

SGN Gas Holder No. 4 Reading

Bat Roost & Bat Activity Survey Report

A Report for Danescroft (Kenavon Drive
Project Management) LLP

October 2019



www.greenspace-ecology.co.uk

info@greenspace-ecology.co.uk

SGN Gas Holder No. 4, Reading

Bat Roost & Bat Activity Survey Report

Controlled Copy

01 of 02

01 Danescroft (Kenavon Drive Project Management) LLP

02 Greenspace Ecological Solutions Ltd

Report Contributors: Gemma Abela and James Johnston ACIEEM

Proofread: Guy Newman MCIEEM

*The content of this report is the responsibility of Greenspace Ecological Solutions Ltd.
It should be noted that whilst every effort has been made to meet the client's requirements, no site survey can ensure complete assessment or prediction of the changeable onsite environment. Furthermore, should more than 12 months elapse between the date of this survey and any subsequent development, it may be necessary to consider the need for an update survey to be undertaken.*

Report Number J20563_P4

Greenspace Ecological Solutions Ltd.
Suite H3, Blackham Court,
Withyham, East Sussex,
TN7 4DB

Tel: 01892 457062

www.greenspace-ecology.co.uk
info@greenspace-ecology.co.uk

CONTENTS

1	PROJECT OVERVIEW	1
2	INTRODUCTION	2
2.1	Context.....	2
2.2	Site Location.....	2
2.3	Site Description	2
2.4	Policies and Legislation	2
2.5	Objectives of the Survey	3
2.6	Survey Constraints	4
3	SURVEY METHODOLOGY.....	5
3.1	Elevated Tree Roost Assessment	5
3.2	Bat Emergence Surveys.....	5
3.3	Bat Transect Surveys.....	6
4	SURVEY RESULTS	8
4.1	Elevated Tree Roost Inspection	8
4.2	Emergence Surveys	8
4.3	Walked Transect Surveys	9
4.4	Static Surveys	10
5	CONCLUSIONS AND RECOMMENDATIONS.....	15
5.1	Elevated Tree Roost Inspection	15
5.2	Bat Emergence	15
5.3	Bat Activity	15
6	SUMMARY	20
7	REFERENCES	21

TABLES

Table 1. Emergence Survey Times and Conditions	5
Table 2. Bat Transect Survey Times and Conditions	6
Table 3. Emergence Survey Results Summary.....	8

FIGURES

Figure 1 –	Surveyor Locations
Figure 2 –	Anabat Locations
Figure 3a-g –	Bat Transect Route and Transect Survey Results
Figure 4a-f –	Static Detector Survey Results
Figure 5 –	Existing Lux Level Impact Plan
Figure 6 –	Proposed Lux Level Impact Plan (Street Lamp Alteration Strategy)

1 PROJECT OVERVIEW

Client: Danescroft (Kenavon Drive Project Management) LLP

Site Address: SGN Gas Holder No. 4, Kenavon Drive, Reading, Berkshire. RG1 3DH

Attending Ecologists: James Johnston (NE Bat Class 2 Licence)
Joseph Dyson (NE Bat Class 1 Licence)
Martin Rann Qualifying CIEEM
Tanya Rowlinson Qualifying CIEEM
Gemma Abela Qualifying CIEEM
Mike Marriott

Survey Period: September 2018 – October 2019

Site Proposals: Redevelopment of an existing brownfield site to facilitate a new residential development with associated parking.

Associated Planning Reference Number: Not yet submitted.

Source of Relevant Documents:

Document:	Source:
Previous Reports:	Preliminary Ecological Appraisal, Greenspace Ecological Solutions, October, 2018

2 INTRODUCTION

2.1 Context

2.1.1 In response to the redevelopment of the SGN Gas Holder No.4 Kenavon Drive, Reading, a Preliminary Ecological Appraisal (PEA) was undertaken by Greenspace Ecological Solutions Ltd (GES) in October 2018. Recommendations made within that report identified the need for further considerations in regard to bats. GES were subsequently commissioned to undertake an elevated tree roost assessment of a tree, bat roost presence/likely absence surveys of the building denoted B1 and bat activity surveys of the area surrounding the site.

2.1.2 The results of the surveys, as described in this report, serve to ensure that the Favourable Conservation Status (FCS) of bats is maintained throughout the development and that the proposals remain compliant with existing legislation and planning policies which serve to protect bats and their roosts. Where appropriate, proportionate mitigation to be incorporated within the design of the building, has been provided within this report.

2.2 Site Location

2.2.1 The site is located on the eastern edge of the town of Reading, Berkshire, at National Grid Reference SU 728 736.

2.3 Site Description

2.3.1 The site occupies approximately 0.71ha and comprises areas of scrub, scattered trees and buildings within areas of hard standing. A prominent gas holder is also present within the site.

2.3.2 The site is bound by residential dwellings to the west; the River Kennett to the south and east; and the National Rail link to the north. The wider landscape is typical of an urban area.

2.4 Policies and Legislation

2.4.1 The National Planning Policy Framework 2019 (NPPF) aims to protect species of significant conservation importance in England (in this case bats), as covered by wildlife legislation (see below), NPPF, national and local Biodiversity Action Plans (BAP's) and Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006. Local planning authorities have an obligation to protect such species and are also required to seek opportunities to promote and enhance biodiversity in accordance with the above legislation, policies and plans.

2.4.2 All British bat species and their places of rest and shelter receive UK and European protection under the Conservation of Habitats and Species Regulation 2018 (Habitats Regulations 2018)

and the Wildlife and Countryside Act (WCA) 1981 (as amended). This protection means that bats and their places of rest and shelter are a material consideration in the planning process.

2.4.3 Taken together, unless under licence, these make it an offence to:

- Deliberately capture or intentionally take a bat;
- Deliberately or intentionally kill or injure a bat;
- To be in possession or control of any live or dead bat or any part of, or anything derived from a bat;
- Damage or destroy a breeding site or resting place of a bat;
- Intentionally or recklessly obstruct access to any place that a bat uses for shelter or protection;
- Intentionally or recklessly disturb a bat while it is occupying a structure or place that it uses for shelter or protection;
- Deliberately disturb any bat, in particular any disturbance which is likely to (i) impair their ability to survive, breed, reproduce or to rear or nurture their young; or in the case of hibernating or migratory species, to hibernate or migrate; or (ii) to affect significantly the local distribution or abundance of the species to which they belong.
- A bat roost may be any structure a bat uses for breeding, resting, shelter or protection. It is important to note that since bats tend to use the same roost sites at different times of year, current legal opinion is that a bat roost is protected whether bats are present at the time.

2.4.4 In addition to the above, certain species of bat are listed on Annex II of the Habitat Regulations 2018. Annex II species include greater and lesser horseshoe bats, barbastelle and Bechstein's bat. Where present, consideration to the requirement of a Special Areas of Conservation (SAC) should be given.

2.5 Objectives of the Survey

2.5.1 The objectives of the surveys were to:

- Determine the presence of bats within the building and tree to be affected by the proposal,
- Gather baseline information on the species of bat using the site and adjacent habitats;
- Determine favoured foraging habitats and commuting routes that are likely to be affected by the proposed;

- Identify species, number and frequency of use of the site by bats should they be present;
- Evaluate the potential for bats to be affected by proposals;
- Identify legal or policy constraints related to bats that may affect the development; and
- Suggest mitigation/compensation measures that may be required.

2.6 Survey Constraints

- 2.6.1 The results taken from bat detector recordings are biased towards bats that use louder echolocation calls. Therefore, quiet species such as long-eared bats may be under recorded due to the limited recording range of the equipment. To compensate for this, the surveyors remained vigilant to ensure that any visual cues identifying the presence of this species were accurately recorded.
- 2.6.2 It is difficult to confidently relate calls registered, to numbers of bats present. Therefore, the number of bat passes does not provide any indication of bat abundance; it is intended only to indicate the level of activity at a particular point.
- 2.6.3 During the walked transect on 18th July 2019, a kit failure resulted in a lack of recordings for the duration of the survey. The results for this section are therefore based on the field observations noted by the surveyor at the time of the survey.
- 2.6.4 Where identification is difficult to distinguish at an individual species level, bat passes are described to genus level such as *Myotis* sp., *Nyctalus* sp., *Pipistrellus* sp.

3 SURVEY METHODOLOGY

3.1 Elevated Tree Roost Assessment

3.1.1 An elevated tree roost assessment was undertaken of T2 on the 17th July 2019 by licenced bat ecologist James Johnston.

3.1.2 The survey was completed in accordance with the guidelines set out by the Bat Conservation Trust (BCT) (Collins, 2016). Equipment used included a ladder and an endoscope. Suitable features identified during the ground level assessment were inspected for any evidence of bats and to determine their suitability for roosting bats.

3.2 Bat Emergence Surveys

3.2.1 Dusk emergence surveys were undertaken of the on-site building denoted B1 on the 26th September 2018 and 17th July 2019. The survey was completed in accordance with current best practice guidance (Collins, 2016) and to adequately observe all aspects of the building, two surveyors were deployed during each survey. The location of the surveyors is depicted in Figure 1.

3.2.2 The survey was completed in favourable weather conditions with night-time temperatures of $\geq 10^{\circ}\text{C}$ and little or no rain.

3.2.3 To account for the varying times in which differing bat species emerge, evening emergence surveys commenced 15 minutes before sunset and continued for 1 hour and 15 minutes after sunset, or until light levels deemed the survey no longer valid.

3.2.4 A summary of the weather conditions, surveyors and survey times recorded during the survey is provided in Table 1.

Table 1 – Survey Times and Conditions

Date	Sunset time	Start Time	End Time	Surveyors	Start Weather Conditions	End Weather Conditions
26/09/18	18:52	18:37	20:07	James Johnston Gemma Abela	17.0°C, 0% CC, no rain, wind 0BF	15.0°C, 0% CC, no rain, wind 0BF
17/07/19	21:12	20:57	22:27	James Johnston Mike Marriott	18.0 °C, 98% CC, no rain, wind 2BF	17.0 °C, 100% CC, no rain, wind 2BF

3.2.5 To aid audible detection, surveyors were equipped with Elekon Batlogger M bat detectors. These detectors convert the inaudible echolocation of bats into a frequency audible to the

human ear. All calls were digitally recorded, and the sonograms later analysed through the application of the computer programme Elekon BatExplorer.

3.3 Bat Transect Surveys

- 3.3.1 The methodology for bat transect surveys follows the guidance set out by the Bat Conservation Trust (Collins, 2016). The primary objective of the transects were to identify foraging areas, commuting routes and species utilisation of the site.
- 3.3.2 To ensure coverage of the site, the transect routes were determined prior to the survey. To identify activity levels around the features of potential value to bats that are to be most affected by the proposals (i.e. hedgerows/tree lines/scrub habitats etc.) point count stops were included in strategic locations along the route. Each point count was 3 minutes long, during which time all bat activity was recorded. The Transect Route is depicted in Figure 3a.
- 3.3.3 The dusk transects commenced at and ran for a period of approximately 2hrs after sunset.
- 3.3.4 Each transect was walked at a steady pace with the species, time and behaviour of all bat passes recorded on a Site plan. The information gathered provides a general view of the bat activity present on Site and identifies the key foraging area and commuting routes. Elekon Batlogger M detectors were utilised, with the location of each call logged using the GPS facility provided within the unit.
- 3.3.5 Post-survey the peak frequency, inter-pulse interval, call duration and end frequency of the recorded bat calls were analysed using Bat Explorer. Analysis was undertaken by suitably experienced bat ecologists, with the level of bat species and activity across the site, in relation to the abundance of individual species foraging and commuting along the associated habitats, assessed accordingly.
- 3.3.6 All transects were undertaken in suitable weather conditions. A summary of the survey times, surveyors and weather conditions recorded during the surveys is provided in Table 2.

Table 2 – Bat Transect Survey Conditions

Date	Survey Start	Survey End	Sunset/Sunrise Time	Start Weather Conditions	End Weather Conditions	Surveyors
29/04/19	20:23	22:23	20:23	13.0°C, 78% CC, dry, wind OBF	12.0°C, 90% CC, dry, wind OBF	Joseph Dyson Tanya Rowlinson
21/05/18	20:57	22:47	20:57	17.0°C, 5% CC, dry, wind OBF	14.5°C, 0% CC, dry, wind OBF	James Johnston Tabitha Plummer

26/06/18	21:25	22:54	21:25	15.2°C, 100% CC, dry, wind OBF	14.8°C, 0% CC, dry, wind OBF	Martin Rann Mike Marriott
18/07/19	03:07	05:00	05:07	14.0°C, 100% CC, dry, wind 1BF	13.5°C, 100% CC, light rain, wind 1BF	James Johnston Mike Marriott
13/08/19	20:31	22:00	21:20	20.5°C, 60% CC, dry, wind OBF	17.0°C, 80% CC, dry, wind OBF	Martin Rann Mike Marriott
11/09/19	19:28	21:28	19:28	20.4°C, 50% CC, dry, wind OBF	18.0°C, 50% CC, dry, wind OBF	Tanya Rowlinson Mike Marriott
08/10/19	18:27	20:27	18:27	19.4°C, 20% CC, dry, wind OBF	11.7°C, 40% CC, dry, wind OBF	Martin Rann Mike Marriott

Bat Static Activity Survey

- 3.3.7 In conjunction with the transect surveys, two Anabat Express static bat detectors were deployed to gather data on bat activity within the site. The static detectors were deployed in strategic places within the site. In this instance, the detectors were deployed on the northern railway and southern river corridor boundaries. The location of the detectors was chosen to maximise coverage of the suitable habitats likely to be affected, directly or indirectly, by the proposed. These locations are depicted in Figure 2.
- 3.3.8 To account for the periods in which the lighting impacts are most likely to occur within the site, each static detector was programmed to record bat activity from ½ hr before sunset until ½ hr after sunrise during the periods 15th May – 19th May 2019, 21st June – 25th June 2019, 17th July – 21st July 2019, 8th August – 12th August 2019, 11th September – 15th September 2019 and 9th October – 13th October 2019. The sunset times during these periods were from 20:48hrs – 20h:54hrs, 21:24hrs – 21:24hrs, 21:12hrs – 21:08hrs, 20:40hrs – 20:32hrs, 19:28hrs – 19:19hrs and 18:24hrs – 18:15hrs, respectively. The sunrise times during these periods were from 05:12hrs – 05:07hrs, 04:46hrs – 04:47hrs, 05:06hrs – 05:11hrs, 05:37hrs – 05:44hrs, 06:31hrs – 06:38hrs and 07:17hrs – 07:23hrs respectively.
- 3.3.9 Upon completion of the data collection period, the static detectors were collected, and the data subsequently analysed using Analook.

