GEOSPHERE ENVIRONMENTAL

REPORT NUMBER:	3709,EC/BAT/GG,KL/21-10-19/V1
SITE:	Land off Fir Covert Road, Taverham, Norfolk, NR8 6HL
DATE:	21/10/2019

DOCUMENT CONTROL SHEET

Report Number:	3709,EC/BAT/GG,KL/21-10-19/V1
Client:	M Scott Properties Limited
Project Name:	Land off Fir Covert Road, Taverham, Norfolk, NR8 6HL
Project Number:	3709,EC
Report Type:	Bat Activity Survey
Status:	Final
Date of Issue:	21 October 2019

Issued By:

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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 and Authorised By:**
George Green	Katie Linehan
Graduate Ecologist	Technical Director of Ecology

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 Limited and relates to the proposed residential development of the site at Land off Fir Covert Road, Taverham, Norfolk, NR8 6HL. The purpose of the survey is to determine the use of the site by foraging bats.
Background Information	The habitats onsite were confirmed suitable for foraging bats within the Preliminary Ecological Appraisal (PEA) undertaken by Geosphere Environmental Limited, dated December 2018, (ref. **R.1**).
Summary of Main Findings	Three Transect Surveys were undertaken between May and July 2019. This included walking a transect that included set stopping points. Two static detectors were deployed onsite on three occasions, between May and September 2019. The detectors ran for a minimum of five consecutive nights on each occasion, totalling 38 nights of monitoring in total. Common Pipistrelle and Soprano Pipistrelle were noted on all occasions, with Noctule noted on two surveys and Brown Long-eared noted on one visit. Within the Static Detector Surveys, Common Pipistrelle and Soprano Pipistrelle were frequently noted and Noctule and Brown Long-eared Bat were occasionally noted. Bats were noted near sunset at all of the locations that static detectors were installed, and as such, it is likely that the roosts for these species are likely to be near the static recorder locations. As such, suitable features onsite could be used for roosting by bats within the local area, such as trees with bat roost potential, identified within the Preliminary Ecological Appraisal. Bat activity was predominantly recorded around the area of woodland to the east of the site, although activity was recorded throughout the site.
Ecological Constraints	The constraints to development will be the removal of habitats considered suitable for protected species, including scattered trees, hedgerow and woodland that provides suitable foraging habitat for foraging bats.
Compensation and Enhancement Opportunities	Retention and enhancement of the boundary vegetation of the site, as noted within the development plan, will ensure that the foraging corridors are maintained. In addition, planting of native plants, incorporating night scented flowers that would be beneficial to bats, would also benefit the site. Bat Boxes or Bat Bricks should be incorporated within the final development of the scheme. Example Bat Boxes and Bricks are included within Appendix 5.
Conclusions	The recommendations within Section 5 of this report should be adhered to, to reduce the impact on protected species.

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1. INTRODUCTION

This report has been prepared by Geosphere Environmental Limited for M Scott Properties Limited and relates to the proposed residential development of the site at Land off Fir Covert Road, Taverham, Norfolk, NR8 6HL.

The report relates to the proposed development of the 14.9-hectare (ha) site at National Grid reference TG 16005 15465.

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

1.1 Background Information

The habitats onsite were confirmed to be potentially suitable for foraging bats within the Preliminary Ecological Appraisal undertaken by Geosphere Environmental Limited (Luci Spencer (Survey Licence Number: 2015-14453-CLS-CLS)) on 04 December 2018 (ref. **R.1**). The Desk Study confirmed records of Natterers Bat (*Myotis nattereri*), Serotine Bat (*Eptesicus serotinus*), Soprano Pipistrelle (*Pipistrellus pygmaeus*), Common Pipistrelle (*Pipistrellus pipistrellus*), Brown Long-eared Bat (*Plecotus auritus*), Whiskered Bat (*Myotis mystacinus*), Barbastelle Bat (*Barbastella barbastellus*), Noctule (*Nyctalus noctula*) and Daubentons Bat (*Myotis daubentonii*) within 2km of the site boundary. Areas of suitable habitat identified within this report include scattered trees, woodland and hedgerow suitable for foraging bats. The habitats present are shown in Drawing ref. 3551,EC,AR,DS/003/Rev1 in Appendix 3.

