

APPENDIX 7: BAT SURVEYS

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1.0 AIMS AND SCOPE OF SURVEY

The present report relates to a Site known as Land at Holmer, Hereford. Ecological surveys of this land were commissioned in order to identify the potential for any ecological constraints or opportunities that might pertain to the development of these Sites.

The purpose of the survey work was to determine the use, if any, of the Site by bats. This included the identification of potential roosting Sites within trees on Site and also assessing the level of use of the Site by bats in the form of commuting corridors and foraging grounds. Two experienced bat surveyors undertook the surveys, one of who holds an all-England English Nature bat license.

All species of bat are fully protected under Schedule 5 of the Wildlife and Countryside Act 1981 (and amendments) and under Annex 4 of the Conservation (Natural Habitats &c.) Regulations 1994 (Appendix I).

2.0 METHODS

2.1 Tree Survey

A detailed survey of trees on Site was undertaken on 20 May 2003 to identify those with potential to support roosting bats. Each tree on Site was assessed from the ground for the presence of cracks, splits, fissures, ivy, woodpecker holes, loose bark etc that could offer opportunities for roosting bats. Typically, this precluded shrubs and young trees where these features were absent. Following this, suitable trees were accessed by ladder and potential roosts were surveyed by endoscope (where appropriate) and high-powered torch.

Any tree that was found to have 'good' or higher potential (i.e. contained visible features which could support roosting bats) was assigned an identification number and a rating on a scale of 1 to 3 as shown

1. = excellent potential. To include most of the following: large number of suitable cracks and fissures, loose bark, woodpecker holes, dead limbs, ivy,
2. = very good potential. To include 2 to 3 of the following: high number of suitable cracks and fissures, loose bark, woodpecker holes, dead limbs, ivy,

3. = good potential. To include 1 or 2 of the following: suitable cracks and fissures, loose bark, woodpecker holes, dead limbs, Ivy.

Each of the surveyed trees scored under this system was mapped (Figure 1) and data entered into a table containing the location, rating, species and general comments on the state of the tree (Appendix 2). Those trees that appeared suitable from ground level but on subsequent examination were found not to support features of value to bats were not recorded in this manner.

2.2 Limitations of Tree Survey

Only those trees with **visible** (from ground level) cracks, fissures or other features of value to roosting bats were recorded during the survey. The survey was undertaken in May, which, although an optimum month to undertake evening bat activity surveys, is sub-optimal for assessing tree roosts. The best time to undertake such a survey is in winter when visibility of the tree trunk and branches is maximised due to the lack of foliage. Therefore, it is possible that cracks and fissures, which could support roosting bats, were present on some trees but were not recorded during this survey as they were concealed from surveyors on the ground.

A high number of trees were found to be partially covered in Ivy. The presence of Ivy on some trees could have concealed potential roost features and the Ivy itself could also act as a potential roost. These trees were not included in the assessment as in practical and logistical terms, a detailed survey of the Ivy was considered virtually impossible.

2.3 Evening Foraging/Commuting Survey

Surveys were undertaken twice a month between 23 April and 23 July 2003 by a team of two experienced bat ecologists. Survey involved walking transects across the Site following hedgerows and other linear features where possible, with particular attention being paid to those areas noted during the tree survey as having particular value to bats (overgrown hedgerows with standards, streams, ponds, linear groups of pollards). No buildings were present on Site although a large housing development was located at the western Site boundary with a number of individual properties along the southern boundary.

All surveys were conducted using Pettersson time-expansion bat detectors in conjunction with Sony mini disc recorders and observations of the time, location, and activity of all bats seen or heard were noted. (Figures 2,3,4,5; Appendix 3). Bats were identified on the basis of their characteristic echolocation calls, which were recorded where appropriate and analysed using computer sonogram analysis (Batsound 3.3) to confirm species identification. Each evening bat survey was undertaken during optimum conditions (no rain, no heavy wind, moderate temperature typically above 10°C).

3.0 RESULTS

3.1 Desk Study

A desk study was undertaken as part of the preliminary ecological assessment during 2002 (see NPA report: *Extended Phase 1 Habitat Survey 2005*). Whiskered and Brandt's bats have been recorded roosting for a number of years within 2 km of the Site 2 km search area, but no records exist for the Site itself.

Reference within the June 2005 report was also made to English Nature's Natural Areas Profile (1998). The Site was found to lie within the Central Hereford Natural Area, which is predominantly lowland in character with a few isolated hills and a plateau in the northeast. The main land use is agriculture, but includes pasture, orchard and woodlands. Eight bat species have been recorded including a number of Lesser Horseshoe bat nursery roosts. The southern part of the Natural Area may also be included in the feeding range of both Lesser and Greater Horseshoe bats from the neighbouring Wye Valley.

3.2 Tree Survey

Twenty two trees were assessed as having potential for roosting bats, the vast majority being Willow Pollards (See Figure 1 and Appendix 2). However no evidence of bats e.g. droppings, staining was found in any of the features examined. The positive identification of trees as bat roosts is notoriously unpredictable as bats may only use a given tree for a few days at a time. A number of suitable standards were present within the hedgerows on Site, these being Ash and Oak, with a number of dead, dying or damaged trees containing features of value for roosting bats (See Figure 1 and Appendix 2). Of these 22 trees:

- Two tree was assigned a rating of 1 (excellent potential)
- Thirteen trees were assigned a rating of 2 to 1
- Six trees were assigned a rating of 2 (very good potential)
- One tree was assigned a rating of 2-3
- No trees were assigned a rating of 3 (good potential)

3.3 Evening Foraging/Commuting Survey

On each evening visit, surveys were initiated at or before dusk and extended for 2 -3 hours into the night. Weather conditions on each visit were optimum for bat surveys, being warm (with the exception of survey on 19 May 2003 minimum temperatures during surveys were above 10°C), generally with little wind, and no rain.

