



**Cambourne to Cambridge Better Public Transport:**

**Stage 2 Bat Activity Surveys 2019.**

**FINAL REPORT**

For:  
Greater Cambridge Partnership

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To achieve the study objectives stated in this report, we were required to base our conclusions on the best information available during the period of the investigation and within the limits prescribed by our client in the agreement.

No investigative method can completely eliminate the possibility of obtaining partially imprecise or incomplete information. Thus, we cannot guarantee that the investigations completely defined the degree or extent of e.g. species abundances or habitat management efficacy described in the report.

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## 0 EXECUTIVE SUMMARY

- 0.1 On behalf of Greater Cambridge Partnership, Cambridge Ecology Ltd was commissioned to carry out a Stage 2 bat activity survey of features (trees and hedgerows/linear features) on land associated with the Cambourne to Cambridge Better Public Transport Scheme between Grange Road, Cambridge and the western entrance to Bourn Airfield off the Broadway.
- 0.2 The survey methods used were based on Bat Surveys: Good Practice Guidelines for manual bat activity survey (Collins, 2016).
- 0.3 The results obtained were considered to provide a representative indication of the bat roosts present in the trees surveyed and the bat activity along the hedgerows and linear features surveyed.
- 0.4 Bat roosts were found in five trees (T30, T34, T35 T38/39). One Common Pipistrelle re-entered a hole in dead stem of T30. Two Common Pipistrelle emerged from T34. One Soprano Pipistrelle emerged from a woodpecker hole in T35. Three Common Pipistrelle re-entered T38/39. The roosts comprised small numbers (up to three individuals) of common species and were considered non-breeding summer roosts. None of the roosts were identified as maternity roosts.
- 0.5 Incidental observations while surveying T32, T33 and T34 indicated that species of bat (unidentified) emerged from behind the bargeboard on the eastern gable of building number 71; and while surveying T50, a probably Common Pipistrelle was observed emerging from the roof structure of the bungalow named the Gate House.
- 0.6 The bat activity survey of hedgerows and linear features identified at least eleven species of bat were using the survey area. The species comprised Nathusius', Common and Soprano Pipistrelles, Noctule, Serotine, Leisler's, (Western) Barbastelle, Brown Long-eared, Natterer's, Daubenton's, Whiskered and Brandt's.
- 0.7 Analysis of the bat calls indicated that the bats were using the hedgerows and linear features in the survey area as commuting routes and feeding habitat.
- 0.8 Barbastelle bat activity was identified during the survey. This species is cited as a key feature of Eversden and Wimpole Woods Special Area of Conservation (SAC), located approximately 7km to the south west of the survey area. Barbastelle bat activity was detected along hedgerows/linear features 1-3, 5, 6, 9-20, 24, 26 and 28-36. The highest number of registrations was recorded during the second set of surveys, when the total number of Barbastelle bat registrations was 1653. The hedgerows/linear feature with the highest number of Barbastelle bat registrations was hedgerow 19 south (near Madingley Wood SSSI) with 1169 registrations.
- 0.9 The presence of roosting bats and twelve species of bat using the area as commuting and foraging habitat indicates that these species are therefore of material consideration for the scheme, as they may be affected by the proposed scheme; and therefore an assessment of the potential adverse and positive effects on bats must form part of the ecological impact assessment.

## 1 INTRODUCTION

- 1.1 On behalf of Greater Cambridge Partnership, Cambridge Ecology Ltd was commissioned to carry out a Stage 2 bat activity survey of features (trees and hedgerows) on land associated with the Cambourne to Cambridge Better Public Transport Scheme between Grange Road, Cambridge and the western entrance to Bourn Airfield off the Broadway.
- 1.2 The results of a review of biological data from recognised sources of ecological records had already been reported in the Protected Species Constraints survey (Cambridge Ecology 2017). The results of the Protected Species Constraints survey suggested that the survey area was suitable to support roosting bats and bat activity in general.
- 1.3 Subsequent Stage 1 Inspection surveys (Cambridge Ecology 2018, 2019) identified 50 trees that had potential to support roosting bats and also recommended emergence/re-entry surveys for the 50 trees containing suitable roost features and static bat detector surveys of the network of hedgerows, lines of trees, woodland edges and field boundaries that could be important foraging and/or commuting routes for bats and which could be bisected by the route of the transport scheme.
- 1.4 Therefore, this bat activity survey was required to investigate, the potential for bats (and bat roost sites), which are protected species, to be present along the scheme route and which could therefore potentially be affected by the development, and so could cause a constraint to the scheme. If present, roosting bats and foraging/commuting routes would need to be considered further in relation to maintaining compliance with wildlife legislation and planning policy.
- 1.5 For clarity in this report the development site (or 'site') refers to land within survey area including the red line boundary of the Cambourne to Cambridge Better Public Transport Scheme (see Figure 1.1).
- 1.6 In addition, for the static bat detector surveys the surveys comprised hedgerows and linear features such as lines of trees. For clarity the term 'hedgerow' used in this report refers to both hedgerow and linear feature.
- 1.7 The aim of the Stage 2 bat activity survey and this report were to:
- identify the likely presence of roosting bats in the 50 trees within the site, including the status of any roost if present.
  - record the usage by bats of the network of hedgerows, lines of trees, woodland edges and field boundaries that could be bisected by the transport route to evaluate their use by foraging and/or commuting bats
  - provide information to address any constraints caused by bats at the site, including whether additional bat surveys are required and whether a European Protected Species (EPS) licence would be required to ensure legal compliance is maintained.

### Survey Area

- 1.8 The site was located between Grange Road, Cambridge at the eastern end and the western entrance to Bourn Airfield off the Broadway, at the western end (Figure 1.1). To the north the site was bordered by the A428 dual carriageway and to the south

mainly by arable land. The site also included potential park and ride sites; adjacent to Scotland Farm and near the water tower adjacent to Madingley Mulch. The total area within the red-line boundary of the development site covers an area of approximately 380 hectares (ha).

- 1.9 The survey area chosen comprised the red line boundary of the Cambourne to Cambridge Better Public Transport Scheme; but included a buffer zone up to 250m beyond the red line boundary. This excluded areas where access was not possible and/or areas beyond significant features such as major roads and residential developments. See Figure 1.1.
- 1.10 This survey area was chosen because the scheme would be confined to an area within the red line boundary, therefore already providing a buffer zone around the potential route. It was also recognised that the scheme was for a busway and not a major road and therefore the effects on biodiversity would not be comparable to a road scheme as traffic flows, noise, light and visual disturbance and habitat loss would likely be less therefore less detrimental to biodiversity.
- 1.11 The survey excluded areas where access was not possible and areas beyond significant features such as major roads (e.g. A428), commercial, academic and residential developments. These features were already likely to influence the movement and behaviour of wildlife and beyond which the scheme would be unlikely to exert an adverse effect.
- 1.12 The survey area did extend into the 250m buffer where access was possible and where significant features that could act as a barrier were not present. This was in order to put into context the observations made and provide a comparison between observations within and outside the red line boundary.
- 1.13 Within the survey area:
  - the dominant habitat was arable land,
  - other habitats included amenity and improved grassland, tall ruderal, dense and scattered scrub, ephemeral/short perennial,
  - habitats of conservation value included, semi-improved grassland, broad-leaved lowland deciduous woodland (including plantation woodland), traditional orchards, hedgerows, wet and dry ditches other waterbodies (such as ponds and a lake) and Bin Brook.

## 2 METHODS

2.1 Bat activity surveys were carried out to ascertain the presence or likely absence of roosting bats in trees previously identified as having potential to support roosting bats and to identify foraging and commuting routes for bats in habitat at the site. The surveys comprised emergence/re-entry surveys of the trees to detect roost sites and static bat detector surveys of the hedgerows/linear feature, to identify notable foraging and commuting routes.

### Features chosen to survey

2.2 The trees where emergence/re-entry surveys were carried out to detect the presence of roost bats, were the 50 trees identified as having bat roost potential during the Stage 1 Inspection surveys (Cambridge Ecology 2018, 2019).

2.3 No buildings or bridges were included in the emergence/re-entry survey as these were either considered unsuitable (negligible/low potential) for roosting bats during the Stage 1 Inspection surveys (Cambridge Ecology 2018, 2019) or were not expected to be directly affected by the proposed scheme and therefore beyond the scope of the Stage 1 Inspection survey.

2.4 Figure 2.1a-f shows the indicative location of the 50 trees that were surveyed.

2.5 The hedgerows (linear features including lines of trees and Bin Brook) where static bat detector surveys were carried out to detect the presence of foraging and/or roosting bats, were chosen based the linear feature have at least two of the following features:

- the linear feature would be bisected by the potential transport route.
- the linear feature would be bordered by the potential transport route.
- the linear feature was considered to have characteristics suitable to support foraging/commuting bats, e.g. intact, tall, thick unmanaged hedgerows.

2.6 Figure 2.2a-g shows the indicative location of the 36 hedgerow/linear features that were surveyed and bat detector locations. Figure 2.3 shows an overview plan of the indicative location of the hedgerow/linear features and bat detector locations along the whole survey area.

### Emergence/Re-entry survey

2.7 The emergence/re-entry survey methodology was based upon the Bat Surveys: Good Practice Guidelines for manual bat activity survey (Collins, 2016).

2.8 The aim of the emergence/re-entry survey was to:

- determine whether bats were using any of the trees as a roost site,
- collect data to identify the species and number of roosting bats,
- note the presence and behaviour of any other bats detected during the survey, that were not considered roosting.

- 2.9 Rather than categorise each tree, into low, moderate or high potential bat roost trees; all trees were treated as being high potential. Therefore, three separate visits were made to each tree to carry out the emergence/re-entry survey. In accordance with Good Practise Guidelines (Collins 2016) each tree had at least one dusk visit and one dawn visit with the third visit being either a dusk or dawn. The surveys were undertaken between May and September with all survey visits made during the core season May to August.
- 2.10 The visits were made either during the dawn or dusk period and were completed during suitable weather conditions for the bat activity. Table 2.1 details to the survey date, period and weather conditions.
- 2.11 The dusk survey commenced approximately 30 minutes before sunset, then continued until 2-2.5 hours after sunset, while the dawn visits commenced 1.5-2 hours before sunrise; then continued until 20 minutes after sunrise, or when bat activity levels observably declined significantly.
- 2.12 The bat surveyors were located at strategic points, chosen to allow all previously identified potential access or emergence points for bats to be viewed, to monitor the bat activity around each tree. At dusk, potential exit points were watched constantly by the surveyors. While at dawn bats were tracked back to any entry points within the tree.
- 2.13 During the survey Wildlife Acoustics EM3 Touch Pro and Anabat Walkabout bat detectors were used as the main bat activity detecting/recording equipment. A Batbox duet bat detector and recorder and Elekon Batscanner were used as back-up devices. Where necessary AnalookW and Batscan software was used.
- 2.14 In addition, to help see any bat activity in the dark, a thermal camera (Flir Scout BTS Series Thermal Night Vision Camera) was set up during one of the three survey visits to each tree. The thermal imaging camera would assist with the detection of bats exiting or returning to their roost site.
- 2.15 During the survey, incidental bat activity within the vicinity of each tree was also recorded. For each location, the species/species group of bats and the number of passes was recorded. From the type of echolocation detected and indication of the bat's behaviour (foraging/feeding, commuting) was also noted.
- 2.16 For those trees (T25-29 and T42) known to have bat boxes fitted, two inspection visits were made during the day at different times through the summer, to check for signs of bat activity. In addition, one emergence/re-entry survey was carried out.
- 2.17 Where trees were in close proximity to each other (e.g. T13 and T14) it was possible to observe more than one tree at the same time.

**Table 2.1 Weather conditions recorded in 2019 during the emergence/re-entry surveys of 50 trees. (\* = tree with bat box)**

Tree Number	Survey date	Dawn/Dusk	Temperature °C	Cloud Cover %	Rain (Dry/Wet)	Wind conditions (Dir/mph)	Humidity	Overall Conditions (Optimal/Suitable)
1	01/07/2019	Dusk	16	10	Dry	WNW 8	-	Optimal

**Cambourne to Cambridge Better Public Transport: Stage 2 Bat Activity Survey 2019**

Tree Number	Survey date	Dawn/ Dusk	Temperature °C	Cloud Cover %	Rain (Dry/Wet)	Wind conditions (Dir/mph)	Humidity	Overall Conditions (Optimal/Suitable)
	05/07/2019	Dawn	15	80	Dry	0	-	Optimal
	06/08/2019	Dusk	22	20	Dry	SW12	-	Optimal
2	28/06/2019	Dawn	22	0	Dry	0	-	Optimal
	02/07/2019	Dusk	16	10	Dry	NW 4	-	Optimal
	25/07/2019	Dawn	19	0	Dry	S 7	-	Optimal
3	02/07/2019	Dusk	16	10	Dry	NW 4	-	Optimal
	03/07/2019	Dusk	15	10	Dry	NNE 8	47	Optimal
	25/07/2019	Dawn	19	0	Dry	S 7	-	Optimal
4	02/07/2019	Dusk	16	10	Dry	NW 4	-	Optimal
	04/07/2019	Dusk	20	50	Dry	N 5	59	Optimal
	25/07/2019	Dawn	19	0	Dry	S 7	-	Optimal
5	08/07/2019	Dusk	16	100	Dry	SE 10	63	Optimal
	23/07/2019	Dawn	17	0	Dry	ESE 11	-	Optimal
	08/08/2019	Dusk	22	30	Dry	SE 8	-	Optimal
6	28/06/2019	Dawn	22	0	Dry	0	-	Optimal
	09/07/2019	Dusk	18	100	Dry	SSE 4	83	Optimal
	01/08/2019	Dusk	16	90	Dry	NE 7	-	Optimal
7	27/06/2019	Dusk	13	0	Dry	SW 3	-	Optimal
	10/07/2019	Dusk	19	100	Dry	SW 6	75	Optimal
	01/08/2019	Dawn	16	90	Dry	NE 7	-	Optimal
8	27/06/2019	Dusk	13	0	Dry	SW 3	-	Optimal
	12/07/2019	Dawn	17	100	Dry	W 7	89	Optimal
	01/08/2019	Dawn	16	90	Dry	NE 7	-	Optimal
9	15/07/2019	Dusk	16	0	Dry	S 5	71	Optimal
	23/07/2019	Dawn	17	0	Dry	ESE 11	-	Optimal
	08/08/2019	Dusk	22	30	Dry	SE 8	-	Optimal
10	20/06/2019	Dusk	15	50	Dry	SW 1	-	Optimal
	16/07/2019	Dusk	19	50	Dry	E 5	78	Optimal
	30/07/2019	Dawn	17	100	Dry	SW 1	-	Optimal
11	20/06/2019	Dusk	15	50	Dry	SW 1	-	Optimal
	22/07/2019	Dawn	18	50	Dry	WSW 15	80	Optimal
	30/07/2019	Dawn	17	100	Dry	SW 1	-	Optimal
12	20/06/2019	Dusk	15	50	Dry	SW 1	-	Optimal
	22/07/2019	Dusk	22	10	Dry	SSW 4	78	Optimal
	30/07/2019	Dawn	17	100	Dry	SW 1	-	Optimal
13	21/06/2019	Dawn	12	20	Dry	SW 1	-	Optimal
	23/07/2019	Dusk	23	10	Dry	ESE 11	66	Optimal
	24/07/2019	Dusk	23	50	Dry	0	-	Optimal
14	21/06/2019	Dawn	12	20	Dry	SW 1	-	Optimal
	23/07/2019	Dusk	23	10	Dry	ESE 11	66	Optimal
	24/07/2019	Dusk	23	50	Dry	0	-	Optimal
15	21/06/2019	Dawn	12	20	Dry	SW 1	-	Optimal
	24/07/2019	Dusk	25	10	Dry	SSW 5	63	Optimal
	25/07/2019	Dusk	23	50	Dry	0	-	Optimal
16	21/06/2019	Dawn	12	20	Dry	SW 1	-	Optimal
	25/07/2019	Dusk	27	10	Dry	S 7	64	Optimal
	31/07/2019	Dusk	17	100	Dry	WSW 12	-	Optimal
17	21/06/2019	Dawn	12	20	Dry	SW 1	-	Optimal
	29/07/2019	Dusk	19	10	Dry	SE 10	67	Optimal
	31/07/2019	Dusk	17	100	Dry	WSW 12	-	Optimal
18	18/06/2019	Dusk	15	60	Dry	SW 1	-	Optimal
	22/07/2019	Dawn	21	0	Dry	WSW 15	-	Optimal
	31/07/2019	Dawn	16	100	Dry	SW15	87	Optimal
19	14/06/2019	Dawn	12	90	Dry	SSW 2	-	Optimal
	29/07/2019	Dusk	18	80	Dry	SE 10	-	Optimal
	31/07/2019	Dusk	17	80	Dry	WSW12	80	Optimal
20	18/06/2019	Dawn	15	60	Dry	0	-	Optimal
	22/07/2019	Dusk	21	0	Dry	SE 1	-	Optimal
	01/08/2019	Dusk	17	10	Dry	NE 7	82	Optimal
21	14/06/2019	Dawn	12	90	Dry	SSW 2	-	Optimal
	29/07/2019	Dusk	21	80	Dry	0	-	Optimal
	05/08/2019	Dusk	18	10	Dry	WSW 7	65	Optimal
22	04/07/2019	Dusk	24	0	Dry	N 2	-	Optimal
	06/08/2019	Dusk	17	0	Dry	SW 12	85	Optimal
	18/08/2019	Dawn	12	80	Dry	SW 3	-	Optimal
23	04/07/2019	Dusk	24	0	Dry	N 2	-	Optimal

**Cambourne to Cambridge Better Public Transport: Stage 2 Bat Activity Survey 2019**

Tree Number	Survey date	Dawn/ Dusk	Temperature °C	Cloud Cover %	Rain (Dry/Wet)	Wind conditions (Dir/mph)	Humidity	Overall Conditions (Optimal/Suitable)
	07/08/2019	Dusk	17	0	Dry	WSW 7	75	Optimal
	13/08/2019	Dawn	12	10	Dry	SW 7	-	Optimal
24	04/07/2019	Dusk	24	0	Dry	N 2	-	Optimal
	08/08/2019	Dawn	14	0	Dry	SE 8	87	Optimal
	13/08/2019	Dawn	12	10	Dry	SW 7	-	Optimal
25*	04/06/2019	Day	12	100	Dry	N 3	-	Optimal
	05/07/2019	Day	21	40	Dry	SW 5	-	Optimal
	13/08/2019	Dawn	12	20	Dry	SW 7	82	Optimal
26*	04/06/2019	Day	12	100	Dry	N 3	-	Optimal
	05/07/2019	Day	21	40	Dry	SW 5	-	Optimal
	13/08/2019	Dawn	12	20	Dry	SW 7	82	Optimal
27*	04/06/2019	Day	12	100	Dry	N 3	-	Optimal
	05/07/2019	Day	21	40	Dry	SW 5	-	Optimal
	14/08/2019	Dawn	14	100	Dry	S 8	90	Optimal
28*	04/06/2019	Day	12	100	Dry	N 3	-	Optimal
	05/07/2019	Day	21	40	Dry	SW 5	-	Optimal
	14/08/2019	Dawn	14	100	Dry	S 8	90	Optimal
29*	04/06/2019	Day	12	100	Dry	N 3	-	Optimal
	05/07/2019	Day	21	40	Dry	SW 5	-	Optimal
	14/08/2019	Dawn	14	100	Dry	S 8	90	Optimal
30	09/07/2019	Dawn	13	100	Dry	SSE 4	-	Optimal
	09/08/2019	Dusk	19	50	Dry	SE 8	-	Optimal
	27/08/2019	Dusk	22	100	Dry	W 6	79	Optimal
31	09/07/2019	Dawn	13	100	Dry	SSE 4	-	Optimal
	09/08/2019	Dusk	19	50	Dry	SE 8	-	Optimal
	28/08/2019	Dawn	18	100	Dry	WSW 7	85	Optimal
32	14/06/2019	Dusk	15	10	Dry	SW 3	-	Optimal
	13/07/2019	Dawn	14	100	Dry	S 5	-	Optimal
	29/08/2019	Dusk	18	100	Dry	SW 8	77	Optimal
33	14/06/2019	Dusk	15	10	Dry	SW 3	-	Optimal
	13/07/2019	Dawn	14	100	Dry	S 5	-	Optimal
	29/08/2019	Dusk	18	100	Dry	SW 8	77	Optimal
34	14/06/2019	Dusk	15	10	Dry	SW 3	-	Optimal
	13/07/2019	Dawn	14	100	Dry	S 5	-	Optimal
	29/08/2019	Dusk	18	100	Dry	SW 8	77	Optimal
35	08/06/2019	Dawn	12	100	Dry	0	-	Optimal
	12/06/2019	Dawn	12	100	Dry	SSW 8	-	Optimal
	11/07/2019	Dusk	19	95	Dry	0	-	Optimal
36	08/06/2019	Dawn	11	100	Dry	0	-	Suitable
	13/06/2019	Dusk	13	100	Dry	SSW 11	-	Optimal
	11/07/2019	Dusk	19	95	Dry	0	-	Optimal
37	15/06/2019	Dawn	11	80	Dry	0	-	Suitable
	18/07/2019	Dusk	17	20	Dry	0	-	Optimal
	20/08/2019	Dusk	15	50	Dry	SW 6	67	Optimal
38	15/06/2019	Dawn	11	80	Dry	0	-	Suitable
	18/07/2019	Dusk	17	20	Dry	0	-	Optimal
	20/08/2019	Dusk	15	50	Dry	SW 6	67	Optimal
39	15/06/2019	Dawn	11	80	Dry	0	-	Suitable
	18/06/2019	Dawn	12	30	Dry	SW 5	-	Optimal
	18/07/2019	Dusk	17	20	Dry	0	-	Optimal
40	15/06/2019	Dawn	11	80	Dry	0	-	Suitable
	18/06/2019	Dawn	12	30	Dry	SW 5	-	Optimal
	18/07/2019	Dusk	17	20	Dry	0	-	Optimal
41	15/06/2019	Dawn	11	80	Dry	0	-	Suitable
	18/06/2019	Dawn	12	30	Dry	SW 5	-	Optimal
	18/07/2019	Dusk	17	20	Dry	0	-	Optimal
42*	04/06/2019	Day	12	100	Dry	N 3	-	Optimal
	05/07/2019	Day	21	40	Dry	SW 5	-	Optimal
	19/07/2019	Dawn	14	0	Dry	SW 7	87	Optimal
43	17/06/2019	Dusk	20	10	Dry	SW 3	-	Optimal
	19/07/2019	Dawn	12	0	Dry	0	-	Optimal
	21/08/2019	Dusk	15	100	Dry	SSW 11	66	Optimal
44	05/06/2019	Dawn	11	5	Dry	N 3	-	Suitable
	08/07/2019	Dusk	15	100	Dry	SE 5	-	Optimal
	02/08/2019	Dusk	18	10	Dry	NE6	78	Optimal
45	05/06/2019	Dawn	11	5	Dry	N 3	-	Suitable

Tree Number	Survey date	Dawn/ Dusk	Temperature °C	Cloud Cover %	Rain (Dry/Wet)	Wind conditions (Dir/mph)	Humidity	Overall Conditions (Optimal/Suitable)
46	08/07/2019	Dusk	15	100	Dry	SE 5	-	Optimal
	08/08/2019	Dusk	20	50	Dry	SE 8	80	Optimal
	14/06/2019	Dusk	15	10	Dry	SW 3	-	Optimal
	13/07/2019	Dawn	14	100	Dry	S 5	-	Optimal
47	22/08/2019	Dawn	13	100	Dry	SSW 8	90	Optimal
	14/06/2019	Dusk	15	10	Dry	SW 3	-	Optimal
	13/07/2019	Dawn	14	100	Dry	S 5	-	Optimal
48	22/08/2019	Dusk	18	100	Dry	WSW 8	77	Optimal
	11/06/2019	Dawn	12	100	Dry	N 5	-	Optimal
	05/07/2019	Dawn	15	80	Dry	0	-	Optimal
49	11/08/2019	Dusk	15	60	Dry	SW 2	-	Optimal
	17/06/2019	Dawn	12	30	Dry	SW 15	-	Optimal
	03/07/2019	Dawn	12	0	Dry	0	-	Optimal
50	05/08/2019	Dusk	15	60	Dry	SW 3	-	Optimal
	03/07/2019	Dawn	12	0	Dry	0	-	Optimal
	05/08/2019	Dusk	15	60	Dry	SW 3	-	Optimal
	19/08/2019	Dusk	15	25	Dry	SW 8	75	Optimal

### Bat Activity survey – Static Detectors

- 2.18 The survey methodology was based upon the Bat Surveys: Good Practice Guidelines for manual bat activity survey (Collins, 2016).
- 2.19 A combination of Song Meter SM2BAT+ Bat Recorder and Anabat Bat Detectors (Express and SD2) static monitoring devices were used and set up at separate locations along the 36 linear features, selected to give an indication of bat activity in areas of suitable commuting and foraging habitat along the linear features. Figure 2.3 a-g shows the indicative location of the bat detectors along the linear features.
- 2.20 The detector locations along the linear features were chosen to provide the best opportunity to detect bat activity and provide a representative indication of bat usage along the hedgerow/feature. Each detector was locked into position along the linear feature, discretely located 3-4 m above ground level to maximise detection of bat activity while minimising detection by members of the public.
- 2.21 The static bat detectors were deployed for a minimum of five consecutive nights for three periods between from June to October 2019 (June to August, July to September and September to October). These periods were chosen based on Good Practise Guidelines (Collins 2016). The detectors were set to operate 30 minutes before sunset until 30 minutes after sunrise. Once triggered, a detector recorded until there was no ultrasonic sound heard for two seconds. The sound files were saved as zero-crossing/Wav files.
- 2.22 Following collection of the static monitoring devices after the recording period, the memory card holding the zero-crossing/Wav sound files (which did not require any conversion) were uploaded onto the computer and the sound files/calls were analysed using Anlook software to determine the species/species group of bat present in each recording, the number of registrations detected and behaviour (foraging/feeding and/or commuting).



- 2.23 If during the analysis it was noted that the detector has stopped recording for any reason, the detector was redeployed along the same linear feature in order to collect a further set of data to make up the minimum five nights worth of recordings.
- 2.24 In order to evaluate the overall level of bat activity along each linear feature and to allow a comparison to be made of the bat activity between each linear feature, a bat activity score was calculated. This was calculated by taking the total number of passes for all species, during each survey event, along each linear feature; then dividing that number by the duration time (hrs) of the survey. The resulting figure would give a bat activity score.
- 2.25 The maximum and minimum air temperatures recorded by the static bat detectors, during the three sets of static monitoring surveys are shown in Table 2.2, 2.3 and 2.4.

**Table 2.2 Weather conditions recorded during the first set of static detector surveys between June and August 2019 (taken from Anabat Express)**

Hedgerow Number	Survey Date	Temperature °C	
		Maximum	Minimum
4, 5, 6	14-06-19	17.5	11.0
	15-06-19	19.5	9.0
	16-06-19	19.5	12.0
	17-06-19	21.5	9.5
	18-06-19	21.5	14.5
1, 2, 12, 15, 20	21-06-19	21.0	13.0
	22-06-19	23.5	12.0
	23-06-19	29.0	17.5
	24-06-19	27.0	20.0
	25-06-19	20.0	15.5
17, 21, 22, 23, 24, 25, 28, 30	28-06-19	20.5	13.0
	29-06-19	27.5	17.0
	30-06-19	22.0	13.0
	01-07-19	19.5	12.0
	02-07-19	19.0	12.5
8, 16, 18, 19, 31, 32, 33, 34, 35, 36	05-07-19	25.5	14.0
	06-07-19	21.0	11.5
	07-07-19	25.0	14.0
	08-07-19	23.5	14.0
	09-07-19	20.5	17.0
3, 7, 9, 11, 13	12-07-19	26.0	15.0
	13-07-19	20.0	14.5
	14-07-19	19.5	13.0
	15-07-19	20.5	8.5
	16-07-19	26.0	15.5
10, 27	17-07-19	28.5	15.5
	18-07-19	20.5	13.0
	19-07-19	18.5	16.5
	20-07-19	22.5	14.0
	21-07-19	22.0	16.5
	22-07-19	26.5	19.5
14	23-07-19	35.0	21.0
	24-07-19	30.5	19.5
	25-07-19	36.0	22.5
	26-07-19	24.5	19.5
	27-07-19	18.5	16.0
26, 29	29-07-19	32.5	18.5
	30-07-19	23.5	17.0
	31-07-19	21.0	17.0
	01-08-19	25.0	15.5
	02-08-19	24.5	13.0
	03-08-19	28.0	14.5
04-08-19	27.0	16.5	

**Table 2.3 Weather conditions recorded during the second set of static detector surveys between July and September 2019 (taken from Anabat Express)**

Hedgerow Number	Survey Date	Temperature °C	
		Maximum	Minimum
1, 2, 3, 5, 6, 7, 8, (9), 10	29-07-19	28.5	18.5
	30-07-19	22.5	17.0
	31-07-19	21.0	17.5
	01-08-19	25.0	15.5
	02-08-19	24.5	13.0
	03-08-19	28.0	14.5
	04-08-19	27.0	16.5
4, (9), 11, 12, 13, 14, (15), 16, 17, 18	08-08-19	25.5	18.5
	09-08-19	24.5	18.5
	10-08-19	20.5	15.0
	11-08-19	20.5	13.0
	12-08-19	18.0	11.5
20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 31	15-08-19	20.0	13.0
	16-08-19	17.5	14.0
	17-08-19	19.5	15.0
	18-08-19	16.5	13.5
	19-08-19	20.0	11.0
30, 32, 33, 34, 35, 36	20-08-19	18.5	12.0
	20-08-19	19.5	11.0
	22-08-19	22.0	15.0
	23-08-19	23.5	14.5
	24-08-19	27.0	16.5
	25-08-19	30.5	18.5
	26-08-19	33.5	19.0
(15), 19	29-08-19	22.0	12.5
	30-08-19	24.0	13.0
	31-08-19	23.0	11.5
	01-09-19	18.0	9.5
	02-09-19	21.0	14.5
	03-09-19	24.0	16.0

**Table 2.4 Weather conditions recorded in 2019 during the third set of static detector surveys between September and October 2019 (taken from Anabat Express)**

Hedgerow Number	Survey Date	Temperature °C	
		Maximum	Minimum
1, 2, 3, 4, 12, 13, 14, 19N, 19S, 34, 36	05/09/2019	25.5	10.5
	06/09/2019	18.5	11.0
	07/09/2019	20.5	6.5
	08/09/2019	23.5	11.0
	09/09/2019	14.5	12.0
5, 6, 15, 16, 17, 19S,	13/09/2019	31.5	5.5
	14/09/2019	33.5	8.5
	15/09/2019	36	16.5
	16/09/2019	19.5	8
	17/09/2019	32.5	2.5
7, 8, 9, 10, 11, 18, 20, 22, 24	21/09/2019	22.0	17.0
	22/09/2019	21.0	14.0
	23/09/2019	19.0	16.5
	24/09/2019	17.5	16.0
	25/09/2019	19.0	16.0
21, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 35	30/09/2019	19.5	13.5
	01/10/2019	20.5	6
	02/10/2019	14	3.5
	03/10/2019	13	10
	04/10/2019	17	11.5
9	05/10/2019	24.0	12.0
	06/10/2019	15.0	8.0
	07/10/2019	13.5	11.5
	08/10/2019	15.5	10.0
	09/10/2019	15.0	8.0
	10/10/2019	16	15
	11/10/2019	17.5	11
	12/10/2019	13.5	11.5
	13/10/2019	16	9.5

**Divergence from Bat Surveys for Professional Ecologists: Good Practice Guidelines**

2.26 It recognised that the categorisation of the trees chosen for the emergence/re-entry surveys deviated from the Good Practise Guidelines (Collins 2016). The guidelines indicate categorising the trees into low, moderate or high potential to support roosting bats, based on the characteristics of the tree and presence of potential roost features. For this survey we did not differentiate between the trees into low, moderate or high potential to support roosting bats. Rather the trees were either categorised as with, or without potential to support roosting bats.

- 2.27 All those trees that had potential roost features were then subject to an emergence/re-entry survey as if they were of high potential to support roosting bats. This method was considered to provide the best opportunity for any bat roosts in trees to be detected, irrespective of whether the tree had low, moderate or high potential to support roosting bats.
- 2.28 It recognised that the emergence/re-entry surveys of the trees deviated from the Good Practise Guidelines (Collins 2016), in that a number of repeat surveys of the trees were undertaken less than two weeks apart, which does not accord with guideline recommendations, which recommends a space of two weeks between each survey. This is a potential constraint. However, it is considered unlikely to be significant as generally there were at least four weeks between the first and last survey visit to each tree, thereby the same period as would be experienced given a two-week gap between each survey. Only trees 3 and 4 were surveyed in a shorter period of 24 days between the first and last survey.
- 2.29 It recognised that the bat activity surveys of the hedgerows/linear features deviated from the Good Practise Guidelines (Collins 2016). The guidelines suggest carrying out individual walked transects along the linear features.
- 2.30 The individual walked transects were omitted from the survey because static detectors were installed along all the linear features (primarily hedgerows) that could be bisected/affected by the potential route of the transport system. The data collected would be expected to provide a valid set (3 sets of 5 nights) of bat activity data that would be representative of the bat activity along those features. The data from individual walked transects across largely arable land and next to busy roads (i.e.M11/A1303/A428) would not likely add significant new data. However, it is acknowledged that individual walked transects have the potential to provide information on numbers of bats and their behaviour. This provided they can be seen at night and different individuals identified and counted, while information on bat behaviour can be readily be evaluated from the static detector calls.
- 2.31 In addition, emergence/re-entry surveys (involving surveyors visiting each tree three times either after sunset or before sunrise) were carried out on individual trees considered suitable to support roosting bats along some of the linear features. Therefore, the incidental bat activity that occurred in the vicinity of the tree, was noted and provided an additional indication of the level of bat activity along the linear feature equivalent to the sort of data that would be collected during individual walked transects.

### 3 RESULTS

#### Emergence/Re-entry Survey of Trees to Detect Bat Roosts

3.1 Table 3.1 shows the results of the bat roosting activity of the 50 trees where three visits were made to detect the emergence and/ or re-entry of bats to their roost sites.

