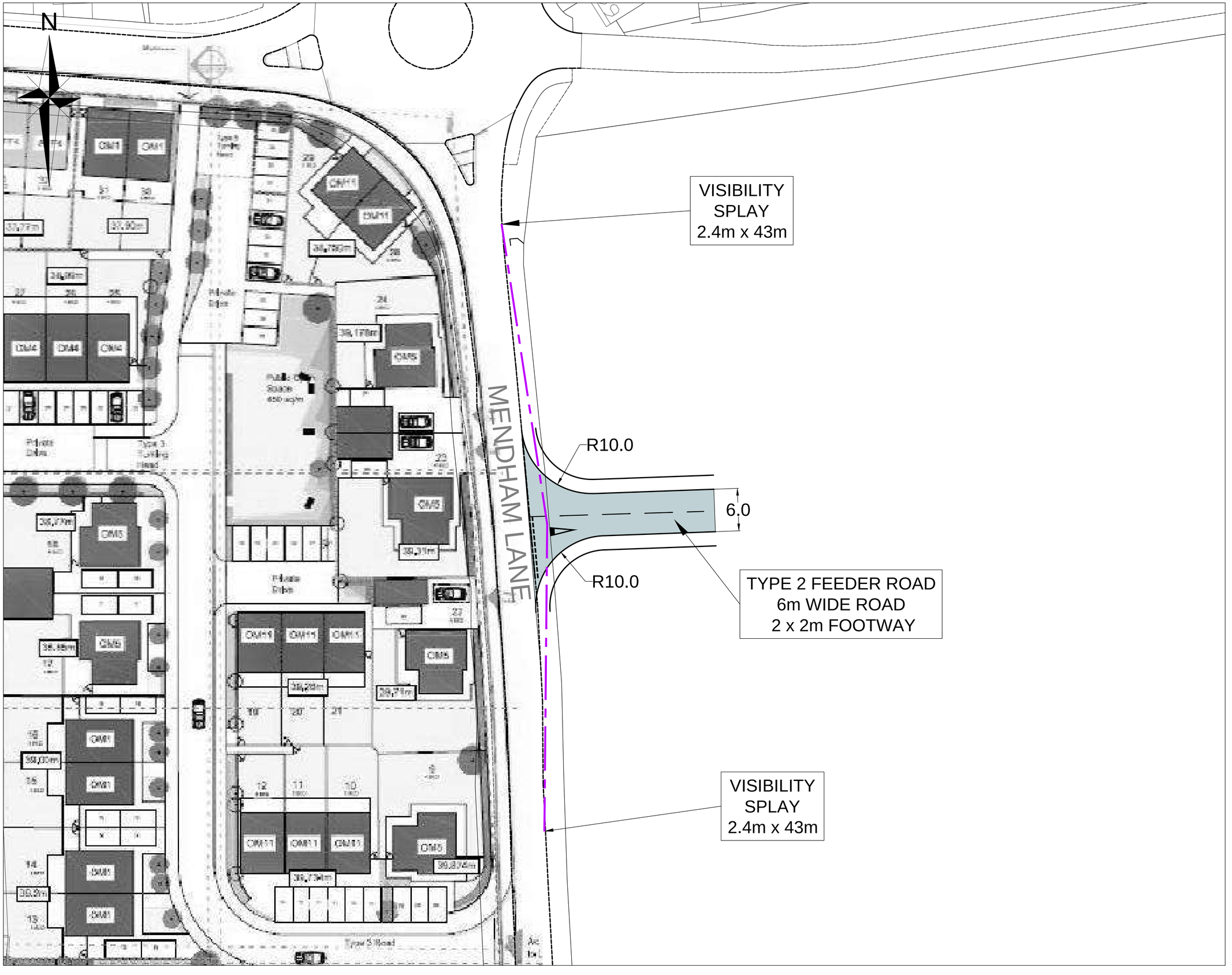

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DWR	DWR	DS

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LAND WEST OF A143
HARLESTON NORFOLK

DRAWING TITLE
ACCESS FROM
MENDHAM LANE

CLIENT
M SCOTT PROPERTIES

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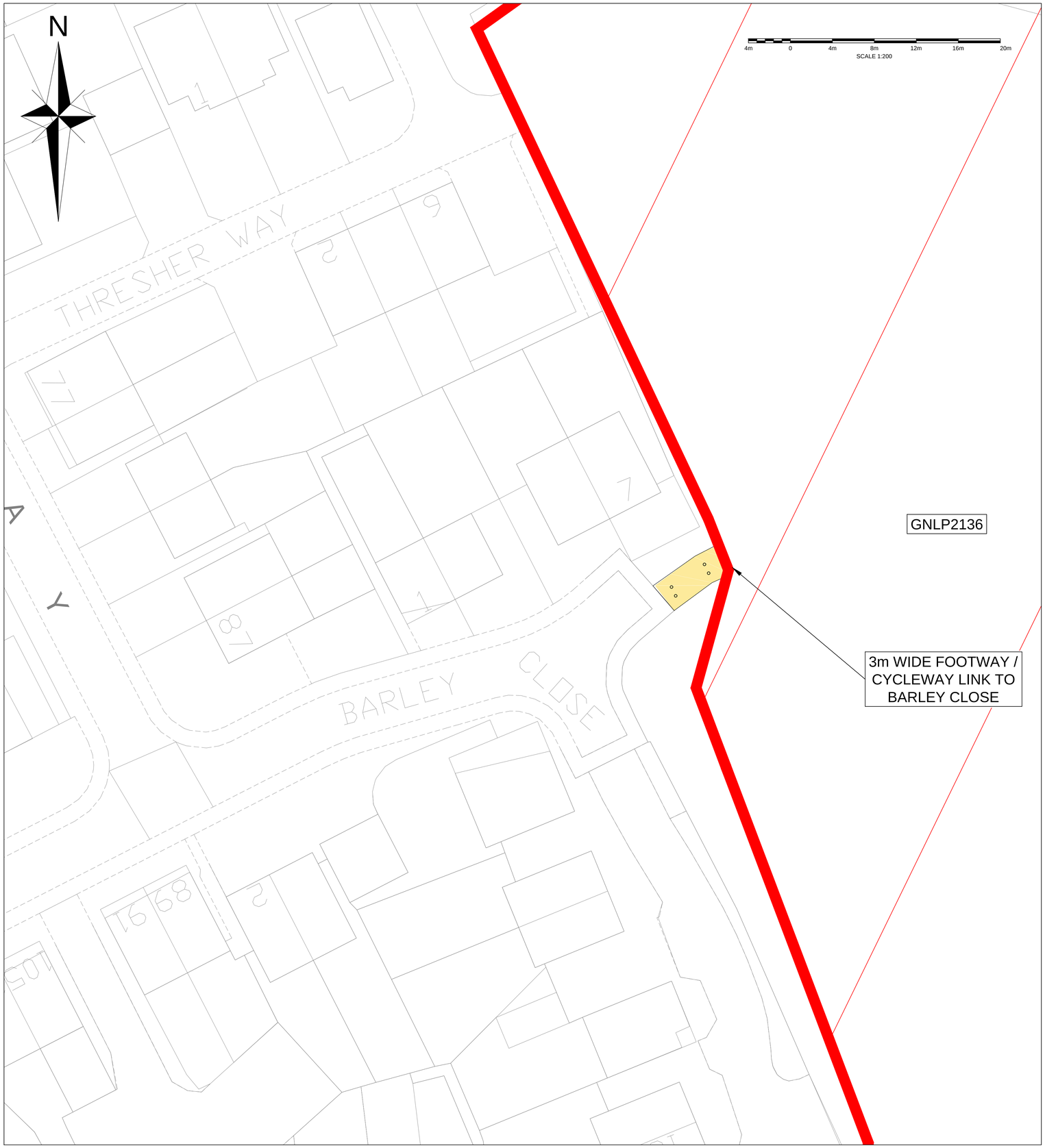

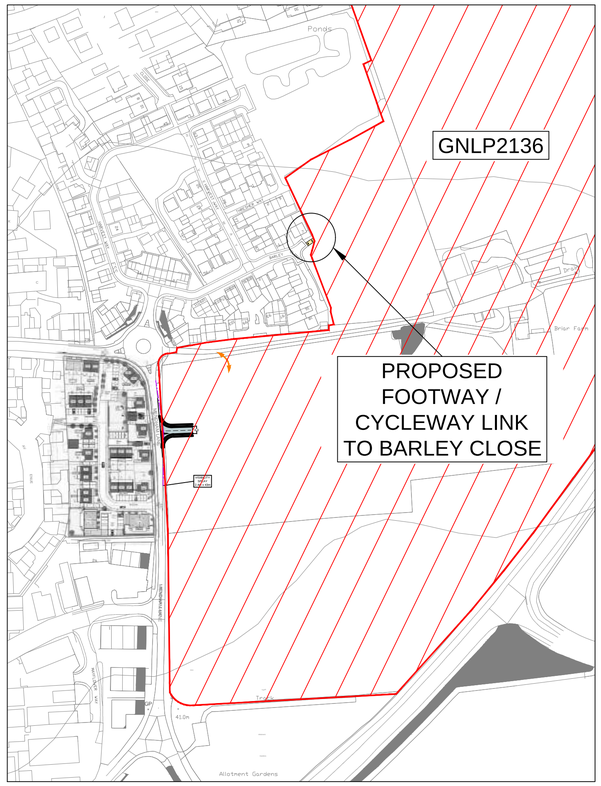

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DWR	DWR	DS

SCALE @ A1 SIZE	DATE
1:250	31/5/2019

PROJECT TITLE
LAND WEST OF A143
HARLESTON NORFOLK

DRAWING TITLE
FOOTWAY AND CYCLEWAY LINK TO BARLEY CLOSE

CLIENT
M SCOTT PROPERTIES

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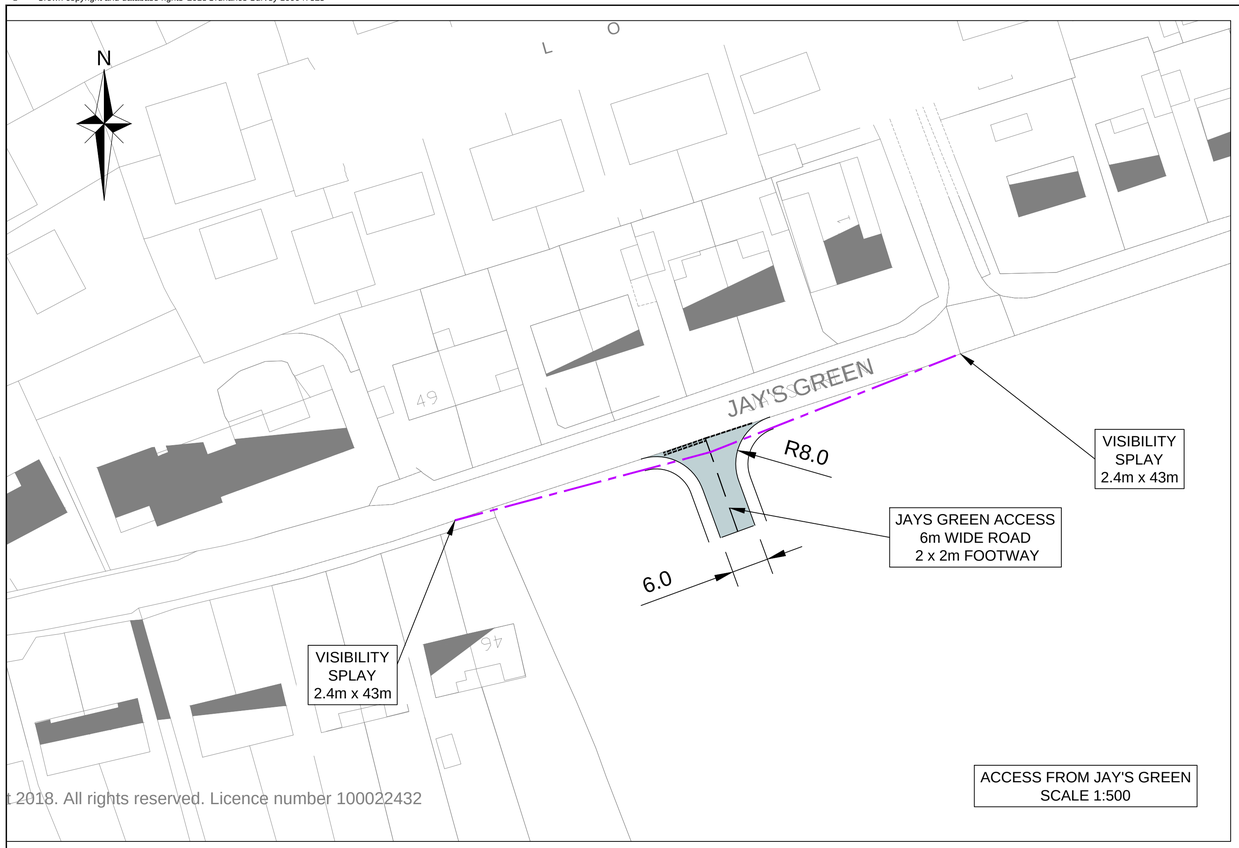
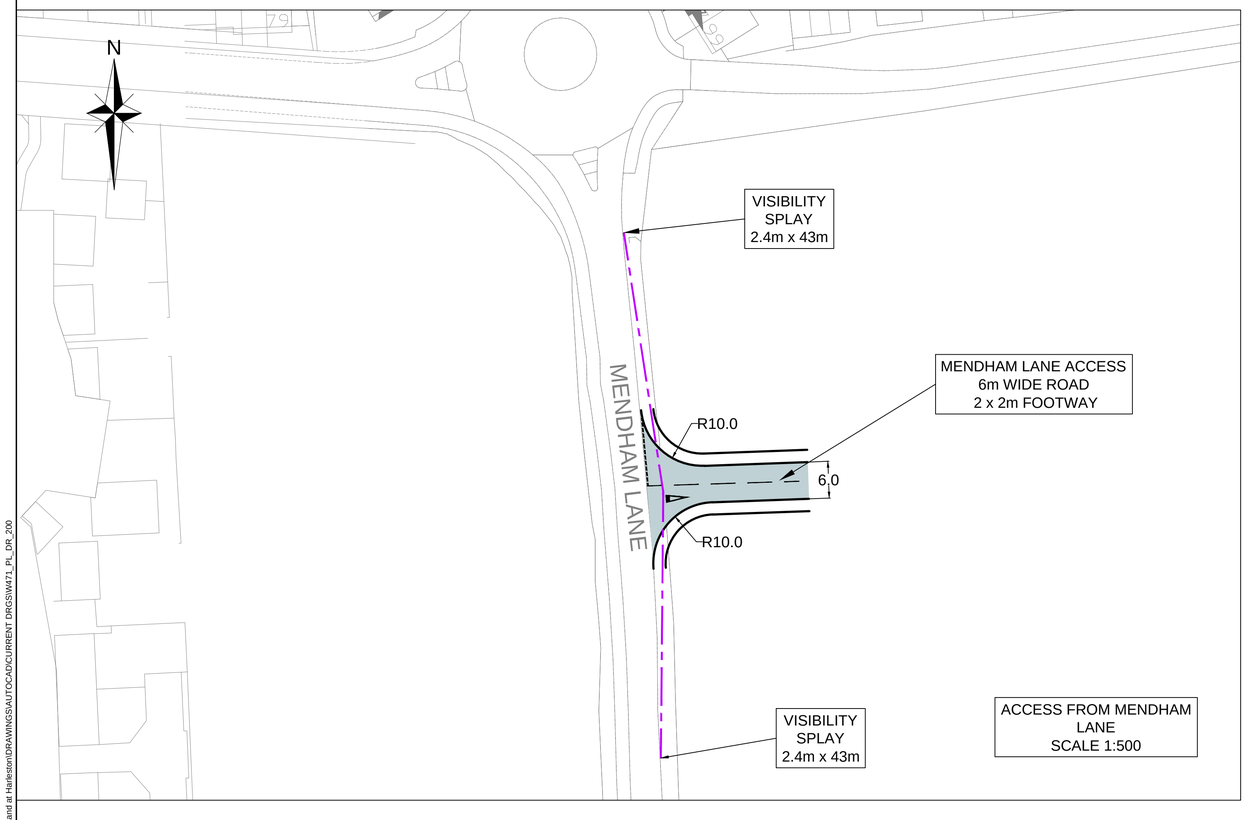
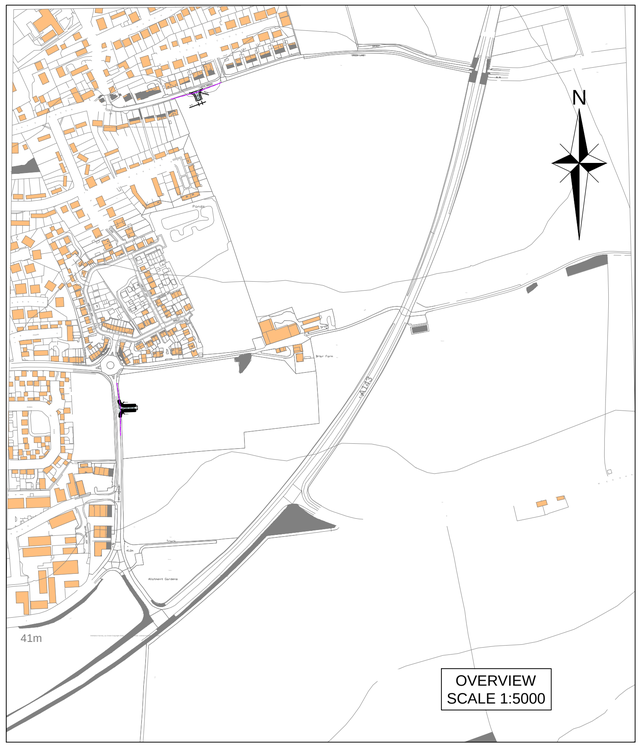


ACCESS FROM JAY'S GREEN
SCALE 1:500



ACCESS FROM MENDHAM LANE
SCALE 1:500



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DEVELOPMENT PLAN
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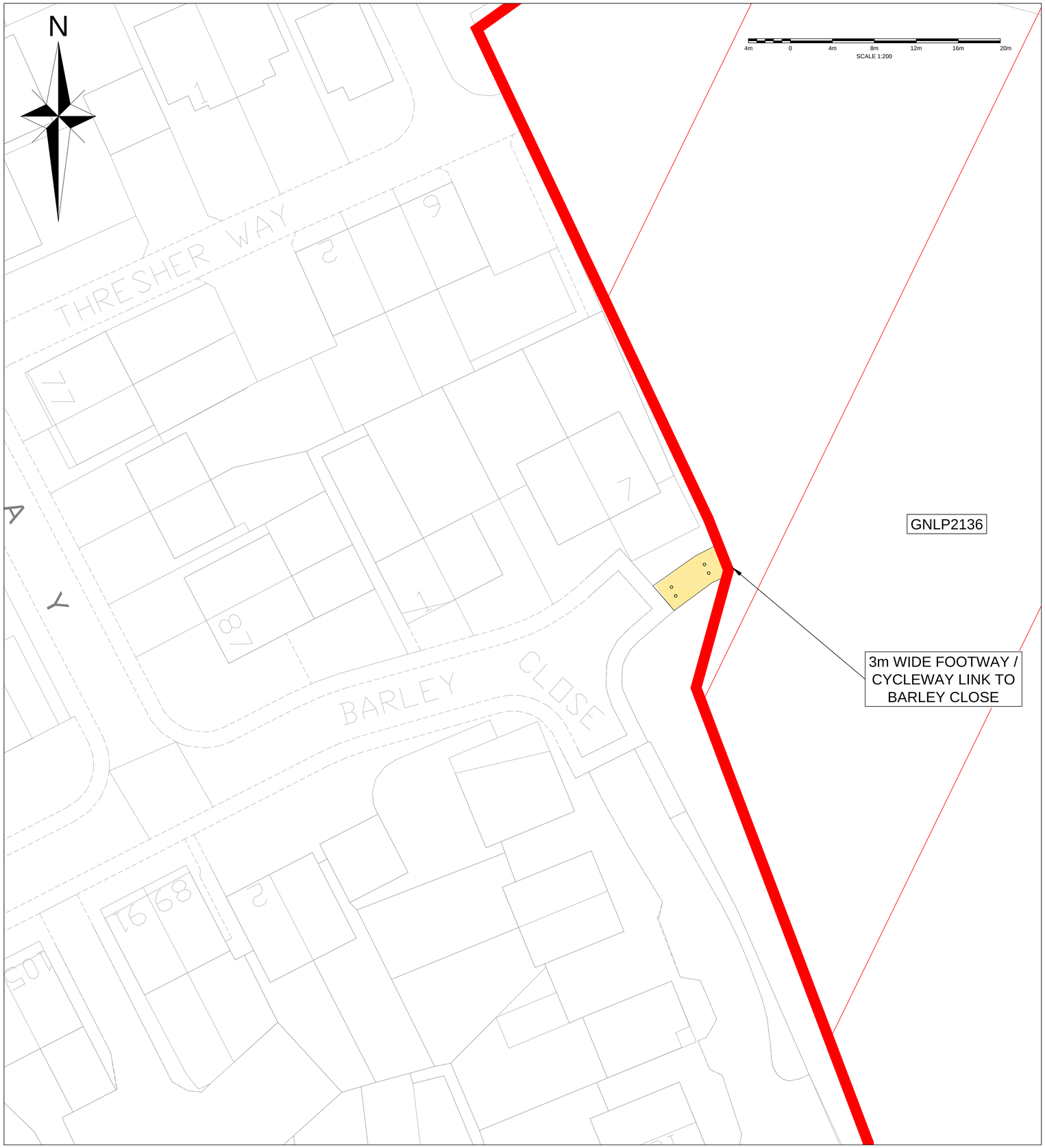

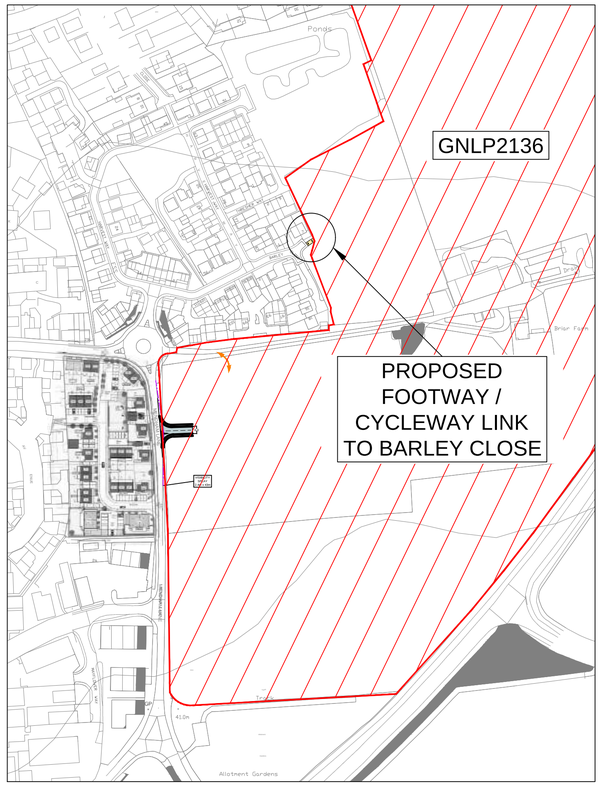

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W471-PL-DR-202	-

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Connecting Your Utilities On Time

M Scott Properties
Suite 5 Oyster House
Severalls Lane
Colchester
Essex
CO4 9PD

Thursday, 30 May 2019

Quotation Ref: T2857v1

Contact: Brad Swainland
T: 01376 332 680
E: brad.swainland@triconnex.co.uk

For the Attention of: Graham McCormick - Director

Dear Graham,

Site: Mendham Lane, Harleston, Norfolk, IP20 9EB

Further to your enquiry, we are pleased to enclose our quotation for the design, installation and connection of gas, water, electricity and Ultra-fast broadband / telephone infrastructure to service your development.

Our core objective is to ensure your utilities are connected safely, on time and in line with your specific site needs.

Our commitments to you include:-

- A comprehensive utility solution to ensure your CML's are achieved
- Attendance at early design team meetings to provide an agreed and workable site solution
- Full multi utility design construction drawings including road crossing duct sizes (on acceptance)
- A dedicated legal team to ensure timely legal conclusion
- Coordinated off site works in line with your section 278 works, reducing disruption to the public
- Dedicated Operational Manager and access to our expert teams
- 10 day maximum call off period for gas, electricity, self-lay water and fibre connections

We will be in touch within five days to answer any questions you may have.