Five different species of bat were recorded on Site during the evening surveys, these being Common and Soprano Pipistrelle, Natterer's, Long-eared, and Noctule. Each of these species are known to roost within trees, in particular Noctule bats are predominantly found roosting in trees. Although also known to use buildings as roosts, the second most common bat species recorded in trees is Pipistrelle. Pipistrelles and Noctule were recorded early in the evening on Site (Appendix 3), suggesting that a roost is either on Site or in close proximity.

Natterer's bats have a close foraging association with water habitats, and this was found to correspond to recordings made on Site. In addition both species of Pipistrelle were recorded feeding along the stream that forms the northern boundary of the Site.

The majority of hedgerows walked during the survey were found to have some associated bat activity, with the northern section of the Site being particularly favoured. Hedgerows following the line of roads, particularly at the southern end of the Site were found to be rarely used by bats.

4.0 DISCUSSION

The features of particular value to bats on the Site are:

- **Trees** - a large number of trees offer suitable features for roosting bats (all of the bat species recorded at the Site are known to utilise tree roosts, with Noctule being restricted to tree roosts)
- **Hedgerows** - used for both commuting and foraging bats
- **Stream** - used for both commuting and foraging bats

Development of this Site could potentially affect its current ecological value and use by bats in a number of ways:

- **Severance of commuting routes:** through creation of gaps in hedgerows, removal of hedgerows and construction of roads or buildings across existing routes. Billington (2000) has found that hedge breaks over 12 m in length can cause certain species not to cross that break.
- **Night-time lighting:** through use of street lighting and garden lighting. The southern section of the Site that was the most well lit was found to be the least well used by foraging and commuting bats.
- **Loss of foraging areas and reduction in availability of food:** through hedgerow removal, changes in land use and loss of waterbodies. However the development of this Site as a residential area could partly increase the availability of foraging habitat in the form of gardens and associated landscaping though will lead to increased predation through the introduction of cats.
- **Loss of roost Sites:** through felling of trees. However, if designed correctly the development of this Site as a residential area could increase the availability of suitable bat roosts using suitable design features.

The following list of actions to avoid or undertake provides guidance for development purposes with regard to bats:

- Avoid (where practicable) removal of hedgerows used by bats for foraging and/or commuting. Where loss of hedgerows is unavoidable, consideration should be given to replacement planting. Any work involving loss of hedgerows should be

undertaken between October and February so as to avoid potential problems with breeding birds and to a lesser extent foraging/commuting bats.

- Where possible avoid creation of gaps over 12 metres – (Billington, 2000) in hedgerows or other linear features identified as important bat commuting routes.
- Where possible avoid constructing main roads or siting buildings where they intersect existing bat commuting routes.
- Avoid felling any trees rated as having a good potential value to roosting bats (Figure 1, Appendix 2). If removal of a tree/s is unavoidable then careful survey prior to and during removal will be required, and where necessary (i.e. if roosting bats are confirmed), Department of Environment Farming and Rural Affairs (DEFRA) licences obtained and appropriate mitigation implemented.
- Design layout of development and associated landscape to enhance the area's value for bats e.g. create green links through the Site which could be used by bats as commuting and foraging routes, incorporate night scented species into planting schemes, utilise mercury vapour lighting, include water in landscape design.
- Design bat-friendly features into buildings to allow their use by roosting bats.

COMMON/SCIENTIFIC NAMES

Vegetation

Ash	<i>Fraxinus excelsior</i>
Elm	<i>Ulmus</i> sp.
Hawthorn	<i>Crataegus monogyna</i>
Ivy	<i>Hedera helix</i>
Oak	<i>Quercus</i> sp.
Willow	<i>Salix</i> sp.

Bats

Barbastelle	<i>Barbastella barbastellus</i>
Bechstein's	<i>Myotis bechsteinii</i>
Brandt's	<i>Myotis brandtii</i>
Common Pipistrelle	<i>Pipistrellus pipistrellus</i>
Soprano Pipistrelle	<i>Pipistrellus pygmaeus</i>
Greater horseshoe	<i>Rhinolophus ferrumequinum</i>
Lesser horseshoe	<i>Rhinolophus hipposideros</i>
Natterer's	<i>Myotis nattereri</i>
Long-eared	<i>Plecotus</i> sp.
Noctule	<i>Nyctalus noctula</i>
Whiskered	<i>Myotis mystacinus</i>

REFERENCES

Billington, G. 2000: Combe Down Greater Horseshoe Bats: Radio Tracking Study. Unpublished Report produced in behalf of Bath and North East Somerset Council.

English Nature, 1998. Natural Areas: Nature Conservation in Context. CD English Nature, Peterborough.