1.2 Aims

The purpose of the survey is to determine the use of the site 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) (2019) National Planning Policy Framework (NPPF) (ref. **R.2**) and Government Circular 05/06: Biodiversity and Geological Conservation – (ref.**R.3**).

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

The Activity Surveys for bat roost potential were undertaken in accordance with Bat Conservation Trust (BCT), JNCC and Natural England guidelines (refs. **R.4, R.5** and **R.6** 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.2**).

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), with the assistance of George Green (Graduate Ecologist), Tom Cox (Ecologist) and George Hood (Assistant Ecologist).

3.3 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. 3709,EC/009/Rev0 in Appendix 3. 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, on 09/05/2019, 17/06/2019 and 10/07/2019, comprising of Dusk Surveys. The 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, is included in Appendix 4.

- Foraging Survey 1: Dusk Survey (Start 20:30, Finish 22:30);
- Foraging Survey 2: Dusk Survey (Start 21:22, Finish 23:22);
- Foraging Survey 3: Dusk Survey (Start 21:17, Finish 23:17).

3.4 Static Detector Surveys

The static detectors were placed in or beside corridors used by bats for foraging or commuting purposes, as shown on Drawing ref. 3709,EC/009/Rev0 in Appendix 3.

Two static detectors were deployed onsite on three occasions, between May and September 2019. The detectors ran for a minimum of five consecutive nights on each occasion, totalling 38 nights of monitoring in total.

3.5 Equipment

Equipment used included Wildlife Acoustics Echo Meter Touch 2 Pro Detectors with Amazon Kindle Fire HD Tablets, analysed using Kaleidoscope software as necessary. Batbox Baton were also used during the Transect Surveys to record the ultrasonic calls. The sound files were analysed with Batscan, to aid accurate species identification.

AnaBat Express Bat Detectors were used during static monitoring periods with the calls analysed using AnalookW software.

3.6 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.7**).

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

4.1 Transect Survey

The results of the Transect Survey are shown on Drawing ref. 3709,EC/009/Rev0 available in Appendix 3.

During Survey 1 (09-05-2019 dusk at 20:30pm), a total of seven individual passes, all Common Pipistrelle (21:01-22:03, at stopping points 3, 4, 5, 6 and 7). Most sightings were of the bats foraging on the edge of the woodland onsite and foraging in the semi-improved grassland field.

During Survey 2 (17-06-2019 dusk at 21:22pm), bat species recorded included Soprano Pipistrelle (from 21:50 to 23:17), Noctule (between 21:34 and 22:40), Common Pipistrelles (between 21:55 and 23:20), and Brown Long-eared bats (from 22:41 to 23:13). The peak count of two Common Pipistrelle was noted during the survey. All sightings were of bats near the woodland onsite and foraging in the semi-improved grassland field.

During Survey 3 (10-07-2019 dusk at 21:17pm), the first bat recorded was Noctule at 21:27. Additional passes were noted until 22:04. Other species noted included; Common Pipistrelle (21:40 to 22:48), Soprano Pipistrelle (21:46 to 23:11), Noctule sp. (single pass at 23:14). The majority of the activity was focused around the woodland onsite, where more than three Noctules were sighted at one time (21:32). The other sightings were of bats foraging in the semi-improved grassland fields.

4.2 Static Detector Survey

Common Pipistrelle and Soprano Pipistrelle were frequently noted, Noctule and Brown Long-eared Bat were occasionally noted. Bats were noted near sunset at all of the locations that static detectors were installed and as such, it is likely that the roosts for these species are likely to be in local proximity to the static recorder locations. As such, suitable roost features present on the onsite trees could be used for roosting bats in the future.