3.2 Figures 3.1a-g shows the indicative location of the 50 trees and their status as potential bat roost sites.

3.3 The results found:

- five trees (T30, T34, T35 T38/39) showed signs of containing a bat roost.
- one Common Pipistrelle re-entered a hole in dead stem of T30 at 04:09 on the 09/07/19. This roost was considered a non-breeding summer roost.
- two Common Pipistrelle emerged from T34 at 2140 on the 14/06/19. They left from ivy 10m up, dropping out and flew west. This roost was considered a non-breeding summer roost.
- one Soprano Pipistrelle emerged from a woodpecker hole in T35 at 2138 on the 11/07/19 then flew east. This roost was considered a non-breeding summer roost.
- three Common Pipistrelle re-entered T38/39 at 0357 on the 15/06/19. The exact, location could not be established without climbing the tree. This roost was considered a non-breeding summer roost, rather than a maternity roost.
- that while surveying T32, T33 and T34 species of bat (unidentified) were observed emerging from behind the bargeboard on the eastern gable of building number 71 at 0426 on the 13/07/19
- that while surveying T50, a probably Common Pipistrelle was observed emerging from the roof structure of the bungalow named the Gate House, at 21.11 on the 05/08/19.

3.4 During the emergence/re-entry surveys incidental observations of bat activity were also recorded. Table 3.2 shows the results of these incidental observations of bat activity.

3.5 The results show:

- a small amount of bat activity was detected in the vicinity of all the trees surveyed.
- the highest level of bat activity comprised 40 passes in the vicinity of T30.
- the commonest species detected were Common and Soprano Pipistrelles.
- Barbastelle bat activity was detected in the vicinity of T11, T12 and T37, T38 and T45.

- other species detected included, Brown Long-eared, Noctule, Serotine, and Myotis sp.
- bat activity detected comprised commuting and foraging, there was no courtship or swarming activity.

### **Static Monitoring of Linear Features to Detect Bat Activity**

#### *First Set of Static Monitoring Surveys between June and August 2019*

3.6 Table 3.3 shows the results of the first set of static monitoring surveys carried out between June and August 2019. The table shows the number of each species of bat detected along each hedgerow surveyed.

3.7 The results show:

- a total of eleven bat species were recorded during the survey period. These comprised Nathusius, Common and Soprano Pipistrelle bats, Noctule, Serotine, Leisler's, Barbastelle, Brown Long-eared, Whiskered/Brandt's, Natterer's and Daubenton's. Other bats that were not identified to species level were either assigned to a family group (e.g. Pipistrelle sp. or Myotis sp.) or left as unidentified if the call was not sufficiently clear to assign a species or a family group.
- the hedgerows with the most species (7), excluding unidentified bats or bats only identified to family group, were hedgerows 3 and 36, along Bin Brook and along the northern boundary of Bourn Airfield respectively.
- the hedgerow with the least number of species (1) was hedgerow 21, along the southern boundary of the covered reservoir.
- the hedgerow with the most activity (848 registrations) of a single species (Common Pipistrelle) was hedgerow 3, along Bin Brook.
- the hedgerow with the highest activity score (38.48) was hedgerow 5, along the southern boundary of the Cambridge West site.
- the hedgerow with the lowest activity score (0.24) was hedgerow 11 along the north side of the A1303 up to the M11 junction.
- Barbastelle bat activity was detected along hedgerows 1, 2, 3, 5, 12, 14, 16, 17, 19 north, 20, 28, 30, 31, 35 and 36. Most Barbastelle activity (27 registrations) was at Hedgerow 3, along Bin Brook.
- the highest level of Nathusius' Pipistrelle bat activity (9 registrations) was along hedgerow 15 between Coton village and the American cemetery.
- the highest level of Noctule bat activity (488 registrations) was at hedgerow 28, along the A1303. These bats were feeding over the balancing pond between the A1303 and A428 dual carriageway.

- the highest level of Soprano Pipistrelle activity (329 registrations) was at hedgerow 1, near Grange Road.
- the highest level of Serotine bat activity (17 registrations) was at hedgerow 1, near Grange Road.
- the highest level of Leisler's bat activity (5 registrations) was at hedgerow 3, along Bin Brook.
- the highest level of Daubenton's bat activity (6 registrations) was at hedgerow 5, along the southern boundary of the Cambridge West site.
- the highest level of Brown Long-eared bat activity (28 registrations) was at hedgerow 16, adjacent to the American cemetery.
- bat recordings indicated that their behaviour along the hedgerows comprised foraging and commuting activity.

3.8 Figure 3.2 a-g provides an illustration of the bat activity detected during the first set of static monitoring of hedgerows. The pie charts illustrate the number of each species detected as a proportion of the total detected along that hedgerow or linear feature.

*Second Set of Static Monitoring Surveys between July and September 2019*

3.9 Table 3.4 shows the results of the first set of static monitoring surveys carried out between July and September 2019. The table shows the number of each species of bat detected along each hedgerow surveyed.

3.10 The results show:

- a total of eleven bat species were recorded during the survey period. These comprised Nathusius, Common and Soprano Pipistrelle bats, Noctule, Serotine, Leisler's, Barbastelle, Brown Long-eared, Whiskered/Brandt's, Natterer's and Daubenton's. Other bats that were not identified to species level were either assigned to a family group (e.g. Pipistrelle sp. or Myotis sp.) or left as unidentified if the call was not sufficiently clear to assign a species or a family group.
- the hedgerow with the most species (8), excluding unidentified bats or bats only identified to family group, was hedgerow 33, at the eastern end of Bourn Airfield north of Highfield Caldecote.
- the hedgerow with the least number of species (1) was hedgerow 24.
- the hedgerow with the most activity (4319 registrations) of a single species (Common Pipistrelle) was hedgerow 10, along the eastern boundary of Coton Orchard.
- the hedgerows with the highest activity score (108.73 and 109.78 respectively) were hedgerows 10 (along the eastern boundary of Coton Orchard) and 11 (along the north side of the A1303 up to the M11 junction).



- the hedgerow with the lowest activity score (0.13) was hedgerow 24, along the western boundary of the covered reservoir parallel to Long Road.
- Barbastelle bat activity was detected along hedgerows 1, 5, 6, 9, 10, 11, 13, 15, 16, 17, 18, 19 north, 19 south 20, 26, 29, 30, 32, 33, 35 and 36. Most Barbastelle activity (1169 registrations) was at Hedgerow 19S, south of the A1303 next to Madingley Wood SSSI.
- the highest level of Nathusius' Pipistrelle bat activity (16 registrations) was along hedgerow 10, along the eastern boundary of Coton Orchard.
- the highest level of Noctule bat activity (2233 registrations) was at hedgerow 10, along the eastern boundary of Coton Orchard.
- the highest level of Soprano Pipistrelle activity (1847 registrations) was at hedgerow 11, along the north side of the A1303 up to the M11 junction.
- the highest level of Serotine bat activity (13 registrations) was at hedgerow 19 south, south of the A1303 next to Madingley Wood SSSI.
- the highest level of Natterer's bat activity (5 registrations) was at hedgerow 9, east of Coton Orchard along the western boundary of the M11.
- the highest level of Daubenton's bat activity (10 registrations) was at hedgerow 29, north of the A1303 near the Hardwick roundabout along the southern boundary of the A428.
- the highest level of Brown Long-eared bat activity (30 registrations) was at hedgerow 30, at the eastern end of Bourn Airfield north of the A1303 and the Highfield Caldecote roundabout.
- bat recordings indicated that their behaviour along the hedgerows comprised foraging and commuting activity.

3.11 Figure 3.3 a-g provides an illustration of the bat activity detected during the second set of static monitoring of hedgerows. The pie charts illustrate the number of each species detected as a proportion of the total detected along that hedgerow.

*Third Set of Static Monitoring Surveys between September and October 2019*

3.12 Table 3.5 shows the results of the first set of static monitoring surveys carried out between September and October 2019. The table shows the number of each species of bat detected along each hedgerow surveyed.

3.13 The results show:

- a total of eleven bat species were recorded during the survey period. These comprised Nathusius, Common and Soprano Pipistrelle bats, Noctule, Serotine, Leisler's, Barbastelle, Brown Long-eared, Whiskered/Brandt's, Natterer's and Daubenton's. Other bats that were not identified to species level were either assigned to a family group (e.g. Pipistrelle sp. or Myotis sp.) or left as

unidentified if the call was not sufficiently clear to assign a species or a family group.

- the hedgerow with the most species (9), excluding unidentified bats or bats only identified to family group, was hedgerow 5, along the southern boundary of the Cambridge West site.
- the hedgerows with the least number of species (1), where some bat activity was recorded, were hedgerows 27, 29 and 30, located along the north side of the A1303 west of Hardwick and south of the A428 dual carriageway between Hardwick and the eastern entrance to Bourn Airfield.
- the hedgerow with the most activity (1973 registrations) of a single species (Common Pipistrelle) was hedgerow 11, located along the north side of the A1303 up to the M11 junction.
- the hedgerow with the highest activity score (55.45) was also hedgerow 11 located along the north side of the A1303 up to the M11 junction.
- the hedgerow with the lowest activity score (0.03), where some bat activity was recorded, was hedgerow 27 located along the A1303 west of Hardwick.
- Barbastelle bat activity was detected along hedgerows 1, 3, 5, 9, 11, 13, 18, 19 south, 24, 26, 32, 34, 35 and 36. Most Barbastelle activity (220 registrations) was along Hedgerow 19 south, south of the A1303 next to Madingley Wood SSSI.
- the highest level of Nathusius' Pipistrelle bat activity (1 registrations) was along hedgerow 5 and 26, located along the southern boundary of the Cambridge West site and along the north side of the A1303 west of Hardwick, respectively.
- the highest level of Noctule bat activity (15 registrations) was at hedgerow 11, located along the north side of the A1303 up to the M11 junction.
- the highest level of Soprano Pipistrelle activity (573 registrations) was at hedgerow 20, located across the arable fields north west of Coton Village.
- the highest level of Serotine bat activity (1 registration) located along hedgerow 1, 5, 11, and 19 south.
- the highest level of Leisler's bat activity (2 registrations) was at hedgerow 11.
- the highest level of Brown Long-eared bat activity (10 registrations) was at hedgerow 24, parallel to Long Road near the covered reservoir.
- the highest level of Brandt's bat activity (6 registrations) was at hedgerow 24, parallel to Long Road near the covered reservoir.
- bat recordings indicated that their behaviour along the hedgerows comprised foraging and commuting activity.
- there were no bat recordings for hedgerows 15, 16, 17 and 19 north.

- 3.14 Figure 3.4 a-g provides an illustration of the bat activity detected during the third set of static monitoring of hedgerows. The pie charts illustrate the number of each species detected as a proportion of the total detected along that hedgerow.

### **Barbastelle Bat Activity**

- 3.15 Barbastelle bats were recorded during the bat activity surveys. This species is cited as a key feature of Eversden and Wimpole Woods Special Area of Conservation (SAC), located approximately 7km to the south west of the survey area. It is therefore possible that the survey area has the potential to include key foraging and commuting routes for this species.
- 3.16 Cambridgeshire Bat Group data show that in 2010 Madingley Wood supported a maternity roost for Barbastelle. They caught a lactating female and adults and non-flying young within roosts identified during radiotracking (pers. comm. Mason 2020).
- 3.17 Barbastelle bat activity was detected along hedgerows 1-3, 5, 6, 9-20, 24, 26 and 28-36.
- 3.18 During the first set of surveys the total number of Barbastelle bat registrations was 93.
- 3.19 During the second set of surveys the total number of Barbastelle bat registrations was 1653.
- 3.20 During the third set of surveys the total number of Barbastelle bat registrations was 536.
- 3.21 The highest number of Barbastelle bat registrations was 1169 along hedgerow 19 south.
- 3.22 Table 3.6 details number of registrations detected for each hedgerow during the three sets of surveys.
- 3.23 Figure 3.5 a-g provides an illustration of the Barbastelle bat activity detected during the three of static detector surveys of the hedgerows. The pie charts illustrate the number of Barbastelle bat registrations during each of the three surveys as a proportion of the total detected along that hedgerow.

### **Survey Constraints**

- 3.24 It was considered that the Stage 2 Bat Activity Survey comprising emergence/re-entry surveys of 50 trees and activity surveys of 36 hedgerows was carried out methodically provided a representative indication of the presence of roosting bats and bat activity on land associated with the Cambourne to Cambridge Better Public Transport Scheme.
- 3.25 The survey methods used were based on those Good Practise Guidelines (Collins 2016). An explanation of the divergence from these methods has been discussed previously (see para 2.26 to 2.31), but this variance would not be considered to reduce the validity of the results.

- 3.26 It is acknowledged that some areas were inaccessible during the survey; due to lack of access to private land (mostly residential and commercial). For instance, none of the buildings were accessible, such as the three residential properties just north of the roundabout on the A1303 at grid reference TL 35483 59740 and the buildings at the eastern end of the survey area along Adams Road and Heschel Road. In addition, access into the habitat at Coton Orchard was not possible during the time of the surveys. Therefore, the presence/absence of roosting bats and bat activity could not be verified in these areas. Figure 1.1 shows the accessible and inaccessible/un-surveyed parts of the study area.
- 3.27 During the first set of static monitoring surveys, bat detectors were situated on Hedgerow 19 (19N) to the north of the A1303 as this hedgerow directly connected with Madingley Wood SSSI. During the subsequent set of static monitoring surveys, detectors were situated on Hedgerow 19 to the north and south of the A1303. The additional hedgerow (19S) was added as a precaution just in case the hedgerows on both sides of the A1303 in close proximity to as this hedgerow Madingley Wood SSSI were found to be used by bats and because which part of hedgerow 19 the actual route may affect was not known. Therefore, Hedgerow 19S does not include set of data to cover the first period between June-August 2019. Also, the detector in Hedgerow 19N stopped recording after two nights and it was not possible to reset the detector in the time frame to obtain an additional three nights worth of data. Therefore, Hedgerow 19N does not include 5 nights worth of data during the second set of static monitoring surveys.
- 3.28 It is recognised that there is potential that using different detectors could result in some minor differences in the data collected due to different sensitivities of the detectors. However, this was not considered a significant issue as all detectors used were fit for purpose and met the specification and bat recording were detected on each detector.
- 3.29 It was considered that all Long-eared bats recording detected came from Brown Long-eared bats species rather than from Grey Long-eared bats as the survey area was outside the normal range Grey Long-eared bats.
- 3.30 Where it was not possible to identify some bat calls to species level, they were categorised and *Myotis*, *Pipistrelle* sp. or Whiskered/Brandt's sp.

**Table 3.1: Results of the Emergence/Re-entry Survey of Trees to Detect Bat Roosts**

Tree Number	Results
30	Re-entry of one Common Pipistrelle during first survey visit on 09/07/19. Considered a non-breeding summer roost
34	Two Common Pipistrelle left from ivy 10m up, dropping out and flying west during first survey visit on 14/06/19. Considered a non-breeding summer roost
35	One Soprano Pipistrelle emerged from woodpecker hole then flew east during second survey visit on 11/07/19. Considered a non-breeding summer roost
38,39	Non-breeding summer roost of three Common Pipistrelle bats during first survey visit on 15/06/19
Near Tree 50	Possible Common Pipistrelle emergence from bungalow in whose garden Tree 50 stands during second survey visit on 05/08/19
Near Tree Group 32, 33, 34	In Coton village near tree group 32,33,34 bat sp. seen roosting behind bargeboard on the eastern gable of bungalow number 71 during second survey visit on 13/07/19
1-29, 31-33, 36-37, 40-50	No Roosting Bat Activity

**Table 3.2: Details of Incidental Bat Activity Noted During the Emergence/Re-entry Survey of Trees**

Tree Number	Survey 1	Survey 2	Survey 3
1	Species: Common Pipistrelle  Activity: 1 bat, foraging	Species: Common Pipistrelle  Activity: 1 bat, 16 passes commuting and foraging	Species: Common Pipistrelle, Soprano Pipistrelle, Noctule. Activity: 8 passes (4 CP, 2 SP, 1 Noc) commuting and foraging
2	No related bat activity	Species: Common Pipistrelle  Activity: 1 pass of social calling Common Pipistrelle	Species: Common Pipistrelle, Soprano Pipistrelle.  Activity: 4 passes (3 CP, 1 SP) commuting.
3	No related bat activity	Species: Common Pipistrelle  Activity: 1 pass of social calling Common Pipistrelle	Species: Common Pipistrelle, Soprano Pipistrelle.  Activity: 5 passes (3 CP, 2 SP) commuting.
4	No related bat activity	Species: Common Pipistrelle  Activity: 1 bat, 16 passes commuting and foraging	Species: Common Pipistrelle, Soprano Pipistrelle.  Activity: 9 passes (5 CP, 4 SP) commuting.
5	No related bat activity	No related bat activity	Species: Common Pipistrelle, Soprano Pipistrelle.  Activity: 7 passes (4 CP, 3 SP) commuting.
6	No related bat activity	Species: Common Pipistrelle  Activity: sporadic use of the clearing adjacent to T6 being used by 1 Common Pipistrelle bat as part of a foraging beat.	Species: Common Pipistrelle, Soprano Pipistrelle.  Activity: 5 passes (4 CP, 1 SP) commuting.
7	No related bat activity	Species: Common Pipistrelle  Activity: 1 bat, 2 passes. commuting	Species: Common Pipistrelle, Soprano Pipistrelle.  Activity: 6 passes (4 CP, 2 SP) commuting.
8	No related bat activity	Species: Common Pipistrelle  Activity: 1 bat, 2 passes. commuting	Species: Common Pipistrelle, Soprano Pipistrelle.  Activity: 4 passes (2 CP, 2 SP) commuting.
9	Species: Common Pipistrelle, Noctule  Activity: 2 bats, 4 passes. 2 of commuting	No related bat activity	Species: Common Pipistrelle, Soprano Pipistrelle, Noctule.

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Tree Number	Survey 1	Survey 2	Survey 3
	Noctule, 2 of commuting Common Pipistrelle		Activity: 9 passes (5 CP, 3 SP, 1 Noc.) commuting.
10	Species: Common Pipistrelle Activity: 1 bat, 1 pass, no other activity	Species: Common Pipistrelle, Noctule Activity: 2 bats, 4 passes. 1 of commuting Noctule, 3 faint Common Pipistrelle passes	Species: Common Pipistrelle, Soprano Pipistrelle. Activity: 8 passes (5 CP, 3 SP) commuting.
11	Species: Common Pipistrelle, Barbastelle Activity: 2 bats. 1 pass commuting Common Pipistrelle. One pass faint Barbastelle	No related bat activity	Species: Common Pipistrelle, Soprano Pipistrelle. Activity: 4 passes (2 CP, 2 SP) commuting.
12	Species: Common Pipistrelle, Barbastelle Activity: 2 bats. 1 pass commuting Common Pipistrelle. One pass faint Barbastelle	Species: Common Pipistrelle, Noctule Activity: 2 bats, 4 passes. 1 of commuting Noctule, 3 faint Common Pipistrelle passes	Species: Common Pipistrelle, Soprano Pipistrelle. Activity: 7 passes (4 CP, 3 SP) commuting.
13	Species: Common Pipistrelle, Soprano Pipistrelle Activity: 2 bats 6 passes. 5 passes commuting and foraging Common Pipistrelle. One pass commuting Soprano Pipistrelle	No related bat activity	Species: Common Pipistrelle, Soprano Pipistrelle. Activity: 8 passes (5 CP, 3 SP) commuting.
14	Species: Common Pipistrelle, Soprano Pipistrelle Activity: 2 bats 6 passes. 5 passes commuting and foraging common pipistrelle. One pass commuting Soprano Pipistrelle	No related bat activity	Species: Common Pipistrelle, Soprano Pipistrelle. Activity: 8 passes (5 CP, 3 SP) commuting.
15	Species: Soprano Pipistrelle, Common Pipistrelle Activity: 2 bats 6 passes. 5 passes commuting and foraging Common Pipistrelle. One pass commuting Soprano Pipistrelle	Species: Soprano Pipistrelle, Common Pipistrelle Activity: 2 bats, 3 passes. 2 passes foraging and commuting Soprano Pipistrelle. 1 pass commuting Common Pipistrelle.	Species: Common Pipistrelle, Soprano Pipistrelle. Activity: 6 passes (5 CP, 1 SP) commuting.

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Tree Number	Survey 1	Survey 2	Survey 3
16	Species: Common Pipistrelle  Activity: 1 bat, 7 passes no activity related with the trees	Species: 1 Noctule, Common and Soprano pipistrelle  Activity: 3 bats, 16 passes. 2 passes commuting Noctule, 1 pass foraging Soprano Pipistrelle, 13 passes Common Pipistrelle foraging and commuting	Species: Common Pipistrelle, Soprano Pipistrelle, Noctule.  Activity: 7 passes (4 CP, 2 SP, 1 Noc) commuting.
17	Species: Common Pipistrelle  Activity: 1 bat, 7 passes no activity related with the trees	Species: 1 noctule, common and Soprano pipistrelle  Activity: 3 bats, 16 passes. 2 passes commuting Noctule, 1 pass foraging Soprano Pipistrelle, 13 passes Common Pipistrelle foraging and commuting	Species: Common Pipistrelle, Soprano Pipistrelle.  Activity: 11 passes (8 CP, 3 SP) foraging and commuting.
18	No related bat activity	No related bat activity	Species: Common Pipistrelle, Soprano Pipistrelle.  Activity: 5 passes (3 CP, 2 SP) commuting.
19	Species: Common Pipistrelle, Soprano Pipistrelle  Activity: 2 bats 21 passes 4 passes Soprano Pipistrelle two of foraging. 17 passes Common Pipistrelle commuting and foraging.	Species: Common Pipistrelle  Activity: 1 bat, 5 passes commuting and foraging activity	Species: Common Pipistrelle.  Activity: 4 passes commuting.
20	Species: Noctule, Common Pipistrelle,  Activity: 2 bats, 5 passes. 1 commuting pass of Noctule. 4 passes of commuting Common Pipistrelle	Species: Serotine, Noctule, Common Pipistrelle, Myotis spp Activity: 5 bats, 16 passes. 2 commuting passes of Serotine, 1 commuting pass of noctule, 1 faint pass Myotis sp. 12 passes foraging and commuting Common Pipistrelle	Species: Common Pipistrelle, Soprano Pipistrelle.  Activity: 10 passes (7 CP, 3 SP) commuting.
21	Species:  Activity: No associated bat activity	Species: Common Pipistrelle  Activity: 1 bat, 4 passes. Seen foraging near to the crown of the tree	Species: Common Pipistrelle.  Activity: 3 passes commuting.
22	Species:  Activity: No associated bat activity	Species:  Activity: No associated bat activity	Species: Common Pipistrelle.  Activity: 4 passes commuting.



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Tree Number	Survey 1	Survey 2	Survey 3
23	Species: Activity: No associated bat activity	Species: Activity: No associated bat activity	Species: Common Pipistrelle. Activity: 4 passes commuting.
24	Species: Activity: No associated bat activity	Species: Activity: No associated bat activity	Species: Common Pipistrelle. Activity: 2 passes commuting.
25	N/A	N/A	Species: Common Pipistrelle, Soprano Pipistrelle. Activity: 5 passes (3 CP, 2 SP) commuting.
26	N/A	N/A	Species: Common Pipistrelle, Soprano Pipistrelle. Activity: 5 passes (3 CP, 2 SP) commuting.
27	N/A	N/A	Species: Common Pipistrelle, Soprano Pipistrelle. Activity: 7 passes (5 CP, 2 SP) commuting.
28	N/A	N/A	Species: Common Pipistrelle, Soprano Pipistrelle. Activity: 7 passes (5 CP, 2 SP) commuting.
29	N/A	N/A	Species: Common Pipistrelle, Soprano Pipistrelle. Activity: 7 passes (5 CP, 2 SP) commuting.
30	Species: Common and Soprano Pipistrelle Activity: 3 bats, 40 passes. 11 passes Soprano Pipistrelle foraging and commuting. 29 passes of Common Pipistrelle foraging and commuting. one Common Pipistrelle seen re-entering hole in dead stem at 04:09	Species: Common and Activity: 1 bat, 7 passes foraging and commuting along the hedge	Species: Common Pipistrelle. Activity: 5 passes commuting
31	No related bat activity	No related bat activity	Species: Common Pipistrelle, Soprano Pipistrelle. Activity: 5 passes (3 CP, 2 SP) commuting

**Cambourne to Cambridge Better Public Transport: Stage 2 Bat Activity Survey 2019**

Tree Number	Survey 1	Survey 2	Survey 3
32	<p>Species: Common Pipistrelle, Soprano Pipistrelle</p> <p>Activity: 4 bats, 25 passes. 2 commuting Soprano Pipistrelle, 23 passes of Common Pipistrelle commuting and foraging</p>	<p>Species: Common Pipistrelle, Soprano Pipistrelle, Myotis sp.</p> <p>Activity: 4 bats, 25 passes 1 commuting Myotis sp, 6 Soprano Pipistrelle commuting and foraging, 18 Common Pipistrelle passes of Common Pipistrelle foraging and commuting. Soprano Pipistrelle seen emerging from under barge boards on eastern gable of number 71 at 04:26am</p>	<p>Species: Common Pipistrelle, Soprano Pipistrelle.</p> <p>Activity: 8 passes (6 CP, 2 SP) commuting</p>
33	<p>Species: Common Pipistrelle, Soprano Pipistrelle, Myotis spp.</p> <p>Activity: 4 bats, 25 passes. 2 commuting Soprano Pipistrelle, 23 passes of Common Pipistrelle commuting and foraging</p>	<p>Species: Common Pipistrelle, Soprano Pipistrelle, Myotis spp.</p> <p>Activity: 4 bats, 25 passes 1 commuting Myotis sp, 6 Soprano Pipistrelle commuting and foraging, 18 Common Pipistrelle passes of Common Pipistrelle foraging and commuting. Soprano Pipistrelle seen emerging from under barge boards on eastern gable of number 71 at 04:26am</p>	<p>Species: Common Pipistrelle, Soprano Pipistrelle.</p> <p>Activity: 8 passes (6 CP, 2 SP) commuting</p>
34	<p>Species: Common Pipistrelle, Soprano Pipistrelle, Myotis spp.</p> <p>Activity: 4 bats, 25 passes. 2 commuting Soprano Pipistrelle, 23 passes of Common Pipistrelle commuting and foraging</p> <p>2 Common Pipistrelles leaving ivy and flying west at 21:40</p>	<p>Species: Common Pipistrelle, Soprano Pipistrelle, Myotis spp.</p> <p>Activity: 4 bats, 25 passes 1 commuting Myotis sp, 6 Soprano Pipistrelle commuting and foraging, 18 Common Pipistrelle passes of Common Pipistrelle foraging and commuting. Soprano Pipistrelle seen emerging from under barge boards on eastern gable of number 71 at 04:26am</p>	<p>Species: Common Pipistrelle, Soprano Pipistrelle.</p> <p>Activity: 8 passes (6 CP, 2 SP) commuting</p>
35	<p>Species: Common Pipistrelle</p> <p>Activity: 1 bat, 30 passes. Common Pipistrelle bats foraging and commuting.</p>	<p>Species: Common Pipistrelle, Soprano Pipistrelle, Brown Long-eared</p> <p>Activity: 3 bats, 11 passes. 1 pass by Brown Long-eared bat, 9 passes of Common Pipistrelle foraging and commuting</p> <p>One Soprano Pipistrelle bat emerging from a</p>	<p>Species: Common Pipistrelle</p> <p>Activity: 2 passes commuting.</p>

**Cambourne to Cambridge Better Public Transport: Stage 2 Bat Activity Survey 2019**

Tree Number	Survey 1	Survey 2	Survey 3
		woodpecker hole at 21:38 (20 minutes after sunset) on 11/7/19	
36	No related bat activity	Species: Common Pipistrelle, Noctule Activity: Constant Common Pipistrelle foraging activity along the ride, 4 passes by foraging Noctule	Species: Common Pipistrelle, Soprano Pipistrelle.  Activity: 4 passes (3 CP, 1 SP) commuting.
37	Species: Common Pipistrelle, Noctule Activity: regular noctule foraging and commuting during the earlier part of the survey. Constant foraging activity by Common Pipistrelle	Species: Common Pipistrelle, Soprano Pipistrelle, Noctule, Serotine, Barbastelle, Myotis sp.  Activity: 7 bats, 31 passes. 1 pass by commuting Serotine, 1 pass of foraging Myotis sp, 1 pass brief/ faint Barbastelle, 3 passes foraging Noctule. 7 passes foraging and commuting Soprano Pipistrelle, 18 passes commuting and foraging Common Pipistrelle	Species: Common Pipistrelle, Soprano Pipistrelle.  Activity: 4 passes (5 CP, 3 SP) commuting.
38	Species: Common Pipistrelle, Noctule  Activity: Maximum of three Common Pipistrelle bats seen circling before darting towards T38/39 followed by no further activity at 03:57 exact location of re-entry not seen but presumed to be the woodpecker holes as no other features are present.	Species: Common Pipistrelle, Noctule  Activity: 7 bats, 31 passes. 1 pass by commuting Serotine, 1 pass of foraging Myotis sp, 1 pass brief/ faint Barbastelle, 3 passes foraging Noctule. 7 passes foraging and commuting Soprano Pipistrelle, 18 passes commuting and foraging Common Pipistrelle	Species: Common Pipistrelle, Soprano Pipistrelle.  Activity: 4 passes (5 CP, 3 SP) commuting.
39	Species: Common Pipistrelle, Noctule  Activity: Maximum of three Common Pipistrelle bats seen circling before darting towards T38/39 followed by no further activity at 03:57 exact location of re-entry not seen but presumed to be the woodpecker holes as no other features are present.	Species: Common Pipistrelle, Soprano Pipistrelle, Brown Long-eared bat, Noctule  Activity: constant pipistrelle and noctule activity throughout the survey. 2 passes by Brown Long-eared late into the survey.	Species: Common Pipistrelle, Soprano Pipistrelle.  Activity: 7 passes (6CP, 1 SP). Commuting
40	Species: Common Pipistrelle, Soprano Pipistrelle  Activity: 3 bats, 14 passes. 1 pass of	Species: Common Pipistrelle, Soprano Pipistrelle, Brown Long-eared, Noctule  Activity: constant Pipistrelle and Noctule activity	Species: Common Pipistrelle, Soprano Pipistrelle.

**Cambourne to Cambridge Better Public Transport: Stage 2 Bat Activity Survey 2019**

Tree Number	Survey 1	Survey 2	Survey 3
	Soprano Pipistrelle, 13 passes of foraging and commuting Common Pipistrelle.	throughout the survey, circling and following regular foraging beats near to the survey position 2 passes by BLE late into the survey	Activity: 7 passes (6CP, 1 SP). Commuting
41	Species: Common Pipistrelle, Soprano Pipistrelle  Activity: 3 bats, 14 passes. 1 pass of Soprano Pipistrelle, 13 passes of foraging and commuting Common Pipistrelle.	Species: Common Pipistrelle, Soprano Pipistrelle, Brown Long-eared, Noctule  Activity: constant Pipistrelle and Noctule activity throughout the survey, circling and following regular foraging beats near to the survey position. 2 passes by Brown Long-eared late into the survey	Species: Common Pipistrelle, Soprano Pipistrelle.  Activity: 7 passes (6CP, 1 SP). Commuting
42	N/A	N/A	Species: Common Pipistrelle, Soprano Pipistrelle.  Activity: 5 passes (3 CP, 2 SP) commuting.
43	Species: Common and Soprano Pipistrelle  Activity: 3 bats, 15 passes. 7 passes of foraging and commuting Soprano Pipistrelle. 8 passes of foraging and commuting Common Pipistrelle.	Species: Common and Soprano Pipistrelle  Activity: 3 bats, 25 passes. 8 passes of foraging and commuting Soprano Pipistrelle. 17 passes of foraging and commuting Common Pipistrelle.	Species: Common Pipistrelle, Soprano Pipistrelle.  Activity: 7 passes (5 CP, 2 SP) commuting
44	Species: Common and Soprano Pipistrelle  Activity: 2 bats, 8 passes. 1 commuting Soprano Pipistrelle, 7 commuting and foraging Common Pipistrelle	Species: Common, Soprano Pipistrelle, Noctule  Activity: 4 bats, 9 passes. 1 Noctule commuting, 5 passes of Soprano Pipistrelle foraging, 3 passes of Common Pipistrelle	Species: Common Pipistrelle, Soprano Pipistrelle.  Activity: 11 passes (7 CP, 4 SP) commuting.
45	Species: 1 soprano pipistrelle Activity: brief pass	Species: Common Pipistrelle, Soprano Pipistrelle, Noctule, Barbastelle  Activity: 4 bats, 15 passes. 1 pass of commuting Noctule, 1 pass Barbastelle, 3 passes foraging and commuting Soprano Pipistrelle. 10 passes of foraging and commuting Common Pipistrelle	Species: Common Pipistrelle, Soprano Pipistrelle, Noctule.  Activity: 6 passes (3 CP, 2 SP, 1 Noc) commuting.
46	Species: Common Pipistrelle  Activity: 3 bats, constant foraging activity throughout the survey.	No related bat activity	Species: Common Pipistrelle.  Activity: 4 passes commuting
47	Species: Common Pipistrelle	No related bat activity	Species: Common Pipistrelle, Soprano

**Cambourne to Cambridge Better Public Transport: Stage 2 Bat Activity Survey 2019**

Tree Number	Survey 1	Survey 2	Survey 3
	Activity: 3 bats, constant foraging activity throughout the survey.		Pipistrelle. Activity: 9 passes (6 CP, 3 SP) commuting
48	Species: Common Pipistrelle, Noctule  Activity: 2 bats, 8 passes. 3 passes of foraging and commuting Noctule, 5 passes of foraging and commuting Common Pipistrelle	Species: Common Pipistrelle, Noctule  Activity: 2 bats, 1 pass of a distant commuting Noctule, 4 passes of foraging and commuting Common Pipistrelle	Species: Common Pipistrelle.  Activity: 1 pass commuting
49	Species: Common Pipistrelle  Activity: distant common pipistrelle sporadically heard throughout the survey.	No related bat activity	Species: Common Pipistrelle, Soprano Pipistrelle.  Activity: 4 passes (2 CP, 2 SP) commuting.
50	Species: Common Pipistrelle  Activity: 1 bat, 3 passes of foraging and commuting Common Pipistrelle	Species: Common Pipistrelle, Soprano Pipistrelle, Noctule, Myotis sp.  Activity: 5 bats, 17 passes. 1 brief/distant pass of Noctule, 7 passes of commuting and foraging Myotis sp bat. 2 passes, one commuting of Soprano Pipistrelle. 7 passes of foraging and commuting Common Pipistrelle. Possible likely emergence of a Common Pipistrelle from the roof of the bungalow adjacent to T50 at 21:11	Species: Common Pipistrelle.  Activity: 3 passes commuting.