APPENDIX I: BAT LEGISLATION

All species of bat are fully protected under Schedule 5 of the Wildlife and Countryside Act 1981 (and amendments) and under Annex 4 of the Conservation (Natural Habitats &c.) Regulations 1994. Four of the sixteen species of bats resident in the UK (Bechstein's, Barbastelle, Greater Horseshoe, Lesser Horseshoe) are also protected under Annex 2 of the Conservation (Natural Habitats &c.) Regulations 1994. Annex 2 of these Regulations requires the designation of Special Areas of Conservation (SAC) to ensure that the species is maintained at a favorable conservation status. There are no SAC's designated for bats within 10 km of the Holmer Site. The Countryside and Rights of Way Act 2000 'CROW Act' makes further amendments to the species protection measures covered in the Wildlife and Countryside Act including the power to impose custodial sentences for offences relating to Schedule 5 (of the WCA). Six species of bats including Common Pipistrelle are represented in the UK Biodiversity Action Plan. Taken together it is illegal to:

- Intentionally or deliberately capture or kill, or intentionally injure a bat
- Deliberately disturb bats or intentionally or recklessly disturb them in a place used for shelter or protection
- To damage or destroy a breeding Site or resting place of a bat
- Intentionally or recklessly damage, destroy or obstruct access to any structure or place used for shelter or protection by a bat

APPENDIX 2: BATS AND TREES ENDOSCOPE SURVEY

Target Number (Figure 1)	Rating	Species	Comments (all measurements are approximate)
1	2-1	Willow	Largely dead mature pollard 3m tall with no branches protruding, only the boll remains. High number of suitable cracks and fissures.
2	2-1	Willow	3m tall Mature pollard with a small number of cracks and fissures. Has 2 holes at 2.5m height which are 8cm diameter and go back for 30cm.
3	2-1	Willow	3m tall Mature pollard with a small number of cracks and fissures.
4	2	Willow	Outgrown mature pollard with some horizontal splits on broken lower limbs.
5	2-1	Willow	Mature pollard with horizontal breaks in lower limbs and a large amount of Ivy. A vertical break was recorded in one of the branches covered in Ivy and was found to go up for at least 30cm.
6	2-1	Willow	Mature pollard with a hole 8-10cm diameter at 3m height in the point where a limb has been sawn off. The hole goes back 20cm. Other suitable cracks and fissures were present on the main trunk.
7	2-1	Oak	Mature standard approximately 30m in height, covered in Ivy. A small hole was present on a previously cut limb at 6m height (not accessed). The entrance to the hole was 8cm x 4cm.
8	1	Oak	A large mature Oak standard with two main limbs from which a number of dead limbs protrude with horizontal splits. A woodpecker hole was recorded at 7m height (not accessed). Should the hole head into the tree it would be particularly suitable for Noctule's (this species has only ever been recorded in trees and was recorded foraging on Site – see survey sheets in Appendix 3). A small number of vertical splits were recorded together with some very large splits towards the top of the tree (not accessed).
9	2	Ash	A mature standard with a large break on one of the main limbs.
10	2-1	Oak	A large dead mature standard with dead limbs and flaking bark. A woodpecker holes was recorded at 6m height and another hole at 8m height. The hole at 6m was accessed and was found to go back into the tree for 30cm. Two further holes were recorded at 6m and 4m height; that at 4m heading back for 20cm, and that at 6m heading back 10cm.
11	2-1	Willow	A group of 5 mature pollards all with large vertical gaps, cracks and fissures. One of the pollards was hollow.
12	2	Willow	A mature pollard that was directly north of the fence. The pollard had vertical gaps, cracks and fissures.
13	2	Oak	A mature standard that was covered in Ivy. A few small horizontal cracks in limbs was visible.

Target Number (Figure 1)	Rating	Species	Comments (all measurements are approximate)
14	2-1	Willow	A mature pollard with a large central vertical split with smaller cracks and fissures leading from it. No horizontal breaks were recorded
15	3-2	Ash	A mature pollard with some large cavities at the head of the main trunk (4m height). These cavities appear to be open to the elements.
16	2	Willow	A mature pollard with some vertical splits and cracks. No horizontal breaks were recorded.
17	2-1	Willow	Mature pollard with evidence of possible past lightning strike producing gaps, cracks
18	2	Willow	Collapsed mature pollard that laid over the stream with cracks and fissures though at a lower height to nearby standing Willows.
19	2-1	Willow	A mature pollard with a small number of holes of 4-6cm diameter at 2.5m height, the cavity of which was 20cm. Other cracks and fissures were also present.
20	2-1	Willow	A mature pollard with a higher number of holes and cracks than horizontal splits.
21	1	Willow	A mature pollard with large gaps of 20cm diameter at 2.5m height that had a cavity of 50cm. One of the entrances went back for 1m into the tree.
22	2-1	Willow	A mature pollard with vertical gaps in the main trunk. No horizontal breaks were visible.

APPENDIX 3: BAT SURVEY SHEETS

Survey Location: Holmer				Temp 13C	Cloud cover (%) 30
Date 23/4/03		Surveyors JK		Rain (%) 0	Wind V.light north-east
Location ref (Figure 2)	Mini Disc No.	Time (pm)	Species	No.	Comments (behaviour, foraging, feeding buzzes heard, commuting, etc.)
1		8.45	Common Pipistrelle	1	Commuting, faint call, north of hedge, not seen
2		8.52	Common Pipistrelle	1	Foraging in corner of field, feeding buzzes
3	1	8.57	Soprano Pipistrelle	2	Foraging along Willows and north-to-south along hedge, feeding buzzes
4	3	9.49	Common Pipistrelle	1	Foraging along hedge and in Holmer Court Garden, feeding buzzes, not seen
5		10.12	Common Pipistrelle	1	Commuting west-to-east
6		9.05	Soprano Pipistrelle	1	Commuting south along hedge

