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Novers Hill

Bat Surveys Report

Bristol City Council

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Quality information

Prepared by	Checked by	Verified by	Approved by
KMi Graduate Ecologist TC Graduate Ecologist	BW Ecologist	CH Senior Ecologist	KW Associate Director

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Prepared for:

Bristol City Council

Prepared by:

AECOM Infrastructure & Environment UK Limited
3rd Floor, Portwall Place
Portwall Lane
Bristol BS1 6NA
United Kingdom

T: +44 117 901 7000
aecom.com

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1. Introduction

1.1 Background and Scope

AECOM Infrastructure and Environment UK Limited (AECOM) was commissioned by Bristol City Council to undertake a Preliminary Ecological Appraisal (PEA) at Novers Hill, Knowle West, in South Bristol (hereafter referred to as 'the Site'). The PEA identified potential for roosting and commuting/foraging bats at the Site and made recommendations for further surveys (AECOM, 2019).

The purpose of this assessment was to establish the value of the Site for roosting, commuting and foraging bats, identify potential adverse impacts that may constrain or influence the design and implementation of the development, and to provide general mitigation advice.

1.2 Site Location and Proposed Development Description

The Site is located in the south of Bristol, the central grid reference for the Site is ST 58286 69563, and it has an area of approximately 7.2 ha. The primary habitat on the Site comprises a horse-grazed field of semi-improved grassland with parcels of dense and scattered scrub, scattered trees and a group of stables. The Site is bounded by residential areas to the east and a steeply sloping grazed area of grassland and scrub that leads to Pigeonhouse Stream and the A4174 to the west. Further residential development is present beyond the A4174.

The proposed works, hereafter referred to as 'the Proposed Development', includes the clearance of existing habitats and demolition of the stables within the Site to facilitate the construction of a new residential development comprised of a number of houses and apartments with a high quality public open space.

The Proposed Development is anticipated to include landscaping including green corridors, street trees, swales, rain gardens and ornamental planting. Exact details including planting schedules are yet to be confirmed.

1.3 Objectives

The objectives of this study were:

- To identify the status, distribution, and assemblage of bat species within the Site through bat activity surveys; and,
- To determine the presence/likely absence, status and distribution of bat roosts in structures and trees within the Site through inspection surveys and bat emergence surveys.

The purpose of this report is to inform the design of the Proposed Development. The report outlines any findings from the surveys and puts forward potential options for mitigation (including avoidance or compensation) of the potential impacts of the Proposed Development (if required).

1.4 Scope of Works

Bat Surveys undertaken at the Site were as follows:

- Desk Study,
- Preliminary bat roost assessment of trees and buildings on 23 July 2019;
- Bat emergence/re-entry surveys in August and September 2019;
- Bat activity surveys comprising walked transects between April and October 2019; and,
- Anabat Swift static automated detector surveys between April and October 2019.

1.5 Bat Legislation and Planning Policy

All UK native bat species and their roosts (whether bats are present or not) are protected under the Conservation of Habitats and Species Regulations 2018 and under the Wildlife and Countryside Act 1981 (as amended). Under this legislation it is 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.

A bat roost is defined as “any structure or place, which is used for shelter or protection” or a “breeding site or resting place”. Because bats commonly use the same roosts at particular times of the year after periods of absence, the roost is protected whether or not bats are resident.

Given the above legislation the potential presence of bats at a site represents a material consideration in the planning process. Even where planning permission is not required there is still a legal responsibility placed on the developer to ensure that a Natural England licence is obtained to cover any works that have the potential to result in an offence under the above legislation.

Seven of the UK bat species are listed as species of principal importance within Section 41 of the NERC Act (2006): namely, the barbastelle bat (*Barbastella barbastellus*), Bechstein’s bat (*Myotis bechsteinii*), noctule bat (*Nyctalus noctula*), soprano pipistrelle (*Pipistrellus pygmaeus*), brown long-eared bat (*Plecotus auritus*), greater horseshoe bat (*Rhinolophus ferrumequinum*) and lesser horseshoe bat (*Rhinolophus hipposideros*).

A summary of relevant national and local planning policy is provided within the Preliminary Ecological Appraisal (PEA) (AECOM, 2019) prepared for the Site.

1.6 European Protected Species Mitigation Licences

Although the law provides strict protection to bats, it also allows this protection to be set aside (derogated) under Regulation 53 of the Habitats Regulations through the issuing of European Protected Species Mitigation Licences (EPSML) for the purpose of preserving public health; public safety; other imperative reasons of overriding public interest, including those of a social or economic nature and beneficial consequences of primary importance for the environment. However, in accordance with the requirements of the Habitats Regulations a licence can only be issued where the following requirements are satisfied:

a) there is no satisfactory alternative; and,

b) the action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range.

In England, EPSML applications are currently determined by Natural England and take up to five working days to acknowledge receipt and then at least 30 working days to determine. Natural England will only accept applications for schemes where planning consent has been granted and all ecology relevant conditions have been discharged.

1.7 Good Practice

Current guidance stresses the need for developers to maintain protected species within their current range at a favourable status. To achieve this, developers are often required to include mitigation strategies with their applications that describe how the project will identify and remediate potential adverse effects. The hierarchy of mitigation in descending order of preference is to avoid, mitigate and compensate (CIEEM, 2018).

1.8 Quality Assurance

This survey and subsequent report were undertaken in line with AECOM’s Integrated Management System (IMS). The IMS places great emphasis on professionalism, technical excellence, quality, environmental and Health and Safety management. All staff members are committed to establishing and maintaining this certification to the international standards BS EN ISO 9001:2015 and 14001:2015 and BS OHSAS 18001:2007. In addition, the IMS requires careful selection and monitoring of the performance of all sub consultants and contractors.

All AECOM Ecologists who worked on this project are members of (at the appropriate level) the Chartered Institute of Ecology and Environmental Management (CIEEM) and follow their code of professional conduct (CIEEM, 2019) when undertaking ecological work.

2. Methodology

2.1 Desk Study

The PEA (AECOM, 2019) prepared for the Site comprised a desk study undertaken during April 2019. As part of this, the following resources were consulted:

- The online Multi Agency Geographic Information for the Countryside (MAGIC) database to identify statutory designated sites and information on habitats and habitat connections relevant to potential Protected and Priority bat species constraints within 2 km, extended to 10 km for statutory sites designated for bats. The MAGIC database was also consulted to determine whether any EPSMLs for bats have been issued by Natural England within 2 km of the Site; and,
- Historical records of Protected and Priority bat species and non-statutory designations that reference bats within 2 km of the Site were purchased from Bristol Regional Environmental Record Centre (BRERC).

2.2 Field Surveys

All bat surveys were undertaken with reference to the Bat Conservation Trust's (BCT) 'Good Practice Guidelines 3rd Edition' (Collins, 2016).

2.2.1 Bat Roost Suitability Surveys

2.2.1.1 Preliminary Roost Assessment

All buildings, structures and trees that could potentially be directly or indirectly impacted by the Proposed Development (subject to access) were appraised for their potential to support roosting bats by a suitably experienced and licensed AECOM ecologist. This was undertaken on 23 July 2019 and comprised a ground-based visual assessment using close focussing binoculars and a high-powered torch to search for features with suitability for roosting bats, including:

- Holes, cankers, cracks, callus rolls, splits or cavities within trees;
- Lifted plates of bark;
- Crevices under thick-stemmed ivy;
- Crevices under lifted roof tiles, lead flashing, soffit boxes or barge boards;
- Broken/missing roof tiles;
- Cracks and crevices, cavities or holes within brick, stone or woodwork; and,
- Dark, sheltered and undisturbed spaces (such as loft voids or disused buildings).

During the assessment a ground-based search of trees and an internal search of the buildings was also undertaken for any evidence of bat use, including:

- Presence of any live or dead bats;
- Bat droppings within a feature, around an entrance to a feature, or underneath a feature;
- Feeding remains;
- Stains around crevice entrance holes;
- Scratch marks or smoothly polished surfaces around entrance holes; and,
- Odours or noise characteristic of bats.

Based on the results of the preliminary roost assessment, buildings and trees were categorised as having Negligible, Low, Moderate or High suitability for roosting bats or noted as a confirmed roost (Appendix B; Figure 1), in accordance with the criteria detailed in Table 1.

Table 1: Criteria for Assessing the Suitability of Features for Roosting Bats

Suitability for Roosting Bats	Description
Confirmed	A feature within which bats are seen to be present (either live bats, or bat carcasses) or heard 'chattering' inside will be classified as a confirmed roost. In addition, any feature/structure found to contain droppings during inspections will in the first instance be considered as a confirmed roost. N.B. In some cases it may be appropriate to revise this assessment following further survey (e.g. for buildings containing low numbers or old droppings and showing no evidence of use during emergence surveys).
High	A feature which, due to its size, depth, shape, orientation or other physical properties (such as ability to maintain a constant temperature, accessibility for bats) is considered to be ideal for use by bats. Potential feeding remains, urine staining or scratch marks (in the absence of droppings) within or around the feature are likely to indicate presence of a bat occupation and therefore suggest high potential that a roost is present. In the absence of such signs, assigning a feature high potential will also be informed by the surveyor's knowledge of bat ecology and preferred roost types (relative to the feature being assessed). The quality of the surrounding habitat for bats will also be considered.
Moderate	A feature which would be considered ideal for use by bats were it not for one or more key factors which limit its potential. For example, an ideal feature in sub-optimal surrounding habitat (e.g. within an area of predominately hard standing) may be considered to have moderate potential.
Low	A tree/structure containing features where use by bats cannot be ruled out but is considered unlikely based on size, depth, construction aspect, habitat location etc.
Negligible	A tree/structure with no features capable of supporting roosting bat species.

Source: Category descriptions drawn from Collins, 2016 to be applied using professional judgement

2.2.1.2 Emergence/Re-Entry Surveys

Based on the results of the preliminary roost assessment of trees, emergence/re-entry surveys were required to determine the presence or likely absence of bat roosts within two trees located on the Site. In accordance with best practice guidance (Collins, 2016), three surveys were undertaken for the tree with high suitability and two surveys were undertaken for the tree with moderate suitability. Further details on these surveys are provided below.

Based on the results of the preliminary roost assessment of buildings, an emergence/re-entry survey was required to determine the presence or likely absence of bat roosts within the stable buildings located on the Site. A re-entry survey was therefore carried out on 16 August 2019. This consisted of two surveyors at opposite ends of the stable buildings, recording the presence of any bats on Site. If any bats emerged from or re-entered the buildings, this would be noted. Incidental records of bats foraging and commuting across the Site were also recorded.

The survey effort required to give confidence in a negative result is determined by the potential of a structure to support roosting bats, as detailed in Table 2.