4 SURVEY RESULTS

4.1 Elevated Tree Roost Inspection

- 4.1.1 The elevated inspection of the tree denoted T2 identified no evidence of use by bats and none of the features identified at ground level were considered suitable to support roosting bats.

4.2 Emergence Surveys

26th September 2018

- 4.2.1 No bats emerged from the building.
- 4.2.2 The first bat recorded during the survey was a common pipistrelle *Pipistrellus pipistrellus*, which was recorded foraging within the site at 19:37hrs, some 45 minutes after sunset.
- 4.2.3 This species, as well as soprano pipistrelle *P. pygmaeus* and noctule *Nyctalus noctula* were recorded in low numbers foraging within and commuting through the site during the survey.
- 4.2.4 Overall bat activity within the site was considered **Low**.

17th July 2019

- 4.2.5 No bats emerged from the building.
- 4.2.6 The first bat recorded was a common pipistrelle, which was recorded within the site at 21:27, some 17 minutes after sunset.
- 4.2.7 Common pipistrelle and soprano pipistrelle were recorded in low numbers foraging and commuting through the site during the survey.
- 4.2.8 Bat activity within the site was considered **Low**.

Summary of Emergence Results

- 4.2.9 Table 3 shows a summary of the survey results.

Table 3. Emergence survey results summary

Date	Bats emerging or returning from/to the building	Bat species recorded commuting / foraging within the site
26/09/18	None	Common pipistrelle Soprano pipistrelle Noctule
17/07/19	None	Common pipistrelle Soprano pipistrelle

4.3 Walked Transect Surveys

29th April 2019

- 4.3.1 The April transect recorded a total of 306 passes throughout the survey. As depicted in Figure 3a, the survey identified that 49% of bat passes were of common pipistrelle and 40% of bat passes were soprano pipistrelle. The remaining passes were of noctule (<6% of passes), *Myotis* sp. (<4% of passes) and long-eared bat (<2% of passes). Activity in April was considered high with peak activity recorded at the bridge to the south of the site and the confluence of the River Kennet and the River Thames.

21st May 2019

- 4.3.2 The May transect recorded a total of 215 passes throughout the survey. As depicted in Figure 3b, the survey identified that 36% of bat passes were of soprano pipistrelle and 27% of bat passes were common pipistrelle. The remaining passes were of *Myotis* sp. (25% of passes) and noctule (11% of passes). Activity in May was considered moderate with peak activity recorded at the bridge to the south of the site and the confluence of the River Kennet and the River Thames.

26th June 2019

- 4.3.3 The June transect recorded a total of 100 passes throughout the survey. As depicted in Figure 3c, the survey identified that 57% of bat passes were of common pipistrelle and 24% of bat passes were soprano pipistrelle. The remaining passes were of *Myotis* sp. (12% of passes), noctule (6% of passes) and serotine (1% of passes). Activity in June was considered low with peak activity recorded at the bridge to the south of the site, at the Network Rail link and the confluence of the River Kennet and the River Thames.

18th July 2019

- 4.3.4 Constrained due to equipment failure, the surveyor identified that most of the bat passes were common and soprano pipistrelle with some intermittent noctule passes. The July transect recorded a low/moderate level of bat activity during the survey. Several bats were recorded foraging and commuting along the length of transect route with peaks of activity recorded at the bridge to the south of the site and at the confluence of the River Kennet and the River Thames.

13th August 2019

- 4.3.5 The August transect recorded a total of 141 passes throughout the survey. As depicted in Figure 3d, the survey identified that 52% of bat passes were of soprano pipistrelle and 34% of bat passes were common pipistrelle. The remaining passes were of *Myotis* sp. (11% of passes)

and noctule (4% of passes). Activity in August was considered moderate with peak activity recorded at the bridge to the south of the site and at Network Rail link.

11th September 2019

- 4.3.6 The September transect recorded a total of 268 passes throughout the survey. As depicted in Figure 3e, the survey identified that 45% of bat passes were of common pipistrelle and 38% of bat passes were soprano pipistrelle. The remaining passes were of noctule (14% of passes) and *Myotis* sp. (2% of passes). Activity in September was considered high with peak activity recorded at the bridge to the south of the site and at the confluence of the River Kennet and the River Thames.

8th October 2019

- 4.3.7 The October transect recorded a total of 76 passes throughout the survey. As depicted in Figure 3f, the survey identified that 58% of bat passes were of common pipistrelle and 38% of bat passes were soprano pipistrelle. The remaining passes were of *Plecotus* sp. (4% of passes). Activity in October was considered low with peak activity recorded at the confluence of the River Kennet and the River Thames.

4.4 Static Surveys

- 4.4.1 Static detector surveys have been carried out during the months of May – October 2019.

15th May – 19th May 2019

- 4.4.2 As detailed in Figure 4a, six species of bat (long-eared bat, common pipistrelle, *Myotis* sp., noctule, serotine and soprano pipistrelle) were recorded on the static detectors during the May survey.
- 4.4.3 The most frequently recorded species was soprano pipistrelle with a total of 2630 passes; 53% of all bat passes recorded across the site. The second most frequently recorded species was common pipistrelle with a total of 2267 passes, equating to 46% of all bat passes. The third most frequently recorded species were bats from the genus *Myotis* sp. with a total of 57 passes, equating to 1% of all bat passes.
- 4.4.4 Long-eared bats and noctule were recorded in low numbers in the south of the site only. Serotine bats were recorded in low numbers in both locations.
- 4.4.5 Accounting for 83% of all bat passes recorded, the highest levels of bat activity was recorded by the detector placed on the northern railway boundary of the site (Ref: Figure 4a).

4.4.6 During the 30 minutes period after sunset, 117 bat passes were recorded. The earliest recording was a soprano pipistrelle at 20:16hrs (32 minutes before sunset) in the south of the site.

4.4.7 During the 30 minutes period prior to sunrise, 12 bat passes were recorded. The latest recording was a common pipistrelle at 04:51hrs (18 minutes before sunrise) in the north of the site.

21st June – 25th June 2019

4.4.8 As detailed in Figure 4b, five species of bat (common pipistrelle, *Myotis* sp., noctule, serotine and soprano pipistrelle) were recorded on the static detectors during the June survey.

4.4.9 The most frequently recorded species was common pipistrelle with a total of 396 passes; 65% of all bat passes recorded across the site. The second most frequently recorded species was soprano pipistrelle with a total of 175 passes, equating to 29% of all bat passes. The third most frequently recorded species were bats were noctule with a total of 22 passes, equating to 4% of all bat passes.

4.4.10 *Myotis* sp. were recorded in low numbers in the south of the site only. Serotine bats were recorded in low numbers in both locations.

4.4.11 Accounting for 87% of all bat passes recorded, the highest levels of bat activity was recorded by the detector placed in the north of the site (Ref: Figure 4b).

4.4.12 During the 30 minutes period after sunset, 8 bat passes were recorded. The earliest recording was a common pipistrelle at 21:14hrs (10 minutes before sunset) in the south of the site.

4.4.13 During the 30 minutes period prior to sunrise, no bat passes were recorded. The latest recording was a soprano pipistrelle at 04:15hrs (31minutes before sunrise) in the north of the site.

17th July – 21st July 2019

4.4.14 As detailed in Figure 4c, four species of bat (common pipistrelle, *Myotis* sp., noctule and soprano pipistrelle) were recorded on the static detectors during the July survey.

4.4.15 The most frequently recorded species was common pipistrelle with a total of 126 passes; 56% of all bat passes recorded across the site. The second most frequently recorded species was soprano pipistrelle with a total of 81 passes, equating to 36% of all bat passes. The third most

frequently recorded species were noctule with a total of 10 passes, equating to 4% of all bat passes.

4.4.16 *Myotis* sp. were recorded in low numbers in both locations within the site.

4.4.17 Accounting for 87% of all bat passes recorded, the highest levels of bat activity was recorded by the detector placed in the north of the site (Ref: Figure 4c).

4.4.18 During the 30 minutes period after sunset, 1 bat pass was recorded. This recording was a *Myotis* sp. at 21.27hrs (15 minutes after sunset) in the north of the site.

4.4.19 During the 30 minutes period prior to sunrise, 5 bat passes were recorded. The latest recording was a common pipistrelle at 04:45hrs (26 minutes before sunrise) in the north of the site.

8th August – 13th August 2019

4.4.20 As detailed in Figure 4d, six species of bat (long-eared bat, common pipistrelle, *Myotis* sp., noctule, serotine and soprano pipistrelle) were recorded on the static detectors during the August survey.

4.4.21 The most frequently recorded species was common pipistrelle with a total of 258 passes; 57% of all bat passes recorded across the site. The second most frequently recorded species was soprano pipistrelle with a total of 138 passes, equating to 30% of all bat passes. The third most frequently recorded species were noctules with a total of 39 passes, equating to 9% of all bat passes.

4.4.22 Serotine bats were recorded in low numbers in the north of the site. Long-eared bats and *Myotis* sp. were recorded in low numbers across the site.

4.4.23 Accounting for 54% of all bats passes recorded, the highest levels of bat activity was recorded by the detector placed in the south of the site (Ref: Figure 4d).

4.4.24 During the 30 minutes period after sunset, 17 bat pass was recorded. The earliest recording was common pipistrelle at 20.08hrs (30 minutes prior to sunset) in the south of the site.

4.4.25 During the 30 minutes period prior to sunrise, 36 bat passes were recorded. The latest recording was a common pipistrelle at 05:29hrs (8 minutes before sunrise) in the north of the site.

11th September – 15th September 2019

- 4.4.26 As detailed in Figure 4e, five species of bat (common pipistrelle, *Myotis* sp., noctule, serotine and soprano pipistrelle) were recorded on the static detectors during the September survey.
- 4.4.27 The most frequently recorded species was common pipistrelle with a total of 598 passes; 61% of all bat passes recorded across the site. The second most frequently recorded species was soprano pipistrelle with a total of 361 passes, equating to 37% of all bat passes. The third most frequently recorded species were noctules with a total of 20 passes, equating to 2% of all bat passes.
- 4.4.28 Serotine bats and *Myotis* sp. were recorded in low numbers in the north of the site, each equating to <1% of bat passes.
- 4.4.29 Accounting for 90% of all bats passes recorded, the highest levels of bat activity was recorded by the detector placed in the north of the site (Ref: Figure 4e).
- 4.4.30 During the 30 minutes period after sunset, 42 bat passes was recorded. The earliest recording was common pipistrelle at 19.40hrs (30 minutes prior to sunset) in the north of the site.
- 4.4.31 During the 30 minutes period prior to sunrise, 102 bat passes were recorded. The latest recording was a common pipistrelle at 06:24hrs (14 minutes before sunrise) in the south of the site.

9th October – 13th October 2019

- 4.4.32 As detailed in Figure 4f, five species of bat (common pipistrelle, *Myotis* sp., noctule, serotine and soprano pipistrelle) were recorded on the static detectors during the October survey.
- 4.4.33 The most frequently recorded species was common pipistrelle with a total of 46 passes; 48% of all bat passes recorded across the site. The second most frequently recorded species was soprano pipistrelle with a total of 43 passes, equating to 45% of all bat passes.
- 4.4.34 *Myotis* sp., noctule and serotine bats were recorded in low numbers, each equating to 2% of all bat passes. *Myotis* sp. was recorded in the north of the site, noctule was recorded in the south and serotine was detected across the site during the October survey.
- 4.4.35 Accounting for 76% of all bats passes recorded, the highest levels of bat activity was recorded by the detector placed in the south of the site (Ref: Figure 4f).
- 4.4.36 During the 30 minutes period after sunset, 12 bat passes was recorded. The earliest recording was common pipistrelle at 18.38hrs (16 minutes prior to sunset) in the south of the site.

- 4.4.37 During the 30 minutes period prior to sunrise, no bat passes were recorded. The latest recording was a common pipistrelle at 05:59hrs (42 minutes before sunrise) in the north of the site.

5 CONCLUSIONS AND RECOMMENDATIONS

5.1 Elevated Tree Roost Inspection

- 5.1.1 The PEA identified the tree T2 as having features with potential to support roosting bats. The elevated tree roost inspection identified no polishing, droppings, staining or suitability to support bats and no further consideration to the presence of roosting bats within trees is required.