Yours Sincerely

Brad Swainland

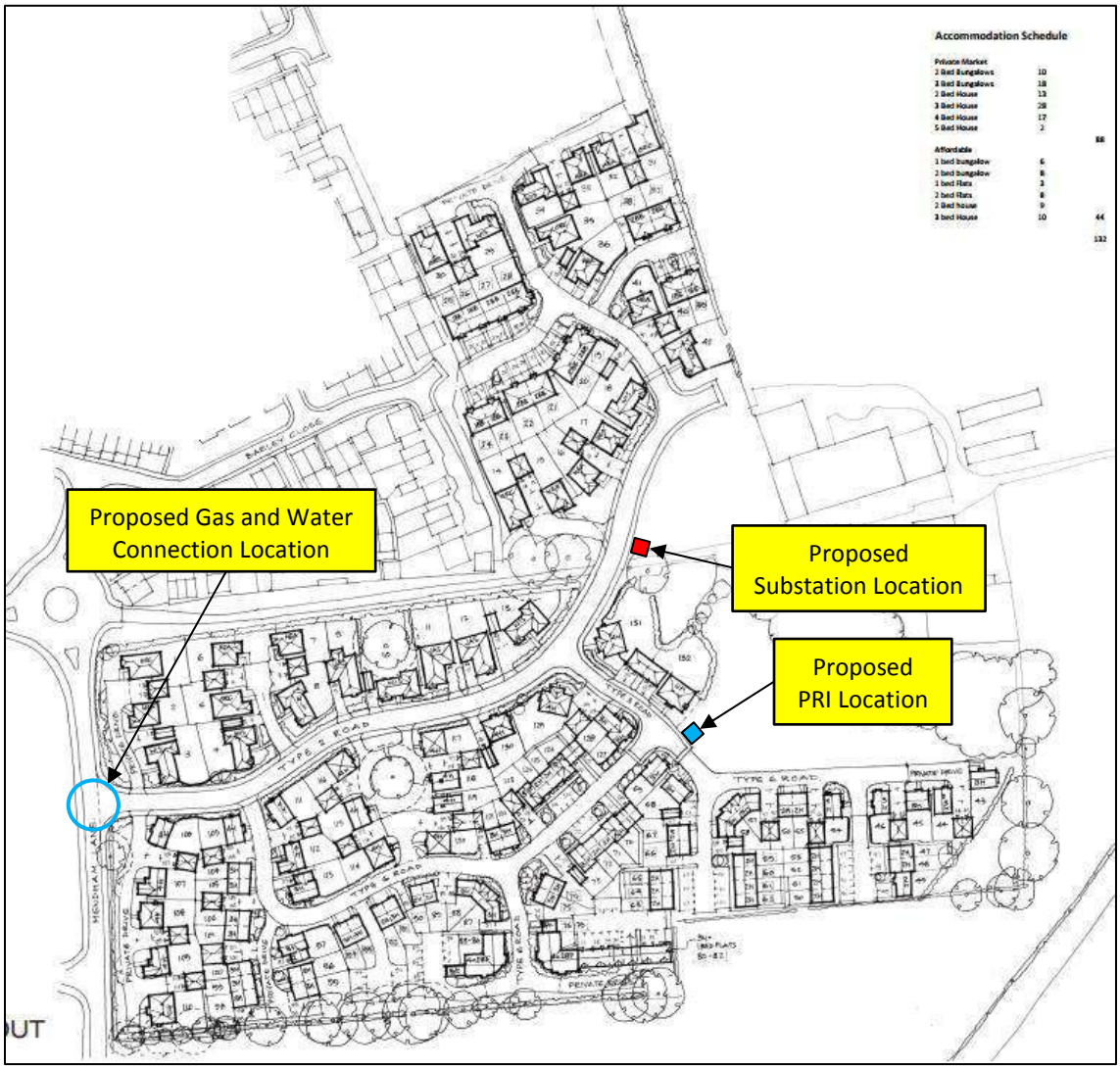
Bid Coordinator

Table of Contents

1.0 – Introduction

This proposal is for the Mendham Lane development, Harleston, Norfolk, IP20 9EB. TriConnex propose to design and install a new gas, electric, water and Ultra-fast fibre optic network to service the proposed development of 132 residential units (Phase 1) with capacity for an additional 268 units (Phase 2) (400 units total).

2.0 – Site Requirements and Design Gains



Site Plan

Gas

The gas connection will be to the existing Cadent 90mm PE Medium Pressure (MP) gas main located in the carriageway of Mendham Lane, as shown in figure 1.

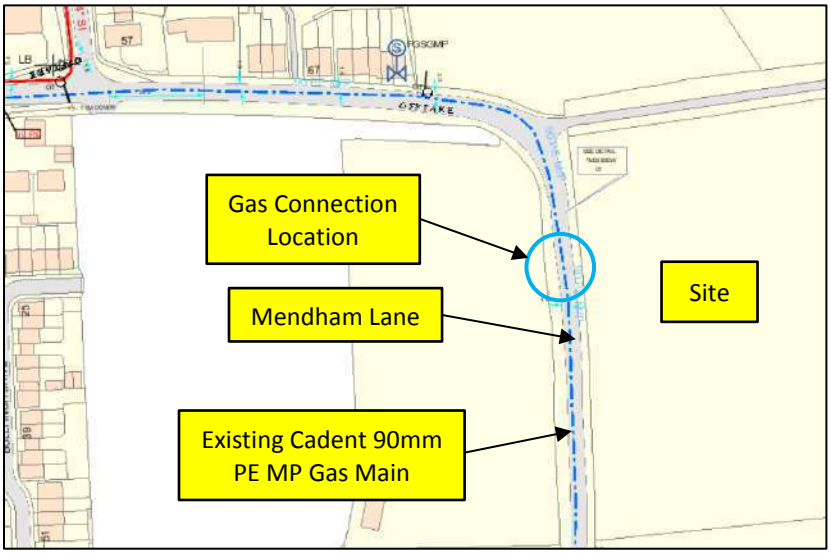


Figure 1 – Gas Connection Location

TriConnex have received a Land Enquiry letter from Cadent which confirms that no chargeable reinforcement is required at the assumed site load of 3305 kWh (Based on 400 units).

Minimal offsite works will be required, comprising of excavation, reinstatement and localised traffic management in the Mendham Lane.

This option would require an above/below ground Pressure Reduction Installation (PRI) to be installed onsite, to be located adjacent to plot 132, as shown in figure 2. This would require a 9m x 9m legal transfer area around it with a 6m total easement (3 meters either side) over the MP main. We have allowed for an above ground PRI within our offer.

Onsite, we have allowed for new mains and services to all properties, terminating at a smart meter within an external wall mounted gas meter box (recessed or surface mounted).

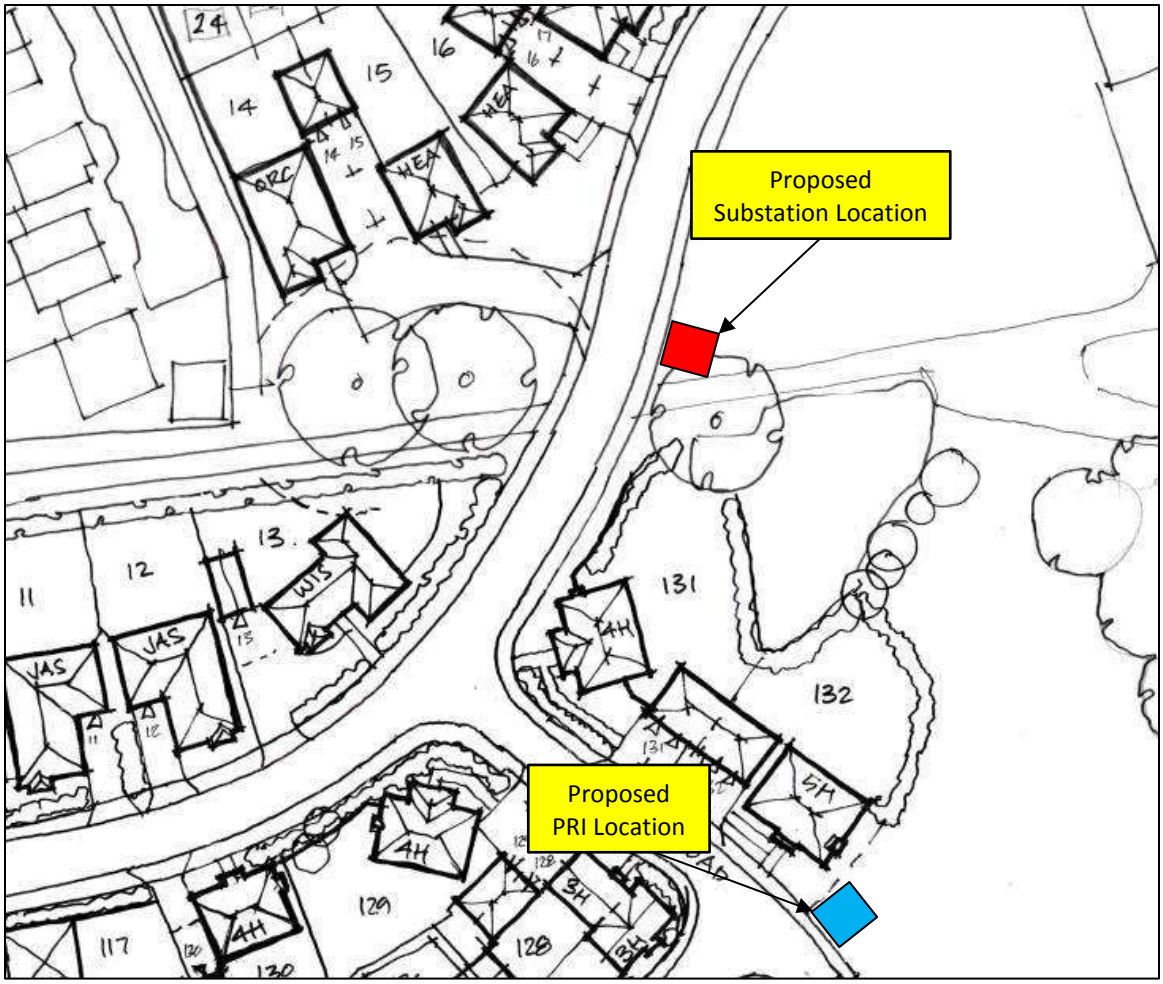


Figure 2 – Proposed PRI & Substation Location

Electricity

The existing UK Power Networks (UKPN) asset plans indicate that there are existing overhead and underground High Voltage (HV) cables onsite, as shown in figure 3. The underground cables to the West of the site do not appear to conflict with the proposed site layout. We have therefore assumed that these cables will remain in situ.

TriConnex have received a UKPN offer of £17,787.47 for the dismantlement the overhead HV cables that cross the site, as these appear to conflict with the site layout. We have included for the cost of these dismantlement works within our proposal.

TriConnex will lay HV cables through the site to complete the diversion works and reconnect the existing network between the diversion points as shown in figure 4. We have allowed for a total of 516 metres of HV cabling to perform the diversion works. We reserve the right to review our offer if, on receipt of a new site layout, there is any change to the HV cabling requirement.

TriConnex have obtained a UKPN Point of Connection (POC) offer for a 766 kVA (Based on 400 units) connection to the new onsite HV cable laid as part of the above diversion works.

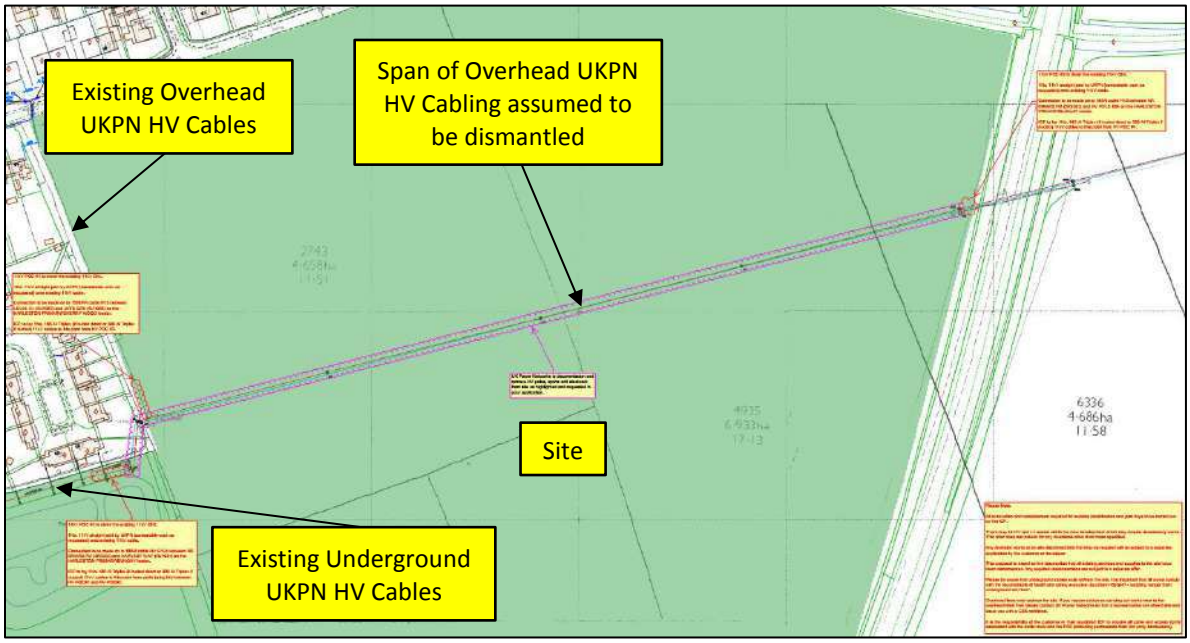


Figure 3 – UKPN HV POC Location

From the POC, TriConnex will dual lay HV cables on site, up to a 1000 kVA transformer (installed by TriConnex) in a purpose built (by others) brick substation, to be located opposite plot 16, as shown in figure 2. We have allowed for a total of 563 metres of HV cabling between the POC and the substation. We reserve the right to review our offer if on receipt of a new site layout, there is any change to the HV cabling requirement.

From the substation, TriConnex will install a new LV network across the site, with individual services to each property, terminating within an approved external wall mounted meter box (recessed or surface mounted) or at an agreed internal position.

For the flats, we will terminate at a red head located within the riser cupboard on the floor of the flat it serves.

Onward distribution and metering is deemed to be by others.

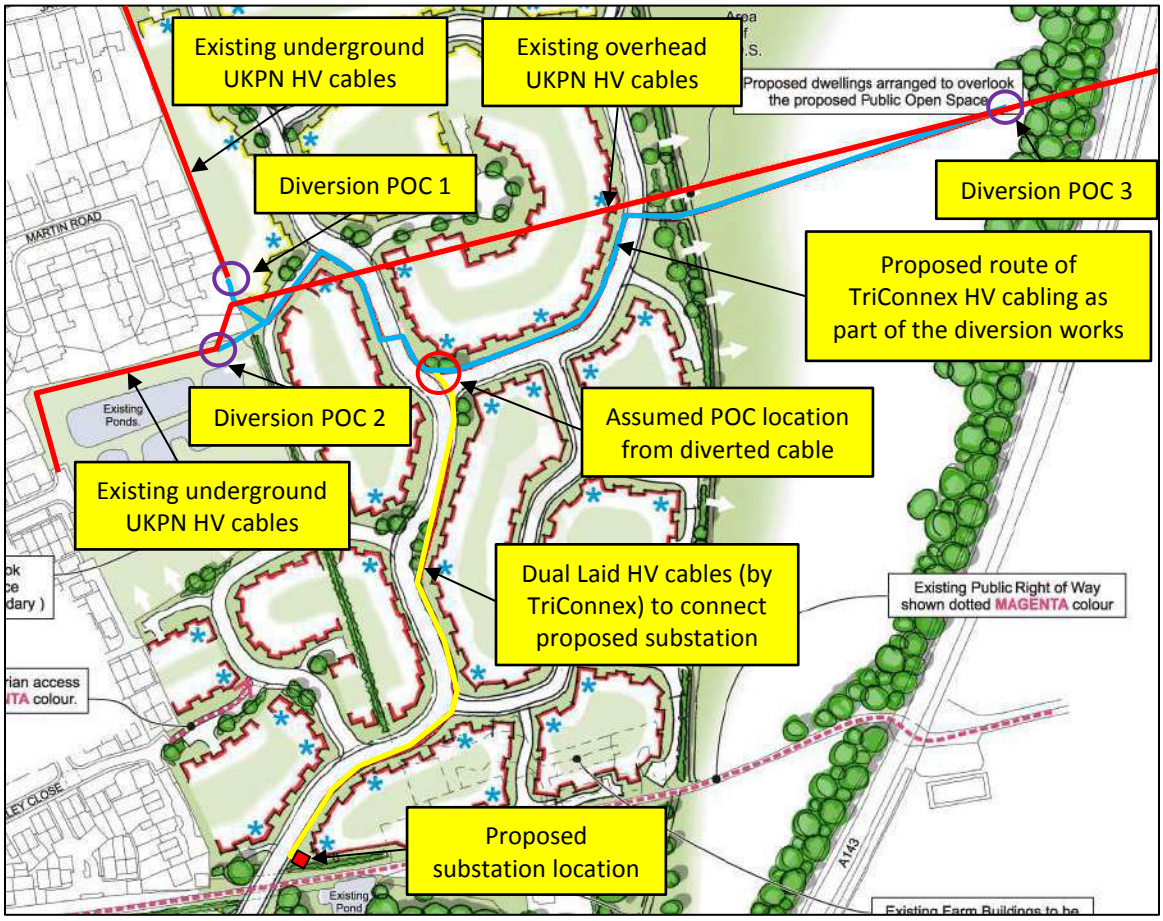


Figure 4 – Indicative Diversion Route & UKPN HV POC Location

Water

The water connection will be to the Anglian Water main, located adjacent to the site entrance in the carriageway of Mendham Lane, as shown in figure 5.

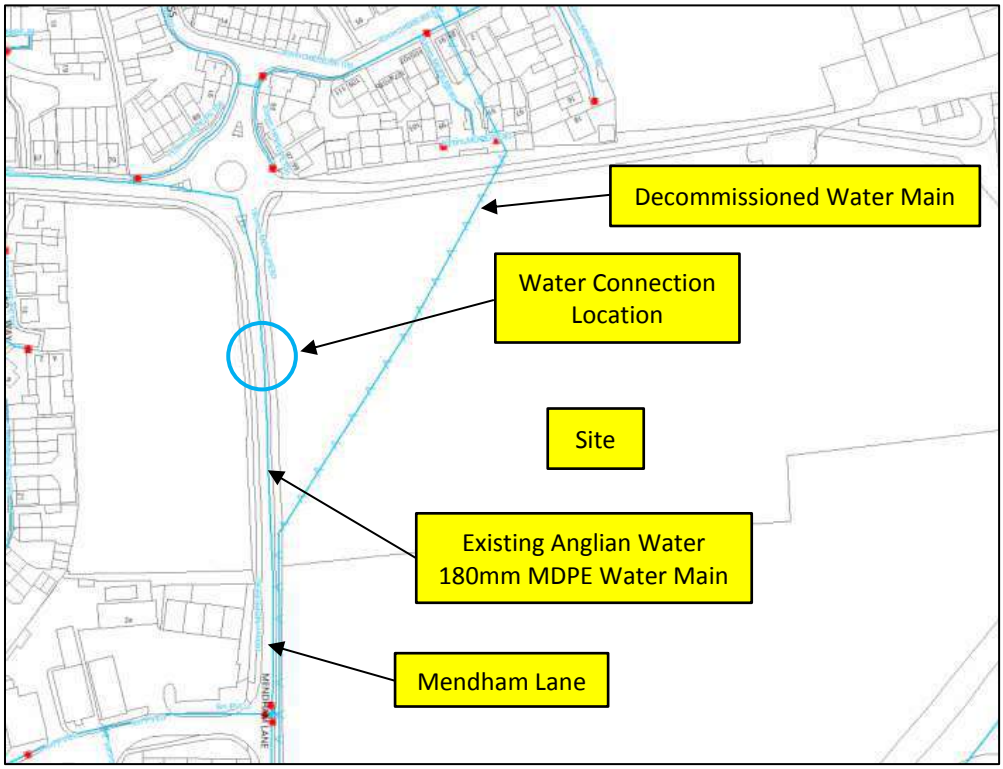


Figure 5 – Water Connection Location

Minimal offsite works will be required comprising of excavation, reinstatement and localised traffic management in the carriageway of Mendham Lane.

Onsite we have allowed for new mains and services to all properties, terminating at a smart meter within a ground boundary box.

In the absence of a soil investigation, we have assumed that the site is clean and inert, and therefore allowed standard MDPE water mains and services. Once a soil investigation is complete, please forward this to us so that we can confirm this requirement.

For the purposes of our proposal, we have used an assumed asset valuation however, on receipt of a water design or firm asset valuation we are able to review the water offer.

Fibre

For fibre we can confirm this site can be serviced with fibre to the premise (FTTP). TriConnex will connect to the existing fibre network and will undertake all offsite works, excavation, ducting and fibre install to a new cabinet offsite.

Once onsite we will install a cabinet containing a fibre aggregation node/convergence point either freestanding or integrated within a bespoke brick built substation (Construction by developer, dependent on asset adopter). From this point TriConnex will install fibre to the premise terminating internally at a consumer unit. From the consumer unit onwards the developer is to install all Cat 5e cabling.

All ducting, chambers and civils onsite are to be installed by the developer.

Diversions and existing services

Unless specifically stated otherwise our quotation makes no allowance for any diversions, lowering, disconnection or reinforcement of any existing utilities either on or off site.

3.0 - Assumptions, Inclusions and Exclusions

3.1 General

All properties are gas heated.

Unless stated otherwise, our designs are based on gas, electricity, water and fibre mains being installed along one side of the road with services crossing to supply units opposite. If due to permeable roads, phasing or wide boulevards dual mains are required a redesign will be needed which may require additional costs.

Our designs are based on sequential build out of phases or alternatively the provision of an agreed suitable route such as kerb line or haunching between phases.

We have made reasonable assumptions regarding the meter locations. Prior to finalising our design we will require house type layouts and may need to make some minor changes to our design.

This quote assumes that TriConnex will install all gas meters, if a third party installs or owns gas meters TriConnex reserve the right to review this offer.

Our price assumes uncontaminated or fully remediated site conditions.

Our offer is based on a minimum of **5 plot connections** per utility, per visit with site mains installed within 6 visits to site or a combination of both equating to 1 days reasonable labour.

For fibre it is assumed that TriConnex will be able to install all services to apartments in either one visit or by complete floor.

Based on the accommodation schedule below we have applied generic peak loads for design purposes and industry standard annual loads coupled with a build period of 2 years for asset calculation purposes.

Residential units	Number
1 Bed	9
2BF, 2BT	8
2BS, 2BD, 3BT, 3BF	22
3BS, 2BB	28
3BD, 3BB	46
4BD, 4BT, 4BS	17
5BD, 5BS, 6BD	2
TOTAL:	**132**

Assumptions

We have allowed for all off-site reinstatement to our trench line only. No allowance has been made for any additional reinstatement that may be required if the existing highway / footway is covered under a Section 58 notice.

Offsite routes are subject to a site survey.

Inclusions

All off site excavation and back fill by TriConnex based on legal boundary as detailed on drawing titled 'Sketch Layout' drawing number SK02 rev A dated March 2019 supplied by ASD Architecture.

Design development and submission to all relevant adopting parties for approval as per our respective GIRS/NERS and WIRS industry accreditations.

Risk assessments and as-built records, in line with the CDM 2015 regulations. TriConnex to act as Designer and contractor. Client to provide details of Principal Designer and Principal Contractor.

Exclusions

On occasion our project offering may include co-ordination of third party works by TriConnex such as undergrounding of overhead cables or co-ordination of the incumbent water operator as an alternative to self lay. It should be noted that co-ordination is not management and is limited to the inclusion of detail on our combined service drawing, initial communication and attendance at site meetings. TriConnex cannot be held responsible for managing or for the failings of third parties.

3.2 Gas

Assumptions

All meters will be in wall mounted boxes (recessed or surface mounted).

Inclusions

The existing gas infrastructure is owned by Cadent.
TriConnex have received a Land Enquiry letter from Cadent which confirms that no chargeable reinforcement is required at the assumed site load of 3305 kWh (Based on 400 units).
The gas connection will be to the existing Cadent 90mm PE Medium Pressure (MP) gas main located in the carriageway of Mendham Lane, as shown in figure 1.
A pressure reduction installation is required adjacent to plot 132.

Gas Scope	**TriConnex**
Chargeable Gas reinforcement	Confirmed with Cadent not required.
Connection to existing MP gas main	✓
Off-site mains	✓
Pressure Reduction Installation & housing	✓
Pressure Reduction Installation Base construction and civils works	X
On site LP mains and services terminating with 3/4" Emergency Control Valves	✓
Non residential Services	X
Provision of domestic boxes	✓
Provision of MPRN's	✓
Installation of smart domestic gas meters	✓

Exclusions

Service entries to garages. These can be supplied at an additional cost if required.

Supply and installation of any commercial meters and housings.