4.3 Conservation Status of Bats

The conservation status of the species noted onsite is show in Table 2 overleaf:

Table 2 - Conservation Status of Bat Species Noted Onsite		
Common Name	**Scientific Names**	**Conservation Status**
Common Pipistrelle	*Pipistrellus pipistrellus*	Hab Regs Sch 2, WCA sec 9
Soprano Pipistrelle	*Pipistrellus pygmaeus*	Hab Regs Sch 2, WCA sec 9, NERC S41, UKBAP
Noctule	*Nyctalus noctula*	Hab Regs Sch 2, WCA sec 9, NERC S41, UKBAP
Brown Long-eared bat	*Plecotus auritus*	Hab Regs Sch 2, WCA sec 9, NERC S41, UKBAP

4.4 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 scattered trees, hedgerows and woodland. These habitats provide connectivity into the wider landscape. The main species found to be using the site are Common and Soprano Pipistrelle, although Noctule and Brown Long-eared are also considered to be using the site. As such the site can be considered important in supporting these local species of bats and offers appropriate habitats for foraging.

Many of the 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, bats were recorded at sunset and close to sunrise, suggesting that bats are likely to be roosting onsite. Based on the above, the habitat onsite is considered important on a local scale, for common species of bat.

5. ECOLOGICAL CONSTRAINTS AND RECOMMENDATIONS FOR MITIGATION AND ENHANCEMENT OPPORTUNITIES

5.1 Foraging Habitat

It is recommended to retain as much bat foraging habitat as possible in the final development. The Development Plan in Appendix 3 (Drawing ref. Preliminary Phase 1 Sketch - Ref F) shows landscaping and the incorporation of potential foraging corridors throughout the site. The retention and enhancement of the area of woodland, with additional corridors throughout the site, maintain a habitat that is suitable for foraging bats.

The trees to be retained should be protected in line with BS 5837 2012- Trees in Relation to Design, Demolition and Construction (ref. **R.8**). 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.

5.2 Roosting Habitat

As bats were recorded near sunset, the likelihood is that bats are roosting locally to the site. This could potentially be within the trees identified as having bat roost potential within the Preliminary Ecological Walkover. Any trees identified as having bat roost potential that are to be affected by the development (e.g. light overspill or removal) should be checked for roosting bats prior to the commencement of the development.

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.

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 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 tree lines that bats are expected to fly along, be positioned at least 4m to 5m above the ground, sheltered from strong winds and exposed to the sun for part of the day, (usually orientated south to south west). Alternatively, Bat Bricks could be incorporated in to the final building design. Example Bat Boxes and Bricks are included within Appendix 5.

Planting within public open space areas (e.g. 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 6.

6. CONCLUSIONS

Findings within the Transect Surveys indicated Common Pipistrelle and Soprano Pipistrelle were noted on all occasions, with Noctule noted on two surveys and Brown Long-eared noted on one visit.

Within the Static Detector Surveys, Common Pipistrelle and Soprano Pipistrelle were frequently noted and Noctule and Brown Long-eared Bat were occasionally noted. Bats were noted near sunset at all of the locations that static detectors were installed, and as such, it is likely that the roosts for these species are likely to be near the static recorder locations. As such, the suitable features present on onsite trees could be used for roosting by bats within the local area.

The majority of the activity noted was in close proximity to the woodland onsite, although recordings of bats were noted throughout the site.

The habitats onsite are considered important for foraging and commuting bats on a local scale.

Retaining the existing boundary habitat will allow for commuting and foraging opportunities for bats within the final design. However, there are opportunities to enhance the area further with inclusion of native species beneficial to bats, and incorporating Bat Bricks and Boxes within the final development.

Providing the recommendations within Section 5 of this report are adhered to, and biodiversity enhancements are included in the final design, foraging and commuting bats will not be a material consideration for this site.

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 upon 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 (2018), Geosphere Environmental Limited, Report reference: 3551,EC-PEA-LS,RF,KL-04.12.18-V1

R.2. Ministry of Housing, Communities and Local Government (MHCLG) (June 2019) National Planning Policy Framework (NPPF).

