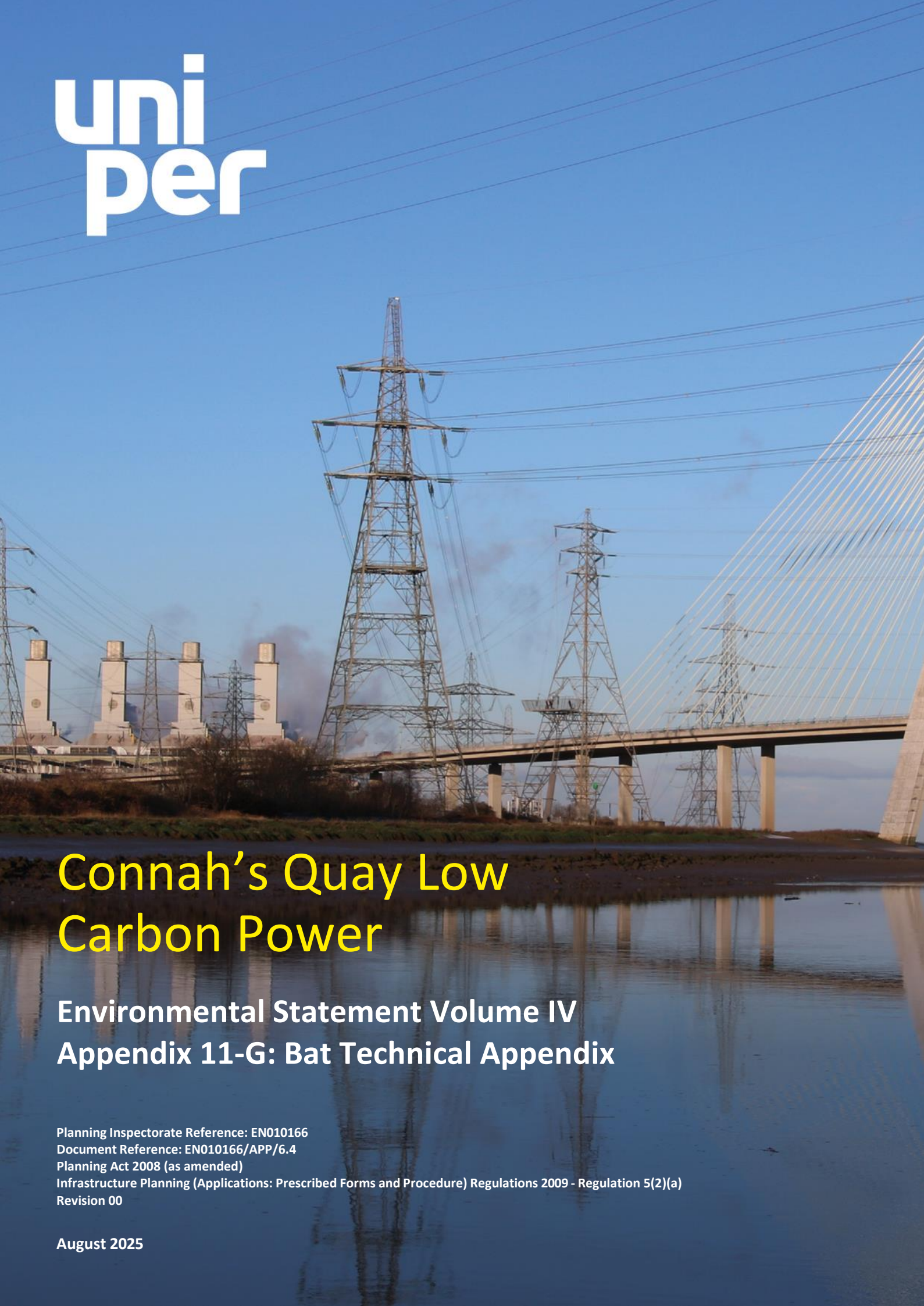

Connah's Quay Low Carbon Power

Environmental Statement Volume IV
Appendix 11-G: Bat Technical Appendix

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1. Introduction

1.1 Background

1.1.1 This report forms a technical appendix accompanying **Chapter 11: Terrestrial and Aquatic Ecology** (**EN010166/APP/6.2.11**) of the Environmental Statement (ES) for the Connah's Quay Low Carbon Power Project (hereafter referred to as the Proposed Development).

1.1.2 This report describes the approach and findings of bat surveys carried out in support of the Ecological Impact Assessment (EcIA) of the Proposed Development.

1.1.3 This report focuses on the Order limits excluding the Accommodation Work Areas (hereafter known as the Construction and Operation Area). This area is shown on **Figure 3-3: Areas Described in the Environmental Statement** (**EN010166/APP/6.3**) sheets 6 to 8 and Plate 3-2 of **Chapter 3: Location of the Proposed Development** (**EN010166/APP/6.2.3**).

1.1.4 The Accommodation Works Areas are considered in **Appendix 5-A: Environmental Screening of Accommodation Works** (**EN010166/APP/6.4**).

1.2 Survey Scope

1.2.1 A Preliminary Ecological Appraisal (PEA) of the ecological constraints and opportunities associated with the Construction and Operation Area was carried out in November 2023 and identified the requirements for further great crested newt surveys. The findings of the initial habitat and scoping survey are compiled within the PEA Report which is annexed to **Appendix 11-C Botanical Technical Appendix** (**EN010166/APP/6.4**)). The habitat descriptions have since been updated by the habitat surveys conducted in 2024; the results of which are also presented in **Appendix 11-C Botanical Technical Appendix** (**EN010166/APP/6.4**). The Botanical Survey Technical Appendix should be referred to for a more detailed overview of the conditions and habitats present.

1.2.2 The purpose of this report is to provide bat baseline technical information only, based on data gathered to date. It does not seek to specify mitigation or make an EcIA of the Proposed Development. The formal EcIA is provided as **Chapter 11: Terrestrial and Aquatic Ecology** (**EN010166/APP/6.2.11**).

1.2.3 The 'study area' and 'survey area' used and referenced within this report are defined within Section 3.

2. Relevant Legislation and Policy

2.1 Legislation

2.1.1 **Appendix 7-A: Legislative, Policy and Guidance Framework for Technical Topics** (**EN010166/APP/6.4**)) provides detail on the legislation that is of direct relevance to the assessment of ecology.

2.1.2 All British bats are listed on Annex IV of the Habitats Directive (Ref 1), with some rare species (namely barbastelle *Barbastellus barbastellus*, Bechstein's bat *Myotis bechsteinii*, greater horseshoe bat *Rhinolophus ferrumequinum* and lesser horseshoe bat *R. hipposideros*) also listed on Annex II.

2.1.3 All British bats are also listed under Schedule 2 of The Conservation of Habitats and Species Regulations 2017 (as amended) (hereafter the Habitats Regulations) (Ref 2) as European Protected Species (EPS).

2.1.4 All British bats are also given full protection under Section 9 of the Wildlife and Countryside Act 1981 (as amended) (Ref 3) through their inclusion in Schedule 5 in that Act.

2.1.5 In summary, the legislation makes it an offence to:

- deliberately, intentionally or recklessly capture, injure or kill a bat;
- damage/destroy a breeding site or resting place of a bat (this is an offence whether the act is deliberate or not);
- deliberately, intentionally or recklessly disturb a bat; or
- intentionally or recklessly obstruct access to any structure which a bat uses for shelter or protection.

2.1.6 Disturbance is defined as that which is likely to impair their ability to survive, to breed or reproduce, or to rear or nurture their young; or, in the case of animals of a hibernating or migratory species, to hibernate or migrate. Disturbance also includes that which has potential to significantly affect the local distribution or abundance of a species.

2.1.7 Licenses to permit otherwise illegal activities relating to bats can be issued for specific purposes and by the relevant licensing authority, which in Wales is Natural Resources Wales (NRW). European Protected Species Mitigation Licenses (EPSMLs) are issued under Habitats Regulations. It is an offence not to comply with the terms and conditions of an EPSML once issued.

2.2 Planning Policy

2.2.1 Full details of relevant national and local planning policy relevant to ecology is provided in **Appendix 7-A: Legislative, Policy and Guidance Framework for Technical Topics** (**EN010166/APP/6.4**).

2.3 Priority Species

2.3.1 Certain species of bat, including barbastelle, Bechstein's bat, noctule *Nyctalus noctula*, brown long-eared bat *Plecotus auritus*, lesser horseshoe

bat, greater horseshoe bat, common pipistrelle *Pipistrellus pipistrellus* and soprano pipistrelle *Pipistrellus pygmaeus* are also listed as Priority Species for the purpose of maintaining and enhancing biodiversity in relation to Wales under Section 7 of the Environment (Wales) Act 2016 (Ref 4).

3. Methods

3.1 Desk Study

3.1.1 Cofnod (North Wales Environmental Information Centre) (Ref 5) were contacted in March 2024 for existing bat species records.

3.1.2 A search was also undertaken, using the MAGIC website (Ref 6) , to identify any internationally and nationally designated sites for bats, within 10 km of the Order limits.

3.1.3 Bat species records received from Cofnod were filtered so that only records up to 10 years prior to the data request (i.e. 2014 to 2024) were considered.

3.1.4 The areas covered by the desk study are hereafter referred to as the Study Area.

3.1.5 Additionally, a document review exercise was undertaken of survey information presented in reports for the HyNet project (Ref 7, Ref 8, Ref 9, Ref 10, Ref 11, Ref 12 & Ref 13). The Hynet project is near the Proposed Development and contains relevant information to support the bat baseline for the Proposed Development.

3.2 Field Survey – Preliminary Bat Roost Assessment

3.2.1 The field survey was conducted on 13 and 14 February 2024 by two ecologists, including one ecologist who holds an NRW bat survey licence. An initial Daytime Bat Walkover (DBW) which included a Ground Level Tree Assessment (GLTA) was conducted within the Construction and Operation Area (where accessible) and included a 50 m buffer to identify trees, woodlands and buildings that contained or were likely to contain Potential Roosting Features (PRFs), as defined by the Bat Conservation Trust (BCT) guidance (Ref 14) . They were then assigned a bat roost suitability in accordance with BCT guidance.

3.2.2 Where bat roosting suitability cannot be assigned during the GLTA (i.e. where PRFs cannot be inspected from the ground) then trees are marked as Further Assessment Required (FAR) or PRFs present should be climbed to determine whether they are PRF-I (i.e. individual bats) or PRF-M (multiple bats). If that tree is not safe to climb, then dusk emergence surveys are required.

3.2.3 Where buildings/structures are identified as having one or more features suitable for roosting bats, dusk emergence surveys are required.

3.2.4 During the assessment, close focusing binoculars and a high-powered torch were used to determine whether any features were present which may be suitable to support bats in accordance with criteria within the standard BCT guidance. The areas covered by the field survey are hereafter known as the Survey Area.

3.3 Assessment of Foraging and Commuting Habitats

3.3.1 The assessment of foraging and commuting habitats was completed on 13 and 14 February 2024 and desk study review of aerial images of areas which were not accessible at the time of survey i.e. the Repurposed CO_2 Connection Corridor and Proposed CO_2 Connection Corridor. When access was possible the assessment of foraging and commuting habitats was reassessed to ensure there was an appropriate level of survey effort.

3.3.2 Habitats such as woodlands, hedgerows, tree lines and watercourses were assessed for their suitability for commuting and foraging bats and the Construction and Operation Area graded as negligible, low, moderate or high suitability in accordance with BCT guidance (Ref 14). This was also determined through consideration of the size and location of the Construction and Operation Area and the quality of habitat present which is suitable for bats. The suitability was used to determine the requirements for Night-time Bat Walkover (NBW) surveys which were also undertaken in 2024.

3.4 Field Survey – Night-time Bat Walkover Surveys (NBW Surveys)

3.4.1 All NBW surveys gave due regard to the (BCT) guidance (Ref 14).

3.4.2 As detailed in section 4.2.7 it was concluded that the habitats within the Construction and Operation Area had Moderate suitability for foraging and commuting bats. This assessment considered the size of the Construction and Operation Area and the quality of habitat present. In accordance with the BCT guidance (Ref 14), one NBW survey per season (one in Spring (April/May), Summer (June/July/August) and Autumn (September/October) should be carried out.

3.4.3 Due to lesser horseshoe bats being recorded on the automated bat detectors in May 2024, the number of NBW surveys were increased to provide additional information on how this species uses the Construction and Operation Area.

3.4.4 The NBW surveys were undertaken in May, July, August, September and October 2024. Each survey commenced at sunset and lasted at least 1.5 hours, including 30 - 60 minutes of stationary observation at a designated start point which was located at potential roost locations and potentially higher value hedgerows (time dependent on bat activity). The NBW surveys involved walking a defined route (**Figure 11G-3**, **Annex A**) that provided representative coverage of the habitats with the Construction and Operation Area of potential value to bats that would be impacted by the Proposed Development. The route changed during the bat survey season due to changes in land access permissions (**Figure 11G-4 - Figure 11G-8, Annex A;** see Limitations). The NBW route was walked at a steady pace by two suitably experienced ecologists. The direction of the route was varied during each visit to sample different areas of the Construction and Operation Area at different times of night, which reduces the likelihood that bat activity at a particular location and time was overlooked. NBW surveys were generally

undertaken in suitable weather conditions i.e. no rain or strong wind, and with temperatures above 10°C at sunset (**Table 1**) (see Limitations).

3.4.5 An Elekon Batlogger M was used to detect and record bat calls. During the NBW, six stopping points at fixed locations (**Figure 11G-4 - Figure 11G-8, Annex A**) were included along the NBW route located at potentially important features with regards to bats. At each stopping point, bat activity was monitored for a period of two minutes. The time, location, numbers, species (where possible) and direction of flight were recorded for each bat pass (a discrete burst of echolocation heard, or bat activity observed) during the survey.

Table 1: Night-time Bat Walkover Surveys Weather Conditions

Month	Date of Survey	Transect Timings	Sunset Time	Average Weather*
May	28 May 2024	21:24 – 00:00	21:24	No rain, wind 2, cloud cover 3, temperature 16°C
July	24 July 2024	21:20 – 23:10	21:22	No rain, wind 1, cloud cover 1, temperature 18°C
August	31 August 2024	20:03 – 22:11	20:03	Frequent drizzle, wind 2, cloud cover 5, temperature 16°C
September	24 September 2024	19:05 – 21:05	19:05	No rain, wind 2, cloud cover 1, temperature 12°C
October	22 October 2024	18:00 – 21:15	18:00	No rain, wind 2, cloud cover 1, temperature 11°C

*Wind scale: 0=Calm, 1=Light Air, 2=Light breeze, 3=Gentle breeze, 4=Moderate breeze; Cloud cover % scale: 1 = 0-20%, 2 = 21-40%, 3 = 41-60%, 4 = 61-80%, 5 = 81-100%

3.5 Field Survey - Automated Bat Detector Surveys

3.5.1 Automated bat detectors, comprising SM4BAT-FS detectors (referred to as SM4s) were used to record activity remotely on the Construction and Operation Area. Based on Moderate suitability for foraging and commuting bats, monthly (May to October 2024) automated bat detector surveys were carried out in accordance with BCT's Good Practice Guidelines 4th Edition (Ref 14). Two SM4s were deployed in two locations (1 and 2) within the Construction and Operation Area in each season **(Figure 11G-3, Annex A**; **Table 2**). The locations of the automated bat detectors were kept the same during each monitoring period and were positioned in representative habitat to record bat activity throughout the Construction and Operation Area.

Table 2: Automated Bat Detector Locations

Automated Bat Detector Reference	OS Grid Reference	Location Description
1	SJ 25392 71031	Attached to an alder *Alnus glutinosa* on field boundary. Microphone facing west.
2	SJ 26054 71465	Attached to an elder *Sambucus nigra* on field boundary near gate. Microphone facing west.

3.5.2 The automated bat detectors were left *in situ* for a minimum of five consecutive nights, in appropriate weather conditions, per monitoring period (**Table 2**). The automated bat detectors were set to start recording half an hour before sunset and to stop recording half an hour after sunrise. Bat calls were recorded in WAV format. All microphones were positioned at least 1 m above the ground in a position clear of vegetation to maximise detection.