5.2 Bat Emergence

- 5.2.1 The structure B1 was identified as having 'Low' suitability for bats and two bat emergence surveys have been conducted over the 2018 and 2019 survey period.
- 5.2.2 As reasonable effort to determine the presence or likely absence of roosting bats within B1 has been applied and no bats or their roosts were recorded, no further consideration to the presence of bats within this structure is required.
- 5.2.3 In the unlikely event that bats, or their roosts are identified during the demolition process, all works should stop and the appointed ecologist or Natural England, be consulted on the appropriate manner in which to proceed.

5.3 Bat Activity

- 5.3.1 Bat transect surveys conducted conclude that although bat activity in the more built environs to the west is lowest, at least six species of bat are using the sites surrounding habitats for the purpose of foraging and commuting. With peak areas of activity being the bridge on the south west corner of the site and the confluence of the Kennet and Thames, in order of frequency across all surveys, the species recorded include common pipistrelle (50.19%), soprano pipistrelle (47.08%), noctule (1.08%), *Myotis* sp. (1.02%), long-eared bat (0.15%) and serotine (0.48%).
- 5.3.2 The surveys identified no rare or Annex II species and although difficult to quantify, the level of bat activity and bat species diversity identified throughout the surveys is considered 'Moderate'.
- 5.3.3 A marked spike in the number of bat passes recorded for common and soprano pipistrelle bats during the May surveys suggests a maternity roost for these species exists within close proximity to the site.

- 5.3.4 Furthermore, the passes by soprano pipistrelle some 32 minutes before sunset in May, common pipistrelle some 30 minutes prior to sunset in June and August and a bat from the genus *Myotis* some 15 minutes after sunset in July, indicates the presence of roosts for these species in close proximity to the site.
- 5.3.5 The results from the walked transects identified bats using the river to the south for the purposes of both foraging and commuting. With key areas identified being the stretch of river between the footbridge immediately to the south of the site and the railway bridge to the east; and the confluence of the Kennet and Thames <200m east of the site, although analysis of the calls could not be conclusive; the habitat type, visual observation of bat morphology and the call parameters suggest at least some of the *Myotis* bats recorded along the Kennet were that of Daubenton's *M. daubentonii*. Comprising up to 1% of the total bat passes recorded, the number of passes by bats of the genus *Myotis* is notable and requires consideration. Although low in number, the presence of long-eared bats during both the static and walked transects confirm the use of the rail and river corridor by this species.
- 5.3.6 Although bats from the genus *Pipistrellus* and *Nyctalus* (noctule) are known to exhibit a low degree of tolerance to artificial lights, many of the 18 species of bat identified within the UK are light sensitive and artificial lighting of bat roosts, access points and foraging pathways can be extremely disturbing to bats and should be avoided. Artificial light falling on or close to a bat roost can cause many problems for bats, by;
- delaying or preventing emergence from roosts, resulting in reduced foraging time and missing the peak time of insect abundance (just after dusk). As all bats in the UK feed on insects, this missed opportunity can have a serious impact on their survival and the growth rates of their young. In some cases, leading to bats abandoning or becoming entombed in the roost when the entrance is lit up as bats will be less inclined to leave their roosts in these conditions. This is likely to be considered a breach of legislation as both bats and their roosts are protected by law.
 - affecting the feeding behaviour of bats away from the roost. Slower flying species (long-eared bats and *Myotis* bats) avoid illuminated areas and therefore lose foraging grounds if they are lit. This results in slower flying species having to use poorer quality foraging sites and losing out on prey, which are attracted to the surrounding lit areas, a so called 'vacuum effect'.

- affecting commuting and foraging routes, which have been shown to be avoided if there is artificial light spill onto these areas.
- 5.3.7 Garland & Markham (2007) highlighted examples of brightly lit developments, as having potential to impact on bats as the lighting often comes on during the early evening when many bat species are becoming active. Furthermore, should the movement of bats along commuting routes or foraging corridors be significantly inhibited by lighting, this would be considered a direct impact and would therefore constitute a disturbance offence under the Habitat Regulations 2018.
- 5.3.8 Therefore, without a lighting scheme that caters to the requirements of foraging and commuting bats, the development may result in the following impacts on bats:
- Severance of commuting routes;
 - Disruption of foraging areas;
 - Disturbance of potential roost sites.
- 5.3.9 Having identified light sensitive species present along both the river and rail corridor, to ensure the site remains suitable for use by bats, consideration to the potential impacts of the proposed development and its associated lighting strategy has been given.

During Construction

- 5.3.10 To maintain the integrity of the surrounding bat habitats, a sensitive lighting scheme is to be implemented during the construction phase.
- 5.3.11 To limit potential lighting disturbance, lighting to facilitate the works will be directional and light spill onto vegetated habitats off-site will be avoided.
- 5.3.12 Where practical, works will be limited to standard daytime hours and where works are required outside of this period, suitable screening will be installed to avoid light spill onto the retained habitats. Installation of the screening will be conducted by the on-site contractors.
- 5.3.13 The appointed ecologist will assess the lighting units, the positioning of the lighting and the light spill resulting from the lighting units prior to the commencement of construction works or at the time of installation should work have commenced.

Post Construction

- 5.3.14 To ensure the sites integrity for bats has been maintained post construction, the lighting design strategy set out within Nick Smith Associates report (2019); has been designed

specifically to minimise lighting impacts on the associated river and rail corridor and has been compiled in accordance with the requirements set out by the Bat Conservation Trust (BCT) and the Institute of Lighting Professionals (ILP) [Guidance Note 08/18 Bats and artificial lighting in the UK](#). (2018).

5.3.15 In accordance with the guidance, application of the following methods has ensured the reduction of the lighting impacts has been reduced to a level suitable for use by bats:

- By forming a dark buffer zone to separate the site from the surrounding rail line and river corridor from lighting. This includes the strategic planting of a 2m high x 8m wide buffer of native tree and shrub species along the river bank.
- The omission of lighting unless required has been implemented across the site.
- The lighting scheme has been designed to achieve 1 lux at both ground and elevated levels, along at least half of the river corridor. (Nick Smith Associates (NSA) - *Drawings 2569-D_02 and 03 rev A*).
- Internal residential lighting is to be achieved using LED downlighters (oppose pendants) which are to be set back from windows and balconies to prevent light spillage.
- Balconies have been positioned to maximise the 'shielding' effect of lighting from within living / communal spaces.
- External column heights restricted to 5m in car parking area.
- The use of specialist bollard and handle rail lighting used in the other public areas of the site.

5.3.16 As long as the above mitigation strategy is implemented in full, the nearby roosts, flight lines and foraging areas identified within and around the site will be maintained and the development will be conducted in accordance with planning policies and legislation which serve to protect bats and their roosts.

5.3.17 The lighting impacts demonstrated within the NSA report are given as a worst-case scenario and in isolation, development of the site results in little increase to the existing light levels. However, to achieve further enhancement for bats the following points have been identified, modelled and demonstrated as viable within the design:

- A significant reduction in the existing lighting impacts on the Kennet River Corridor from roadside lighting on the opposite southern side of the river, could be achieved through revision / replacement of the existing off-site lighting units. In the location of the proposed development, replacement of these units would lower the lux levels to <0.4 lux across the

entirety of the water course. Further details of this strategy are set out within the NSA report (2019). For clarity; the existing and proposed lux level lighting plans are depicted in Figure 5 and 6 respectively.

- Allowing the vegetation within the on-site green buffer along the river corridor to grow to a height of 5m+ would provide a robust flight-line for bats and further reduce the lux levels on the river.
- The installation of floating ecosystem riverbanks such as those provided by [Biomatrix Water](#) along the site side bank of the River Kennet would provide a source of flowering plants for invertebrates (bat prey items) and also provide extra vegetation lines for commuting bats.

5.3.18 It should also be noted, that these recommendations are provided in addition to the wildlife friendly planting strategies, integrated bat boxes to be included within the proposed buildings and alternate measures to achieve biodiversity net gain, as set out within the alternate ecology reports.

5.3.19 It is, there, suggested that through application of the above and alternately proposed mitigation strategies, development of the site will serve to significantly increase the Site and adjacent River Kennet Corridor in its suitability to support even the more light sensitive species of bat.

6 SUMMARY

- 6.1 In response to the proposed redevelopment of the site at SGN Gas Holder No.4, Reading; the tree T2 was subject to an elevated inspection, the building B1 was subject to a series of two evening emergence surveys and the site and surrounds were subject to bat activity surveys.
- 6.2 The tree T2 supports no features suitable for use by bats and no bats or their roosts were recorded within B1. No further consideration to the presence of roosting bats within the trees or structures is required.
- 6.3 The bat activity surveys identified common pipistrelle, soprano pipistrelle and bats of the genus *Myotis* roosting in close proximity to the site. Furthermore, the northern rail and southern river corridor were both identified as important for foraging and commuting bats.
- 6.4 Without mitigation, lighting from the development had the potential to impact on the suitability of these areas for bats. Working collaboratively with the appointed lighting engineer, the lighting scheme proposed serves to result in minimal and acceptable levels of increased lighting through on-site mitigation, and opportunity to significantly reduce lighting impacts on the river corridor through off-site lighting alterations.
- 6.5 In addition to wildlife friendly landscaping, integrated bat boxes and wider measures to achieve biodiversity net gain within the proposed development, measures inclusive of floating eco systems and an increase in the height of on-site vegetation will further enhance the areas use for wildlife.
- 6.6 It is suggested that so long as the above recommendations are implemented in full, the proposed development will not only be conducted in accordance with current legislation and planning policies which serve to protect habitats and species of conservation importance, but will serve to provide significant enhancements for not only bats, but also the adjacent river Kennet corridor and the species which depend upon it.

7 REFERENCES

Bat Conservation Trust and the Institute of Lighting Professionals. 2018, Bat and Artificial Lighting in the UK. <https://www.theilp.org.uk/documents/guidance-note-8-bats-and-artificial-lighting/>

Collins, J. (ed.) 2016. *Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn)*. Bat Conservation Trust, London.

Dietz C and Kiefer A. 2016. *Bats of Britain and Europe*. Bloomsbury Natural History. London. UK.

Garland L. & Markham S. (2007) *Is important bat foraging and commuting habitat legally protected?*
http://www.bats.org.uk/publications_download.php/351/Batflightpathlegalprotectionarticle_FinalVersionSep2007.pdf

Greenspace Ecological Solutions (2018). *SGN Gas Holder No. 4, reading. Preliminary Ecological Appraisal*. Unpublished.

Mitchell – Jones A.J & Mcleish A.P. 2004. *Bat Workers Manual*. 3rd Edition. Joint Nature Conservation Committee.

National Planning Policy Framework (NPPF) (2019).
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/740441/National_Planning_Policy_Framework_web_accessible_version.pdf

Natural Environment and Rural Communities (NERC) Act 2006.
<http://www.legislation.gov.uk/ukpga/2006/16/contents>

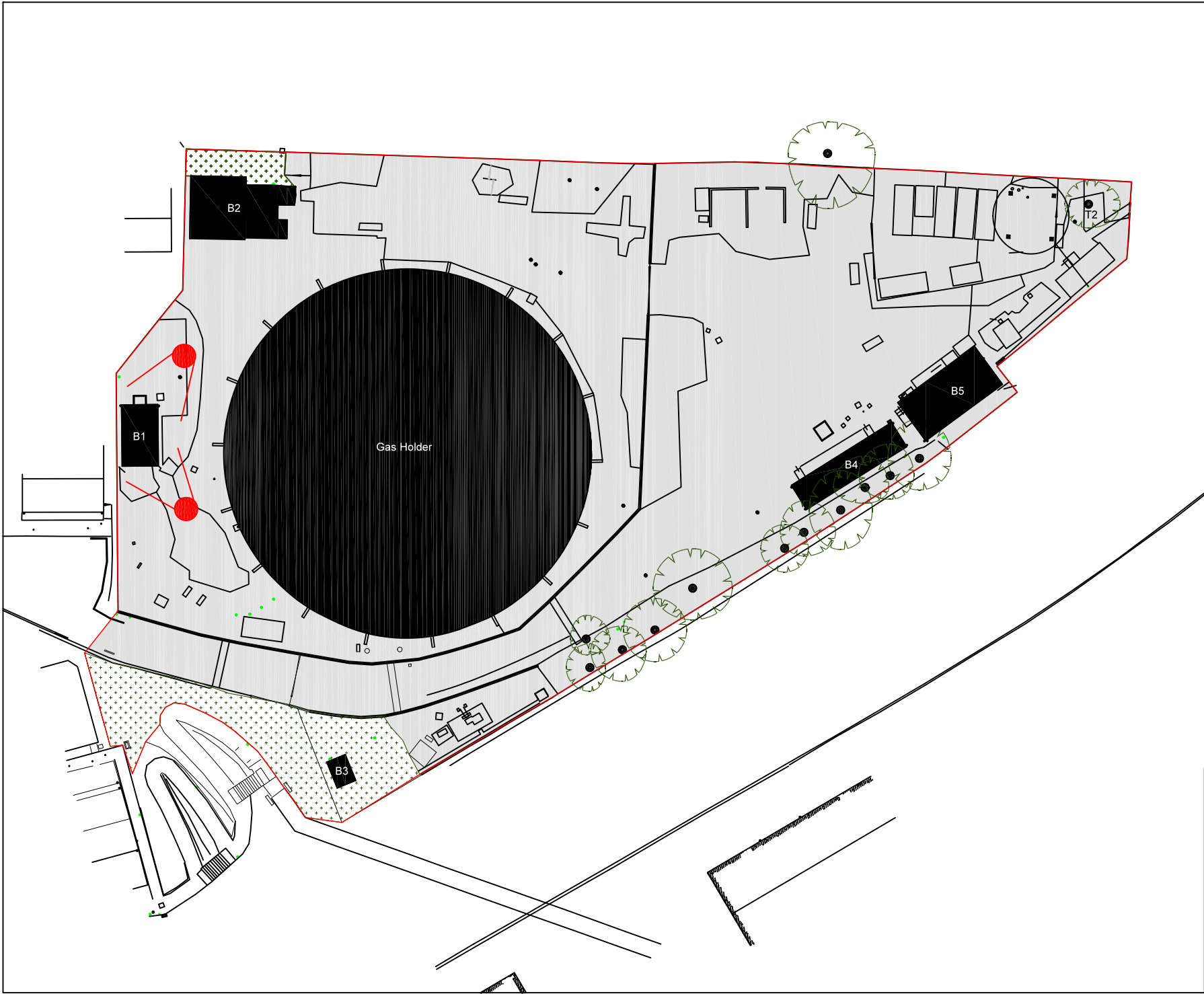
Nick Smith Associates 2019. Former Gas Holder Site at Kenavon Drive, Reading. Unpublished