Our gas network is not designed to work in conjunction with boosted boilers. If these are required please contact us so we can amend our quotation accordingly.

3.3 Electric

Assumptions

This proposal is based on a demand only connection and if any onsite generation e.g. PV panels are planned the customer or their nominated specialist will be required to conduct a “worst case” generation study in accordance with G98 or G99 as appropriate. If this information is provided prior to the demand only POC being accepted we can request that UKPN confirm whether the generation can be connected at the proposed POC or additional works are required.

If the aforementioned generation information is provided after acceptance of the POC the IDNO will assess its impact on the Network and is required to confirm to UKPN that the generation has no impact on the original POC parameters.

All electricity metering will be external within an approved meter box to houses or within the riser cupboard on the same floor as the flat it serves.

No allowance has been made for fast or communal car charging points in our quotation.

Inclusions

The existing electricity infrastructure is owned by UKPN. We have contacted UKPN and can confirm that no reinforcement is required.
A UKPN diversion quotation of £17,787.47 is included in this quotation and is valid for 90 days from 30/05/2019. If this quotation is accepted outside of this validity period the UKPN quotation may increase and TriConnex will pass through any cost changes.
A UKPN HV POC quotation of £7,577.72 is included in this quotation and is valid for 90 days from 24/05/2019. If this quotation is accepted outside of this validity period the UKPN quotation may increase and TriConnex will pass through any cost changes.
The connection is to the new onsite HV cable laid as part of the above diversion works.
A Sub Station installation is required adjacent to plot 16.
We have allowed for standard substation earthing only. Any additional earthing required will be an additional cost not included within this proposal. *(Please note that additional earthing requirements can only be finalised at point of installation and therefore any additional costs will be issued post installation).*

Electricity Scope	TriConnex
Electricity reinforcement	Confirmed with UKPN not required.
Non Contestable Electricity Connection/s	✓
Off Site High Voltage/Low Voltage	X
On Site High Voltage/Low Voltage	✓
Installation of substation/s equipment and small power and lighting	✓
Installation of Sub Station Earthing (perimeter)	✓
Installation of LV mains, services and cut outs	✓
Termination at ground floor (Houses)	✓
Termination at Red Head in the riser on the same floor as the flat it serves (Flats)	✓
Installation of three phase landlord services x 3	✓
Installation of commercial services	X
Provision of MPAN's	✓

Exclusions

Supply and fit of electricity meters.

Electricity ducting or racking

The supply of electric meter boxes or hockey sticks.

Installation of enclosures, plinths, meter boxes.

It is assumed that any flat blocks with either multiple cable entries or commercial elements will be constructed in such a way that no metallic connections (metallic pipes, any type of cabling etc) will exist between each core/commercial unit.

If this is not the case our design will need to be revised and our costs may increase.

3.4 Water

Assumptions

The water connection will be immediately to the front of the site to an existing Anglian Water main.

In the absence of a soil investigation we have assumed the site is clean and inert and therefore allowed standard MDPE water mains and services. Once a soil investigation is complete please forward this to us so we can confirm this requirement. Please note, the use permeable or porous paving/surfaces may mean Protecta-Line or metallic pipes are required. No allowance has been made for this in our quotation and our price will increase if these are required.

Note – this proposal is already NETT of any predicted asset values from the host water company and no further rebates will become payable to the Developer on this project.

Inclusions

The existing water infrastructure is owned by Anglian Water. We have NOT contacted Anglian Water as an application fee is required. We are therefore unable to confirm whether reinforcement is required or confirm the exact connection point. Our quotation is based on the above connection point detailed in our water assumptions. If a design fee is paid we can confirm the connection point and the off-site costs.
Our quotation is based on TriConnex installing water as part of a Self Lay Agreement.

Water Scope	**TriConnex**
Water reinforcement	TBC
Connection to existing water main	✓
Off-site mains	TBC
On site water mains	✓
25mm plot connections terminating in external boxes (pipe supplied by others)	✓
Commercial services terminating in external boxes	X
Full testing and chlorination	✓

Exclusions

Infrastructure Charges or any network reinforcement required by the adopting network.

3.5 Ultra-Fast Fibre Optic Network

Assumptions

Our Fibre network is the only communications network installed on site.

For your customers to gain the most from the fibre network installation you should;

Ensure that you follow the developer guidelines that outline the requirements within the plot.

Install a standard Cat5e socket near the fibre hub with Cat5e wiring to a second point (normally behind the likely TV location and within close proximity to a power socket). This enables accurate testing of the ordered broadband speeds.

For apartment blocks TriConnex will install services to each apartment in one visit or by entire floor on a single visit.

Inclusions

The existing fibre infrastructure is owned by one of three national backhaul providers. We have contacted all of them and can confirm that any off site, connection and reinforcement required is included in this quote.

The off-site network will be connected to a termination box that will be in a standard roadside cabinet. We have assumed the termination box will be located adjacent to plot 106.

Ultra-fast fibre and telephone connections in each property including supply and install of the home hub box, power adaptor and battery backup, ONT (Modem) and telephone adaptor.

This proposal includes for a one off temporary broadband and or phone connection to your site compound.

Ultra-Fast Fibre scope	**Design**	**Supply**	**Install**
Off-site connection and any network reinforcement	TCX	TCX	TCX
OSCP – Equipment room – generic details	TCX	**CL**	**CL**
OSCP – Equipment room – site specific design	**CL**	N/A	N/A
OSCP – LV connection and power and lighting	TCX	TCX	TCX
OSCP – Fit out with equipment	TCX	TCX	TCX
OSCP – Ducting	TCX	TCX	CL
OSCP – Fibre	TCX	TCX	TCX
On site tube and ducting	TCX	TCX	**CL**
On site chambers	TCX	**CL**	**CL**
On site chamber lids	TCX	TCX	**CL**
On site fibre cabling and joints	TCX	TCX	TCX
On site containment for flats / Trays	**CL**	**CL**	**CL**
Service drops to flats – tube and ducting	TCX	TCX	**CL**
Fibre to flats	TCX	TCX	TCX
Plot – Ducting through slab	TCX	TCX	**CL**
Plot – Mini Duct	TCX	TCX	**CL**

Plot - Home hub box	TCX	TCX	**CL**
Plot – Fibre	TCX	TCX	TCX
Plot – Electronics	TCX	TCX	TCX
Plot – In plot Cat5e cabling	**CL**	**CL**	**CL**

TCX – TriConnex / CL - Client

Exclusions

This proposal does not include for any provision of broadband or telephony service which is provided direct to your purchasers by their selected ISP.

3.6 Future Phases

We have allowed for additional capacity only for Phase 2 (268 Units).
The total capacity allowed for both phases Phase 1 (132 units) & Phase 2 (268 Units) is based on the below accommodation schedule.

Residential units	**Number**
1 Bed	36
2BF, 2BT	62
2BS, 2BD, 3BT, 3BF	49
3BS, 2BB	108
3BD, 3BB	46
4BD, 4BT, 4BS	70
5BD, 5BS, 6BD	29
TOTAL:	**400**

Based on the prorated onsite costs of Phase 1 (132 units) we estimate that the additional cost for mains and connections for Phase 2 (268 Units) to be **+£781,159.35.**

3.7 Additional Services

Upon request TriConnex are also able to offer:-

- Applications for Water and Electricity temporary builders supplies
- Offsite LV street lighting service connection
- Onsite LV street lighting service connection @ £395 per column *(this price is based on the assumption that no additional mains are required to allow the street lighting connections to be made)*

4.0 - Responsibilities and Attendances

4.1 Schedule

	TriConnex	Client
Provision of all necessary drawings and the like including all subsequent revisions in a suitable electronic format in a timely manner to enable TriConnex to carry out design and provide project drawings		✓
Provision of Developer Guidelines documentation at pre start meeting	✓	
Supply the client with TriConnex design documents up to the termination points as defined in the above scope.	✓	
Provision of risk assessments and as built information in accordance with CDM 2015 regulations. TriConnex act as Contractor and Designer.	✓	
Obligation to ensure engagement in and timely completion of all necessary licenses, transfers and consents		✓
Transfer of land free of charge necessary for the installation of network equipment		✓
Granting of easements, Wayleaves where required by distribution companies in agreed adoptable or private areas		✓
Suitable and sufficient welfare facilities in accordance with Schedule 2 of the CDM regulations		✓
Supply of suitable temporary or permanent hard standings and access roads necessary to carry out the works		✓
Suitable secure space for the storage of materials and any office accommodation required		✓
Adequate on site security measures. Customer responsible for all fixed and unfixed material prior to energisation / charging of mains		✓
Off-loading of equipment / material delivered to site		✓
Hoisting, distribution and placing in position items of equipment requiring mechanical handling		✓
Setting out of line and level of all on site works in accordance with approved design.		✓
Highway surface installed adjacent to proposed mains routes prior to install		✓
Clearance of rubbish to an agreed onsite location	✓	
Disposal of rubbish / waste from site		✓
Provide location onsite for temporary storage of excavated and backfill material from / for off-site works.		✓

5.0 – Contract Price

5.1 Proposed Contract Price Breakdown

Offsite Gas	£17,488.41
Offsite Electricity	£46,169.18
Offsite Total	**£63,657.59**
Onsite LP Gas Main & Connections	£81,486.24
Onsite HV Network	£105,415.66
Onsite LV Mains & Connections	£96,225.57
Onsite Water Mains & Connections	£108,897.32
Onsite Fibre Mains & Connections	-£7,274.66
Onsite Total	**£384,750.13**
Quotation Total	**£448,407.72**

All prices are net of VAT
All prices are net asset value, no other rebates will be paid to the developer.

5.2 Payment Schedule

	Option 1 – Gas, Electricity & Water	Option 2 – Gas & Electricity
Upon Acceptance	£40,000.00	£40,000.00
Acceptance + 3 months	£190,755.59	£190,755.59
Acceptance + 6 months	£67,478.04	£34,808.84
Acceptance + 9 months	£44,985.36	£23,205.89
Acceptance + 12 months	£44,985.36	£23,205.89
Acceptance + 15 months	£33,739.02	£17,404.42
Acceptance + 18 months	£22,492.68	£11,602.95
Acceptance + 21 months	£11,246.33	£5,801.48
Totals (Exc Fibre)	**£455,682.38**	**£346,785.06**

Fibre	-£7,274.66	-£7,274.66
Totals (Inc fibre)	**£448,407.72**	**£339,510.40**

5.3 Additional Commercial Considerations

Infrastructure Charge current as of 2019-2020: £370.00 per plot clean water. Infrastructure Charges for commercial units will vary depending on predicted water usage. Zonal charges may apply to your development and are excluded from our quotation.

Please note that Infrastructure Charges for clean and waste water are excluded in entirety from this offer. These are standard charges and must be paid by you before the water company will permit water service connections, However, due to the self-lay agreement we will be invoiced by Anglian Water and this cost will be passed through to you with no margin.

The base price for Aluminium is £1,362.66 per metric tonne and in the case of copper £4,720.41 per metric tonne.

This Quotation should be read alongside our standard terms and conditions version 5.1 which are available to download at TriConnex Files

6.0 - Acceptance Form – Gas, Electricity & Water

M Scott Properties
Suite 5 Oyster House
Severalls Lane
Colchester
Essex
CO4 9PD

(the **Customer**)

Site: Mendham Lane, Harleston, Norfolk, IP20 9EB

Option 1 – Gas, Electricity & Water Quotation in the sum of £455,682.38 excluding VAT (Contract Sum) where applicable

Option 2 – Gas & Electricity Quotation in the sum of £346,785.06 excluding VAT (Contract Sum) where applicable

This Quotation is based on the information detailed in the above Quotation documents.

If information is materially varied at any point by either party, TriConnex Limited reserve the right to revert to the adopting body to secure confirmation that their acceptance remains valid. If in the event the acceptance from the adopting body is no longer deemed valid we reserve the right to vary or terminate this agreement and or to vary the Contract Price.

Acceptance is made in accordance with TriConnex standard terms and conditions.

We accept TriConnex Quotation Option 1 ref T2857v1 for Gas, Electric & Water ☐

We accept TriConnex Quotation Option 2 ref T2857v1 for Gas & Electric only ☐

I enclose a cheque made payable to TriConnex Limited in the sum of £40,000.00 excl. VAT or

We have made a BACS payment of £40,000.00 excl. VAT to bank details below

Bank Account Number 01840076 Sort Code 23-85-81 Allied Irish Bank

I am a director / authorised signatory of the above named company

Print Name _____

Signature _____ Date _____

Position _____

On behalf of _____ Company Number _____

* Please complete and return the following page with this acceptance

6.1 - Acceptance Form – Ultra-Fast Fibre

M Scott Properties
Suite 5 Oyster House
Severalls Lane
Colchester
Essex
CO4 9PD

(the **Customer**)

Site: Mendham Lane, Harleston, Norfolk, IP20 9EB

Fibre quotation in the sum of -£7,274.66 excluding VAT (Contract Sum) where applicable

This Quotation is based on the information detailed in the above Quotation documents and can only be accepted if one of the options shown in section 6.0 is also accepted.

If information is materially varied at any point by either party, TriConnex Limited reserve the right to revert to the adopting body to secure confirmation that their acceptance remains valid. If in the event the acceptance from the adopting body is no longer deemed valid we reserve the right to vary or terminate this agreement and or to vary the Contract Price.

Acceptance is made in accordance with TriConnex standard terms and conditions.

We accept TriConnex Quotation ref T2857v1 for Ultra-Fast Fibre ☐

I am a director / authorised signatory of the above named company

Print Name _____

Signature _____ Date _____

Position _____

On behalf of _____ Company Number _____

* Please complete and return the following page with this acceptance

6.2 - Appointment of Fibre Optic Distribution Network Owner

Only to be completed if the Fibre offer at 6.1 is accepted

M Scott Properties
Suite 5 Oyster House
Severalls Lane
Colchester
Essex
CO4 9PD

(The **Customer**)

Site: Mendham Lane, Harleston, Norfolk, IP20 9EB

We wish to appoint Open Fibre Networks Limited (OFNL) as the Fibre Optic Distribution Network Owner (FODN) for property(s) on the above site

All as detailed in TriConnex Quotation ref T2857v1

We can confirm that we have not given a Letter of Intent to any other Distribution Network Owner for properties at this development.

By signing and returning this Appointment of Fibre Optic Distribution Network Owner form and the Acceptance of Quotation form, we undertake:

A) To produce that all future successors in title to the site, in whole or in part, who acquire title otherwise than pursuant to an Exempted Disposition (hereinafter defined) prior to completion of the fibre optic distribution network and/or its adoption by Open Fibre Networks Limited (OFNL), appoint OFNL as the Fibre Optic Distribution Network Owner and sign and return an Appointment of Fibre Optic Distribution Network Owner form in respect of OFNL to TriConnex; and

B) To ensure that any contract between us and any such future successor in title to the site, in whole or in part, includes the following wording:

"The [purchaser/buyer] agrees to use such fibre optic distribution network owner as shall be nominated by the [vendor/seller] for and agree that we, as vendor/seller, will nominate OFNL as the Fibre Optic Distribution Network Owner under such contract"

C) We acknowledge and agree that we shall comply with the above undertakings and that OFNL reserves the right to revisit the charges detailed in the Quotation and adjust the charges payable by us in accordance with reasonably expected variables should any such future successors in title to the site, in whole or in part, fail to appoint OFNL as the Fibre Optic Distribution Network Owner.

For the purposes of this Appointment of Fibre Optic Distribution Network Owner, "Exempted Disposition" means a *bona fide* arm's length completed disposition of:

a) The transfer, grant or lease of:

b) Any completed house, flat, apartment, maisonettes, office, shop, garage or other dwelling or commercial unit with associated access, amenities, gardens, buildings, car parking spaces and other grounds (if any);

c) Sites required for OSCPs (Exchange buildings) electricity sub stations, gas governors, pumping stations or similar apparatus which serve the site;

d) The freehold reversion of a completed block of flats, apartments, maisonettes, offices, shops or other dwelling or commercial units or a completed block comprising one or more flats, apartments, maisonettes, offices, shops or other dwelling or commercial units with garages and associated car parking spaces (if any); or

e) Common or communally used parts of land to a management company (in respect of which the shareholders will be the owners of completed houses, flats, apartments, maisonettes, offices, shops, garages and/or other dwelling or commercial units built or to be built on the site or on some part thereof);

f) The dedication, adoption or transfer of land pursuant to a requirement of any relevant authority; or the dedication or transfer of the roads.

I am a director / authorised signatory of the above named Company

Print Name _____

Signature _____ Date _____

Position _____

On behalf of _____ Company Number _____

7.0 - Timescales

Lead in time to finalise designs is provisionally 8 weeks from receipt of acceptance and payment subject to statutory authority's approval. We anticipate energisation within 18 weeks from design approval.

For consistency, our chosen asset adopters utilise standard legal documentation to secure and manage the land interests they require. The timetable for programming the engineering and connection works is based upon you providing accurate land ownership information and completing the standard documentation without delay.

If, due to programme constraints, any works are required to be installed in advance of completion of all necessary consents and / or licenses and the Customer fails to obtain such consents and / or licences it will indemnify us for all loss and / or damage suffered and shall remain responsible for all work done and materials supplied on a quantum merit basis.

Standard call off periods for plot connections once site is live are as follows.

Electric	Gas	Self Lay Water	Fibre
10 days	10 days	10 Days	10 days

Our Quote is valid for 60 Days from the date of this quotation.

Our Quotation is based on the following information:

- Site Plan – 'Sketch Layout' drawing number SK02 rev A dated March 2019 supplied by ASD Architecture.
- Accommodation Schedule – included within the drawing noted above

References to Customer, You or Your (whether capitalised or not) means the person, firm or company whose name and address is shown on the Acceptance Form at section 6 below (together with any holding or subsidiary companies as defined in the Companies Acts, any co-venturers, assignees and successors in title).

References to TriConnex, We, Our, Ourselves, or Us (whether capitalised or not) means TriConnex Limited whose registered office is at 4 Tamdown Way, Braintree, Essex, CM7 2QL (together with any assignees and successors in title).

Appendix 1

Land Ownership Details (If different from Developer, For Legal Requirements)			
Land Ownership	☐ Developer	☐ Adopted	☐ Third Party
Identifying Drawing			
Contact			
Address			
Tel no.		Mobile no.	
Email			
Third Party Landowner Details (If Applicable, For Legal Requirements)			
Contact			
Address			
Tel no.		Mobile no.	
Email			
Landowner/Third Party Solicitor Details (For Legal Requirements) please add additional sheets if applicable			
Company			
Contact			
Address			
Tel		Mobile no.	
Email			
Principal Designer			
Company			
Contact			
Address			
Tel		Mobile no.	
Email			

- ☐ Site Layout in .dwg format including all meter positions
- ☐ Ground investigation report
- ☐ Floor Plans of units with internal meter rooms
- ☐ Details of any site constraints
- ☐ Section 38 plans / Adoption plans
- ☐ Abnormal Load Details (Lifts/Motors/Landlords)

We will require the following information at later stages in the process, which we will request when required, if this information is available now or becomes available before our request please forward this information to us.

- ☐ Postal Addresses
- ☐ Build sequence
- ☐ Sales Units – Locations and Dates

W471 – Land at Harleston, Norfolk
Flooding and drainage note 02
For Scott Properties
March 2020

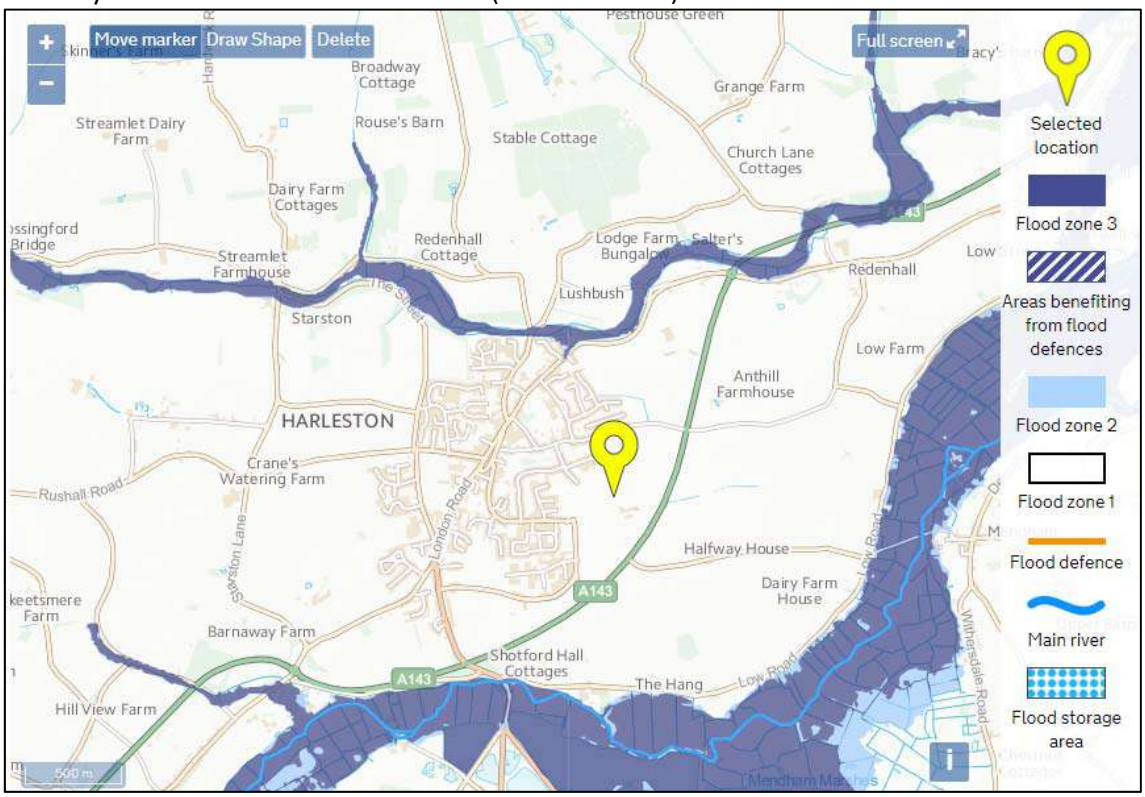
Introduction

This note presents the findings of a desktop investigation into flooding and drainage issues for a potential mixed use development site in the east of Harleston, Norfolk. The site is identified as GNLP2136 in the Greater Norwich Local Plan Regulation 18 Consultation.

The site extends to approximately 27 ha of predominantly undeveloped greenfield land. The site lies to the west of the A143 and south of Green Lane, and is approximately centred on Ordnance Survey grid reference 625336,283181.

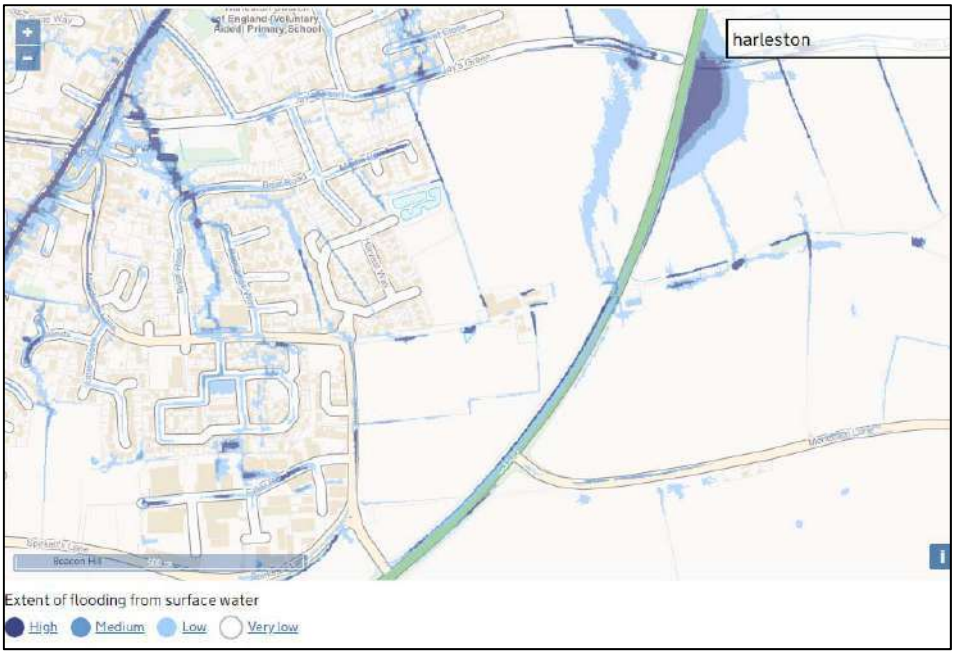
Flooding

The site lies in Flood Zone 1 (see map extract below) and is not therefore considered likely to be affected by floodwater from a watercourse (or tidal source).