Table 2: Recommended Survey Effort for Emergence/Re-entry Surveys

Roosting Suitability	Survey Effort for Trees	Survey Effort for Buildings
High	Three separate survey visits. At least one dusk emergence and a separate dawn re-entry survey.	Three separate visits. At least one dusk emergence and a separate dawn re-entry survey.
Moderate	Two separate survey visits. One dusk emergence and a separate dawn re-entry survey.	Two separate survey visits. One dusk emergence and a separate dawn re-entry survey.
Low	No further surveys required.	One survey visit. One dusk emergence or dawn re-entry survey.
Negligible	No further surveys required.	No further surveys required.

Source: Category descriptions drawn from Collins, 2016 to be applied using professional judgement

Emergence surveys started 15 minutes before sunset and continued for approximately 1.5 hours after sunset. Dawn re-entry surveys started 1.5 hours before sunrise and continued until approximately 15 minutes after sunrise. Each surveyor was equipped with an Elekon Batlogger M to detect and record bat activity.

Any bats observed emerging from or returning to the trees/structures were recorded, along with details on their roost location. In addition, incidental notes of general bat activity from within the Site were also made by each of the surveyors. All recordings of bat passes were subsequently analysed using Elekon's BatExplorer software to identify the species of bat present. Dates, times and weather conditions of the emergence/re-entry surveys are provided in Table 3.

Table 3: Environmental Conditions During Emergence/Re-entry Surveys

Structure/Tree ID	Date	Sunset/ Sunrise Times	Start/Finish Times	Temperature (°C)	Wind Speed (Beaufort)	Cloud Cover (%)	Precipitation
Stable buildings	16 August 2019	05:57	04:20/06:12	16	3	100	Nil
Tree 1	06 August 2019	20:50	20:32/22:22	17.5/15.6	8	80	Light rain prior to survey
Tree 1	27 August 2019	06:14	04:41/06:19	15	0	20	Nil
Tree 1	16 September 2019	19:23	19:03/20:53	15	6	80	Light rain prior to survey
Tree 2	07 August 2019	05:42	04:08/05:45	14	7	100	Nil
Tree 2	28 August 2019	20:06	19:51/21:36	13	6	100	Light rain prior to survey

2.2.2 Bat Activity Surveys

The number of survey visits, transects and automated static detectors used was determined by considering the size of the Site and its relative habitat quality, with reference to the current BCT guidance (Collins, 2016). The Site was assigned to one of the categories detailed in Table 4. It was concluded that the Site provides Moderate habitat suitability for foraging/commuting bats, however, the Site's connectivity to other habitats in the wider landscape is limited due to the urban location of the Site. This limits the number and diversity of bats capable of being supported. Therefore, one static detector deployment per month, in addition to the monthly transect surveys between April and October, was considered sufficient to survey bat activity within the Site. Owing to the size of the Site, a single transect route was sufficient to cover all habitats within the Site.

Table 4: Commuting and Foraging Habitat Suitability Categories

Commuting and Foraging Suitability	Description
High	Continuous high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees, and woodland edge. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland. Site is close to and connected to known roosts.
Moderate	Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland, or water.
Low	Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or un-vegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitats. Suitable, but isolated habitat that could be used by small number of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub.
Negligible	Negligible habitat features on Site likely to be used by commuting or foraging bats.

Source: Category descriptions drawn from Collins, 2016 to be applied using professional judgement

2.2.2.1 Walked Transect Surveys

Walked transect surveys were undertaken once a month between April and October 2019. Dusk surveys commenced at sunset and lasted for approximately two hours; this coincides with peak activity periods as bats emerge and disperse from their roosts. In accordance with guidance one dawn survey was also undertaken, this began two hours before sunrise and finished at sunrise. The surveys involved walking a defined transect route that provided representative coverage of the habitats of potential value to bats (as shown in Appendix B; Figure 2). The transect route was walked at a steady pace by two suitably qualified AECOM ecologists.

The direction of the transect varied during survey visits in order to sample different areas of the Site at different times of night; the transect route was also walked twice during each survey. These measures reduce the likelihood

that bat activity at a particular location and time would be overlooked. All bat activity detected during the survey was recorded and GPS mapped using an Elekon BatLogger M handheld bat detector, along with notes on behaviour/direction if the bat was seen. Identification of bat species recorded during activity surveys was later verified by analysing bat call recordings using Elekon BatExplorer software. Reference was made to bat call identification guidance (Russ, 2012) where necessary.

All survey visits were completed during mostly suitable weather conditions, i.e. no rain or strong wind and with temperatures above 10°C at sunset, as detailed in Table 5.

Table 5: Environmental Conditions During Walked Transect Surveys

Date	Sunset/Sunrise Times	Start/ Finish Times	Temperature (°C)	Wind Speed (Beaufort)	Cloud Cover (%)	Precipitation
25 April 2019	20:23	20:23/22:26	11	2	20	Nil
09 May 2019	20:46	20:46/22:46	9	3	40	Nil
05 June 2019	21:22	21:22/23:28	13	1	40	Nil
10 July 2019	21:26	21:27/23:26	19	2	90	Nil
27 August 2019	20:08	20:08/22:10	18	1	100	Nil
28 August 2019	06:14	04:08/06:15	16	0	80	Nil
17 September 2019	19:24	19:20/21:24	15	1	10	Nil
03 October 2019	18:44	18:44/20:44	16	1	100	Light drizzle throughout with moderate rain for the final 24 minutes

2.2.2.2 Automated Detector Surveys

One Anabat Swift static automated detector was deployed monthly during April to October 2019 at a total of seven different locations within the Site (a different location each month). These detectors automatically switch on half an hour before sunset and switch off half an hour after sunrise, recording every time a bat passes the detector throughout this survey period. The locations of the automated detectors were varied during each monitoring period to ensure sufficient coverage of all potentially important flight lines and targeted habitats more likely to be removed/impacted by the Proposed Development. Anabat Swift locations are shown on Figure 2 (Appendix B).

In accordance with best practice guidance, the Anabat was left in situ for a minimum of five nights per monitoring period. Table 6 provides details of the Anabat locations and dates deployed during the monthly monitoring periods and should be read in conjunction with Figure 2 (Appendix B).

Table 6: Automated Detector Survey Dates and Locations

Month	Location Number	Dates	Minimum Nightly Temperature Range (°C)
April	1	24-29 April 2019	5-8
May	2	09-16 May 2019	2-7
June	3	05-10 June 2019	7-9
July	4	10-16 July 2019	10-15
August	5	27 August – 01 September 2019	10-15
September	6	17-22 September 2019	6-10
October	7	03-07 October 2019	6-11

Bat call recordings collected by the Anabat Swift automated detectors were analysed using Titley Scientific Anabat Insight software. This 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 detector file made up of bat pulses of a single species; this can be one bat in a file or several bats in a file. The number of passes recorded on automated detectors 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.

For the purposes of analysis, bat activity has been quantified according the number of bat passes and time (hour slots). The hourly totals are averaged across the duration of the night (for example, ten hourly slots between 20:00 and 06:00). This permitted a Bat Activity Index (BAI) to be calculated for each location. This analysis provides an indication of:

- Seasonal variation in species activity and composition at the Site;
- Relative levels of bat activity; and,
- Potential roosting sites, important foraging areas and commuting routes.

BAI values for the Site are calculated by averaging the number of bat passes/hr over the number of nights each detector recorded for. This data was used to calculate the BAI for each location and gives a relative indication of bat abundance and activity at a particular location and time.

There is currently no published guidance on the categorisation of bat activity levels based on the number of bat passes. The following relative scale for within this Site, guided by professional judgement, has therefore been used in this report:

- High Activity = an average of greater than 40 passes per hour;
- Moderate Activity = an average of between 10 and 39 passes per hour;
- Low Activity = an average of between 3 and 9 passes per hour; and,
- Very Low Activity = an average of less than 3 passes per hour.

2.3 Limitations

The aim of a desk study is to help characterise the baseline context of a proposed development 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 study area. Likewise, the presence of records for particular species does not automatically mean that these still occur within the area of interest or are relevant in the context of the Proposed Development.

The bat roosting and bat activity surveys were predominantly undertaken during optimal weather conditions and at an appropriate time of year for such surveys. There was, however, some precipitation during the October transect, this included light drizzle throughout the survey and moderate rain for the final 24 minutes. This is not considered to have detrimental effects on the survey data collected as bat activity continued throughout. There was also light rain prior to three emergence/re-entry surveys. However, this is not considered to be detrimental to the survey results as bat activity continued throughout the surveys. During the static detector surveys, there were lower temperatures experienced on several nights throughout the season. Bat activity may therefore have been lower during these nights. This has been taken into consideration when analysing the survey results.

Certain groups of bats, including “big bats” (noctule, serotine (*Eptesicus serotinus*) and Leisler’s bat (*Nyctalus leislerii*), which have been grouped together as NSL), Myotis bats (*Myotis* sp.), and long-eared bats (*Plecotus* sp,), can be difficult or impossible to identify to species level based on call sonogram recordings alone. Recordings from bats belonging to one of these genera have therefore been grouped as such within this report.

Bats are highly mobile animals that, in addition to being faithful to certain preferred roosting locations, will also frequently move between sites and establish new roost sites. These surveys therefore only provide a snapshot of current roosting behaviour at the Site, in addition to 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 (April – October 2021).

3. Results

3.1 Desk Study

No statutory sites designated for bats were identified within 10 km of the Site.

Records of at least eight bat species were received from BRERC during the desk study, including common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle, Nathusius' pipistrelle (*Pipistrellus nathusii*), lesser horseshoe bat, serotine, noctule, Leisler's bat, and brown long-eared bat.

The desk study also returned eleven records of bat roosts within 2 km of the Site boundary. These include eight common pipistrelle roosts, one Nathusius' pipistrelle roost, and two unidentified bat species roosts. No records of bat EPSMLs were shown on the MAGIC website within 2 km of the Site boundary.

3.2 Field Surveys

3.2.1 Bat Roost Suitability Surveys – Trees

During the ground-based preliminary roost assessment of trees within the Site, three trees were identified as having bat roosting suitability. One of the trees was classified as having low bat roost suitability and therefore required no further surveys. Of the remaining trees, one was classified as having high bat roost suitability and one as moderate bat roost suitability. Table 7 provides details of the assessed trees, and their locations are shown on Figure 1 (Appendix B).