R.3. ODPM (2005) Government Circular: Biodiversity and Geological Conservation – statutory obligations and their impact within the planning system.

R.4. BCT (2016). 'Bat Surveys – Good Practice Guidelines' Bat Conservation Trust, London, 3rd edition.

R.5. JNCC (2004). 'Bat Workers Manual' 3rd edition. Joint Nature Conservation Committee, Peterborough.

R.6. English Nature (2004) Bat mitigation guidelines.

R.7. CIEEM, (2016). Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland (Second edition dated January 2016).

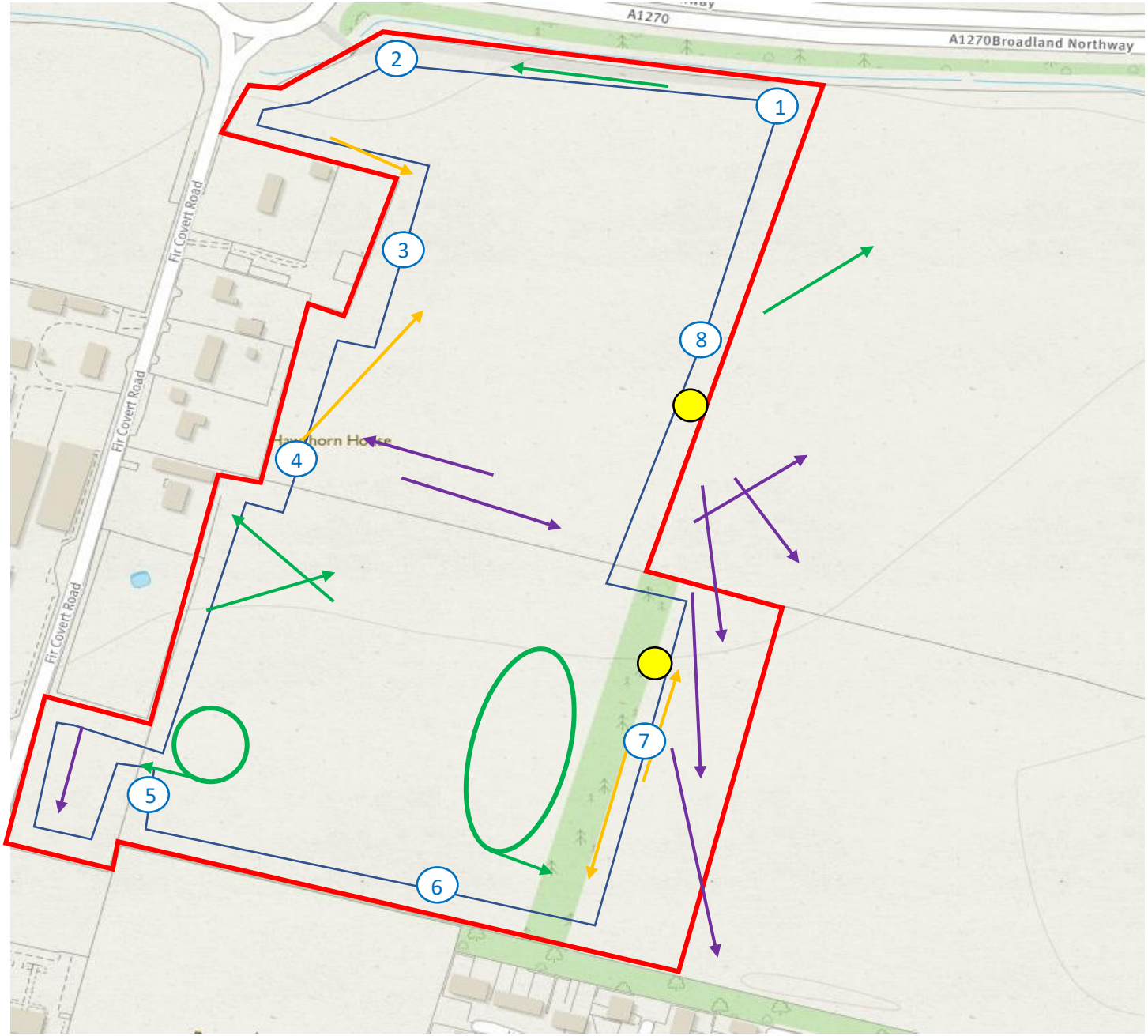
R.8. BS 5837: (2012), 'Trees in Relation to Design, Demolition and Construction'.