Table 3: Dates and Environmental Conditions during Automated Bat Detector Surveys

Month Deployed	Date of Deployment	Date of Collection	Dates Analysed	Minimum nightly Temperature Range (°C)	Nightly Rainfall Range (precipitation scale^)	Minimum and Maximum Nightly Wind Speed (mph)
May	28 May 2024	5 June 2024	28 May – 2 June 2024	11-12	0-0	3-14
June	25 June 2024	02 July 2024	25 – 30 June 2024	12-15	0-0	4-21
July	23 July 2024	06 August 2024	23 – 28 July 2024	13-15	0-0	2-21
August	23 August 2024	24 September 2024	23 – 28 August 2024	11-15	0-0	9-18
September	24 September 2024	20 October 2024	24-29 September 2024	7-9	0-3	4-13
October	22 October 2024	15 November 2024	22-27 September 2024	6-11	0-0	4-16

^Precipitation scale: 0 = none, 1 = drizzle, 2 = shower, 3 = rain, 4 = downpour, 5 = flood.

Source: Weather data from https://www.timeanddate.com/ for Flint. Weather data is generalised for local area and is not Site or SM4 location specific. It gives an impression of local conditions during the survey period.

3.6 Bat Sonogram Analysis

3.6.1 Sound recordings from NBW surveys were made in full spectrum WAV format to allow subsequent verification of species or species groups, where required. Records of bat passes were subsequently analysed using BatExplorer software (Ref 15) to identify the species of bat present.

3.6.2 Bat call recordings made by automated bat detectors were analysed using Kaleidoscope Pro software (Ref 16) and/or AnalookW (Ref 17). All bat calls and noise files were checked by a suitably experienced ecologist. Following this, 10% of all species verified were subject to a second check by an appropriately experienced ecologist for quality assurance purposes. Reference was made to bat call identification guidance (Ref 18) where necessary.

3.6.3 This analysis provides information on the species present at each location, as well as the number and timing of bat passes. A bat pass is defined as a single automated bat detector file made up of bat pulses of a single species; this can be one bat in a file or many bats in a file. The number of passes recorded on an automated bat detector gives an indication of the level of bat activity at a given location, but this cannot be reliably correlated to actual bat abundance because there is no observational context.

3.6.4 Where bat calls were identified during the NBW surveys, the location which the species was recorded is illustrated on the relevant figure (**Figure 11G-4 - Figure 11G-8, Annex A**).

3.7 Bat Activity Index (BAI)

3.7.1 The Bat Activity Index values were calculated by averaging the total number of bat passes per hours for each automated bat detector unit at each location per month. The term pass is defined as a single file made up of bat pulses of a single species i.e. this may be one bat in a recorded sound file or many bats in a single file.

3.7.2 Limited guidance is available on what constitutes low to high bat activity on a site based on number of passes. As such, a relative scale has been used that follows the protocol used by Ecobat (Ref 19), where:

- Low activity; 0-20th percentiles[1];
- Low to moderate activity: 21st-40th percentiles;
- Moderate activity: 41st-60th percentiles;
- Moderate to high activity: 61st-80th percentiles; and
- High activity: 81st-100th percentiles.

3.7.3 For NBW data, relative bat activity levels were described to aid the assessment of ecological importance. No guidance is available on what constitutes low, moderate or high bat activity based on number of passes during a NBW survey (based on a survey time of 2 to 3 hours). As such a relative scale is used by AECOM in this report where:

[1] Percentiles provide a numerical indicator of the relative importance of a night's bat activity

- Very low activity is up to 5 passes per survey;
- Low activity is 6 to 25 passes per survey;
- Moderate activity is 26 to 99 passes per survey; and
- High activity is 100 passes per survey.

3.7.4 Reference to surveyor observations, including numbers of individual bats seen, flight routes and behaviour and detectability of individual species are also made to inform the overall evaluation.

3.8 Evaluation of Ecological Importance

3.8.1 Evaluation of ecological importance of identified ecological features within a Site is required to inform an EcIA. This report presents the evaluation of importance for bats, and the impact assessment is presented in **Chapter 11: Terrestrial and Aquatic Ecology** (**EN010166/APP/6.2.11**).

3.8.2 The method of evaluation of ecological importance is presented in **Appendix 11-A: Ecological Impact Assessment Methodology** (**EN010166/APP/6.4**).

3.8.3 An assessment of importance for bats (in the absence of full survey data) has been made with reference to published guidance and criteria in the UK Bat Mitigation Guidelines (Ref 20) and further explained in **Annex E**.

3.9 Limitations and Assumptions

3.9.1 The aim of a desk study is to help characterise the baseline context of the Construction and Operation Area and provide valuable background information that would not be captured by a single site survey alone. Information obtained during the course of a desk study is dependent upon people and organisations having made and submitted records for the area of interest. As such, a lack of records for a particular species does not necessarily mean that the species do not occur in the desk study area. Likewise, the presence of records for species does not automatically mean that these still occur within the area of interest or are relevant in the context of the Construction and Operation Area.

3.9.2 Tree B (located within the Main Development Area, as shown on **Figure 11G-2, Annex A**) was only viewed from the roadside due to restricted access, however it was possible to view all aspects of the tree and therefore record any PRFs that may be present.

3.9.3 The terrestrial components of the Water Connection Corridor (an area in the north-east of the Construction and Operation Area adjacent to the Dee Estuary) was not accessible due to health and safety/restricted access. This area was viewed from a vantage point and it was confirmed there were no buildings or trees are present within this area.

3.9.4 It is accepted that Myotis bat species *Myotis spp.* are difficult to identify from echolocation alone, therefore these species are aggregated as Myotis species. This aggregation, where undertaken, is widely accepted and does not affect the evaluation of the results of activity surveys. Likewise, the term NLS is used where echolocation calls of noctule, Leisler's bat *Nyctalus leisleri* and serotine *Eptesicus serotinus* were unable to be confidently

distinguished from one another. Similarly, long-eared bats cannot be identified to species level by their echolocation call alone. However, due to the location of the Construction and Operation Area being outside of the known or potentially suitable range of the grey long-eared bat *Plecotus austriacus*, all long-eared bat calls recorded are considered to be brown long-eared bat.

3.9.5 Bats are highly mobile animals. Therefore, these surveys only provide a snapshot of current foraging and commuting behaviour. Such survey data is typically considered valid for up to two years, after which point update surveys will be required (Ref 21).

3.9.6 The NBW route changed over time due to changes in land access permissions, however a sufficient coverage of suitable foraging and commuting habitats for bats was achieved and additional surveys were carried out. This is not considered a limitation.

3.9.7 On the August NBW, drizzle was frequent which may have reduced the bat activity at the time of survey. As the NBW was conducted at the end of August, there was no opportunity for another attempt and therefore the NBW was continued despite the sub-optimal weather conditions. As there were additional NBW surveys completed within the Summer season, this is not deemed to impact the assessment of ecological importance made in this report as data was still collected in line with best practice guidance and the purpose of an August survey was to provide additional information.

3.9.8 Automated bat detectors were not deployed in April. The weather conditions in April is often considered as sub-optimal for bats and therefore the lack of data in April is not considered a limitation. One automated bat detector was damaged during deployment in September at location 2, sufficient data was captured throughout the bat survey season including October at this location and this is not considered a limitation.

3.9.9 During the automated bat detector deployments, September and October had nights of sub-optimal weather. In September, there were scattered showers and light rain on two nights, and the minimum nightly temperature was consistently below 10°C. In October, there were two nights which were cooler than 10°C. However, bats were recorded on all nights of sub-optimal weather, and the weather was otherwise optimal during the deployments. September and October are generally cooler months and these temperatures are typical of these months. The rain in September also only lasted for a few hours each night to provide sub-optimal conditions for only part of the nights. Overall, sub-optimal weather is not considered a limitation.

3.9.10 Tree Group A and Woodland Block A (**Figure 11G-3 , Annex A)** could not be accessed fully due to health and safety concerns, however they were viewed from a safe distance using binoculars and a precautionary assessment of bat roost suitability was made. The tree group and the woodland are within the Survey Area but not within the Site and would not be removed or impacted therefore there are no limitations.

4. Results and Evaluation

4.1 Desk Study

Designated Sites

4.1.1 One statutory site designated for bats was identified within the Study Area. This is Chwarel Cambrian / Cambrian Quarry, Gwernymynydd Site of Special Scientific Interest (SSSI) located approximately 9.1 km south-west of the Construction and Operation Area and approximately 10.5 km south-west of the Main Development Area. It is designated for its large population of hibernating lesser horseshoe bats, one of the largest in northeast Wales.

Cofnod Records

4.1.2 A summary of the records returned by Cofnod is presented within **Table 4** and shown on **Figure 11G-1 , Appendix A**. The desk study records may relate to either foraging or roosting bats and does not specify roost types.

Table 4: Existing Bat Species Records within the Study Area

Species	Number of Records	Most Recent	Closest
Brandt's bat *Myotis brandti*	1	2021	1.3 km south
Brown long-eared bat	7	2021	1.18 km southeast
Common pipistrelle	56	2021	0.6 km west
Daubenton's bat *Myotis daubentonii*	10	2021	Within the Construction and Operation Area
Lesser horseshoe bat	2	2021	1.2 km south
Myotis sp.	5	2021	1.1 km south
Natterer's bat *Myotis nattereri*	2	2021	1.3 km south
Noctule	12	2021	1.1 km south
Soprano pipistrelle	94	2021	0.6 km west
Whiskered bat *Myotis mystacinus*	2	2021	1.3 km south

Review of Relevant Information from HyNet Carbon Dioxide Pipeline Development Consent Order Project

4.1.3 The following was identified following a review of the HyNet data which overlaps with the Proposed CO_2 Connection Corridor :

- Static detectors were deployed during bat activity surveys of hedgerows as part of the HyNet project. The automated bat detectors deployed identified the following species: serotine *Eptesicus serotinus*, common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle *Pipistrellus nathusii*, noctule, Leisler's bat *Nyctalus leisleri*, Myotis sp., brown long-eared bat, and lesser horseshoe bat.

4.2 Field Survey

Buildings

4.2.1 Within the Main Development Area is the existing gas fired CCGT generating station and its supporting infrastructure, including settlement ponds, cooling towers, and water treatment plant, in addition to buildings for storage and workshops, administration and staff welfare and security facilities.

4.2.2 **Table 5** provides a summary of the roost suitability of the buildings within the Survey Area and their locations are shown in **Figure 11G-2, Annex A** and photographs in **Annex B**. All buildings were assessed as negligible suitability for roosting bats. This is defined as "*No obvious habitat features on site likely to be used by roosting bats; however, a small element of uncertainty remains as bats can use small and apparently unsuitable features on occasion*."

Table 5: Bat Roost Suitability of Buildings within the Survey Area

Building/ Structure Number	Roost Suitability	Description
1a – 1d	Negligible	Hydrogen cooling towers. Large metal and concrete structures comprised of corrugated metal panels, grills/vents, metal pipe work, concrete base, and columns. External metal staircases.
2a – 2d	Negligible	Brick based buildings located adjacent to the cooling towers with corrugated metal upper half and roof with round edges. Metal shutter entrances.
3	Negligible	Large concrete tower with smooth concrete walls, external metal staircase and associated pipework.
4	Negligible	Several metal shipping containers and portacabins used as offices within contractor's compound.
5	Negligible	Small brick building with flat concrete roof.
6	Negligible	Single storey metal storage shed with metal corrugated sides and pitched roof.

Building/ Structure Number	Roost Suitability	Description
7	Negligible	Existing GTP AGI consisting of metal pipework. Brick based buildings with metal corrugated walls and round edged pitched roof.
8	Negligible	Large warehouses with metal shutter entrance and metal panel walls. Plastic sheet/ canvas pitched roof.
9	Negligible	Large metal warehouse with brick base and metal shutter entrances. Corrugated metal panel walls and pitched roof.
10	Negligible	Gas Treatment Plant. Large area of metal pipework, water tanks and warehouses consisting of brick bases and corrugated metal walls and roof.
11	Negligible	Four-unit CCGT. Large industrial structure with four towers/chimneys. Corrugated metal sides and metal shutter. Series of pipelines on external.
12	Negligible	Large multiple storey glass fronted office building. Brick base and corrugated metal roof with rounded edges.
13	Negligible	Dragon Building. Corrugated metal walls with brick base, multi-use building for office/ warehouse with metal shutters.
14	Negligible	Warehouse with brick base, metal shutters and corrugated metal walls and roof with rounded edges.
15	Negligible	Small building with brick base, metal shutter and corrugated metal walls and roof with rounded edges.
16	Negligible	Training Centre. Single storey brick building used as a training centre. Metal corrugated roof with rounded edges. Lights all round.
17	Negligible	Small building with brick base, metal shutter and corrugated metal walls and roof with rounded edges.
18	Negligible	Security Office. Single storey brick and glass building used as security office. Metal corrugated pitched roof with rounded edges.
19	Negligible	Warehouse with brick base, metal shutters and corrugated metal walls and roof with rounded edges.
20	Negligible	Singe storey brick building used as Deeside Naturalists' Society Field Studies Centre. Metal

Building/ Structure Number	Roost Suitability	Description
		shutter on windows and entrance. Flat roof with felt covering.
21	Negligible	Single storey breeze block building used as a wildlife hide ('East Hide') with flat roof.
A	Negligible	Large metal warehouse building with pitched roof.
B	Negligible	Open sided metal farm shed.

Trees/Woodland

4.2.3 Five trees (Tree A, Tree B, Tree C, Tree D and Tree E) and one tree group (Tree Group A) within the Survey Area were identified as having PRFs present. **Table 6** provides a summary of tree suitability for roosting bats. The tree locations are shown in **Figure 11G-2 , Annex A** and photographs in **Annex B**. A woodland belt (Woodland Belt A) is present along the edge of the south-eastern boundary, trees were identified within this woodland as containing PRFs.

4.2.4 The Water Connection Corridor (i.e. area to the north-east) could be viewed and no trees are present.

Table 6: Summary of Tree Bat Roost Suitability

Tree	Roost Suitability	Description
Tree A	PRFs present	Semi-mature poplar *Populus* sp. (tree tag 447) located on roadside in the east of the Construction and Operation Area adjacent to the estuary. One hole in trunk approximately 6 m high.
Tree B	PRFs present	Semi-mature oak *Quercus* sp. located near to railway line off Kelsterton Road. Broken, decayed limb present, which is open at the top.
Tree C	PRFs present	Semi-mature oak in hedgerow. Hole in limb. Dense ivy *Hedera helix* other features maybe obscured. PRFs present.
Tree D	PRFs present	Semi-mature oak in hedgerow. Large tear out on trunk with potential cavity.
Tree E	PRFs present	Mature weeping willow *Salix babylonica* in woodland belt. Unable to access fully, at least three PRFs present, large cavity in trunk, two hazard beams.
Tree Group A	PRFs may be present	Group of ivy clad trees, dense foliage. PRFs could be present.

Assessment of Foraging and Commuting Habitats

4.2.5 The Main Development Area and C&IEA were assessed as having Negligible to Low suitability habitat for foraging and commuting bats. The suitability assessment considered the lack of roosting features, industrial nature of the Main Development Area, exposed location adjacent to the Dee Estuary, high number of artificial light sources and low-quality habitat such as hard standing and grassland with uniform sward (due to grazing and maintained amenity grassland).

4.2.6 Some areas of scrub and woodland are likely to provide foraging and commuting opportunities, however a lack of connectivity such as mature hedgerows reduce the suitability for foraging and commuting bats.

4.2.7 The Proposed CO_2 Connection Corridor and Repurposed CO_2 Connection Corridor are assessed as having Moderate suitability to support foraging and commuting bats given hedgerow and tree line connectivity to the wider landscape and surrounding farm buildings which may have potential to support roosting bats.

Night-time Bat Walkover

4.2.8 Full results of the NBW surveys are provided in **Annex C**. The results of the NBW surveys are summarised in **Table 7** and **Table 8** below, and are shown in **Figure 11G-4 - Figure 11G-8, Annex A**.