Russ, J. 2012. *British Bat Calls, A Guide to Species Identification*. Pelagic Publishing. UK

The Conservation of Habitats and Species Regulations (Habitats Regulations) 2017.
<http://www.legislation.gov.uk/uksi/2017/1012/made>

Wildlife and Countryside Act (as amended) 1981. <http://jncc.defra.gov.uk/page-1377>

Figures



Legend

- Site Boundary
- Surveyor Locations



Job Reference : J20563_P4

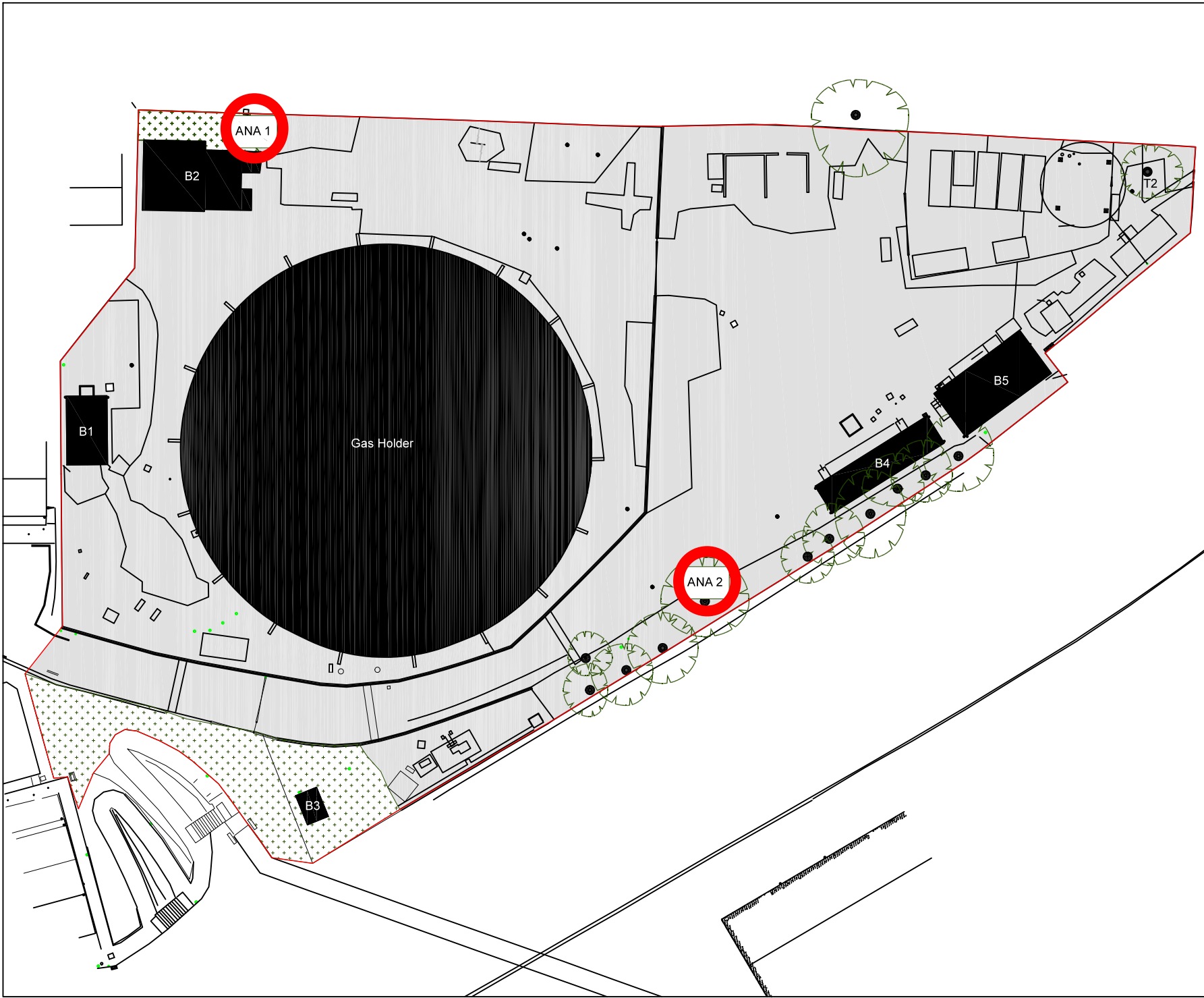
Project Title
Reading SGN Site

Drawing Title
Figure 1: Surveyor Locations

Date : 16-08-19 Checked : JJ

Drawn : GA Approved : N/A

Status : Final Scale : NTS



Legend

-  Site Boundary
-  Ana 1-2
- Anabat Locations



Job Reference : J20563_P4

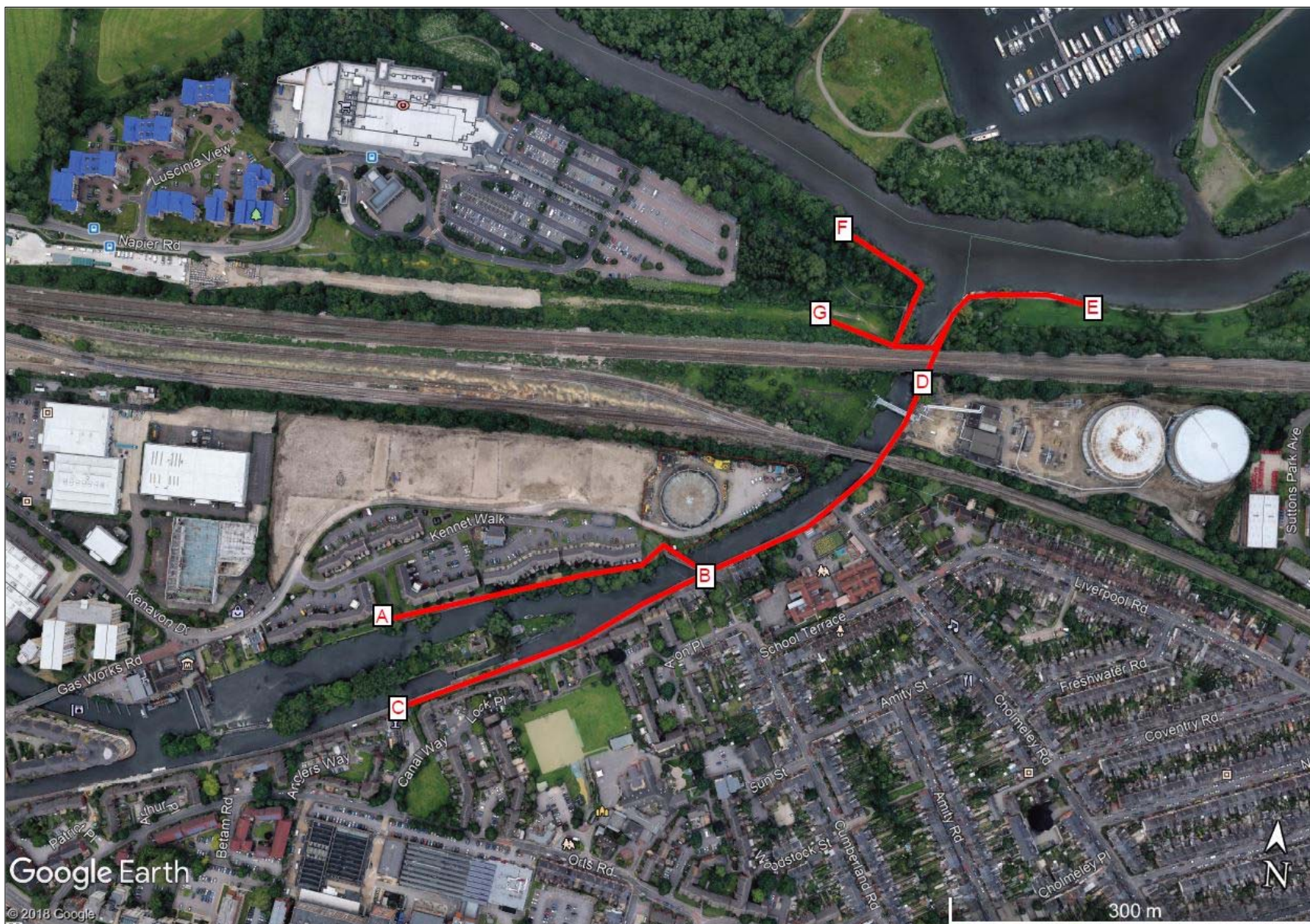
Project Title
Reading SGN Site

Drawing Title
Figure 2: Anabat Locations

Date : 16-08-19 Checked : JJ

Drawn : GA Approved : N/A

Status : Final Scale : NTS



Legend

- Transect Route
- Point Count Stop



Job Reference : J20563_P4

Project Title: Reading SGN

Drawing Title
Figure 3a - Transect Route

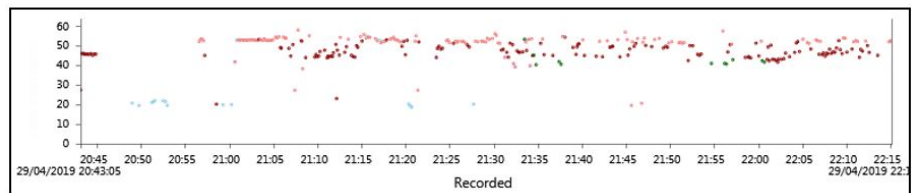
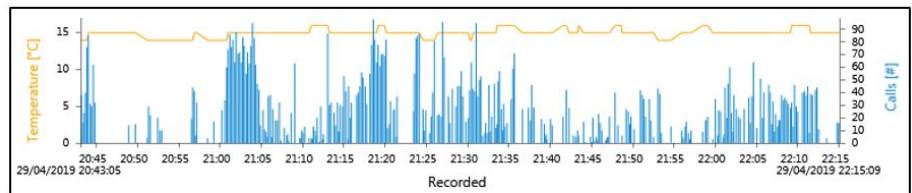
Date : 09-09-19 Checked : JJ

Drawn : GA Approved : N/A

Status : Final Scale : NTS



Species	#	# Calls
● Pipistrellus pipistrellus	149	4245
● Nyctalus noctula	17	414
● Pipistrellus pygmaeus	121	4332
● Plecotus auritus	7	207
● Myotis spec.	12	206



Job Reference : J20563_P4

Project Title: Reading SGN

Drawing Title
Figure 3b - Transect Results (April 2019)

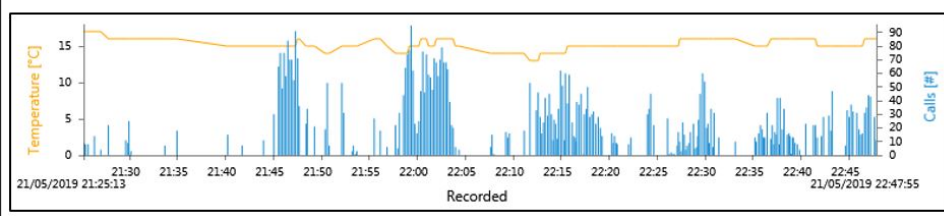
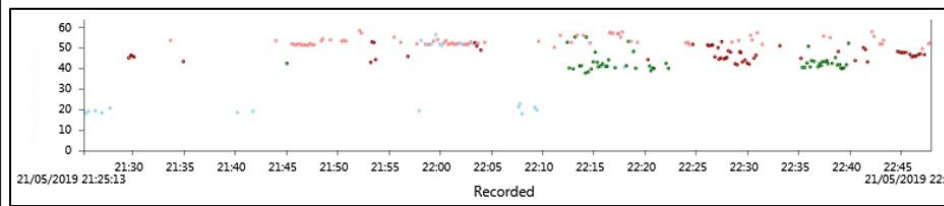
Date : 13-08-19 Checked : JJ

Drawn : GA Approved : N/A

Status : Final Scale : NTS



Species	#	Calls
Nyctalus noctula	24	636
Myotis spec.	54	1253
Pipistrellus pipistrellus	59	1050
Pipistrellus pygmaeus	78	3046