Appendix 3 – Drawings

Bat Activity Plan – Drawing ref. 3709,EC/009/Rev0

Phase One Habitat Plan – Drawing ref. 3551,EC,AR,DS/003/Rev 1

Development Plan – Drawing ref. Preliminary Phase 1 Sketch - Ref F



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LEGEND

- Site Boundary
- 1 — Transect Route and Stopping Points
- May Activity
- June Activity
- July Activity
- Static Location

SOURCE

© OpenStreetMap contributors

PROJECT

Land off Fir Covert Road, Taverham, Norfolk, NR8 6HL

TITLE

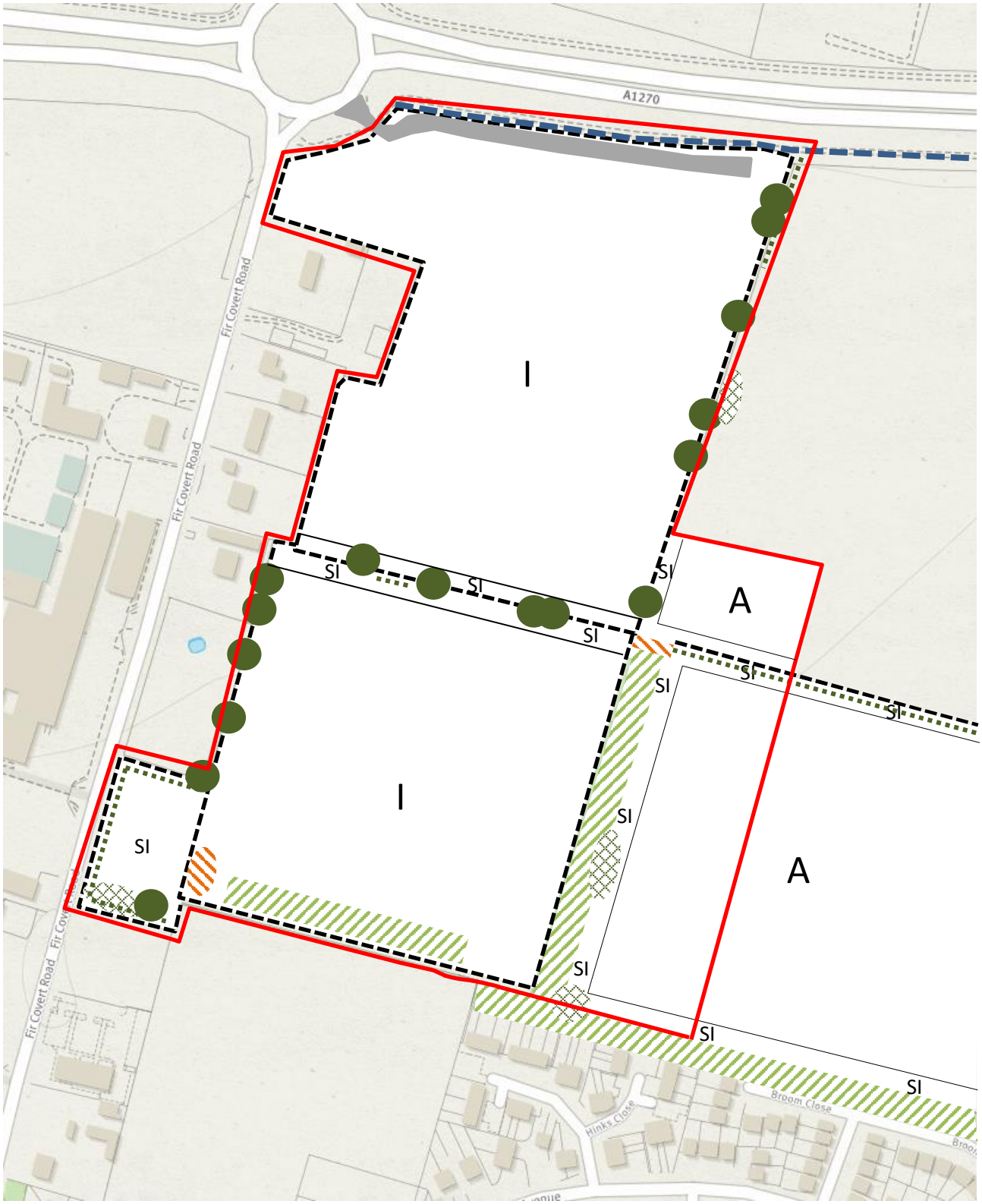
Bat Activity Plan

DRAWING NUMBER

3709,EC/009/Rev0

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

N



Site Boundary		Tall Ruderal	I	Improved grassland	
SI	Species-poor semi-improved grassland	Fenceline		Species-poor defunct hedgerow	
		Hardstanding			
	Plantation Woodland	Dry Ditch		Dense Scrub	
	Scattered Trees	A	Arable	TN1	Target Notes

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SITE	TITLE	PROJECT NO.	DRAWING NO.	DATE
Land off Fir Covert Road, Marriott's Park, Taverham, Norfolk, NR8 6HT	Phase 1 Habitat Survey	3551,EC,AR,DS/P1	003 / Rev 1	November 2018
	CLIENT: M Scott Properties Ltd	DRAWN BY: LS	CHECKED: RF	SCALE: Not to scale