Table 7: Results of Preliminary Bat Roost Potential Survey of Trees within the Site

Tree ID	Species	Feature(s)	Bat Roost Suitability
Tree 1	Apple (*Malus sp.*)	Large woodpecker hole at 3 m on the north side.	High
Tree 2	Sycamore (*Acer pseudoplatanus*)	A fissure where two branches meet, forming a crevice at 2 m high on the south side.	Moderate
Tree 3	Unknown - dead tree	Several lifted plates of bark up the entire trunk, where the bark of this dead tree is peeling off.	Low

3.2.1.1 Emergence/Re-Entry Surveys – Trees

Three emergence/re-entry surveys were undertaken on Tree 1 due to this tree being classified as having high suitability for roosting bats. Two surveys were undertaken on Tree 2 which was classified as having moderate suitability for roosting bats. During these surveys, no bats were observed emerging from or re-entering the trees.

There were several incidental recordings of bats foraging and commuting across the Site during the emergence/re-entry surveys. These included common pipistrelle, soprano pipistrelle and noctule bats.

3.2.2 Bat Roost Suitability Surveys – Buildings

At the north of the Site there are three lines of joined horse stables/shelters. These have mostly block walls with some sections of corrugated metal or plywood panelling. They have flat roofs which are constructed from various materials including corrugated metal, corrugated plastic and corrugated asbestos-type material. A few small, suitable crevices were found within several of the stables during the preliminary roost assessment. These could be accessed by bats through the open stable doors/windows within the courtyard between the stables. No evidence of bat use was observed during the preliminary roost assessment survey, however, this survey was limited due to most of the floors being either covered in hay or recently swept. This group of buildings were therefore precautionarily assessed as having low suitability for roosting bats, and subsequently warranted further survey.

3.2.2.1 Emergence/Re-Entry Survey – Buildings

One dawn re-entry survey was carried out on the stable buildings in the north of the Site on 16 August 2019. One common pipistrelle was seen to fly over the stable buildings at 05:22 (approximately 40 minutes before sunrise) but no other bat activity was recorded during this survey. No bats were seen to re-enter the stable buildings.

3.2.3 Bat Activity Surveys

3.2.3.1 Walked Transect Surveys

Results of the walked transect surveys are shown on Figures 3.1 – 3.8 (Appendix B). Table 8 includes the count of bat passes for each species, or species group, per month. A summary of the bat activity recorded during each survey is provided in Table 9.

Table 8: Walked Transects – Species Composition and Passes per Month

Species	Total Species Passes	Percentage of all Bat Passes	April Bat Passes	May Bat Passes	June Bat Passes	July Bat Passes	August Dusk Bat Passes	August Dawn Bat Passes	September Bat Passes	October Bat Passes
Common pipistrelle	116	82.27	9	8	16	21	25	3	28	6
Soprano pipistrelle	9	6.38	2	0	0	0	0	2	0	5
Noctule	1	0.71	0	0	0	0	1	0	0	0
Serotine	11	7.80	0	1	0	2	8	0	0	0
NSL*	2	1.42	0	0	0	0	0	2	0	0
Myotis species	1	0.71	0	0	0	0	1	0	0	0
Long-eared bat species	1	0.71	0	0	1	0	0	0	0	0
All Species	**141**	**-**	**11**	**9**	**17**	**23**	**35**	**7**	**28**	**11**

**NSL = Noctule, Serotine or Leisler's bat*

Table 9: Walked Transect Survey Results

Survey Month	Bat Activity Description	Species Encountered
April 2019	Eleven records of bat activity were noted. These began half an hour after sunset (20:59) and finished almost two hours after sunset (22:20). The majority of activity recorded was foraging common pipistrelles, which were found throughout the Site along tree lines and flying over areas of scrubland and grassland. Two soprano pipistrelles were also recorded foraging over areas of scrubland around the centre and southern end of the Site.	Common pipistrelle Soprano pipistrelle
May 2019	Nine records of bat activity were noted. These began 26 minutes after sunset (21:12) and continued until one hour and 50 minutes after sunset (22:35). These records are dominated by foraging common pipistrelles, which were found around the centre and southern end of the Site along tree lines and over areas of grassland. One brief pass of serotine was recorded in the centre of the Site over an area of scrubland.	Common pipistrelle Serotine
June 2019	Seventeen records of bat activity were noted. These began 25 minutes after sunset (21:47) and the last recording of bat activity was two hours after sunset (23:24). These were mostly foraging common pipistrelles, which were found throughout the Site along tree lines and flying over areas of scrubland and grassland. One long-eared bat was recorded over an area of grassland along the western boundary of the Site at 23:22.	Common pipistrelle Long-eared bat
July 2019	23 records of bat activity were noted. These began 14 minutes after sunset (21:41), the last record was nearly two hours after sunset (23:22). These were mostly foraging common pipistrelles, which were found throughout the Site along tree lines and flying over areas of scrubland and grassland. There are also two records of noctule along tree lines at 21:46 and 22:02, and two records of serotine foraging over areas of scrubland and grassland in the centre of the Site at 22:05 and 22:21. One unidentified species of bat was recorded along the western boundary of the Site at 21:41.	Common pipistrelle Noctule Serotine
August 2019 (dusk)	35 records of bat activity were noted. These began 24 minutes after sunset (20:32) and finished two hours after sunset (22:07). These were mostly foraging common pipistrelle and serotine which were found throughout the Site along tree lines and over areas of Scrubland, grassland and hard	Common pipistrelle Noctule Serotine Myotis

Survey Month	Bat Activity Description	Species Encountered
	standing. Noctule and myotis were both recorded foraging over areas of grassland in the southern end of the Site once.	
August 2019 (dawn)	Seven records of bat activity were noted. These began one hour before sunrise (05:14) and continued until 17 minutes before sunrise (05:57). Bats recorded during this survey included foraging common and soprano pipistrelles which were found in the centre and southern end of the Site along tree lines and flying over areas of grassland. One commuting NSL* was recorded over an area of open grassland in the southern end of the Site at 05:32, and one foraging NSL was recorded over an area of grassland in the north-east of the Site at 05:57.	Common pipistrelle Soprano pipistrelle NSL
September 2019	28 records of bat activity were noted. These began 33 minutes after sunset (19:57) and finished approximately two hours after sunset (21:22). Bats recorded during this survey were all foraging and commuting common pipistrelles, which were found throughout the Site along tree lines and flying over areas of scrubland and grassland.	Common pipistrelle
October 2019	Eleven records of bat activity were noted. These began 44 minutes after sunset (19:28) and continued until an hour and 18 minutes after sunset (20:02). The majority of these bats were foraging and were all common pipistrelle and soprano pipistrelle. The bats were mostly recorded along tree lines and over an area of grassland around the centre and northern end of the Site.	Common pipistrelle Soprano pipistrelle

*NSL = Noctule, Serotine or Leisler's bat

3.2.3.2 Automated Detector Surveys

A monthly summary of bat activity recorded by the static detectors across the season is presented in Table 10. Detailed results from each of the monitoring periods are shown in tables within Appendix A. Table 11 displays the Bat Activity Index (BAI) (passes/hour) for each species or species group.

Table 10: Automated Detector Survey Results Summary

Month	Location Number	Number of Bat Passes per Species During Each Deployment									Total Number of Bat Passes	Nightly Average (No. of Recording Nights)
		Common pipistrelle	Soprano pipistrelle	Noctule	Serotine	Leisler's bat	NSL	Lesser Horseshoe bat	Myotis sp.	Long-eared bat		
April	1	185	5	5	0	0	0	0	0	1	196	39.20 (5)
May	2	924	3	29	1	0	0	0	0	3	960	160 (6)
June	3	53	0	20	3	0	0	0	0	1	77	15.40 (5)
July	4	1016	2	170	68	0	0	0	1	2	1259	209.83 (6)
August	5	38	3	1	1	2	0	1	1	0	47	9.40 (5)
September	6	449	4	9	0	0	1	0	2	0	469	93.80 (5)
October	7	1462	6	5	5	0	0	8	17	0	1503	300.60 (5)
	Total	**4127**	**23**	**239**	**78**	**2**	**1**	**9**	**21**	**7**	**4511**	**121.92**
Percentage of all species records (%)		**91.49**	**0.51**	**5.30**	**1.73**	**0.04**	**0.02**	**0.20**	**0.47**	**0.16**		

**NSL = Noctule, Serotine or Leisler's bat*

A total of at least eight species of bat (NSL, Myotis sp. and long-eared bats have not been identified to species level) were recorded during the automated detector surveys. The vast majority of this activity was from common pipistrelle, followed by noctule. The species recorded least frequently was Leisler's bat. A rarer species of bat, the lesser horseshoe, was recorded on nine occasions (once in August and eight times in October).

Table 11: Automated Detector Survey Results – BAI per Hour for Each Species (Per Month and in Total) and Species Composition (Shown by Activity Level)

Month	Dates	Location Number	No. of Recording Nights	Common pipistrelle	Soprano pipistrelle	Noctule	Serotine	Leisler's bat	NSL**	Lesser horseshoe bat	Myotis sp.	Long-eared bat	All Species
April	Dusk 24 Apr – Dawn 29 Apr	1	5	3.70	0.10	0.10	0	0	0	0	0	0.02	3.92
May	Dusk 9 May – Dawn 15 May	2	6	19.25	0.06	0.60	0.02	0	0	0	0	0.06	19.99
June	Dusk 5 June – Dawn 10 June	3	5	1.33	0	0.50	0.08	0	0	0	0	0.03	1.94
July	Dusk 10 July – Dawn 16 July	4	6	21.17	0.04	3.54	1.42	0	0	0	0.02	0.04	26.23
August	Dusk 27 Aug – Dawn 1 Sept	5	5	0.84	0.07	0.02	0.02	0.04	0	0.02	0.02	0	1.03
September	Dusk 17 Sept – Dawn 22 Sept	6	5	8.16	0.07	0.16	0	0	0.02	0	0.04	0	8.53
October	Dusk 3 Oct – Dawn 8 Oct	7	5	22.49	0.09	0.08	0.08	0	0	0.12	0.26	0	23.12
Average BAI* per hour				**11.76**	**0.07**	**0.68**	**0.22**	**0.01**	**<0.01**	**0.03**	**0.06**	**0.02**	**12.85**
Activity Level				**Moderate**	**Very Low**	**Very Low**	**Very Low**	**Very Low**	**Very Low**	**Very Low**	**Very Low**	**Very Low**	**Moderate**

**Bat Activity Index = Bat Pass / Average Survey Hours, **NSL = Noctule, Serotine or Leisler's bat*

4. Conclusions and Recommendations

4.1 Assessment of the Site for Bats

4.1.1 Bat Tree Roost Suitability

Three trees within the Site were classified as having suitability for roosting bats. One tree was considered to have low suitability to support roosting bats (Tree 3) and therefore no further survey was required of this tree. The additional two trees were classified as having high (Tree 1) and moderate (Tree 2) suitability. No bats were seen to emerge from or re-enter these trees during the emergence/re-entry surveys, suggesting that the trees did not support roosting bats at the time of the surveys. However, as bats are mobile animals there is the potential that the suitable roosting features on these trees can be used in the future or are used irregularly by bats. No further surveys are required for any tree on the Site with regards to bats, although precautions are required where felling/pruning is required (see Section 4.2.1).