Table 3.3: Results of First Set of Static Monitoring Surveys between June and August 2019

Hedgerow Number	Survey Period	Total number of nights	Total Hours Recording	Bat Species													Total number of bat registrations	Activity Score (total number of registrations divided by hours recording)	Comment	
				Pipistrelle sp.	Nathusius' Pipistrelle	Common Pipistrelle	Soprano Pipistrelle	Noctule	Natterer's	Serotine	Leisler's	Barbastelle	Brown Long-eared	Whiskered sp.	Daubenton's	Myotis				Unidentified Bat
1	21-25 /06/2019	5	37.5	228	0	439	329	3	0	17	0	19	0	0	3	0	3	1041	27.76	
2	21-25 /06/2019	5	37.5	23	0	34	38	0	1	3	0	1	0	0	0	2	1	103	2.75	
3	12-16 /07/2019	5	37.5	74	0	848	181	6	0	6	5	27	4	0	0	0	0	1151	30.69	
4	14-18 /06/2019	5	37.5	28	0	97	55	0	0	0	0	0	0	0	0	0	0	180	4.80	
5	14-18/06/2019	5	37.5	780	2	345	303	0	0	0	0	1	2	0	6	0	4	1443	38.48	
6	14-18/06/2019	5	37.5	174	0	151	27	0	0	0	0	0	0	0	0	0	0	352	9.39	
7	12-16/07/2019	5	37.5	88	0	225	146	3	0	0	0	0	0	0	0	0	3	465	12.40	
8	05-09/07/2019	5	37.5	198	0	90	24	0	0	0	0	0	0	0	0	0	0	312	8.32	
9	12-16/07/2019	5	37.5	14	0	102	12	1	0	0	0	0	2	0	0	0	0	131	3.49	
10	18-22/07/2019	5	37.5	337	0	187	100	22	0	0	0	0	0	0	0	0	1	647	17.25	
11	12-16/07/2019	5	37.5	0	0	7	2	0	0	0	0	0	0	0	0	0	0	9	0.24	
12	21-25/06/2019	5	37.5	21	0	47	3	2	0	0	0	1	1	0	0	0	1	76	2.03	
13	12-16/07/2019	5	37.5	12	0	65	13	0	0	0	0	0	3	0	0	0	2	95	2.53	
14	23-27/07/2019	5	37.5	40	0	26	14	15	0	2	0	2	1	0	0	0	1	101	2.69	
15	21-25/06/2019	5	37.5	2	9	55	84	0	0	0	0	0	0	0	0	0	0	150	4.00	
16	05-09/07/2019	5	37.5	10	0	95	29	15	1	0	0	12	28	0	0	2	6	198	5.28	
17	28/06-02/07/2019	5	37.5	0	0	0	2	0	0	0	0	1	10	1	1	0	2	17	0.45	
18	05-09/07/2019	5	37.5	3	1	74	10	0	0	1	0	0	6	0	0	0	2	97	2.59	

**Cambourne to Cambridge Better Public Transport: Stage 2 Bat Activity Survey 2019**

Hedgerow Number	Survey Period	Total number of nights	Total Hours Recording	Bat Species														Total number of bat registrations	Activity Score (total number of registrations divided by hours recording)	Comment
				Pipistrelle sp.	Nathusius' Pipistrelle	Common Pipistrelle	Soprano Pipistrelle	Noctule	Natterer's	Serotine	Leisler's	Barbastelle	Brown Long-eared	Whiskered sp.	Daubenton's	Myotis	Unidentified Bat			
19	05-09/07/2019	5	37.5	4	0	48	28	0	0	0	0	12	2	1	0	0	1	96	2.56	
20	21-25/06/2019	5	37.5	11	0	52	32	0	0	0	0	2	0	0	0	0	0	97	2.59	
21	28/06-02/07/2019	5	37.5	0	0	13	0	0	0	0	0	0	0	0	0	0	0	13	0.35	
22	28/06-02/07/2019	5	37.5	3	0	261	5	0	0	0	0	0	0	0	0	0	0	269	7.17	
23	28/06-02/07/2019	5	37.5	9	0	255	4	0	0	0	0	0	0	0	0	0	0	268	7.15	
24	28/06-02/07/2019	5	37.5	18	0	114	11	0	0	0	0	0	0	0	0	0	0	143	3.81	
25	28/06-02/07/2019	5	37.5	30	0	221	4	1	0	0	0	0	0	0	0	0	0	256	6.83	
26	29/7-04/08/2019	7	52.5	113	0	1588	68	6	0	0	0	0	1	2	0	1	1	1780	33.90	
27	18-22-07/2019	5	37.5	50	0	25	16	0	0	0	0	0	0	0	0	0	0	91	2.43	
28	28/06-02/07/2019	5	37.5	16	0	129	19	488	0	2	0	4	0	0	0	0	10	668	17.81	
29	29/7-02/08/2019	5	37.5	4	0	20	0	2	0	0	0	0	0	0	0	0	0	26	0.69	
30	28/06-02/07/2019	5	37.5	539	0	175	0	2	0	0	0	5	0	0	0	0	0	721	19.23	
31	05-09/07/2019	5	37.5	63	0	305	9	1	0	0	0	1	2	0	0	0	2	383	10.21	
32	05-09/07/2019	5	37.5	10	0	193	94	6	0	0	0	0	1	0	0	0	0	304	8.11	
33	05-09/07/2019	5	37.5	13	0	259	11	1	0	0	0	0	0	0	0	0	1	285	7.60	
34	05-09/07/2019	5	37.5	14	0	112	26	1	0	0	0	0	0	0	0	0	0	153	4.08	
35	05-09/07/2019	5	37.5	8	0	13	7	2	0	0	0	2	0	0	0	0	0	32	0.85	
36	05-09/07/2019	5	37.5	16	2	22	19	8	0	1	1	3	0	0	0	0	1	73	1.95	

Table 3.4: Results of Second Set of Static Monitoring Surveys between July and September 2019

Hedgerow Number	Survey Period	Total number of nights	Total Hours Recording	Bat Species													Total number of bat registrations	Activity Score (total number of registrations divided by hours recording)	Comment	
				Pipistrelle sp.	Nathusius' Pipistrelle	Common Pipistrelle	Soprano Pipistrelle	Noctule	Natterer's	Serotine	Leisler's	Barbastelle	Brown Long-eared	Whiskered sp.	Daubenton's	Myotis				Unidentified Bat
1	29/07 - 04/08/2019	7	77	98	0	187	126	11	4	0	0	10	0	0	0	0	3	439	5.70	
2	29/07 - 04/08/2019	7	77	32	0	165	103	0	0	0	0	0	0	0	0	1	2	303	3.94	
3	29/07 - 04/08/2019	7	77	77	0	145	372	0	0	0	0	0	0	0	0	0	0	594	7.71	
4	08-12/08/2019	5	55	1	0	9	11	0	0	0	0	0	0	0	0	0	0	21	0.38	
5	29/07 - 04/08/2019	7	77	192	0	647	545	4	0	1	0	1	0	2	1	4	2	1399	18.17	
6	29/07 - 04/08/2019	7	77	174	0	338	221	5	0	0	0	1	0	0	0	0	0	739	9.60	
7	29/07 - 04/08/2019	7	77	27	0	93	54	6	0	0	0	0	0	0	0	0	18	198	2.57	
8	29/07 - 04/08/2019	7	77	20	0	19	11	0	0	0	0	0	0	0	0	0	0	50	0.65	
9	29-31/07 and 08-12/08/2019	8	88	14	0	26	26	2	5	0	0	1	0	0	0	1	1	76	0.86	
10	29/07 - 04/08/2019	7	77	578	16	4319	980	2233	0	0	1	161	15	0	0	6	63	8372	108.73	C Pip and Noctule activity notable
11	08-12/08/2019	5	55	679	0	3477	1847	9	0	0	0	2	2	0	0	4	18	6038	109.78	C Pip and S Pip activity notable
12	08-12/08/2019	5	55	12	0	33	12	1	0	0	0	0	0	0	1	0	0	59	1.07	
13	08-12/08/2019	5	55	89	0	140	743	0	0	0	0	13	1	0	0	0	2	988	17.96	
14	08-12/08/2019	5	55	171	0	570	126	0	0	0	0	0	0	0	0	1	0	868	15.78	
15	08-10/08 and 02-03/09/2019	5	55	8	0	26	43	0	0	0	0	2	0	0	0	0	1	80	1.45	
16	08-12/08/2019	5	55	22	0	29	27	5	1	0	0	14	2	0	2	0	2	104	1.89	
17	08-12/08/2019	5	55	13	3	67	25	16	3	0	0	32	1	0	0	3	11	174	3.16	



**Cambourne to Cambridge Better Public Transport: Stage 2 Bat Activity Survey 2019**

Hedgerow Number	Survey Period	Total number of nights	Total Hours Recording	Bat Species													Total number of bat registrations	Activity Score (total number of registrations divided by hours recording)	Comment	
				Pipistrelle sp.	Nathusius' Pipistrelle	Common Pipistrelle	Soprano Pipistrelle	Noctule	Natterer's	Serotine	Leisler's	Barbastelle	Brown Long-eared	Whiskered sp.	Daubenton's	Myotis				Unidentified Bat
18	08-12/08/2019	5	55	88	0	87	113	0	2	1	0	110	2	1	0	1	0	405	7.36	
19N	29-30/08/2019	2	22	4	1	10	8	0	0	0	0	6	0	0	2	0	1	32	1.45	
19S	29/8-02/09/2019	5	55	76	0	964	230	0	0	13	0	1169	13	0	3	1	6	2475	45.00	Barbastelle activity notable
20	15-19/08/2019	5	55	12	0	67	31	0	0	0	0	2	11	0	0	3	2	128	2.33	
21	15-19/08/2019	5	55	18	0	5	7	0	0	0	0	0	0	0	0	0	0	30	0.55	
22	15-19/08/2019	5	55	21	0	75	1	0	0	0	0	0	0	0	0	0	0	97	1.76	
23	15-19/08/2019	5	55	9	0	42	1	0	0	0	0	0	1	0	0	0	0	53	0.96	
24	15-19/08/2019	5	55	6	0	1	0	0	0	0	0	0	0	0	0	0	0	7	0.13	
25	15-19/08/2019	5	55	3	0	6	3	1	0	0	0	0	3	0	0	0	1	17	0.31	
26	15-19/08/2019	5	55	2128	0	904	148	0	0	0	0	4	0	0	0	1	0	3185	57.91	
27	15-19/08/2019	5	55	5	0	6	3	0	1	0	0	0	0	0	0	0	0	15	0.27	
28	15-17/08/2019	8	88	17	0	9	7	2	0	0	0	0	0	0	0	1	1	37	0.42	
29	15-19/08/2019	5	55	4	0	46	9	0	0	0	0	1	0	0	10	0	0	70	1.27	
30	20-26/08/2019	7	77	110	2	4174	115	85	0	0	0	60	30	0	0	15	11	4602	59.77	C Pip activity notable
31	15-19/08/2019	5	55	1	0	14	9	0	0	0	0	0	0	0	0	0	1	25	0.45	
32	22-26/08/2019	5	55	48	0	392	105	3	0	3	0	29	5	0	2	1	4	592	10.76	
33	22-26/08/2019	5	55	53	1	398	170	1	0	3	0	33	1	0	3	2	6	671	12.20	
34	22-26/08/2019	5	55	303	0	713	124	0	0	0	0	0	0	0	0	0	0	1140	20.73	
35	22-26/08/2019	5	55	11	0	70	55	0	0	0	0	1	0	0	0	1	0	138	2.51	
36	22-26/08/2019	5	55	7	0	15	11	1	0	0	0	1	1	0	1	0	3	40	0.73	

Table 3.5: Results of Third Set of Static Monitoring Surveys between September and October 2019

Hedgerow Number	Survey Period	Total number of nights	Total Hours Recording	Bat Species														Total number of bat registrations	Activity Score (total number of registrations divided by hours recording)	Comment	
				Pipistrelle sp.	Nathusius' Pipistrelle	Common Pipistrelle	Soprano Pipistrelle	Noctule	Natterer's	Serotine	Leisler's	Barbastelle	Brown Long-eared	Whiskered sp.	Daubenton's	Brandt's	Myotis				Unidentified Bat
1	05-09/09/2019	5	67.5	16	0	294	118	0	0	1	0	22	0	0	0	0	0	8	459	6.80	
2	05-09/09/2019	5	67.5	0	0	15	57	0	0	0	0	0	2	0	0	0	0	0	74	1.10	
3	05-09/09/2019	5	67.5	7	0	214	84	3	0	0	1	60	0	0	7	0	0	2	378	5.60	
4	05-09/09/2019	5	67.5	2	0	71	46	2	0	0	0	0	0	0	0	0	0	0	121	1.79	
5	13-17/09/2019	5	67.5	210	1	293	429	15	0	1	1	9	1	0	1	2	0	7	970	14.37	
6	13-17/09/2019	5	67.5	63	0	56	247	0	2	0	0	0	0	0	0	0	0	0	368	5.45	
7	21-25/09/2019	5	67.5	12	0	69	16	3	0	0	0	0	1	0	0	0	0	0	101	1.50	
8	21-25/09/2019	5	67.5	16	0	45	5	0	0	0	0	0	0	0	0	0	0	0	66	0.98	
9	21/09 and 05/10 and 09/10-12/10/2019	6	81	9	0	7	12	0	0	0	0	10	0	0	0	0	0	4	42	0.52	
10	21-25/09/2019	5	67.5	2	0	20	10	0	0	0	0	0	0	0	0	0	0	0	32	0.47	
11	21-25/09/2020	5	67.5	1294	0	1973	448	15	1	1	2	4	1	0	0	0	1	3	3743	55.45	
12	05-09/09/2019	5	67.5	1	0	6	9	0	0	0	0	0	0	0	0	0	0	0	16	0.24	
13	05-09/09/2019	5	67.5	3	0	27	45	0	0	0	0	8	0	0	0	0	0	0	83	1.23	
14	05-09/09/2019	5	67.5	1	0	36	22	0	0	0	0	0	0	0	0	0	0	2	61	0.90	
15	13-17/09/2019	5	67.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	
16	13-	5	67.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	

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Hedgerow Number	Survey Period	Total number of nights	Total Hours Recording	Bat Species														Total number of bat registrations	Activity Score (total number of registrations divided by hours recording)	Comment		
				Pipistrelle sp.	Nathusius' Pipistrelle	Common Pipistrelle	Soprano Pipistrelle	Noctule	Natterer's	Serotine	Leisler's	Barbastelle	Brown Long-eared	Whiskered sp.	Daubenton's	Brandt's	Myotis				Unidentified Bat	
	17/09/2019																					
17	13-17/09/2019	5	67.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	
18	21-25/09/2019	5	67.5	0	0	84	105	2	0	0	0	2	0	0	0	0	1	8	202	2.99		
19N	05-09/09/2019	5	67.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	
19S	05-09/09/2019 and 13-17/09/2019	10	135	33	0	297	234	9	2	1	0	220	1	0	0	0	3	0	800	5.93		
20	21-25/09/2020	5	67.5	6	0	397	573	0	0	0	0	0	0	0	0	0	0	0	976	14.46		
21	30/09 to 04-10/2019	5	67.5	3	0	25	6	0	0	0	0	0	0	0	0	0	1	0	35	0.52		
22	21-25/09/2020	5	67.5	0	0	5	45	1	0	0	0	0	1	0	0	0	0	0	52	0.77		
23	30/09-04-10/2019	5	67.5	12	0	811	236	0	0	0	0	0	0	0	0	0	0	0	1059	15.69		
24	21-25/09/2020	5	67.5	63	0	379	93	11	0	0	0	76	10	0	0	6	16	0	654	9.69		
25	30/09 to 04-10/2019	5	67.5	2	0	47	4	0	0	0	0	0	2	0	0	0	0	0	55	0.81		
26	30/09 to 04-10/2019	5	67.5	1	1	242	2	1	0	0	0	1	0	0	1	0	0	0	249	3.69		
27	30/09 to 04-10/2019	5	67.5	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2	0.03		
28	30/09 to 04-10/2019	5	67.5	1	0	23	157	1	0	0	0	0	0	0	0	0	0	0	182	2.70		
29	30/09 to 04-10/2019	5	67.5	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	4	0.06		
30	30/09 to 04-10/2019	5	67.5	0	0	10	0	0	0	0	0	0	0	0	0	0	1	0	11	0.16		
31	30/09 to 04-10/2019	5	67.5	1	0	39	8	0	0	0	0	0	0	0	0	0	0	0	48	0.71		

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Hedgerow Number	Survey Period	Total number of nights	Total Hours Recording	Bat Species														Total number of bat registrations	Activity Score (total number of registrations divided by hours recording)	Comment	
				Pipistrelle sp.	Nathusius' Pipistrelle	Common Pipistrelle	Soprano Pipistrelle	Noctule	Natterer's	Serotine	Leisler's	Barbastelle	Brown Long-eared	Whiskered sp.	Daubenton's	Brandt's	Myotis				Unidentified Bat
32	30/09 to 04-10/2019	5	67.5	3	0	131	103	1	0	0	0	32	0	0	0	0	2	0	272	4.03	
33	30/09 to 04-10/2019	5	67.5	0	0	194	23	0	0	0	1	0	0	0	0	0	1	0	219	3.24	
34	05-09/09/2019	5	67.5	3	0	131	103	1	0	0	0	32	0	0	0	0	2	0	272	4.03	
35	30/09 to 04-10/2019	5	67.5	6	0	43	7	0	1	0	0	57	1	0	1	0	6	0	122	1.81	
36	05-09/09/2019	5	67.5	3	0	9	13	0	1	0	0	3	0	0	1	0	1	2	33	0.49	

**Table 3.6: Barbastelle Bat Activity Detected During the Three Bat Activity Surveys of Hedgerows. (n/a = hedgerow not surveyed)**

Hedgerow/Linear feature	Survey Period		
	June-August	July- September	September-October
1	19	10	22
2	1	0	0
3	27	0	60
4	0	0	0
5	1	1	9
6	0	1	0
7	0	0	0
8	0	0	0
9	0	1	10
10	0	161	0
11	0	2	4
12	1	0	0
13	0	13	8
14	2	0	0
15	0	2	0
16	12	14	0
17	1	32	0
18	0	110	2
19N	12	6	0
19S	n/a	1169	220
20	2	2	0
21	0	0	0
22	0	0	0
23	0	0	0
24	0	0	76
25	0	0	0
26	0	4	1
27	0	0	0
28	4	0	0
29	0	1	0
30	5	60	0
31	1	0	0
32	0	29	32
33	0	33	0
34	0	0	32
35	2	1	57
36	3	1	3
<b>Total Registrations</b>	<b>93</b>	<b>1653</b>	<b>536</b>

## 4 KEY POINTS AND FINDINGS

- 4.1 During the emergence/re-entry surveys of 50 trees considered to have potential to support roosting bats, bat roosts were found in five trees (T30, T34, T35 T38/39). One Common Pipistrelle re-entered a hole in dead stem of T30. Two Common Pipistrelle emerged from T34. One Soprano Pipistrelle emerged from a woodpecker hole in T35. Three Common Pipistrelle re-entered T38/39. The roosts comprised small numbers (up to three individuals) of common species and were considered non-breeding summer roost. None of the roosts were identified as maternity roosts.
- 4.2 Incidental observations made during the emergence/re-entry surveys of the trees indicated that species of bat (unidentified) emerged from behind the bargeboard on the eastern gable of building number 71 near trees T32, T33, T34. In addition, a probably Common Pipistrelle was observed emerging from the roof structure of the bungalow named the Gate House near T50.
- 4.3 Of the five trees considered to support roosting bats, tree group T38/39 were the nearest (<100m) to the route of the potential transport scheme. It should also be noted that the Gate House near T50 is potentially within 50m of the route of the transport scheme.
- 4.4 The results from the analysis of the static bat detectors along the hedgerows and linear features highlighted the presence of at least eleven species of bat utilising the area for commuting and foraging. The species comprised Nathusius', Common and Soprano Pipistrelles, Noctule, Serotine, Leisler's, (Western) Barbastelle, Brown Long-eared, Natterer's, Daubenton's, Whiskered and Brandt's.
- 4.5 During the first set of surveys eleven species of bat were detected. The hedgerows with the most species (seven) were H3 and H36. The hedgerow with the highest Activity Score (38.48) was H5. The total number of bat registrations during the period was 12,226.
- 4.6 During the second set of surveys eleven species of bat were detected. The hedgerow with the most species (eight) was H33. The hedgerows with the highest Activity Scores (108.73 and 109.78) were H10 and H11 respectively. The total number of bat registrations during the period was 34,231.
- 4.7 During the third set of surveys eleven species of bat were detected. The hedgerow with the most species (nine) was H5. The hedgerow with the highest Activity Score (55.45) was H11. The total number of bat registrations during the period was 11,761.
- 4.8 The differences in the number of registrations detected, which hedgerows were most favoured during the different survey periods is likely to reflect the changing behaviour of bats throughout the year.
- 4.9 There was less bat activity (11,761 registrations in total) during the autumn period, which may reflect the dispersal of bats to the hibernation sites away from the survey area.

- 4.10 It was also noticed that bat activity appeared decreased after grass around field boundaries and roadside verges had been cut. This may as a result of a decrease in the availability of insect prey.
- 4.11 Hedgerow 10 was identified as a notable hedgerow for bat activity, including 19 registrations of Nathusius' Pipistrelle, 4,319 registrations of Common Pipistrelle, 2,233 registrations of Noctule and 161 registrations of Barbastelle bat.
- 4.12 Noctule bat activity (488 registrations) along hedgerow 28, along the A1303, involved bats feeding over the balancing pond between the A1303 and A428 dual carriageway, indicating the value that these sites have as foraging areas for some species of bat.
- 4.13 Hedgerow 5 appeared to have some value for bats, supporting nine species during the autumn period when perhaps bats were moving from the summer roost sites to their winter hibernation sites.
- 4.14 Barbastelle bat activity was identified during the survey. This species is cited as a key feature of Eversden and Wimpole Woods Special Area of Conservation (SAC), located approximately 7km to the south west of the survey area. Barbastelle bat activity was detected along hedgerows/linear features 1-3, 5, 6, 9-20, 24, 26 and 28-36. The highest number of registrations was recorded during the second set of surveys, when the total number of Barbastelle bat registrations was 1,653. The hedgerows/linear feature with the highest number of Barbastelle bat registrations was hedgerow 19 south (near Madingley Wood SSSI) with 1,169 registrations.
- 4.15 The high numbers of Barbastelle bats recorded to the south of the Madingley Wood together with the information from Cambridgeshire Bat Group, would appear to indicate that a significant Barbastelle bats roost is still present. The peak activity during the summer would also indicate that Madingley Wood could still support a maternity roost.
- 4.16 Hedgerow 19 (north and south) are located along the A1303 road into Cambridge. If the route of the transport scheme were to follow an online route, then these hedgerows may be affected by the scheme and consequently affect any bats using the hedgerows.
- 4.17 The presence of roosting bats and twelve species of bat using the area as commuting and foraging habitat indicates that these species are therefore of material consideration for the scheme, as they may be affected by the proposed scheme; and therefore an assessment of the potential adverse and positive effects on bats must form part of the ecological impact assessment.

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6 FIGURES

Figure 1.1: Plan showing the red line boundary of the scheme and the boundary of the Stage 2 Bat Activity Survey, showing inaccessible/un-surveyed areas.

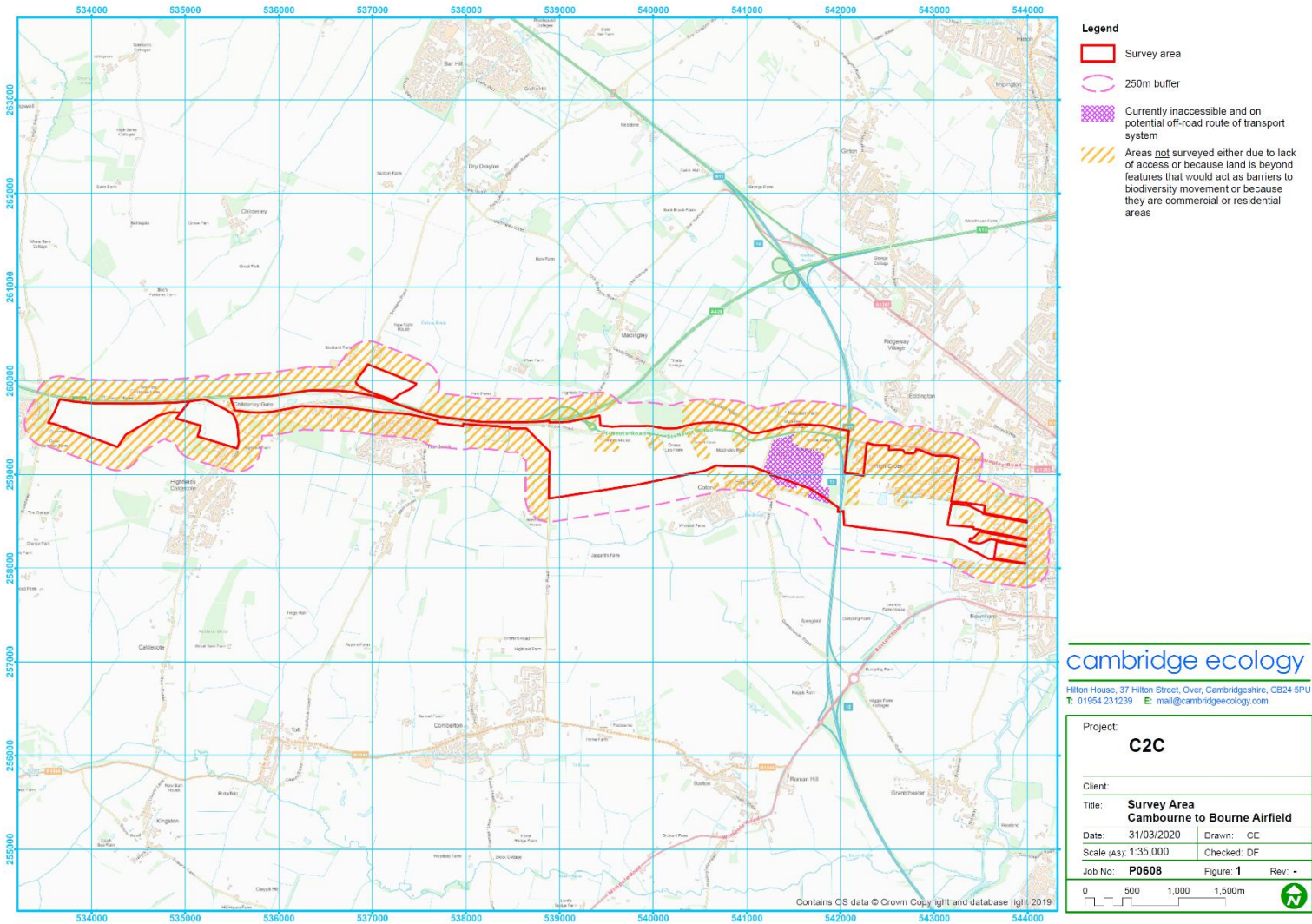


Figure 2.1a: Plan showing the indicative location of the trees where emergence/re-entry surveys were carried out (sheet 1 of 7)

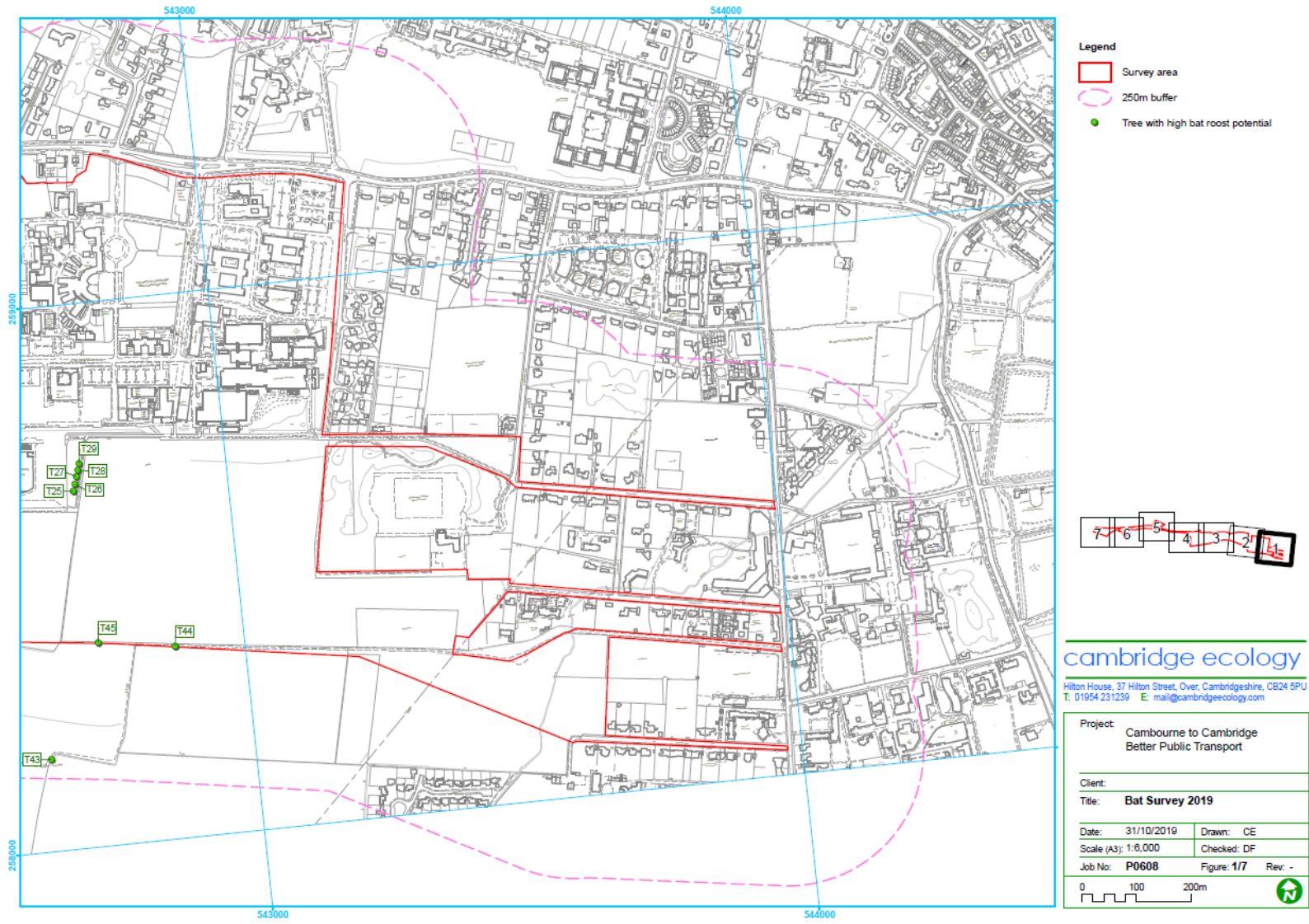


Figure 2.1b: Plan showing the indicative location of the trees where emergence/re-entry surveys were carried out (sheet 2 of 7)

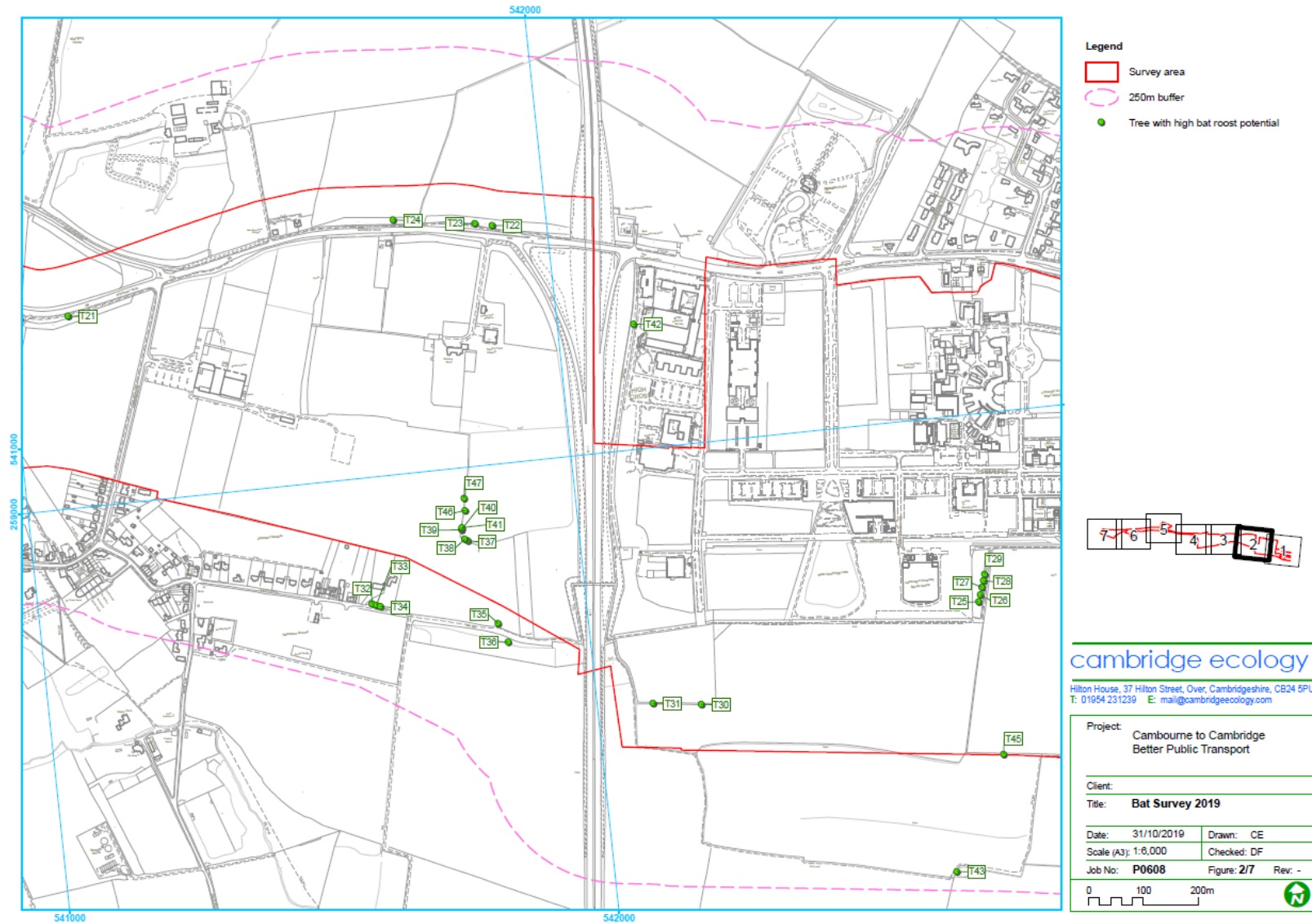


Figure 2.1c: Plan showing the indicative location of the trees where emergence/re-entry surveys were carried out (sheet 3 of 7)