North

North south connecting path along edge of existing tree belt

New planting belt

Existing planting belt retained and enhanced

Existing planting belt retained and enhanced

Existing planting belt retained and enhanced

New planting belt to NDR

Park

North south connecting path along edge of existing tree belt

5 acre extension to existing playing fields

Potential new pathway link to Taverham

Park

New pedestrian cycleway connection to roundabout on NDR

Park

Existing planting belt retained and enhanced

Existing planting belt retained and enhanced

Village green

New access roundabout

New Development off Fir Covert Road, Taverham , for M Scott Properties Ltd

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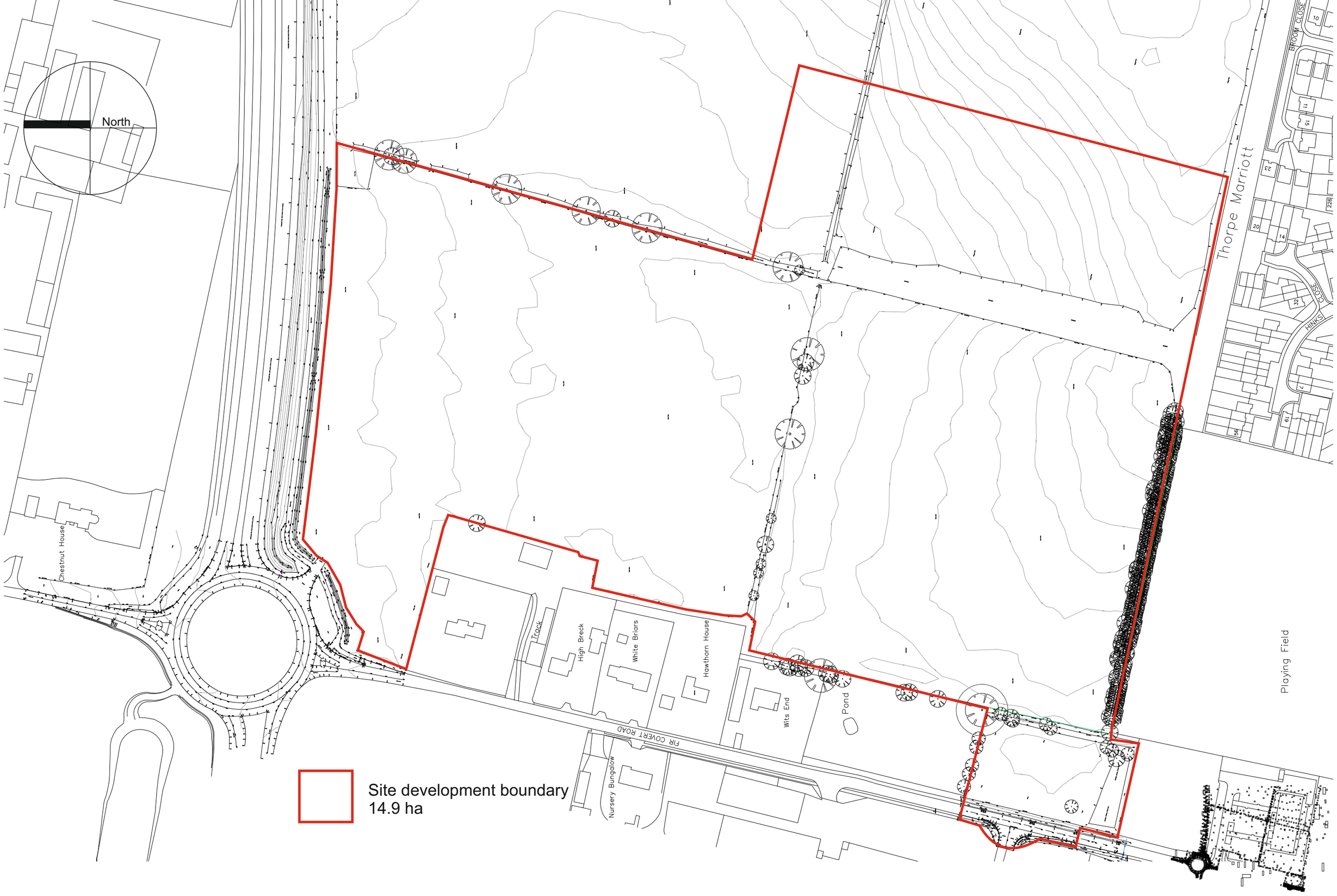

Red Line plan - 1:2000 @ A3

New Development off Fir Covert Road, Taverham , for M Scott Properties Ltd

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Appendix 4 – Transect Survey Timings & Weather

BAT ACTIVITY SURVEYS - WEATHER RECORDS

Project Number: 3709,EC **Date:** 21/10/2019

Project Name: Land off Fir Covert Road, Taverham, Norfolk, NR8 6HL

Surveyor Names:		Tom Cox (TC), George Hood (GH), James Booty (JB) and George Green (GG)							
Date	**Transect**	**Time**		**Ambient Temp (°C)**		**Time of Sunset**	**Wind Speed* (Beaufort)**	**Cloud Cover (%)**	**General Weather Observation**
		Start	**End**	**Start**	**End**				
09/05/2019	1	20:30	22:30	8	7	20:30	2	100	Dry
17/06/2019	2	21:22	23:22	16	15	21:22	1	70	Dry
10/07/2019	3	21:17	23:17	19	17	21:17	0	90	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 – Example Bat Boxes & Bat Bricks

EXAMPLE BAT BRICKS AND BOXES

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Integrated Bat Box: Ibstock Enclosed Bat Box 'B'

Large 215 x 290mm

Large Bespoke
215 x 290 mm

Small Red
215 x 215 mm

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.

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

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

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Example Bat Bricks & Boxes

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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

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Appendix 6 – 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*		

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REFERENCES

TITLE
Plants Considered Beneficial to Bats

DATE
21/10/2019

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Ec Ecology.

Fr Flood Risk.

Ge Geotechnical.

En Environmental.

Kw Knotweed.

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