4.2.9 The highest levels of activity were detected in May. The lowest levels of activity were detected in August.

4.2.10 Common pipistrelle was the most frequently recorded species, followed by soprano pipistrelle and then Myotis sp.

Table 7: Summary of the results of the NBW surveys within the Construction and Operation Area

Month of Survey	Summary of Results
May	The first bat was a common pipistrelle detected at 21:56, approximately 32 minutes after sunset travelling north west along a tree lined track. The May survey had high levels of bat activity (170 passes) this comprised frequent commuting and foraging activity, predominantly of common pipistrelles with soprano pipistrelles more occasional. Activity was predominantly along the tree-lined watercourse and along the hedges to the south-west of the Construction and Operation Area. Activity was more scattered across the north of the Construction and Operation Area.
July	Soprano pipistrelle and common pipistrelle bats were observed at 21:40 and 21:52 respectively (approximately 18 minutes and 30 minutes after sunset) flying north-west along the tree lined track

Month of Survey	Summary of Results
	The July survey had high levels of bat activity (101 passes) this comprised frequent bat activity was present to the south-west and north of the Construction and Operation Area. Species including common pipistrelles, soprano pipistrelles, and noctule bats.
August	The first bat was a common pipistrelle detected at 20:46, approximately 43 minutes after sunset along a hedgerow. The August survey had very low levels of bat activity (2 passes) this comprised common pipistrelle calls (foraging and commuting) to the west and centre of the Construction and Operation Area.
September	The first bat was a soprano pipistrelle detected at 19:40, approximately 35 minutes after sunset flying along the tree lined track. The September survey had moderate level of bat activity (77 passes). Species included common pipistrelle, Leisler's bat, Myotis sp. noctule, serotine and soprano pipistrelle.
October	A single noctule bat travelling along the tree lined track at 18:25 (approximately 25 minutes after sunset). The October survey has moderate levels of bat activity (45 passes) this comprised occasional foraging and commuting common pipistrelle, soprano pipistrelle, and noctule across the Construction and Operation Area, mostly along hedgerows and tree-lines.

Table 8: Summary of NBW Survey Results

Month	Number of Passes Per Bat Species						Total Number of Passes per Survey and relative bat activity level	Species Count
	Common pipistrelle	Soprano pipistrelle	Myotis sp.	Serotine	Noctule	Leisler's bat		
May	71	62	37	0	0	0	170 (High)	3
July	48	18	12	0	21	2	101 (High)	5
August	2	0	0	0	0	0	2 (Very Low)	1
September	33	13	6	10	5	10	77 (Moderate)	6
October	4	28	9	0	4	0	45 (Moderate)	4
Total passes	**158**	**121**	**64**	**10**	**30**	**12**	395	-
% of total	**40**	**31**	**16**	**3**	**8**	**3**	--	--

Automated Detector Surveys

4.2.11 Summaries of the automated detector survey results are shown in **Table 9** and **Table 10**. Full standardised data is in **Annex D**.

4.2.12 The highest levels of activity were detected in July. The lowest levels of activity were detected in October. Common pipistrelle was the most frequently recorded species, followed by soprano pipistrelle and then Myotis sp.

Table 9: Automated Bat Detector Survey Results

Deployment Month	Location	Common pipistrelle	Soprano pipistrelle	Nathusius' pipistrelle	Pipistrelle sp.	Noctule	Leisler's bat	Serotine	NLS	Brown long-eared bat	Myotis sp.	Lesser horseshoe bat	Total Number of Passes	BAI Per Hour	Activity Levels*
May	1	375	109	0	0	6	4	0	1	0	14	1	510	12.8	M-H
	2	172	202	0	0	0	2	3	0	0	88	1	468	11.7	M-H
June	1	308	57	0	0	17	2	3	0	0	15	0	402	11.1	M
	2	168	127	0	0	13	0	0	0	4	60	0	372	10.3	L-M
July	1	383	131	1	7	17	5	1	0	7	81	0	633	16.9	H
	2	249	291	0	51	48	2	0	0	19	151	0	811	21.6	H
August	1	121	276	0	0	13	5	2	0	26	43	1	487	10.8	M
	2	57	66	0	0	50	27	2	0	32	177	0	411	9.1	L-M
September	1	67	53	0	8	27	2	0	0	19	586	6	768	12.3	M-H
	2[2]	-	-	-	-	-	-	-	-	-	-	-	-	-	N/A
October	1	164	53	0	0	31	32	0	0	7	20	3	310	4.8	L
	2	68	211	0	0	2	0	0	0	2	85	4	373	5.7	L-M

*L = Low; L-M = Low-Moderate; M=Moderate; M-H = Moderate-high' H = high

[2] Automatic detector damaged see limitations paragraph 3.9.8

Table 10: Summary of Total Bat Passes by Month Automated Bat Detector

Month Deployed	Automated Bat Detector Location		Total bat calls
	1	2	
May	510	468	978
June	402	372	774
July	633	811	1444
August	487	411	898
September	768	N/A*	768
October	310	373	683
Total Passes per Location	3110	2435	5545

*September Automated Bat Detector Location 2 damaged (see Limitations)

4.3 Evaluation of Ecological Importance

Preliminary Roost Assessment

4.3.1 All areas of the Construction and Operation Area are located over 9 km from Chwarel Cambrian / Cambrian Quarry, Gwernymynydd SSSI and the SSSI is separated from the Construction and Operation Area by several urban areas such as the towns of Mold and Buckley. This severance of viable habitat links and the relatively small home ranges of lesser horseshoe bats means the Construction and Operation Area is not considered functionally linked to the SSSI as reflected by the very few records of this species during the surveys. In addition, significant parts of the SSSI have been affected by quarrying and mining which have left a legacy of open ground, quarry faces and benches and spoil heaps. The lesser horseshoe bats are known to use the now disused mine workings in Chwarel Cambrian/Cambrian Quarry itself, with the complex of underground workings providing a range of conditions suitable for bat hibernation. It is noted that the SSSI also includes woodland habitat, mainly mixed broadleaved in character (characterised by trees such as ash *Fraxinus excelsior*, sycamore *Acer pseudoplatanus*, birch *Betula spp* and willows *Salix spp*.), contiguous with these mine workings predominantly to their north, west and east.

4.3.2 There is a lack of PRFs within the Construction and Operation Area (specifically the Main Development Area and C&IEA). There are no buildings within the Construction and Operation Area with suitability to support roosting bats, however there are several trees, tree group and a woodland belt which contain PRFs. None of these potential bat roost features would be removed or impacted as a result of the Proposed Development so no further surveys are needed.

Assemblage

4.3.3 Using the scoring system within the Bat Mitigation Guidance (Ref 20), the value of bat species assemblage of the Construction and Operation Area is summarised in **Table 11** and further details are provided in **Annex E**.

Table 11: Summary of Conservation Importance of Bats

Species	Importance of Roosts (summary of justification)	Importance of Commuting and Foraging Habitat (summary of justification)	Importance of Assemblage
Widespread: common pipistrelle soprano pipistrelle brown long-eared	Two trees with potential roost features on the edge of the Site boundary and all structures and buildings had negligible suitability for roosting bats. No known roosts within the Site, lack of suitable roosting habitat within the Site. Does not exceed **Site** importance.	There is foraging and commuting activity by a diverse assemblage of bats with higher reliance on habitats by common and soprano pipistrelle.	**(1 point per species)** **Score 3 for this part of the assemblage**
Widespread in many geographies but not as abundant in all: Noctule Daubenton's bat Myotis bat species	No known roosts within the Site, lack of suitable roosting habitat within the Site. Does not exceed **Site** importance.	Moderate reliance on habitats by Myotis species and noctule bats; and low reliance on habitats by all other species, serotine, Leisler's , brown long-eared bat and lesser horseshoe bat as demonstrated by limited evidence or irregular use and generally by small numbers of bats.	**(2 points per species)** **Score 6 for this part of the assemblage**
Rarer or restricted	No known roosts within the Site, lack of suitable roosting habitat within the Site.		**(3 points per species)**

Species	Importance of Roosts (summary of justification)	Importance of Commuting and Foraging Habitat (summary of justification)	Importance of Assemblage
distribution: Lesser horseshoe Nathusius' pipistrelle Serotine bat Leisler's bat	Does not exceed **Site** importance.		**Score 12 for this part of the assemblage**

5. Summary

5.1.1 All buildings within the Construction and Operation Area (Buildings 1 – 21, A and B) were categorised as being Negligible suitability for roosting bats. Therefore, no further bat surveys or mitigation measures are required for these buildings.

5.1.2 Trees A, B (within the Main Development Area) C, D, E, Tree Group A and B, and Woodland Belt A were identified as having PRFs present, but given the current design is not expected to impact these trees, no further bat surveys are required. There are no known bat roosts within the Construction and Operation Area and there is a lack of suitable bat roosting habitats within the Construction and Operation Area . The value of the Construction and Operation Area for roosting bats of all recorded species is unlikely to exceed Site level.

5.1.3 Bat activity was recorded sporadically across the Construction and Operation Area during the NBWs, with the locations of highest activity varying by time of year. Hedgerows and tree lines were frequently utilised by foraging and commuting bats. During the NBWs, the following bat species were recorded: common pipistrelle, soprano pipistrelle, Myotis sp., serotine, noctule, and Leisler's bat.

5.1.4 The automated bat detector surveys recorded at least nine different bat species. In addition to those recorded during the NBWs, these species were: Nathusius' pipistrelle, brown long-eared bat, and lesser horseshoe bats.

5.1.5 The bat species assemblage at the Construction and Operation Area, and the value for commuting and foraging bats, was valued at no higher than County importance.

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Abbreviations

Abbreviation	Term
AIL	Abnormal Indivisible Load
BAI	Bat Activity Index
BCT	Bat Conservation Trust
CO_2	Carbon Dioxide
C&IEA	Construction and Indicative Enhancement Area
EcIA	Ecological Impact Assessment
EPS	European Protected Species
EPSML	European Protected Species Mitigation Licence
FAR	Further Assessment Required
GLTA	Ground Level Tree Assessment
NBW	Night-time Bat Walkover
NRW	Natural Resources Wales
PEA	Preliminary Ecological Appraisal
PRF	Potential Roost Feature

Annex A: Figures

Revision: 0 Drawn: LP Checked: JG Approved: JC Date: 2025-07-28

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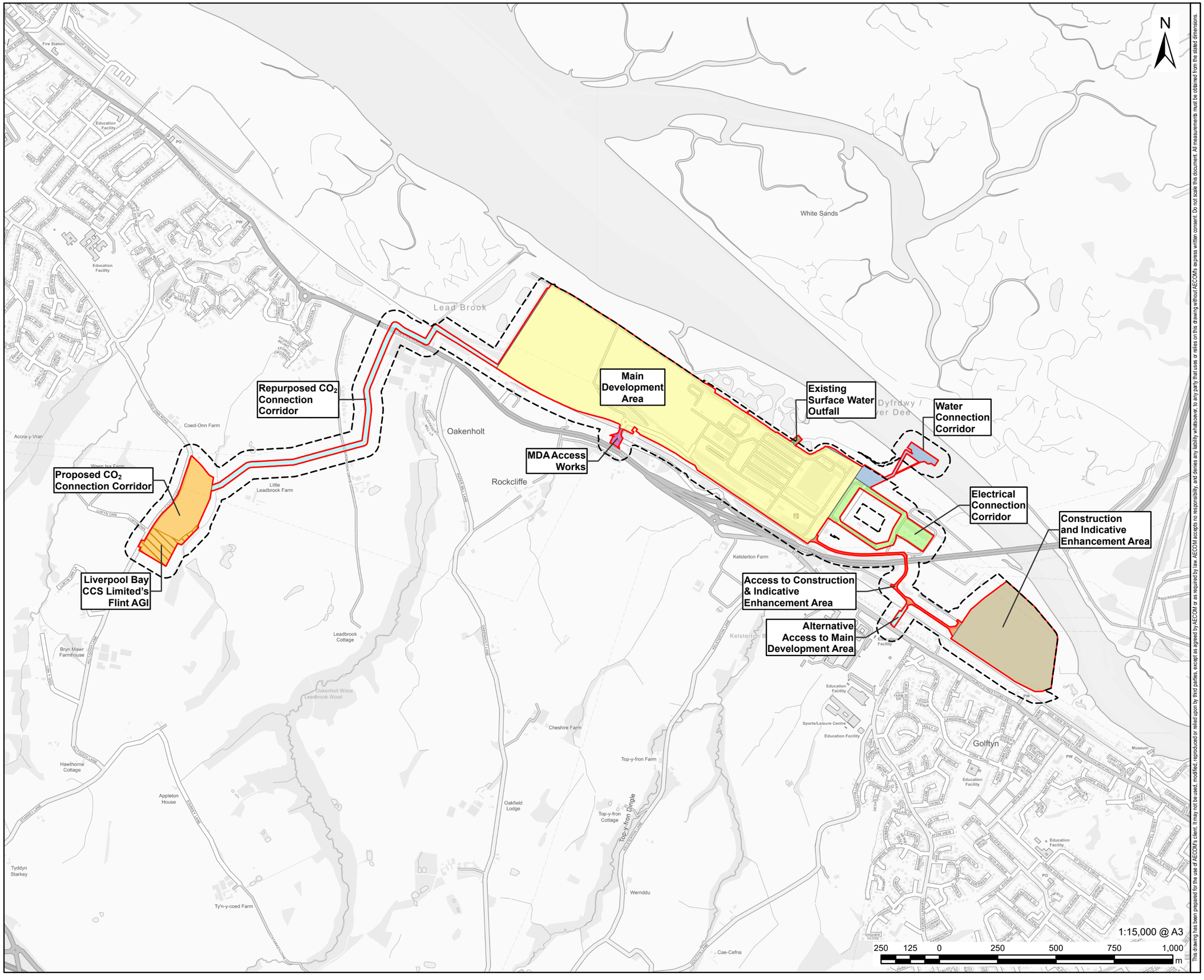

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LEGEND

- Construction and Operation Area
- Survey Area
- Main Development Area
- Repurposed CO_2 Connection Corridor
- Proposed CO_2 Connection Corridor
- Water Connection Corridor
- Electrical Connection Corridor
- Surface Water Outfall Area
- MDA Access Works
- Access to Construction & Indicative Enhancement Area
- Alternative Access to Main Development Area
- Construction & Indicative Enhancement Area
- Liverpool Bay CCS Limited's Flint AGI

NOTES

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FIGURE TITLE

Survey Area

FIGURE NUMBER

Figure 11G-1

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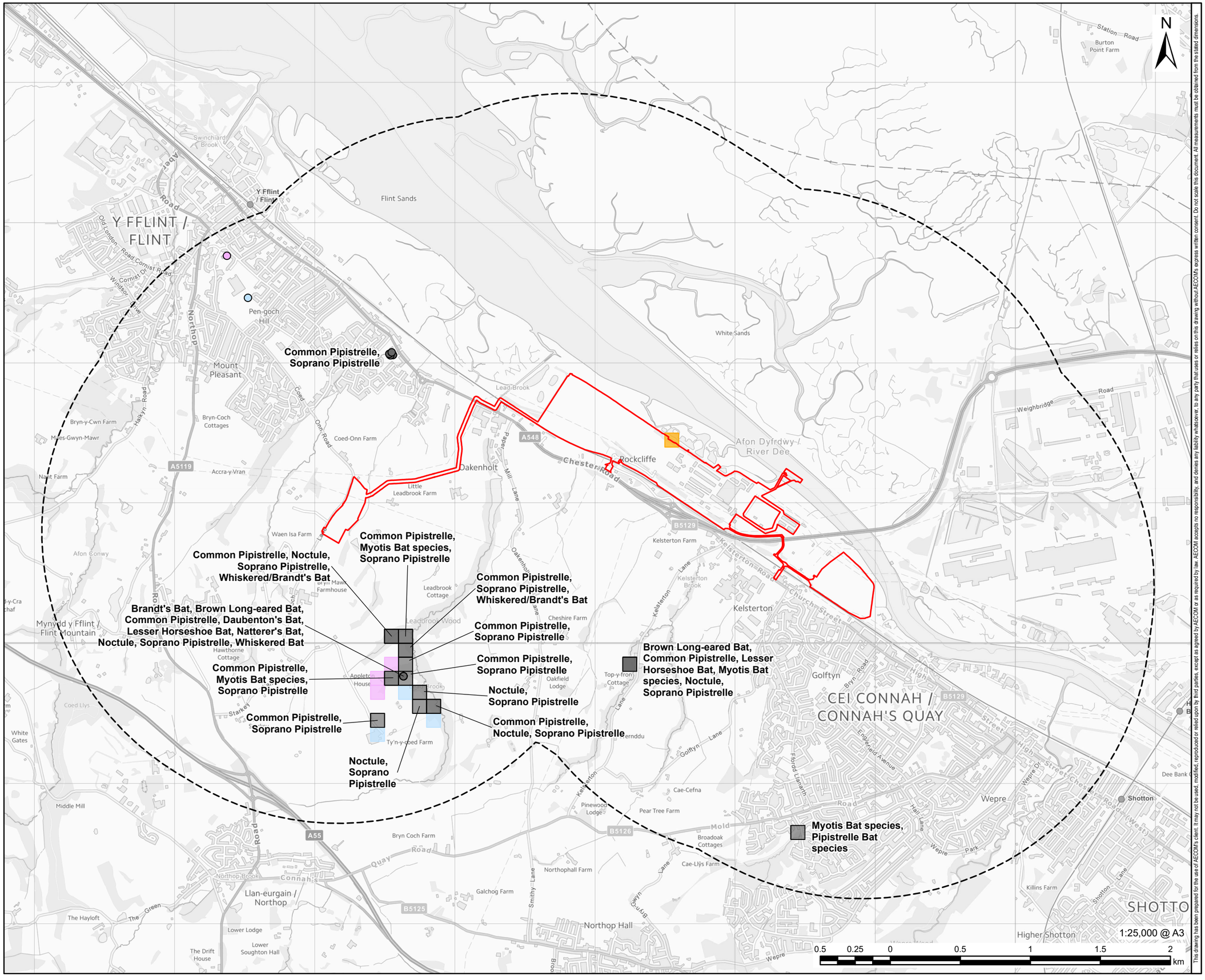

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LEGEND

- Construction and Operation Area
- 2km Study Area

Category 1 Species

1m to 10m Accuracy

- Bat - Common Pipistrelle
- Bat - Pipistrelle Bat species
- Multiple Species Records (see label)

100m Accuracy

- Bat - Daubenton's Bat
- Bat - Common Pipistrelle
- Bat - Soprano Pipistrelle
- Multiple Species Records (see label)

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Records provided by Cofnod for Ecological Records Search Request. Due to the accuracy of the grid reference supplied some records are approximate. Any records with a grid reference accurate to a 100m square or less have been represented by a polygon rather than a point.