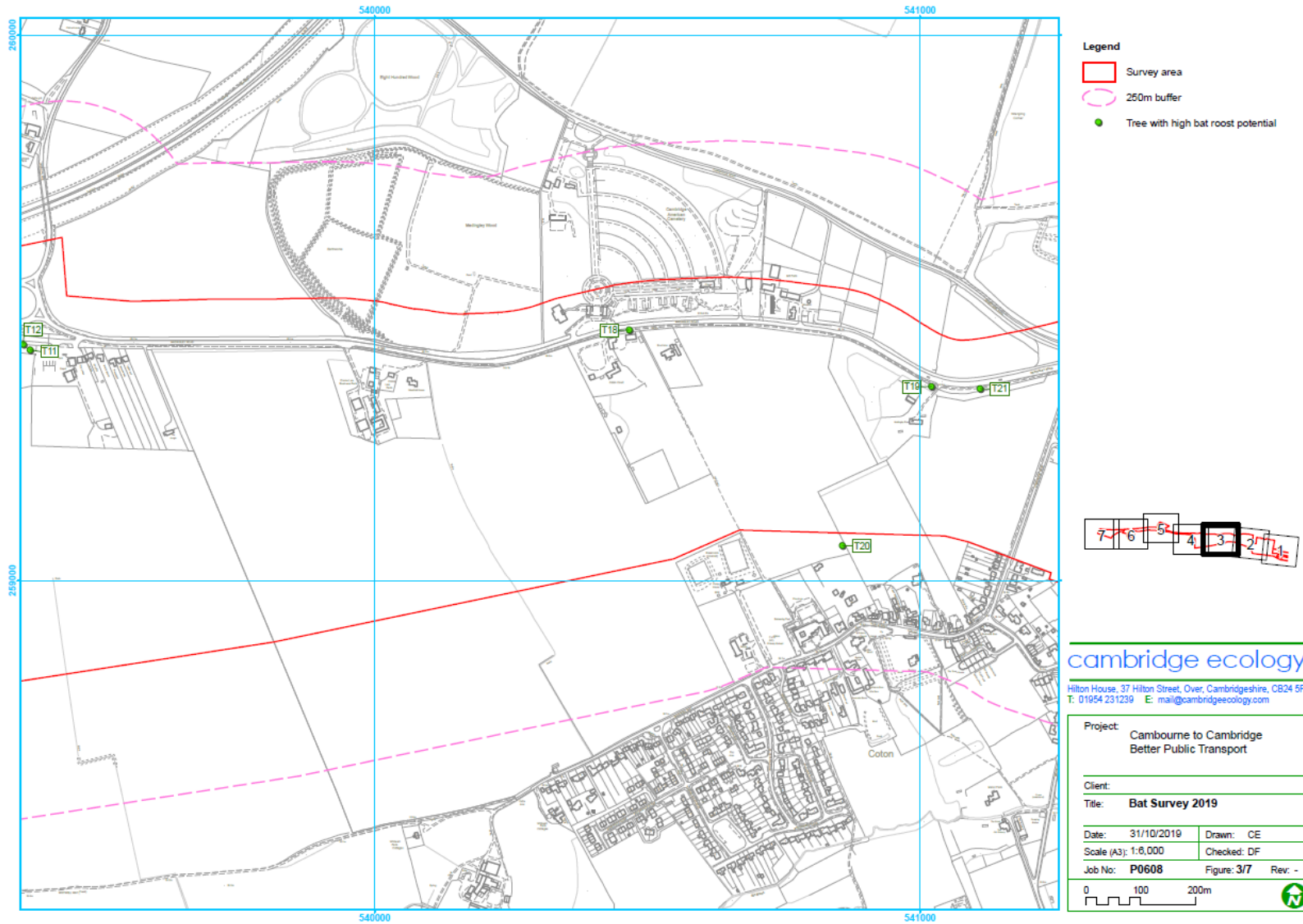


Figure 2.1d: Plan showing the indicative location of the trees where emergence/re-entry surveys were carried out (sheet 4 of 7)

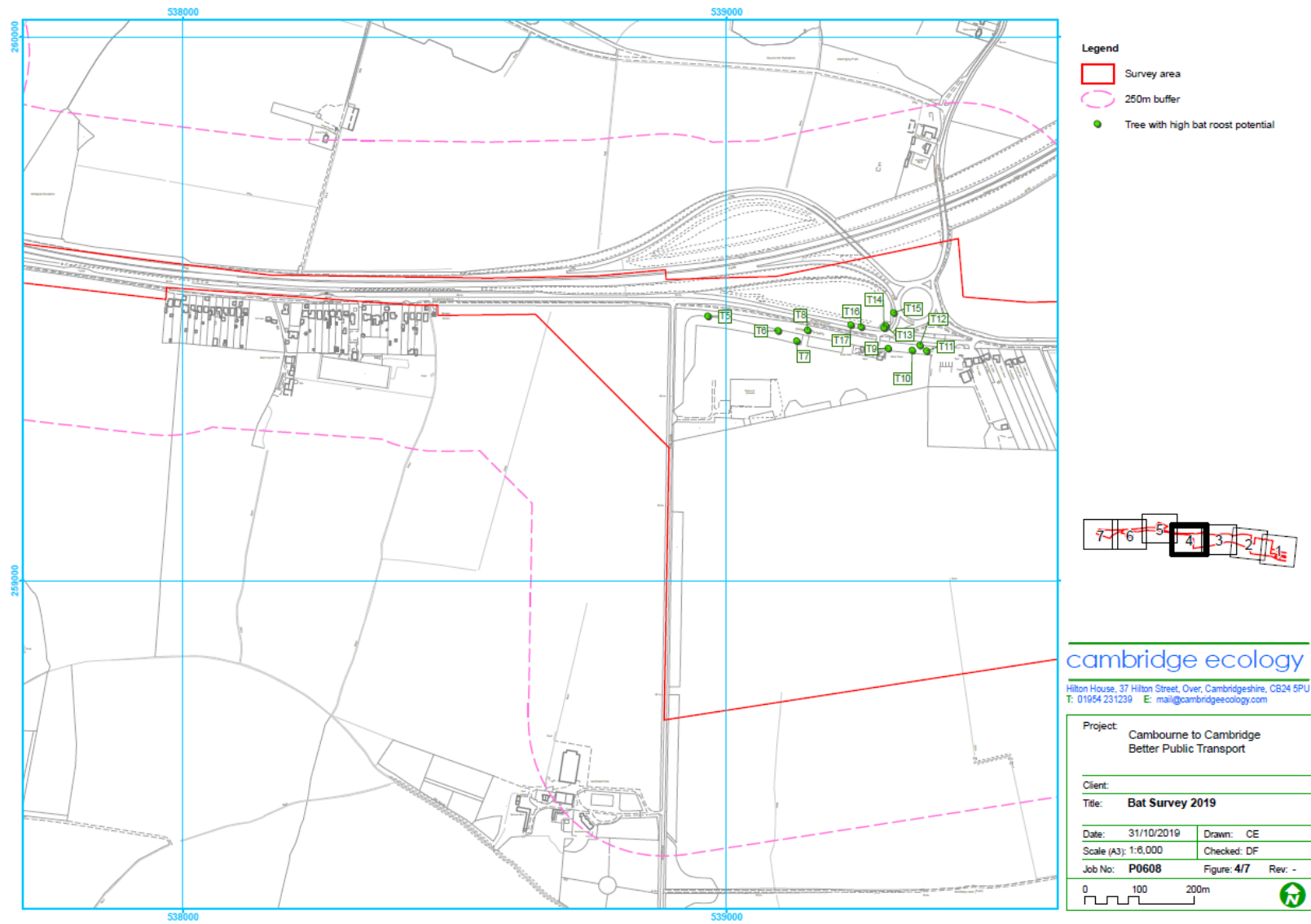


Figure 2.1e: Plan showing the indicative location of the trees where emergence/re-entry surveys were carried out (sheet 5 of 7)

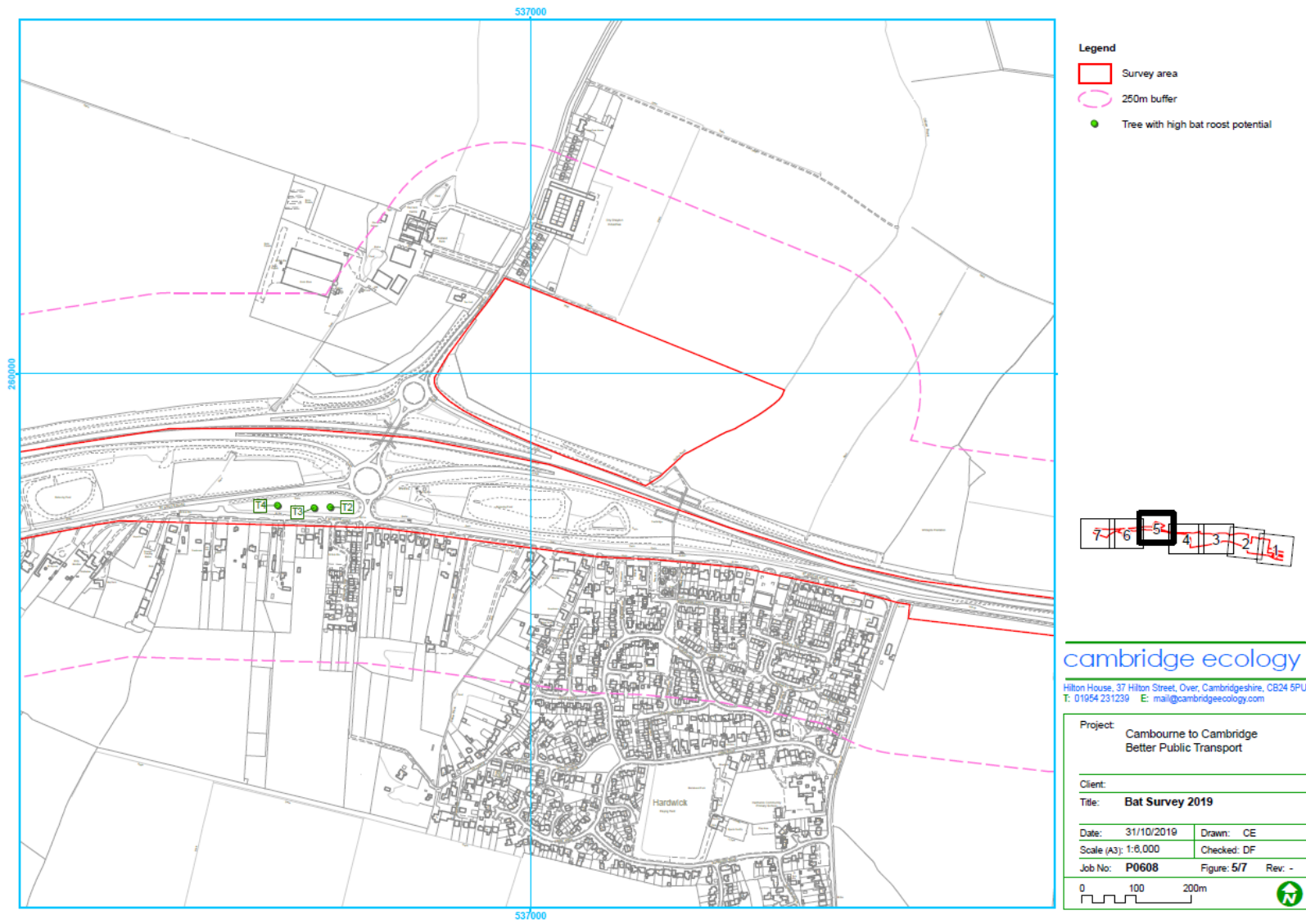


Figure 2.1f: Plan showing the indicative location of the trees where emergence/re-entry surveys were carried out bats (sheet 6 of 7)

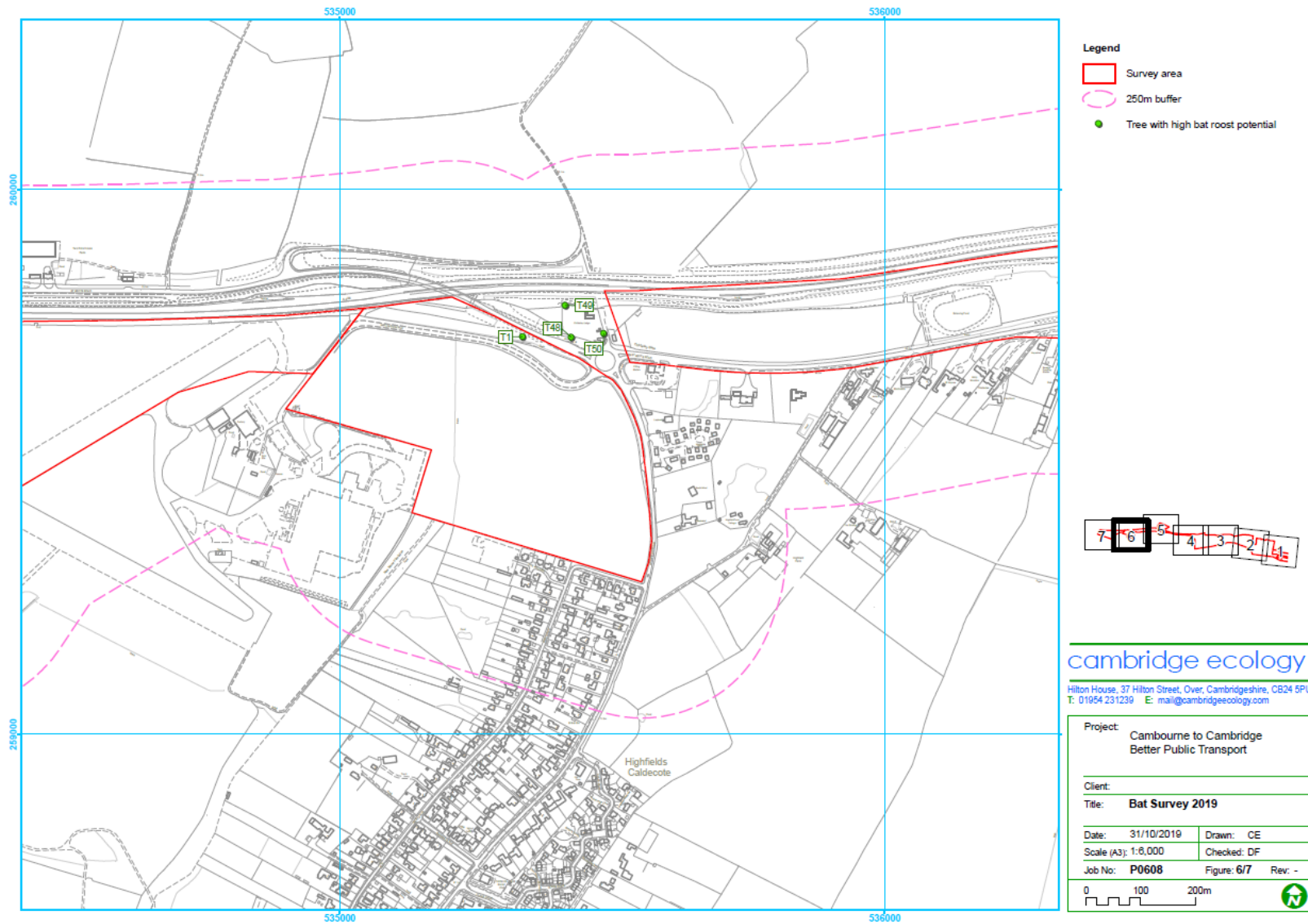


Figure 2.1g: Plan showing the indicative location of the trees where emergence/re-entry surveys were carried out bats (sheet 7 of 7)

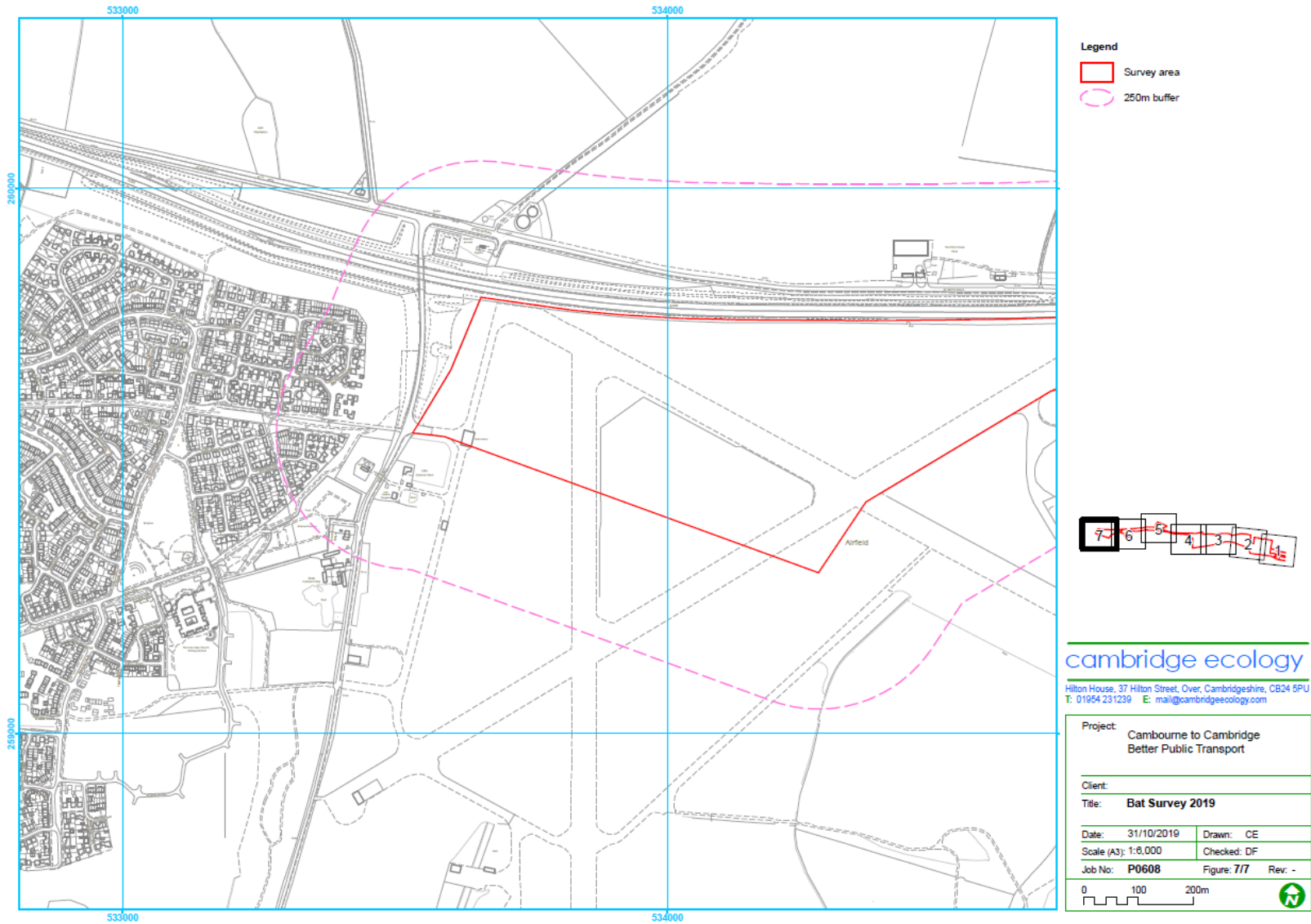




Figure 2.2a: Plan showing the indicative location of the hedgerows where bat activity surveys using static detectors were carried out (sheet 1 of 7)

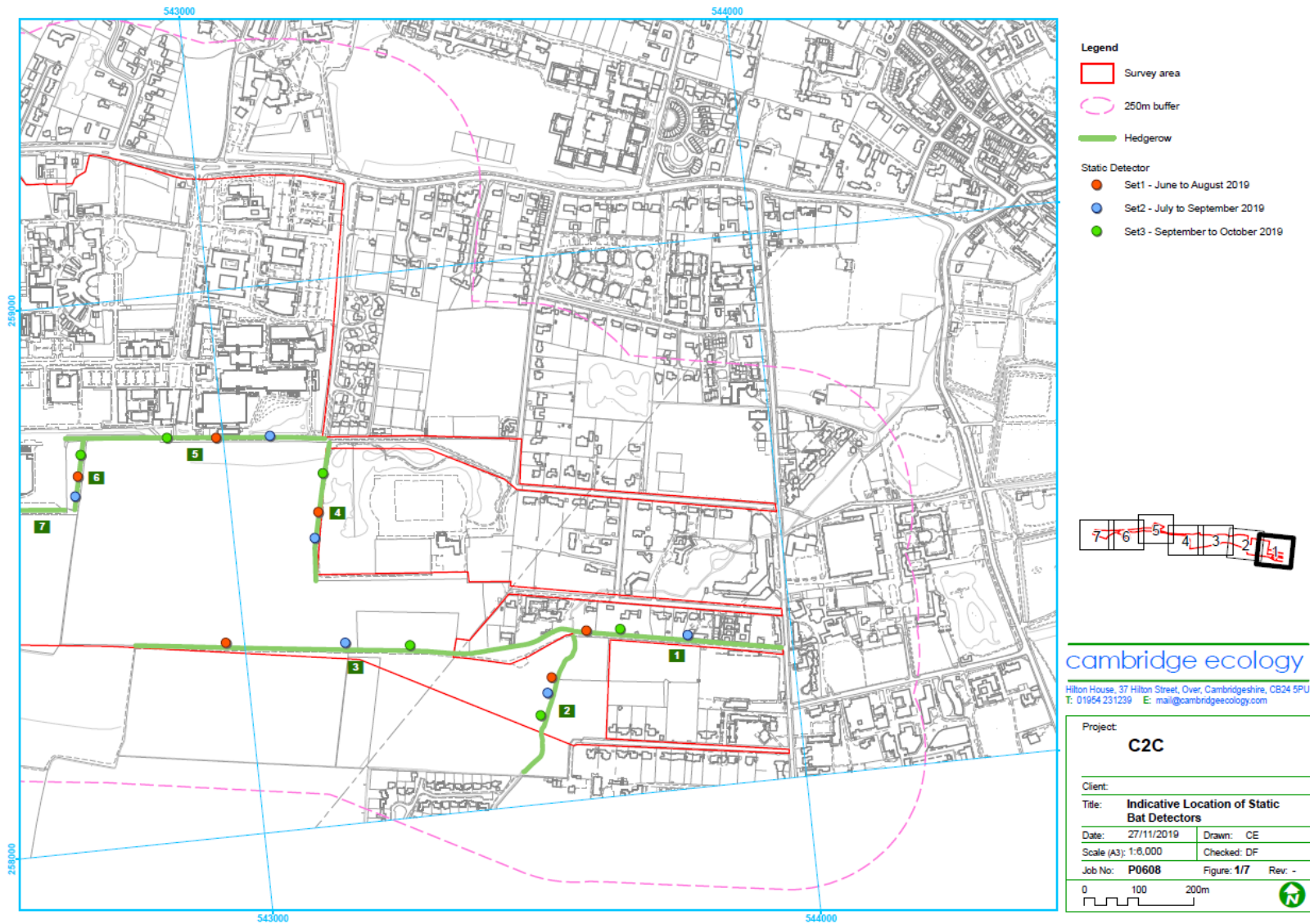


Figure 2.2b: Plan showing the indicative location of the hedgerows where bat activity surveys using static detectors were carried out (sheet 2 of 7)

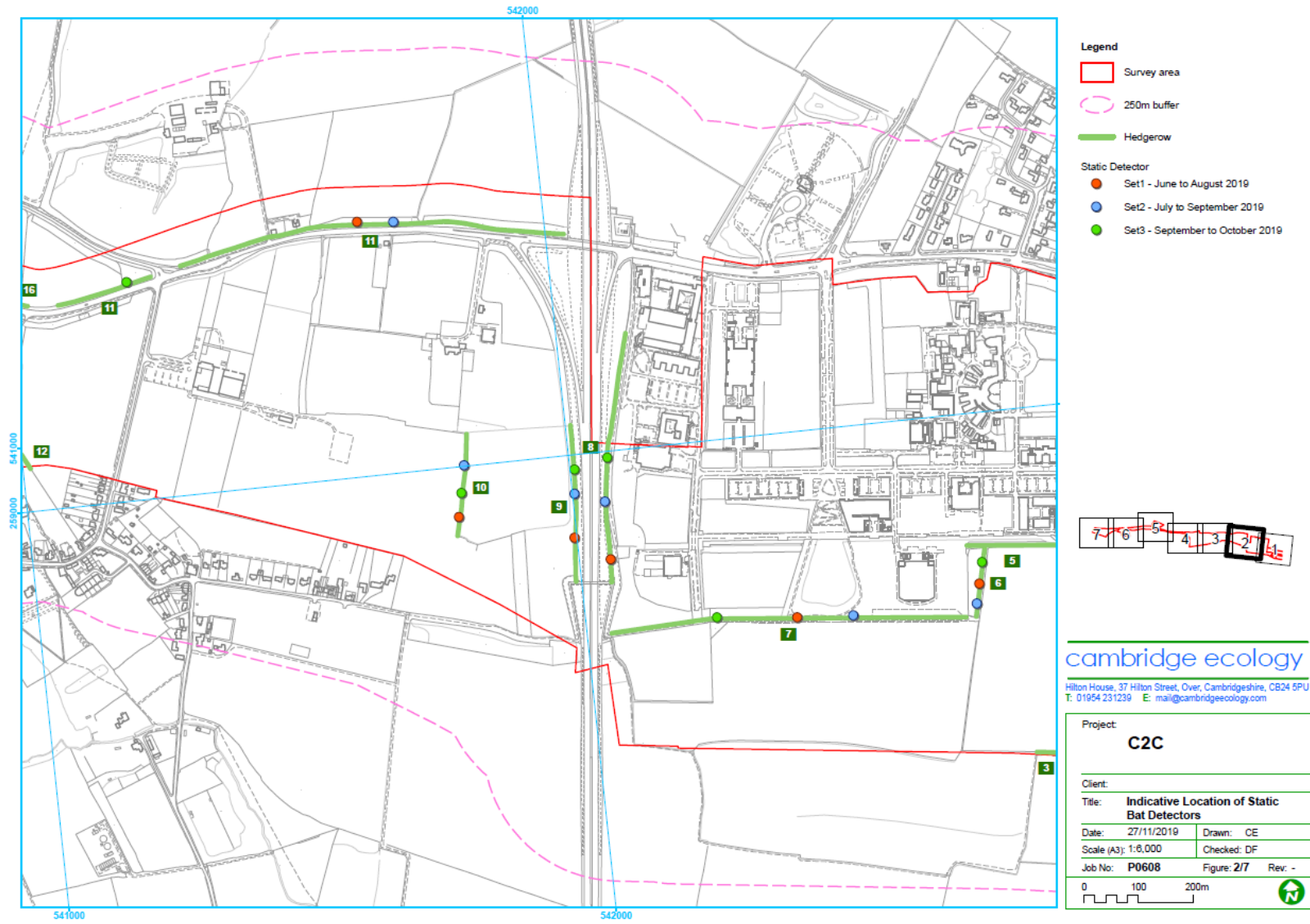


Figure 2.2c: Plan showing the indicative location of the hedgerows where bat activity surveys using static detectors were carried out (sheet 3 of 7)

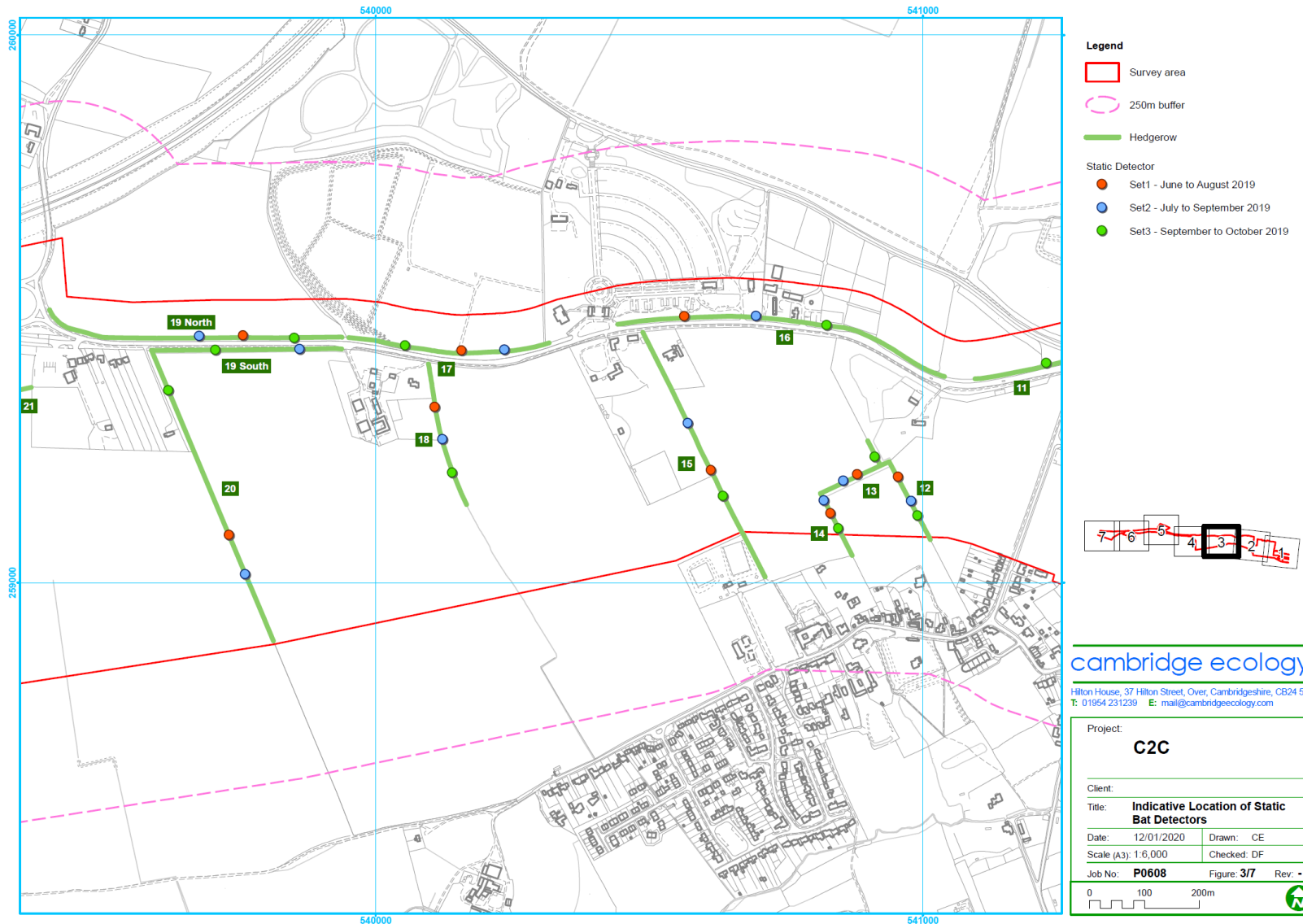


Figure 2.2d: Plan showing the indicative location of the hedgerows where bat activity surveys using static detectors were carried out (sheet 4 of 7)

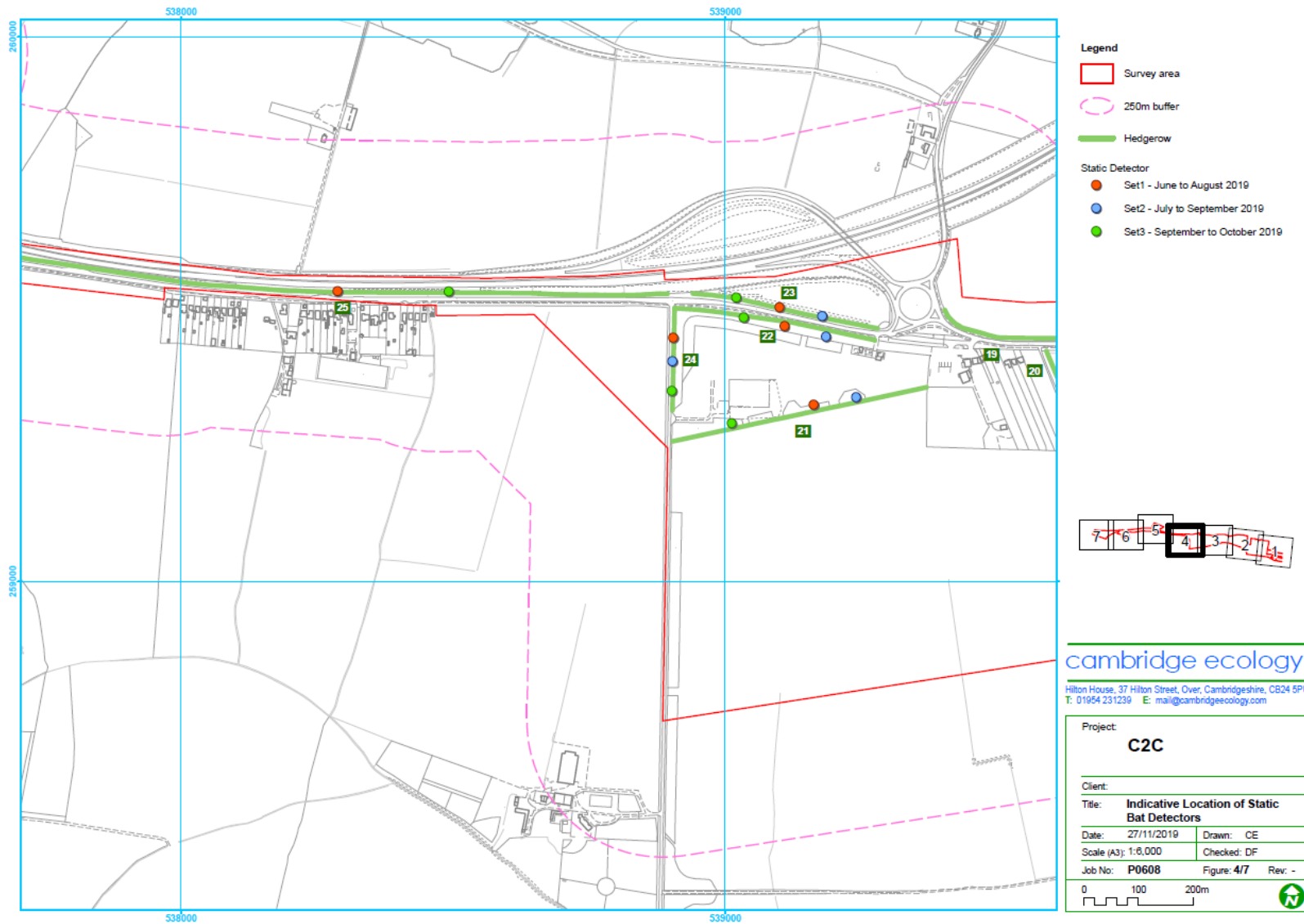


Figure 2.2e: Plan showing the indicative location of the hedgerows where bat activity surveys using static detectors were carried out (sheet 5 of 7)