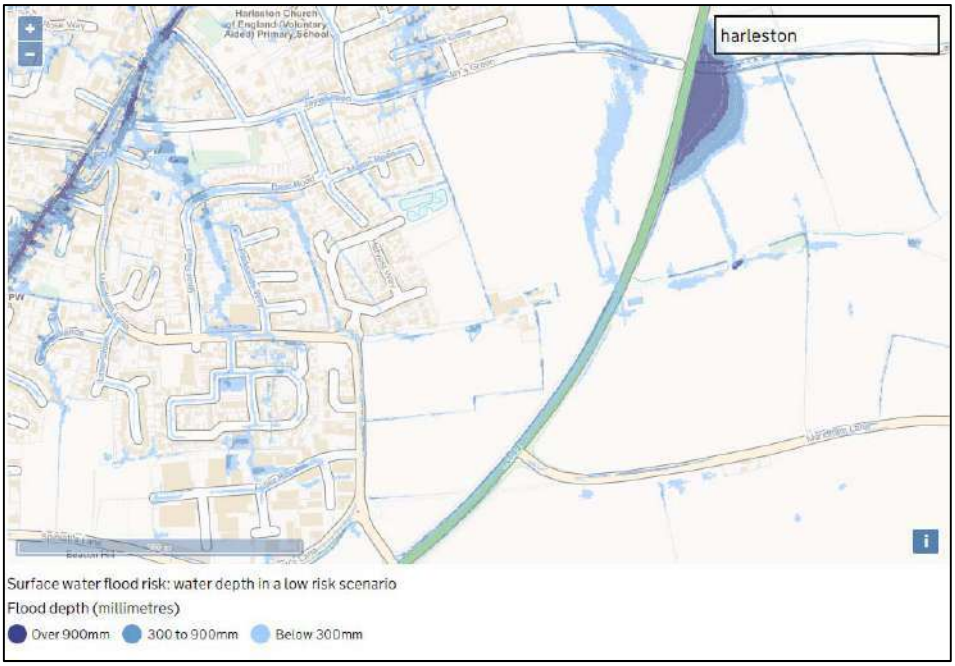


Flood map for planning extract (13/03/2020)© Crown copyright and database rights 2020 Ordnance Survey 100047325

The surface water flood map for the area (see extracts below) shows a band of shallow low risk, surface water flooding flowing northwards through the east of the site (eventually entering the ditch/watercourse to the north of Green Lane). The map also picks out the land drainage/boundary ditch network on and around the site. The limited extent and/or low probability of the flooding means that it is not considered to pose any notable or unmanageable constraint to the development of the site. The inclusion of a shallow landscaped channel and/or low bund in the east of the site would allow for the surface water flow route to be maintained without causing any negative on or off-site effects.



Surface water flood map extract (13/03/2020))© Crown copyright and database rights 2020 Ordnance Survey 100047325



Surface water flood map extract low risk flood depths (13/03/2020)© Crown copyright and database rights 2020 Ordnance Survey 100047325

The most notable off-site area of flooding shown on the surface water flood map is the pooling to the east of the A143. The pooling is apparently the result of the combination of the alignment of the A143 embankment and a restriction in the Green Lane watercourses/drainage ditches where they have been piped beneath the A143 (the images below show the apparent outlets to the Green Lane watercourses/drainage ditches to the west of the A143).

Headwalls at the heads of the two Green Lane watercourses/drainage ditches to the west of the A 143 (north of Green Lane on the left, south of Green Lane on the east)

As the extent of the pooling upstream of the A143 is limited, and the result of overland rural flow, it is not considered to pose a notable threat to the structure of the A143, or threaten to overwhelm the 'structure' and flow towards the site. In other words the area of flooding is not analogous to a reservoir, and the A143 is not acting on the scale of a reservoir embankment or flood defence structure.

The appended Anglian Water sewer plan shows surface water sewers to the west and north of the site. There is also an unmapped short length of surface water sewer along the site's western boundary. The precise location of the sewer (or its adoption status) is not defined in this note. However, from plans submitted to South Norfolk planning department and the position of manholes observed during a site visit, the sewer is the outfall for the Persimmon Homes "Harvest Way" development. The outfall crosses into the site at a point adjacent to the north-western corner of the Harvest Way basin, runs north (following the western boundary ditch) for some 50 m before outfalling to the ditch through a brick headwall (see images overleaf). For clarity, there is also a length of wastewater sewer shown running from the Harvest Way development to Green Lane, along the western boundary.

None of the surface water sewers in the area are considered to pose a notable or unmanageable threat to the proposed development. In the event that any of them become overloaded (because of an intense rainfall event for example) then any floodwater arising from manholes would tend to be

directed away from the site and/or be intercepted by the existing ditch network. At the masterplanning stage, space for access and a maintenance strip for the boundary ditch and sewers will be provided along the western site boundary. This strip will also allow any flood flows from the surface water sewer to be routed northwards and/or into the ditch.

Image showing the Harvest way development outfall to the western boundary ditch, looking north towards Green Lane

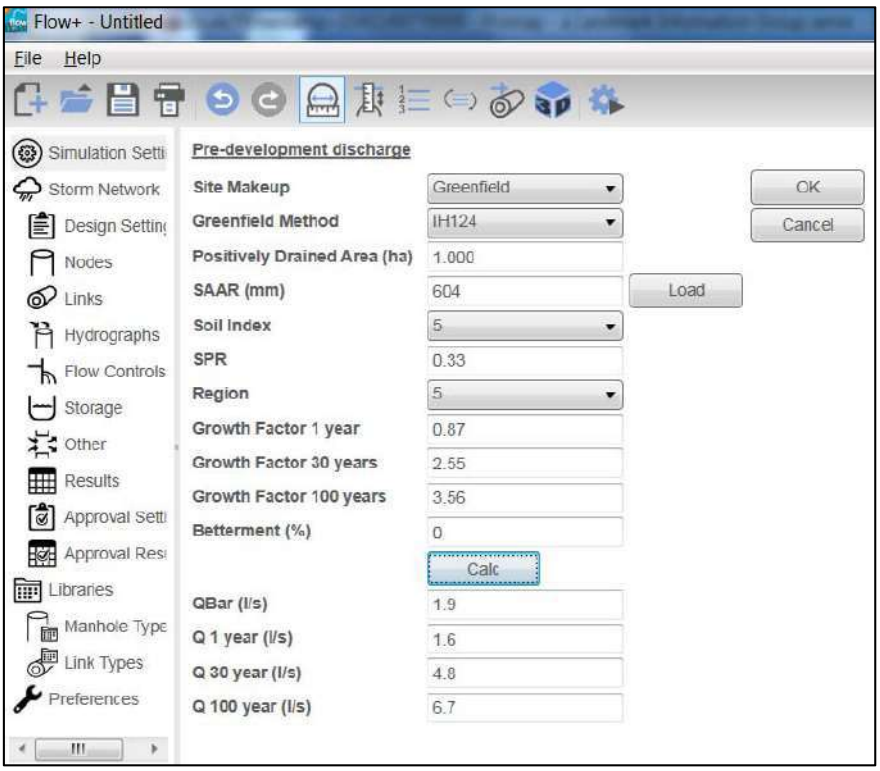
The site geology (Boulder Clay over Crag) suggests that groundwater flooding (i.e. flooding arising from a significant rise in the level of a regional or local groundwater body) is not a realistic threat to the site.

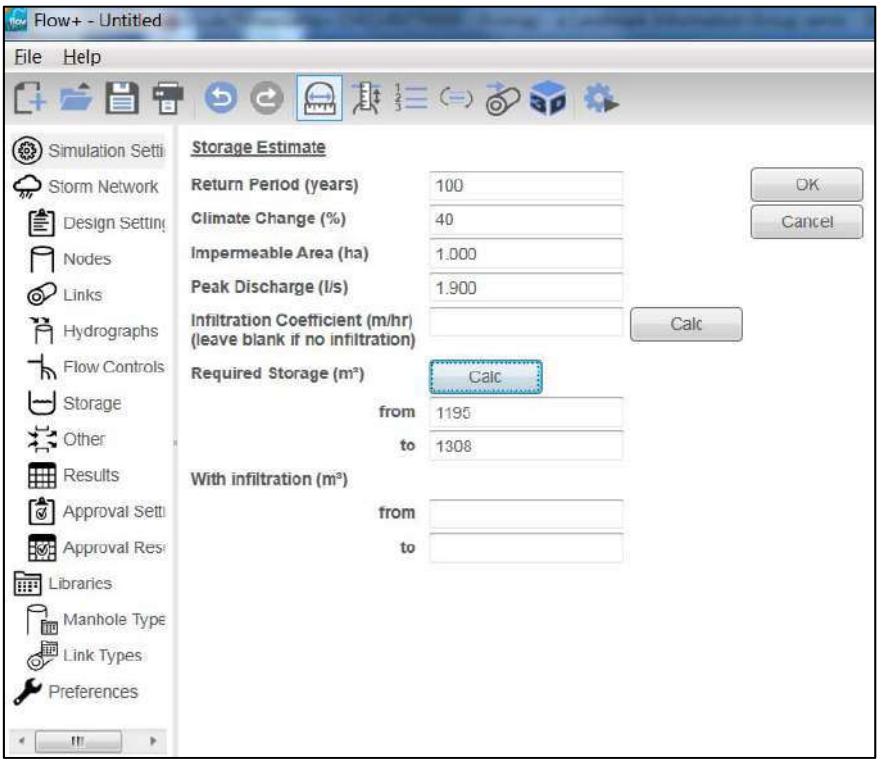
Surface water management

The site is underlain by the Lowestoft Formation (Boulder Clay) over Crag. British Geological Society (BGS) borehole data (available online) suggests that the Crag is not shallow enough to allow the site to be drained using 'normal' depth infiltration methods. Initial intrusive investigations (see appended infiltration test report) found Lowestoft Formation to a depth of at least 3 m and it is therefore proposed to discharge runoff from the development to the on-site ditch network. Flows would be limited to the mean annual greenfield runoff rate (Q_{BAR}) calculated for the post development impermeable catchment. On-site attenuation would be provided in order to manage the runoff generated by the development for up to and including the 1 in 100 annual probability storm, inclusive of the requisite climate change allowance (currently an allowance of 40 %).

The volume required to attenuate flows to the mean annual greenfield rate per 1 hectare of newly created impermeable cover is approximately 1,300 m^3 which would readily fit within the site boundary.

Surface water storage estimate – greenfield discharge





Draft policy comments

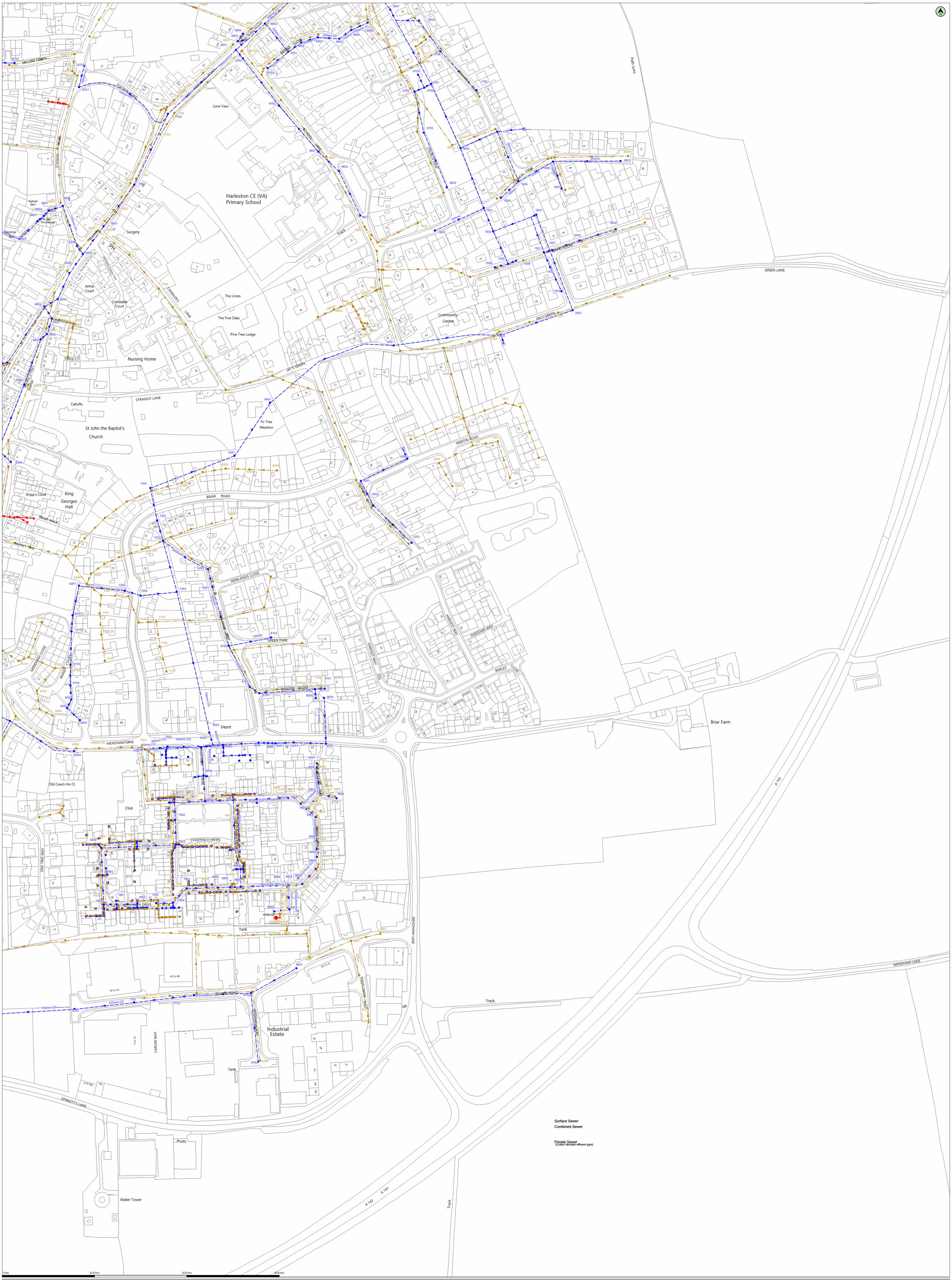
Bullet point 9 of the draft policy states *"Appropriate investigation works and mitigation measures to address the surface water flooding to the north-east of the site will be required."*

The wording suggests that a reduction in the off-site flooding (to the north of Jay's Green) may be required in order for the development to proceed. Taking opportunities to help to reduce off-site flood risk as part of development aligns with the spirit of national policy and will be pursued. However we would suggest that the current wording could require more than can be reasonably achieved within the confines of the site.

Bullet point 10 of the draft policy states *"A proportionate contribution towards a new public water supply to help meet the requirements of the development."*

Under the current new connections charging regime potable water supply is managed by Anglian Water. They are obliged to supply new developments with the necessary infrastructure with any upgrades being financed through the pooling of infrastructure charges. We therefore would suggest that Bullet Point 10 need not be included in the policy.

Appended information
Anglian Water sewer plans
Infiltration test report



Surface Sewer
Combined Sewer

Private Sewer
(Colour denotes effluent type)

Data updated: 04/09/18

Scale: 1:1250 | Date: 24/10/18 | Wastewater Plan A0
Map Centre: 625105,283161 | Our Ref: 285248 - 2 | Powered by digdat

Foul Sewer
Surface Sewer
Combined Sewer
Final Effluent Sewer
Rising Main*
Private Sewer*
Decommissioned Sewer*

Outfall*
Inlet*
Manhole*

Sewage Treatment Works
Public Pumping Station
Decommissioned Pumping Station

*(Colour denotes effluent type)

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Green Lane, Harlesto

love every drop anglianwater

Manhole Reference	Easting	Northing	Liquid Type	Cover Level	Invert Level	Depth to Invert
0200	625032	283266	F	-	-	-
0301	625035	283379	F	32.24	31.21	1.03
0302	625080	283328	F	33.58	32.44	1.14
0303	625065	283353	F	32.85	31.26	1.59
0401	625023	283475	F	30.31	28.07	2.24
0402	625070	283478	F	29.96	28.28	1.68
0403	625092	283402	F	32.18	30.56	1.62
0404	625078	283449	F	31.29	29.66	1.63
0502	625005	283562	F	28.1	26.71	1.39
0503	625079	283564	F	28.93	27.32	1.61
0504	625002	283542	F	28.56	26.93	1.63
0506	625000	283563	F	-	-	-
0601	625042	283613	F	-	-	-
0602	625070	283646	F	-	-	-
0603	625079	283697	F	26.12	22.7	3.42
0701	625042	283712	F	25.61	23.8	1.81
0702	625042	283743	F	24.97	22.89	2.08
0704	625024	283776	F	23.72	22.11	1.61
0705	625045	283787	F	23.64	22.42	1.22
0706	625023	283782	F	-	-	-
0801	625001	282844	F	-	-	-
0801	625039	283835	F	24.12	23.02	1.1
0802	625067	283802	F	23.93	22.63	1.3
0803	625011	283803	F	23.07	21.57	1.5
0804	625051	283812	F	-	-	-
0805	625040	283804	F	-	-	-
1301	625129	283377	F	33	31.67	1.33
1302	625142	283337	F	33.77	32.67	1.1
1303	625173	283359	F	33.42	32.19	1.23
1304	625102	283372	F	32.55	31.17	1.38
1401	625137	283418	F	32.13	31.07	1.06
1402	625153	283414	F	32.47	31.19	1.28
1403	625131	283495	F	30.17	28.78	1.39
1404	625125	283491	F	30.23	28.76	1.47
1501	625156	283572	F	28.57	27.78	0.79
1502	625194	283516	F	30.02	29.25	0.77
1509	625099	283555	F	28.86	27.32	1.54
1601	625128	283639	F	27.04	25.55	1.49
1602	625147	283659	F	26.81	24.47	2.34
1603	625183	283682	F	-	-	-
1604	625190	283684	F	27.5	25.53	1.97
1701	625126	283715	F	24.87	23.49	1.38
1702	625109	283750	F	24.41	23.13	1.28
2501	625255	283536	F	31.02	29.25	1.77
2502	625220	283593	F	29.46	28.33	1.13
2601	625288	283613	F	29.99	29.06	0.93
2602	625270	283686	F	28.48	26.57	1.91
2605	625202	283649	F	-	-	-
3501	625315	283556	F	31.51	30.02	1.49
5102	624593	283150	F	33.5	31.33	2.17
5307	624599	283378	F	26.26	24.51	1.75
5308	624599	283349	F	28	26.34	1.66
5402	624594	283459	F	25.83	24.17	1.66
6001	624607	283079	F	33.8	32.26	1.54
6002	624651	283044	F	35.65	33.44	2.21
6004	624647	283080	F	35.32	34.16	1.16
6005	624633	283086	F	35.36	34.15	1.21
6006	624672	283044	F	-	-	-
6101	624610	283139	F	33.64	31.45	2.19
6102	624621	283143	F	33.54	31.56	1.98
6103	624650	283131	F	34.05	32.24	1.81
6104	624635	283181	F	-	-	-
6105	624630	283107	F	34.48	33.71	0.77
6106	624666	283132	F	34.31	33.38	0.93
6201	624622	283262	F	-	-	-
6202	624661	283252	F	31.17	29.07	2.1
6203	624681	283272	F	30.6	29.36	1.24
6204	624684	283222	F	31.95	29.49	2.46
6205	624688	283233	F	31.54	29.73	1.81
6401	624600	283461	F	25.51	23.72	1.79
6402	624640	283499	F	24.73	23.33	1.4
6403	624621	283438	F	25.1	24.19	0.91
6404	624668	283499	F	-	-	-
6405	624663	283468	F	-	-	-
6501	624628	283505	F	24.76	22.85	1.91
6502	624649	283537	F	24.33	22.37	1.96
6503	624677	283586	F	23.76	21.74	2.02
6504	624671	283592	F	24.54	22.6	1.94
6505	624650	283508	F	-	-	-
6506	624654	283508	F	-	-	-
6507	624670	283504	F	-	-	-
6601	624694	283604	F	23.54	21.6	1.94
6602	624652	283693	F	25.67	24.02	1.65
6603	624655	283635	F	25.55	23.5	2.05
6701	624654	283705	F	25.73	24.2	1.53
6702	624673	283772	F	19.04	17	2.04
6703	624668	283777	F	19.7	17.088	2.612
6704	624671	283796	F	20.07	17.179	2.891
6705	624600	283784	F	20.06	18.308	1.752
6801	624660	282836	F	38.11	34.56	3.55
6804	624687	283815	F	27.72	26.23	1.49
6900	624698	282931	F	-	-	-
6901	624699	282906	F	-	-	-
6903	624654	282975	F	-	-	-
6904	624632	282970	F	-	-	-
6905	624659	282982	F	-	-	-
7000	624747	283015	F	-	-	-
7001	624743	283045	F	-	-	-
7002	624721	283045	F	-	-	-
7101	624698	283190	F	32.3	31.35	0.95
7102	624700	283167	F	33.08	32.05	1.03
7103	624703	283139	F	33.79	32.73	1.06
7104	624759	283181	F	32.45	31.42	1.03
7105	624740	283180	F	32.56	30.81	1.75
7106	624763	283155	F	33.04	31.82	1.22
7107	624770	283127	F	33.48	32.33	1.15
7201	624703	283294	F	30.19	29.46	0.73
7202	624703	283244	F	31.49	29.85	1.64
7203	624719	283251	F	31.05	30	1.05
7204	624744	283260	F	31.07	30.07	1
7205	624750	283261	F	30.96	30.09	0.87
7206	624729	283209	F	32.33	30.27	2.06
7207	624699	283210	F	32.21	29.83	2.38
7208	624775	283273	F	30.83	30.55	0.28
7209	624797	283282	F	31.29	30.71	0.58
7210	624797	283249	F	-	-	-
7301	624727	283311	F	30.01	29.63	0.38
7302	624754	283323	F	30.11	29.76	0.35
7303	624787	283332	F	30.4	29.99	0.41
7501	624730	283578	F	24.32	22.65	1.67
7502	624762	283542	F	26.01	24.38	1.63
7503	624791	283503	F	27.58	25.38	2.2
7601	624737	283661	F	22.59	21.34	1.25
7602	624716	283625	F	23.12	21.43	1.69
7603	624697	283604	F	23.47	21.53	1.94
7604	624731	283656	F	22.62	20.69	1.93
7605	624713	283627	F	23.24	21.22	2.02
7700	624746	282774	F	-	-	-
7701	624771	283738	F	22.04	20.19	1.85
7702	624764	283736	F	22.21	20.2	2.01
7703	624769	283735	F	22.07	21.22	0.85
7704	624778	283732	F	21.72	20.06	1.66
7705	624763	283709	F	22.06	20.5	1.56
7706	624778	283746	F	-	-	-
7801	624747	282845	F	38.28	35.07	3.21
7802	624700	282881	F	-	-	-
7803	624707	282873	F	-	-	-
7803	624799	283847	F	-	-	-
7804	624718	282873	F	-	-	-
7805	624787	282890	F	-	-	-
7806	624773	282875	F	-	-	-
7807	624761	282875	F	-	-	-
7900	624777	282988	F	-	-	-
7901	624749	282987	F	-	-	-
7902	624778	282941	F	-	-	-
7903	624736	282940	F	-	-	-
7904	624704	282939	F	-	-	-
7951	624777	282965	F	-	-	-
8101	624829	283184	F	-	-	-
8102	624876	283197	F	-	-	-
8103	624843	283151	F	33.608	32.488	1.12
8104	624890	283108	F	35.393	33.055	2.338
8105	624866	283104	F	34.9	32.878	2.022
8201	624841	283293	F	31.95	30.97	0.98
8202	624817	283240	F	-	-	-
8203	624823	283212	F	-	-	-
8204	624883	283230	F	-	-	-
8301	624809	283343	F	31.14	30.26	0.88
8302	624834	283347	F	31.73	30.92	0.81
8303	624860	283346	F	-	-	-
8304	624890	283345	F	32.13	32.12	0.01
8401	624834	283432	F	30.07	27.97	2.1
8402	624885	283447	F	30.29	28.96	1.33
8700	624871	282706	F	41.067	38.68	2.387
8701	624863	282781	F	40.134	37.691	2.443
8701	624894	283746	F	23.13	21.03	2.1
8702	624803	282779	F	-	36.862	-
8702	624852	283799	F	20.94	19.37	1.57
8703	624873	283773	F	22.047	20.247	1.8
8704	624875	283780	F	21.94	20.34	1.6
8705	624886	283790	F	22.157	20.457	1.7
8801	624827	282841	F	38.47	35.54	2.93
8801	624802	283846	F	-	-	-
8802	624801	282843	F	-	36.02	-
8802	624862	283823	F	21.28	-	-
8803	624842	283806	F	20.95	19.78	1.17
8803	624853	282892	F	-	-	-
8804	624841	282892	F	-	-	-
8805	624813	282891	F	-	-	-
8806	624899	282843	F	-	-	-
8807	624893	282861	F	-	-	-
8808	624893	282865	F	-	-	-
8900	624846	282935	F	-	-	-
8901	624845	282967	F	-	-	-
8902	624844	282990	F	-	-	-
8903	624839	282989	F	-	-	-
8904	624808	282989	F	-	-	-
8905	624846	282920	F	-	-	-
8906	624852	282915	F	-	-	-
8907	624891	282991	F	-	-	-
9000	624935	283017	F	-	-	-
9001	624935	283026	F	-	-	-
9101	624917	283158	F	-	-	-
9102	624938	283110	F	36.198	33.412	2.786
9301	624952	283397	F	31.48	30.1	1.38
9302	624963	283371	F	32.2	30.54	1.66
9303	624976	283335	F	32.77	31.16	1.61
9304	624983	283322	F	-	-	-
9305	624992	283305	F	33.29	31.4	1.89
9401	624939	283430	F	30.94	29.54	1.4
9402	624907	283439	F	30.28	-	-
9403	624985	283498	F	-	-	-
9404	624983	283498	F	-	-	-
9501	624998	283583	F	28.06	26.32	1.74
9502	624934	283511	F	-	-	-
9503	624951	283519	F	-	-	-
9504	624996	283540	F	-	-	-
9505	624967	283526	F	-	-	-
9506	624999	283592	F	-	-	-
9507	624972	283522	F	-	-	-
9508	624978	283514	F	-	-	-
9509	624981	283505	F	-	-	-
9510	624988	283504	F	-	-	-
9601	624943	283685	F	26.43	24.55	1.88
9602	624984	283609	F	-	-	-