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FIGURE TITLE

Desk Study Information

FIGURE NUMBER

Figure 11G-2

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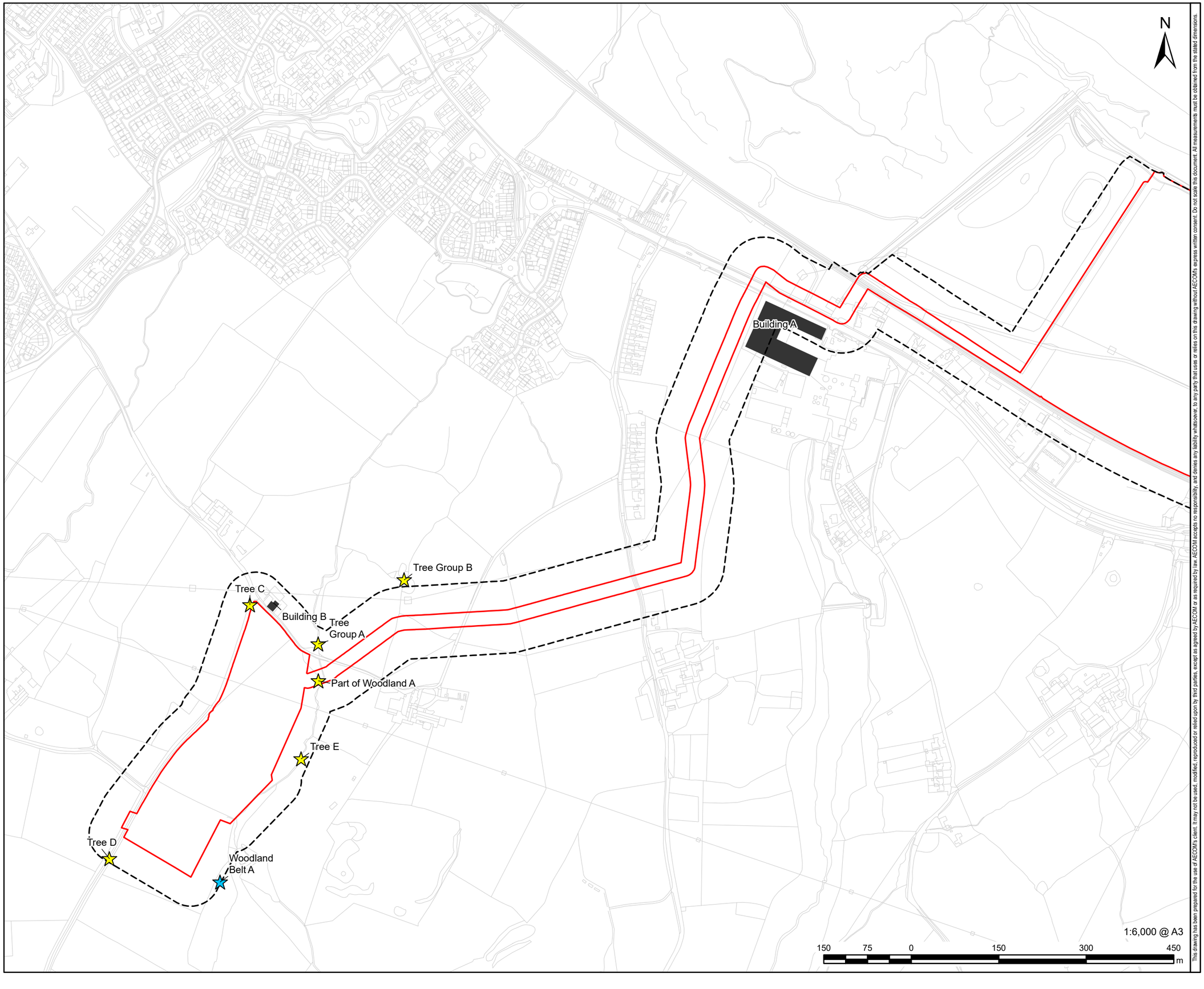

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LEGEND

- Construction and Operation Area
- Survey Area
- Tree/Tree Groups with Potential Roost Features
- Woodland with Potential Roost Features Present

Structure

- Negligible Bat Roost Suitability

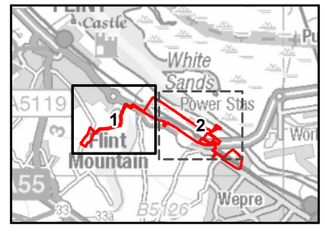

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FIGURE TITLE

Preliminary Bat Roost Assessment Results
Sheet 1 of 2

FIGURE NUMBER

Figure 11G-3

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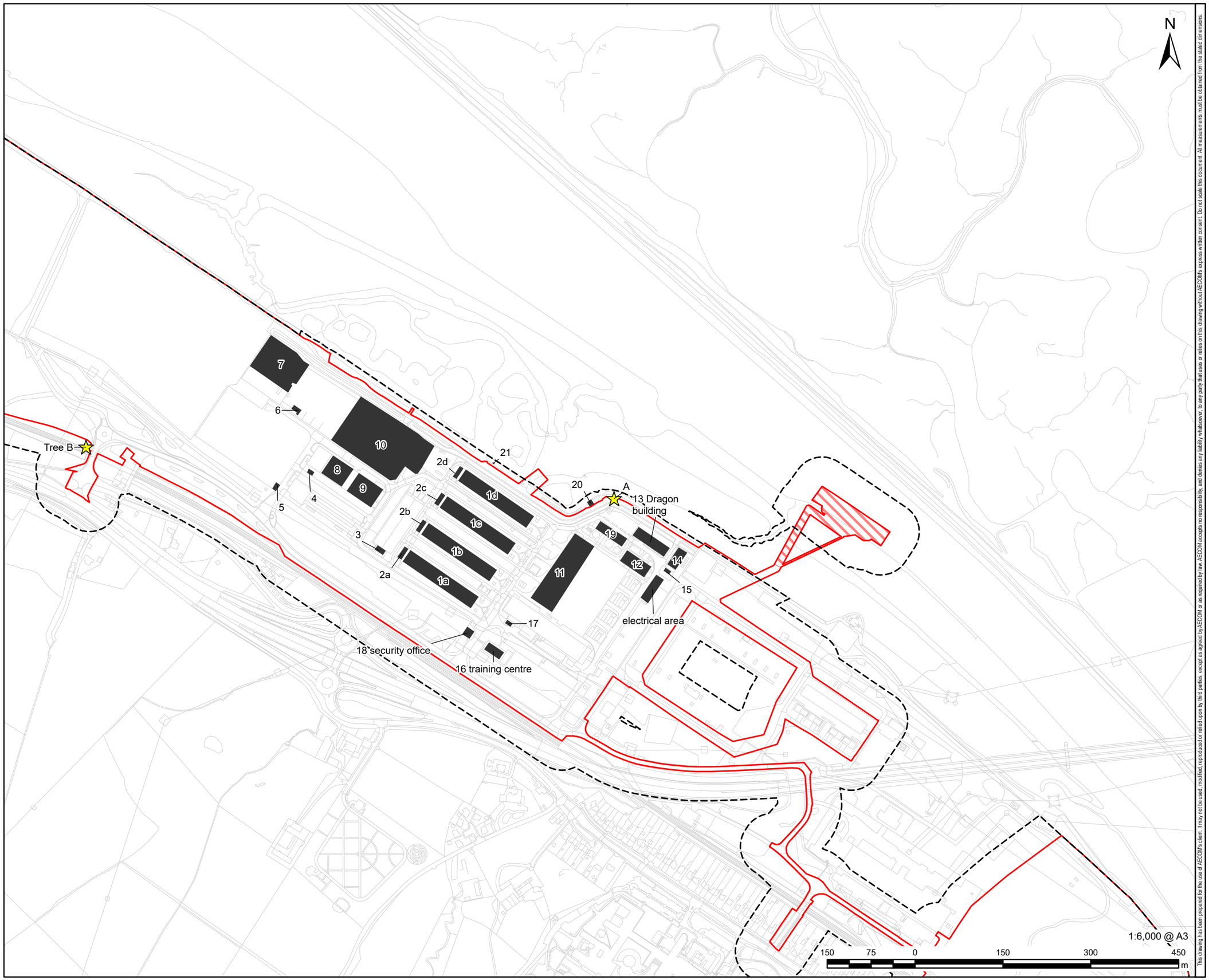

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LEGEND

- Construction and Operation Area
- Survey Area
- Area Not Accessed
- Tree/Tree Groups with Potential Roost Features

Structure

- Negligible Bat Roost Suitability

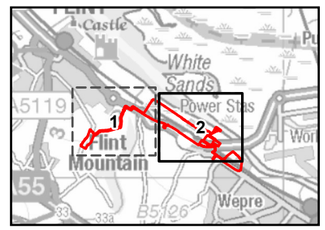

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FIGURE TITLE

Preliminary Bat Roost Assessment Results
Sheet 2 of 2

FIGURE NUMBER

Figure 11G-3

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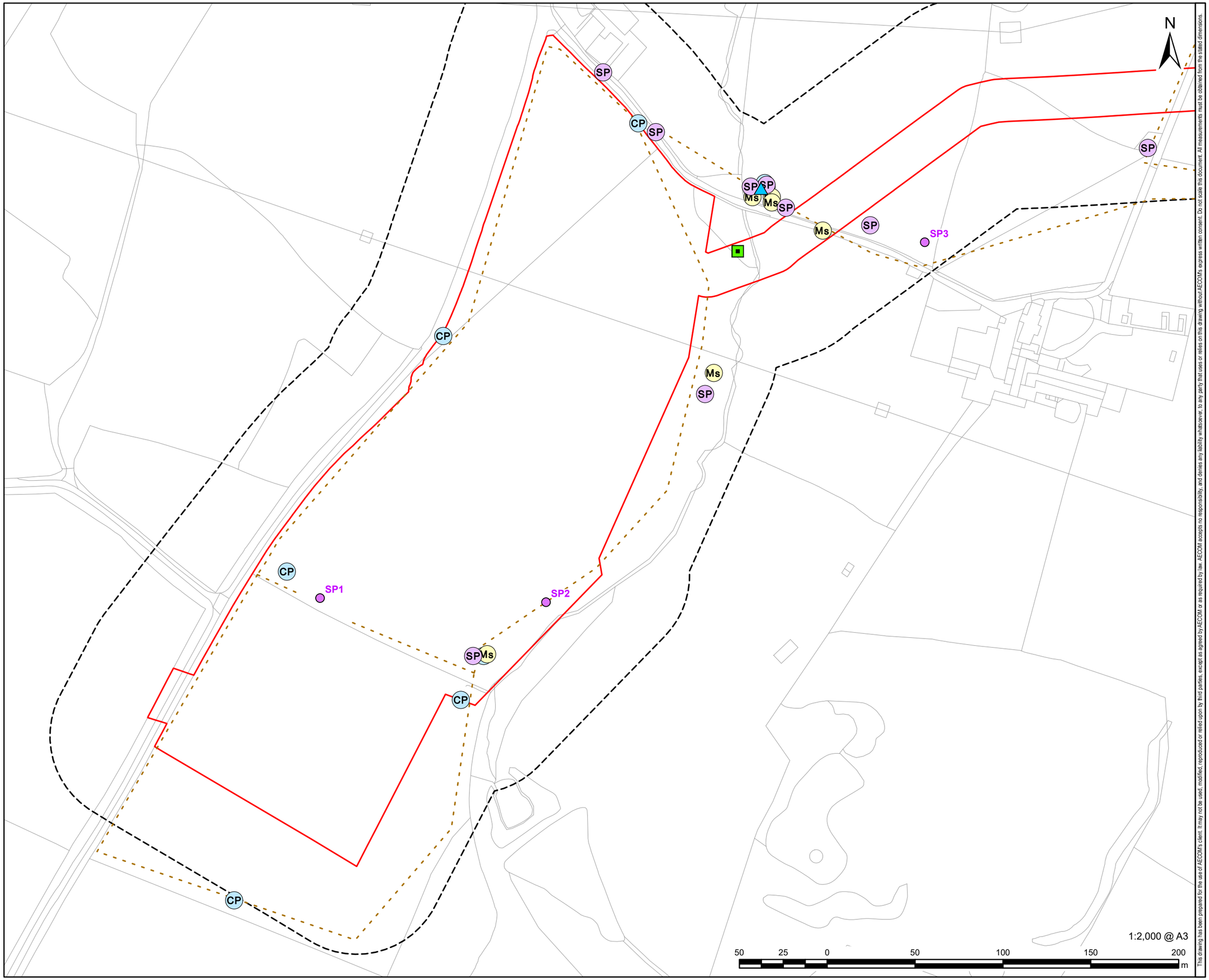

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LEGEND

- Construction and Operation Area
- Survey Area
- Survey Vantage Point
- Stopping Point
- Automated Bat Detector Location
- May Night-time Bat Walkover (NBW) Survey Route

Bat Species

- CP Common Pipistrelle
- Ms Myotis sp.
- SP Soprano Pipistrelle

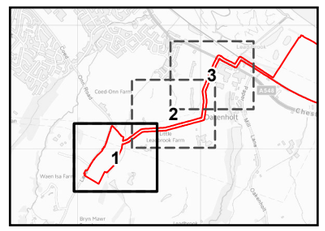

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FIGURE TITLE

May Night-time Bat Walkover (NBW) Survey Results
Sheet 1 of 3

FIGURE NUMBER

Figure 11G-4

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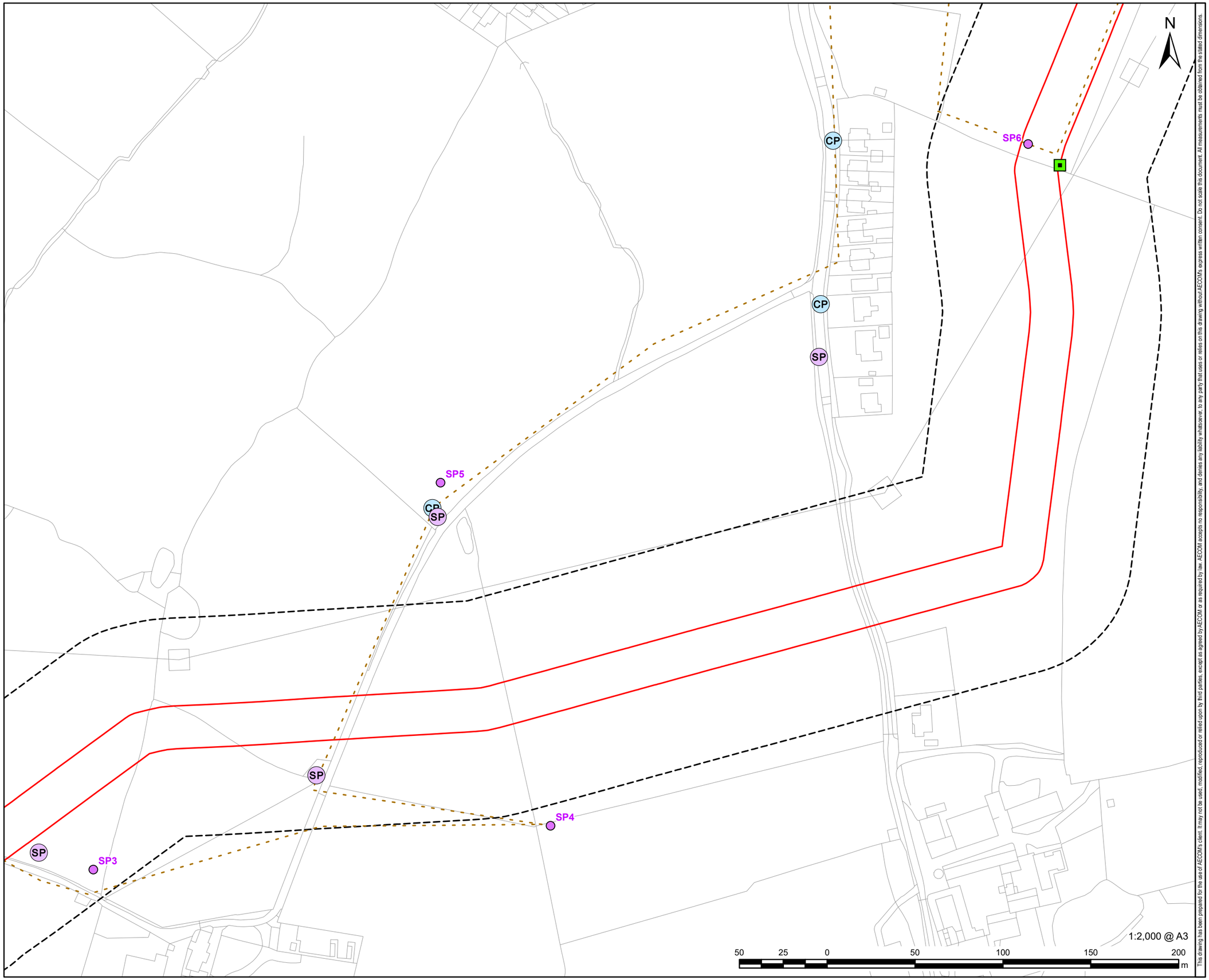