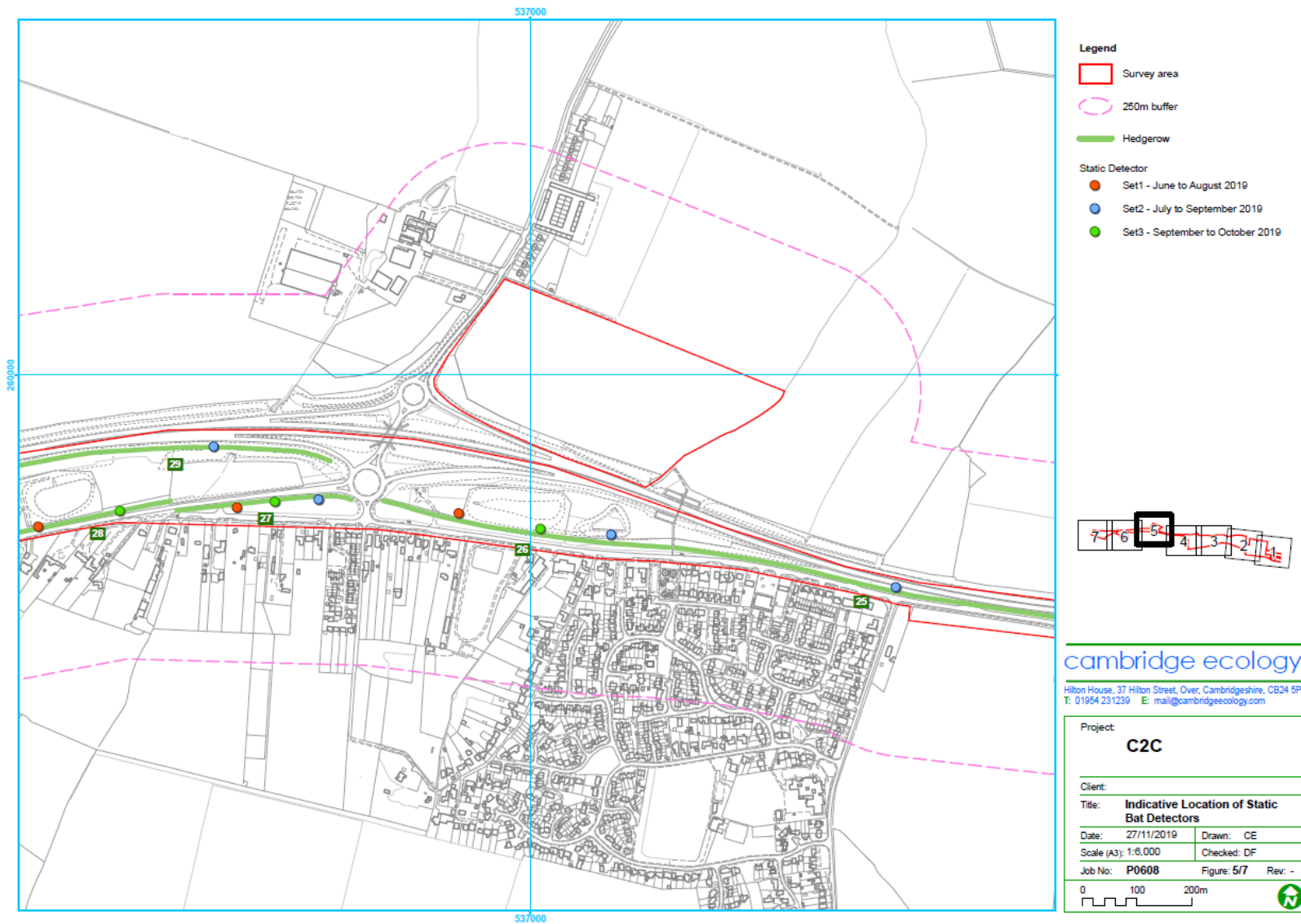


Figure 2.2f: Plan showing the indicative location of the hedgerows where bat activity surveys using static detectors were carried out (sheet 6 of 7)

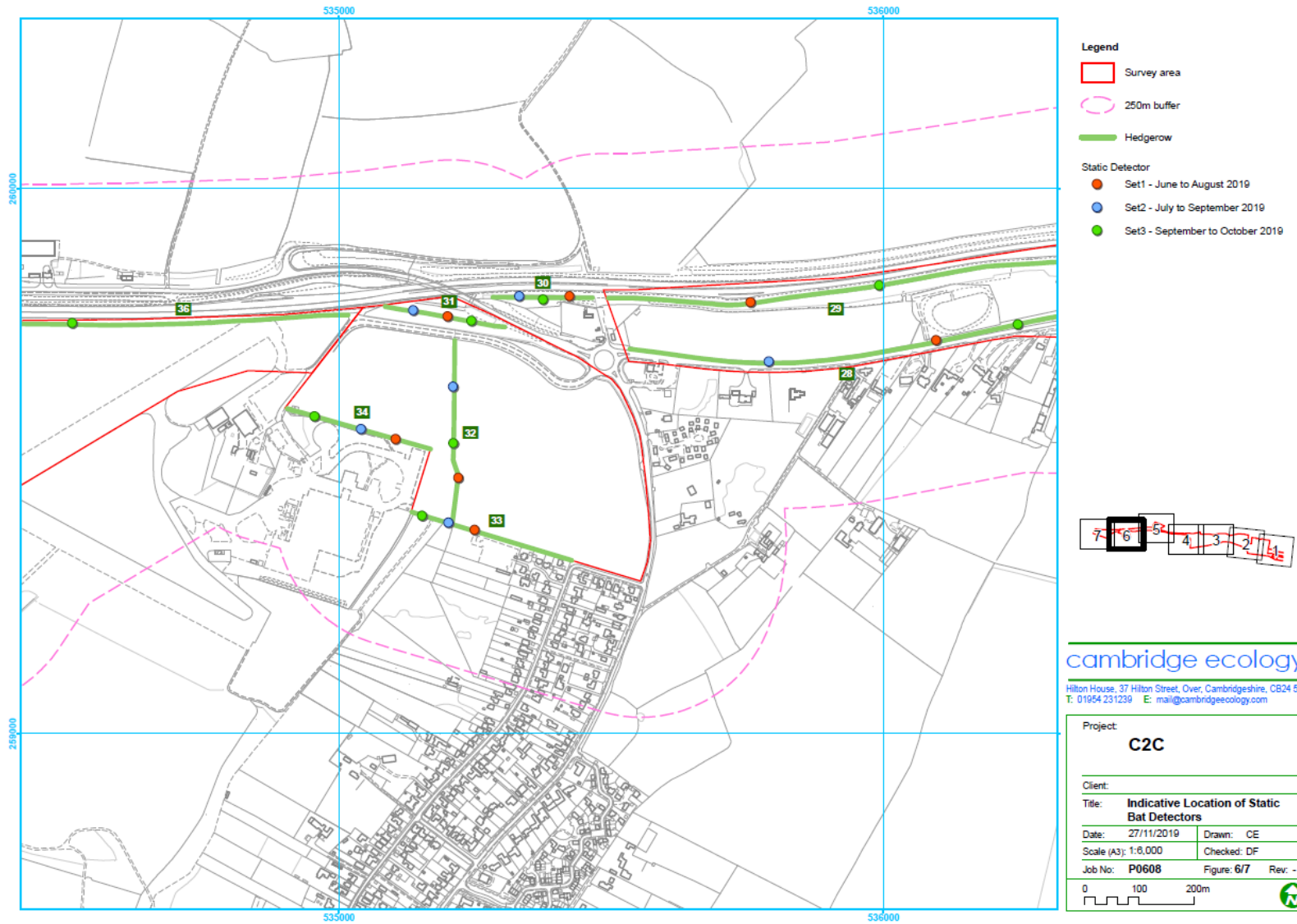


Figure 2.2g: Plan showing the indicative location of the hedgerows where bat activity surveys using static detectors were carried out (sheet 7 of 7)

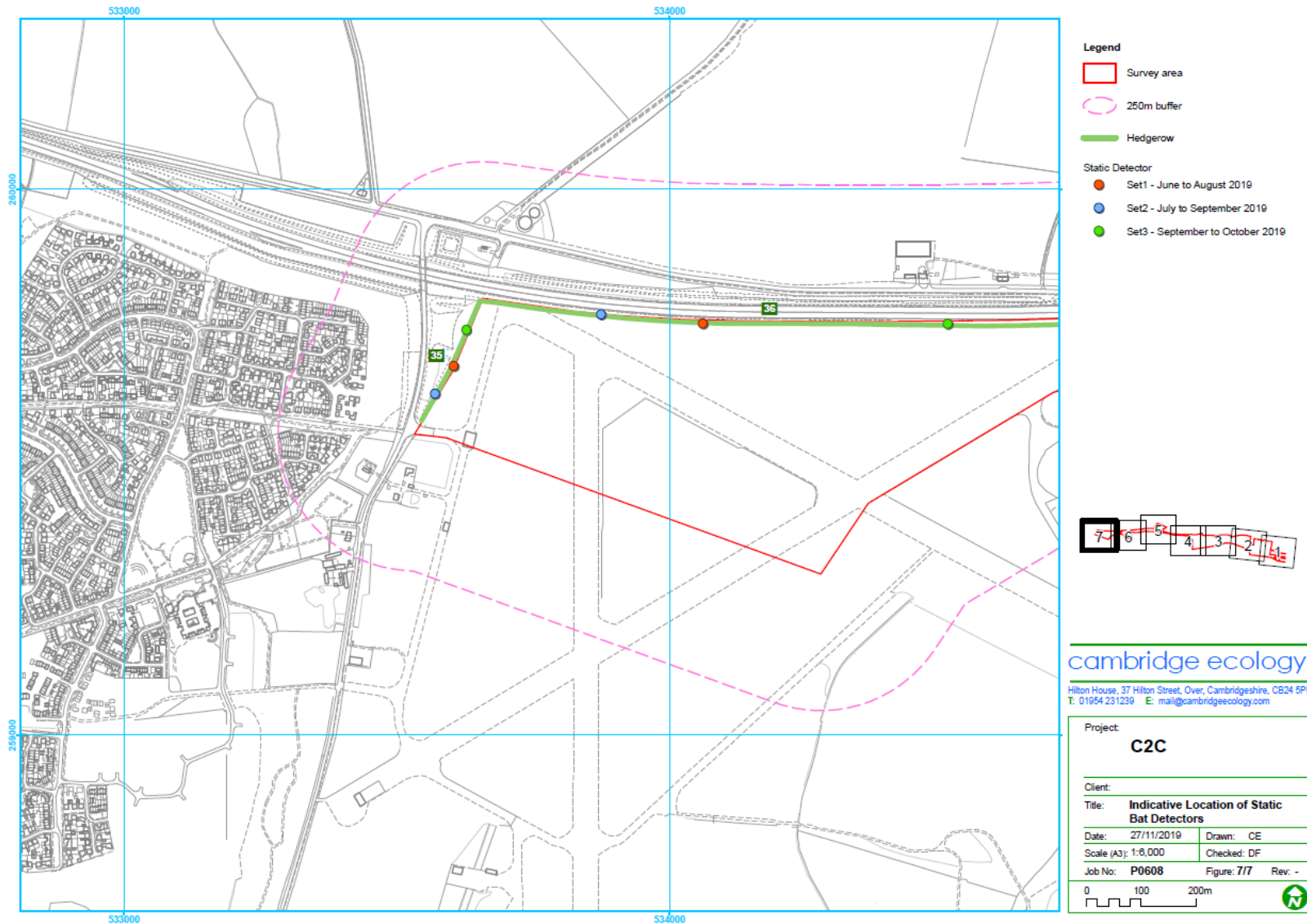


Figure 2.3: Overview plan showing the indicative location of the hedgerows where bat activity surveys using static detectors were carried out

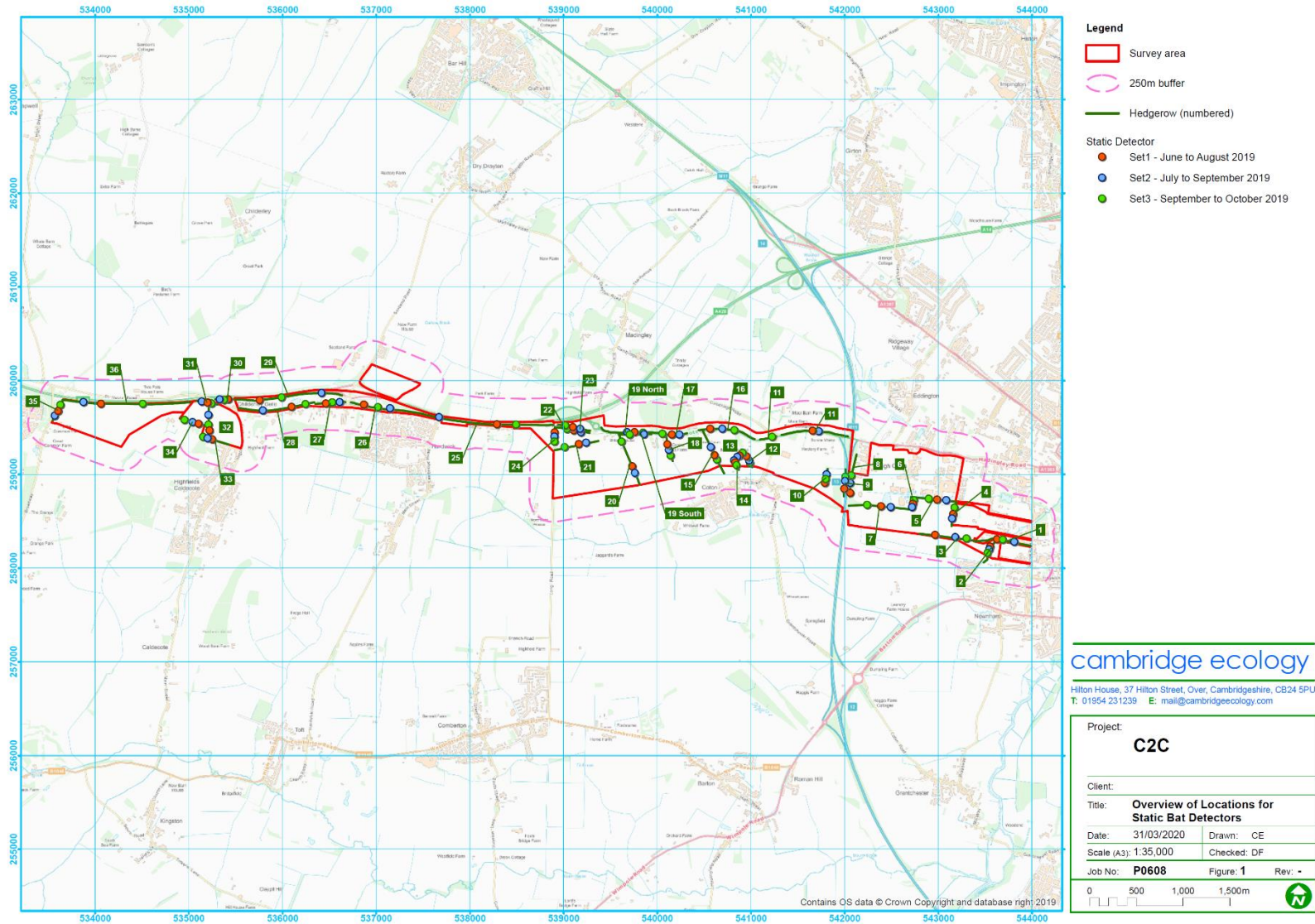




Figure 3.1a: Results of emergence/re-entry surveys of trees (sheet 1 of 7)

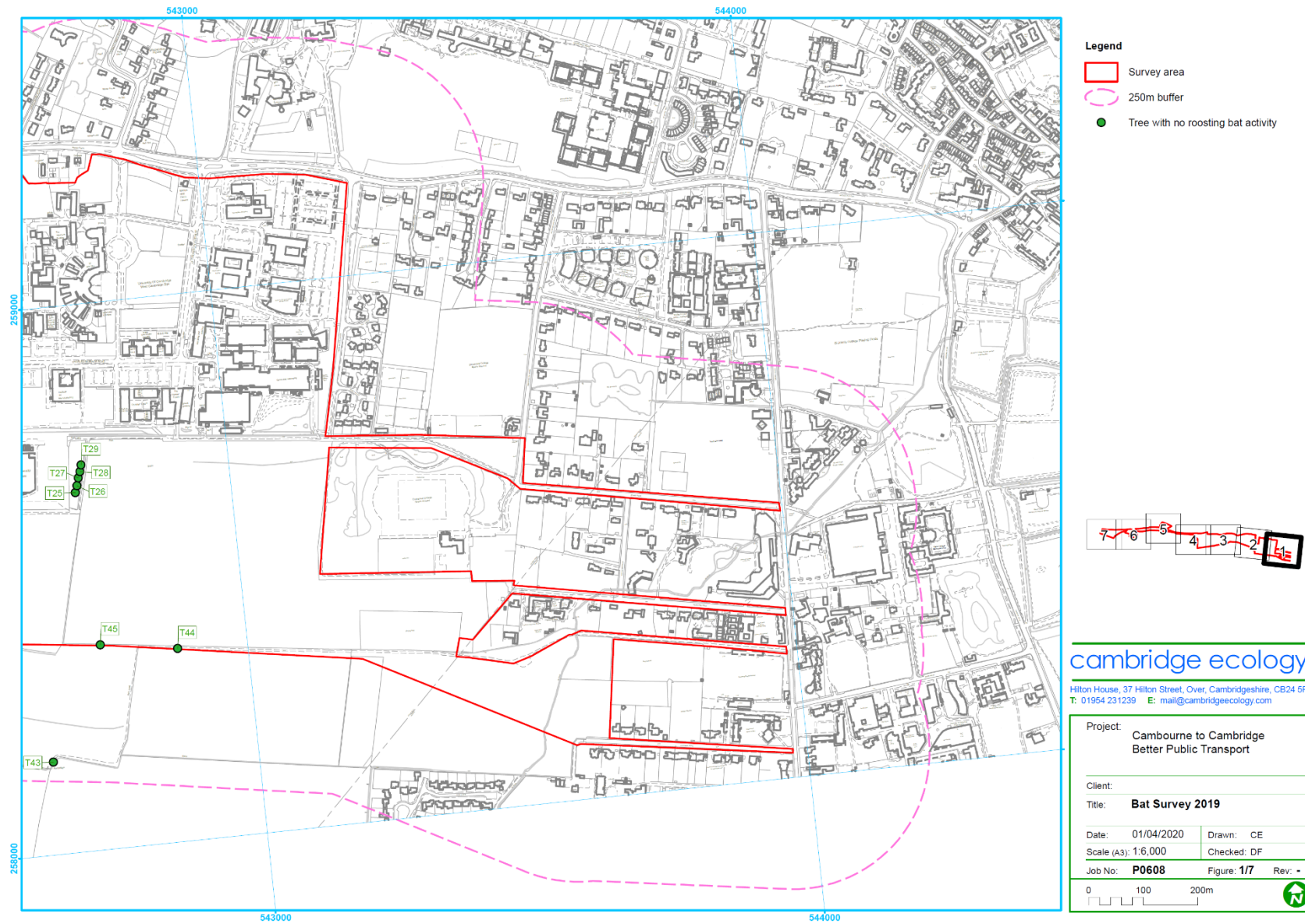


Figure 3.1b: Results of emergence/re-entry surveys of trees (sheet 2 of 7)

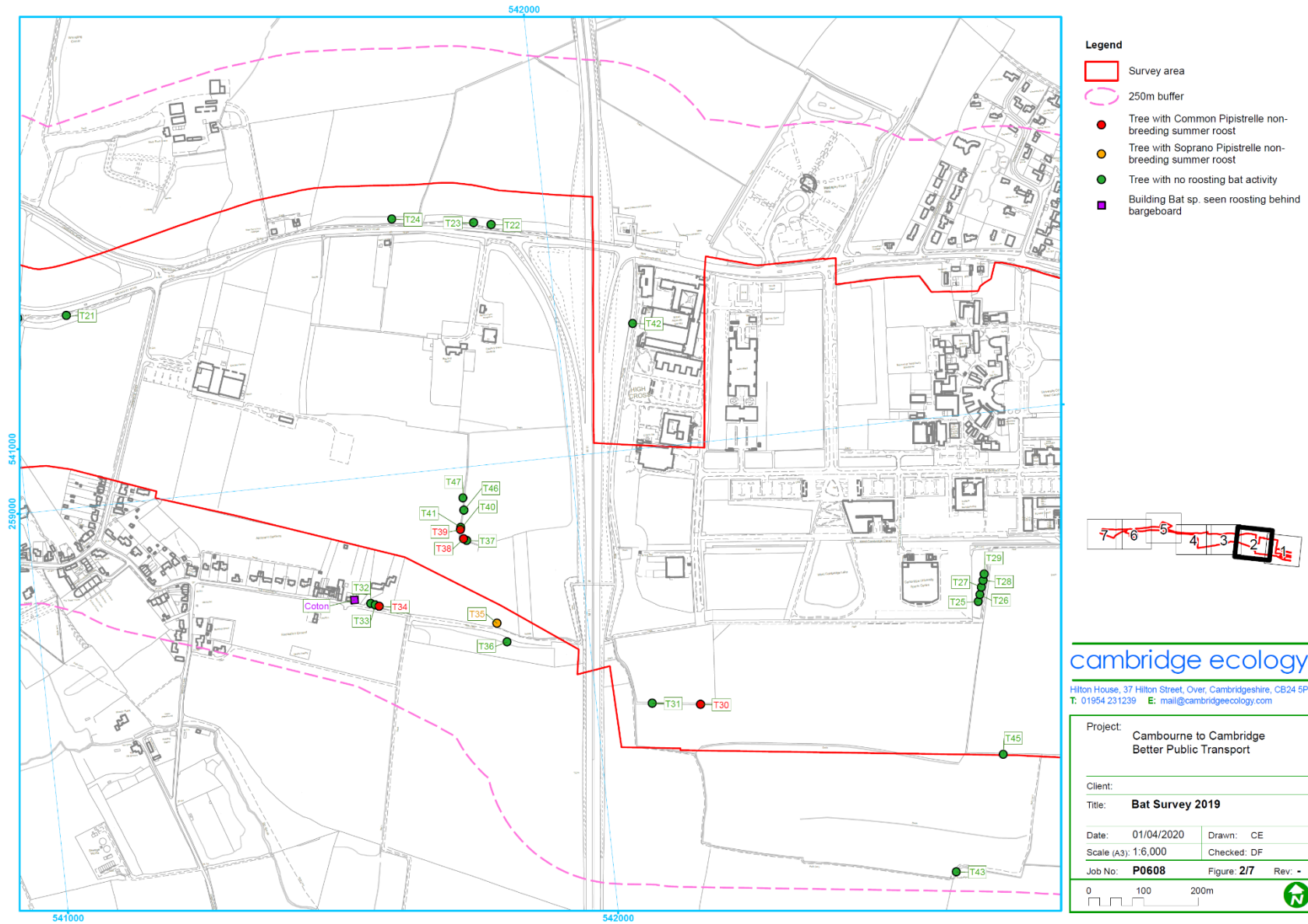


Figure 3.1c: Results of emergence/re-entry surveys of trees (sheet 3 of 7)

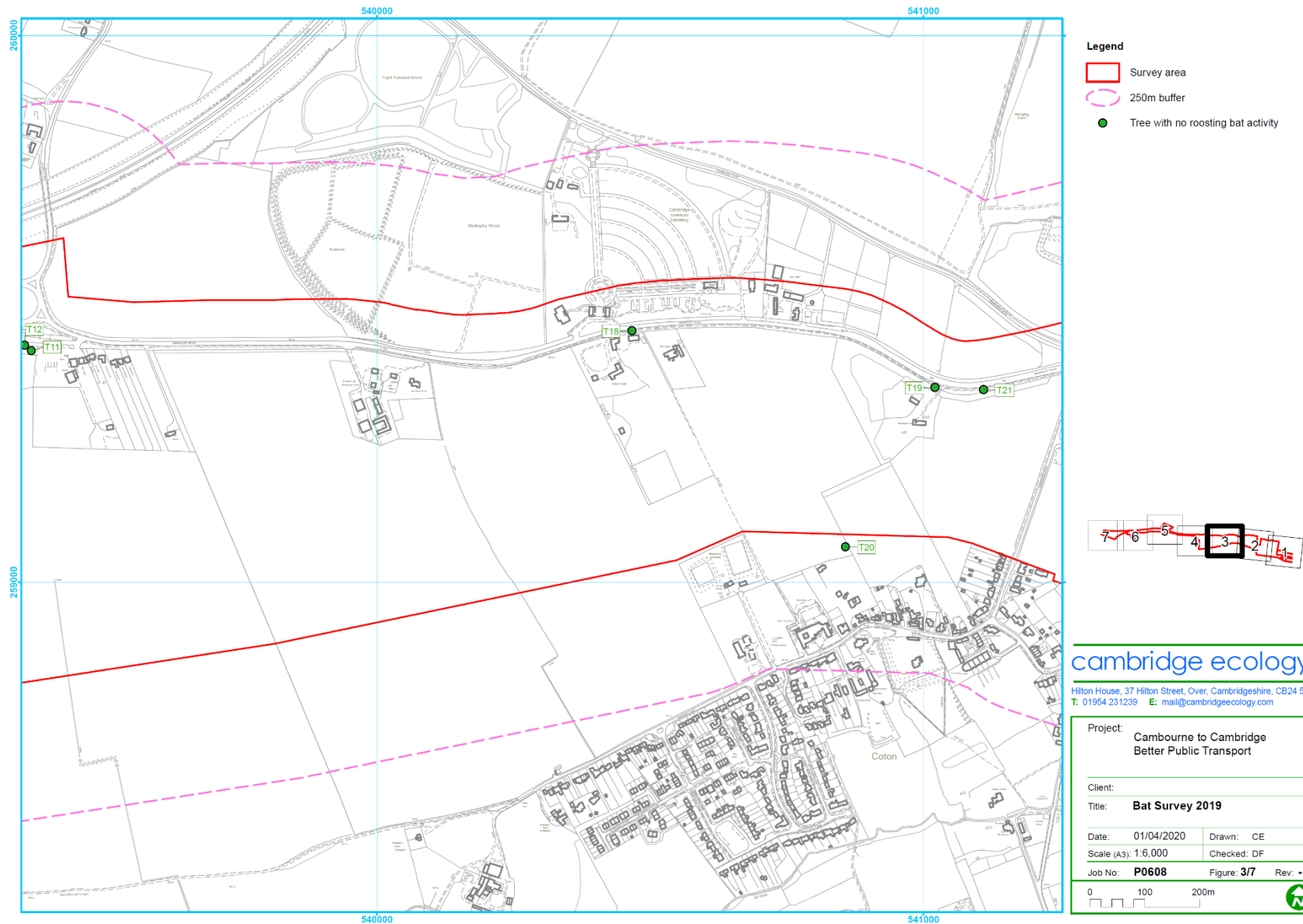


Figure 3.1d: Results of emergence/re-entry surveys of trees (sheet 4 of 7)

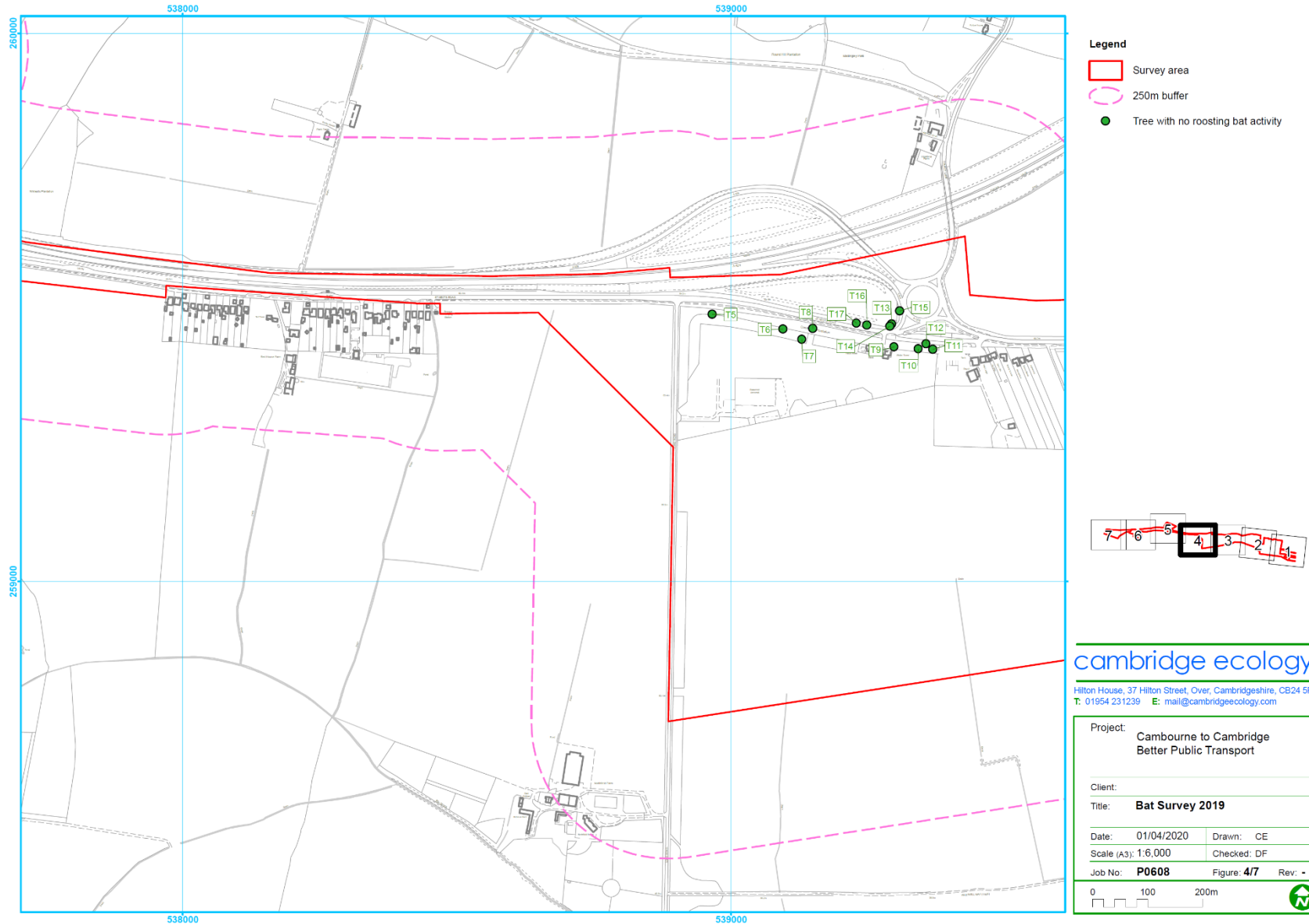


Figure 3.1e: Results of emergence/re-entry surveys of trees (sheet 5 of 7)

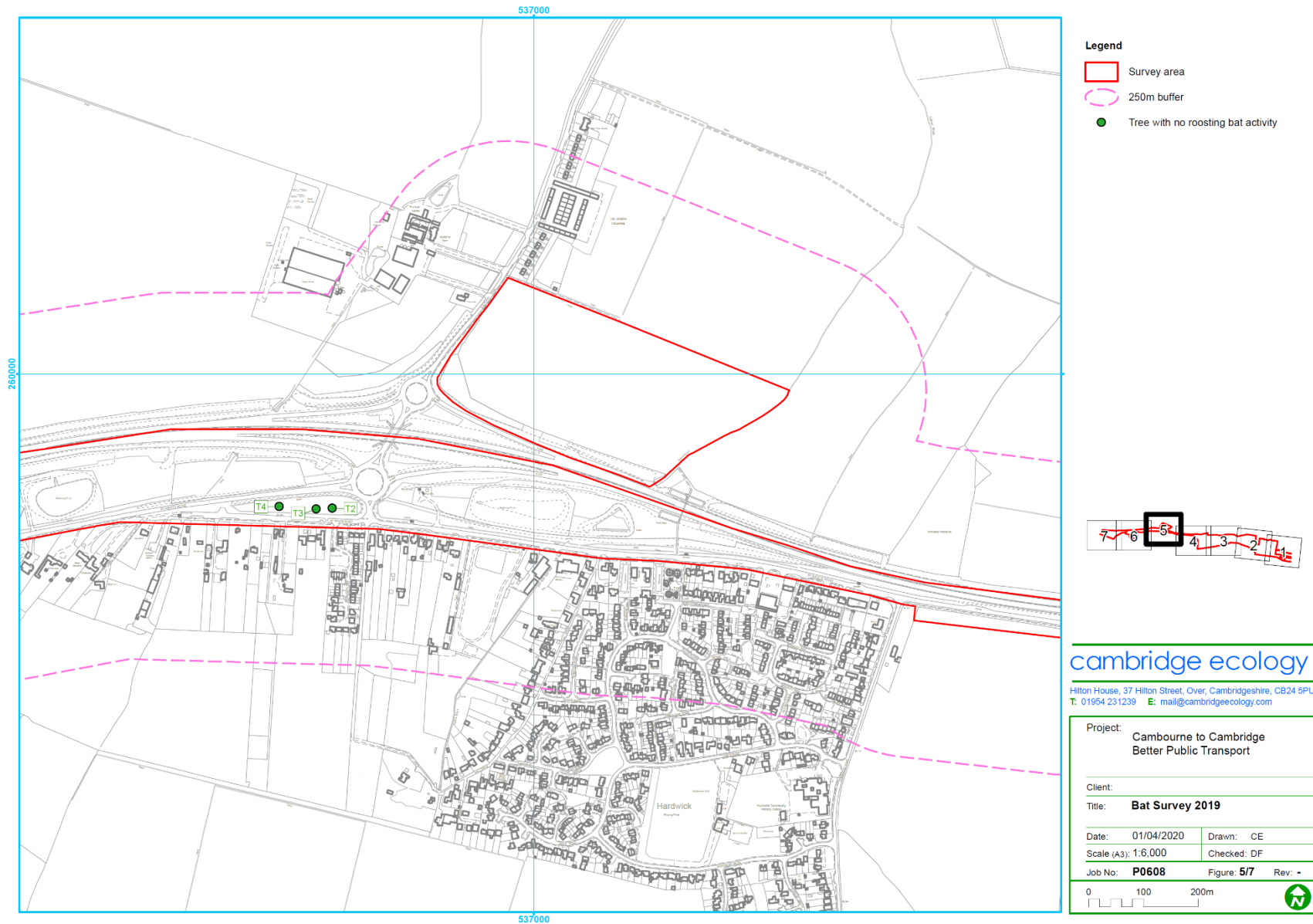


Figure 3.1f: Results of emergence/re-entry surveys of trees (sheet 6 of 7)