Manhole Reference	Easting	Northing	Liquid Type	Cover Level	Invert Level	Depth to Invert
9701	624987	282763	F	39.91	38.1	1.81
9702	624989	282747	F	40.02	38.31	1.71
9801	624922	282844	F	38.19	36.23	1.96
9802	624925	282817	F	39.23	36.57	2.66
9803	624970	282836	F	39.21	37.1	2.11
9804	624900	282848	F	-	-	-
9805	624901	282872	F	-	-	-
9806	624901	282894	F	-	-	-
9806	624988	283833	F	23.37	20.896	2.474
9807	624919	282896	F	-	-	-
9807	624970	283825	F	22.038	20.058	1.98
9808	624916	283811	F	22.457	20.807	1.65
9809	624935	283817	F	22.524	21.174	1.35
9900	624933	282911	F	-	-	-
9901	624934	282943	F	-	-	-
9902	624933	282971	F	-	-	-
9903	624924	282979	F	-	-	-
9904	624939	282995	F	-	-	-
9905	624953	282992	F	-	-	-
9906	624911	282992	F	-	-	-
9907	624935	282919	F	-	-	-
0251	625035	283267	S	-	-	-
0352	625031	283358	S	32.63	31.43	1.2
0451	625016	283480	S	30.37	28.03	2.34
0651	625061	283605	S	27.64	25.87	1.77
0652	625074	283652	S	-	-	-
0653	625088	283694	S	25.61	23.54	2.07
0751	625056	283764	S	-	-	-
0752	625049	283760	S	-	-	-
0753	625043	283773	S	-	-	-
0754	625039	283755	S	-	-	-
0755	625049	283711	S	-	-	-
0756	625067	283799	S	23.94	22.31	1.63
0851	625012	283844	S	-	-	-
0853	625044	283832	S	24.15	21.49	2.66
1451	625132	283492	S	30.3	27.49	2.81
1551	625179	283581	S	-	-	-
1552	625185	283565	S	-	-	-
1553	625198	283539	S	-	-	-
1554	625126	283565	S	-	-	-
1555	625140	283569	S	-	-	-
1556	625149	283572	S	-	-	-
1557	625187	283584	S	-	-	-
1651	625113	283629	S	25.65	23.65	2
1652	625124	283604	S	27.09	24.28	2.81
1653	625170	283622	S	27.77	25.01	2.76
1654	625132	283640	S	26.96	25.35	1.61
1655	625151	283658	S	26.87	24.86	2.01
1656	625189	283680	S	27.56	25.84	1.72
1657	625198	283650	S	28.53	27.03	1.5
1751	625128	283712	S	-	-	-
1752	625106	283757	S	24.44	22.83	1.61
2551	625210	283519	S	30.43	27.22	3.21
2552	625217	283594	S	-	-	-
2651	625262	283680	S	28.5	26.8	1.7
2652	625256	283606	S	-	-	-
5453	624598	283462	S	25.47	22.76	2.71
6051	624667	283097	S	-	-	-
6052	624662	283088	S	-	-	-
6053	624676	283074	S	-	-	-
6054	624670	283041	S	-	-	-
6055	624601	283074	S	-	-	-
6151	624668	283188	S	-	-	-
6152	624667	283171	S	-	-	-
6153	624666	283135	S	-	-	-
6154	624666	283112	S	-	-	-
6251	624675	283220	S	-	-	-
6356	624601	283354	S	-	-	-
6451	624634	283487	S	24.76	22.64	2.12
6452	624641	283493	S	24.72	22.51	2.21
6453	624616	283438	S	-	-	-
6551	624646	283510	S	24.55	22.17	2.38
6552	624638	283522	S	24.56	21.94	2.62
6553	624652	283531	S	-	21.77	-
6554	624665	283559	S	23.96	21.33	2.63
6555	624680	283579	S	-	-	-
6556	624673	283588	S	-	-	-
6557	624611	283595	S	-	-	-
6650	624658	283631	S	-	-	-
6651	624642	283626	S	-	-	-
6652	624637	283621	S	-	-	-
6653	624630	283615	S	-	-	-
6751	624670	282762	S	39.904	37.418	2.486
6751	624675	283760	S	18.57	18.11	0.46
6752	624681	283783	S	19.89	18.538	1.352
6753	624606	283786	S	-	19.407	-
6950	624700	282936	S	-	-	-
7051	624756	283044	S	-	-	-
7052	624739	283043	S	-	-	-
7053	624771	283046	S	-	-	-
7251	624760	283291	S	30.81	29.23	1.58
7252	624766	283269	S	30.06	29.24	0.82
7253	624781	283214	S	31.86	30.55	1.31
7254	624742	283210	S	-	-	-
7255	624725	283215	S	-	-	-
7351	624752	283326	S	29.72	28.39	1.33
7651	624702	283610	S	23.32	20.6	2.72
7652	624735	283654	S	22.61	20.04	2.57
7751	624735	282769	S	39.904	-	-
7752	624777	282774	S	39.904	37.866	2.038
7752	624772	283731	S	21.87	19.46	2.41
7850	624702	282875	S	-	-	-
7851	624716	282875	S	-	-	-
7852	624739	282876	S	-	-	-
7853	624792	282892	S	-	-	-
7854	624777	282877	S	-	-	-
7855	624759	282876	S	-	-	-
7950	624779	282986	S	-	-	-
7952	624779	282966	S	-	-	-
7953	624780	282940	S	-	-	-
7954	624738	282938	S	-	-	-
7955	624701	282907	S	-	-	-
8051	624817	283061	S	-	-	-
8052	624804	283046	S	-	-	-
8053	624821	283047	S	-	-	-
8054	624831	283048	S	-	-	-
8055	624870	283050	S	-	-	-
8056	624880	283050	S	-	-	-
8057	624888	283050	S	-	-	-
8058	624810	283015	S	-	-	-
8059	624808	283045	S	-	-	-
8151	624860	283111	S	34.845	34.025	0.82
8152	624837	283155	S	-	-	-
8153	624884	283164	S	-	-	-
8155	624871	283104	S	34.91	34.075	0.835
8251	624820	283219	S	-	-	-
8252	624815	283238	S	-	-	-
8351	624844	283361	S	-	-	-
8451	624882	283418	S	-	-	-
8751	624800	282777	S	39.904	37.985	1.919
8751	624853	283791	S	-	-	-
8752	624861	282779	S	40.08	38.209	1.871
8752	624892	283740	S	-	-	-
8753	624869	282705	S	41.067	39.389	1.678
8753	624879	283781	S	23.026	19.926	3.1
8850	624851	282894	S	-	-	-
8851	624839	282894	S	-	-	-
8851	624845	283801	S	-	-	-
8852	624813	282893	S	-	-	-
8852	624877	283829	S	-	-	-
8853	624875	282895	S	-	-	-
8853	624847	283810	S	-	-	-
8854	624889	282896	S	-	-	-
8854	624853	283818	S	-	-	-
8855	624887	282868	S	-	-	-
8950	624812	282987	S	-	-	-
8951	624842	282988	S	-	-	-
8952	624868	282989	S	-	-	-
8953	624844	282934	S	-	-	-
8954	624850	282913	S	-	-	-
8955	624893	282990	S	-	-	-
9051	624908	283050	S	-	-	-
9052	624943	283049	S	37.2	35.025	2.175
9054	624941	283099	S	36.57	35.13	1.44
9055	624932	283098	S	36.245	34.239	2.006
9056	624933	283018	S	-	-	-
9057	624933	283028	S	-	-	-
9150	624931	283108	S	36.107	34.219	1.888
9151	624942	283109	S	36.274	34.239	2.035
9351	624980	283334	S	-	-	-
9352	624994	283307	S	-	-	-
9651	624934	283690	S	-	-	-
9652	624957	283669	S	-	-	-
9653	624980	283621	S	-	-	-
9751	624902	283799	S	22.446	20.246	2.2
9851	624911	282806	S	39.734	38.596	1.138
9852	624902	282896	S	-	-	-
9852	624916	283808	S	22.452	20.502	1.95
9853	624903	282870	S	-	-	-
9853	624934	283814	S	22.538	20.838	1.7
9854	624917	282897	S	-	-	-
9854	624957	283812	S	22.656	21.206	1.45
9855	624970	283822	S	23.006	21.606	1.4
9856	624988	283830	S	23.346	21.946	1.4
9950	624932	282913	S	-	-	-
9951	624909	282990	S	-	-	-
9952	624922	282979	S	-	-	-
9953	624936	282994	S	-	-	-
9954	624954	282990	S	-	-	-
9955	624932	282969	S	-	-	-
9956	624932	282944	S	-	-	-
9957	624933	282927	S	-	-	-

Manhole Reference	Easting	Northing	Liquid Type	Cover Level	Invert Level	Depth to Invert

Manhole Reference	Easting	Northing	Liquid Type	Cover Level	Invert Level	Depth to Invert

GEOSPHERE ENVIRONMENTAL

Our Ref: 3985,SK,Ltr/JDo,GF/V1
Your Ref: 083 – SP4598

M Scott Properties Ltd
Suite 5, Oyster House
Severalls Lane
Colchester
Essex
CO4 9PD

Date: 3uly 2019

For the attention of Mr Graham McCormick

By Email
graham@mscott.co.uk

Dear Graham,

INFILTRATION TESTING AT: BRIAR FARM, HARLESTON, NORFOLK, IP20 9DW

1. Introduction

This report has been prepared for M Scott Properties Ltd, Briar Farm, Land Off Mendham Lane, Harleston, Norfolk, IP20 9DW.

The primary objective of this ground investigation was to assess the infiltration potential of the natural soils beneath the site.

This was achieved by:

- Excavating three machine-dug trial pits across the site;
- Undertaking soakage testing in line with BRE Digest 365 guidance; and
- Undertaking infiltration calculations to assess the suitability of soakaways for the future development of the site.

It is understood that the proposed development will comprise 132 residential dwellings of varying composition. A Proposed Development Plan (entitled Sketch Layout), provided by Mr Graham McCormick, Drawing ref. 7055, SK02, Rev A, dated March 2019, is provided within Appendix 4 at the end of this letter report.

A Site Location Plan, Drawing ref. 3985,SK/001/Rev 0, is presented in Appendix 4, at the end of this letter.

The purpose of this report is to provide factual data only.

2. Site Works

2.1 Methodology

This ground investigation was carried out on the basis of the practices set out in BRE Digest 365, 'Soakaway Design'. 2016, which requires, in summary, a total of three infiltration tests to be

undertaken in succession over a 24-hour period, where possible, or the infiltration test to run for up to 24 hours.

The exploratory holes were positioned in adherence to the plans supplied, to provide an appropriate assessment of infiltration for conventional soakaways.

In general, where a test location showed limited or no infiltration, it was allowed to continue for circa 24 hours, the data obtained and the test ceased. Where a test exhibited appreciable infiltration and the "75%" infiltration level was achieved, a further infiltration "run", or more was undertaken.

2.2 Scope

Site works were carried out on 24 and 25 of June 2019, and comprised of the following:

- Excavation of three machine excavated trial pits, (SK01 to SK03), to a depth of 3mbgl;
- Undertaking infiltration testing in line with BRE Digest 365 guidance; and
- Undertaking infiltration calculations to allow for assessment of the suitability of soakaways for the future development of the site.

An Exploratory Hole Location Plan, Drawing ref. 3985,SK/002/Rev0, is presented in Appendix 4, at the end of this letter.

2.3 Ground Conditions Encountered

The sequence of the strata encountered during the investigation generally confirms with the anticipated geology as interpreted from the geological map.

The sequence and indicative thickness of strata are summarised in Table 1 below, with logs provided in Appendix 2:

Table 1 - Ground Conditions

Strata	Depth Encountered (mgl)		Strata Thickness (m)	Location and Composition
	From	To		
Topsoil	0.00	0.15 – 0.30	0.15 – 0.30	All exploratory holes: A brown, sandy ORGANIC SILT containing roots.
Lowestoft Formation (Diamicton)	0.15 – 0.30	3.00-unproven	Unproven	All exploratory holes: A firm mottled orange and grey, sandy gravelly CLAY with occasional flint cobbles.

2.4 Groundwater

No groundwater was encountered in any of the exploratory holes during the intrusive investigation.

2.5 Infiltration Testing Results

Soil infiltration testing was undertaken in accordance with BRE 365, 2016. The results are summarised in Table 2 below and are provided in full in Appendix 3, presented at the end of this letter:

Table 2 - Summary of Soil Infiltration Results

Location	Test 1 (m/s)	Test 2 (m/s)	Test 3 (m/s)	Notes
TP1	N/A	-	-	No infiltration achieved.
TP2	N/A	-	-	No infiltration achieved.
TP3a	N/A	-	-	No infiltration achieved.

We trust the above is clear and acceptable. If you have any comments or queries then please do not hesitate to contact us.

Yours sincerely,

James Donlin
Graduate Engineer
Geosphere Environmental Ltd
jamesd@geosphere-environmental.co.uk

Enclosures:
Appendix 1 – Report Limitations and Conditions
Appendix 2 – Exploratory Hole Logs
Appendix 3 – Infiltration Testing Results
Appendix 4 – Drawings

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APPENDICES

GEOSPHERE ENVIRONMENTAL LTD

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Registered Office: Brightwell Barns, Ipswich Road, Brightwell, Suffolk, IP10 0BJ | Registered in England and Wales | Registered NO. 7107630 | VAT NO. 985 4247 79

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APPENDIX 1 – REPORT LIMITATIONS AND CONDITIONS

This report refers, within the limitations stated, to the condition of the site at the time of the inspections. No warranty is given as to the possibility of future changes in the condition of the site.

This report has been prepared for the sole use of the Client for the purposes described and no extended duty of care to any third party is implied or offered. Third parties using any information contained within this report do so at their own risk.

This report is prepared and written for the use stated herein; it should not be used for any other purposes without reference to Geosphere Environmental Limited. The report has been prepared in relation to the proposed end use, should another end use be intended, a further re-assessment may be required. It is likely that over time practises will improve and the relevant guidance and legislation be amended or superseded, which may necessitate a re-assessment of the site.

The accuracy of any map extracts cannot be guaranteed. It is possible that different conditions existed onsite, between and subsequent to the various map surveys appended.

Whilst the report may express an opinion on possible configurations of strata between or beyond exploratory holes discussed or on the possible presence of features based upon visual, verbal or published evidence, this is for guidance only and no liability can be accepted for its accuracy.

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APPENDIX 2 – EXPLORATORY HOLE LOGS

Trial Pit Logs
(SK01, SK02, SK03)

Geosphere Environmental Ltd

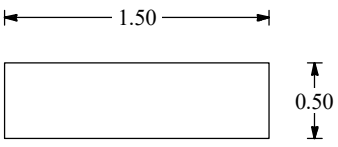
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Briar Farm, Harleston, Norfolk, IP20 9DS	M Scott Properties Ltd	**SK01**

Job No	Date	Ground Level (m)	Coordinates ()
3985,SK	24-06-19		,

Fieldwork By	Logged By	Sheet
GEL	FS	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.30	Brown sandy ORGANIC SILT. Sand is fine to coarse. Frequent active very fine and fine roots. TOPSOIL				
0.30-3.00	Firm mottled orangeish grey and speckled white slightly sandy, slightly gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded chalk and occasional flint.				
3.00	EXPLORATORY HOLE COMPLETED AT 3.0m BGL				



Shoring/Support: Gravel Filled
Stability: Stable

All dimensions in metres Scale 1:33.3333333333333	Method Trial Pit/trench	Plant Used JCB 3CX	Checked By GF

Geosphere Environmental Ltd

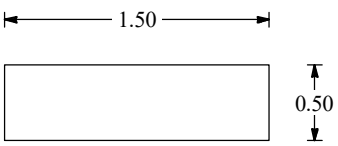
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Briar Farm, Harleston, Norfolk, IP20 9DS	M Scott Properties Ltd	**SK02**

Job No	Date	Ground Level (m)	Coordinates ()
3985,SK	24-06-19		,

Fieldwork By	Logged By	Sheet
GEL	FS	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.28	Brown sandy ORGANIC SILT. Sand is fine to coarse. Frequent active very fine and fine roots. TOPSOIL				
0.28-0.46	Firm orangeish brown sandy CLAY. Sand is fine to medium.				
0.46-3.00	Firm mottled orangeish grey and speckled white slightly sandy, slightly gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse angular to rounded chalk. Low cobble content of flint and chalk.				
3.00	EXPLORATORY HOLE COMPLETED AT 3.0m BGL				



Shoring/Support: Gravel Filled
Stability: Stable

All dimensions in metres Scale 1:33.3333333333333	Method Trial Pit/trench	Plant Used JCB 3CX	Checked By GF

GEL AGS TP BETA 3985,SK,JDO.GPJ GINT STD AGS 3_1.GDT 2/7/19

Geosphere Environmental Ltd

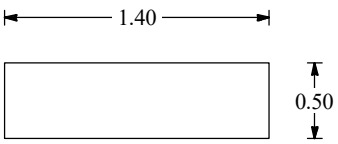
TRIAL PIT LOG

Project	Client	TRIAL PIT No
Briar Farm, Harleston, Norfolk, IP20 9DS	M Scott Properties Ltd	**SK03**

Job No	Date	Ground Level (m)	Coordinates ()
3985,SK	24-06-19		,

Fieldwork By	Logged By	Sheet
GEL	FS	1 of 1

Depth	DESCRIPTION	Legend	Depth	No	Remarks/Tests
0.00-0.15	Brown sandy ORGANIC SILT. Sand is fine to coarse. Frequent active very fine and fine roots.				
0.15-3.00	TOPSOIL				
	Firm mottled orangeish grey and speckled white slightly sandy, slightly gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse angular to subrounded chalk with occasional flint.				
3.00	EXPLORATORY HOLE COMPLETED AT 3.0m BGL				



Shoring/Support: Gravel Filled
Stability: Stable

All dimensions in metres Scale 1:33.3333333333333	Method Trial Pit/trench	Plant Used JCB 3CX	Checked By GF

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APPENDIX 3 – INFILTRATION TEST RESULTS

INFILTRATION TEST

Project Number: 3985,SK,JDo,CC

Date: 03/07/2019

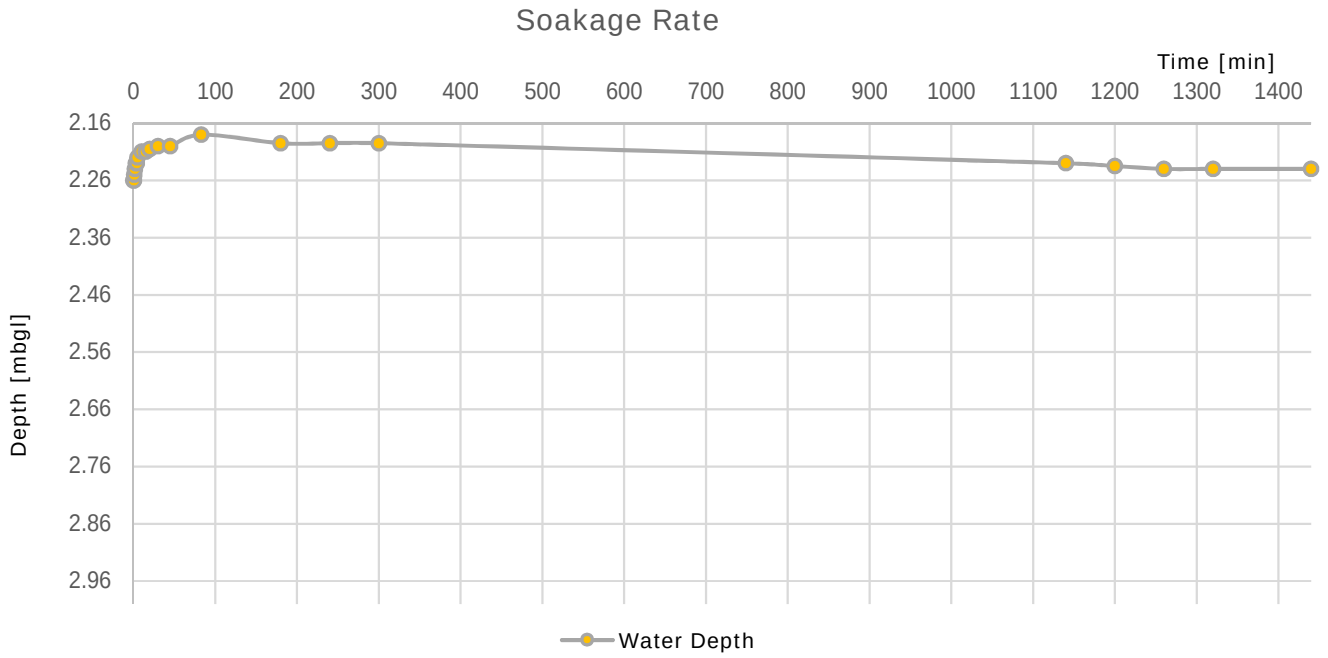
Project Name: Briar Farm, Land Off Mendham Lane, Harleston, Norfolk, IP20 9DW

Time [min]	Depth to Water [mbgl]
0.0	2.26
0.5	2.26
1.0	2.25
2.0	2.24
3.0	2.23
4.0	2.23
5.0	2.22
10.0	2.21
15.0	2.21
20.0	2.21
30.0	2.20
45.0	2.20
83.0	2.18
180.0	2.20
240.0	2.20
300	2.20
1140	2.23
1200	2.24
1260	2.24
1320	2.24
1440	2.24

Trial Pit Dimensions		
Length	Width	Depth
1.50m	0.50m	3.00m

It was not possible to undertake full-depth soakaway test.
Maximum water depth achieved in the test = 2.24mbgl

Hole	SK01
Run	1 of 1
Test Date	24/06/2019-25/06/2019
Groundwater Encountered at	n/a



mbgl - meters below ground level

Checked by: GF

INFILTRATION TEST

Project Number: 3985,SK,JDo,CC

Date: 03/07/2019

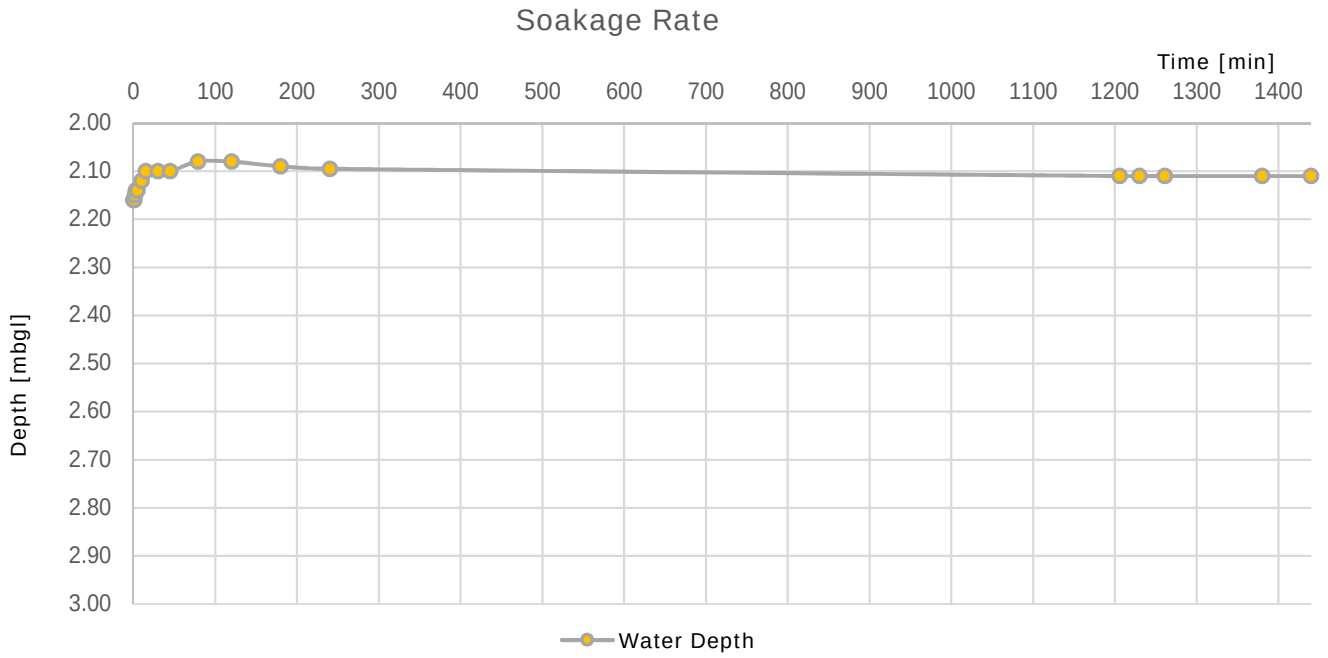
Project Name: Briar Farm, Land Off Mendham Lane, Harleston, Norfolk, IP20 9DW