4.1.2 Bat Building Roost Suitability

No bats were found to be roosting in the stable buildings on Site. Destruction of these buildings would, therefore, not result in the loss of a bat roost, avoiding the potential killing, injuring or disturbing of a bat or destruction of a resting place. No further surveys are required for the buildings although precautions are required during their demolition and removal (see Section 4.2.2).

4.1.3 Bat Commuting/Foraging Activity

The majority of bat activity within the Site was from common and widespread bat species, namely common pipistrelle and noctule. However, activity from rarer species, including lesser horseshoe and Leisler's bats, was also recorded. Taking into consideration temporal variations in bat activity across the active season and the different weather conditions experienced during each monitoring period, the transect and automated detector survey results are considered to show that the bat activity was highest in the north of the Site around Static Detector Locations 4 (26.23 BAI) and 7 (23.12 BAI). Moderate activity was also recorded at Static Detector Location 2 (19.99 BAI) in the south of the Site, along with low activity at Static Detector Location 6 (8.53 BAI). These areas are therefore considered to provide more important foraging/commuting habitats for bats. The centre of the Site, bordering the school, contained the lowest levels of bat activity. Static Detector Locations 1 (3.92 BAI), 3 (1.94 BAI), and 5 (1.03 BAI) were located here and recorded low or very low numbers of bats.

Common pipistrelle was the most commonly recorded species in the Site. Overall common pipistrelles comprised 82.27% of all passes recorded on the walked transect surveys and 91.49% of the static detector surveys. Activity levels of common pipistrelle on average were moderate during the static monitoring periods (11.76 BAI), and were low during the walked activity transects, which had an average of 16.57 passes per survey. This suggests that the higher levels recorded during the static detector surveys may be a result of repeat registrations by low numbers of bats passing the detector multiple times. Foraging and commuting pipistrelles were commonly recorded throughout the Site, with the highest level of activity recorded at Static Detector Location 7 in the far north of the Site (22.49 BAI). This is likely due to the presence of woodland adjacent to this area, and its greater connectivity to surrounding habitats. Notwithstanding their legal protection (afforded to all bat species), common pipistrelle are common and widespread across the UK.

Noctule comprised 0.71% of all passes recorded on the walked transect surveys and 5.3% of the static detector surveys. Activity levels of noctule on average were very low during the static monitoring period (0.68 BAI). This is supported by the very low levels of activity recorded during the walked transects, which had an average of 0.14 passes per survey. Noctule were recorded throughout the Site, with the highest level of activity recorded at Static Detector Location 4 in the north-east of the Site (3.54 BAI). This is likely due to the presence of a tree line, providing a suitable commuting route. Noctule are an uncommon species of bat, however, they are also widespread across the UK.

Serotine comprised 7.8% of all passes recorded on the walked transect surveys and 1.73% of the static detector surveys. Activity levels of serotine on average were very low during the static monitoring periods (0.22 BAI). This is supported by the very low levels of activity recorded during the walked transects, which had an average of 1.57 passes per survey. Serotine were recorded throughout most of the Site, with the highest level of activity recorded at Static Detector Location 4 in the north-east corner of the Site (1.42 BAI). This is likely due to the presence of a

tree line, providing a suitable commuting route. Serotine are an uncommon species of bat and are generally restricted in the UK to the south and south-east of England.

Soprano pipistrelle comprised 6.38% of all passes recorded on the walked transect surveys and 0.51% of the static detector surveys. Activity levels of soprano pipistrelle on average were very low during the static monitoring periods (0.07 BAI). This is supported by the very low levels of activity recorded during the walked transects, which had an average of 1.29 passes per survey. Soprano pipistrelles were recorded throughout the Site, with no particular area showing higher levels of activity. This is likely due to the generalist nature of soprano pipistrelles, allowing them to forage in most habitat types. Notwithstanding their legal protection, soprano pipistrelle are common and widespread across the UK.

Myotis species comprised 0.71% of all passes recorded on the walked transect surveys and 0.47% of the static detector surveys. Activity levels of myotis species on average were very low during the static monitoring periods (0.06 BAI). This is supported by the very low levels of activity recorded during the walked transects, which had an average of 0.14 passes per survey. Myotis species were recorded throughout most of the Site, with the highest level of activity recorded at Static Detector Location 7 in the far north of the Site (0.26 BAI). This is likely due to the presence of woodland in this area, and its greater connectivity to surrounding habitats. Myotis species are uncommon species of bats, except for some rare species. Most Myotis species are widespread across the UK, although some have restricted distributions.

Lesser horseshoe bats were not recorded during the walked transect surveys and comprised 0.2% of the static detector surveys. Activity levels of lesser horseshoe bats on average were very low during the static monitoring periods (0.03 BAI). This is supported by the absence of activity recorded during the walked transect surveys. Lesser horseshoe bats were mostly recorded at Static Detector Location 7 in the far north of the Site (0.12 BAI). This is likely due to the presence of woodland in this area, and its greater connectivity to surrounding habitats. A single lesser horseshoe bat was also recorded at Static Detector Location 5 in the middle of the Site. Lesser horseshoe bats are an uncommon species of bat and are generally restricted in the UK to south-west England, and Wales.

Long-eared bat species comprised 0.71% of all passes recorded on the walked transect surveys, and 0.16% of the static detector surveys. Activity levels of long-eared bat species on average were very low during the static monitoring periods (0.02 BAI). This is supported by the very low levels of activity recorded during the walked transect surveys, which had an average of 0.14 passes per survey. Long-eared bat species were recorded throughout most of the Site, with no particular area showing higher levels of activity. Brown long-eared bats are common and widespread throughout the UK; however, grey long-eared bats (*Pleocotus austriacus*) are rarer and in the UK are generally restricted to the south coast and south-west of England. Due to the restricted range of grey long-eared bats compared to the brown long-eared bats, which can be found across the UK, it is more likely that the bats recorded are brown long-eared bats. It is considered likely that this species has been under-recorded during the walked activity transects and static detector surveys due to the low amplitude calls they produce. However, as brown long-eared bats are a common and widespread species, the potential that they may have been under-recorded is not considered a limitation of the survey and does not impact the recommendations and mitigations proposed.

Leisler's bat were not recorded during the walked transect surveys and comprised 0.04% of the static detector surveys. Activity levels of Leisler's bat on average were very low during the static monitoring periods (0.01 BAI). This is supported by the absence of activity recorded during the walked transect surveys. Leisler's bat were only recorded at Static Detector Location 5 in the centre of the Site (0.04 BAI). This is likely due to Leisler's bats preference for foraging over areas of open parkland. Leisler's bat are an uncommon species of bat, however, in the UK they are widespread across England and Northern Ireland.

Two recordings from the walked transect surveys, and one recording from the static detector surveys could not be identified to species level due to the similarity of calls from noctule, serotine, and Leisler's bats, and have, as such, been recorded as NSL. These recordings comprised 1.42% of all passes recorded during the walked transect surveys, and 0.02% of the static detector surveys.

4.1.4 Lighting

It is likely there will be an increase in external lighting at the Site during construction and operation of the Proposed Development. There is currently no external lighting within the majority of the Site boundary, although there is some light spill from adjacent street lighting and residential areas. If there will be an increase in external lighting, and the lighting plan for the Proposed Development is poorly designed, there is potential for a light spill onto retained and proposed habitats. Many species of bat are averse to light, with different species having different tolerances. Species such as lesser horseshoe bats, which were recorded during the survey, are particularly sensitive to light

and are unlikely to forage or commute within a well-lit area (Stone et. al., 2009). Light exploiting bats, such as common and soprano pipistrelles will also be negatively impacted by lighting, especially when roosting (Patriarca & Debernardi, 2010). External lighting can make areas of previous foraging habitat unsuitable or inaccessible and cause indirect habitat loss. Therefore, a sensitive lighting plan, considering the species recorded by these surveys, is recommended for the Proposed Development (see 4.2.5 for additional information).

4.2 Recommendations for Mitigation

Where there is potential that the Proposed Development will have a significant effect on bats, recommendations for mitigation are made based on the mitigation hierarchy suggested in Paragraph 118 of the National Planning Policy Framework and detailed in Paragraph: 018 Reference ID: 8-018-20140306 of National Planning Practice Guidance, 2018:

- Avoidance – significant harm to wildlife species and habitats should be avoided through design;
- Minimisation – where significant harm cannot be wholly or partially avoided, it should be minimised by design, or using effective mitigation measures that can be secured by, for example, conditions or planning obligations; and,
- Compensation – where, despite whatever mitigation would be effective, there would still be significant residual harm, as a last resort, this should be properly compensated for by measures to provide for an equivalent value of biodiversity.

4.2.1 Trees

No bats were recorded roosting within any of the trees on Site at the time of survey. However, two of the trees identified in Table 7 have high or moderate suitability to support roosting bats (Tree 1 and Tree 2). If the loss of these trees is unavoidable, the trees should be felled using best practice techniques and it is recommended section or soft felling is undertaken in the presence of a Natural England bat licensed ecologist, avoiding features that may be obscured by dense ivy. This methodology entails felling the trees in sections, with the following precautions:

- Cutting above or below (rather than directly through) a potential roost feature;
- Lowering of cut sections gently to the ground level by rope; and,
- Leaving cut sections on Site, with any potential roost feature entrances left unobstructed, for 48 hours prior to chipping or removal from Site.

A further tree on Site was classified as having low suitability for roosting bats (Tree 3). If the loss of this tree is unavoidable, it should be felled using best practice techniques under an ecological watching brief. It is recommended that once the tree is felled, it is left on Site for 24 hours, or inspected once on the ground prior to chipping or removal from Site. If bats are found during the felling, all works should stop, and the ecologist present will advise on any further course of action.

The trees within the Site provide suitable foraging habitat and commuting habitat connections for bat species, and therefore the removal of this habitat should be avoided. If any trees or areas of scrub are to be affected by the Proposed Development, then the loss of these should be compensated for elsewhere on Site. Recommended habitat enhancements are provided in Section 4.3.

4.2.2 Buildings

The stable buildings within the Site are considered to have low suitability to support roosting bats. No bats were recorded exiting or re-entering these structures during the re-entry survey, therefore no further surveys are required prior to demolition of the stable buildings. However, in the unlikely event that bats are discovered during the building demolition, work must stop immediately, and a Natural England bat licensed ecologist should be contacted before works can continue.