Job Reference : J20563_P4

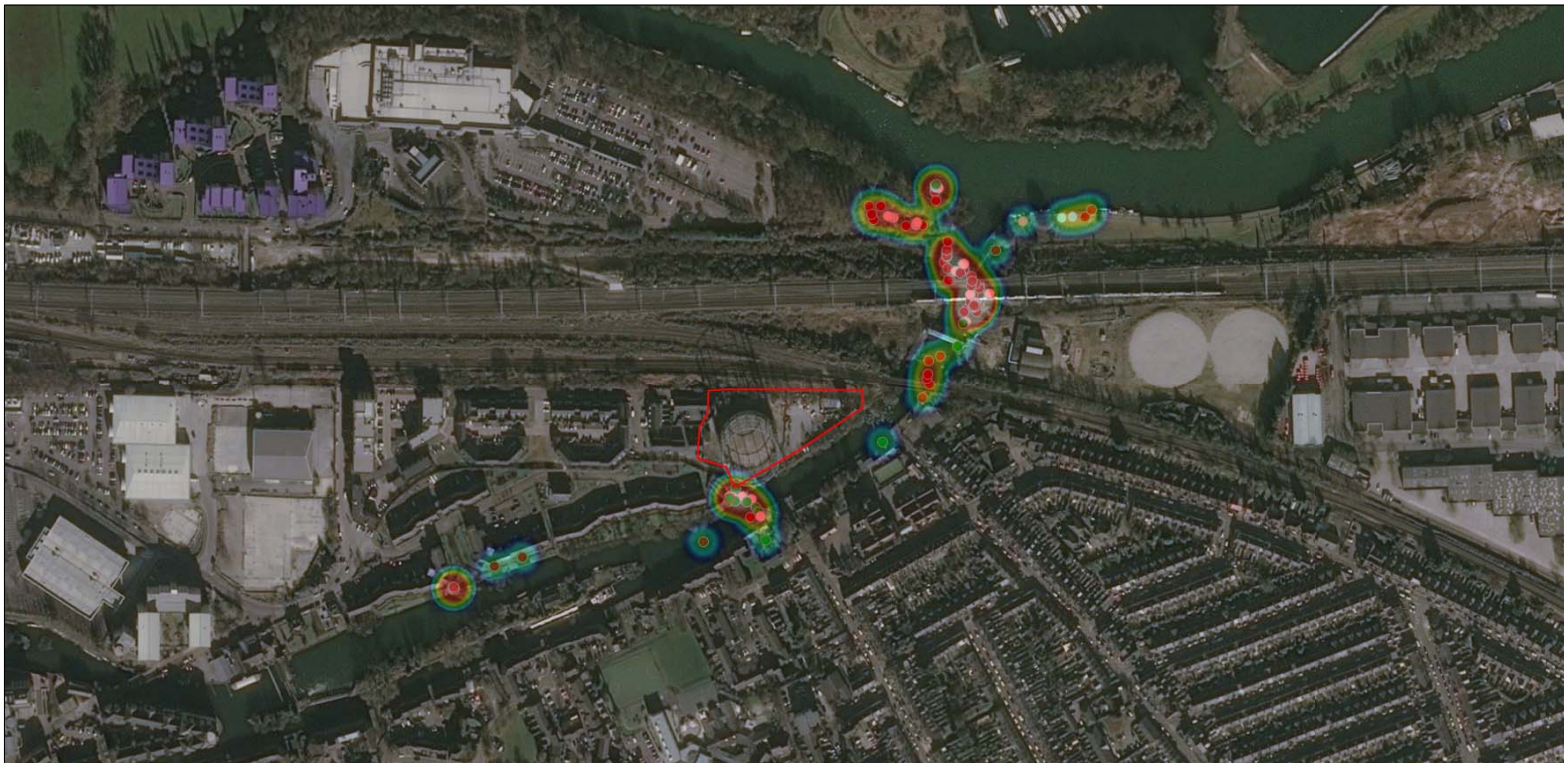
Project Title: Reading SGN

Drawing Title
Figure 3c - Transect Results (May 2019)

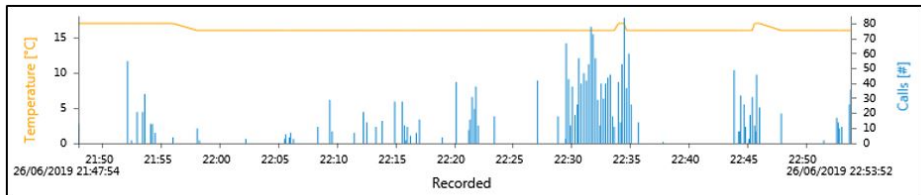
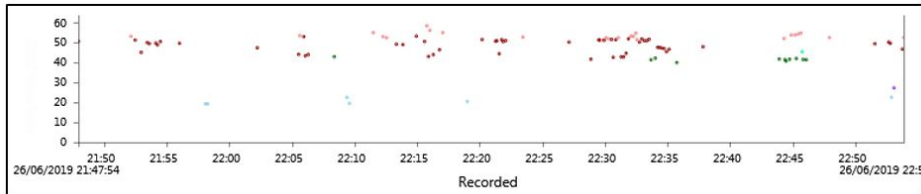
Date : 13-08-19 Checked : JJ

Drawn : GA Approved : N/A

Status : Final Scale : NTS



Species	#	Calls
● <i>Eptesicus serotinus</i>	1	11
● <i>Nyctalus noctula</i>	6	63
● <i>Myotis spec.</i>	12	289
● <i>Pipistrellus pygmaeus</i>	24	566
● <i>Pipistrellus pipistrellus</i>	57	1436



Job Reference : J20563_P4

Project Title: Reading SGN

Drawing Title
Figure 3d - Transect Results (June 2019)

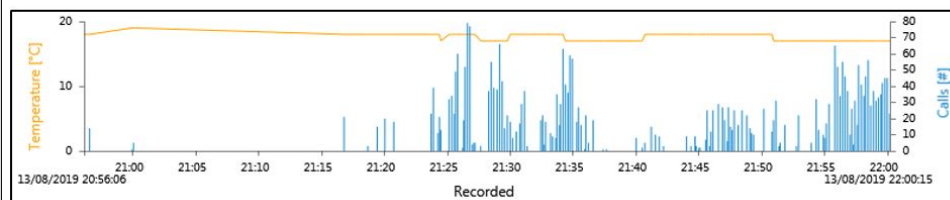
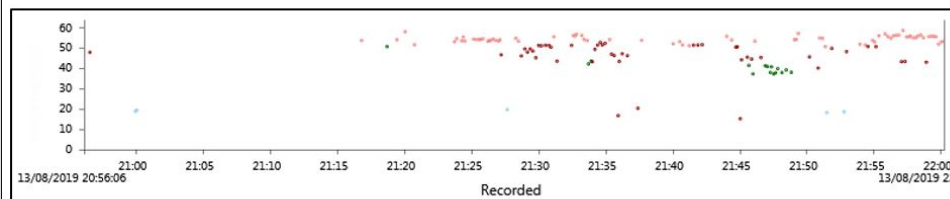
Date : 13-08-19 Checked : JJ

Drawn : GA Approved : N/A

Status : Final Scale : NTS



Species	#	Calls
● <i>Nyctalus noctula</i>	5	17
● <i>Myotis spec.</i>	15	286
● <i>Pipistrellus pipistrellus</i>	48	957
● <i>Pipistrellus pygmaeus</i>	73	1950



Job Reference : J20563_P4

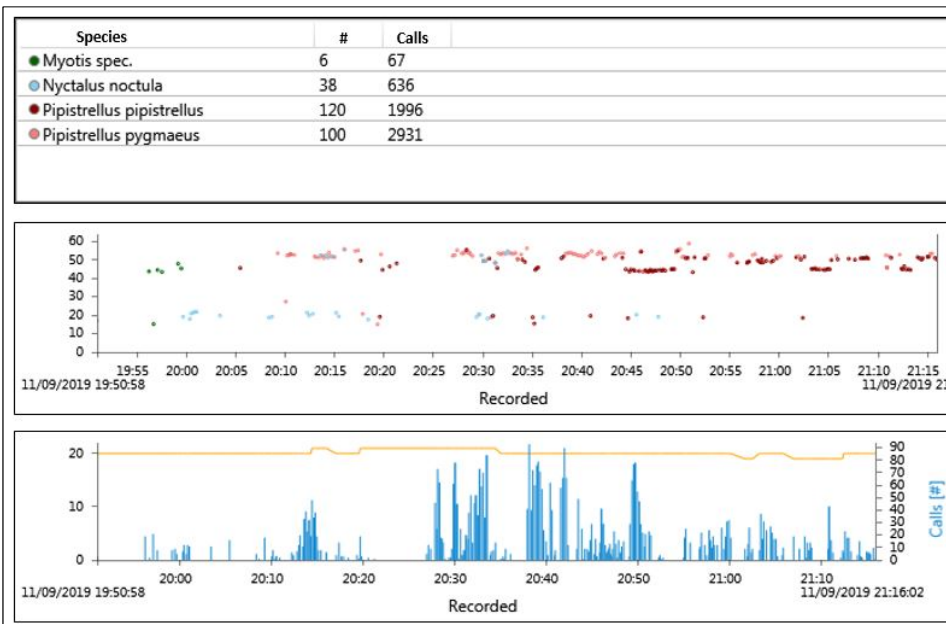
Project Title: Reading SGN

Drawing Title
Figure 3e - Transect Results (August 2019)

Date : 15-08-19 Checked : JJ

Drawn : GA Approved : N/A

Status : Final Scale : NTS



Job Reference : J20563_P4

Project Title: Reading SGN

Drawing Title
Figure 3f - Transect Results (September 2019)

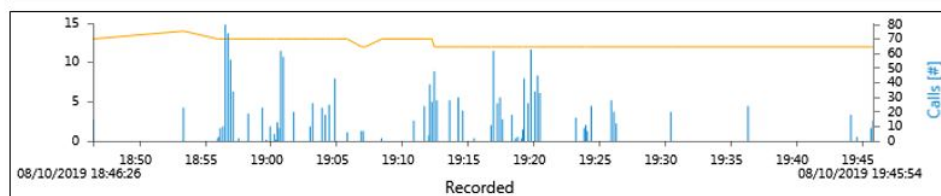
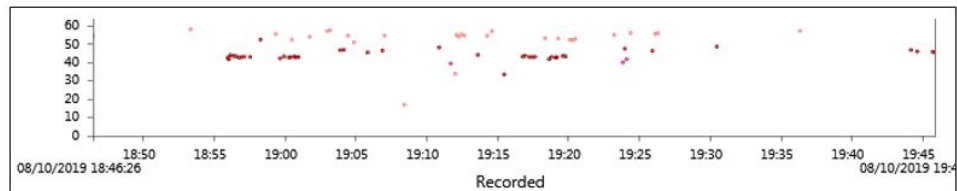
Date : 15-08-19 Checked : JJ

Drawn : GA Approved : N/A

Status : Final Scale : NTS



Species	#	Calls
● Pipistrellus pipistrellus	44	884
● Pipistrellus pygmaeus	29	673
● Plecotus spec.	3	40



Job Reference : J20563_P4

Project Title: Reading SGN

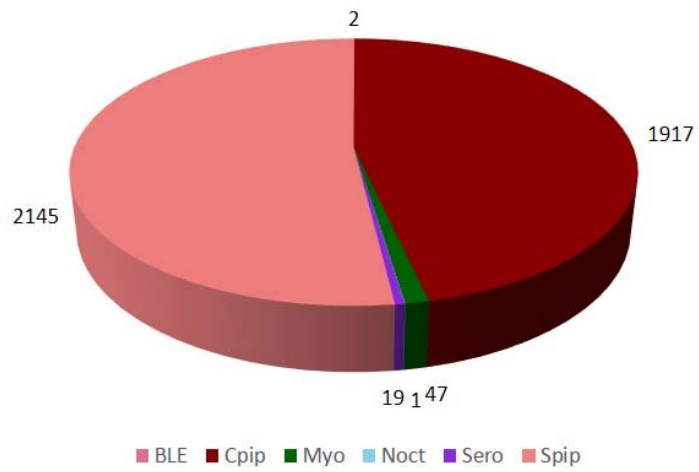
Drawing Title
Figure 3g - Transect Results (October 2019)