Time [min]	Depth to Water [mbgl]
0.0	2.16
0.5	2.16
1.0	2.16
2.0	2.15
3.0	2.14
4.0	2.14
5.0	2.14
10.0	2.12
15.0	2.10
30.0	2.10
45.0	2.10
79.0	2.08
120.0	2.08
180.0	2.09
240	2.10
1206	2.11
1261	2.11
1230	2.11
1380	2.11
1440	2.11

Trial Pit Dimensions		
Length	Width	Depth
1.50m	0.50m	3.00m

It was not possible to undertake full-depth soakaway test.
Maximum water depth achieved in the test = 2.11mbgl

Hole	SK02
Run	1 of 1
Test Date	24/06/2019-25/06/2019
Groundwater Encountered at	n/a



mbgl - meters below ground level

Checked by: GF

INFILTRATION TEST

Project Number: 3985,SK,JDo,CC

Date: 03/07/2019

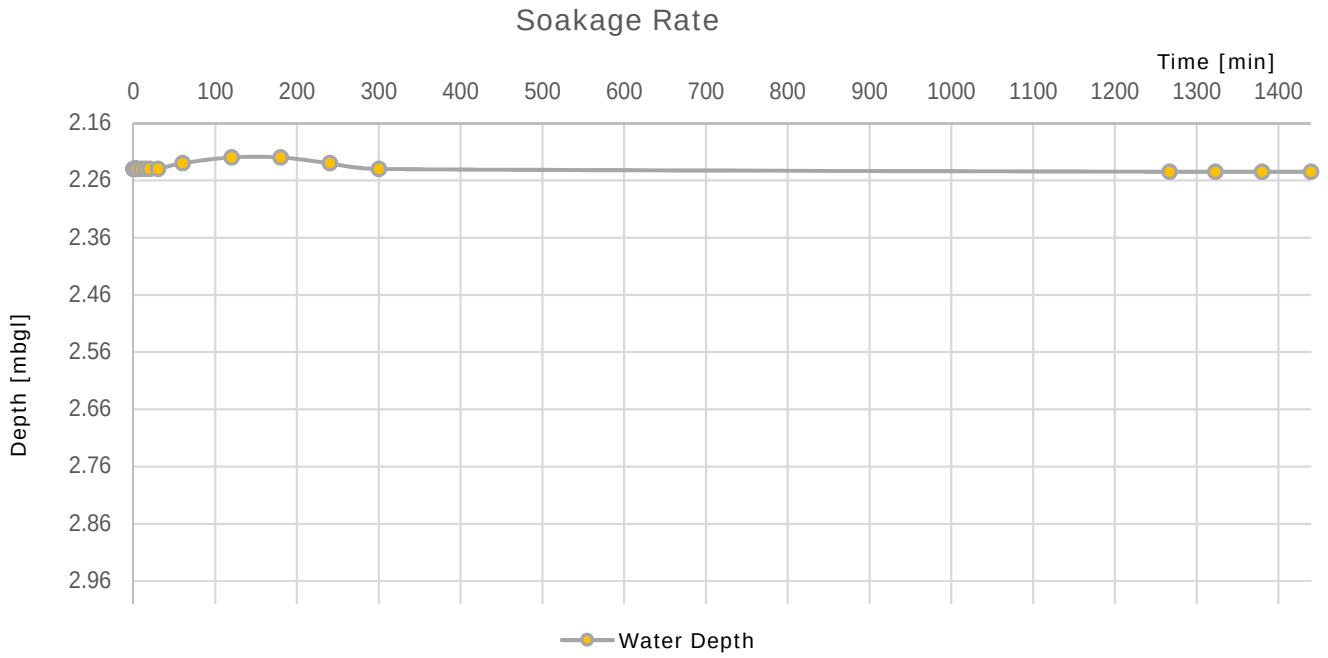
Project Name: Briar Farm, Land Off Mendham Lane, Harleston, Norfolk, IP20 9DW

Time [min]	Depth to Water [mbgl]
0.0	2.24
0.5	2.24
1.0	2.24
2.0	2.24
3.0	2.24
4.0	2.24
5.0	2.24
10.0	2.24
15.0	2.24
20.0	2.24
30.0	2.24
60.0	2.23
120.0	2.22
180.0	2.22
240	2.23
300	2.24
1267	2.25
1323	2.25
1380	2.25
1440	2.25

Trial Pit Dimensions		
Length	Width	Depth
1.40m	0.50m	3.00m

It was not possible to undertake full-depth soakaway test.
Maximum water depth achieved in the test = 2.25mbgl

Hole	SK03
Run	1 of 1
Test Date	24/06/2019-25/06/2019
Groundwater Encountered at	n/a



mbgl - meters below ground level

Checked by: GF

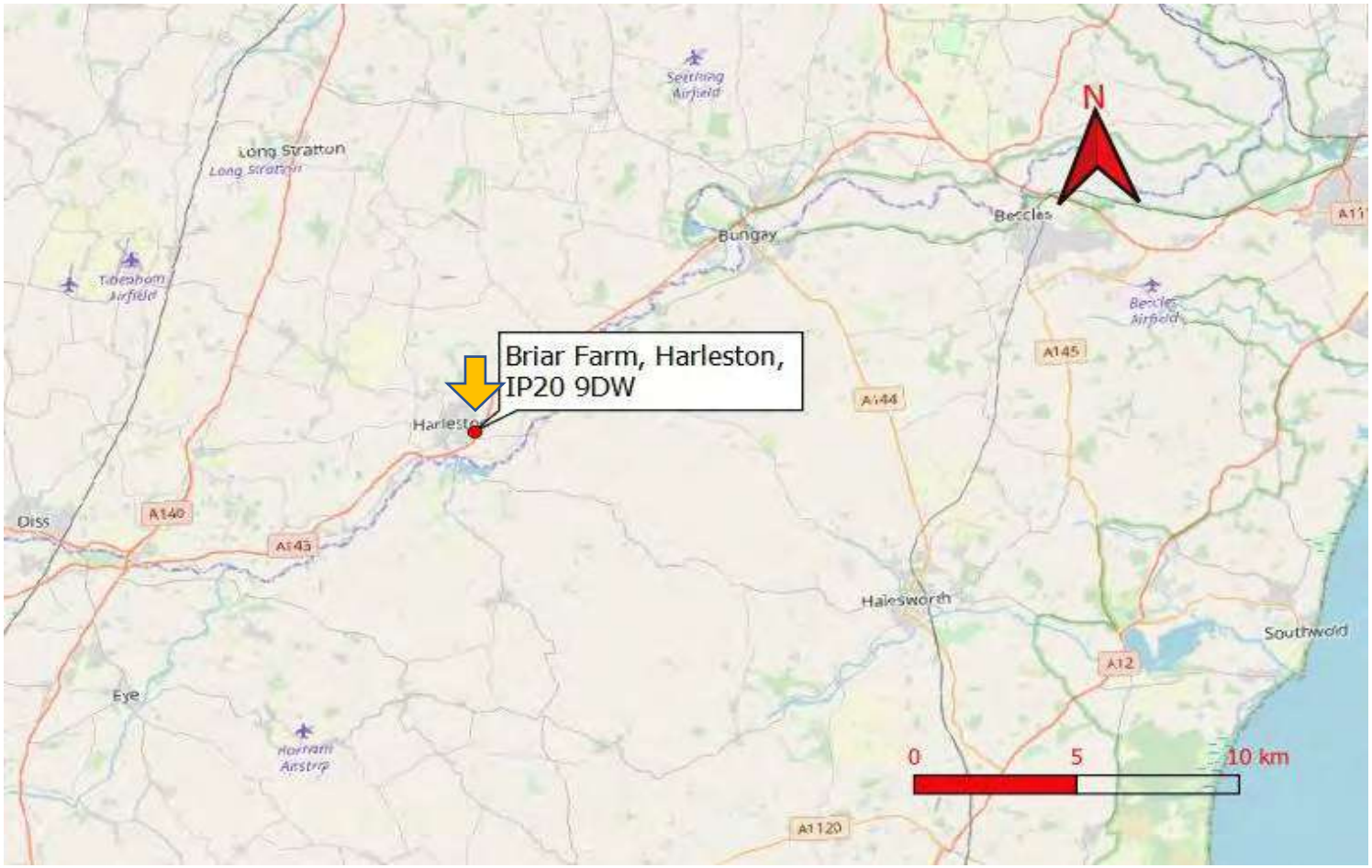
GEOSPHERE ENVIRONMENTAL

APPENDIX 4 – DRAWINGS

Site Location Plan Drawing ref. 3985,SK/001/Rev0

Exploratory Hole Location Plan – Drawing ref. 3985,SK/002/Rev0

Proposed Development Plan (entitled Sketch Layout), provided by Mr Graham McCormick, Drawing ref. 7055, SK02, Rev A, dated March 2019.



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LEGEND

Site Location

SOURCE

© OpenStreetMap contributors

PROJECT

BRIAR FARM, LAND OFF MENDHAM LANE, HARLESTON, NORFOLK, IP20 9DW.

TITLE

Site Location Plan

DRAWING NUMBER

3985,SK/001/Rev0

SCALE	DATE
As marked	26/06/2019
DRAWN BY	CHECKED BY
JD	GF

GEOSPHERE ENVIRONMENTAL

LEGEND

SK** Infiltration Test Location

SOURCE

© OpenStreetMap contributors

PROJECT

BRIAR FARM, LAND OFF MENDHAM LANE, HARLESTON, NORFOLK, IP20 9DW.

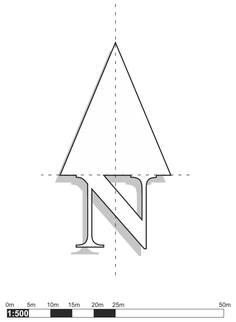
TITLE

Exploratory Hole Plan

DRAWING NUMBER

3985,SK/002/Rev0

SCALE	DATE
As marked	26/06/2019
DRAWN BY	CHECKED BY
JD	GF



Accommodation Schedule

Private Market		
2 Bed Bungalows	10	
3 Bed Bungalows	18	
2 Bed House	13	
3 Bed House	28	
4 Bed House	17	
5 Bed House	2	
		88
Affordable		
1 bed bungalow	6	
2 bed bungalow	8	
1 bed Flats	3	
2 bed Flats	8	
2 Bed house	9	
3 bed House	10	44
		132

SKETCH LAYOUT

1:500 @ A0 size

REVISIONS

REV.		DATE
A	Revised to clients comments	29.03.19

CLIENTS:

SCOTT PROPERTIES

PROJECT:

LAND OFF MENDHAM LANE AND JAYS GREEN, HARLESTON.

DRAWING TITLE:

SKETCH LAYOUT

SCALE - 1:500 @ A0. | DATE - MARCH 2019

ASD ARCHITECTURE Ltd
16A Bridge Street • Halesworth • Suffolk • IP19 8AQ
Tel. (01986) 872250
Fax. (01986) 872228
enquiries@ASD-architecture.co.uk
www.ASD-architecture.co.uk

JOB NO.	DWG NO.	REV.
7055	SK02	A

drg location: 7055/scottproperties/harleston/drawings.cdr.

GEOSPHERE ENVIRONMENTAL

Ec Ecology.

Fr Flood Risk.

Ge Geotechnical.

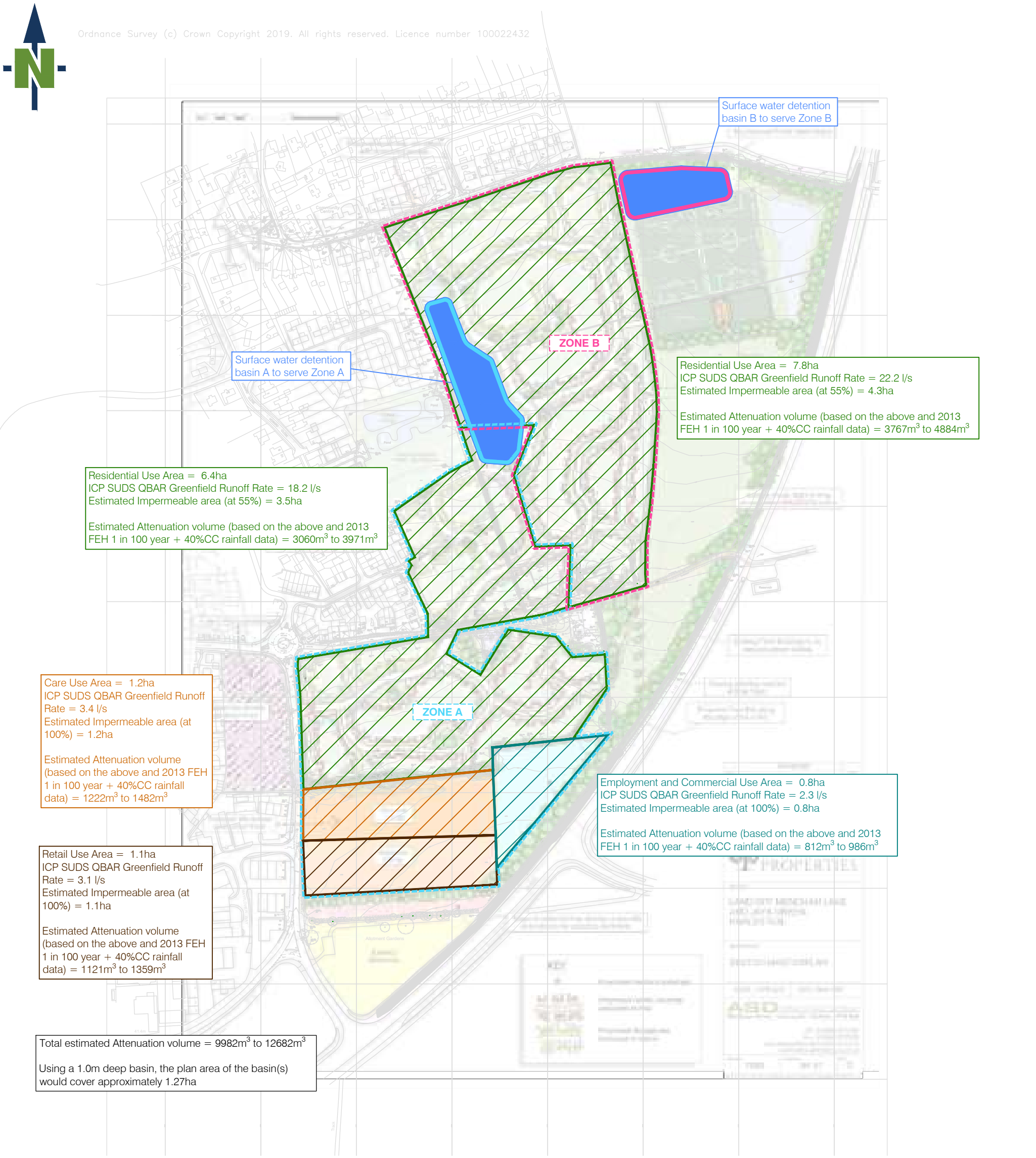
En Environmental.

Kw Knotweed.

GEOSPHERE ENVIRONMENTAL LTD

Brightwell Barns, Ipswich Road, Brightwell, Suffolk, IP10 0BJ

T: 01603 298076 | 01473 353519 | **E**: info@geosphere-environmental.co.uk | **W**: geosphere-environmental.co.uk



Residential Use Area = 7.8ha
ICP SUDS QBAR Greenfield Runoff Rate = 22.2 l/s
Estimated Impermeable area (at 55%) = 4.3ha

Estimated Attenuation volume (based on the above and 2013 FEH 1 in 100 year + 40%CC rainfall data) = 3767m^3 to 4884m^3

Residential Use Area = 6.4ha
ICP SUDS QBAR Greenfield Runoff Rate = 18.2 l/s
Estimated Impermeable area (at 55%) = 3.5ha

Estimated Attenuation volume (based on the above and 2013 FEH 1 in 100 year + 40%CC rainfall data) = 3060m^3 to 3971m^3

Care Use Area = 1.2ha
ICP SUDS QBAR Greenfield Runoff Rate = 3.4 l/s
Estimated Impermeable area (at 100%) = 1.2ha

Estimated Attenuation volume (based on the above and 2013 FEH 1 in 100 year + 40%CC rainfall data) = 1222m^3 to 1482m^3

Employment and Commercial Use Area = 0.8ha
ICP SUDS QBAR Greenfield Runoff Rate = 2.3 l/s
Estimated Impermeable area (at 100%) = 0.8ha

Estimated Attenuation volume (based on the above and 2013 FEH 1 in 100 year + 40%CC rainfall data) = 812m^3 to 986m^3

Retail Use Area = 1.1ha
ICP SUDS QBAR Greenfield Runoff Rate = 3.1 l/s
Estimated Impermeable area (at 100%) = 1.1ha

Estimated Attenuation volume (based on the above and 2013 FEH 1 in 100 year + 40%CC rainfall data) = 1121m^3 to 1359m^3

Total estimated Attenuation volume = 9982m^3 to 12682m^3

Using a 1.0m deep basin, the plan area of the basin(s) would cover approximately 1.27ha

Scale 1/4000

0m 40m 80m 120m 160m 200m

CHAS CONTRACTORS HEALTH & SAFETY ASSESSMENT SCHEME
ACCREDITED CONTRACTOR

Any drainage or highway work carried out prior to full technical approval from the relevant sewerage undertaker and/ or the relevant highways authority shall be at the risk of the contractor and/or client.

Rev.	Revisions	Date
-	Original Drawing.	17.02.20

Job Title

Land off Mendham Lane and Jays Green
Harleston, Norfolk

Drawing Title

Preliminary Surface Water Attenuation Calculations

Drawn By JH
Checked By
Scale 1/4000 (A3)
Date 17 February 2020

Client

SCOTT PROPERTIES

Drawing Status **Preliminary**

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Drg No. **1361/GEN/001** *Rev.*

GEOSPHERE ENVIRONMENTAL

REPORT NUMBER:	3902,EC/BAT/P1/KL,TC/21-10-19/V1
SITE:	Briar Farm, Land off Mendham Lane, Harleston, Norfolk, IP20 9DW
DATE:	21/10/2019

DOCUMENT CONTROL SHEET

Report Number:	3902,EC/BAT/P1/KL,TC/21-10-19/V1
Client:	M Scott Properties Ltd
Project Name:	Briar Farm, Land off Mendham Lane, Harleston, Norfolk, IP20 9DW
Project Number:	3950,EC
Report Type:	Bat Scoping & Activity Survey
Status:	Final
Date of Issue:	21 October 2019

Issued By:

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Confidentiality, Copyright and Reproduction:

Time limit of reliance:

Please note that the reported surveys were conducted on the date(s) stated in the report and that it represents site conditions at the time of the visit. The findings and recommended mitigation are based upon these conditions. If site conditions change materially after the site survey, the original report cannot be relied upon and will need to be updated. Bat Activity reports can typically be relied on for 12 to 24 months from the date of survey.

Prepared By:	Reviewed By:	Authorised By:
Katie Linehan	Tom Cox	Tom Powling
Technical Director for Ecology	Ecologist	Director

REVISION RECORD

Revision	Date	Revision Details	Prepared By:	Admin

Non-Technical Executive Summary

Report Description		This report has been prepared by Geosphere Environmental Limited for M Scott Properties Ltd and relates to the proposed residential development of the site at Briar Farm, Land off Mendham Lane, Harleston, Norfolk, IP20 9DW. This report includes an external bat scoping survey of the buildings within the survey area, a climbing survey of trees with bat roost potential as well as the results of emergence/re-entry surveys on four buildings and three transect surveys to assess foraging use.
Background Information		Habitats including hedgerows and semi-improved grassland field margins were confirmed suitable for foraging bats within the Extended Phase 1 Habitat Survey dated December 2018 (ref. **R.1**).
Summary of Main Findings		No bats were confirmed roosting within building B1, B2, B3 or B7, during the emergence/re-entry surveys. The majority of the forging and commuting activity was predominantly recorded within the southern section of the proposed development works, although bats were also found to be using the northern section of the boundary. Low numbers of Common Pipistrelle were recorded on all survey visits, with Soprano Pipistrelle and Noctule recorded on one survey each. Within the static detector survey, Common Pipistrelle and Soprano Pipistrelle were frequently noted, with Noctule and Brown Long-eared rarely noted. Bats were noted near sunset and sunrise where the static detector was installed, and as such it is likely that the roosts for these species are likely to be in close proximity to the detector, potentially within the trees classified with bat roost potential within the preliminary walkover. The tree climbing survey found that T51, T52, T46 and G16.6 have features which display a high risk of bat roost potential. G16.10 has features which are considered moderate risk and T45 and G16.11, show a low risk of bat roost potential. The species assemblage and numbers observed are considered to be of local importance only.
Ecological Constraints		The constraints to development will be the removal of habitats considered suitable for protected species, including trees and hedgerows suitable for foraging bats. Some trees have roost features considered suitable for roosting bats.
Avoidance measures & Timings of		Mature trees and hedgerows should be retained in the final development. Trees should be protected in line with BS 5837 2012: Trees in Relation to Design,

Works to reduce impact		Demolition and Construction. Any hedgerow or trees to be removed should be replaced elsewhere onsite. The mature trees along the field boundaries as well as T45 and T46, have features suitable to support a bat roost and should be retained and protected during the proposed development works. If the mature trees are to impacted by the development either through light pollution or pruning then further surveys may be required. Lighting overspill on the boundary trees, hedgerows and areas of suitable foraging habitats should be avoided during construction and within the final development, to maintain this habitat as suitable for foraging and commuting.
Compensation and Enhancement Opportunities		Bat boxes or bat bricks should be incorporated into the scheme. Boxes should be placed close to hedgerows and tree lines that bats are expected to fly along, be positioned at least 4m or 5m above the ground on trees, and sheltered from strong winds and exposed to the sun for part of the day, (usually facing south to south west). In addition, bat bricks could easily be incorporated in to the final building design. Planting within public open space areas and residential gardens should utilise species considered beneficial to wildlife such as Common Hawthorn, Ivy, Lavender, Rosemary, Thyme, Ox-eye Daisy, Red Campion and Primrose. Planting night scented flowers including Jasmine and Honeysuckle would also be beneficial to foraging bats.
Conclusions		Activity surveys were not undertaken on the mature trees onsite, as it is unclear whether they are to be affected by the proposed development. Tree protection measures will be adequate in protecting these trees during development works, should roosts be present. Should the mature trees located onsite require any remedial works or removal, bat activity surveys will be required prior to removal. The recommendations within section 5 of this report should be adhered, to reduce the impact on protected species.

CONTENTS

CONTENTS

TABLES

1. INTRODUCTION

This report has been prepared by Geosphere Environmental Limited for M Scott Properties Ltd and relates to the proposed residential development of the site at Briar Farm, Land off Mendham Lane, Harleston, Norfolk, IP20 9DW. This report includes an external bat scoping survey of the buildings within the survey area, a climbing survey of trees with bat roost potential as well as the results of emergence/re-entry surveys on four buildings and three transect surveys to assess foraging.

Any limitations and conditions pertaining to the report are stated within Appendix 1, with a full list of technical references provided within Appendix 2.