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LEGEND

- Construction and Operation Area
- Survey Area
- Stopping Point
- Automated Bat Detector Location
- May Night-time Bat Walkover (NBW) Survey Route

Bat Species

- CP Common Pipistrelle
- SP Soprano Pipistrelle

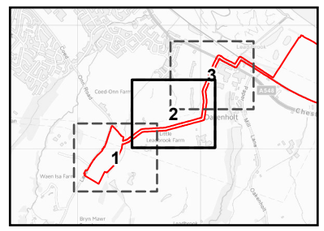

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FIGURE TITLE

May Night-time Bat Walkover (NBW) Survey Results
Sheet 2 of 3

FIGURE NUMBER

Figure 11G-4

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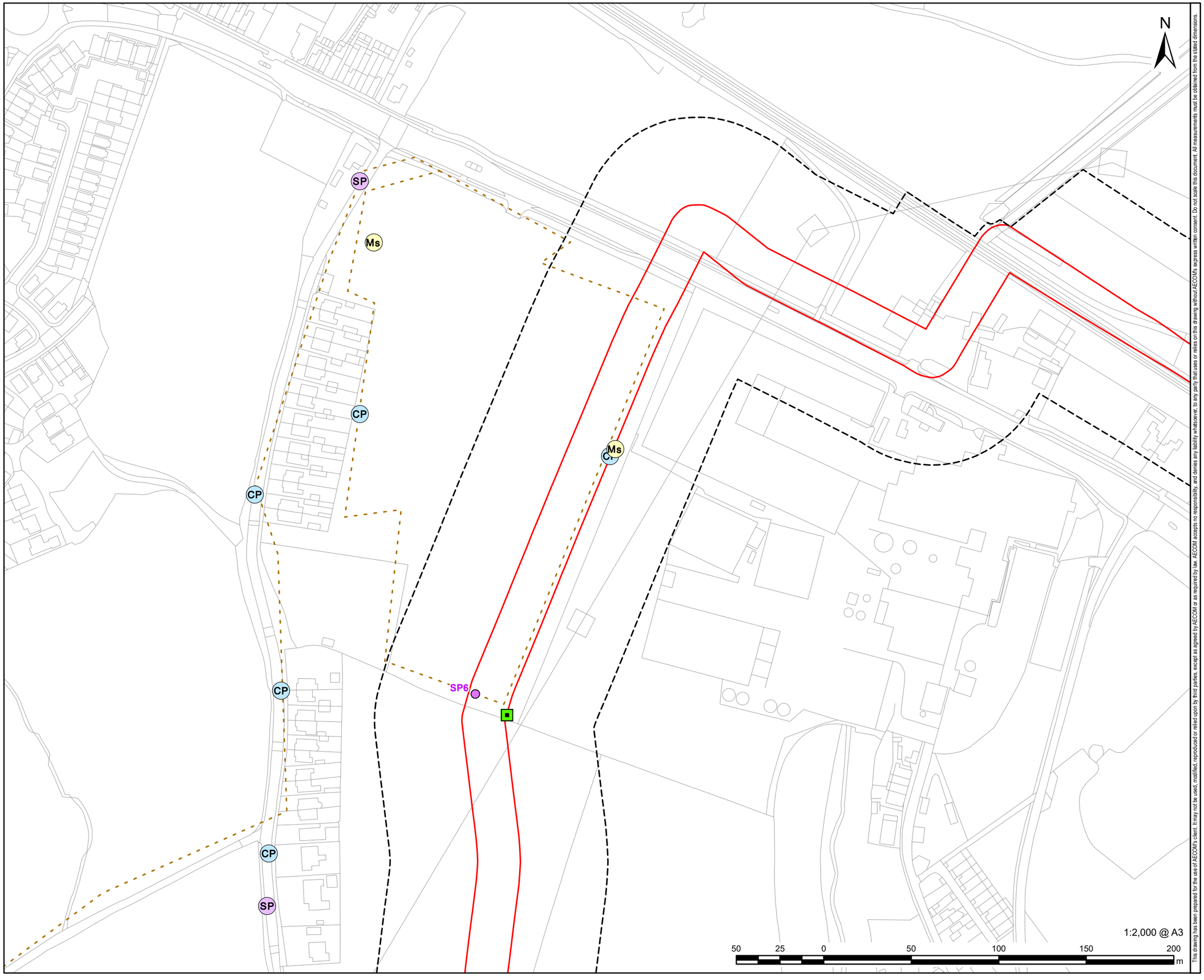

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LEGEND

- Construction and Operation Area
- Survey Area
- Stopping Point
- Automated Bat Detector Location
- May Night-time Bat Walkover (NBW) Survey Route

Bat Species

- CP Common Pipistrelle
- Ms Myotis sp.
- SP Soprano Pipistrelle

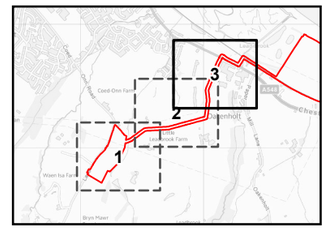

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FIGURE TITLE

May Night-time Bat Walkover (NBW) Survey Results
Sheet 3 of 3

FIGURE NUMBER

Figure 11G-4

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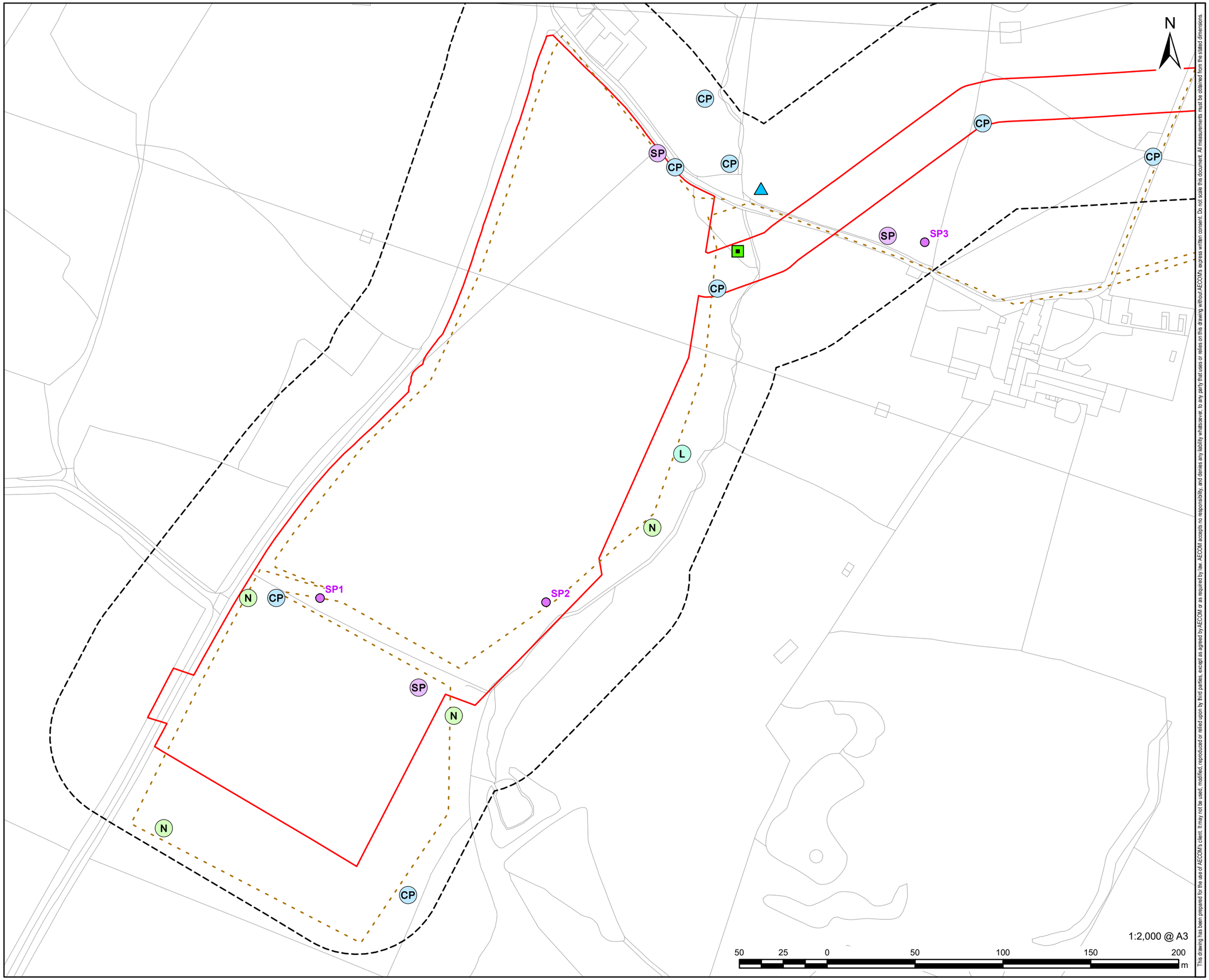

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LEGEND

- Construction and Operation Area
- Survey Area
- Survey Vantage Point
- Stopping Point
- Automated Bat Detector Location
- July Night-time Bat Walkover (NBW) Survey Route

Bat Species

- CP Common Pipistrelle
- L Leisler's bat
- N Noctule
- SP Soprano Pipistrelle

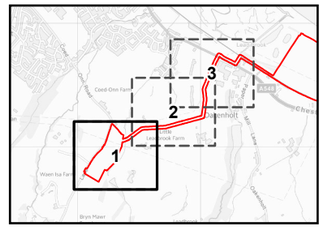

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FIGURE TITLE

July Night-time Bat Walkover (NBW) Survey Results
Sheet 1 of 3

FIGURE NUMBER

Figure 11G-5

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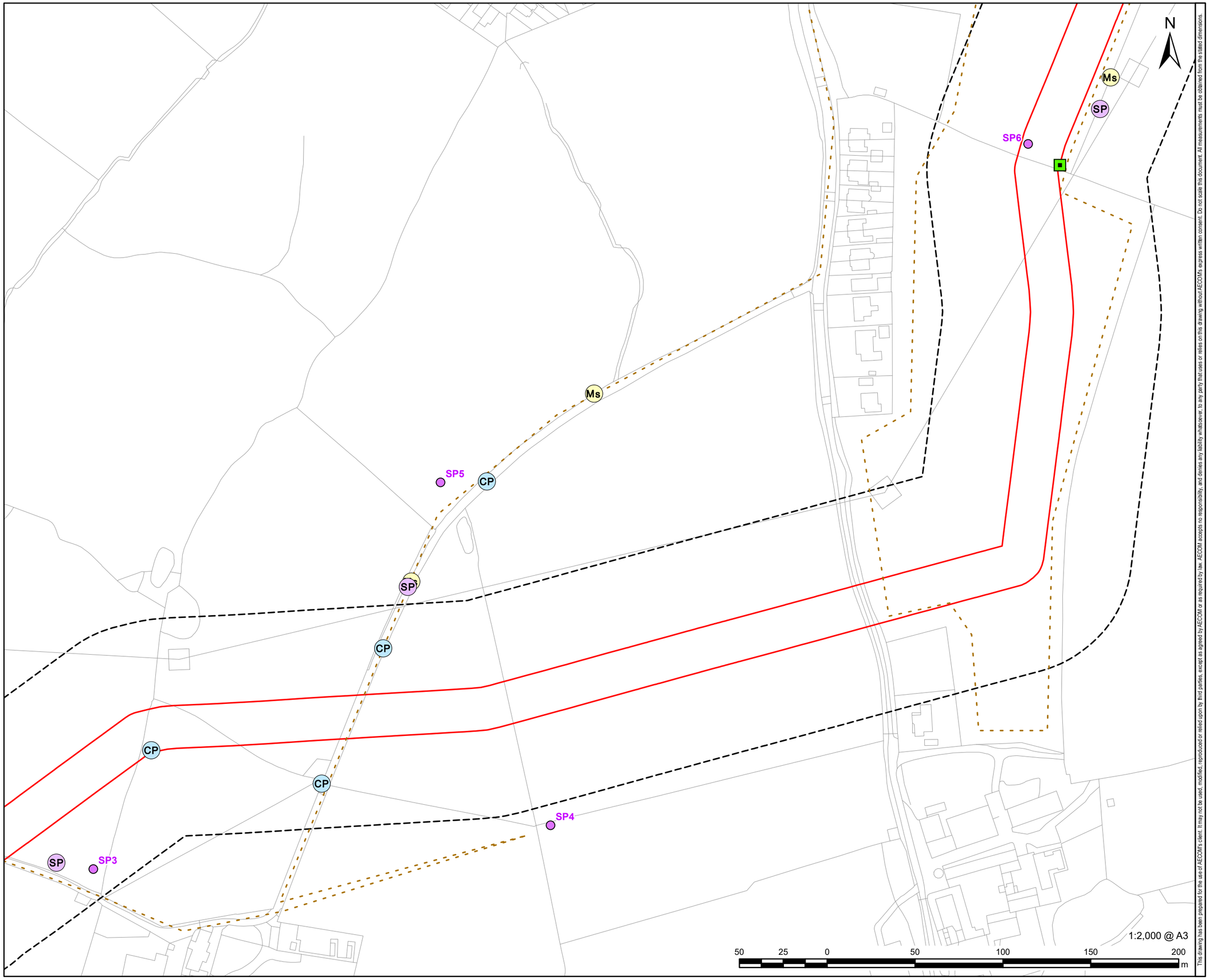

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LEGEND

- Construction and Operation Area
- Survey Area
- Stopping Point
- Automated Bat Detector Location
- July Night-time Bat Walkover (NBW) Survey Route