4.2.3 Disturbance

Works associated with the Proposed Development should be undertaken during daylight hours in order to minimise impacts on active bats during the night.

4.2.4 Habitat Loss

It is currently unknown what areas of habitat important to bats will be removed as part of the Proposed Development, however, it is anticipated that the scrub and wooded areas will be removed to facilitate the works.

This will result in the loss of foraging and commuting habitat for bats which will have to be mitigated or compensated for. Compensation for loss of foraging and commuting habitat should be included within a Landscape Environmental Management Plan (LEMP) and/or Ecological Mitigation and Enhancement Strategy (EMES) prepared for the Site. This will include the provision of tree lines and woodland habitats to ensure habitat connectivity is maintained where bats were recorded. This landscape plan should be reviewed by an ecologist prior to submission.

4.2.5 Lighting

A precautionary approach should be adopted in relation to foraging and commuting bats, particularly along boundary features, during both the construction and operational phases of the Proposed Development if lighting is to be introduced into any of the Site. Screening (i.e. soil bunds, planting of tree/scrub/hedgerow and/or fencing) should also be included where appropriate with any landscaping in relation to nocturnal wildlife to aid the elimination of artificial light.

Lighting should be designed to minimise additional light spill onto site boundaries, such as the woodland edge. It is recommended that the lighting design consultant is experienced in lighting impact assessments and nocturnal wildlife and that consultation with an ecologist is undertaken.

The following details should be addressed ‘and not compromised’ for the implementation of a lighting design in relation to nocturnal wildlife:

- LED lighting in warm white colour temperatures of 3000K, avoiding blue colouring;
- Well positioned light fittings, designed with optics that are most suitable for the type of area being lit;
- Identified dark zones (flight paths) should be maintained at <0.5 lux;
- Vertical calculation planes at 2/3 m height should be undertaken during calculations and modelling and be included on the key plan to show references, locations and lengths;
- A scaled CAD plan should be provided with isoline contours shown for horizontal illuminance at ground level; and,
- The lighting design consultant should undertake baseline surveys for existing lighting on the Site and the lighting levels on Site should be monitored throughout construction and in the initial stages of operation. This monitoring should be specified as part of the EMES and/or LEMP.

Lighting installation should be in accordance with the Guidance Note 08/18, Bats and artificial lighting in the UK, Bats and the Built Environment series (ILP and BCT, 2018).

4.2.6 General Vegetation Clearance

The Proposed Development will likely require the removal of grassland, scrub and trees. The clearance methodology should be detailed in a Construction Environment Management Plan (CEMP) and an EMES and/or LEMP should be produced to outline the full mitigation for bats (and other identified protected/priority species and habitats). These documents will be followed during construction.

4.3 Recommendations for Habitat Enhancement

A sustainable and appropriate landscaping and planting plan should be incorporate into the final design. The addition of suitable native tree and shrub species, of local provenance, into the landscape design will provide foraging opportunities to bats.

The provision of roosting opportunities should be provided as an enhancement. It is recommended that bat boxes, bat tiles and/or bricks be installed in the new and retained buildings and retained mature trees to increase the roosting opportunities for bats within the Site.

An LEMP and/or EMES should be produced for the Site, that will outline the full mitigation and enhancement recommendations for the Site and once produced should be read in conjunction with this report.

Further consultation on all the mitigation and enhancement described above should be undertaken with an ecologist prior to implementation to ensure on-Site optimisation.

5. References

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Appendix A Automated Detector Survey Detailed Results

Deployment: April
Location: 1

Species Detected	Date					Total	Nightly Average
	24/04/2019	25/04/2019	26/04/2019	27/04/2019	28/04/2019		
Common pipistrelle	100	34	0	0	51	185	37
Soprano pipistrelle	2	1	0	0	2	5	1
Noctule	0	1	0	0	4	5	1
Long-eared bat	1	0	0	0	0	1	0.20
Total	103	36	0	0	57	196	39.20

Deployment: May
Location: 2

Species Detected	Date						Total	Nightly Average
	09/05/2019	10/05/2019	11/05/2019	12/05/2019	13/05/2019	14/05/2019		
Common pipistrelle	1	147	182	276	152	166	924	154
Soprano pipistrelle	0	0	0	0	3	0	3	0.50
Noctule	3	14	1	2	3	6	29	4.83
Serotine	0	0	0	0	1	0	1	0.16
Long-eared bat	0	0	1	0	1	1	3	0.50
Total	4	161	184	278	160	173	960	160

Deployment: June
Location: 3

Species Detected	Date					Total	Nightly Average
	05/06/2019	06/06/2019	07/06/2019	08/06/2019	09/06/2019		
Common pipistrelle	7	7	21	5	13	53	10.60
Noctule	4	1	9	1	5	20	4
Serotine	1	1	1	0	0	3	0.60
Long-eared bat	0	0	0	1	0	1	0.20
Total	12	9	31	7	18	77	15.40

Deployment: July
Location: 4

Species Detected	Date						Total	Nightly Average
	10/07/2019	11/07/2019	12/07/2019	13/07/2019	14/07/2019	15/07/2019		
Common pipistrelle	289	314	170	99	70	74	1016	169.33
Soprano pipistrelle	0	0	0	0	1	1	2	0.33
Noctule	28	31	35	24	15	37	170	28.33
Serotine	5	21	25	6	9	2	68	11.33
Myotis sp.	0	0	0	1	0	0	1	0.17
Long-eared bat	0	1	0	0	0	1	2	0.33
Total	322	367	230	130	95	115	1259	209.83

Deployment: August
Location: 5

Species Detected	Date					Total	Nightly Average
	28/08/2019	29/08/2019	30/08/2019	31/08/2019	01/09/2019		
Common pipistrelle	0	4	4	1	29	38	7.60
Soprano pipistrelle	0	1	0	1	1	3	0.60
Noctule	0	0	1	0	0	1	0.20
Serotine	0	1	0	0	0	1	0.20
Leisler's bat	0	2	0	0	0	2	0.40
Lesser horseshoe bat	0	0	1	0	0	1	0.20
Myotis sp.	0	0	0	0	1	1	0.20
Total	0	8	6	2	31	47	9.20

Deployment: September
Location: 6

Species Detected	Date					Total	Nightly Average
	18/09/2019	19/09/2019	20/09/2019	21/09/2019	**22/09/2019**		
Common pipistrelle	1	59	137	133	119	449	89.80
Soprano pipistrelle	0	0	0	4	0	4	0.80
Noctule	1	2	0	3	3	9	1.80
NSL	0	1	1	3	0	5	1
Myotis sp.	0	0	1	1	0	2	0.40
Total	2	62	139	144	122	469	93.80

Deployment: October
Location: 7

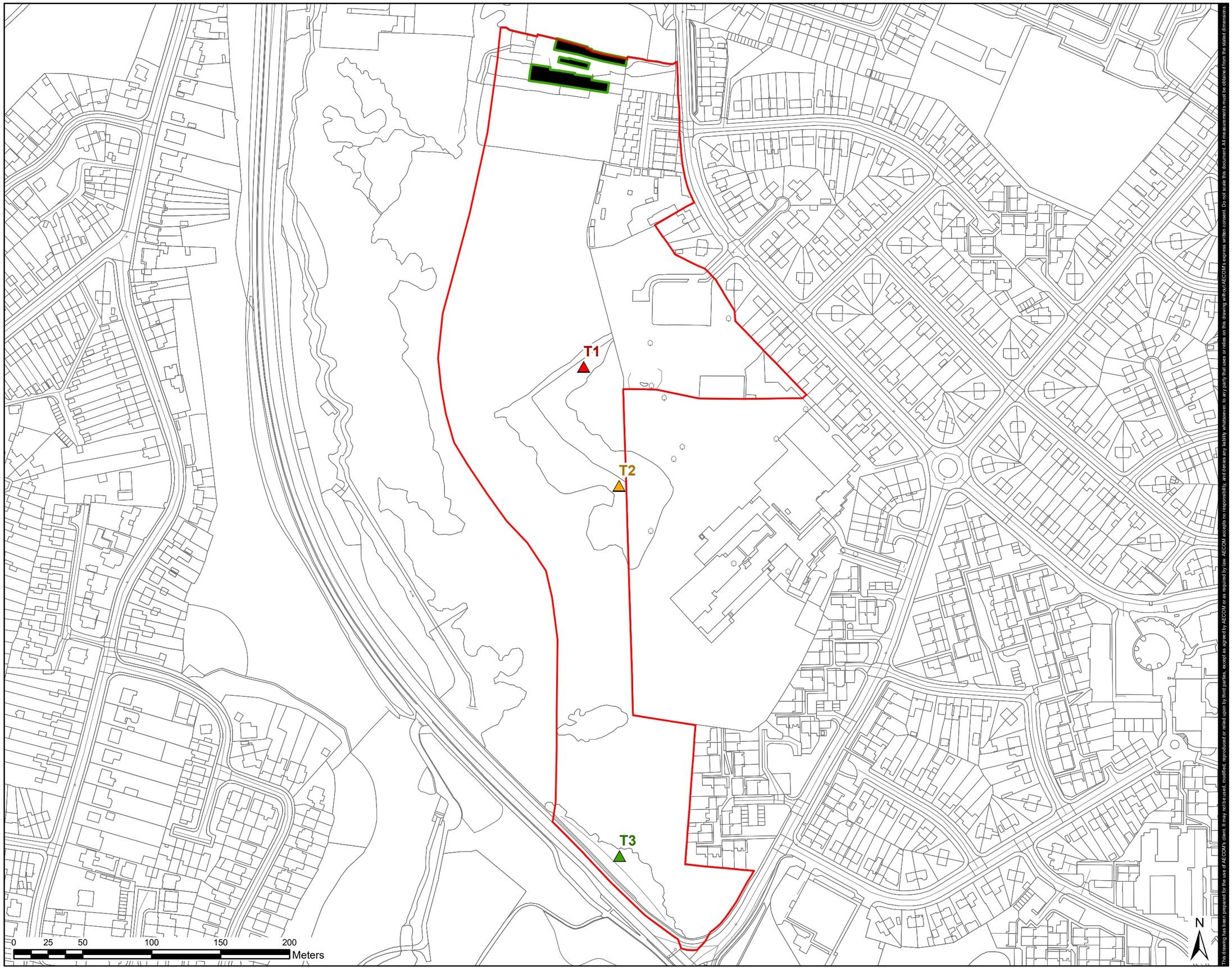
Species Detected	Date					Total	Nightly Average
	03/10/2019	04/10/2019	05/10/2019	06/10/2019	07/10/2019		
Common pipistrelle	145	190	226	249	652	1462	292.40
Soprano pipistrelle	0	1	0	0	5	6	1.20
Noctule	0	2	1	1	1	5	1
Serotine	0	0	3	0	2	5	1
Lesser horseshoe bat	2	0	1	1	4	8	1.60
Myotis sp.	1	0	1	7	8	17	3.40
Total	148	193	232	258	672	1503	300.60