Date : 14-10-19 Checked : JJ

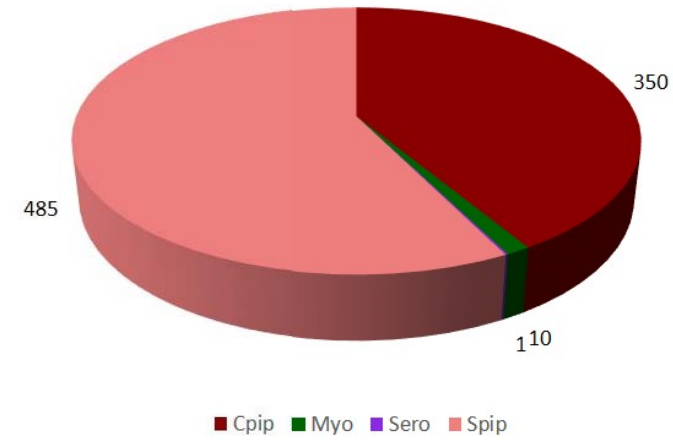
Drawn : GA Approved : N/A

Status : Final Scale : NTS

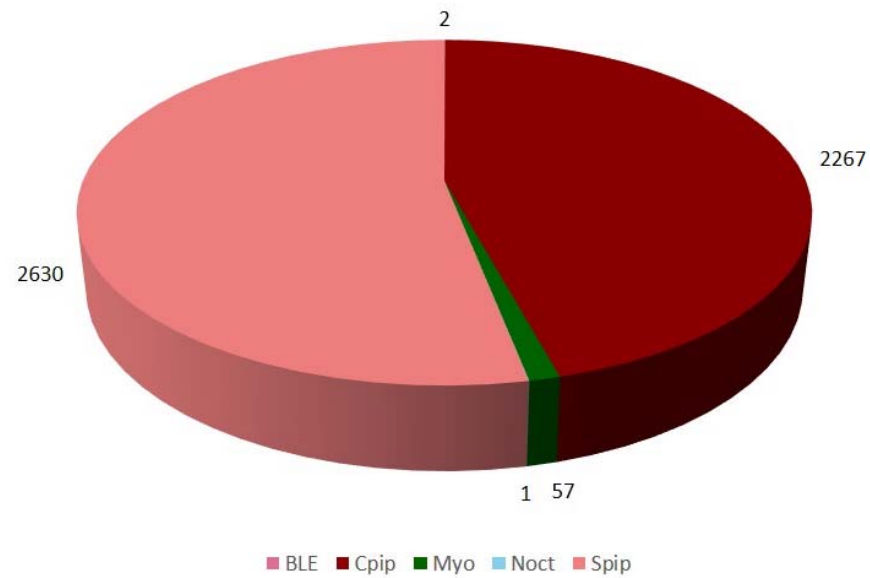
May 2019_Anabat 1_North



May 2019_Anabat 2_South



May 2019_Combined Anabat Results



Job Reference : J20563_P4

Project Title: Reading SGN

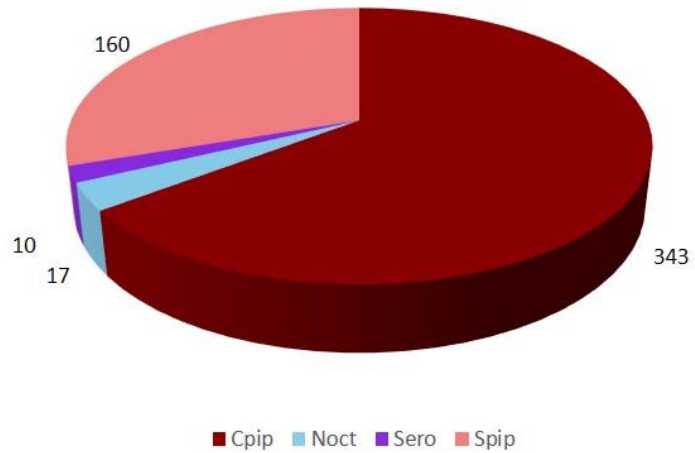
Drawing Title
Figure 4a - Static Detector Results (May 2019)

Date : 12-08-19 Checked : JJ

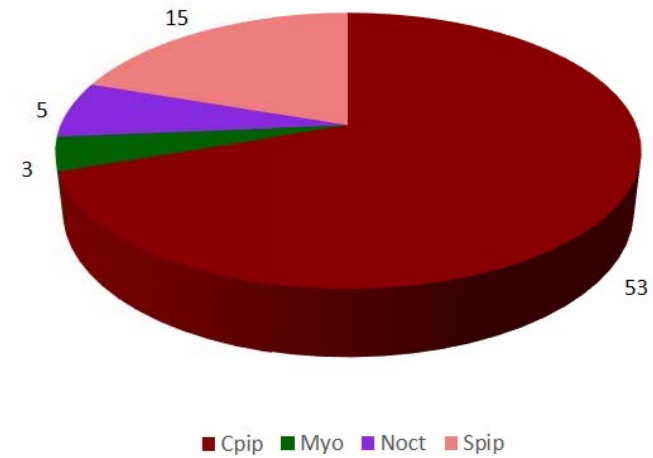
Drawn : GA Approved : N/A

Status : Final Scale : NTS

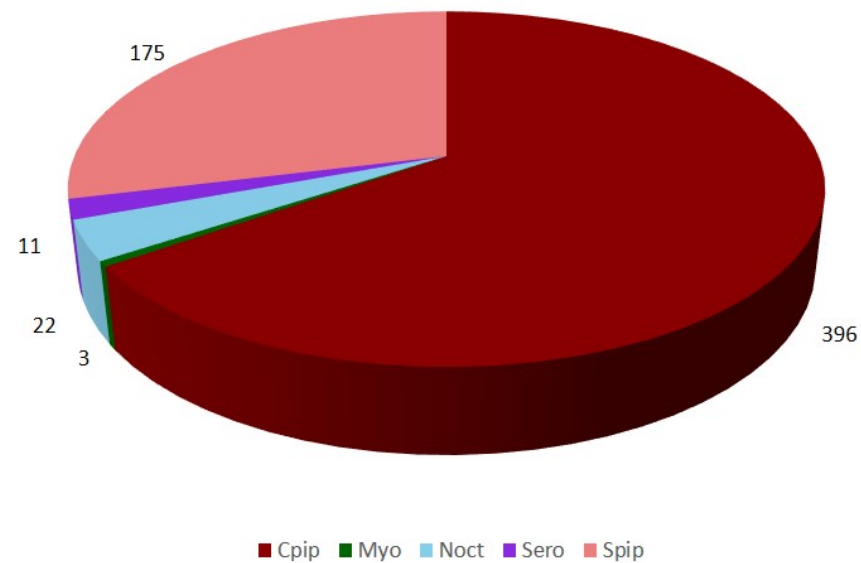
June 2019_Anabat 1_North



June 2019_Anabat 2_South



June 2019_Combined Anabat Results



Job Reference : J20563_P4

Project Title: Reading SGN

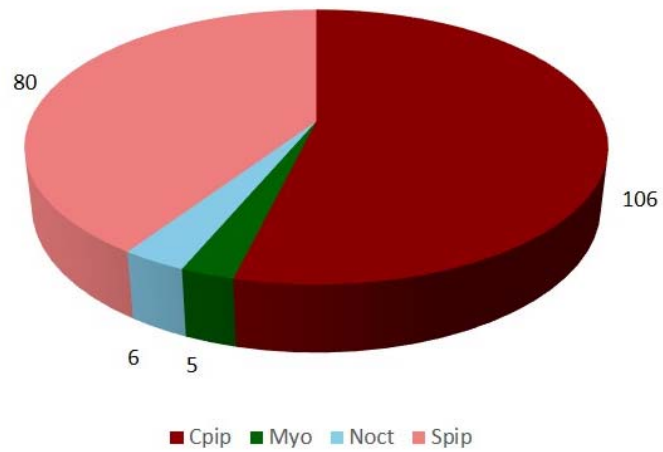
Drawing Title
Figure 4b - Static Detector Results (June 2019)

Date : 12-08-19 Checked : JJ

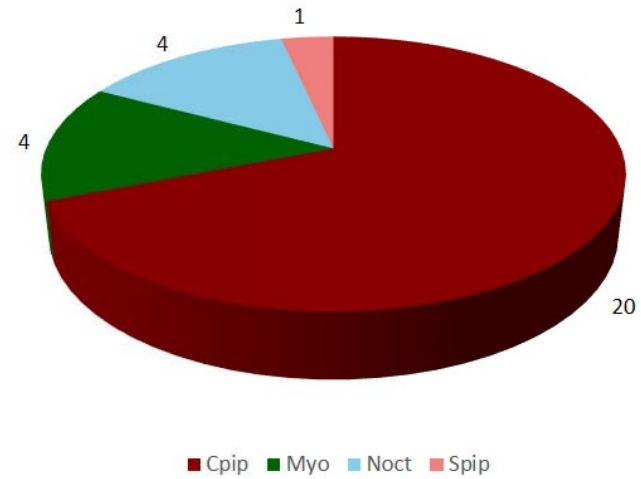
Drawn : GA Approved : N/A

Status : Final Scale : NTS

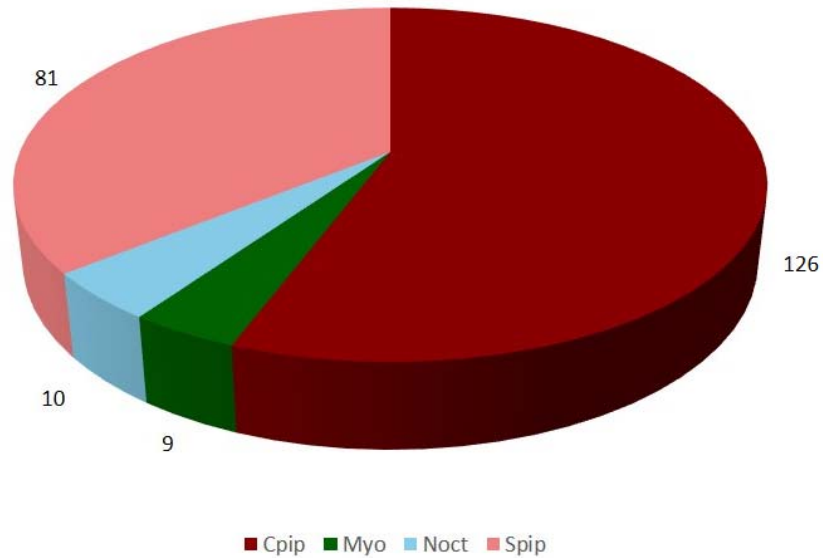
July 2019_Anabat 1_North



July 2019_Anabat 2_South



July 2019_Combined Anabat Results



Job Reference : J20563_P4

Project Title: Reading SGN

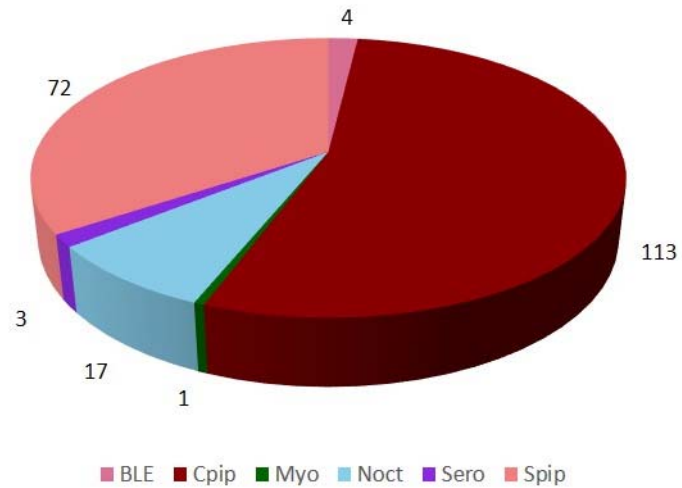
Drawing Title
Figure 4c - Static Detector Results (July 2019)