Survey Location: Holmer				Temp 11C	Cloud cover (%) 85
Date 24/4/03		Surveyors MMW		Rain (%) 0	Wind V.light
Location ref (Figure 2)	Mini Disc No.	Time (pm)	Species	No.	Comments (behaviour, foraging, feeding buzzes heard, commuting, etc.)
1		8.49	Common Pipistrelle	2	Bats feeding on west side of hedge from Willows to Oak, constant activity. Feeding at 3m height.
2	9	9.02	Possible Long-eared	1	Very faint signal, bat not seen
3		9.28	Common Pipistrelle	1	Not see, no feeding buzzes

Survey Location: Holmer				Temp 8C	Cloud cover (%) 35
Date 19/5/03		Surveyors MMW		Rain (%) 0	Wind Brisk heading east
Location ref (Figure 3)	Mini Disc No.	Time (pm)	Species	No.	Comments (behaviour, foraging, feeding buzzes heard, commuting, etc.)
1		10.20	Soprano Pipistrelle	1	Feeding in sheltered corner of trees around pond, constant activity for 5 minutes
1		10.22	Common Pipistrelle	1	Feeding buzzes
1	1	10.25	Soprano Pipistrelle	1	Feeding buzzes

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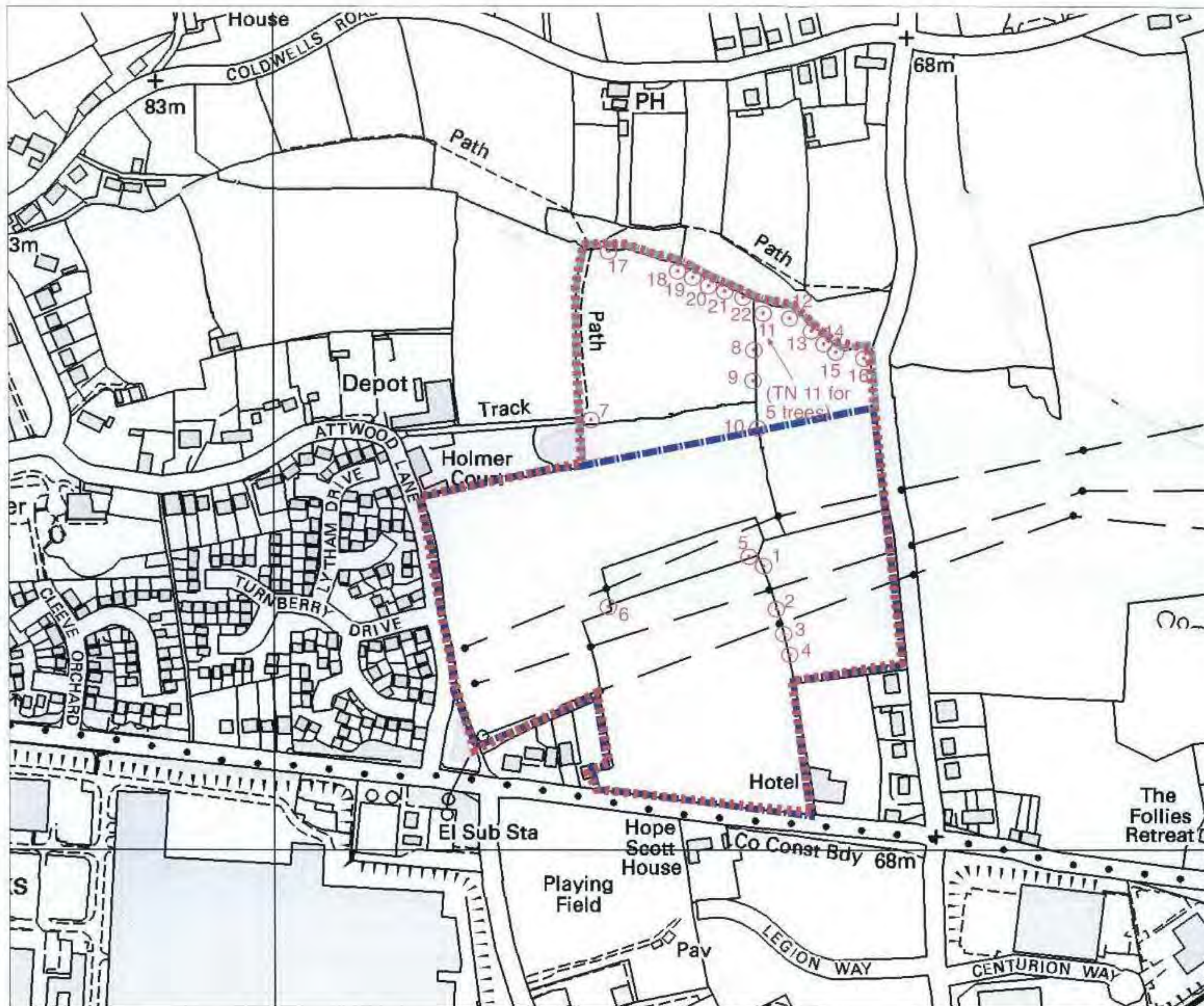
Survey Location: Holmer				Temp 10C	Cloud cover (%) 100
Date 20/5/03		Surveyors JK		Rain (%) 0	Wind light heading east
Location ref (Figure 3)	Mini Disc No.	Time (pm)	Species	No.	Comments (behaviour, foraging, feeding buzzes heard, commuting, etc.)
1		9.30	Common Pipistrelle	1	Foraging, not seen, possibly to north of hedge
2		9.39	Common Pipistrelle	1	Commuting east along south side of Willows, seen
2		9.40	Common Pipistrelle	1	Commuting east along south side of Willows, seen
2		9.44	Common Pipistrelle	1	Commuting east along south side of Willows, seen
2		9.59	Common Pipistrelle	1	Commuting east along south side of Willows, seen
3		10.04	Common Pipistrelle + Myotis sp.	5	Foraging in field at tree edge beside pond, mostly Common Pipistrelle.
3		10.13	Noctule	1	Commuting, swift at 6m height in field following tree line of pond
4		10.22	Common Pipistrelle	1	Foraging in field along hedge
5		10.54	Common Pipistrelle	1	Foraging in field along hedge
6		10.59	Common Pipistrelle	2	Foraging in field along hedge
7		11.05	Common Pipistrelle	1	Foraging north of hedge