Appendix B Bat Survey Figures

B.1 Figure 1. Bat Roost Suitability Map

B.2 Figure 2. Walked Transect Route and Static Detector Locations

B.3 Figures 3.1 – 3.8 Walked Transect Survey Results



AECOM Ltd
4th Floor Portwall Place,
Portwall Lane,
Bristol, BS1 6NA
www.aecom.com

Project Title:

BRISTOL CITY COUNCIL HOUSING SITES

Client:

LEGEND

- Site Boundary

Bat Roost Suitability

Buildings and Trees

- Tree - High
- Tree - Moderate
- Tree - Low
- Building - Low

AECOM Internal Project No:

60601667_1.2

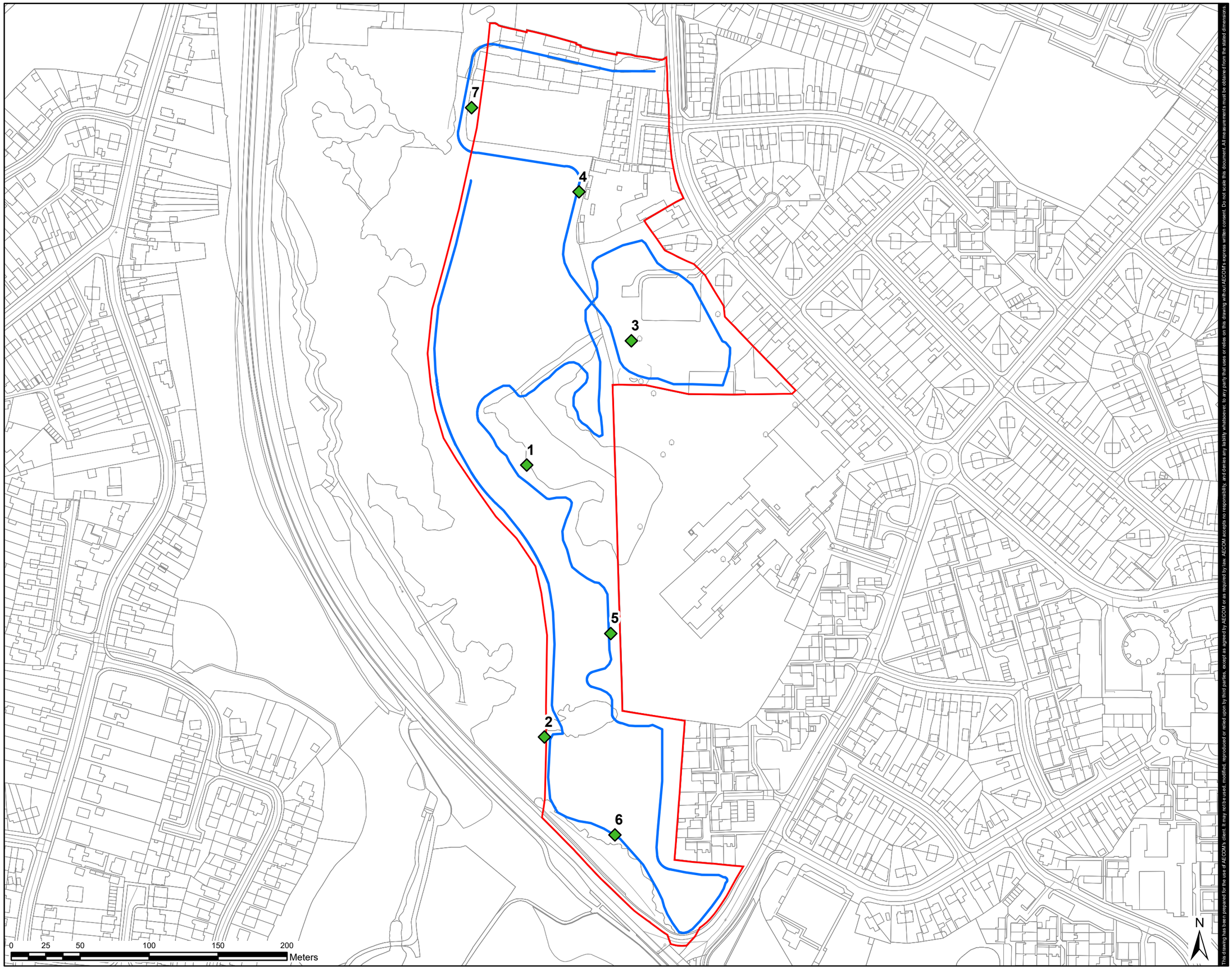
Drawing Title:

BAT ROOST SUITABILITY - NOVERS HILL

Scale at A3: 1:2,500

Drawing No:			Rev:
FIGURE 1			004
Drawn:	**Chk'd:**	**App'd:**	**Date:**
AM	MLS	TC	10/02/20

Filename: B:\Projects\!Environmental\General\GIS\Projects\Bristol Habitats\02_Maps\Novers Hill F1 Bat Roost Suitability Map.mxd



AECOM Ltd
4th Floor Portwall Place,
Portwall Lane,
Bristol, BS1 6NA
www.aecom.com

Project Title:

BRISTOL CITY COUNCIL HOUSING SITES

Client:

LEGEND

- Site Boundary
- Static Detector Locations
- Bat Transect

AECOM Internal Project No:

60601667_1.2

Drawing Title:

NOVERS HILL – BAT TRANSECT AND STATIC DETECTOR LOCATIONS

Scale at A3: 1:2,500

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FIGURE 2			001
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BM	AM	TC	10/02/20

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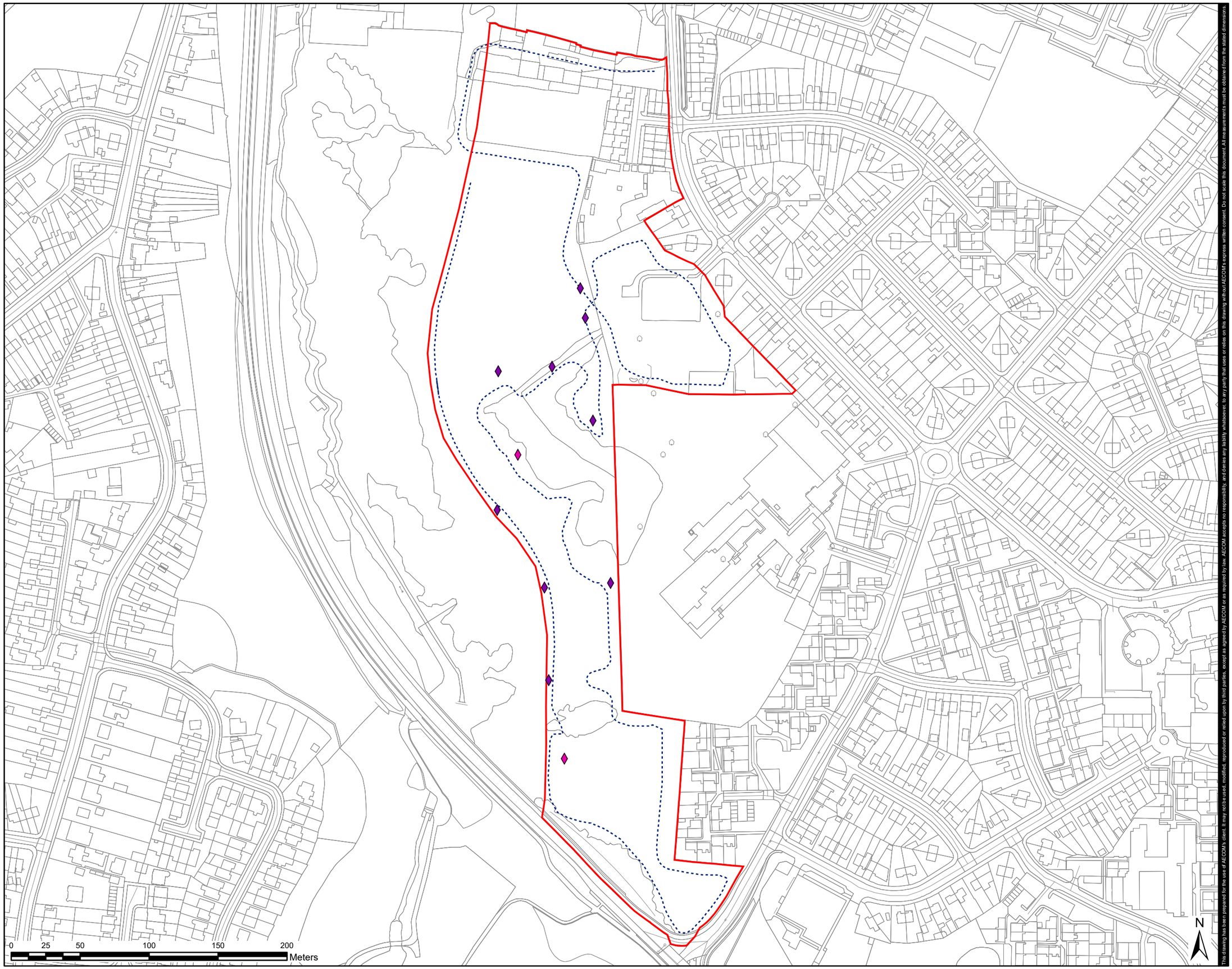

AECOM Ltd
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Portwall Lane,
Bristol, BS1 6NA
www.aecom.com

Project Title:

BRISTOL CITY COUNCIL HOUSING SITES

Client:

LEGEND

- Site Boundary
- Walked Transect Route

Bat Activity - Foraging

- Common pipistrelle
- Soprano pipistrelle

AECOM Internal Project No:

60601667_1.2

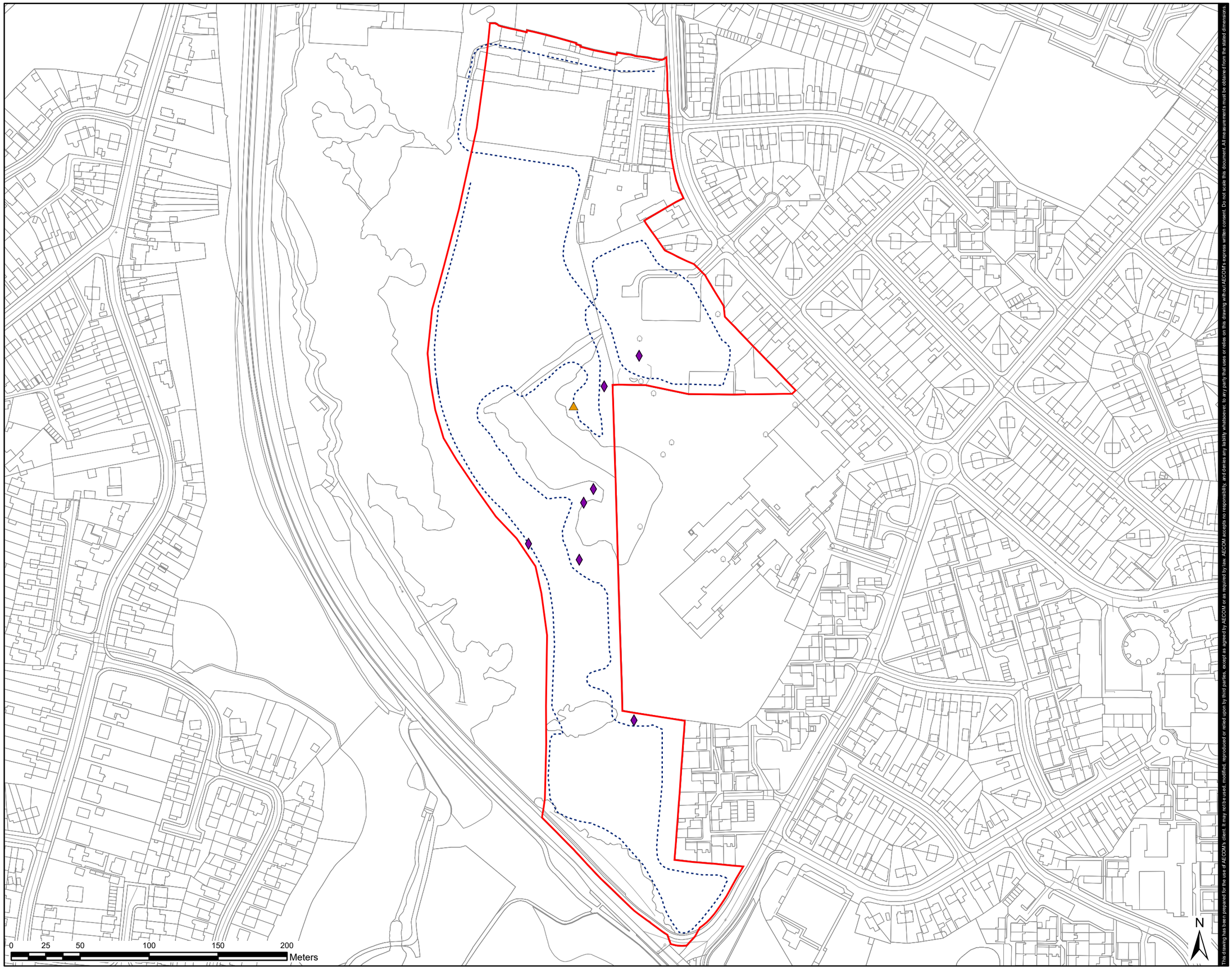
Drawing Title:

NOVERS HILL –
BAT ACTIVITY RESULTS
25TH APRIL 2019

Scale at A3: 1:2,500

Drawing No:			Rev:
FIGURE 3.1			001
Drawn:	**Chk'd:**	**App'd:**	**Date:**
AM	MLS	TC	10/02/20

Filename: B:\Projects\!Environmental\General\GIS\Projects\Bristol Habitats\02_Maps\Novers Hill F3.1 Bat Activity Results 25th April 2019.mxd



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www.aecom.com

Project Title:

BRISTOL CITY COUNCIL
HOUSING SITES

Client:

LEGEND

- Site Boundary
- Walked Transect

Bat Activity - Foraging

- Common

Bat Activity - Brief Pass

- Serotine

AECOM Internal Project No:

60601667_1.2

Drawing Title:

NOVERS HILL –
BAT ACTIVITY RESULTS
9TH MAY 2019

Scale at A3: 1:2,500

Drawing No:			Rev:
FIGURE 3.2			001
Drawn:	**Chk'd:**	**App'd:**	**Date:**
AM	MLS	TC	10/02/20

Filename: B:\Projects\!Environmental\General\GIS\Projects\Bristol Habitats\02_Maps\Novers Hill F3.2 Bat Activity Results 9th May 2019.mxd

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www.aecom.com

Project Title:

BRISTOL CITY COUNCIL
HOUSING SITES

Client:

LEGEND

- Site Boundary
- Walked Transect Route

Bat Activity - Foraging

- Common pipistrelle

Bat Activity - Brief Pass

- Common pipistrelle
- Long-eared bat species

0 25 50 100 150 200
Meters

N

AECOM Internal Project No:

60601667_1.2

Drawing Title:

NOVERS HILL –
BAT ACTIVITY RESULTS
5TH JUNE 2019

Scale at A3: 1:2,500

Drawing No:			Rev:
FIGURE 3.3			001
Drawn:	**Chk'd:**	**App'd:**	**Date:**
AM	MLS	TC	10/02/20

Filename: B:\Projects\!Environmental\General\GIS\Projects\Bristol Habitats\02_Maps\Novers Hill F3.3 Bat Activity Results 5th June 2019.mxd

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Project Title:

BRISTOL CITY COUNCIL
HOUSING SITES

Client:

LEGEND

- Site Boundary
- Walked Transect Route

Bat Activity - Foraging

- Common pipistrelle
- Serotine

Bat Activity - Brief Pass

- Common pipistrelle
- Noctule
- Indeterminate species

AECOM Internal Project No:

60601667_1.2

Drawing Title:

NOVERS HILL –
BAT ACTIVITY RESULTS
10TH JULY 2019

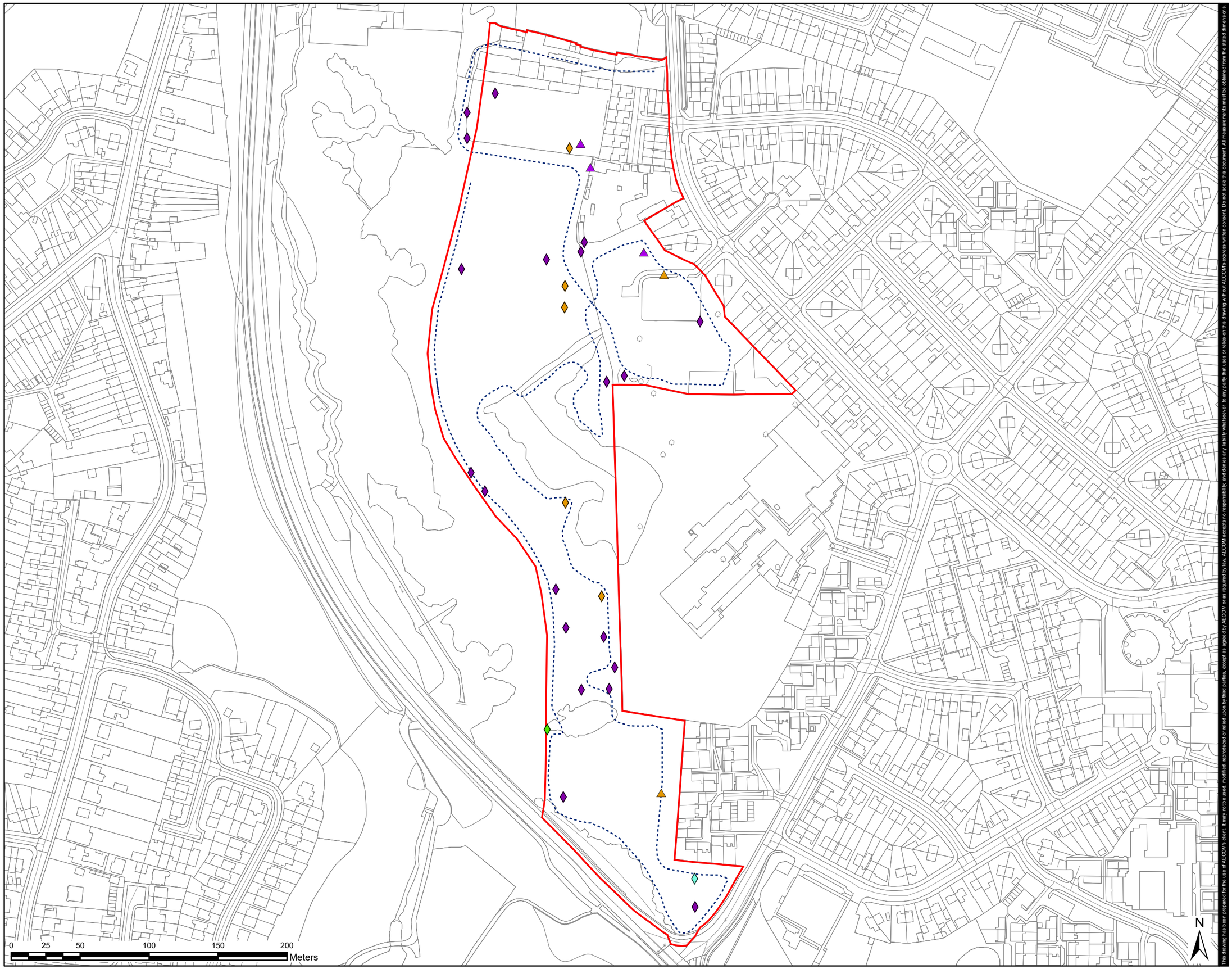
Scale at A3: 1:2,500

Drawing No:			Rev:
FIGURE 3.4			001
Drawn:	**Chk'd:**	**App'd:**	**Date:**
AM	MLS	TC	10/02/20

0 25 50 100 150 200
Meters

N

Filename: B:\Projects\!Environmental\General\GIS\Projects\Bristol Habitats\02_Maps\Novers Hill F3.4 Bat Activity Results 10th July 2019.mxd



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www.aecom.com

Project Title:

BRISTOL CITY COUNCIL HOUSING SITES

Client:

LEGEND

- Site Boundary
- Walked Transect Route

Bat Activity - Foraging

- Common pipistrelle
- Noctule
- Serotine
- Myotis species

Bat Activity - Brief Pass

- Common pipistrelle
- Serotine

AECOM Internal Project No:

60601667_1.2

Drawing Title:

NOVERS HILL – BAT ACTIVITY RESULTS 27TH AUGUST 2019

Scale at A3: 1:2,500

Drawing No:			Rev:
FIGURE 3.5			001
Drawn:	**Chk'd:**	**App'd:**	**Date:**
AM	MLS	TC	10/02/20