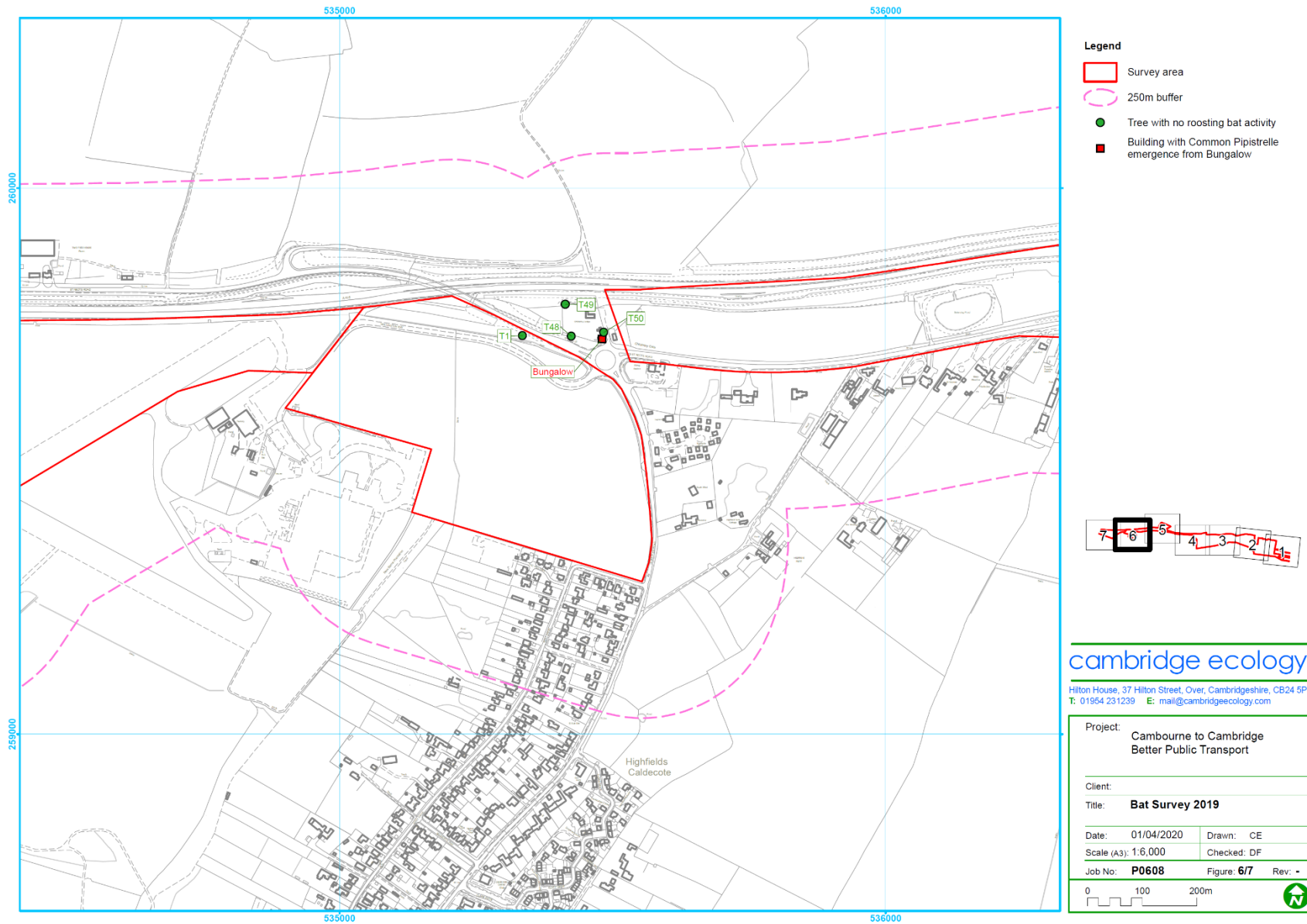


Figure 3.1g: Results of emergence/re-entry surveys of trees (sheet 7 of 7)

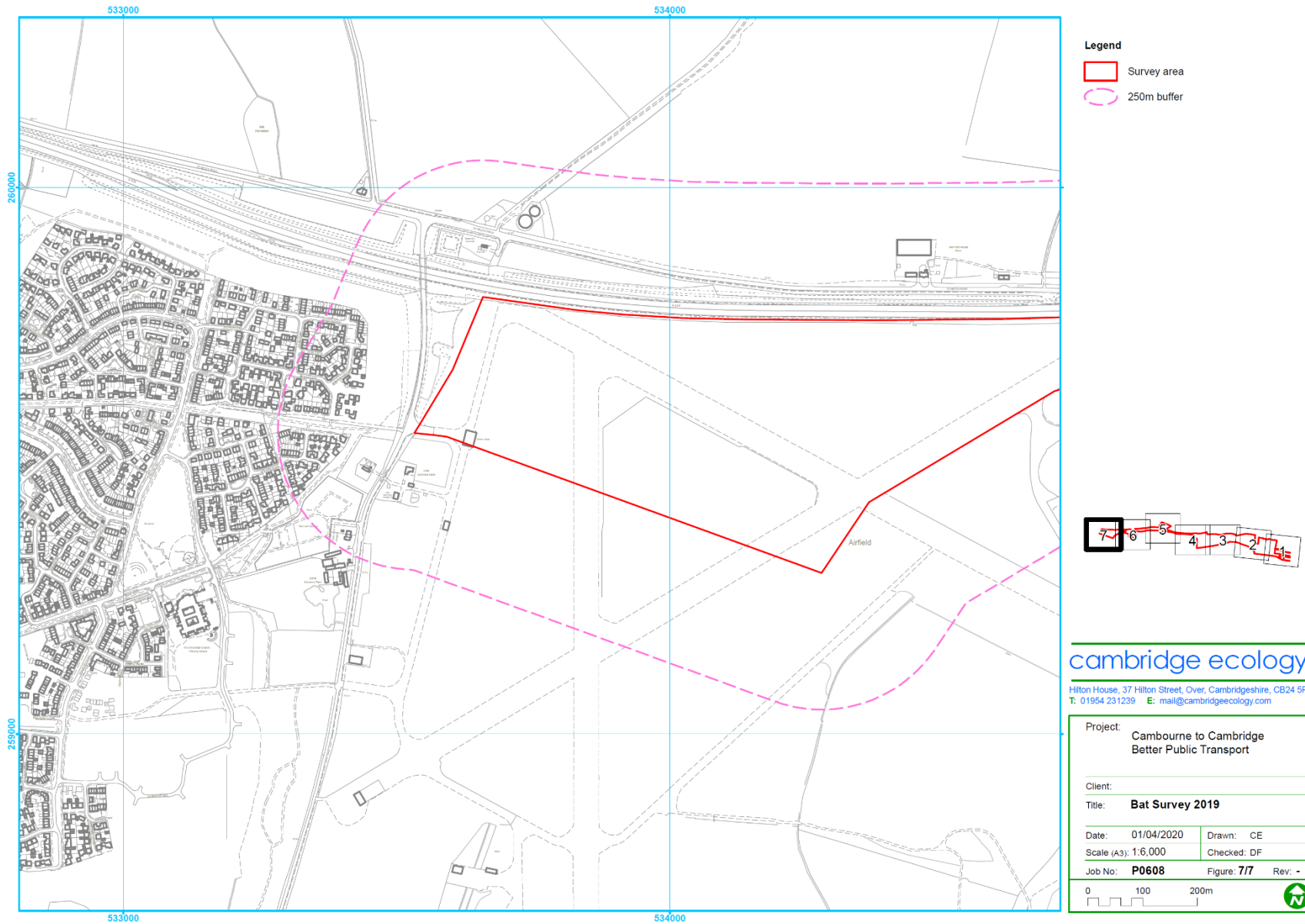


Figure 3.2a: Results of first set of bat activity surveys along hedgerows and linear features (sheet 1 of 7)

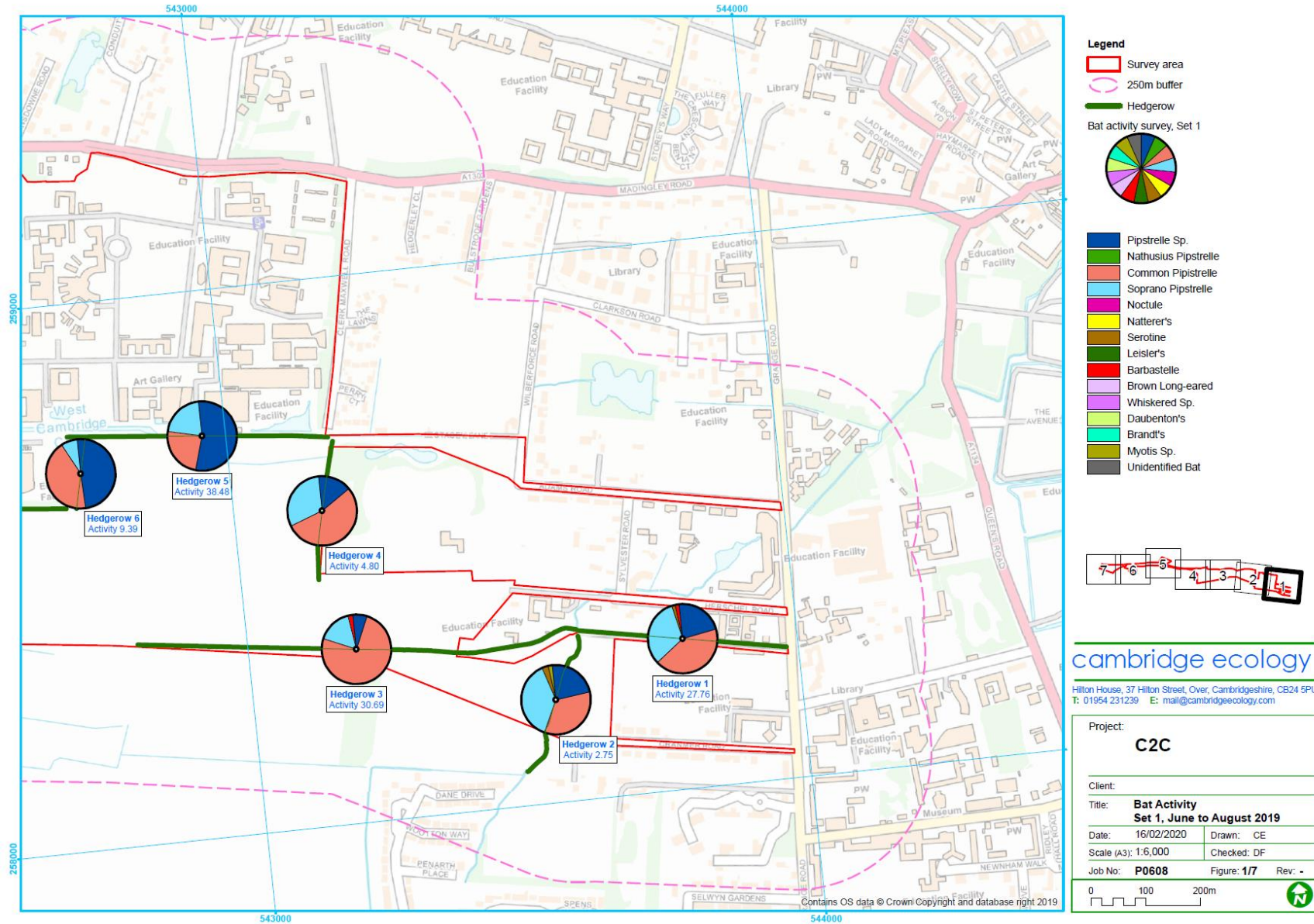




Figure 3.2b: Results of first set of bat activity surveys along hedgerows and linear features (sheet 2 of 7)

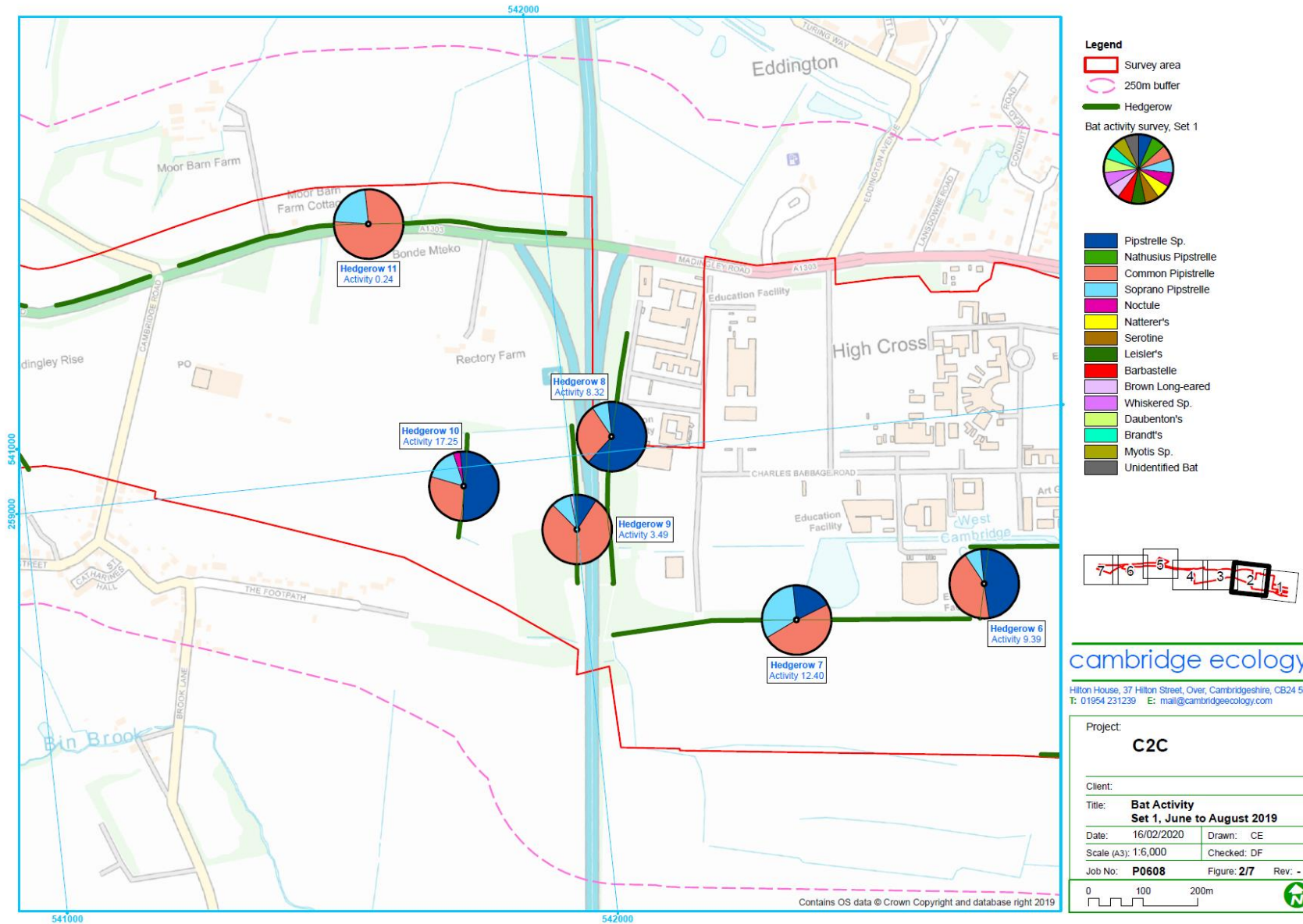


Figure 3.2c: Results of first set of bat activity surveys along hedgerows and linear features (sheet 3 of 7)

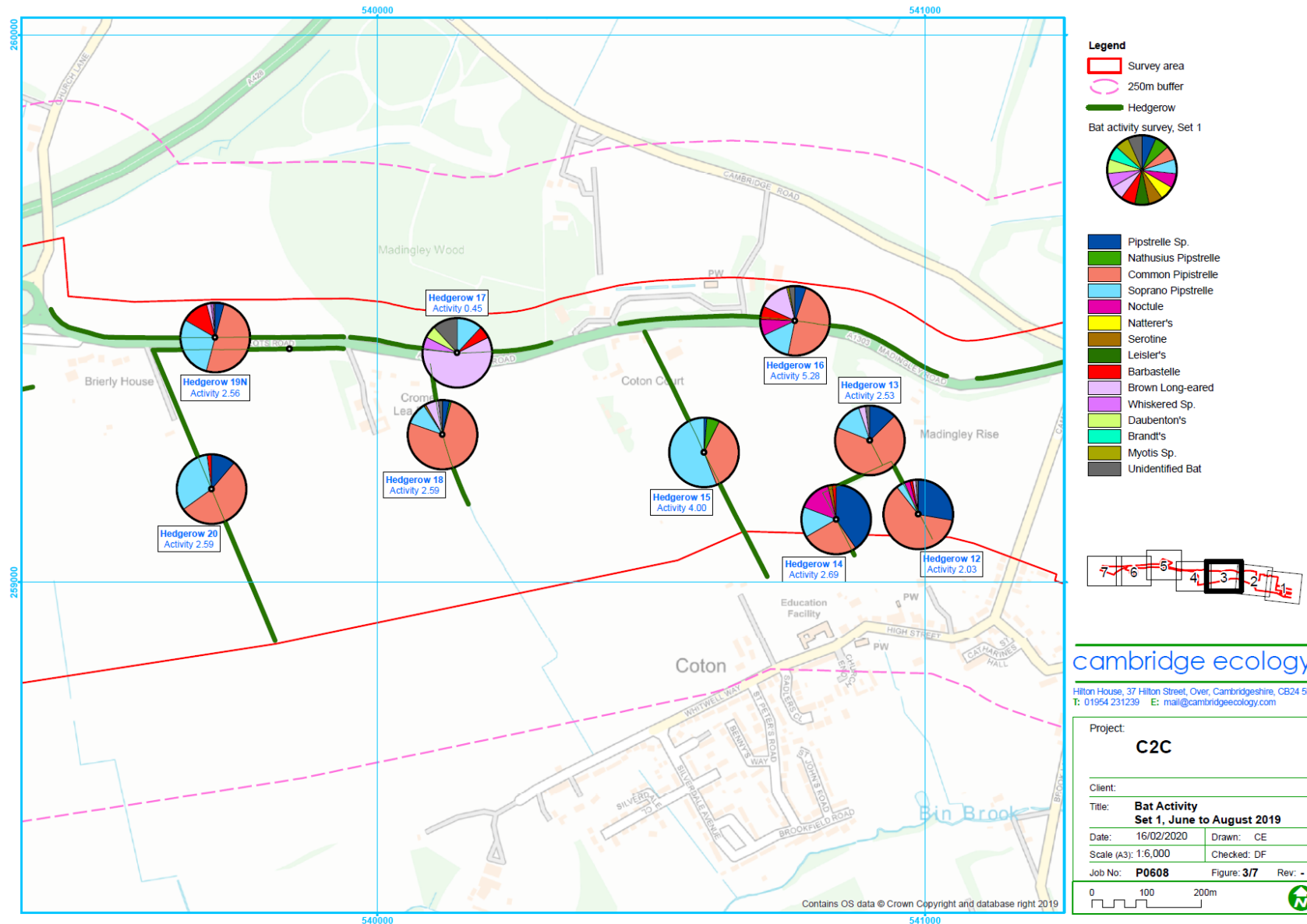


Figure 3.2d: Results of first set of bat activity surveys along hedgerows and linear features (sheet 4 of 7)

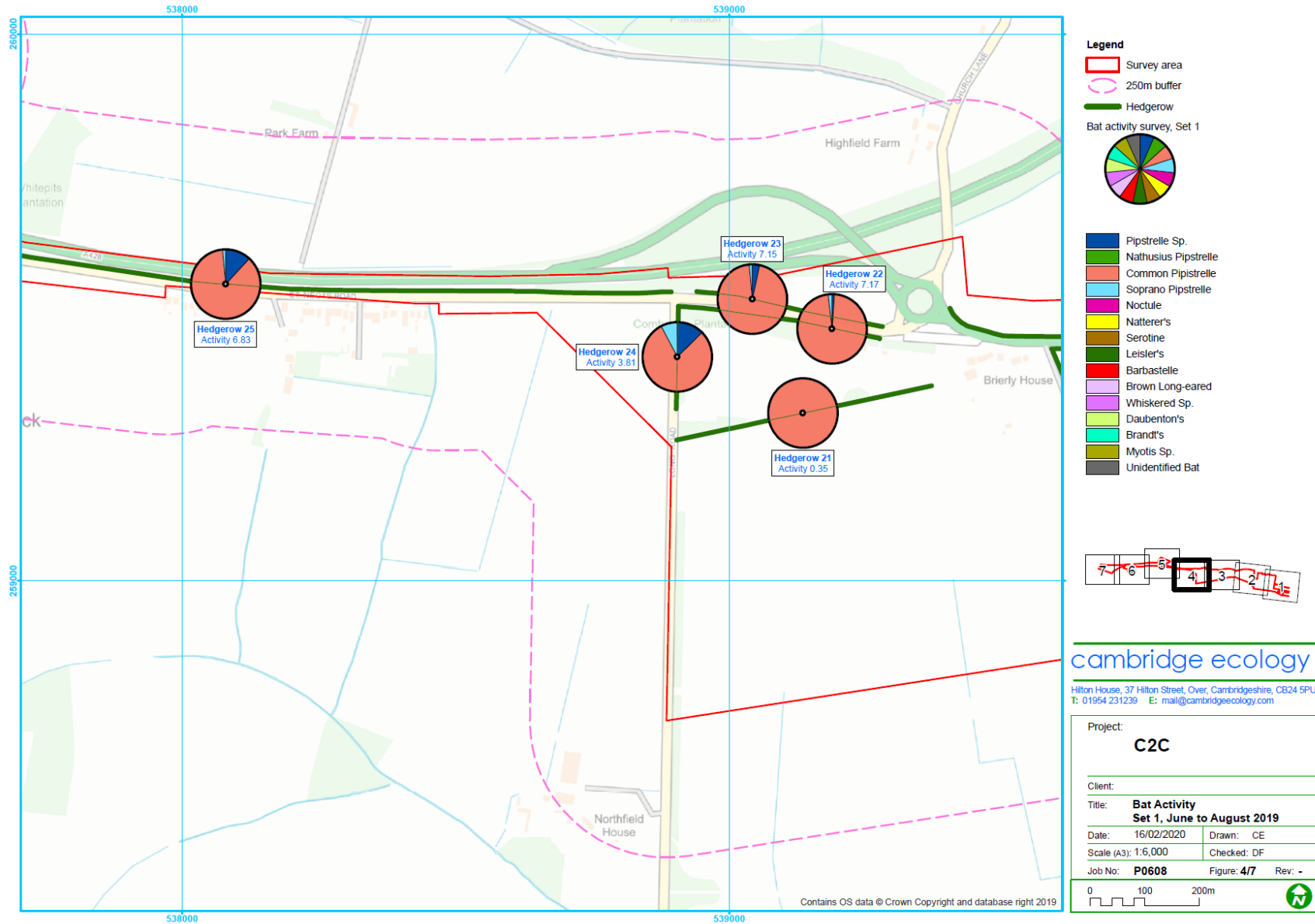




Figure 3.2f: Results of first set of bat activity surveys along hedgerows and linear features (sheet 6 of 7)

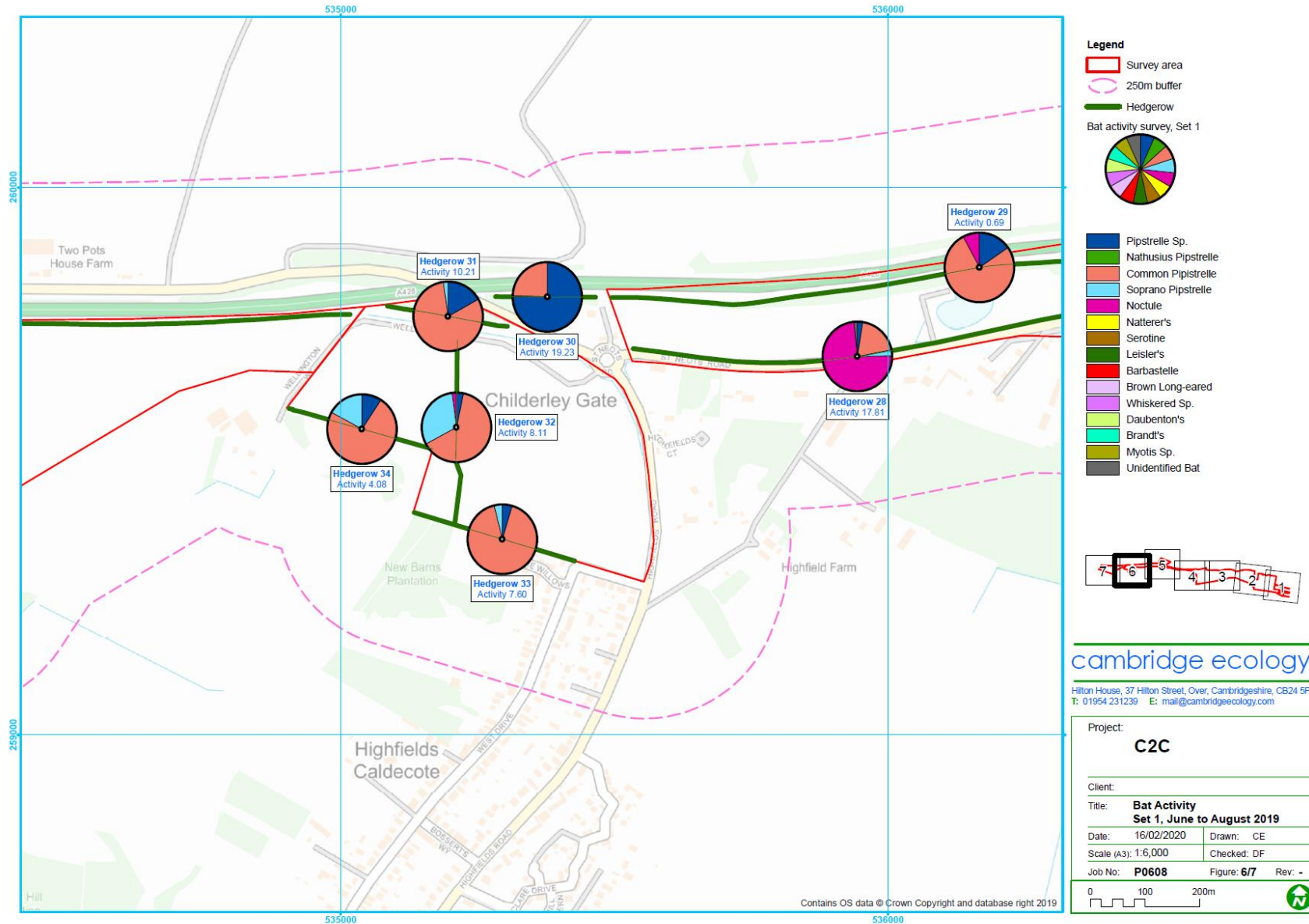


Figure 3.2g: Results of first set of bat activity surveys along hedgerows and linear features (sheet 7 of 7)

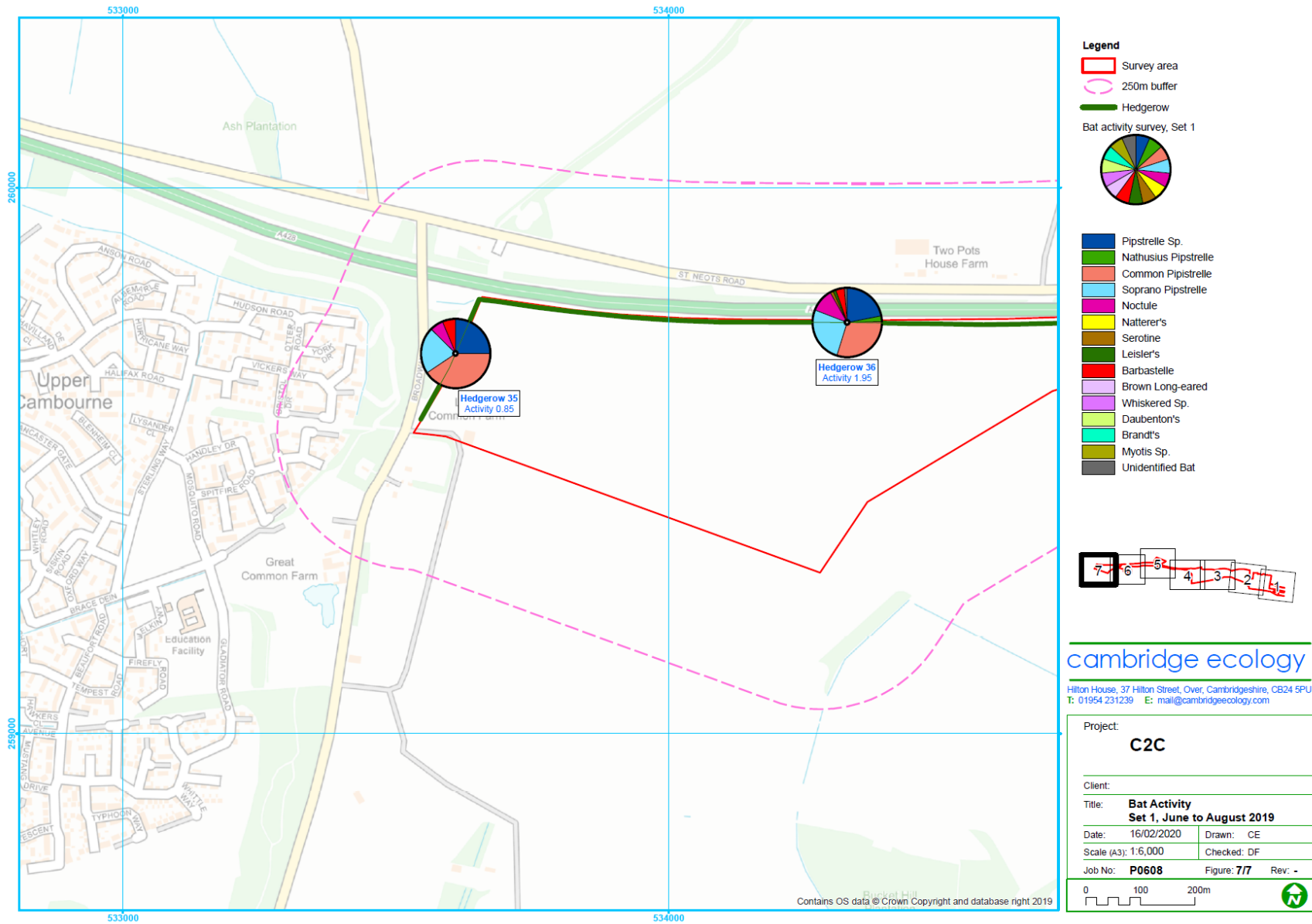


Figure 3.3a: Results of second set of bat activity surveys along hedgerows and linear features (sheet 1 of 7)

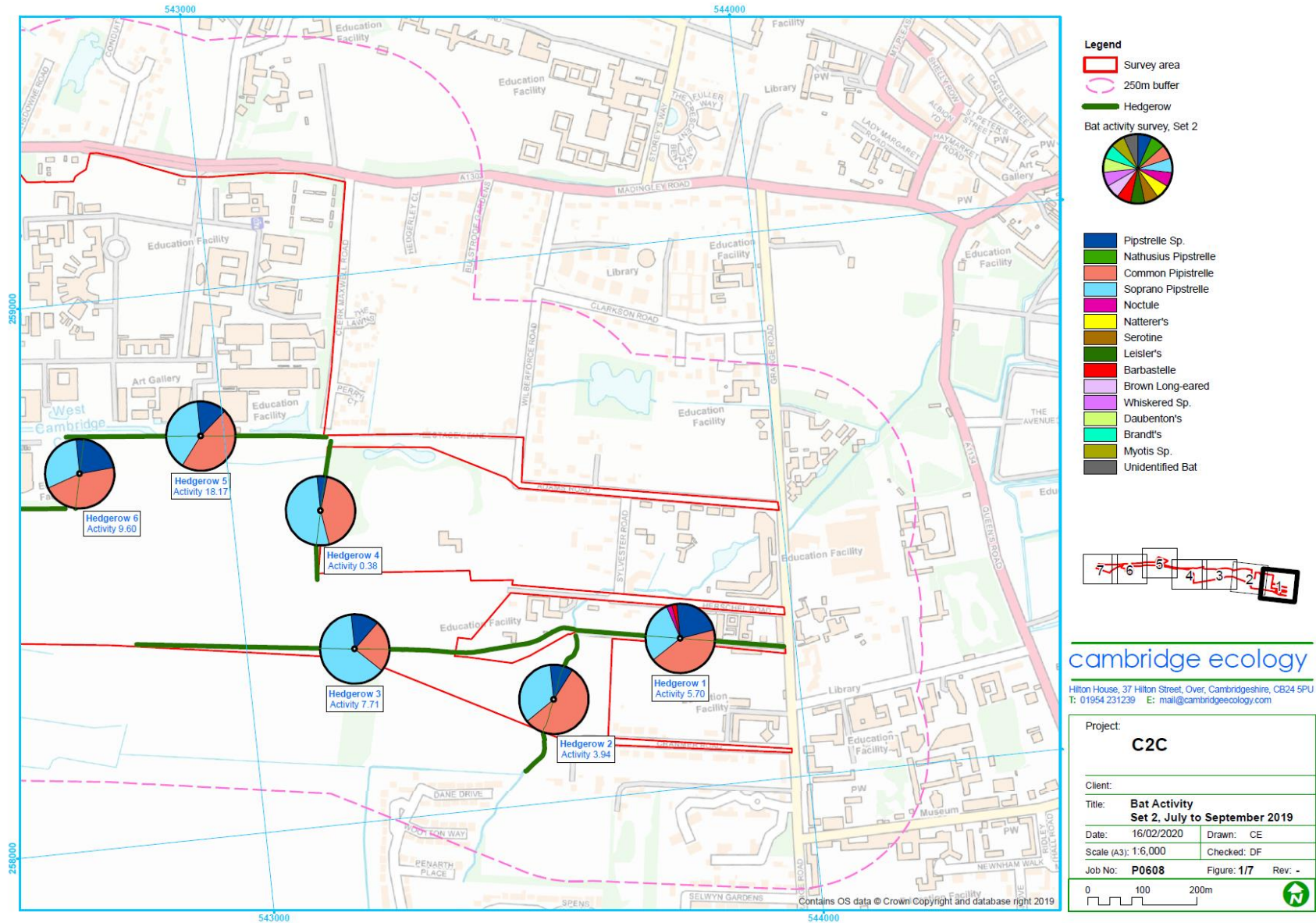


Figure 3.3b: Results of second set of bat activity surveys along hedgerows and linear features (sheet 2 of 7)