The report relates to the proposed development of the site, at present a finalised development plan is not available for the scheme however, the development is expected to fall within the survey area as shown in figure 1 below:

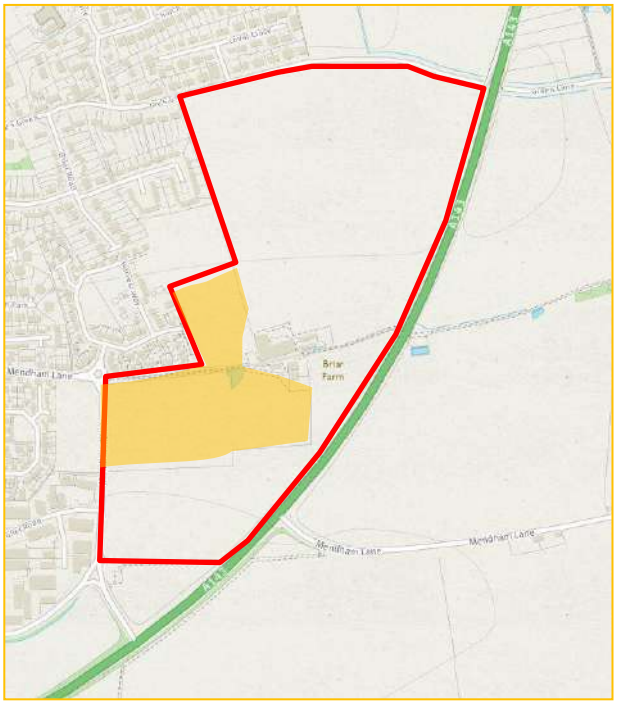


Figure 1 – The 27 ha Survey Area is outlined in red with the likely development zone highlighted orange

1.1 Background Information

Habitats including hedgerows and semi-improved grassland field margins were confirmed suitable for foraging bats within the Extended Phase 1 Habitat Survey dated December 2018 (ref **R.1**). Immediately outside of the development zone four buildings referenced B1, B2, B3 or B7 were deemed to have potential bat roost features. The building locations are shown in on Drawing ref. 3902,EC/009/Rev0 in Appendix 3. A tree survey has also been undertaken on site (ref. **R.2**).

1.2 Aims

The purpose of the survey is to determine bat presence/absence within buildings in the development zone of influence and to determine the use of the site and wider area by foraging bats.

2. LEGISLATIVE AND POLICY CONTEXT

2.1 Current UK Legislation

Within England and Wales, bats are protected under The Wildlife and Countryside Act 1981 (as amended) and The Conservation of Habitats and Species Regulations 2017. This legislation makes it illegal to kill or disturb any bats, or to damage, destroy or block access to a place of shelter.

Seven species of bat are listed as species of principle importance under section 41 of the Natural Environment and Rural Communities Act 2006. All public bodies, including local authorities, are obligated to consider whether their activities can contribute to the protection of wildlife, with reference to species of principle importance.

The reader is referred to the original legislation for definitive interpretation.

2.2 Planning Policy

The recommendations of this report are in line with the key principles of the Ministry of Housing, Communities and Local Government (MHCLG) (July 2018) National Planning Policy Framework (NPPF) (ref.**R.3**) and Government Circular 05/06: Biodiversity and Geological Conservation – (ref.**R.4**).

Local planning policies relating to ecology are invariably based upon the conservation of species protected under the above legislation, including species and habitats of principal importance listed under Section 41 of the NERC Act 2006; and the protection of designated sites.

All of these features are considered within the scope of this Preliminary Ecological Appraisal and therefore any recommendations made herein, are likely to be in line with this policy.

3. METHODOLOGY

3.1 TECHNICAL APPROACH

All surveys have been undertaken in accordance with Bat Conservation Trust (BCT), JNCC and Natural England guidelines (refs.**R.5 R.6** and **R.7** respectively). Works are undertaken following the principles of the Ministry of Housing, Communities and Local Government (MHCLG) (July 2018) National Planning Policy Framework (NPPF) (ref.**R.3**).

3.2 Personnel

The bat scoping survey has been undertaken by James Booty BSc (Hons) Grad CIEEM (Natural England Level 2 Bat Class Survey Licence no. 2015-11511-CLS-CLS; Natural England Barn Owl Survey Licence no. CL29/00370). Buildings B1, B3 and B7, were not accessed internally.

Roost emergence/return surveys and transect surveys were undertaken by James Booty (Senior Ecologist), Richard Fenna (Senior Ecological and Arboricultural Consultant), Tom Cox (Ecologist), George Green (Graduate Ecologist), Louisa Theeman (Graduate Ecologist), Joe Glenwright (Assistant), George Hood (Assistant Ecologist) and Paul Davies (Director) all of Geosphere Environmental Ltd.

3.3 Bat Scoping Survey

3.3.1 External Inspection of Buildings

A visual inspection of the buildings was undertaken to identify the suitability of the building to provide potential roost space for bats. In particular, potential access points and evidence of bats were searched for. This was carried out in full day light with the aid of binoculars, endoscope, torch and ladders to identify the following features:

- Age and structure of the building;
- Condition of the roof noting any missing, dislodged or lifted tiles that would provide entry;
- Condition of the walls, doors and windows that may provide entry;
- Windowsills, walls and sheltered areas are searched for bat droppings;
- Grease marks, scratch marks and urine staining around possible entry points.

3.3.2 Internal Inspection of Buildings

This section of the survey focuses on identifying features or areas which provide the correct environmental conditions for roosting bats and the evidence of bat activity. These include:

- Identifying dark, warm undisturbed areas normally in the roof space such as, joins in traditional roof joists and beams, behind the ridge beam or roofing felt and any cracks or crevices in the bricks or stone work that could be utilised as a roost site;
- The walls, floor and any flat areas such as on top of beams were examined for bat droppings, feeding remains and bat corpses.

3.3.3 Climbing Inspection of Trees

All established trees that could be accessed within the survey area were inspected and assessed in terms of their suitability (negligible, low, moderate or high) to support roosting bats, in line with the Bat Conservation Trust (BCT) survey guidelines (ref.**R.5**).

Trees that were flagged as having bat roost potential during the Extended Phase 1 Habitat Survey underwent a preliminary ground level roost assessment where a detailed inspection of the of the tree was carried out to identify any features bats could use for roosting and whether or not these features would need further inspection via climbing.

Features that were identified as needing further inspection were accessed via rope and harness or ladders by an experienced climber. The detailed internal inspection was carried out using torches, mirrors and an endoscope to record the dimensions of the feature, its level of protection from the elements and to look for signs of bats.

The weather was checked before any climbing took place to ensure that it would be dry and calm.

3.4 Roost Activity Surveys

To ensure all aspects that were highlighted as having roost potential were observed during the survey, two surveys observed each structure from a fixed point. The locations of the surveyors during building emergence/re-entry surveys are shown on Drawing ref. 3902,EC/009/Rev0 in Appendix 3. An infrared (IR) camcorder (supported by two IR floodlights) was deployed within the survey effort and focused on key features on the buildings.

Dusk Emergence Surveys commenced approximately a quarter of an hour before sunset and conclude approximately two hours later, to ensure that all species of bats are afforded time to egress form the roost. Dawn re-entry surveys commence approximately 1 hour and 45 minutes before dawn to a quarter of an hour after sunrise, to ensures that all species of bats are afforded time to return to their roost. All surveys are undertaken for a total of two hours each, unless otherwise specified.

Building B1, B3 and B7, were deemed to have low potential therefore one dusk survey was undertaken on each build. Building B2, was considered high potential, therefore three surveys were undertaken comprising two dusk and one dawn survey.

Surveys were undertaken between 20 June 2019 and 30 August 2019. Specific timings of surveys, and a record of the weather during the surveys are included in Appendix 4.

3.5 Transect Survey

Areas of potential foraging habitat and commuting routes were identified based upon the results of the extended Phase One Habitat Survey, and a review of aerial photography and OS maps of the site. The

route of the transect, and stopping points were then plotted as shown on Drawing ref. 3902,EC/002/Rev0 in Appendix 3. The likely development area and associated wider area were surveyed within both orange and blue transect routes, with blue stopping points 1 and 2, and orange stopping points 1,2 and 3 located within the likely development boundary. The blue stopping points 3,4,5,6 and 7, and the orange stopping points 4,5,6 and 7 were located within the wider area. The stopping points were located within the proximity of features considered to have potential to be utilised for foraging or commuting purposes. The transect route was reversed every second visit in line with best practice. During the surveys, all visual and audio observations of bat activity were recorded.

In total three transect surveys were undertaken between 16 May and 08 August 2019, comprising of dusk surveys only. The Dusk surveys commenced at sunset and concluded two hours after sunset. The specific times the surveys were undertaken, and a record of the weather during the surveys are included in Appendix 4.

3.6 Static Detector Surveys

The detector was placed in or beside a corridor used by bats for foraging or commuting purposes, as shown on Drawing ref. 3902,EC/002/Rev0 in Appendix 3.

Static detectors were deployed within the survey area on three occasions, between May and September 2019. The detector ran for a minimum of five consecutive nights on each occasion, totalling 15 nights.

3.7 Equipment

Equipment used included Wildlife Acoustics Echo Meter Touch 2 Pro detectors with Amazon Kindle Fire HD tablets, Anabat Express static passive monitoring detectors and an infra-red camcorder supported by two infra-red floodlights. All recorded bat echolocations were analysed using AnalookW and Kaleidoscope software as necessary. Video footage was played back to determine numbers, locations and species of bats emerging from roost (if any).

3.8 Ecological Impact Assessment

The ecological evaluation and impact assessment detailed below is based upon CIEEM Guidelines for Ecological Impact Assessment in the United Kingdom, (ref.**R.8**).

CIEEM Guidelines state that the value or potential value of an ecological resource or feature should be determined within a defined geographical context from an international to site scale as follows in Table 1 overleaf:

Table 1 - Assessment of Conservation Value of Bat Species	
Geographical Frame of Reference	**Brief Description**
International	• A species which is part of the cited interest of a SAC; • A species which regularly occurs in internationally or nationally important numbers. (>1% of international population).
National	• A species which is part of the cited interest of a SSSI onsite or with direct habitat connectivity with the site; • A nationally important population of a European species/ s41 NERC species of principal importance.
Regional	• species listed as principal importance under s41 NERC, which are not covered above, and which regularly occurs in regionally important numbers in a feature such as a woodland, hibernation roost or maternity roost.
County	• species listed as principal importance under s41 NERC, which regularly occurs in county important numbers in a feature such as a woodland, hibernation roost or maternity roost; • Habitats which support sustainable populations of a species that is rare or scarce within a county.
District	• Sustainable populations of a species that is rare or scarce within the locality/listed on the local BAP; • Good quality foraging habitat (e.g. woodland) with good linkages to the wider environment supporting diverse assemblages of commonly encountered bat species; • A significant roost (such as large maternity) for regularly occurring species.
Local	• Good quality foraging habitat with linkages to the wider environment; • Areas of habitat with medium or high potential to be utilised as a roost site by commonly encountered species in relatively low numbers.
Site	• Low populations of common species utilising areas of the site for foraging or commuting purposes; • Summer roost with few individual common bats.

4. FIELD SURVEY RESULTS AND DISCUSSION

4.1 Site Specific Limitations

Buildings B1, B3 and B7, were not accessed internally.

4.2 Bat Scoping Survey

4.2.1 Buildings

Building B1, is a residential property with an apex roof and interlocking tiles. The tiles, chimney edging, bricks and windows are all in good condition with no observable external features. Given that the internal roof space could not be accessed, this building is considered to have low potential for roosting bats based upon external features present.

Building B2, is an L-shaped building with solid brick walls. The western half of the building has corrugated sheet roofing and the eastern half has interlocking tiles. There are multiple access/egress points within the tiled roof, brick walls and in the wooden eaves. Based upon the external inspection, this building is considered to be of high suitability for roosting bats.

Building B3, is separated into an older open wooden garage, and concrete, flat roof garages fitted with doors. No gaps were noted within the walls or flat roof of the concrete garages. Although the older garage is partially open to the elements and light, there are multiple cracked and broken tiles within the roof. Given that the tiles are not backed by another material they offer limited potential for a small number of bats and therefore Building B3, is considered to be of low potential for roosting bats.

Building B4, is a metal framed farm building with asbestos sheet roofing and walls. This building is a lean to, used for storing machinery and hay, and is open to the elements. This building is not considered suitable for roosting bats.

Buildings B5, and B6, are also large metal framed farm buildings with good condition asbestos roofing and walls. These buildings are not considered to be suitable for roosting bats.

Building B7, has solid brick walls with an apex roof made of asbestos tiles and sheets. Small cracks within the brick walls and a slight gap in the sheeting were noted. Based upon these external features this building is considered to have low potential for roosting bats.

Building B8, has an asbestos roof and asbestos cladding walls. No external gaps or features were noted on this building and therefore it is not considered suitable for roosting bats.

Selected photos of the scoping survey are included in Appendix 5.

4.2.2 Trees

The preliminary roost assessment of the established trees within the survey area identified 12 trees of low or higher suitability to support roosting bats. The location of these trees is shown on Drawing ref. 3902,EC/007/Rev0, attached in Appendix 3. Selected photos of the scoping survey are included in Appendix 5 and details of the potential roost features identified in these trees and their suitability are provided in Table 2 below. The tree reference numbers are from the Arboricultural Report (ref. **R.2**):

Table 2 – Bat Roost Suitability of Trees

Ref. no.	Species	Potential Roost Feature	Bat Roost Suitability
G16.2	Ash	Old pruning wound/cavity 7m high, entrance dimensions: 20mm height, 300mm wide. Internal dimensions: 150mm deep. Features were discounted after climbing.	Negligible
G16.6	Oak	South facing crack 9m high, entrance dimensions: 500 height 20mm wide. Internal dimensions: 1.5m height, 200mm wide and 200mm deep.	High risk
G16.10	Oak	Failed limb caused crack/ cavity 3.5m high, entrance dimensions: 400mm height 20mm wide. Internal dimensions: 500mm height, 100mm wide and 300mm deep.	Moderate risk
G16.11	Ash	Old wound partially occluded with cavity, south facing, 7m high, entrance dimensions: 40mm height, 40mm wide. Internal dimensions 150mm height, 100mm wide and 100mm deep.	Low risk
T45	Oak	Lifted bark on western aspect.	Low risk
T46	Oak	Old wound partially occluded with crack, east facing 12m high, 1m long and 200mm wide.	High risk
T51	Oak	Lots of high deadwood with features retain if possible.	High risk
T52	Oak	Lots of high deadwood with features, retain if possible.	High risk
G16.12 – G16.15	Oak	Features were discounted after climbing.	Negligible

4.3 Roost Emergence/Return Survey

No bats were noted entering or egressing from any of the buildings surveyed. Common Pipistrelle, Noctule, Soprano Pipistrelle, and Daubenton were noted within the area during the activity surveys on the buildings.

4.4 Transect Survey

Two transects were undertaken, shown as blue and orange on Drawing ref. 3902,EC/002/Rev0 in Appendix 3. The results of the transect survey are shown on Drawing ref. 3902,EC/008/Rev0 within Appendix 3 and are summarised below.

4.4.1 Survey 1 (16/05/2019 dusk at 19:50pm)

Likely Development Area: No records of bats were recorded within the likely development boundary of the blue transect route. Records of bats recorded within the likely development boundary of the orange transect route, included individual passes of Common Pipistrelle (between 21:12 and 22:25, at stopping points 1 and 3). Most activity was recorded along the northern section of the southern field within the likely development boundary.

Wider Survey Area: Findings within the wider area of the blue transect route, included individual passes of Noctule (between 21:09 and 21:48, at stopping points 4,5 and 6). Evidence of bats within the wider area included Common Pipistrelle (between 21:45 and 22:01, at stopping points 6 and 7).

4.4.2 Survey 2 (27/06/2019 dusk at 21:06pm),

Likely Development Area: Records of bat passes within the likely development boundary of the blue transect route, included individual passes of Common Pipistrelle (single pass at 22:55, at stopping point 2) and Soprano Pipistrelle (single pass at 22:58, at stopping point 2). Records of bat recorded within the likely development boundary of the orange transect route, included Common Pipistrelle (between 22:49 and 23:13, at stopping points 1,2 and 3) and Soprano Pipistrelle (single pass at 22:54, at stopping point 2). A maximum count of two Common Pipistrelle was noted around the pond within the southern section of the development boundary.

Wider Survey Area: Findings within the wider area of the blue transect route included individual records of Common Pipistrelle (between 21:27 and 23:06, at stopping points 3,5,6 and 7) and Noctule (between 21:27 and 22:48, at stopping points 3 and 7). Evidence of bats within the wider area included Common Pipistrelle (between 22:18 and 22:43, at stopping points 6 and 7).

4.4.3 Survey 3 (08/08/2019 dusk at 20:35pm),

Likely Development Area: Records of bat passes within the likely development boundary of the blue transect route, included individual passes of Noctule (between 21:02 and 21:23, at stopping points 1 and 2) and Common Pipistrelle (single pass at 21:18, at stopping point 2). The majority of the activity seen was along the eastern and southern section of the northern field within the likely development area. Records of bat recorded within the likely development boundary of the orange transect route, included Noctule (between 21:03 and 22:20, at stopping point 3).

Wider Survey Area: Findings within the area of the blue transect route included individual records of Common Pipistrelle (between 21:49 and 22:31, at stopping points 4,5,6 and 7), Noctule (between 20:38

and 22:28, at stopping points 4,5,6 and 7) and Soprano Pipistrelle (between 21:30 and 22:21, at stopping points 3 and 7). Within the orange transect, evidence of bats within the wider area included Common Pipistrelle (between 21:25 and 22:05, at stopping points 5,6 and 7).

4.5 Static Detector Survey

Common Pipistrelle and Soprano Pipistrelle were frequently noted, with Noctule and Brown Long-eared rarely noted. Bats were noted near sunset and sunrise where the static detector was installed, and as such it is likely that the roosts for these species are likely to be in close proximity to the detector. As such, bats are considered likely to be roosting within the local area.

4.6 Conservation Status of Bats

The conservation status of the species noted onsite are shown in Table 3 below:

Table 3 - Conservation status of bat species noted onsite

Common Name	Conservation Status
Common Pipistrelle	Hab Regs Sch 2, WCA sec 9.
Soprano Pipistrelle	Hab Regs Sch 2, WCA sec 9, NERC S41, UKBAP.
Noctule	Hab Regs Sch 2, WCA sec 9, NERC S41, UKBAP.
Daubenton	Hab Regs Sch 2, WCA sec 9.
Brown Long-eared	Hab Regs Sch 2, WCA sec 9, NERC S41, UKBAP.

4.7 Assessment of Ecological value

The ecological value of the site for bats has been measured using two separate approaches: conservation status of species and nature conservation value of habitats.

Bats are using the site to commute and forage, primarily along the hedgerows and scattered trees throughout the site. These habitats provide connectivity into the wider landscape. The main species found to be using the site are Common Pipistrelle, although Soprano Pipistrelle and Noctule were found to be using the site.

The mature trees located on the site offer potential roosting opportunities, with habitat links to the wider area. Roost surveys were not undertaken on individual trees however, as bats were recorded at sunset and close to sunrise, this suggests that bats are likely to be roosting on or in close proximity to the site. These habitats present, offer important roosting and foraging habitat opportunities for bats within the local area.

5. ECOLOGICAL CONSTRAINTS AND RECOMMENDATIONS FOR MITIGATION AND ENHANCEMENT OPPORTUNITIES

5.1 Roosts

Although no roosts were confirmed within the buildings, foraging activity has been noted in proximity to the buildings. As such, should these buildings required demolition as part of the proposed development, a soft strip of the buildings should be undertaken under supervision of a licenced ecologist to ensure that care and vigilance is exercised by site contractors during these works.

The mature trees along the field boundaries as well as T45 and T46, have features suitable to support a bat roost and should be retained and protected during the proposed development works. If the mature trees are to impacted by the development either through light pollution or pruning then further surveys may be required.

5.2 Foraging habitat

It is recommended to retain as much bat foraging habitat as possible in the final development. This should include the retention of the hedgerows and tree lines along the boundaries, to allow bats to continue to utilise these habitats for foraging.

The trees to be retained should be protected in line with BS 5837 2012- Trees in Relation to Design, Demolition and Construction (ref.**R.9**). The tree protection measures, (barrier fencing etc), should provide a suitable buffer during the construction phase, to avoid direct impact upon these trees during construction.

Any hedgerow or trees to be removed should be replaced elsewhere onsite, with shrub and tree species considered beneficial to wildlife. If sections of hedgerow need to be removed, then it is recommended that a native tree is planted at either end of the severed section. In time, these will help to reduce the gap via the canopy and maintain the continuity of the corridor, which is particularly important for commuting bats.

5.3 Lighting during Construction

During the construction phase, lighting should be directed away from the boundary features and areas of suitable foraging, to ensure light does not obstruct bat flight paths. It would be best practice to have all lighting turned off overnight, to avoid disturbance to foraging and commuting bats.

5.4 Lighting within Final Development

Any new lighting, which may be installed as part of the proposed development should be designed, to avoid excessive light pollution which may disturb bats using commuting and foraging habitats across the site. Specifically, it is recommended that the foraging habitat along the boundaries of the site and in the eastern half of the site remains unlit at night, and that no light pollution from the proposed development overspills onto this habitat.

Excess lighting can act as a barrier to bats, potentially restricting their access to foraging areas. Any public lighting to be included within the proposed development, should ideally comprise of low-pressure sodium lights or alternatively high-pressure sodium lights with UV filters and louvers.

Below are broad examples of what could be considered regarding lighting for the scheme to reduce impact:

- Power: It is rarely necessary to use a lamp of greater than 2000 lumens, (150 W), in security lights. The use of a higher power is not as effective for the intended function and will be more disturbing for bats;
- Lighting columns for pedestrianised areas: The height of lighting columns in general should be as short as is possible, as light at a low level reduces the ecological impact. However, there are cases where a taller column will enable light to be directed downwards at a more acute angle and thereby reduce horizontal spill. For pedestrian lighting this can take the form of low-level lighting that is as directional as possible and below 3 lux at ground level;
- Movement sensors for external lights on properties: Many residential security lights fitted within rear gardens are fitted with movement sensors which, if well installed and aimed, will reduce the amount of time a light is on each night. This is more easily achieved in a system where the light unit and the movement sensor are able to be separately aimed;
- Timers: If the light is fitted with a timer this should be adjusted to the minimum to reduce the amount of 'lit time'. This could be considered on street lights;
- Aim of light: The light should be aimed to illuminate only the immediate area required by using as sharp a downward angle as possible. A shield or hood can be used to control or restrict the area to be lit. Avoid illuminating at a wider angle as this will be more disturbing to foraging and commuting bats.

5.5 Biodiversity Enhancements

Bat boxes or bat bricks should be incorporated in to the scheme. Boxes should be placed close to hedgerows and tree lines that bats are expected to fly along, be positioned at least 4m to 5m above the ground and sheltered from strong winds and exposed to the sun for part of the day, (usually orientated south to south west). In addition, bat bricks could be incorporated in to the final building design. Example bat boxes are included within Appendix 6.

Planting within public open space areas and residential gardens should utilise species considered beneficial to wildlife such as Wild Cherry, Rowan, Common Hawthorn, Ivy, Lavender, Rosemary, Thyme, Ox-eye Daisy, Red Campion and Primrose. Planting night scented flowers including Jasmine and Honeysuckle would also be beneficial to foraging bats. Example species are included within Appendix 7.

6. CONCLUSIONS

The majority of the forging and commuting activity was predominantly recorded within the southern section of the likely development boundary, although bats were also found to be using the northern section of the boundary. Low numbers of Common Pipistrelle were recorded on all survey visits, with Soprano Pipistrelle and Noctule recorded on one survey each.

Within the static detector survey, Common Pipistrelle and Soprano Pipistrelle were frequently noted, with Noctule and Brown Long-eared rarely noted. Bats were noted near sunset and sunrise where the static detector was installed, and as such it is likely that the roosts for these species are likely to be in close proximity to the detector, potentially within the trees classified with bat roost potential within the preliminary walkover.

Bat activity was recorded throughout almost all manual and static surveys, suggesting that the hedgerows are being used for foraging as well as commuting. The bat foraging commuting is restricted to the hedgerows and scattered trees along the boundaries of the parcels of land.

The species assemblage and numbers observed are considered to be of local importance only.

The hedgerows and trees are considered important for foraging and commuting and as such, should be retained where possible.

Although bats may utilise the site for commuting and foraging purposes, based upon the results of this bat detector survey, they are not utilising the buildings surveyed to roost. Therefore, demolition of the buildings (if required) will not adversely affect the local bat population.

The mature trees along the field boundaries as well as T45 and T46, have features suitable to support a bat roost and should be retained and protected during the proposed development works. If the mature trees are to impacted by the development either through light pollution or pruning then further surveys may be required.

The recommendations within section 5 of this report should be adhered, to reduce the impact on protected species.

APPENDICES

Appendix 1 – Report Limitations and Conditions

General Limitations and Exceptions

This report was prepared solely for our Client for the stated purposes only and is not intended to be relied on by any other party or for any other use. No extended duty of care to any third party is implied or offered.

Geosphere Environmental Ltd does not purport to provide specialist legal advice.