Survey Location: Holmer				Temp 14C	Cloud cover (%) 20
Date 24/6/03		Surveyors JO		Rain (%) 0	Wind None
Location ref (Figure 4)	Mini Disc No.	Time (pm)	Species	No.	Comments (behaviour, foraging, feeding buzzes heard, commuting, etc.)
1		10.25	unknown	1	Feeding
2		10.25	Pipistrelle	2+	Feeding
3		10.30	Pipistrelle	1+	Feeding
4		10.32	Pipistrelle	2	Feeding
5		10.35	Pipistrelle	1	Feeding
6		10.37	Pipistrelle	1	Feeding
7		10.37	Myotis	1	Commuting
8		10.40	Pipistrelle	2	Feeding
9		10.42	Pipistrelle	1+?	Feeding
10		10.45	Myotis	2	Possibly 2 different species
11		10.55	Pipistrelle	1	Commuting
12		11.00	Myotis	1	Feeding, bat seen - large
13		11.10	Pipistrelle	2?	Feeding at distance

Survey Location: Holmer				Temp 15C	Cloud cover (%) 80
Date 25/6/03		Surveyors JK		Rain (%) 0	Wind None
Location ref (Figure 4)	Mini Disc No.	Time (pm)	Species	No.	Comments (behaviour, foraging, feeding buzzes heard, commuting, etc.)
1		11.48	Common Pipistrelle	1	Foraging along dual hedge (footpath)
2		11.49	Myotis	1	Very briefly heard, potentially by pond

Survey Location: Holmer				Temp 16C	Cloud cover (%) 95
Date 23/7/03		Surveyors JK		Rain (%) 0	Wind Light, no direction
Location ref (Figure 5)	Mini Disc No.	Time (pm)	Species	No.	Comments (behaviour, foraging, feeding buzzes heard, commuting, etc.)
1		9.30	Common Pipistrelle	3+	At least 3 at one time were seen (possibly 4-5 present) constantly foraging in corner of field but also foraging north to south along hedge and east to west along hedge. Constant feeding buzzes
2		9.45	Common Pipistrelle	1	Constant foraging (feeding buzzes) east to west along hedge
3		9.50	Common Pipistrelle	1	Commuting on southern side of hedgerow heading east to west
4		9.55	Common Pipistrelle	1	Foraging for short time in corner of field
5	1	10.03	Natterer's	1	Foraging up and down hedge
6		10.04	Common Pipistrelle	1	Commuting north along hedge
7		10.09	Common Pipistrelle + Myotis	2-3	Constant foraging up and down entire hedge
8		10.12	Common Pipistrelle	2	Constant foraging up and down entire hedge
9	8	10.47	Common Pipistrelle	2	Feeding around Ash in hedge
9	9	10.48	Natterer's	1	Feeding in same area as Pipistrelle

Survey Location: Holmer				Temp 16C	Cloud cover (%) 95
Date 23/7/03		Surveyors MMW		Rain (%) 0	Wind Light, no direction
Location ref (Figure 5)	Mini Disc No.	Time (pm)	Species	No.	Comments (behaviour, foraging, feeding buzzes heard, commuting, etc.)
1		9.47	Common Pipistrelle	1	Feeding on far side (west) of hedge. Did not emerge from Oak
1	1	9.49	Myotis	1	Feeding low on eastern side of hedge. Feeding at 1m – tops of grasses
2		9.52	Common Pipistrelle	1	Feeding along mature Hawthorn hedge
3	2	9.56	Myotis	1	Travelling north along hedgerow at 2-3m above ground – just above hedge
3		9.58	Common Pipistrelle	1	Feeding
4	3	10.10	Noctule	1	Not seen, presumed to be high overhead
5	4	10.16	Common Pipistrelle	1	Feeding over hedgerow
6	5	10.23	Noctule	1	Not seen
6	6	10.25	Common Pipistrelle	1	Feeding along hedge close to pond
7		10.38	Common Pipistrelle	1	Feeding along trees surrounding pond
8		10.41	Common Pipistrelle	1	Flying west 5m up along hedge – feeding route? Probably same bat as 7
8	7	10.43	Noctule	1	Passing overhead
9	8	10.47	Common Pipistrelle	2	Feeding around Ash in hedge
9	9	10.48	Natterer's	1	Feeding in same area as Pipistrelle



-  Application site boundary
-  Informal Open Space
-  Development site
-  Target notes