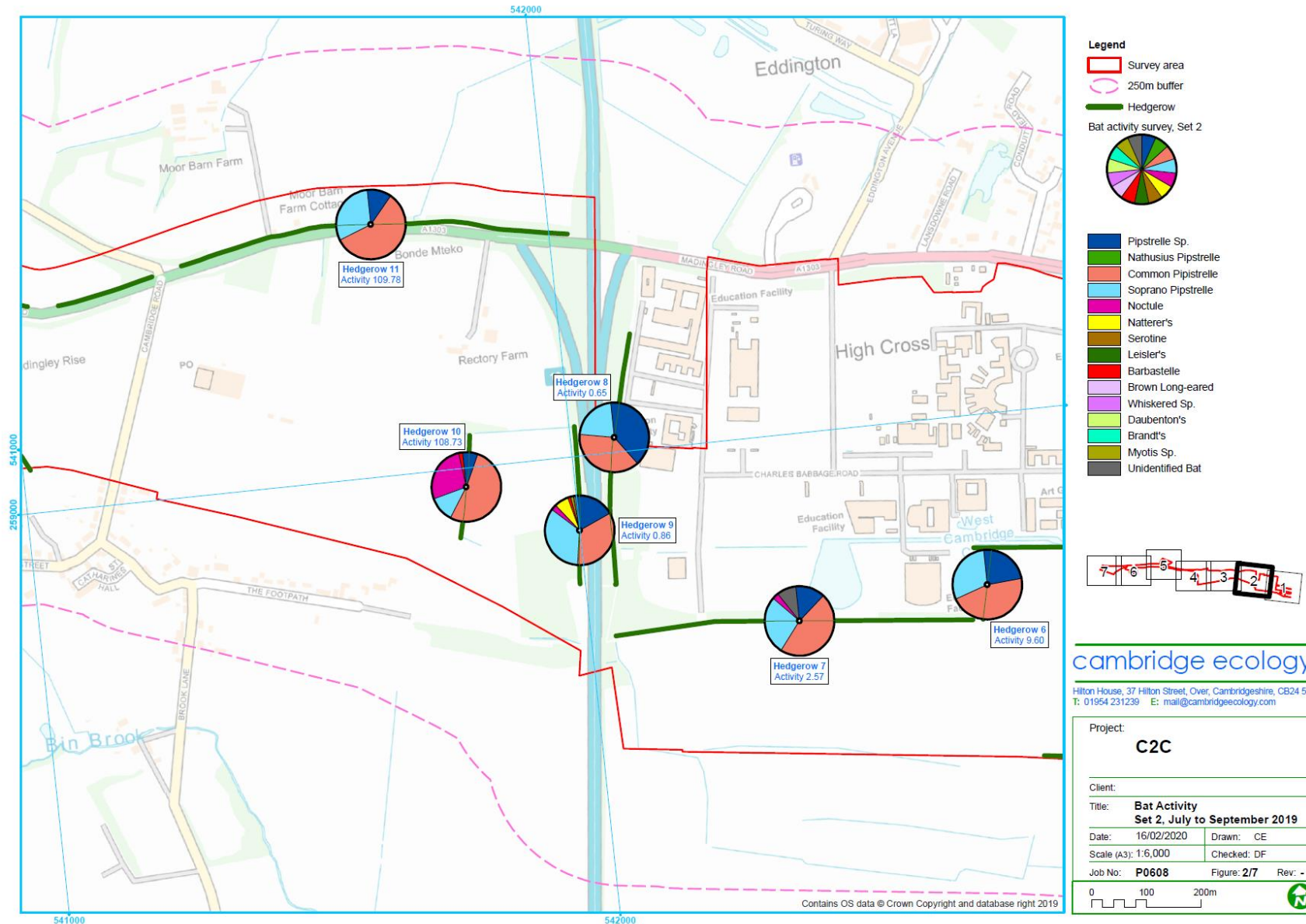




Figure 3.3c: Results of second set of bat activity surveys along hedgerows and linear features (sheet 3 of 7)

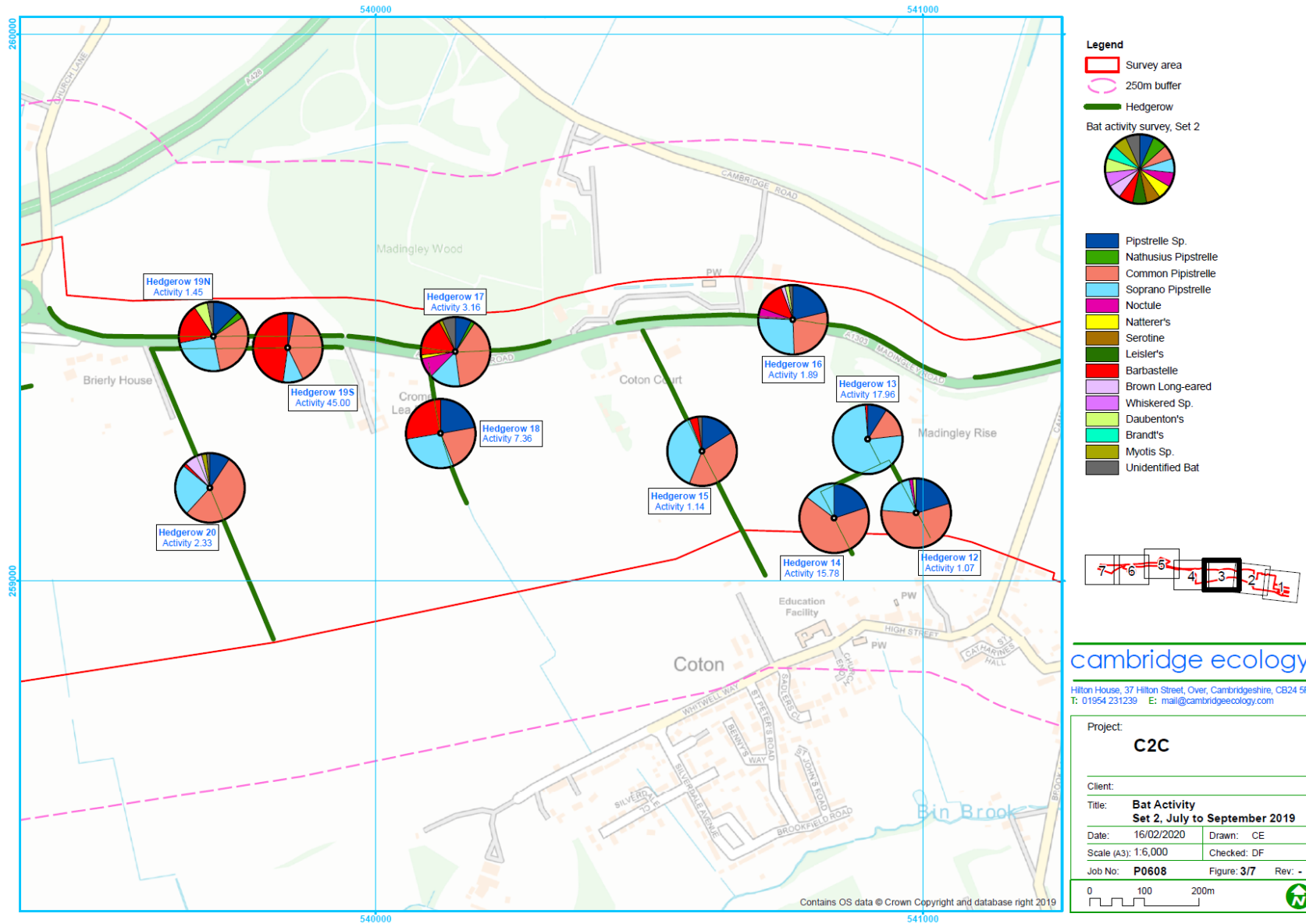


Figure 3.3d: Results of second set of bat activity surveys along hedgerows and linear features (sheet 4 of 7)

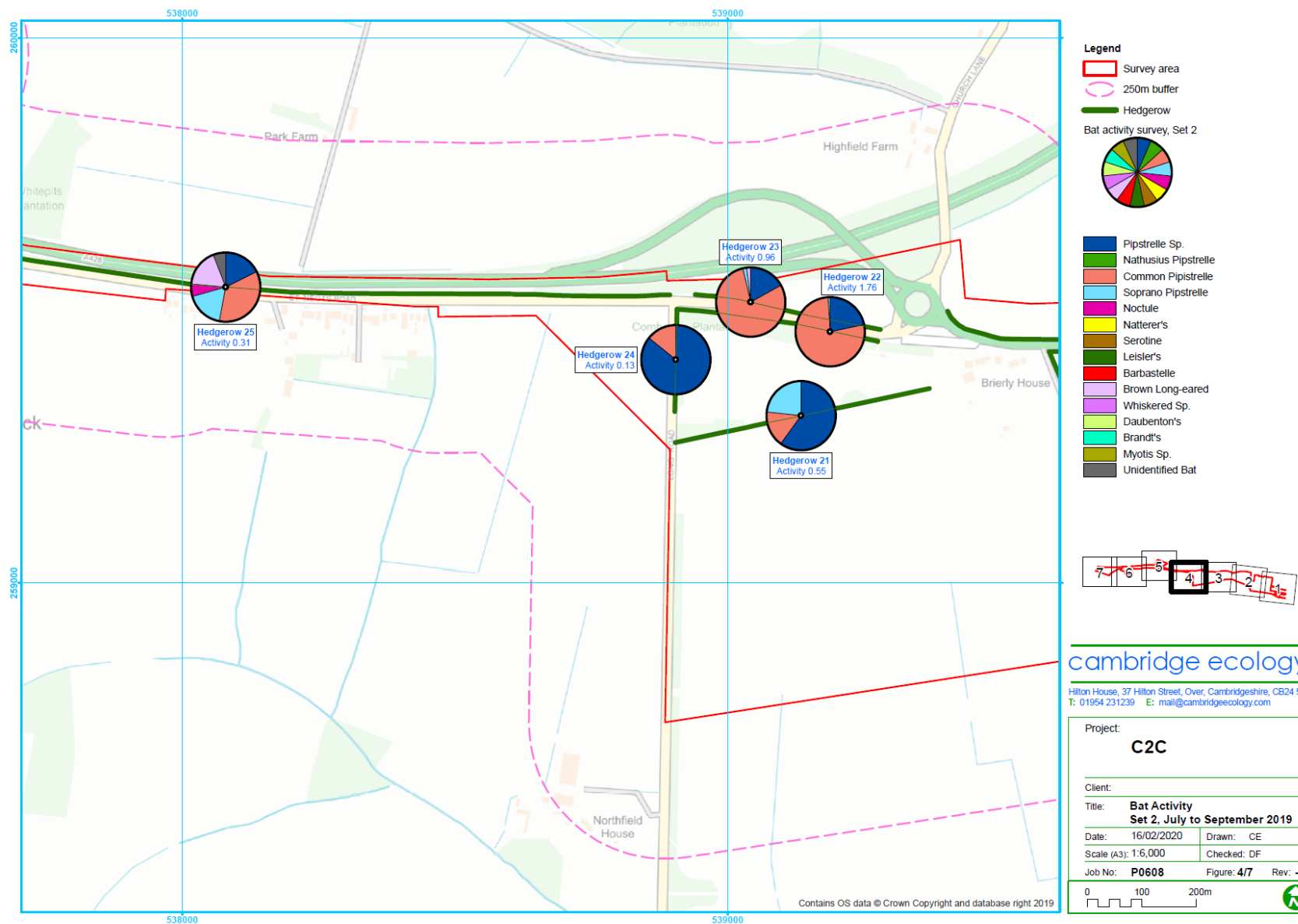


Figure 3.3e: Results of second set of bat activity surveys along hedgerows and linear features (sheet 5 of 7)

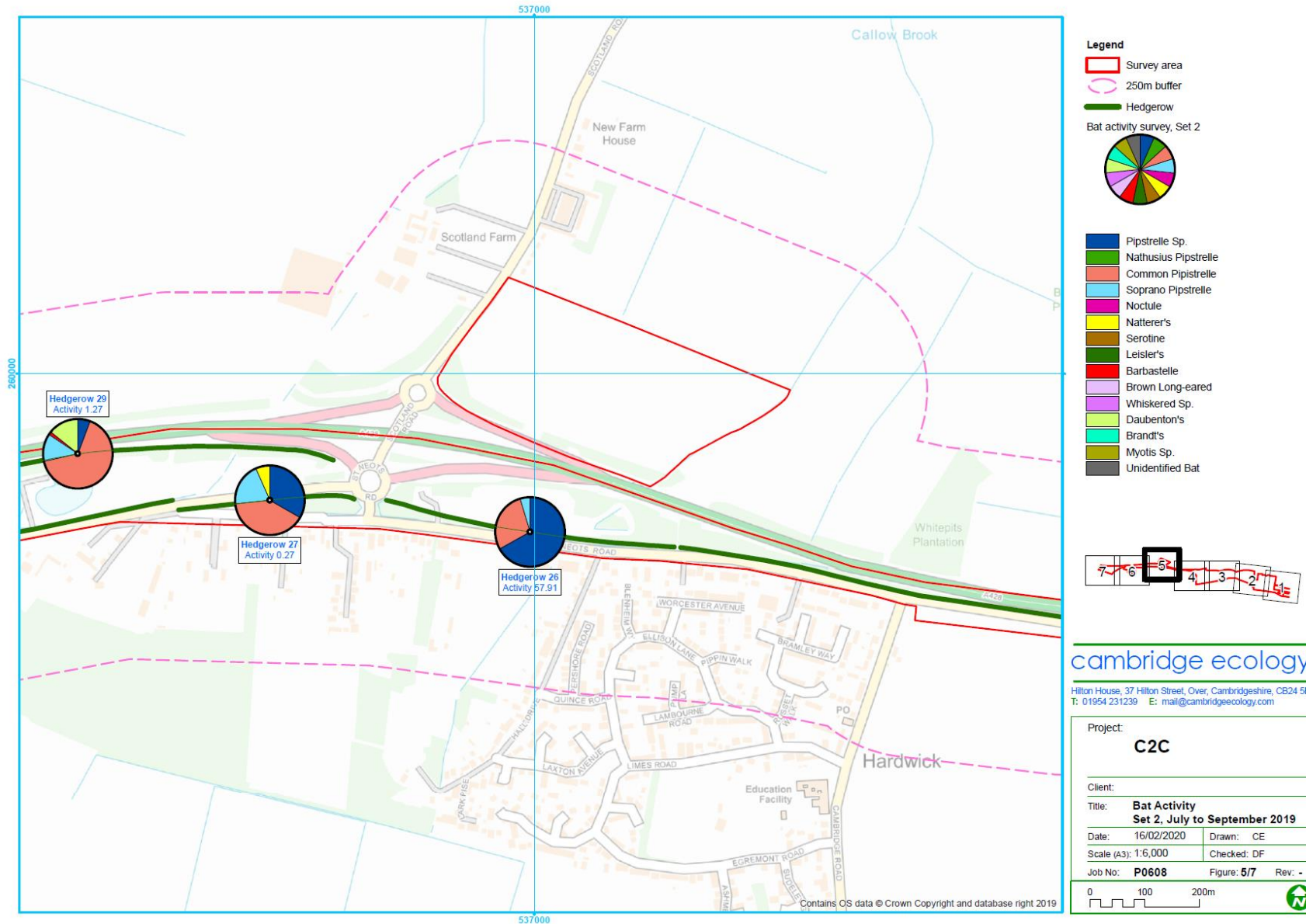


Figure 3.3f: Results of second set of bat activity surveys along hedgerows and linear features (sheet 6 of 7)

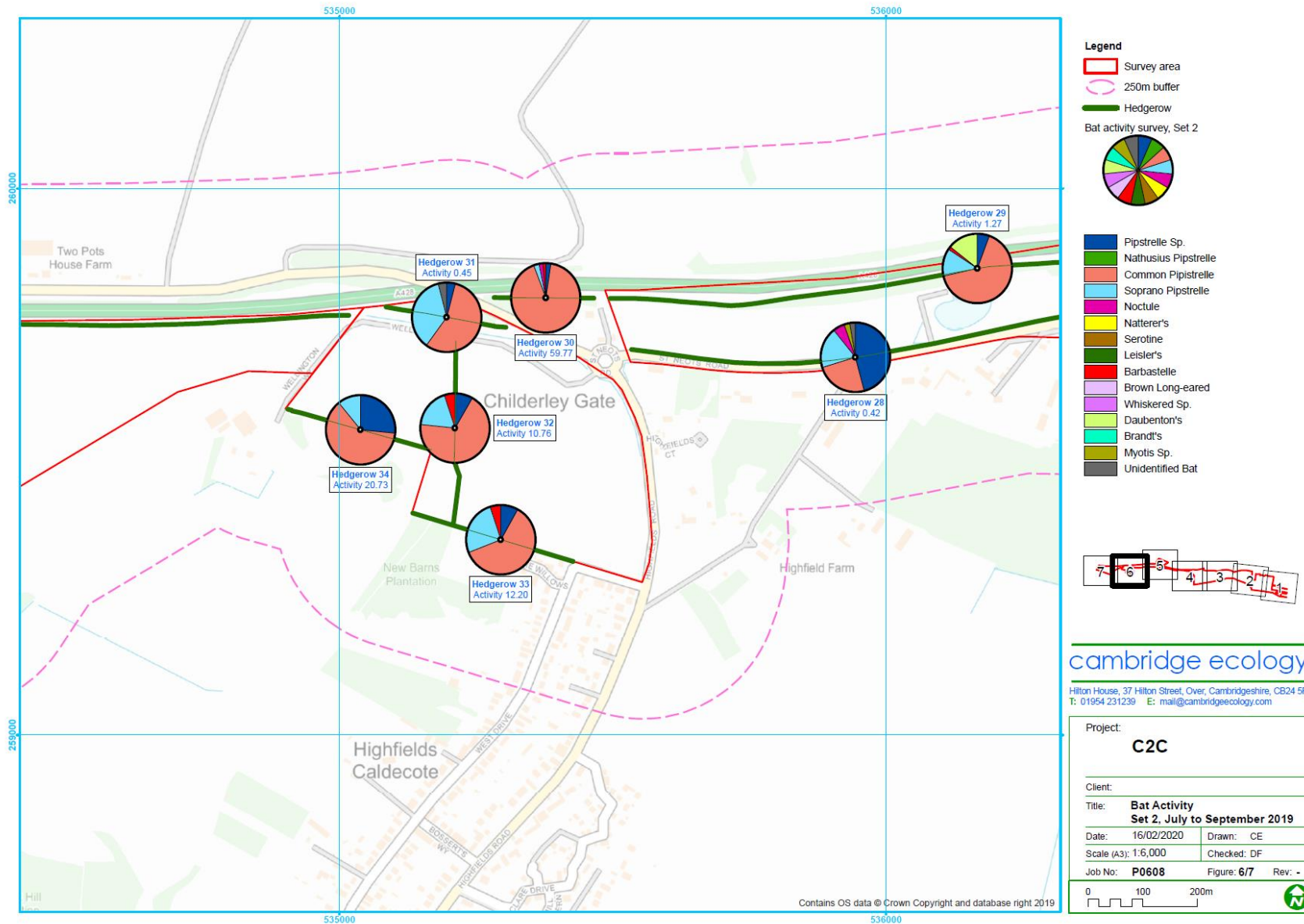


Figure 3.3g: Results of second set of bat activity surveys along hedgerows and linear features (sheet 7 of 7)

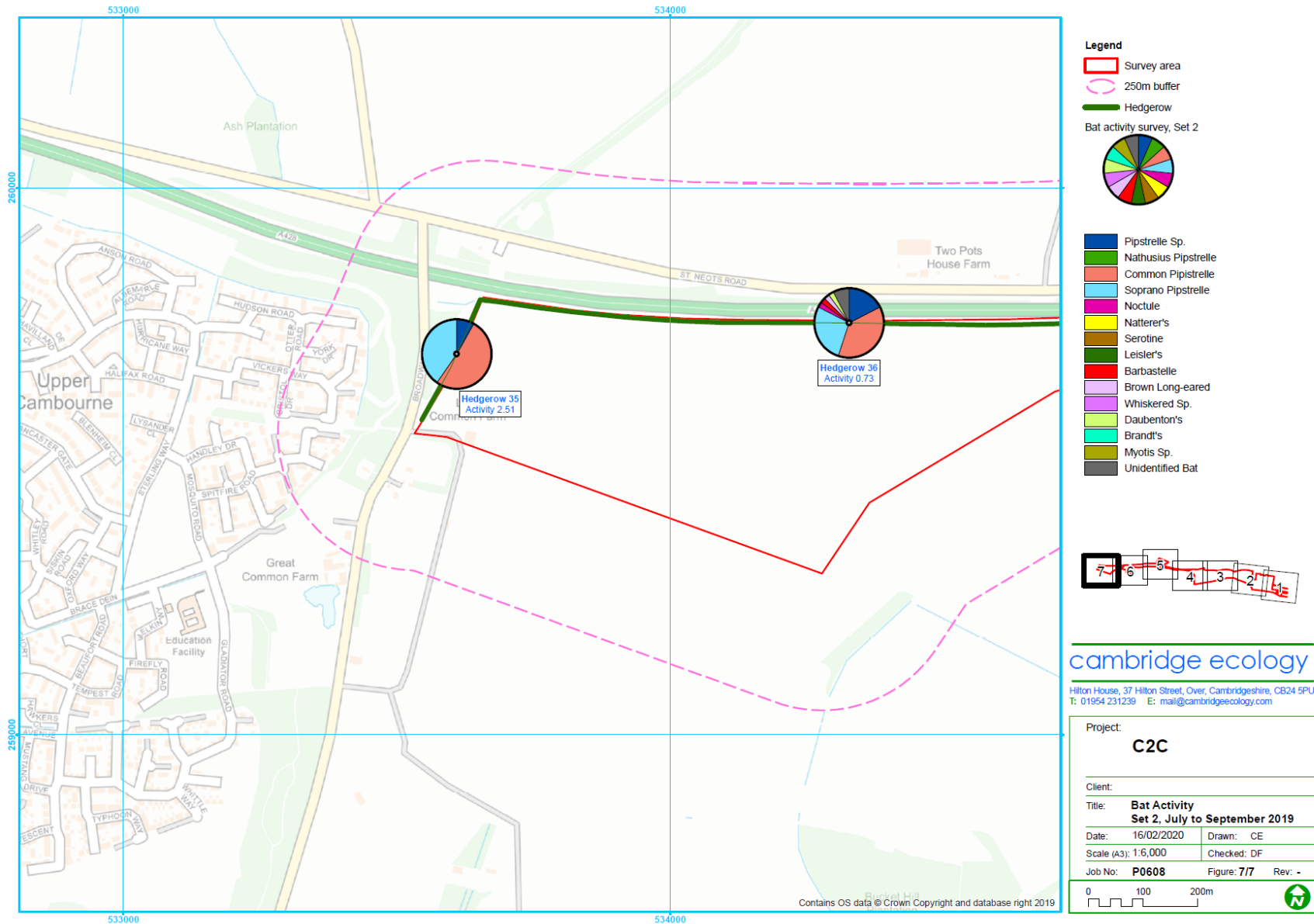


Figure 3.4a: Results of third set of bat activity surveys along hedgerows and linear features (sheet 1 of 7)

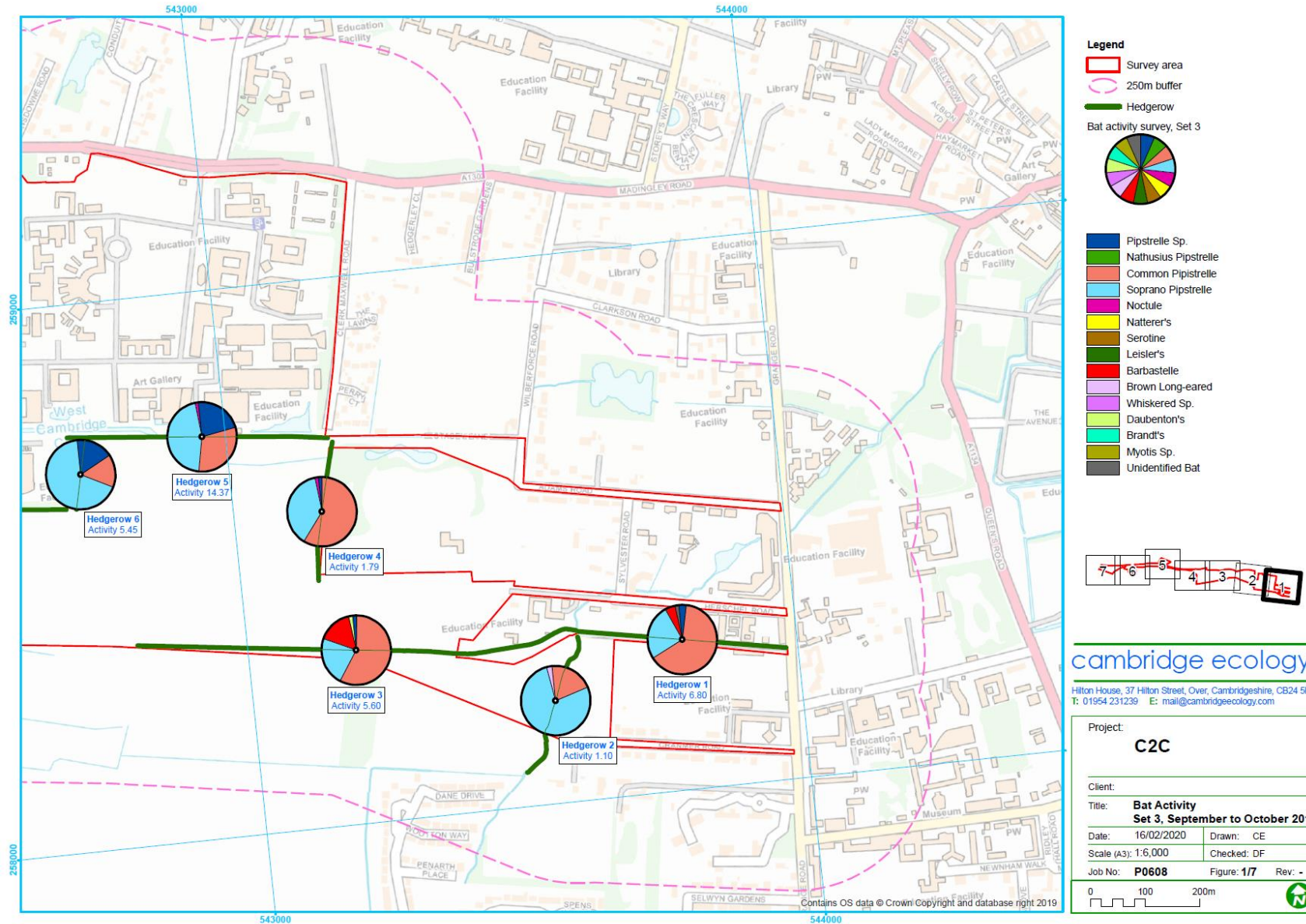


Figure 3.4b: Results of third set of bat activity surveys along hedgerows and linear features (sheet 2 of 7)

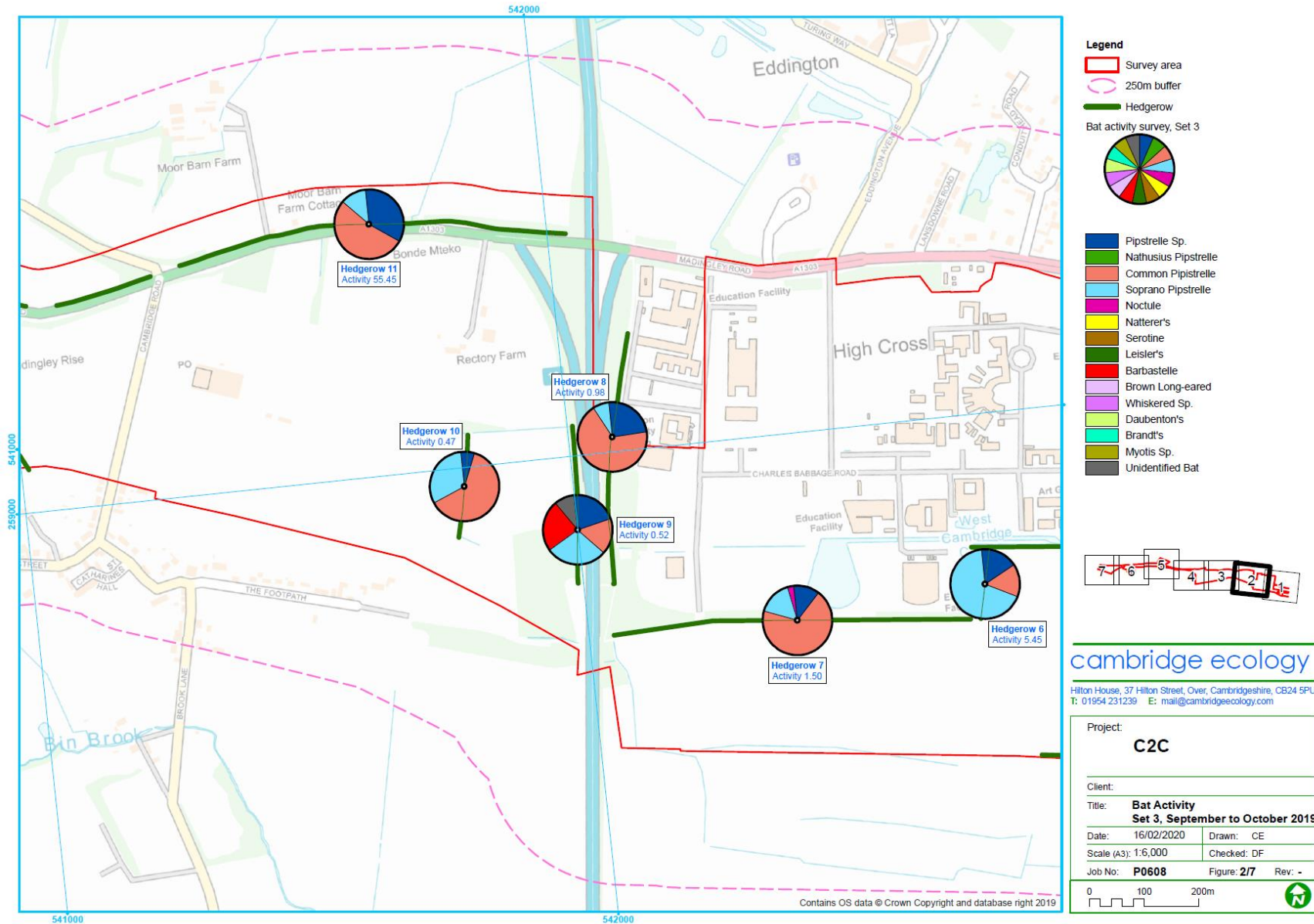


Figure 3.4c: Results of third set of bat activity surveys along hedgerows and linear features (sheet 3 of 7)

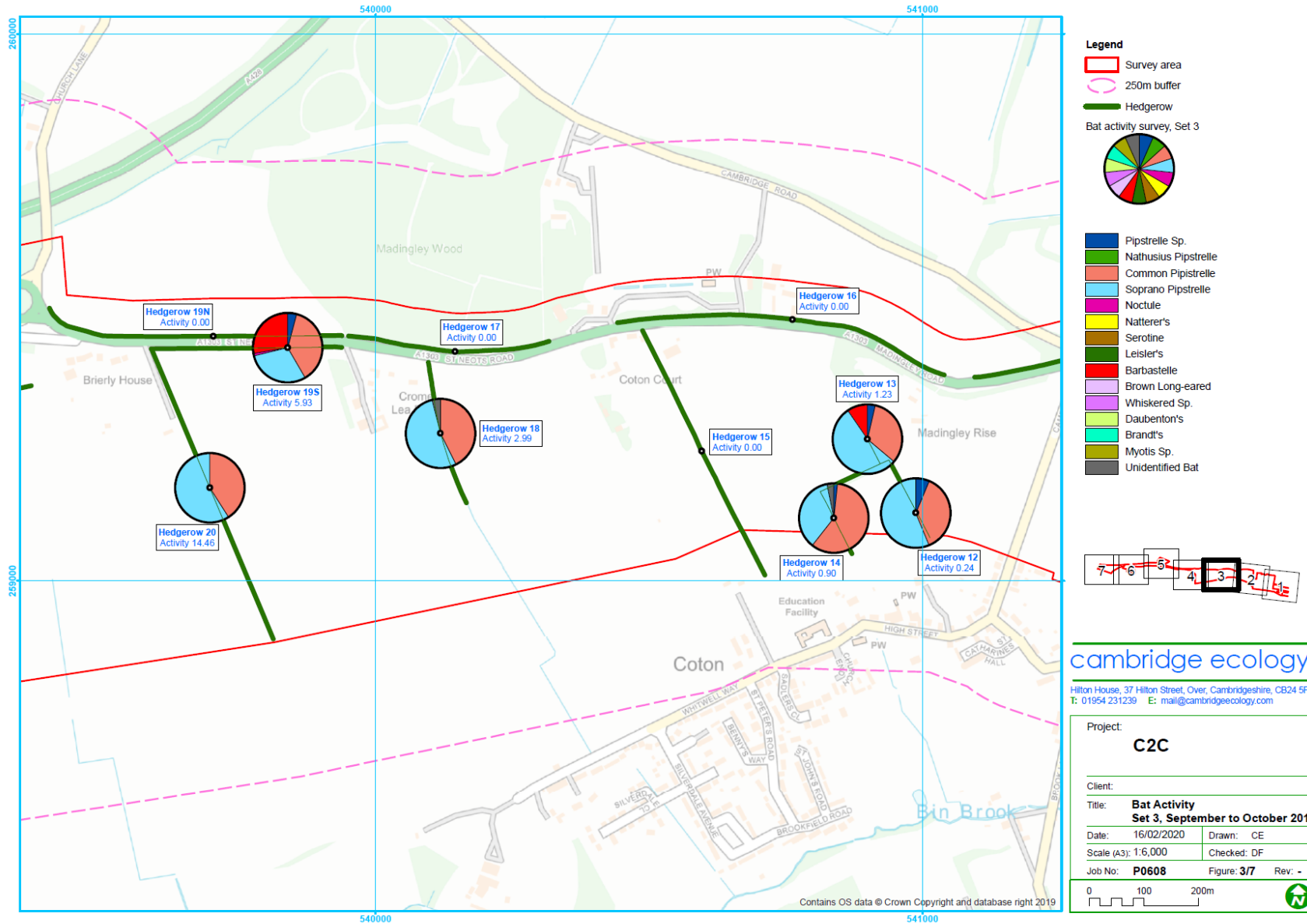




Figure 3.4d: Results of third set of bat activity surveys along hedgerows and linear features (sheet 4 of 7)