Filename: B:\Projects\!Environmental\General\GIS\Projects\Bristol Habitats\02_Maps\Novers Hill F3.5 Bat Activity Results 27th August 2019.mxd

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Project Title:

BRISTOL CITY COUNCIL HOUSING SITES

Client:

LEGEND

- Site Boundary
- Walked Transect Route

Bat Activity - Foraging

- Common pipistrelle
- Noctule, Serotine and Leisler's
- Soprano pipistrelle

Bat Activity - Commuting

- Noctule, Serotine and Leisler's

0 25 50 100 150 200 Meters

N

AECOM Internal Project No:

60601667_1.2

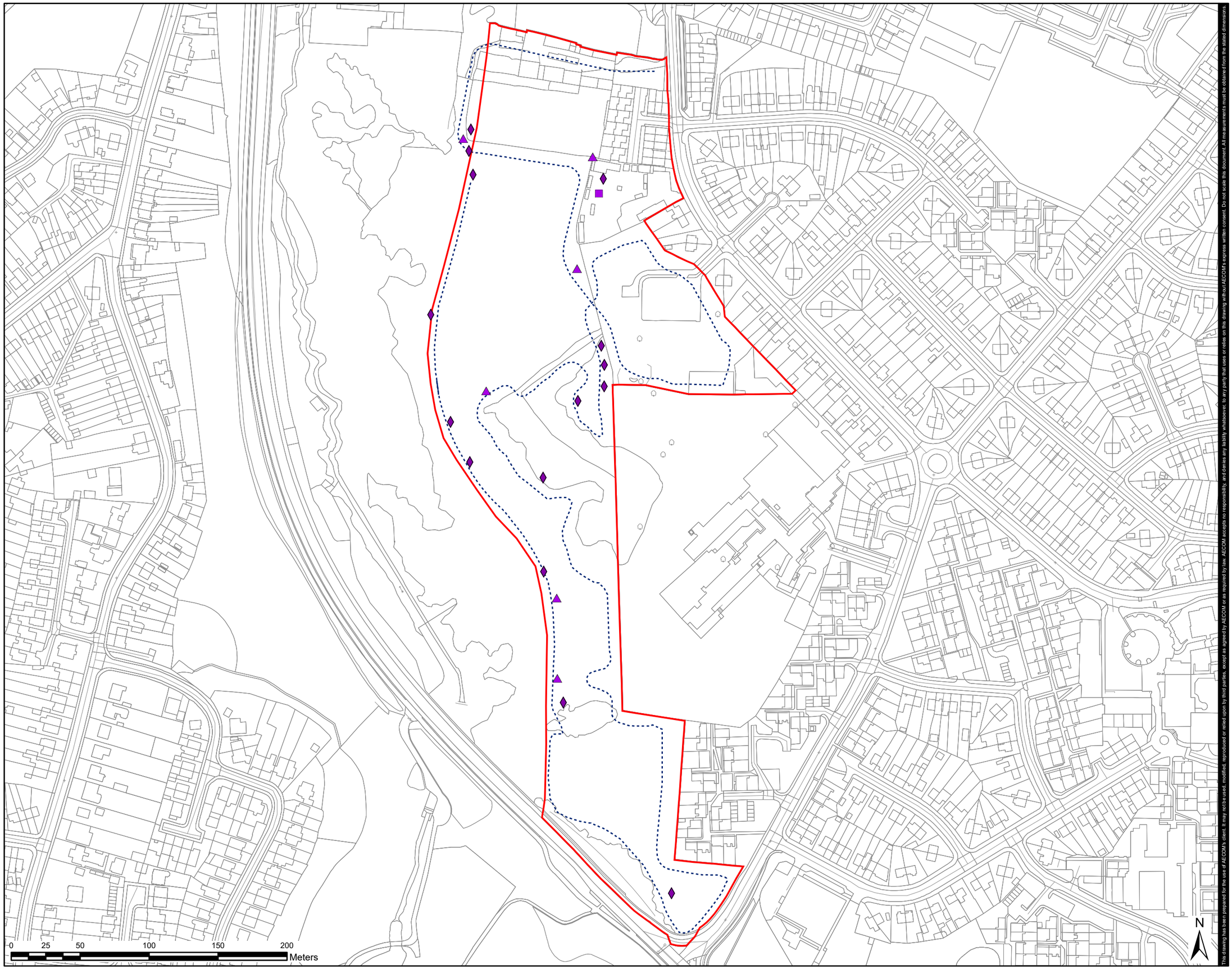
Drawing Title:

NOVERS HILL – BAT ACTIVITY RESULTS 28TH AUGUST 2019

Scale at A3: 1:2,500

Drawing No:			Rev:
FIGURE 3.6			001
Drawn:	**Chk'd:**	**App'd:**	**Date:**
AM	MLS	TC	10/02/20

Filename: B:\Projects\!Environmental\General\GIS\Projects\Bristol Habitats\02_Maps\Novers Hill F3.6 Bat Activity Results 28th August 2019.mxd



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Project Title:

BRISTOL CITY COUNCIL
HOUSING SITES

Client:

LEGEND

- Site Boundary
- Walked Transect Route

Bat Activity - Foraging
- Common pipistrelle

Bat Activity - Brief Pass
- Common pipistrelle

Bat Activity - Commuting
- Common pipistrelle

AECOM Internal Project No:

60601667_1.2

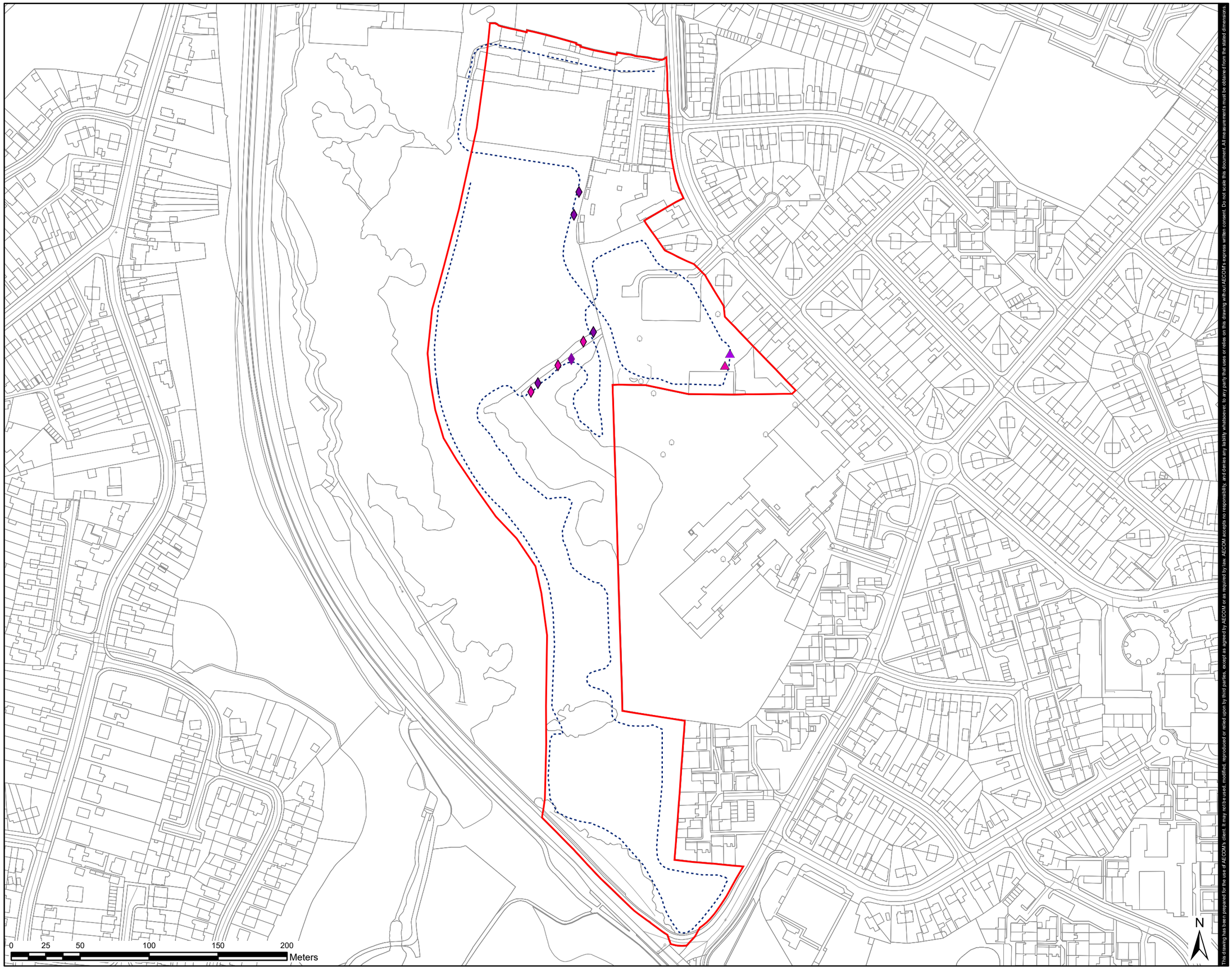
Drawing Title:

NOVERS HILL –
BAT ACTIVITY RESULTS
17TH SEPTEMBER 2019

Scale at A3: 1:2,500

Drawing No:			Rev:
FIGURE 3.7			001
Drawn:	**Chk'd:**	**App'd:**	**Date:**
AM	MLS	TC	10/02/20

Filename: B:\Projects\!Environmental\General\GIS\Projects\Bristol Habitats\02_Maps\Novers Hill F3.7 Bat Activity Results 17th September 2019.mxd



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Portwall Lane,
Bristol, BS1 6NA
www.aecom.com

Project Title:

BRISTOL CITY COUNCIL
HOUSING SITES

Client:

LEGEND

- Site Boundary
- Walked Transect

Bat Activity - Foraging

- Common pipistrelle
- Soprano pipistrelle

Bat Activity - Brief Pass

- Common pipistrelle
- Soprano pipistrelle

AECOM Internal Project No:

60601667_1.2

Drawing Title:

NOVERS HILL –
BAT ACTIVITY RESULTS
3RD OCTOBER 2019

Scale at A3: 1:2,500

Drawing No:			Rev:
FIGURE 3.8			001
Drawn:	**Chk'd:**	**App'd:**	**Date:**
AM	MLS	TC	27/11/19

Filename: B:\Projects\!Environmental\General\GIS\Projects\Bristol Habitats\02_Maps\Novers Hill F3.8 Bat Activity Results 3rd October 2019.mxd

Appendix C Photographs

	
Photo 1: Stable buildings with low bat roost suitability where a re-entry survey took place.	**Photo 2:** Stable buildings with low bat roost suitability where a re-entry survey took place.