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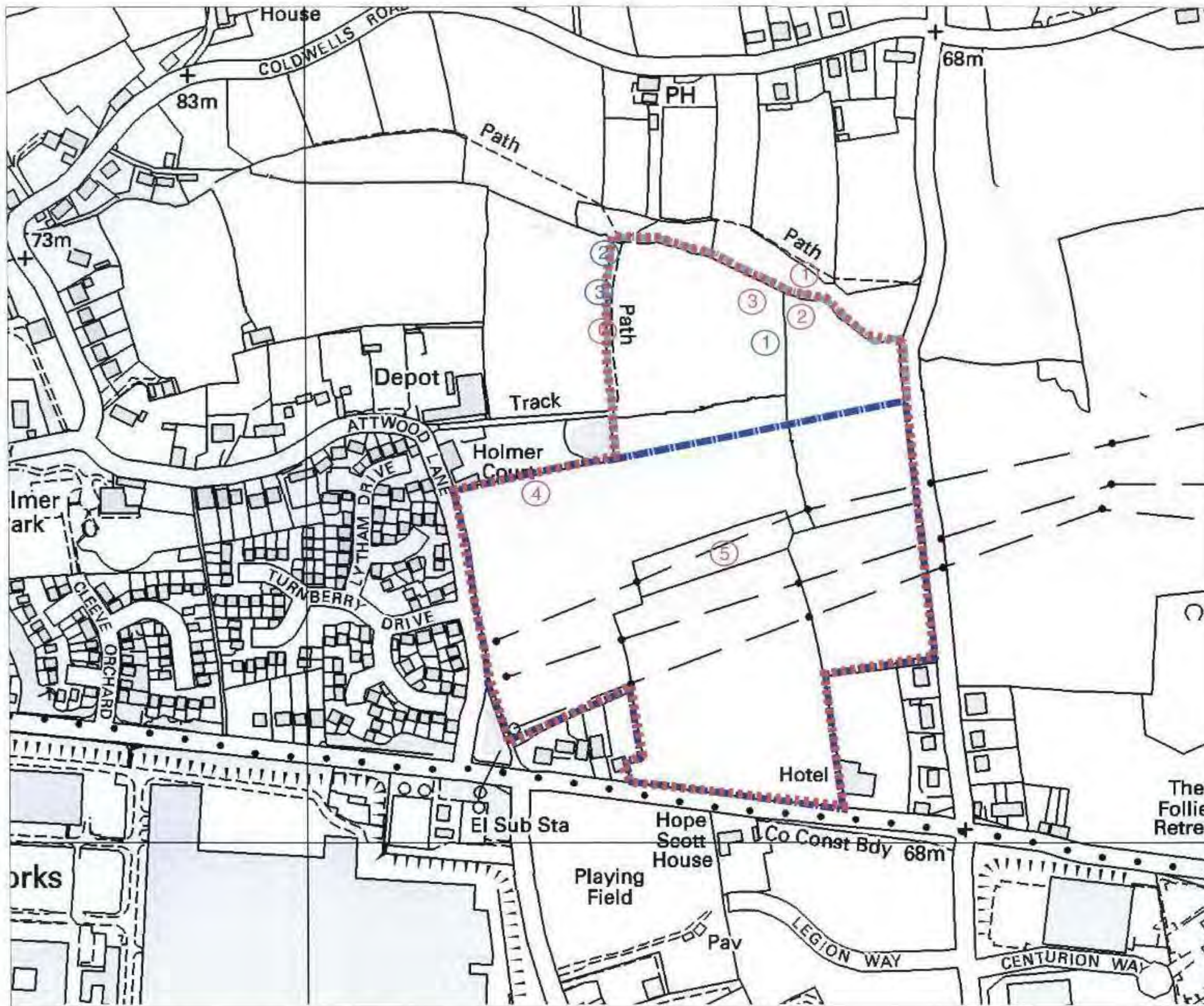
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Client: Crest Strategic Projects

Project: Land North of Roman Road, Holmer, Hereford

Drawing: Figure 1: Location map of trees surveyed for bats

Scale: Planning



-  Application site boundary
-  Informal Open Space
-  Development site
-  Location of bat survey results 23/4
-  Location of bat survey results 24/4