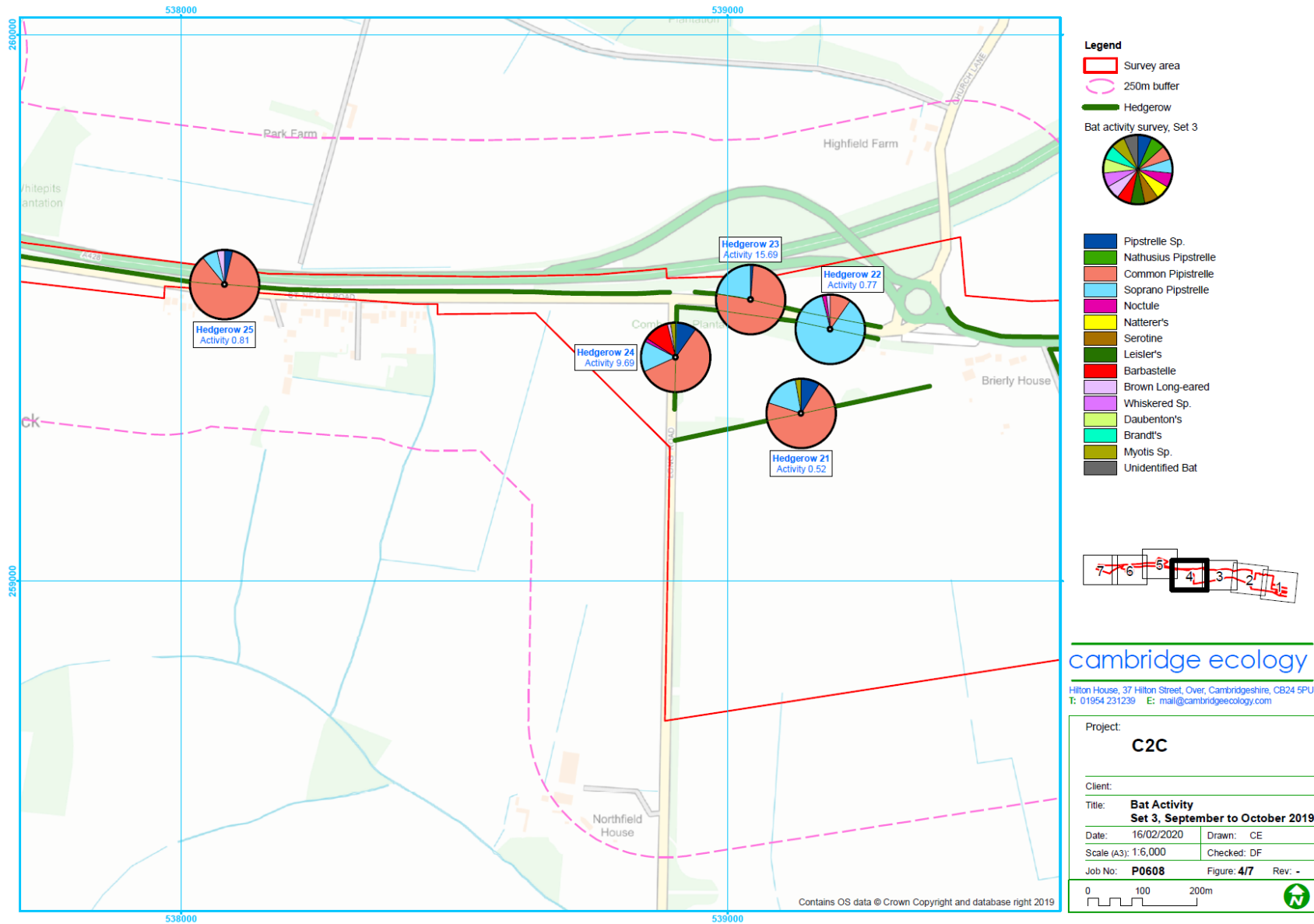


Figure 3.4e: Results of third set of bat activity surveys along hedgerows and linear features (sheet 5 of 7)

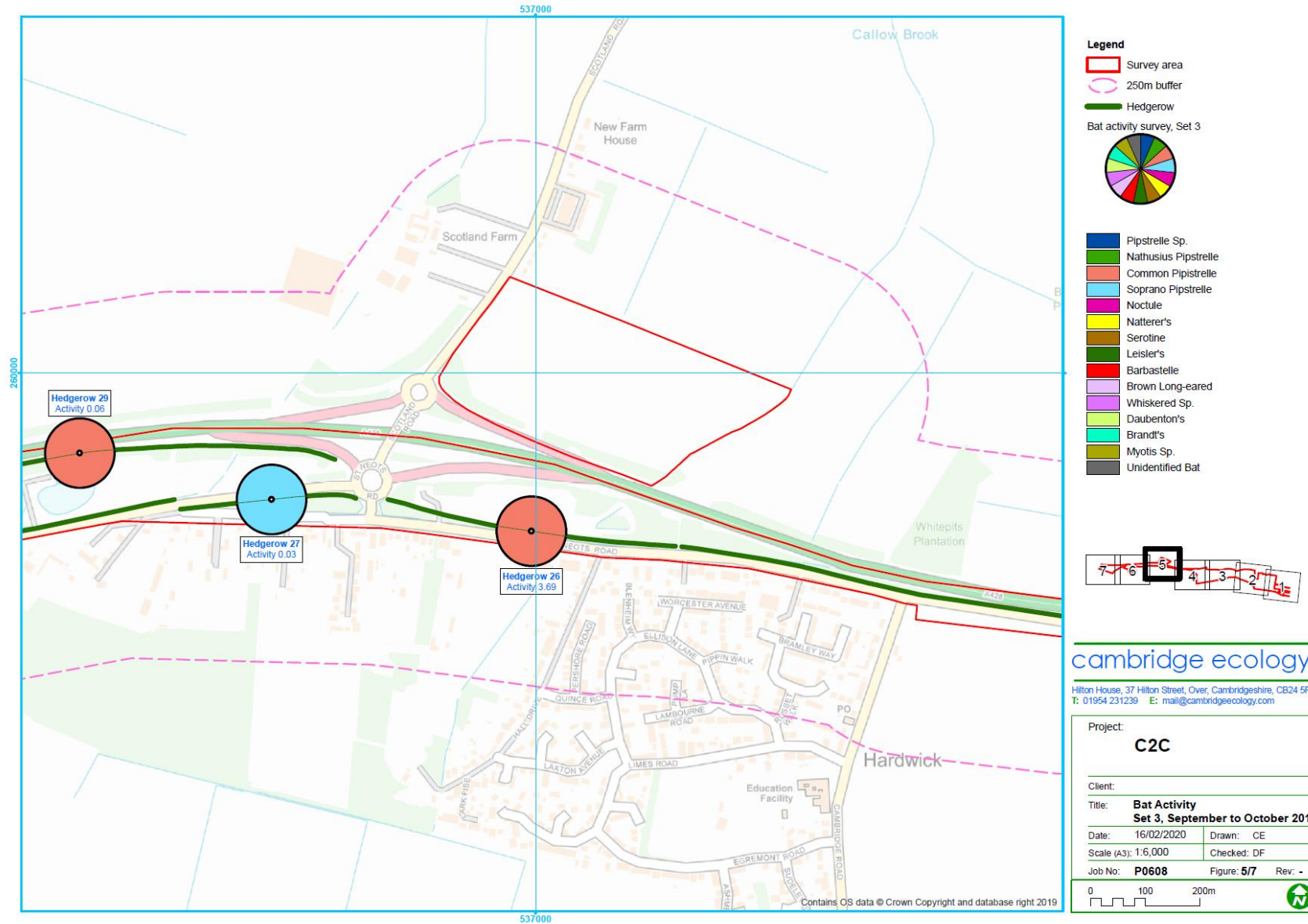


Figure 3.4f: Results of third set of bat activity surveys along hedgerows and linear features (sheet 6 of 7)

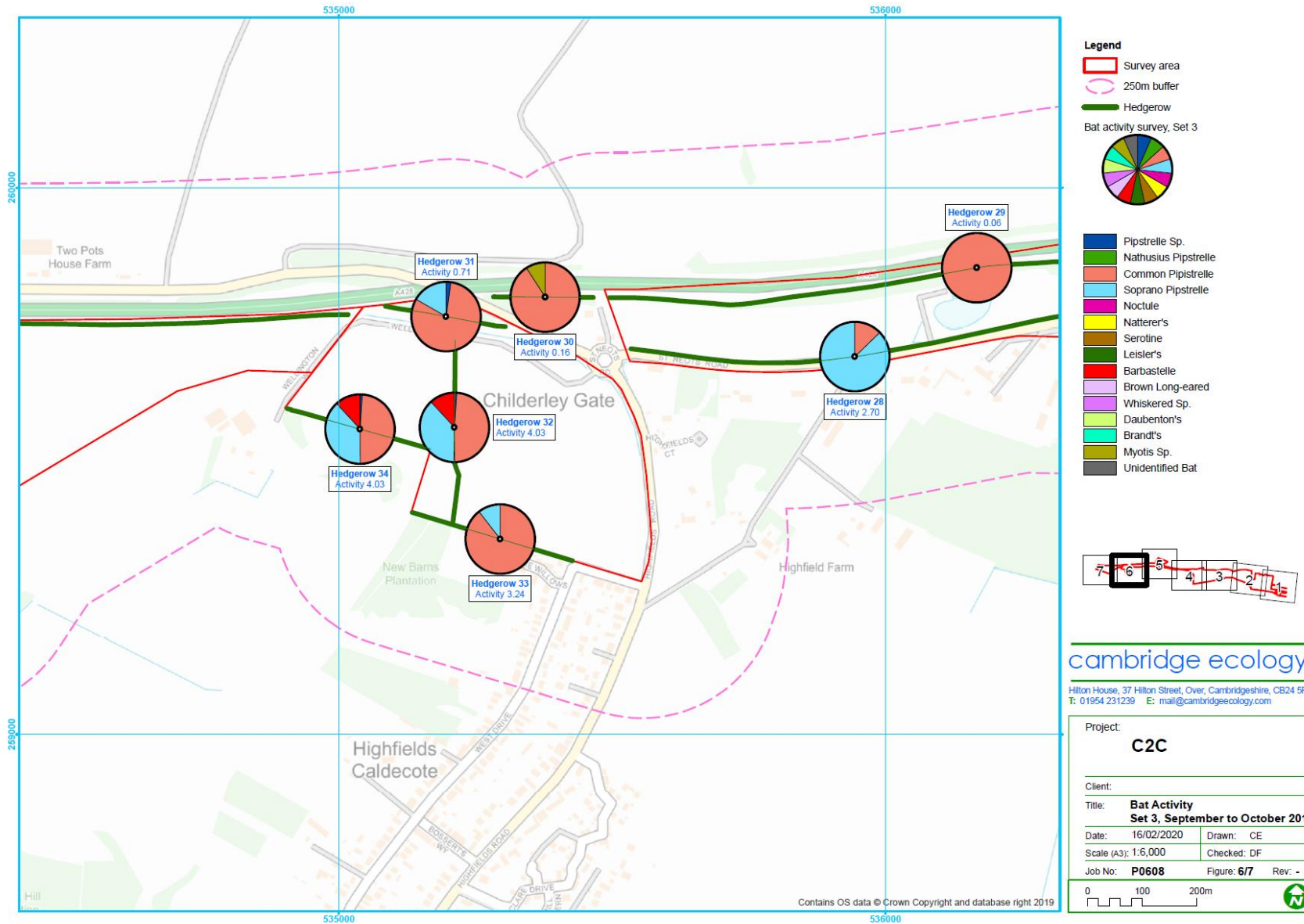


Figure 3.4g: Results of third set of bat activity surveys along hedgerows and linear features (sheet 7 of 7)

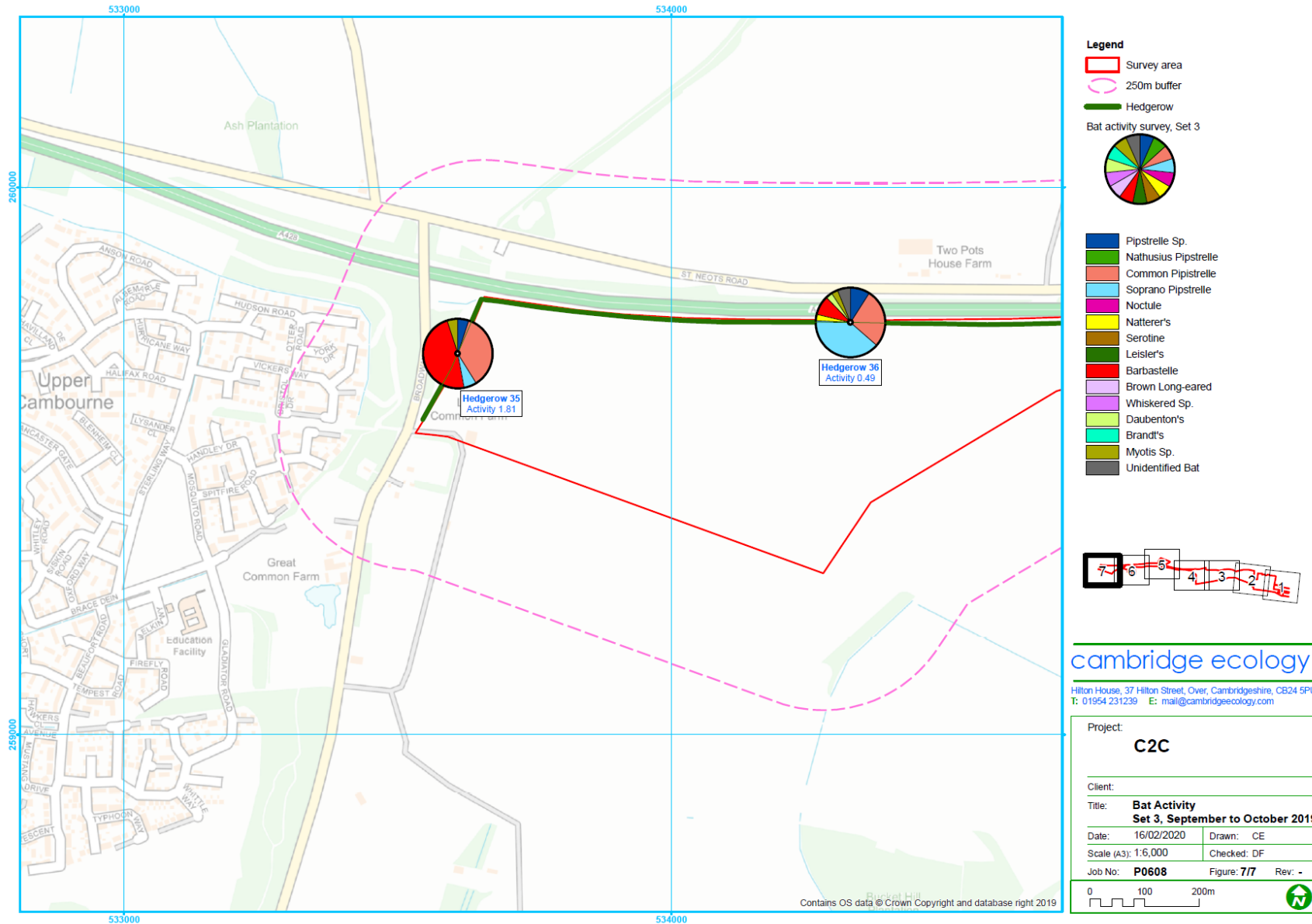


Figure 3.5a: Barbastelle Bat activity during surveys along hedgerows and linear features (sheet 1 of 7)

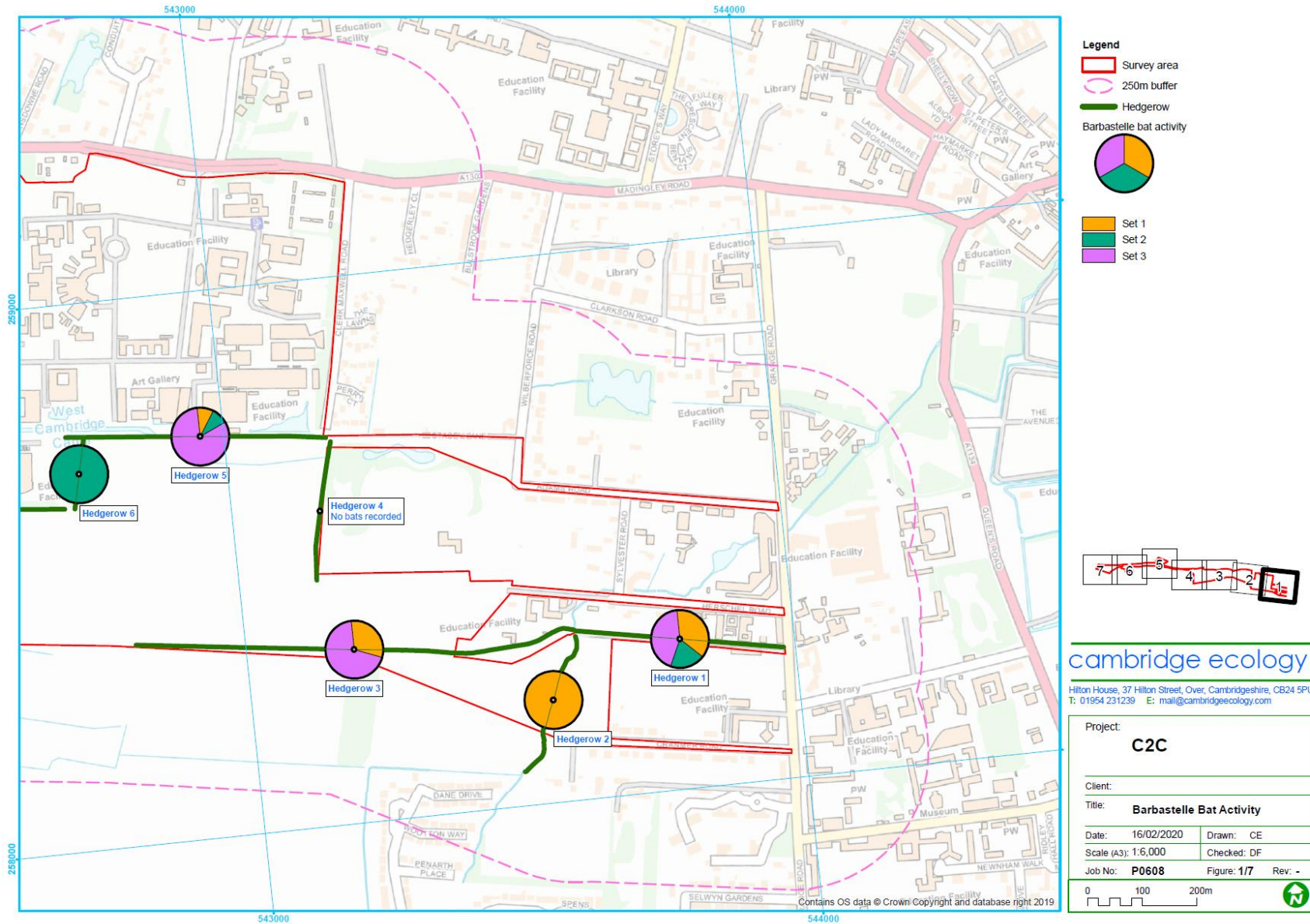


Figure 3.5b: Barbastelle Bat activity during surveys along hedgerows and linear features (sheet 2 of 7)

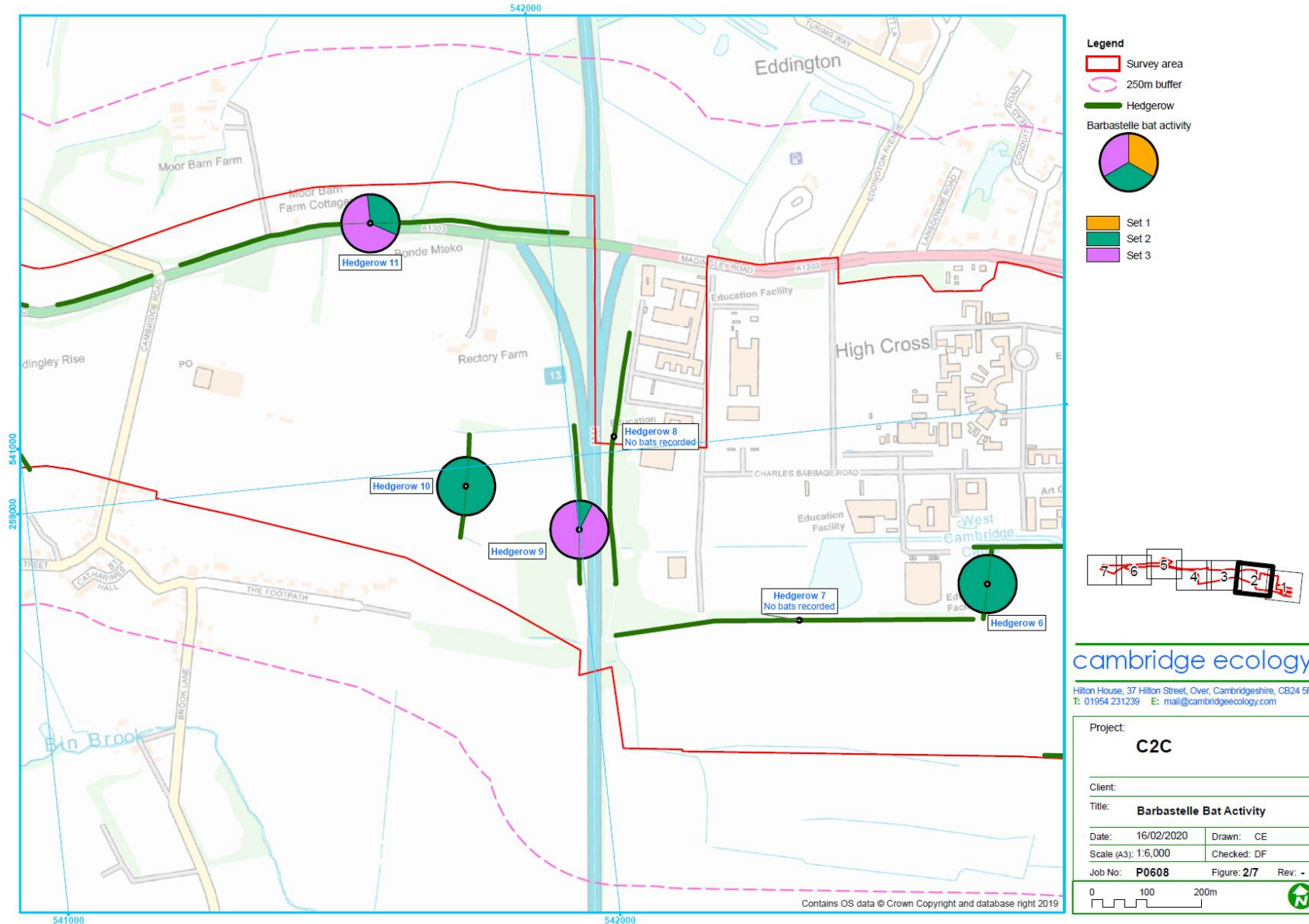


Figure 3.5c: Barbastelle Bat activity during surveys along hedgerows and linear features (sheet 3 of 7)

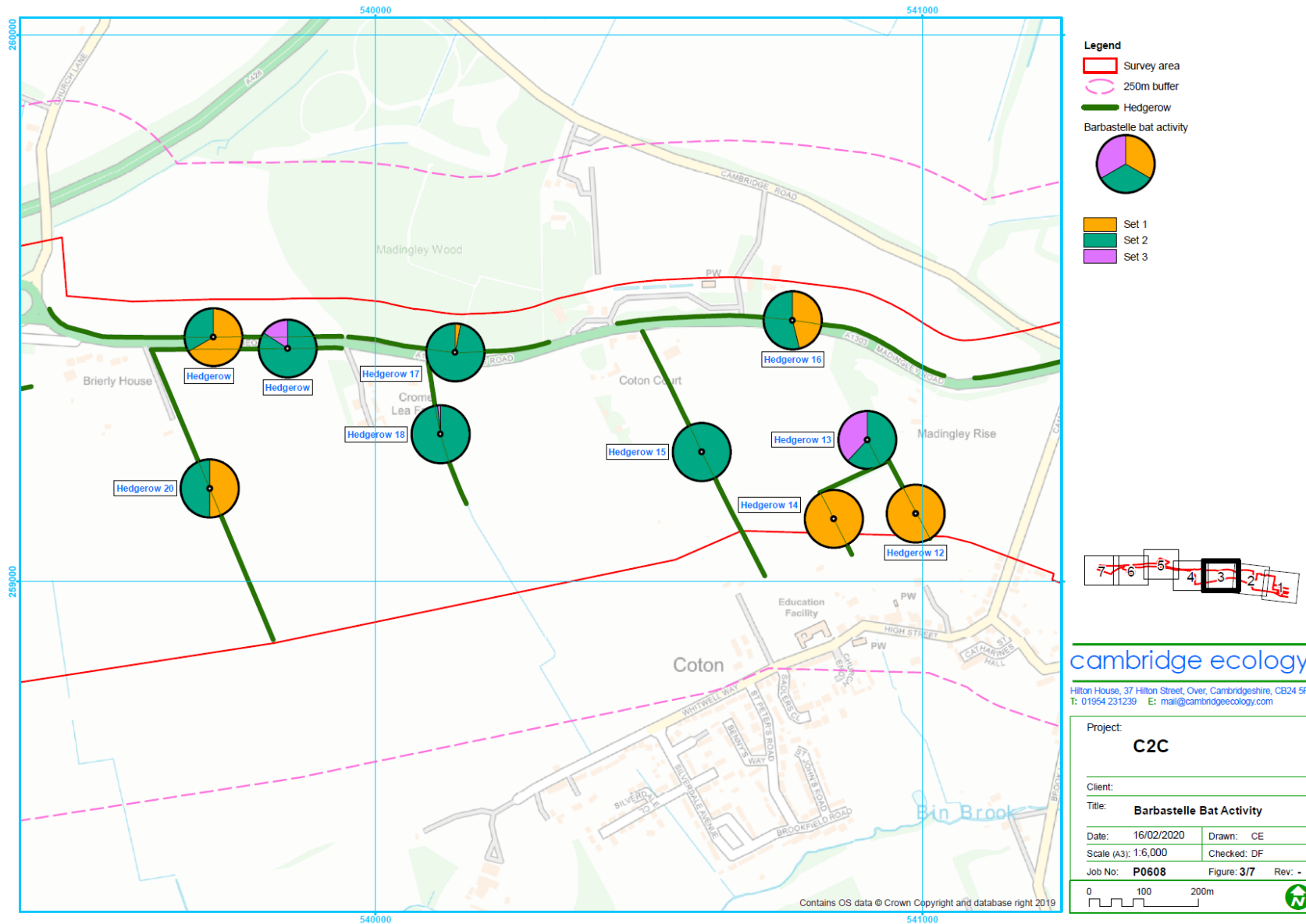


Figure 3.5d: Barbastelle Bat activity during surveys along hedgerows and linear features (sheet 4 of 7)

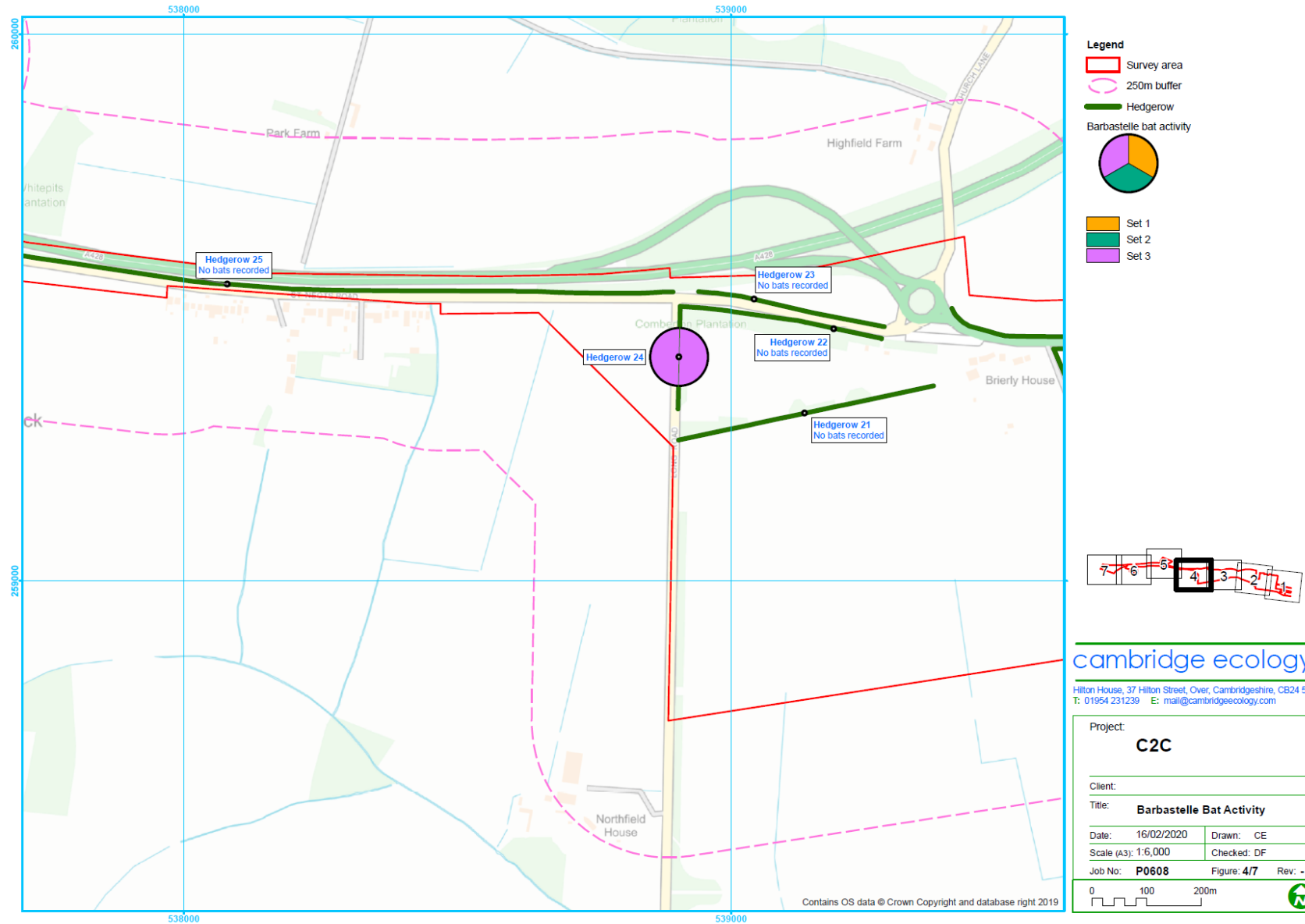




Figure 3.5e: Barbastelle Bat activity during surveys along hedgerows and linear features (sheet 5 of 7)

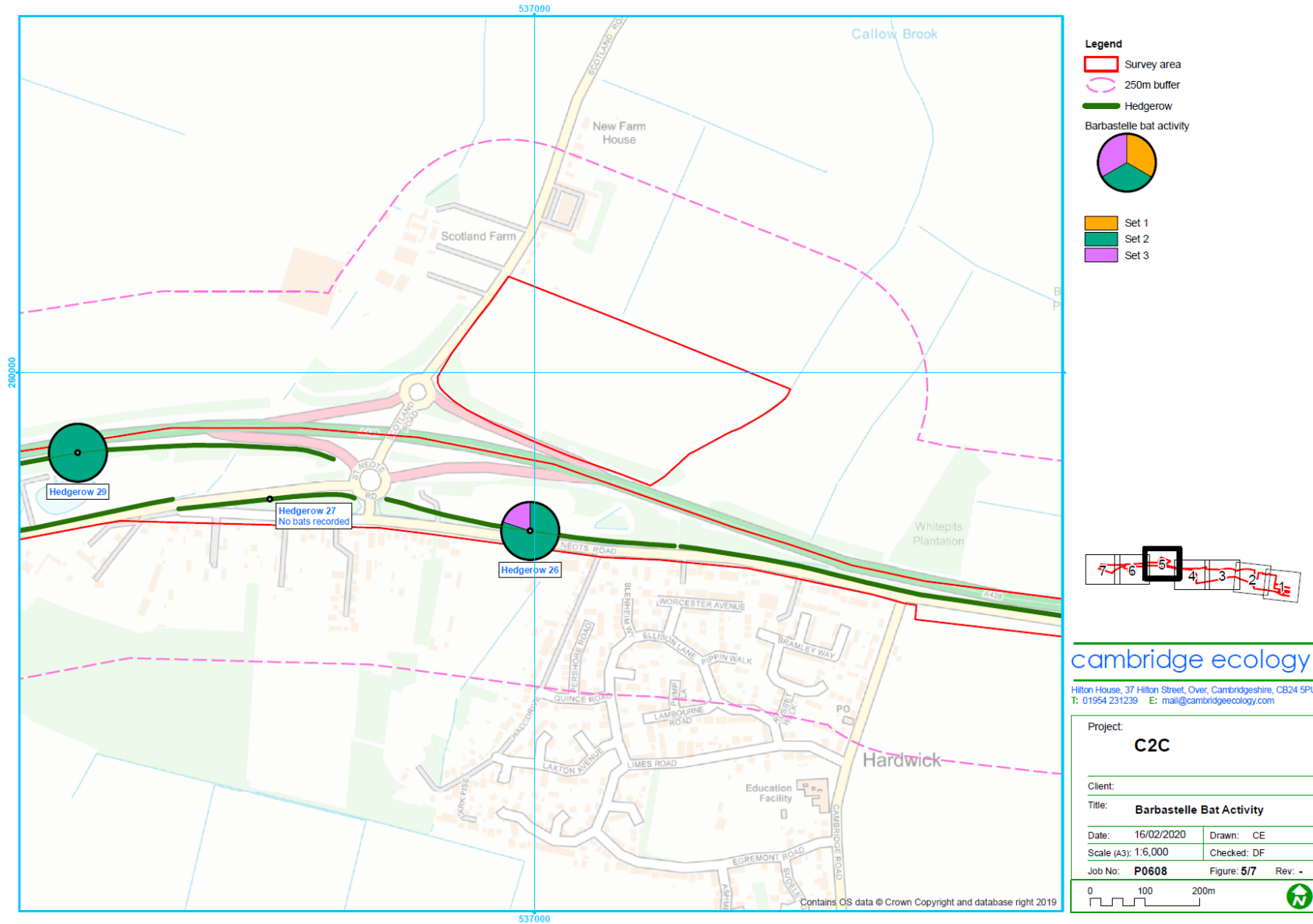


Figure 3.5f: Barbastelle Bat activity during surveys along hedgerows and linear features (sheet 6 of 7)