Date : 12-08-19 Checked : JJ

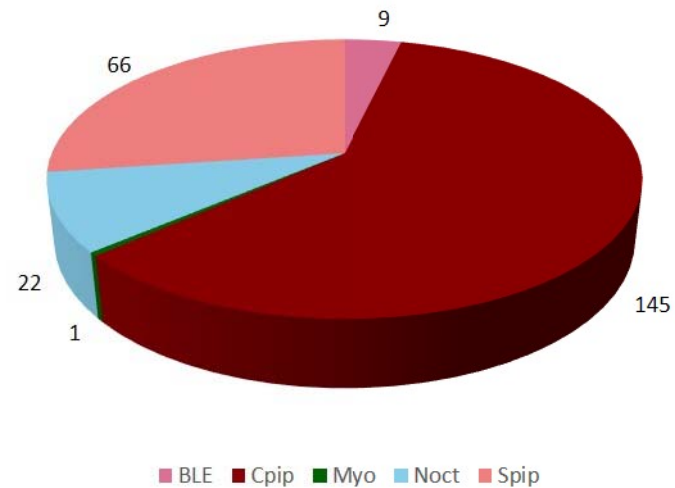
Drawn : GA Approved : N/A

Status : Final Scale : NTS

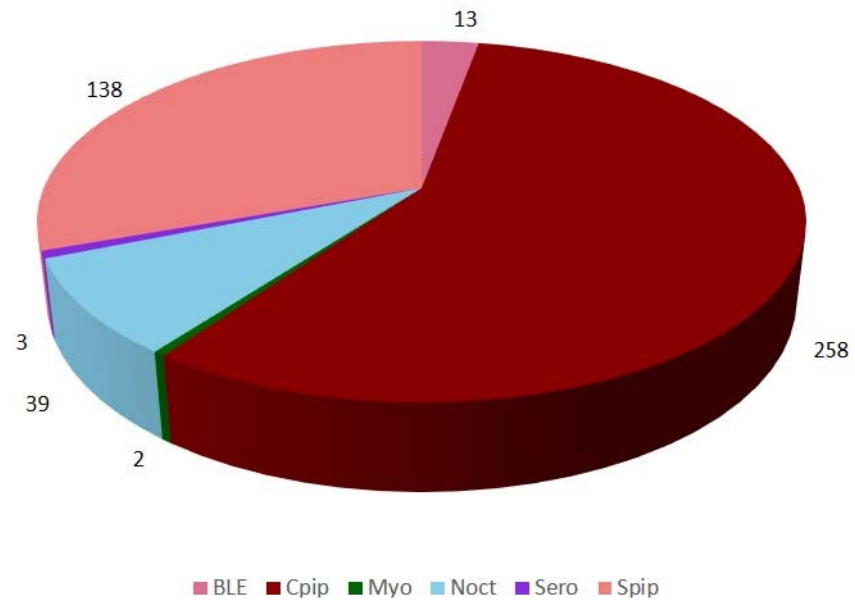
August 2019_Anabat 1_North



August 2019_Anabat 2_South

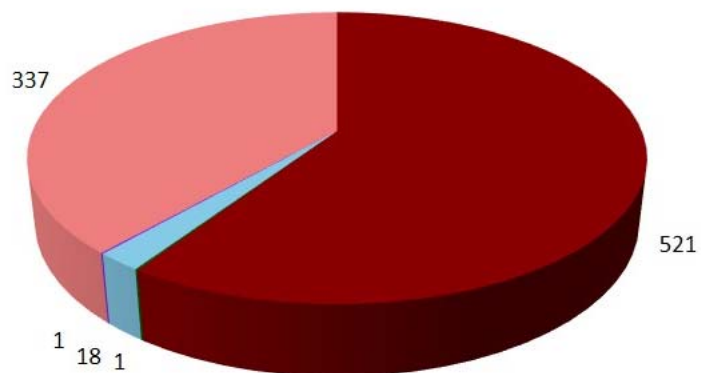


August 2019_Combined Anabat Results



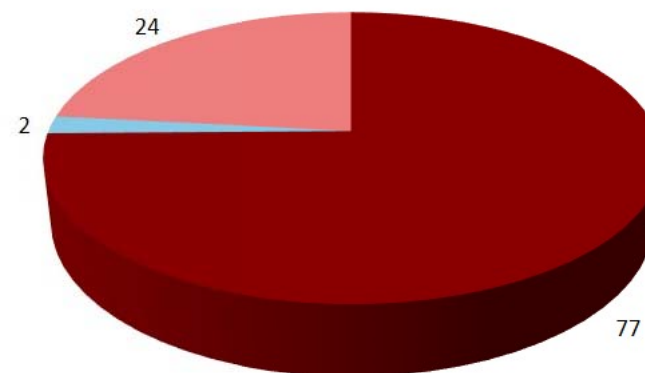
Job Reference : J20563_P4
 Project Title: Reading SGN
 Drawing Title
 Figure 4d - Static Detector Results (August 2019)
 Date : 12-08-19 Checked : JJ
 Drawn : GA Approved : N/A
 Status : Final Scale : NTS

September 2019_Anabat 1_North



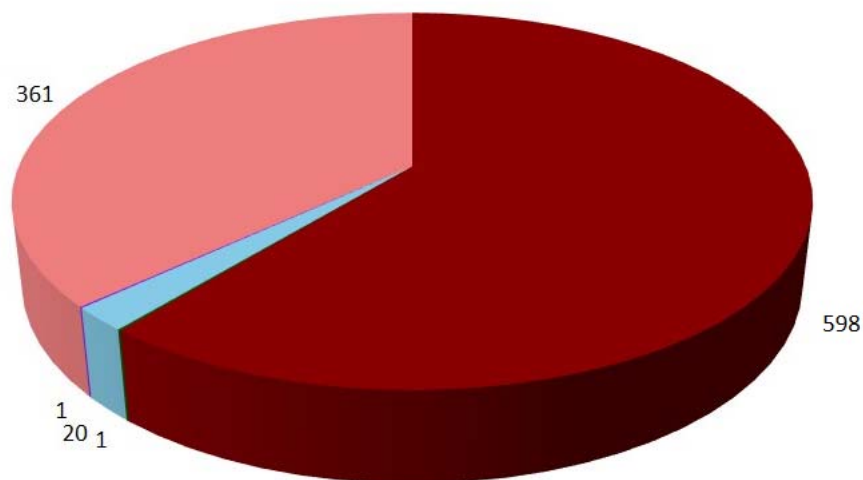
■ Cpip ■ Myo ■ Noct ■ Sero ■ Spip

September 2019_Anabat 2_South



■ Cpip ■ Noct ■ Spip

September 2019_Combined Anabat Results



■ Cpip ■ Myo ■ Noct ■ Sero ■ Spip

Job Reference : J20563_P4

Project Title: Reading SGN

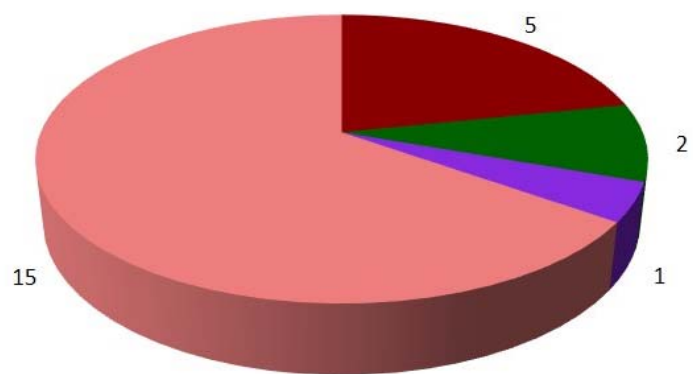
Drawing Title
Figure 4e - Static Detector Results (Sept 2019)

Date : 17-10-19 Checked : JJ

Drawn : GA Approved : N/A

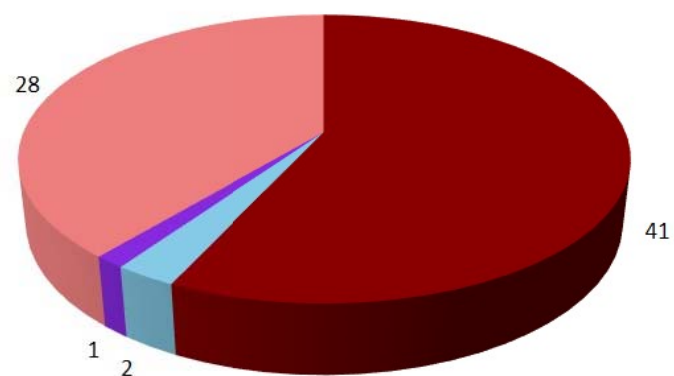
Status : Final Scale : NTS

October 2019_Anabat 1_North



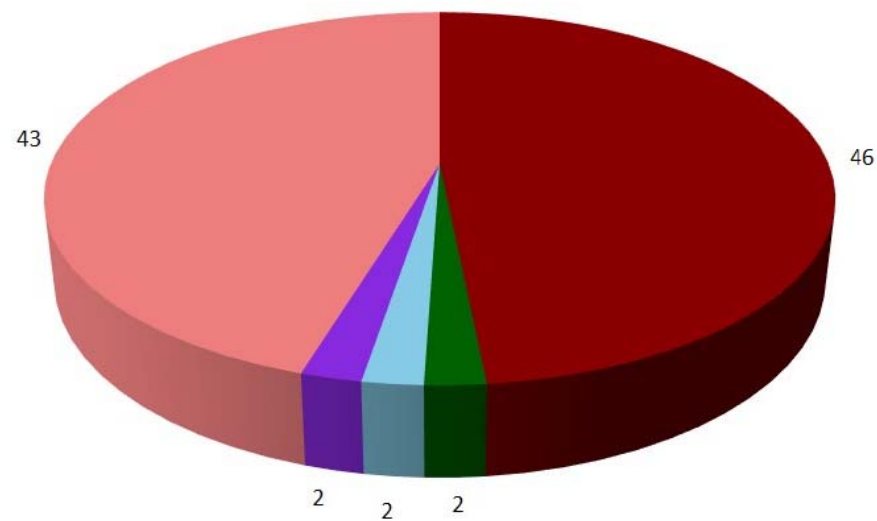
■ Cpip ■ Myo ■ Sero ■ Spip

October 2019_Anabat 2_South



■ Cpip ■ Noct ■ Sero ■ Spip

October 2019_Combined Anabat Results



■ Cpip ■ Myo ■ Noct ■ Sero ■ Spip

Job Reference : J20563_P4

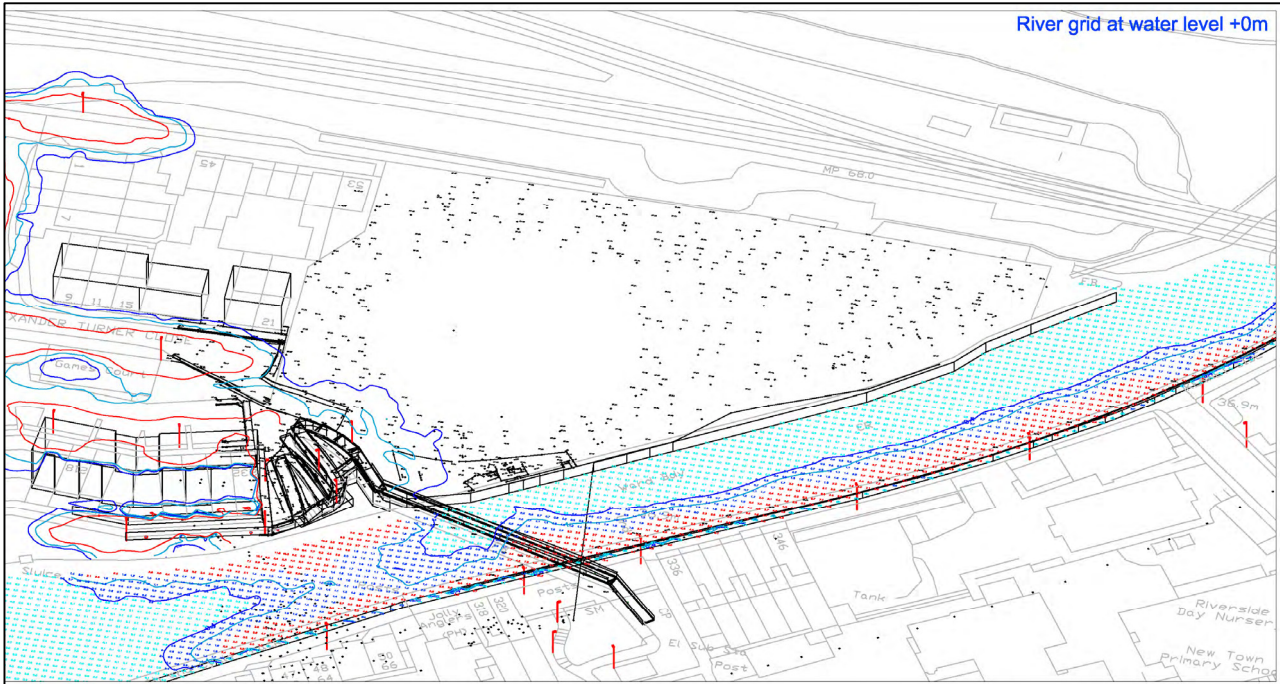
Project Title: Reading SGN

Drawing Title
Figure 4f - Static Detector Results (Oct 2019)

Date : 17-10-19 Checked : JJ

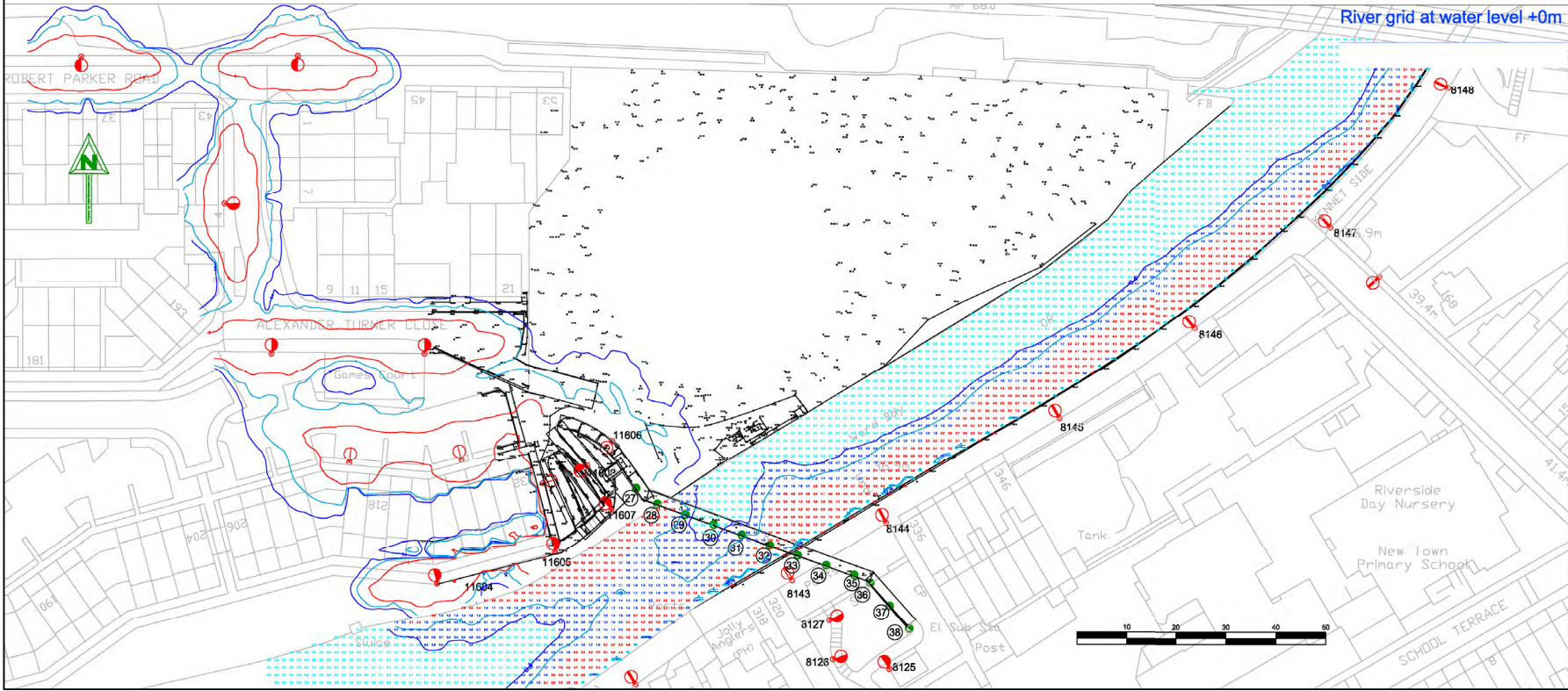
Drawn : GA Approved : N/A

Status : Final Scale : NTS



This drawing includes the light from the existing street lighting around the development.