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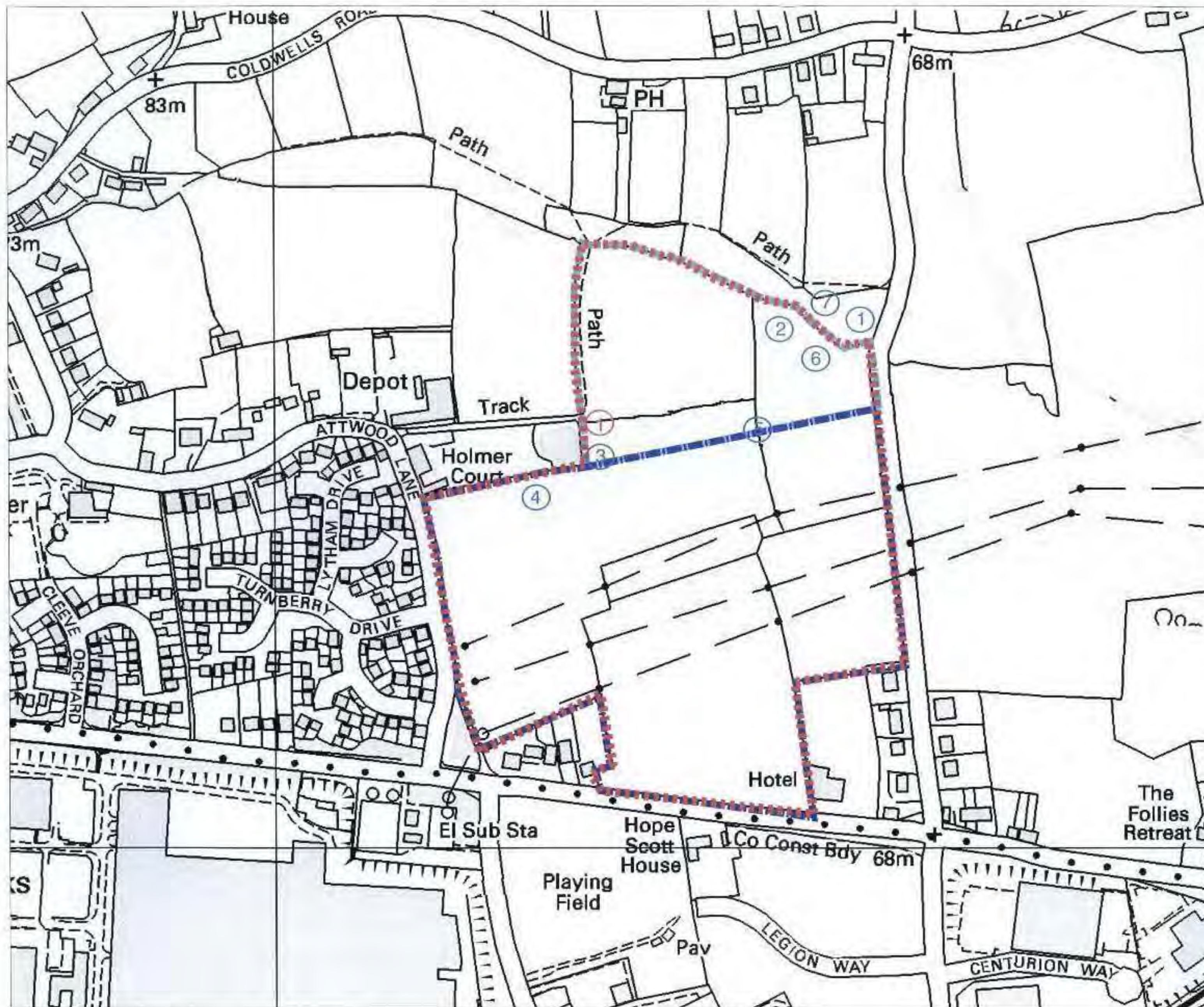
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Project Land North of Roman Road, Holmer, Hereford

Drawing Figure 2: Location map of evening bat survey results:
April (see Appendix 3)

Status Planning



-  Application site boundary
-  Informal Open Space
-  Development site
-  Location of bat survey results 19/5
-  Location of bat survey results 20/5

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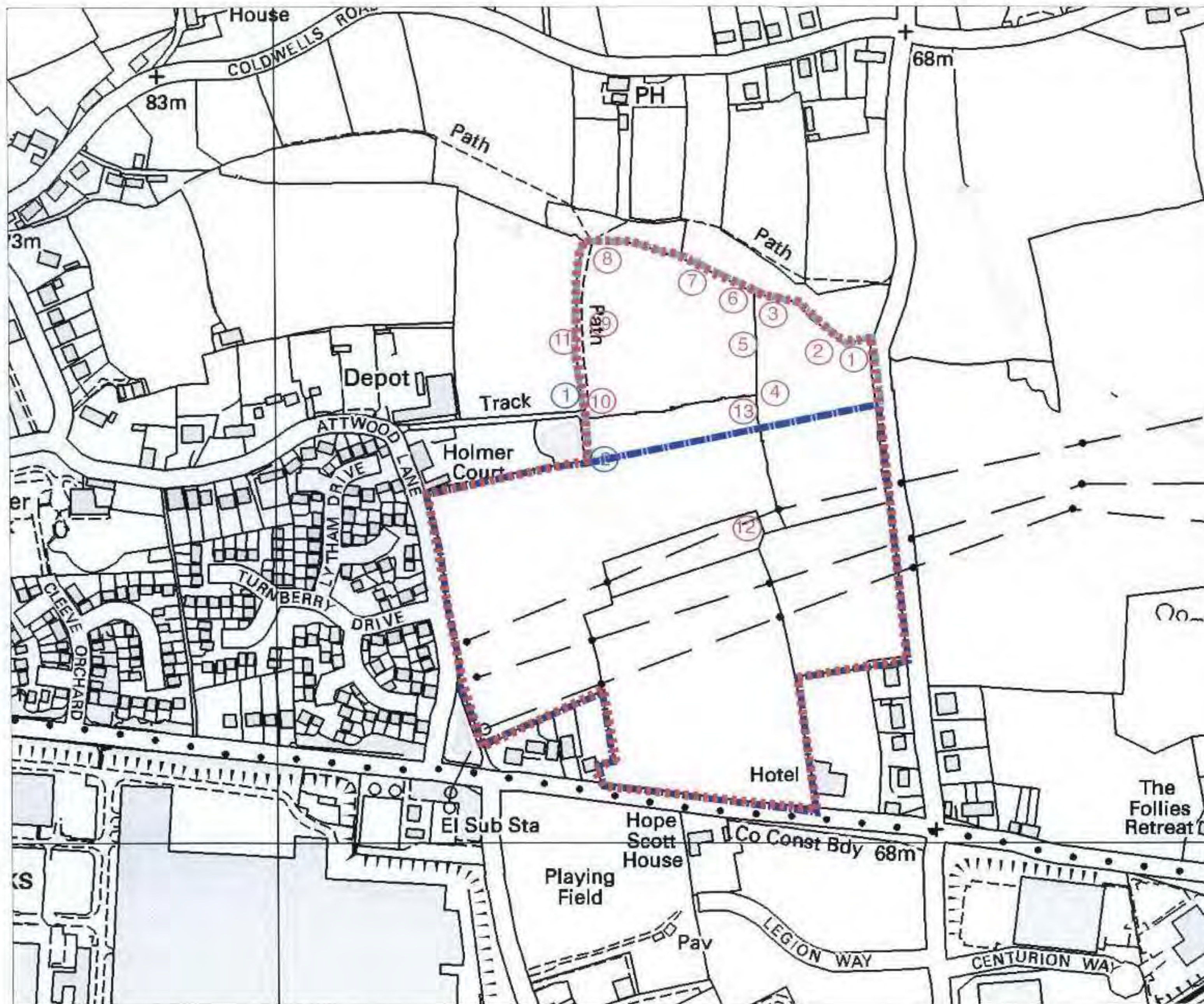
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Drawing Figure 3: Location map of evening bat survey results:
May (see Appendix 3)