Bat Species

- CP Common Pipistrelle
- Ms Myotis sp.
- SP Soprano Pipistrelle

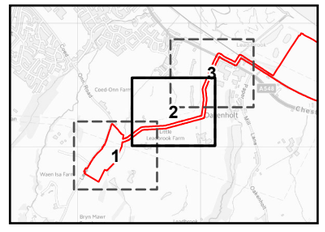

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FIGURE TITLE

July Night-time Bat Walkover (NBW) Survey Results
Sheet 2 of 3

FIGURE NUMBER

Figure 11G-5

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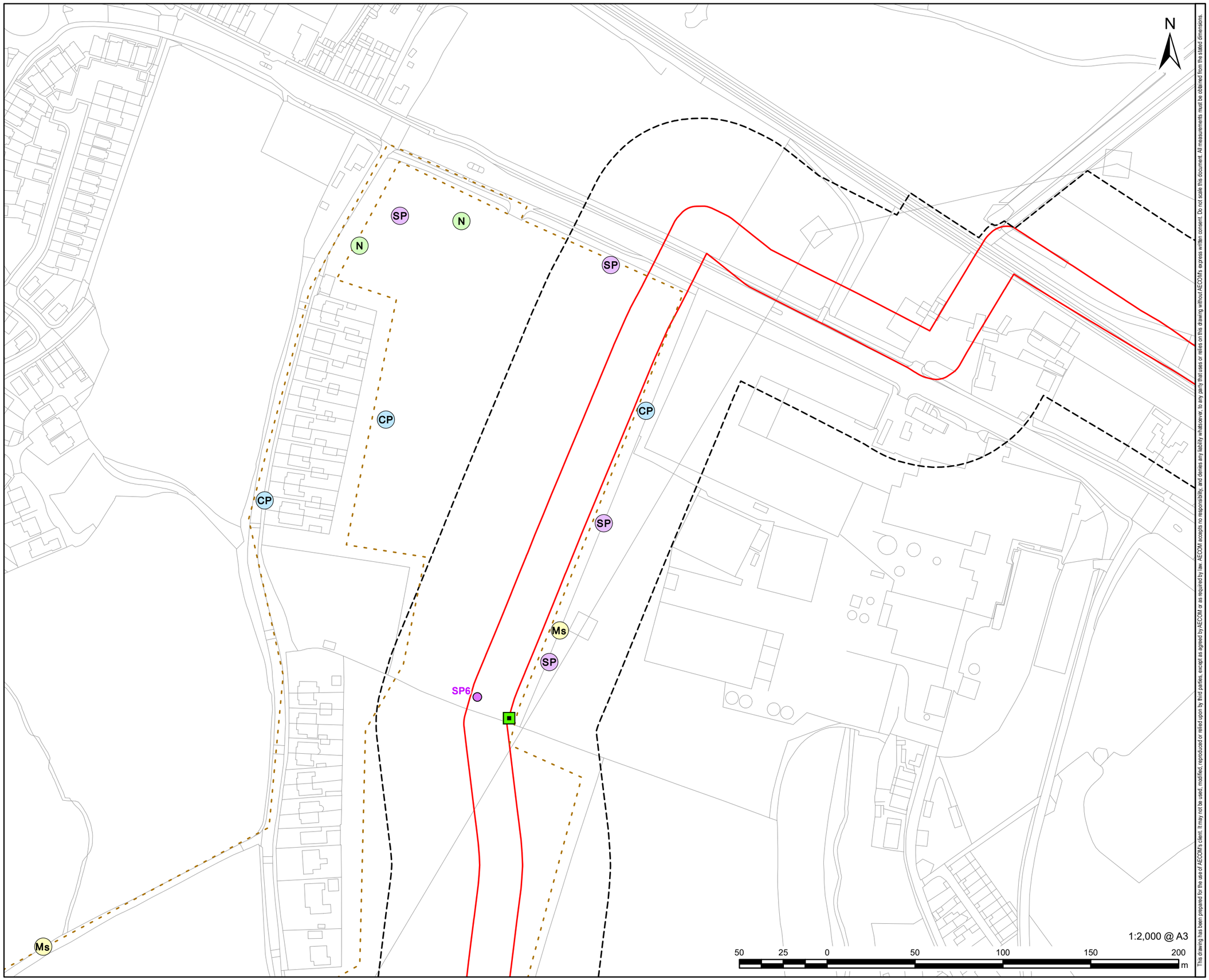

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LEGEND

- Construction and Operation Area
- Survey Area
- Stopping Point
- Automated Bat Detector Location
- July Night-time Bat Walkover (NBW) Survey Route

Bat Species

- CP Common Pipistrelle
- Ms Myotis sp.
- N Noctule
- SP Soprano Pipistrelle

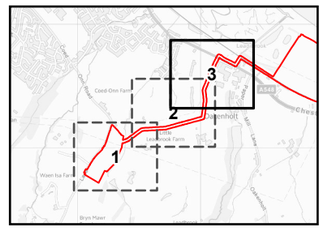

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FIGURE TITLE

July Night-time Bat Walkover (NBW) Survey Results
Sheet 3 of 3

FIGURE NUMBER

Figure 11G-5

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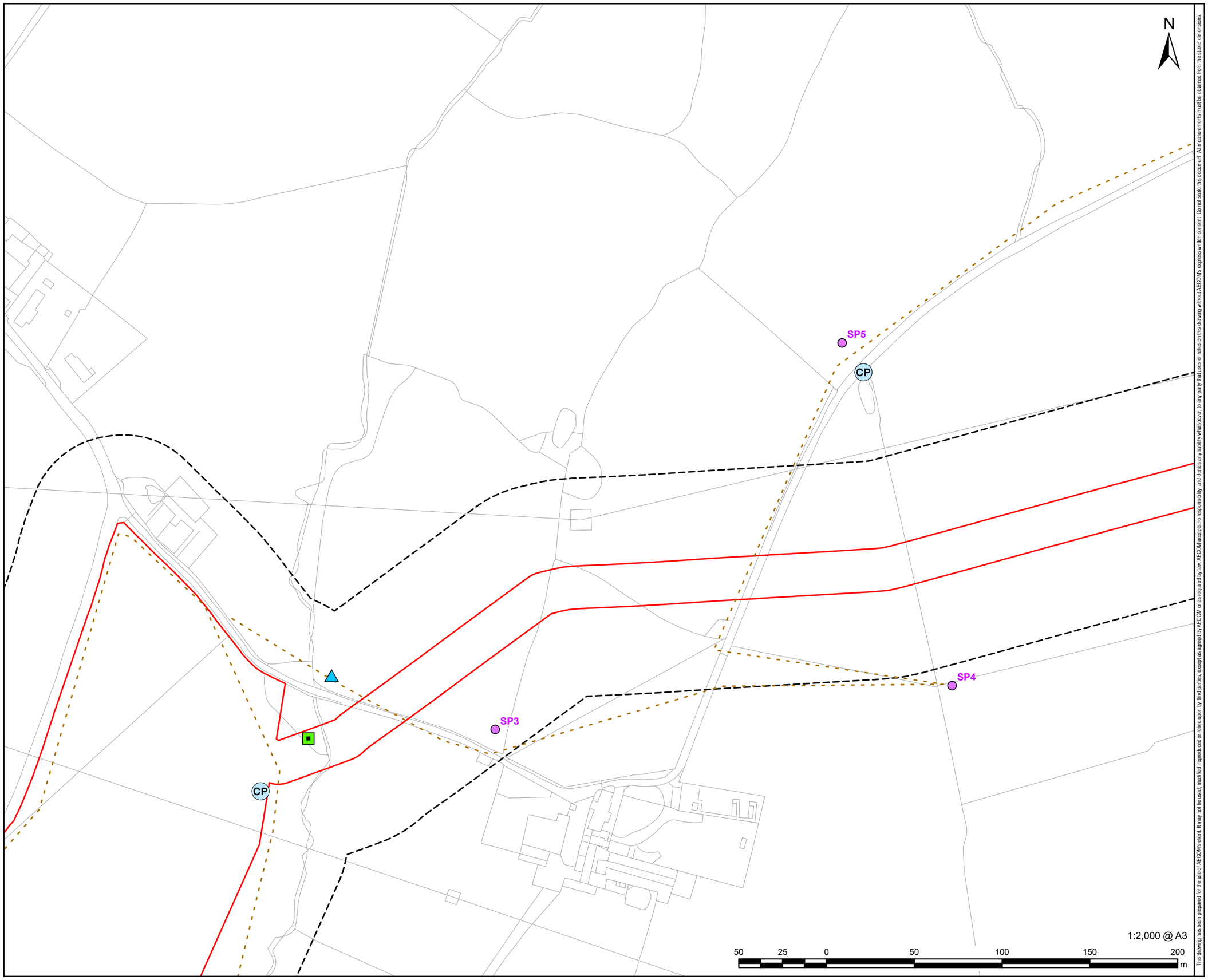

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LEGEND

- Construction and Operation Area
- Survey Area
- Survey Vantage Point
- Stopping Point
- Automated Bat Detector Location
- August Night-time Bat Walkover (NBW) Survey Route

Bat Species

- CP Common Pipistrelle

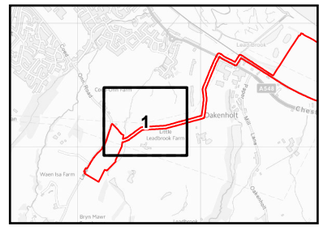

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FIGURE TITLE

August Night-time Bat Walkover (NBW) Survey Results
Sheet 1 of 1

FIGURE NUMBER

Figure 11G-6

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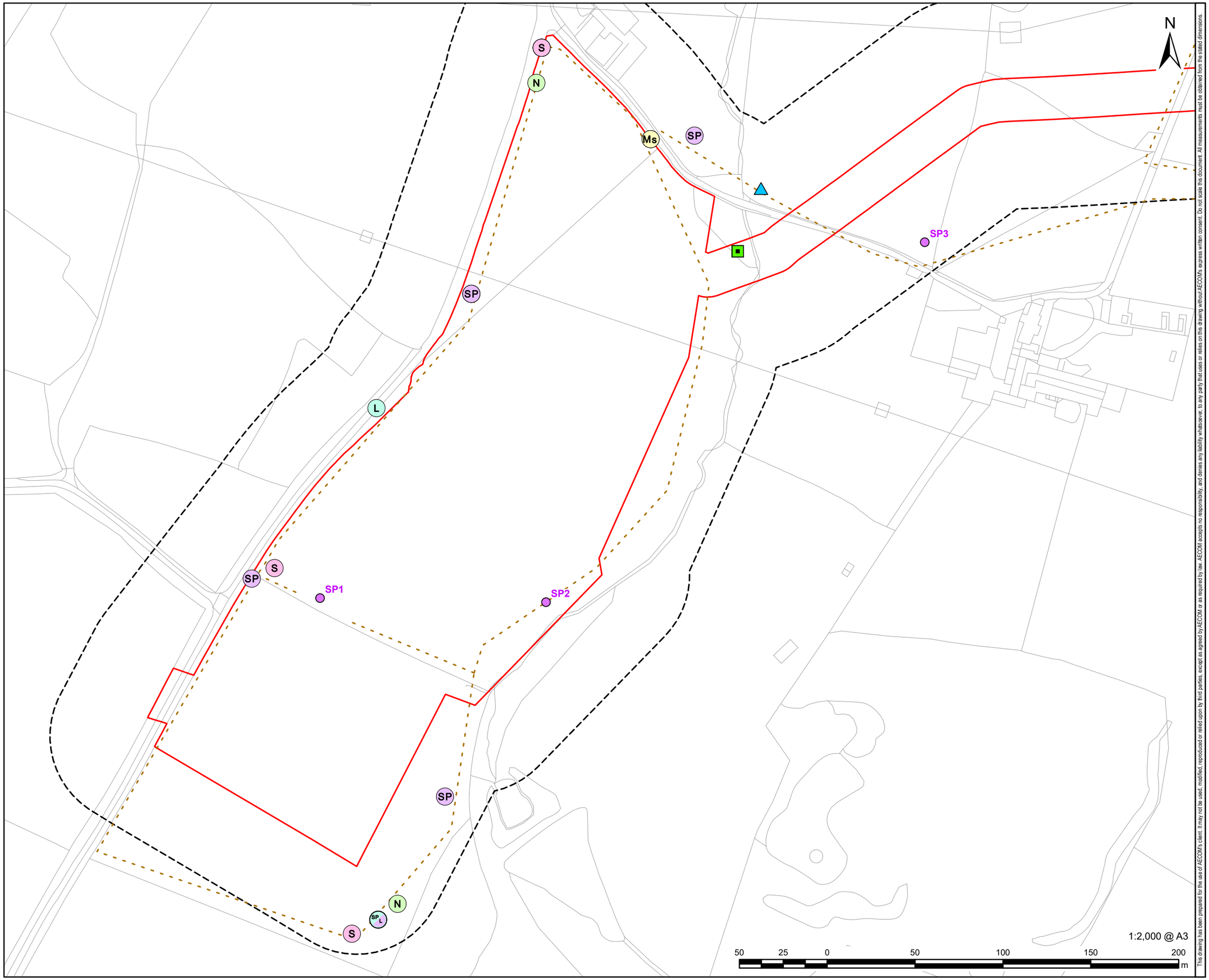

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LEGEND

- Construction and Operation Area
- Survey Area
- Survey Vantage Point
- Stopping Point
- Automated Bat Detector Location
- September Night-time Bat Walkover (NBW) Survey Route

Bat Species

- CP Common Pipistrelle
- L Leisler's bat
- Ms Myotis sp.
- N Noctule
- S Serotine
- SP Soprano Pipistrelle
- SP L Soprano Pipistrelle and Leisler's bat

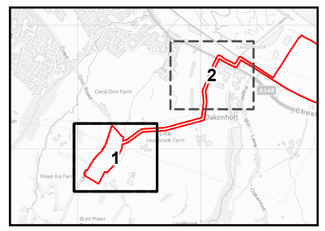

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FIGURE TITLE

September Night-time Bat Walkover (NBW) Survey Results
Sheet 1 of 2

FIGURE NUMBER

Figure 11G-7

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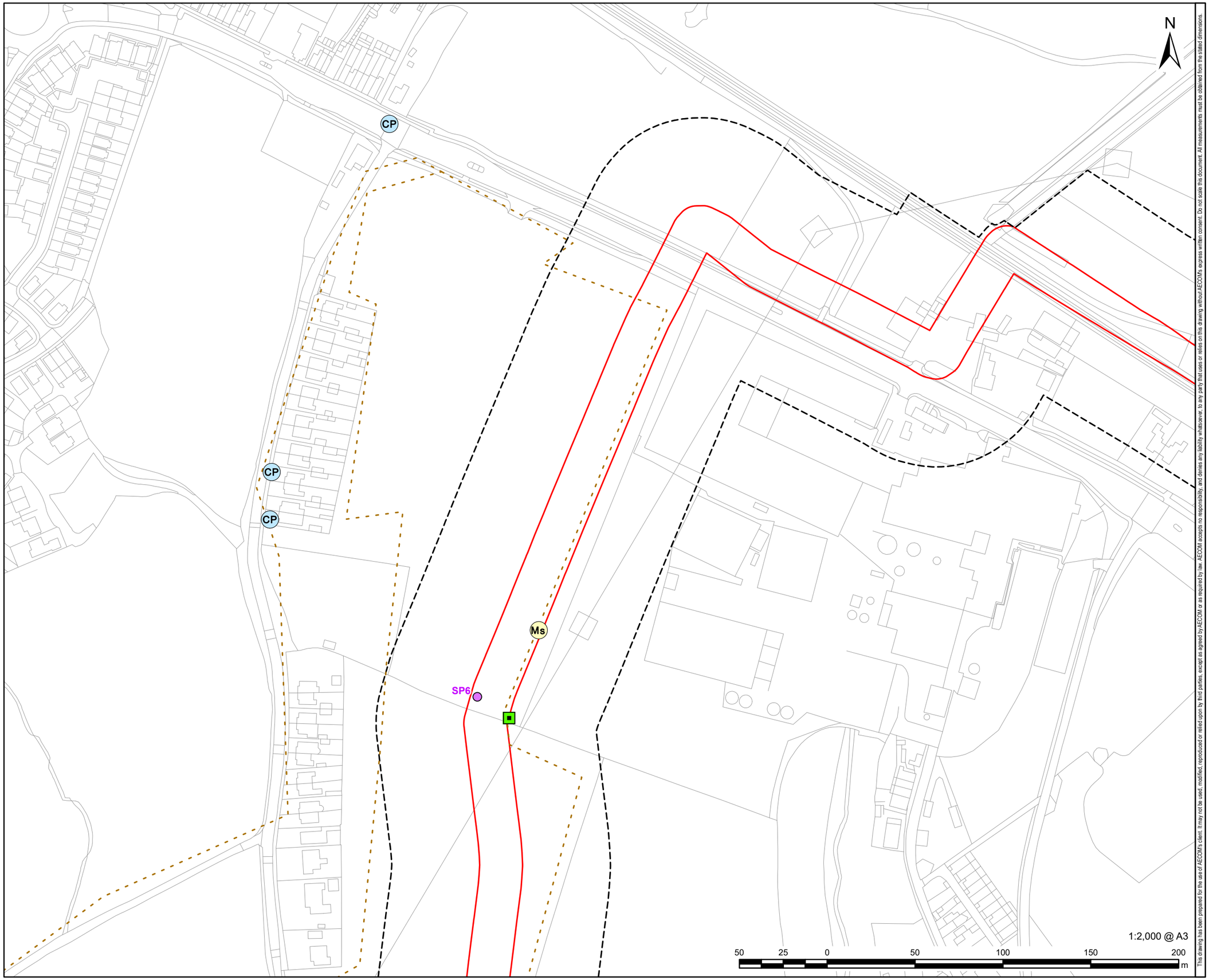

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LEGEND

- Construction and Operation Area
- Survey Area
- Stopping Point
- Automated Bat Detector Location
- September Night-time Bat Walkover (NBW) Survey Route

Bat Species

- CP — Common Pipistrelle
- Ms — Myotis sp.