It does not take account of lumen depreciation of any light sources.



Notes

1. In this instance the use of 3 dimensional masking has been used to take into consideration the actual position of high sided objects such as buildings and the like. Trees and shrubs etc have not been considered as their masking ability will vary with seasonal conditions.
2. Iso contours produced in this drawing have been created using a conventional symmetrical grid. This does not take into account the spacing or weightings as detailed in BS5489 or BS EN 13201-3:2003.
3. The water level in the river has been modelled at 35.31m above OS zero level. This data was gathered from the topographical survey.
4. The ground level for the north side of the site has been modelled 38.45m above OS zero level.
5. The ramps and footbridge have been models using data from the 3D survey, the height of the ramp and footbridge varies

Key

- Existing 6m column with post mounted Urbis Axia with 24 cool white LED
- Existing 6m column with post mounted WRTL Stela wide with 18 no cool white LED
- Existing 5m column with post mounted Holophane VMX lantern with 16 no warm white LED
- Existing 5m column with post mounted Philips ME lantern and 70w SONT lamp
- Existing 5m column with post mounted Urbis Axia with 24 cool white LED
- Existing wall mounted wall packet lantern 70w SONT assumed
- Proposed column number
- Existing column number
- 5.0 lux iso-contour line
- 1.0 lux iso-contour line
- 0.40 lux iso-contour line

Job Reference : J20563_P4

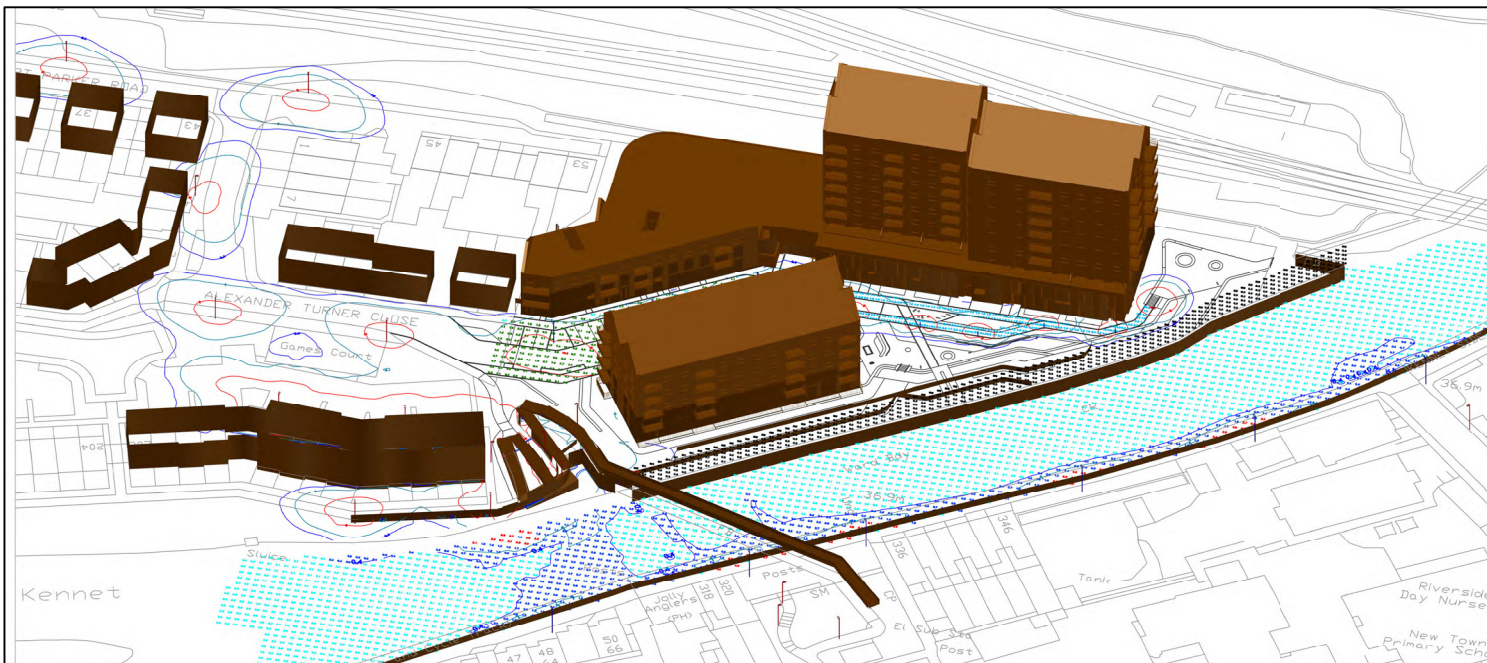
Project Title
Reading SGN Site

Drawing Title
Figure 5 - Existing Lux level Impact Plan

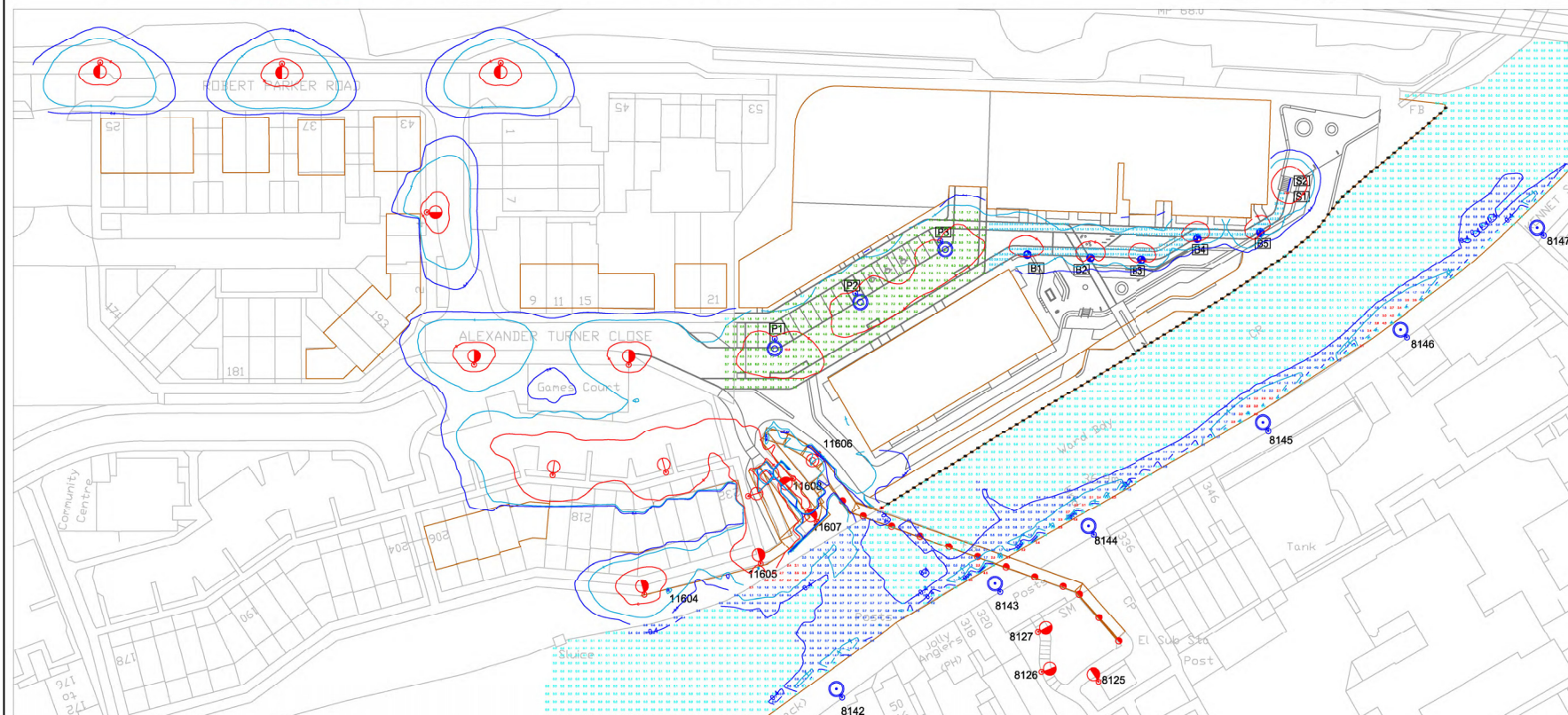
Date : 23-10-19 Checked : JJ

Drawn : GN Approved : N/A

Status : Final Scale : NTS



River Bank Vertical grid @39m	
93 points	
LUX perpendicular to surface	
Average	0.0
Maximum	1.0
Minimum	0.0
Min/Avg(Uo)	0.000
Min/Max	0.000
Coef Var	3.417
River Bank Vertical grid @40m	
93 points	
LUX perpendicular to surface	
Average	0.0
Maximum	1.0
Minimum	0.0
Min/Avg(Uo)	0.000
Min/Max	0.000
Coef Var	3.753
River Bank Vertical grid @41m	
93 points	
LUX perpendicular to surface	
Average	0.0
Maximum	0.9
Minimum	0.0
Min/Avg(Uo)	0.000
Min/Max	0.000
Coef Var	3.868
River Bank Vertical grid @42m	
93 points	
LUX perpendicular to surface	
Average	0.0
Maximum	0.7
Minimum	0.0
Min/Avg(Uo)	0.000
Min/Max	0.000
Coef Var	4.560
River Bank Vertical grid @43m	
93 points	
LUX perpendicular to surface	
Average	0.3
Maximum	0.3
Minimum	0.000
Min/Avg(Uo)	0.000
Min/Max	0.000
Coef Var	3.726
Footpaths	
107 points at p=36.45, sp 1m by 1m	
HORIZONTAL LUX	
Average	4.7
Maximum	79.4
Minimum	0.7
Min/Avg(Uo)	0.147
Min/Max	0.010
Coef Var	1.367
UnifGrad	6.97
Car Park	
380 points at p=38.45, sp 1.5m by 1.5m	
HORIZONTAL LUX	
Average	4.7
Maximum	10.8
Minimum	0.7
Min/Avg(Uo)	0.148
Min/Max	0.065
Coef Var	0.517
UnifGrad	2.13



Notes

- In this instance the use of 3 dimensional masking has been used to take into consideration the actual position of high sided objects such as buildings and the like. Trees and shrubs etc have not been considered as their masking ability will vary with seasonal conditions.
- Iso contours produced in this drawing have been created using a conventional symmetrical grid. This does not take into account the spacing or weightings as detailed in BS5489 or BS EN 13201-3:2003.
- The water level in the river has been modelled at 35.31m above OS zero level. This data was gathered from the topographical survey.
- The ground level for the north side of the site has been modelled 38.45m above OS zero level.
- The ramps and footbridge have been models using data from the 3D survey, the height of the ramp and footbridge varies.

Key

- Existing 6m column with post mounted Urbis Axia with 24 cool white LED
- Existing 6m column with post mounted WRTL Stela wide with 18 no cool white LED
- Existing 5m column with post mounted Holophone VMX lantern with 16 no warm white LED
- Existing 5m column with post mounted Philips ME lantern and 70w SONT lamp
- Existing 5m column with post mounted Urbis Axia with 24 cool white LED
- Existing wall mounted wall packet lantern 70w SONT assumed
- DW Windsor Garda Hand rail.
- 2 no 1.2m section on free standing posts with 2700K LED to deliver 1400 lumens
- TRT Lighting VIA steel bollard with ASY distribution CLO 2700K LED
- Proposed 5m steel column with TRT aspect Eco with 12 no 2700K LED- GA1 lens- internal driver to deliver L90 CLO at 2290 lumens and photocell set to switch on at 35 lux
- Existing 6m column fitted with Philips Luma Micro (BGP615_DN10_1000_6LED_5.1S_CLO_L90_WW) at zero degree tit

11 Project column number

11606 Existing column number

- 5.0 lux iso-contour line
- 1.0 lux iso-contour line
- 0.40 lux iso-contour line

Job Reference : J20563_P4

Project Title
Reading SGN Site

Drawing Title
Figure 6 - Proposed Lux Levels Impacts Plan
(Street Lamp Alteration Strategy)

Date : 23-10-19 Checked : JJ

Drawn : GN Approved : N/A

Status : Final Scale : NTS

Greenspace Ecological Solutions

No dimensions are to be scaled from this drawing.
All dimensions are to be checked on site. All measurements are for indicative purposes only