Status Planning



-  Application site boundary
-  Informal Open Space
-  Development site
-  Location of bat survey results 24/6
-  Location of bat survey results 25/6



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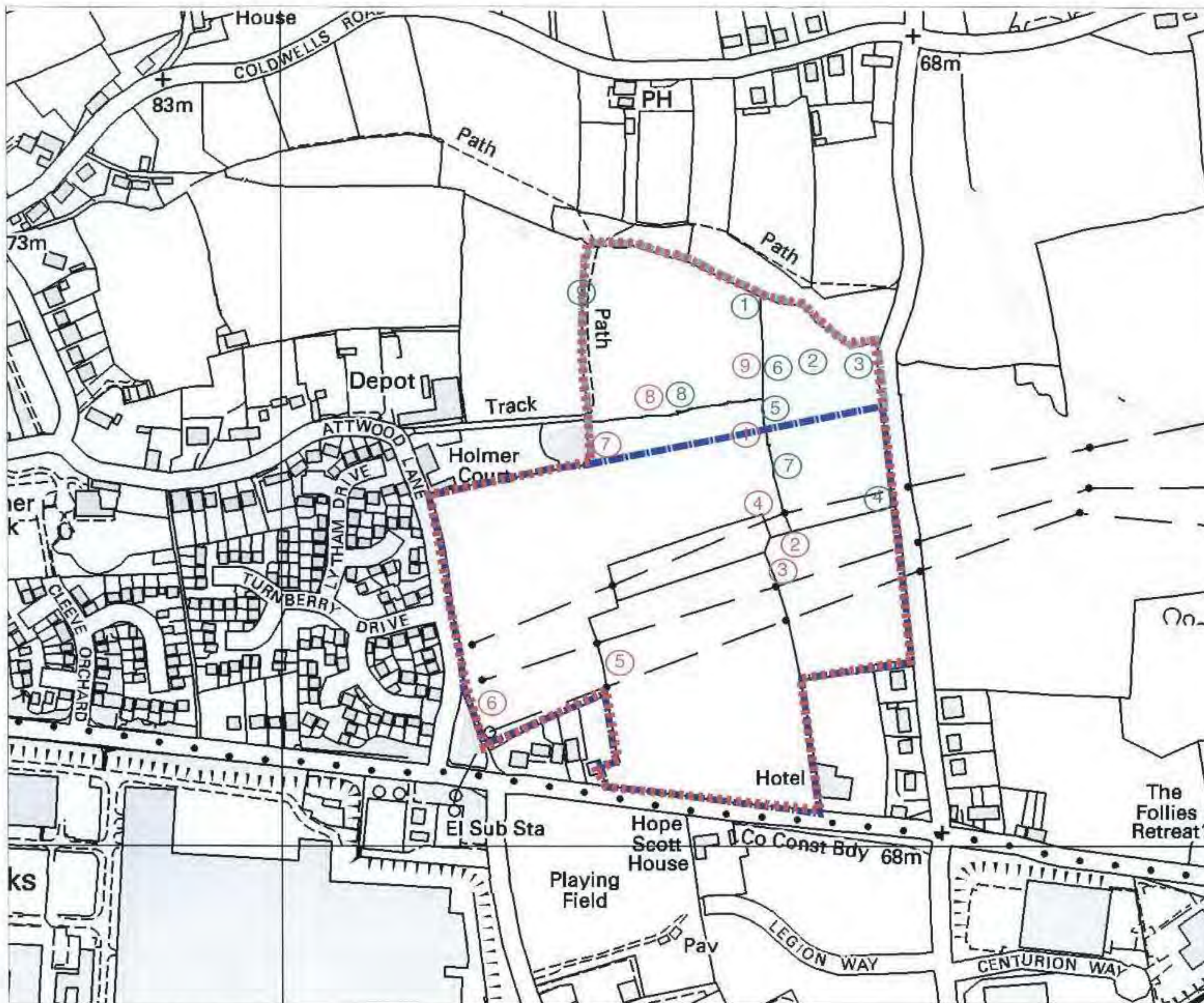
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Project Land North of Roman Road, Holmer, Hereford

Drawing Figure 4: Location of map evening bat survey results:
June (see Appendix 3)

Status Planning



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Not to scale

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Drawing Figure 5: Location of map evening bat survey results: July

Status Planning