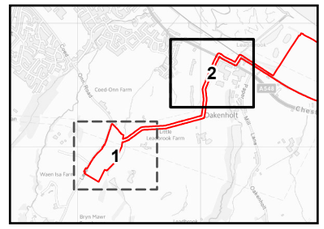

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FIGURE TITLE

September Night-time Bat Walkover (NBW) Survey Results
Sheet 2 of 2

FIGURE NUMBER

Figure 11G-7

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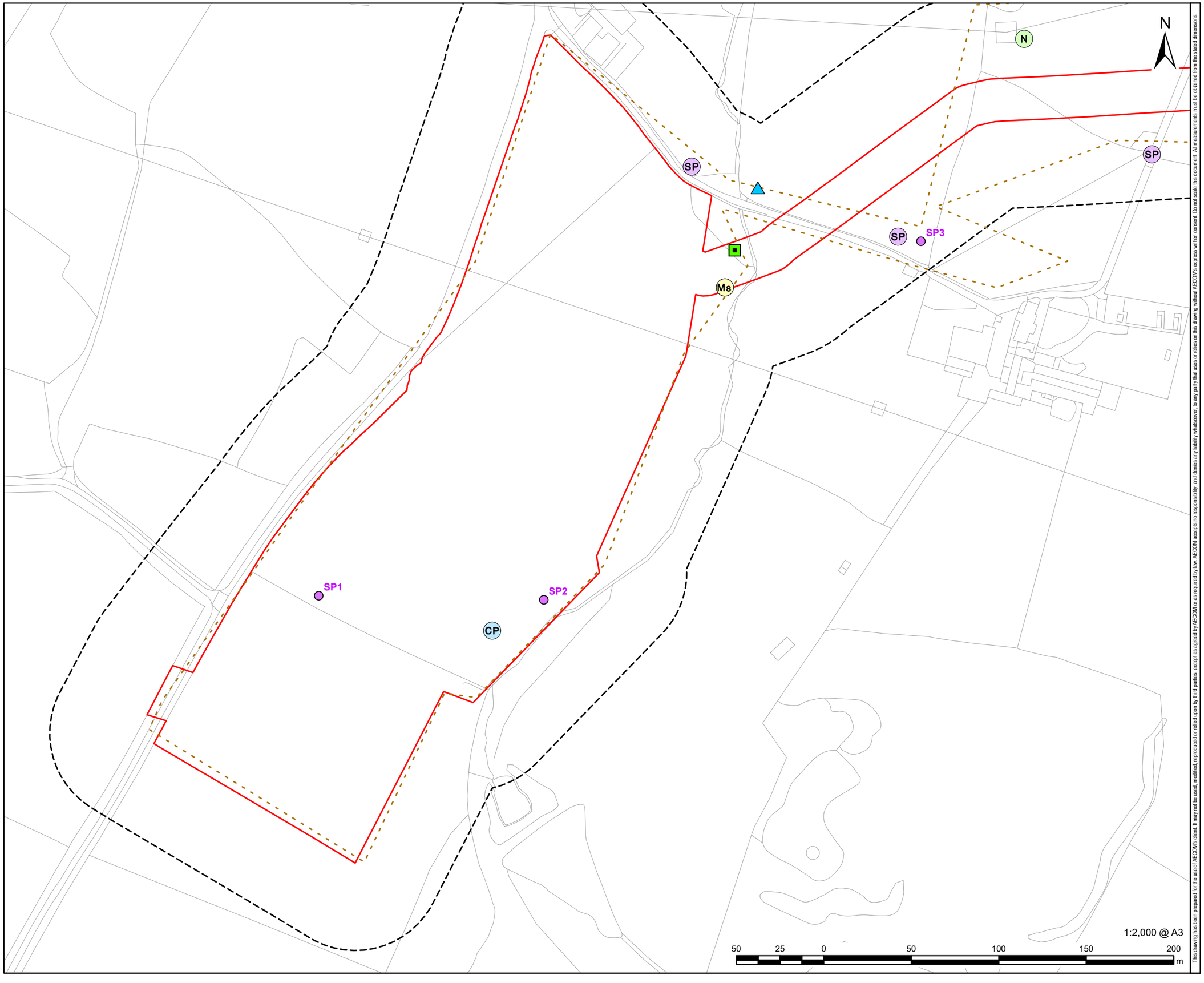

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LEGEND

- Construction and Operation Area
- Survey Area
- Survey Vantage Point
- Stopping Point
- Automated Bat Detector Location
- October Night-time Bat Walkover (NBW) Survey Route

Bat Species

- CP Common Pipistrelle
- Ms Myotis sp.
- N Noctule
- SP Soprano Pipistrelle

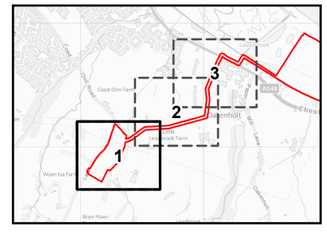

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FIGURE TITLE

October Night-time Bat Walkover (NBW) Survey Results
Sheet 1 of 3

FIGURE NUMBER

Figure 11G-8

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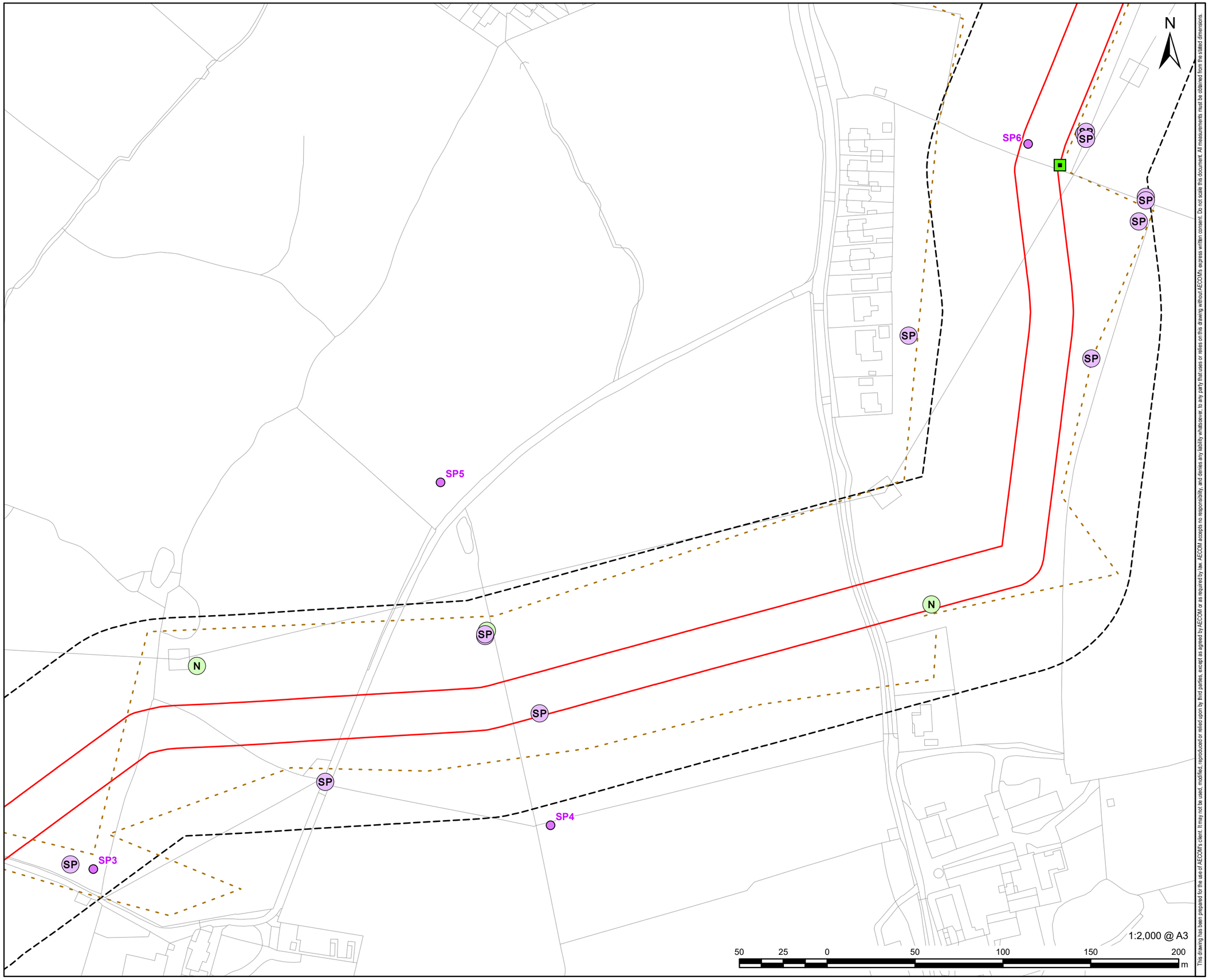

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LEGEND

- Construction and Operation Area
- Survey Area
- Stopping Point
- Automated Bat Detector Location
- October Night-time Bat Walkover (NBW) Survey Route

Bat Species

- Ms — Myotis sp.
- N — Noctule
- SP — Soprano Pipistrelle

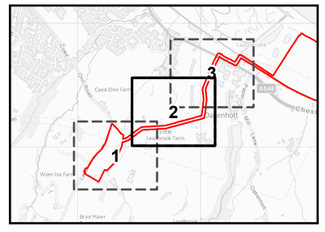

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FIGURE TITLE

October Night-time Bat Walkover (NBW) Survey Results
Sheet 2 of 3

FIGURE NUMBER

Figure 11G-8

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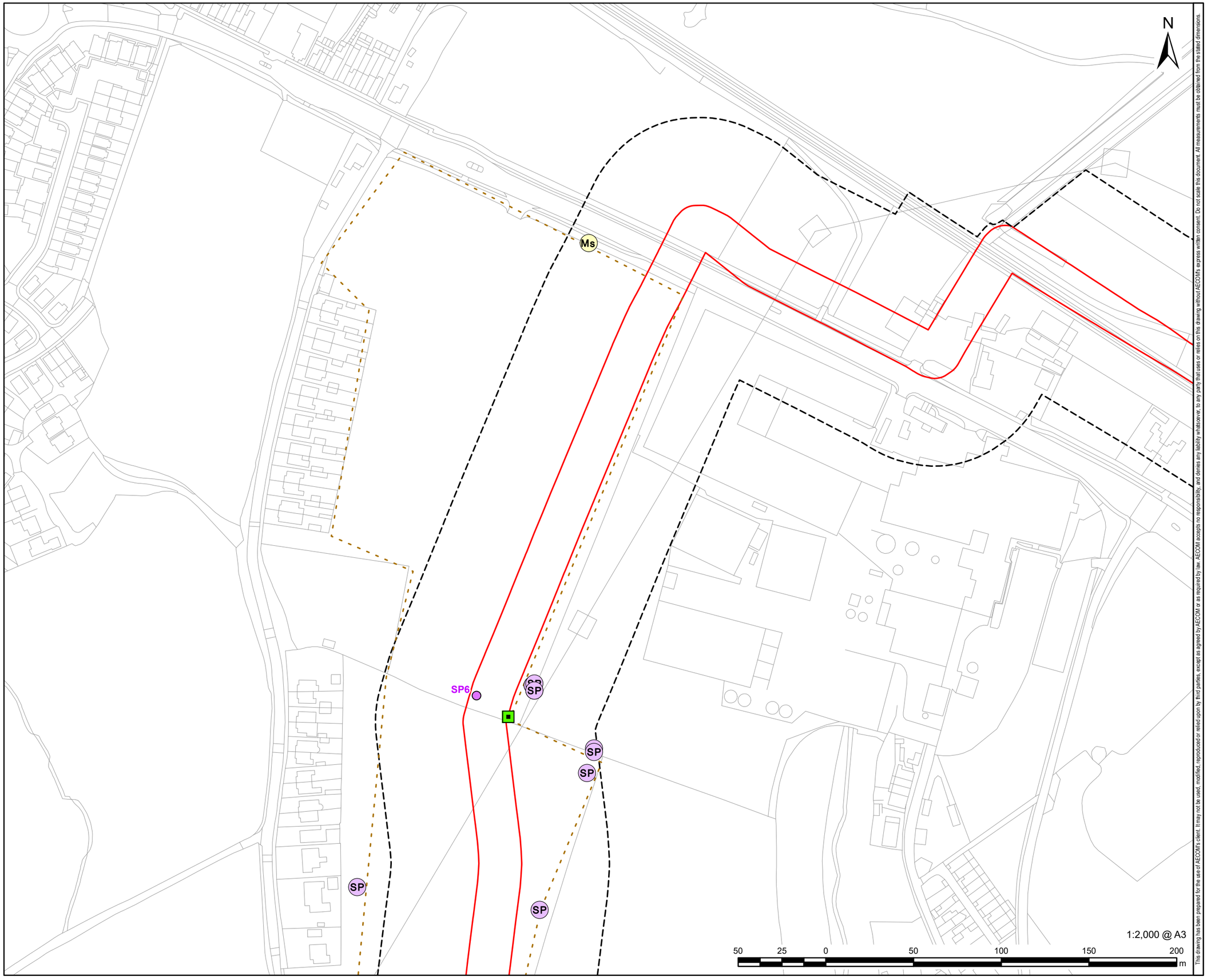

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LEGEND

- Construction and Operation Area
- Survey Area
- Stopping Point
- Automated Bat Detector Location
- October Night-time Bat Walkover (NBW) Survey Route

Bat Species

- Ms — Myotis sp.
- SP — Soprano Pipistrelle

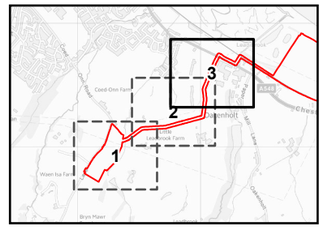

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FIGURE TITLE

October Night-time Bat Walkover (NBW) Survey Results
Sheet 3 of 3

FIGURE NUMBER

Figure 11G-8

Annex B: Photographs

Table B-1: PRA Survey Photographs

Feature	Photograph
Buildings 1a-1d -Negligible bat roost suitability	  

Feature	Photograph
Buildings 2a-2d -Negligible bat roost suitability	 

Feature	Photograph
Building 3 - Negligible bat roost suitability	 

Feature	Photograph
	
Building 4 - Negligible bat roost suitability	

Feature	Photograph
	
Building 5 - Negligible bat roost suitability	

Feature	Photograph
Building 6 - Negligible bat roost suitability	
Building 7 - Negligible bat roost suitability	

Feature	Photograph
Building 8 - Negligible bat roost suitability	
Building 9 - Negligible bat roost suitability	

Feature	Photograph
Building 10 - Negligible bat roost suitability	  

Feature	Photograph
Building 11 - Negligible bat roost suitability	 
Building 12 - Negligible bat roost suitability	

Feature	Photograph
Building 13 - Negligible bat roost suitability	
Building 14 - Negligible bat roost suitability	

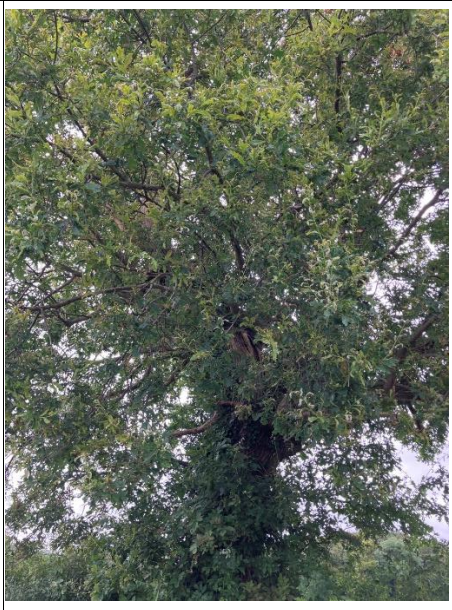
Feature	Photograph
Building 15 - Negligible bat roost suitability	
Building 16 - Negligible bat roost suitability	

Feature	Photograph
Building 17 - Negligible bat roost suitability	
Building 18 - Negligible bat roost suitability	
Building 19 - Negligible bat roost suitability	

Feature	Photograph
Building 20 - Negligible bat roost suitability	 
Building 21 - Negligible bat roost suitability	
Building A -- Negligible bat roost suitability	

Feature	Photograph
Building B - Negligible bat roost suitability	
Electrical Area. This is not a Building so not considered in Section 4. Included for information	
Tree A – identified as having PRFs.	