The Executive Summary, Conclusions and Recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon until considered in the context of the whole report.

Interpretations and recommendations contained in the report represent our professional opinions, which were arrived at in accordance with currently accepted industry practices at the time of reporting and based upon current legislation in force at that time.

Ecology Limitations and Exceptions

Any limitations associated with the report will be stated. The consequences of any limitations, findings and/or recommendations in the report are made clear in line with CIEEM (2013) 'Guidelines for Preliminary Ecological Appraisal' (GPEA) and BSI (2013) BS 42020:2013 Biodiversity – 'Code of practice for planning and development'.

This report is prepared and written in the context of the proposals stated in the introduction to this report and should not be used in a differing context.

The wildlife and habitats present on any site are subject to change over time. Surveys of this kind can have limited validity, with the possibility of behaviour patterns and territory boundaries varying over time, due to the dynamics of adjacent populations.

New information, improved practices and legislation may necessitate an alteration to the report in whole or in part after its submission. Therefore, with any change in circumstances or after the expiry of one year from the date of the report, the report should be referred to us for re-assessment and, if necessary, re-appraisal.

It should be noted that whilst every effort has been made to provide a comprehensive description of the site, no investigation can ensure the complete characterisation of the natural environment.

The scoping survey does not assess the presence or absence of a species, but is used to assess the potential for habitat to support them. Additional surveys may be recommended if, on the basis of the preliminary assessment or during subsequent surveys, it is considered reasonably likely that protected species may be present.

This survey does not constitute an invasive species survey and should not be treated as such.

Owing to seasonal variances and prevailing weather, conditions may sometimes be sub-optimal for surveying and this may delay or disrupt planned survey programmes. If applicable, full details are given in the report.

Geosphere Environmental Ltd may not be aware of information that could be held by other organisations or individuals, and it is always possible for features of nature conservation interest to be unrecorded during surveys.

Scientific survey data will be shared with local biological records centre in accordance with the CIEEM professional code of conduct.

Appendix 2 – References

R.1. Preliminary Ecological Appraisal, Geosphere Environmental, 3495,EC,AR,DS/PEA/ZK,RF,KL/13-12-18/V2

R.2. Arboricultural Survey Report, Geosphere Environmental, 3902,EC/ARB/RF,KL/28.06.19/V1

R.3. Ministry of Housing, Communities and Local Government (MHCLG) (July 2018) National Planning Policy Framework (NPPF).

R.4. ODPM (2005) Government Circular: Biodiversity and Geological Conservation – statutory obligations and their impact within the planning system.

R.5. BCT (2016). 'Bat Surveys – Good Practice Guidelines' Bat Conservation Trust, London, 3rd edition.

R.6. JNCC (2004). 'Bat Workers Manual' 3rd edition. Joint Nature Conservation Committee, Peterborough.

R.7. English Nature (2004) Bat mitigation guidelines.

R.8. CIEEM, (2016). Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland (Second edition dated January 2016).

R.9. BS 5837: (2012), 'Trees in Relation to Design, Demolition and Construction'.

Appendix 3 – Drawings

Bat Transect Plan - 3902,EC/002/Rev0

Bat Activity Plan - Drawing ref. 3902,EC/008/Rev0

Roost Survey Plan – Drawing ref. 3902,EC/009/Rev0

Tree Constraints Plan – Drawing ref. 3902,EC/007/Rev0

GEOSPHERE ENVIRONMENTAL

LEGEND

- Survey Area
- Transect A & Stopping Points
- Transect B & Stopping Points
- Static Location

N

SOURCE

©googlemaps

PROJECT

Briar Farm, Land off Mendham Lane, Harleston, Norfolk, IP20 9DW

TITLE

Bat Transect Plan

DRAWING NUMBER

3902,EC/002/Rev0

SCALE	DATE
As marked	16/05/2019
DRAWN BY	**CHECKED BY**
LT	JB

GEOSPHERE ENVIRONMENTAL

LEGEND

- Site Boundary
- May Activity
- June Activity
- August Activity
- Static Location

SOURCE

©googlemaps

PROJECT

Briar Farm, Land off Mendham Lane, Harleston, Norfolk, IP20 9DW

TITLE

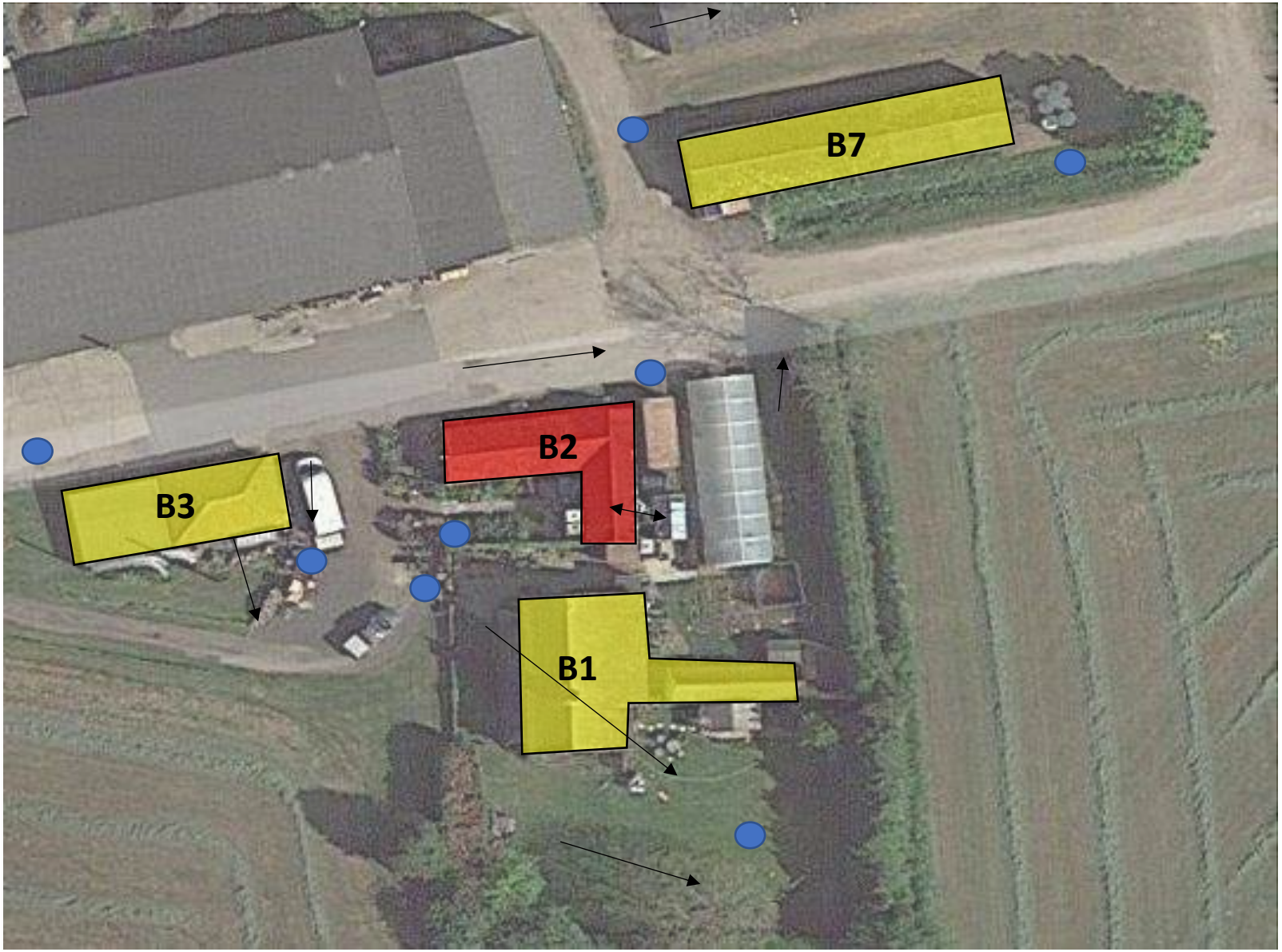
Bat Activty Plan

DRAWING NUMBER

3902,EC/008/Rev0

SCALE	DATE
As marked	20/09/2019
DRAWN BY	**CHECKED BY**
GH	KL

N



GEOSPHERE ENVIRONMENTAL

LEGEND

- Building with Low Bat Roost Potent
- Building with High Bat Roost Poten
- Surveyor Location
- Bat Passes Noted

SOURCE

© GoogleMaps

PROJECT

Briar Farm, Land off Mendham Lane, Harleston, Norfolk, IP20 9DW

TITLE

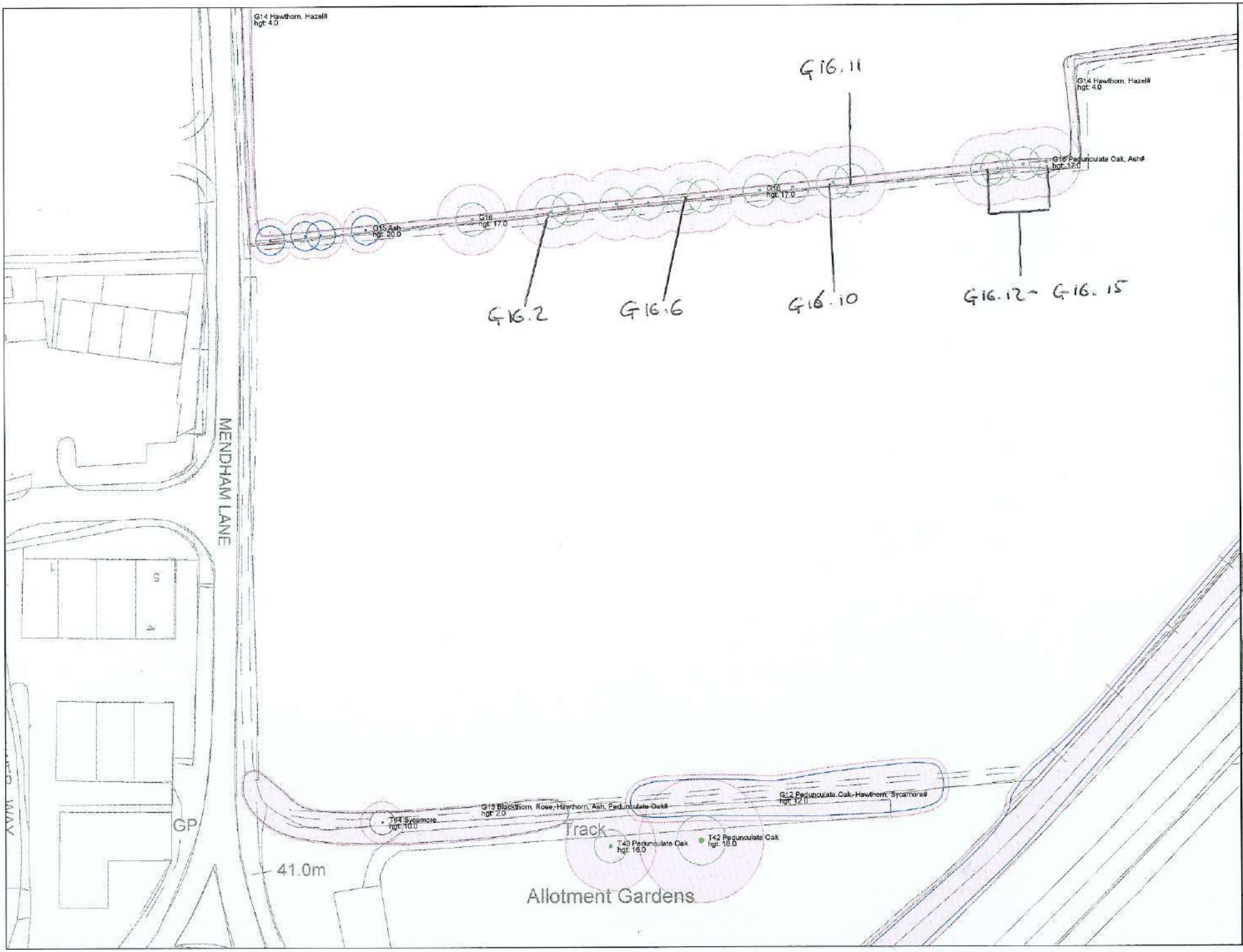
Roost Survey Plan

DRAWING NUMBER

3902,EC/009/Rev0

SCALE	DATE
As marked	02/10/2019
DRAWN BY	**CHECKED BY**
GG	KL

N



REV | DATE | DESCRIPTION

LEGEND

- Category U
- Category A
  Trees of high quality
- Category B
  Trees of moderate quality
- Category C
  Trees of low quality
- RPA using formula in accordance with BS5837:2012

# denotes estimated values due to lack of access

Trees categorised in accordance with BS5837:2012 "Trees in relation to design, demolition and construction – Recommendations"

The original of this drawing was produced in colour – a monochrome copy should not be relied upon

PROJECT
Briar Farm, Land Off Mendham Lane, Harleston, Norfolk, IP20 9DW

TITLE
Tree Constraints Plan

DRAWING NUMBER
5902,EC/007-7/Rev0

CLIENT
M Scott Properties Ltd

SCALE 1:400 @ A1 DATE 17/06/19

GEO

Appendix 4 – Roost & Transect Survey Timings & Weather

BAT ACTIVITY SURVEYS - WEATHER RECORDS

Project Number: 3902,EC **Date:** 21/10/2019

Project Name: Briar Farm, Land off Mendham Lane, Harleston, Norfolk, IP20 9DW

Surveyor Names:		James Booty, Richard Fenna, Tom Cox, George Green, George Hood, Paul Davies, Louisa Theeman, Joe Glenwright							
Date	**Building (B) Number or Transect (T)**	**Time**		**Ambient Temp (°C)**		**Time of Sun Set**	**Wind Speed* (Beaufort)**	**Cloud Cover (%)**	**General Weather Observation**
		Start	**End**	**Start**	**End**				
16/05/2019	T1	20:30	22:30	12	9	20:30	1	15	Dry
20/06/2019	B7	21:05	23:20	15	12	21:20	0	20	Dry
24/06/2019	B2/B3	21:05	23:20	19	15	21:20	0	100	Dry
27/06/2019	T2	21:06	23:21	14	12	21:21	1	25	Dry
23/07/2019	B1/B2	20:46	23:01	22	19	21:01	0	20	Dry
08/08/2019	T3	20:35	22:35	19	18	20:35	1	20	Dry
30/08/2019	B2	04:02	6:17	16	14	06:02	2	20	Dry

***Beaufort Scale**

Beaufort Scale		**Wind Speed (mph)**	**Beaufort Scale**		**Wind Speed (mph)**
0	Calm	0 -1	**4**	Moderate breeze	13 - 17
1	Light air	1 - 3	**5**	Fresh breeze	18 - 24
2	Light breeze	4 - 7	**6**	Strong breeze	25 - 30
3	Gentle breeze	8 - 12	**7**	Near gale	31 - 38

Appendix 5 – Selected Bat Scoping Photos

Photograph 1

Photograph 2

Photograph 3

Photograph 4

GEOSPHERE ENVIRONMENTAL

DESCRIPTION

Photograph 1

Building 1 (Low Bat Roost Potential), showing the eastern aspect of the build, with additional extension included within categorisation.

Photograph 2

Building 1 (Low Bat Roost Potential), showing the western aspect of the build and its construction.

Photograph 3

Building 2 (High Bat Roost Potential), the southern aspect of the L-shaped build, with evidence of cracked tiling and potential access points for roosting bats.

Photograph 4

Building 2 (High Bat Roost Potential), the northern aspect of the L-shaped build, with evidence of potential access points through tiling and brickwork.

PROJECT

Briar Farm, Land off Mendham Lane, Harleston, Norfolk, IP20 9DW

PROJECT NUMBER

3902,EC

TITLE

Selected Bat Scoping Photographs

DATE

21/10/2019

Photograph 5

Photograph 6

Photograph 7

Photograph 8

GEOSPHERE ENVIRONMENTAL

DESCRIPTION

Photograph 5
Building 2 (High Bat Roost Potential), the northern aspect of the L-shaped build, with further evidence of gaps in the brickwork.

Photograph 6
Building 3 (Low Bat Roost Potential), with evidence of cracked and broken tiles.

Photograph 7
Detailing the location of Building 1, Building 2 and Building 3 in relation to one another.

Photograph 8
Building 7 (Low Bat Roost Potential), evidence of the construction of the build, with small gaps in the brickwork and sheeting.

PROJECT

Briar Farm, Land off Mendham Lane, Harleston, Norfolk, IP20 9DW

PROJECT NUMBER

3902,EC

TITLE

Selected Bat Scoping Photographs

DATE

21/10/2019

Appendix 6 – Example Bat Boxes & Bat Bricks

EXAMPLE BAT BRICKS AND BOXES

GEOSPHERE ENVIRONMENTAL

Integrated Bat Box: Ibstock Enclosed Bat Box 'B'

Large 215 x 290mm

SOURCE
http://www.nhbs.com/title/160551

The Ibstock Enclosed Bat Box 'B' is designed for integration into the wall of new buildings or conservation projects and is intended to provide summer roosting space for pipistrelles specifically. It provides a discrete home for bats, with several roosting chambers to provide zones of differing temperatures within the box. The bats are contained within the box itself and the entrance at the bottom allows droppings to fall out, meaning that the box is maintenance free.

Integrated Bat Box: Standard bat Box

Bat boxes can be supplied in brick fronted, half bond and quarter bond brickwork or alternatively with a stainless-steel mesh fitted to the front. The mesh is designed for optimum adhesion in render and stonework applications. A basic version can be fitted directly behind weatherboarding or into studwork.

These bat boxes are best positioned in sunlit clusters, at a height of 3-6 metres and ideally facing a variety of aspects as bats will move around a building as the seasons change.

This product makes an ideal bat house for most of the UK's bat species, including Pipistrelles, who will use it for roosting, hibernating and (in maternity roosts) bringing up their young. The entrance hole and internal design can be tailored to suit different species of bat e.g. Bechstein's and Serotine.

The box is self-cleaning. The bat boxes are supplied with a non-removable front as standard.

SOURCE
http://www.birdbrickhouses.co.uk/brick-nesting-boxes/bat-box/

TITLE
Example Bat Bricks and Boxes

DATE
21/10/2019

External Bat Box: Schwegler 1FQ bat box

The structure of the 1FQ has been designed with bat behaviour in mind. For example, the outside of the front panel has been roughened to enable the animals to land and hang onto it securely. Access is via a step-like recess which enables even young and inexperienced bats, to safely access the box. The inside of the box has rough pieces of wood incorporated which provide good insulation and are also used by the bats as perches. The internal layout provides three different areas from which bats can hang and which offer different levels of light and temperature. There are also non-slip areas, gaps ranging from 1.5 to 3.5cm in width and various places for individuals to hide.

Installation of the 1FQ is achieved using the four screws and plugs provided. The back panel is initially screwed onto the wall (using four screws) and then the front panel is attached to this. It can easily be attached to most types of external brick, timber or concrete and can also be placed inside a roof space. (If fixing to timber then the gaps between the wall and the box should be sealed with silicone to prevent moisture being trapped here). The box should be positioned a minimum of three metres above the ground and where there is a clear flight path for bats entering and leaving. If desired, the front panel can be painted to match your building using an air-permeable paint.

SOURCE
http://www.nhbs.com/title/160551

External Bat Box: 1FF Schwegler Bat Box with Built-in Wooden Rear Panel

The Schwegler 1FF bat box is spacious enough for bats to use as a summer roost or nursery site and is open at the bottom, allowing droppings to fall out so it does not need cleaning. The 1FF is, therefore, especially suitable for hanging in inaccessible places such as high in trees, or on steep slopes and house walls.

The 1FF is manufactured from long-lasting Woodcrete, which is a blend of wood, concrete and clay which will not rot, leak, crack or warp, and will last for at least 20 - 25 years, making it suitable for long-term mitigation projects.

The inner dimensions of the 1FF have a reducing width making it ideal for bat species which inhabit crevices such as pipistrelle and noctule bats. For conservation projects and studies, the entire front of the box can be easily swung open for inspection purposes.

The 1FF bat box can be sited in trees or on buildings and is best positioned at a height of between 4 to 6 metres.

SOURCE
https://www.nhbs.com/1ff-schwegler-bat-box-with-built-in-wooden-rear-panel

TITLE
Example Bat Bricks & Boxes

DATE
21/10/2019

External Bat Box: 2F Schwegler Bat Box with Double Front Panel

This box has a front panel and a second inner wooden panel fitted to it to create a cavity wall. This provides ideal quarters for bats that inhabit crevices, such as Nathusius' Pipistrelle (*Pipistrellus nathusii*), Daubenton`s Bat (*Myotis daubetonii*) and the Common Pipistrelle (*Pipistrellus pipistrellus*).

It has been designed as a summer roosting space for bats and has a simple entrance hole at the front. The Schwegler 2F double front panel is removable and can be converted in to a bird nest box using a replacement 1B front panel if there is no evidence of bat activity after a couple of years. The 2F Double Front Panel is manufactured from long-lasting Woodcrete, which is a blend of wood, concrete and clay which will not rot, leak, crack or warp, and will last for at least 20 - 25 years, making it suitable for long-term mitigation projects. Woodcrete is breathable and maintains a stable temperature inside the box and the 2F is painted black to absorb warmth. It also provides a good rough surface for bats to cling on to and climb.

The 2F Double Front Panel bat box can be sited in trees or on buildings and is best positioned at a height of between 3 to 6 metres.

SOURCE
https://www.nhbs.com/vincent-pro-bat-box

External Bat Box: Vincent Pro Bat Box

This attractive bat box has been designed by leading bat researcher, Collin Morris, based on a tried and tested design from the Vincent Wildlife Trust.

The box features three vertical chambers of different sizes, providing ideal roosting space for a variety of species. Beneath the crevice entrances is a ladder which provides a rough surface for bats to land.

Proven with seven UK species: Barbastelle, Leisler's, common pipistrelle, soprano pipistrelle, brown long-eared, Natterer's and whiskered bat.

Please note that once bats have inhabited a roost (integrated or external box) they may only be disturbed by licensed bat workers.

TITLE
Example Bat Bricks and Boxes

DATE
21/10/2019

Appendix 7 – Example Plant Species to Attract Bats

PLANTS CONSIDERED BENEFICIAL TO BATS

The lists of plants below are considered suitable species for foraging bats. When buying native plants, ensure they are from a reputable source, as many wildflowers are illegally taken from the wild.

Trees

Common Name	Latin Name	Common Name	Latin Name
Apple	*Malus domestica*	Plum	*Prunus domestica*
Bird Cherry	*Prunus padus*	Rowan	*Sorbus aucuparia*
Crab Apple	*Malus baccata*	Sugar Maple	*Acer saccharum*
Medlar	*Mespilus germanica*	Sycamore	*Acer pseudoplatanus*
Norway Maple	*Acer platanoides*	Whitebeam	*Sorbus aria*
Pear	*Pyrus communis*	Wild Cherry	*Prunus avium*

shrubs

Common Name	Latin Name	Common Name	Latin Name
Field Maple	*Acer campestre*	Butterfly Bush	*Buddleja davidii*
Hazel	*Corylus avellana*	Golden Ball Buddleia	*Buddleja globose*
Hawthorn	*Crataegus monogyna*	Hebe	*Hebe spp.*
Heather	*Erica vagans*	Privet	*Ligustrum ovalifolium*
Cherry Laurel	*Prunus laurocerasus*	Wayfaring	*Viburnum lantana*

Climbers

Common Name	Latin Name	Common Name	Latin Name
Dog Rose	*Rosa canina*	Ivy	*Hedera helix*
Guelder Rose	*Viburnum opulus*	Jasmine (night scented)	*Cestrum nocturnum*
Honeysuckle	*Lonicera periclymenum*		

Herbaceous Plants

Common Name	Latin Name	Common Name	Latin Name
Angelica	*Angelica sylvestris*	Lemon Balm	*Melissa officinalis*
Aubretia	*Aubretia deltoidea*	Marjoram	*Origanum majorana*
Candytuft	*Iberis sempervirens*	Knapweed	*Centaurea nigra*
Corn Cockle	*Agrostemma githago*	Mallow	*Malva sylvestris*
Cornflower	*Centaurea cyanus*	Ox-eye Daisy	*Leucanthemum vulgare*
Corn Marigold	*Glebionis segetum*	Primrose	*Primula vulgaris*
Borage	*Borago officinalis*	Yarrow	*Achillea millefolium*
English Marigolds	*Calendula officinalis*	Rosemary	*Rosmarinus officinalis*
Lavender	*Lavandula spp.*	Sweet Cicely	*Myrrhis odorata*
Musk Mallow	*Malva moschata*		

GEOSPHERE ENVIRONMENTAL

REFERENCES

TITLE
Plants Considered Beneficial to Bats

DATE
21/10/2019

GEOSPHERE ENVIRONMENTAL

Ec Ecology.

Fr Flood Risk.

Ge Geotechnical.

En Environmental.

Kw Knotweed.

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