Feature	Photograph
Tree B – identified as having PRFs.	  

Feature	Photograph
Tree C	
Tree D	
Tree E	

Feature	Photograph
Tree Group A - identified as having PRFs.	

Annex E: NBW Results

Table E-1: NBW – May Results

Time	Species	Number of passes
21:56	Common pipistrelle	2
21:56 - 21:57	Soprano pipistrelle	2
21:58	Common pipistrelle	2
22:00	Soprano pipistrelle	2
22:05	Soprano pipistrelle	3
22:07 - 22:08	Common pipistrelle	2
22:11 - 22:13	Common pipistrelle	13
22:19	Common pipistrelle	1
22:24	Common pipistrelle	2
22:28 - 22:31	Soprano pipistrelle	32
22:30	Myotis sp.	1
22:32 - 22:35	Common pipistrelle	13
22:37 - 22:38	Soprano pipistrelle	14
22:38	Myotis sp.	1
22:41 - 22:42	Soprano pipistrelle	10
22:43	Myotis sp.	6
22:44 - 22:45	Soprano pipistrelle	3
22:48	Soprano pipistrelle	1
22:58 - 23:00	Soprano pipistrelle	6
23:00 - 23:01	Common pipistrelle	6
23:05	Soprano pipistrelle	2
23:06 - 23:07	Common pipistrelle	3
23:09 - 23:13	Common pipistrelle	12
23:20	Myotis sp.	4
23:24	Common pipistrelle	1
23:30	Common pipistrelle	2
23:32	Myotis sp.	2
23:36	Soprano pipistrelle	1
23:39 - 23:40	Common pipistrelle	6
23:52	Myotis sp.	2

Time	Species	Number of passes
23:52 - 23:53	Soprano pipistrelle	7
23:52	Myotis sp.	1
23:53 - 23:55	Myotis sp.	20
23:55	Common pipistrelle	3

Table E-2: NBW – July Results

Time	Species	Number of passes
21:40	Soprano pipistrelle	1
21:52	Common pipistrelle	4
21:54	Common pipistrelle	5
21:54 - 21:56	Soprano pipistrelle	6
22:03	Common pipistrelle	1
22:06	Soprano pipistrelle	1
22:06 - 22:07	Noctule	2
22:10	Common pipistrelle	2
22:13 - 22:14	Noctule	7
22:18	Noctule	1
22:23	Noctule	5
22:25	Leisler's bat	2
22:26 - 22:28	Common pipistrelle	6
22:30	Common pipistrelle	1
22:35	Common pipistrelle	3
22:37	Common pipistrelle	2
22:39 - 22:40	Common pipistrelle	6
22:40	Soprano pipistrelle	1
22:40 - 22:41	Myotis sp.	5
22:42	Common pipistrelle	3
22:43	Myotis sp.	4
22:50	Noctule	4

Time	Species	Number of passes
22:52	Common pipistrelle	1
22:59 - 23:00	Soprano pipistrelle	2
23:00	Myotis sp.	3
23:01 - 23:02	Soprano pipistrelle	2
23:03 - 23:05	Common pipistrelle	11
23:05	Soprano pipistrelle	3
23:06 - 23:07	Noctule	2
23:10	Soprano pipistrelle	2
23:11	Common pipistrelle	1

Table E-3: NBW – September Results

Time	Species	Number of passes
19:40	Soprano pipistrelle	2
19:41	Noctule	2
19:42	Soprano pipistrelle	4
19:42:00 - 19:43	Leisler's bat	5
19:43	Noctule	1
19:43 - 19:44	Serotine	6
19:47	Soprano pipistrelle	2
19:46	Serotine	1
19:50	Leisler's bat	2
19:52	Serotine	2
19:52	Soprano pipistrelle	2
19:52	Common pipistrelle	2
19:55	Noctule	2
19:55	Leisler's bat	2
19:55	Common pipistrelle	1
19:55	Serotine	1
19:55	Leisler's bat	1

19:57 - 19:58	Common pipistrelle	7
19:57 - 19:58	Myotis sp.	4
19:59	Soprano pipistrelle	2
20:12 - 20:13	Common pipistrelle	12
20:15	Common pipistrelle	1
20:21	Myotis sp.	2
23:35	Common pipistrelle	10

Table E-4: NBW – October Results

Time	Species	Number of passes
18:25	Noctule	1
18:33	Soprano pipistrelle	2
18:36	Soprano pipistrelle	1
18:38 - 18:39	Soprano pipistrelle	9
18:41	Soprano pipistrelle	1
18:45	Soprano pipistrelle	1
18:45	Myotis sp.	1
18:47	Soprano pipistrelle	1
18:51	Myotis sp.	1
18:51	Soprano pipistrelle	1
18:59	Myotis sp.	3
19:11	Soprano pipistrelle	1
19:24	Soprano pipistrelle	1
19:28 - 19:29	Soprano pipistrelle	3
19:30	Noctule	1
19:30	Soprano pipistrelle	1
19:36	Soprano pipistrelle	1
19:42	Noctule	2
19:57	Soprano pipistrelle	2
20:04	Soprano pipistrelle	3
20:32	Common pipistrelle	2

Time	Species	Number of passes
20:40	Myotis sp.	4
20:40	Common pipistrelle	2

Annex D: Automated Bat Detector Results

Table D-1: Bat Pass Summary for May 2024 – Location 1

	Common pipistrelle	Soprano pipistrelle	Nathusius' pipistrelle	Pipistrelle sp.	Noctule	Leisler's bat	Serotine	NLS	Brown long-eared bat	Myotis sp.	Lesser horseshoe bat	Greater horseshoe bat	Barbastelle
Total Passes	375	109	0	0	6	4	0	1	0	14	1	0	0
Passes per Day	75	21.8	0	0	1.2	0.8	0	0.2	0	2.8	0.2	0	0
Passes per Hour	8.8	2.6	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.3	0.0	0.0	0.0

Table D-2: Bat Pass Summary for May 2024 – Location 2

	Common pipistrelle	Soprano pipistrelle	Nathusius' pipistrelle	Pipistrelle sp.	Noctule	Leisler's bat	Serotine	NLS	Brown long-eared bat	Myotis sp.	Lesser horseshoe bat	Greater horseshoe bat	Barbastelle
Total Passes	172	202	0	0	0	2	3	0	0	88	1	0	0
Passes per Day	34.4	40.4	0	0	0	0.4	0.6	0	0	17.6	0.2	0	0
Passes per Hour	4.0	4.8	0.0	0.0	0.0	0.0	0.1	0.0	0.0	2.1	0.0	0.0	0.0

Table D-3: Bat Pass Summary for June 2024 – Location 1

	Common pipistrelle	Soprano pipistrelle	Nathusius' pipistrelle	Pipistrelle sp.	Noctule	Leisler's bat	Serotine	NLS	Brown long-eared bat	Myotis sp.	Lesser horseshoe bat	Greater horseshoe bat	Barbastelle
Total Passes	308	57	0	0	17	2	3	0	0	15	0	0	0
Passes per Day	61.6	11.4	0	0	3.4	0.4	0.6	0	0	3	0	0	0
Passes per Hour	7.7	1.4	0.0	0.0	0.4	0.1	0.1	0.0	0.0	0.4	0.0	0.0	0.0

Table D-4: Bat Pass Summary for June 2024 – Location 2

	Common pipistrelle	Soprano pipistrelle	Nathusius' pipistrelle	Pipistrelle sp.	Noctule	Leisler's bat	Serotine	NLS	Brown long-eared bat	Myotis sp.	Lesser horseshoe bat	Greater horseshoe bat	Barbastelle
Total Passes	168	127	0	0	13	0	0	0	4	60	0	0	0
Passes per Day	33.6	25.4	0	0	2.6	0	0	0	0.8	12	0	0	0
Passes per Hour	4.2	3.2	0.0	0.0	0.3	0.0	0.0	0.0	0.1	1.5	0.0	0.0	0.0

Table D-5: SM4 Bat Pass Summary for July 2024 – Location 1

	Common pipistrelle	Soprano pipistrelle	Nathusius' pipistrelle	Pipistrelle sp.	Noctule	Leisler's bat	Serotine	NLS	Brown long-eared bat	Myotis sp.	Lesser horseshoe bat	Greater horseshoe bat	Barbastelle
Total Passes	383	131	1	7	17	5	1	0	7	81	0	0	0
Passes per Day	76.6	26.2	0.2	1.4	3.4	1	0.2	0	1.4	16.2	0	0	0
Passes per Hour	8.5	2.9	0.0	0.2	0.4	0.1	0.0	0.0	0.2	1.8	0.0	0.0	0.0

Table D-6: Bat Pass Summary for July 2024 – Location 2

	Common pipistrelle	Soprano pipistrelle	Nathusius' pipistrelle	Pipistrelle sp.	Noctule	Leisler's bat	Serotine	NLS	Brown long-eared bat	Myotis sp.	Lesser horseshoe bat	Greater horseshoe bat	Barbastelle
Total Passes	249	291	0	51	48	2	0	0	19	151	0	0	0
Passes per Day	49.8	58.2	0	10.2	9.6	0.4	0	0	3.8	30.2	0	0	0
Passes per Hour	5.5	6.5	0.0	1.1	1.1	0.0	0.0	0.0	0.4	3.4	0.0	0.0	0.0

Table D-7: Bat Pass Summary for August 2024 – Location 1

	Common pipistrelle	Soprano pipistrelle	Nathusius' pipistrelle	Pipistrelle sp.	Noctule	Leisler's bat	Serotine	NLS	Brown long-eared bat	Myotis sp.	Lesser horseshoe bat	Greater horseshoe bat	Barbastelle
Total Passes	121	276	0.0	0.0	13	5	2	0	26	43	1	0	0
Passes per Day	24.2	55.2	0.0	0.0	2.6	1.0	0.4	0.0	5.2	8.6	0.1	0.0	0.0
Passes per Hour	2.2	5.0	0.0	0.0	0.2	0.1	0.0	0.0	0.5	0.8	0.0	0.0	0.0

Table D-8: Bat Pass Summary for August 2024 – Location 2

	Common pipistrelle	Soprano pipistrelle	Nathusius' pipistrelle	Pipistrelle sp.	Noctule	Leisler's bat	Serotine	NLS	Brown long-eared bat	Myotis sp.	Lesser horseshoe bat	Greater horseshoe bat	Barbastelle
Total Passes	57	66	0	0	50	27	2	0	32	177	0	0	0
Passes per Day	11.4	13.2	0.0	0.0	10	5.4	0.4	0.0	6.4	35.4	0.0	0.0	0.0
Passes per Hour	1.0	1.2	0.0	0.0	0.9	0.5	0.0	0.0	0.6	3.2	0.0	0.0	0.0

Table D-9: Bat Pass Summary for September 2024 – Location 1

	Common pipistrelle	Soprano pipistrelle	Nathusius' pipistrelle	Pipistrelle sp.	Noctule	Leisler's bat	Serotine	NLS	Brown long-eared bat	Myotis sp.	Lesser horseshoe bat	Greater horseshoe bat	Barbastelle
Total Passes	67	53	0	8	27	2	0	0	19	586	6	0	0
Passes per Day	13.4	10.6	0	1.6	5.4	0.4	0	0	3.8	117.2	1.2	0	0
Passes per Hour	1.1	0.9	0.0	0.1	0.4	0.1	0.0	0.0	0.3	9.6	0.1	0.0	0.0

Table D-10: Bat Pass Summary for October 2024 – Location 1

	Common pipistrelle	Soprano pipistrelle	Nathusius' pipistrelle	Pipistrelle sp.	Noctule	Leisler's bat	Serotine	NLS	Brown long-eared bat	Myotis sp.	Lesser horseshoe bat	Greater horseshoe bat	Barbastelle
Total Passes	164	53	0	0	31	32	0	0	7	20	3	0	0
Passes per Day	32.8	10.6	0	0	6.2	6.4	0	0	1.4	4	0.6	0	0
Passes per Hour	2.2	0.7	0.0	0.0	0.4	0.4	0.0	0.0	0.1	0.3	0.0	0.0	0.0

Table D-11: Bat Pass Summary for October 2024 – Location 2

	Common pipistrelle	Soprano pipistrelle	Nathusius' pipistrelle	Pipistrelle sp.	Noctule	Leisler's bat	Serotine	NLS	Brown long-eared bat	Myotis sp.	Lesser horseshoe bat	Greater horseshoe bat	Barbastelle
Total Passes	68	211	0	0	2	0	0	0	2	85	4	0	0
Passes per Day	13.6	42.2	0.0	0.0	0.4	0.0	0.0	0.0	0.4	17.0	0.8	0.0	0.0
Passes per Hour	0.9	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.1	0.0	0.0

Annex E: Method for Valuing Bats in Ecological Impact Assessment

Tables and valuation method for bat roosts, foraging and commuting habitats are based on the Bat Mitigation Guidelines (Ref 20).

Table E-1: Categorising bats by distribution and rarity

Rarity Category	South-West England & South Wales
Widespread	Common pipistrelle *Ppip* Soprano pipistrelle *Ppyg* Brown long-eared *Paur*
Widespread in many geographies, but not abundant in all	Whiskered *Mmys* Brandt's *Mbra* Daubenton's *Mdau* Natterer's *Mnat* Noctule *Nnyc*
Rarer or restricted distribution	Lesser horseshoe *Rhip* Serotine *Eser* Leisler's *Nlei* Nathusius' pipistrelle *Pnat*
Rarer Annex II species and very rare	Greater horseshoe *Rfer* Bechstein's *Mbec* Barbastelle *Bbar* Grey long-eared *Paus*

Source: Data taken from Table 3.1 from Reason and Wray (2023) Ref 20

It has not been possible to adopt the same matrix-based approach for valuing commuting routes (flightlines) and foraging areas. It is inherently more difficult to assess them and requires a higher degree of professional judgement. For example, some routes may be used only at certain times of year, and hence show low numbers of bat passes, but they may be critical routes to hibernation sites. As such, the importance of commuting and foraging areas should not be interpreted in isolation and should always be made by an experienced ecologist based on the overall knowledge of bat activity in the area. It is important to explicitly state the rationale for any professional judgement and be aware that any activity recorded will reflect the approach used to collect those data.

Geographical levels of importance are not defined by 'numbers of bats using a feature', because numbers of individuals can be difficult to determine, and colony sizes vary across species and regionally. Care is required to avoid undervaluing common and widespread species; again, the importance chosen should be justified. Assigning a geographical level of importance will be influenced by a number of factors:

- Levels of bat activity indicating reliance (or otherwise) on specific habitats/features as determined by surveys (relative bat activity across the features being surveyed).
- Landscape context: distribution and abundance of suitable foraging habitats, flight-lines and overall connectivity. For example, a 'strategic flyway' narrowed by encroaching development would increase the importance of connecting habitat, compared to a richly connected landscape with many alternatives.
- The species assemblage using a feature, and their conservation status (see Table 3.1: Rarity Category in the Bat Mitigation Guidelines).
- Whether any species present are edge-of-range.
- Proximity/connectivity to roosts (species and roost type influence value too)
- A species' habitat preferences and landscape context; for example, a development site without a waterbody may be of lower value to foraging Daubenton's bats than a neighbouring area supporting a large waterbody.
- The importance of roosts is assessed separately (on- and off-site). The proximity to roosts should not be over-emphasised when assessing the importance of flightlines, because this should be drawn out by evidence of use. That said, as bats spread out into the landscape from a roost, activity levels along a specific feature can decrease rapidly with increasing distance from a roost.
- Commuting routes may be more obvious at dusk than pre-dawn, as bats often return to roosts well before dawn and/or cross open spaces in darkness (multiple observations from radio-tracking: Davidson-Watts, pers. comm. and authors' own findings).
- Suitable habitat near to hibernation sites or spring/autumn swarming sites, and connections to such habitat, may not be identified through activity surveys and should not be overlooked.
- Where species are difficult to identify by call alone (e.g. *Myotis, Plecotus*), trapping (which may be supported by DNA analysis of droppings from captured bats) may be required to determine the species before assessing importance (though it is important that the project scale and impacts justify this intrusive technique).
- Where trapping is used as a methodology, each species' likelihood of trapping should be taken into account (e.g. high-flying species are less likely to be trapped unless lures are used). Caveats/limitations on data collection or interpretation must be taken into account.
- In all cases, the evidence of a level of foraging or commuting (flight) activity must be based on adequate survey; where surveys are incomplete, a precautionary approach should be adopted.