

# A1 Birtley to Coal House

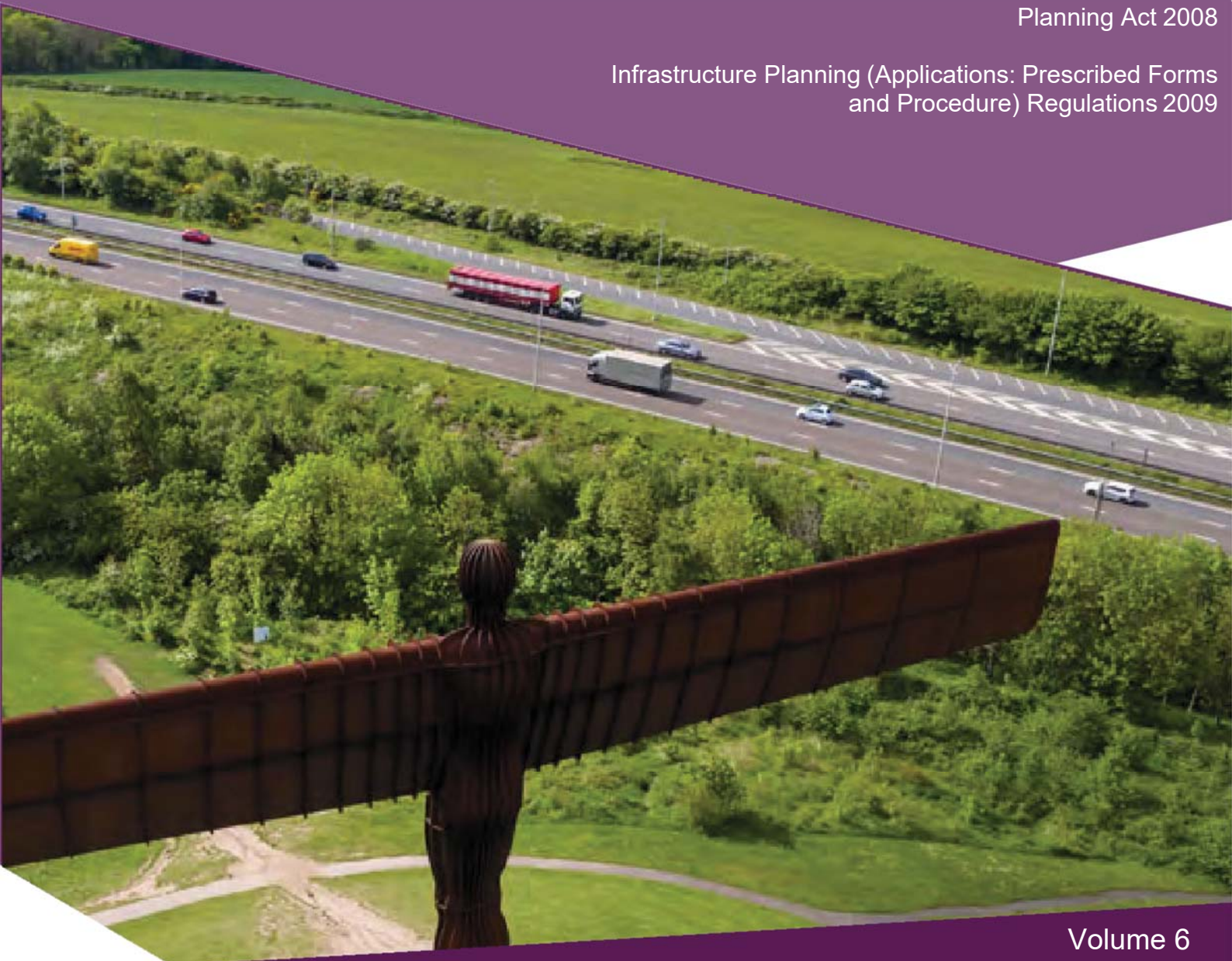
## Scheme Number: TR010031

### 6.3 Environmental Statement – Appendix 8.3 Bat Activity Survey Report

APFP Regulation 5(2)(a)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed Forms  
and Procedure) Regulations 2009



Infrastructure Planning

Planning Act 2008

**The Infrastructure Planning  
(Applications: Prescribed Forms and  
Procedures) Regulations 2009**

**A1 Birtley to Coal House  
Development Consent Order 20[xx]**

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**Environmental Statement -  
Appendix**

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|-----------------------------------------------|------------------------------------------------------------|
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## EXECUTIVE SUMMARY

WSP was commissioned by Highways England to undertake bat activity surveys in support of proposals for the A1 Birtley to Coal House Scheme. The Scheme is located between J65 (Birtley) and J67 (Coal House) and is approximately 6.5 km in length, as shown on **Figure 1**. The Scheme involves on-line widening, upgrading and the replacement of Allerdene Bridge, to enable the retention of Coal House interchange.

A Preliminary Ecological Appraisal undertaken by WSP (then WSP | Parson Brinckerhoff) during 2015, identified the Scheme as having 'Low' bat suitability. The desk study, undertaken as part of the Preliminary Ecological Appraisal (PEA), returned 35 bat records within 1 km of the Scheme.

Bat activity surveys were undertaken during May, July and October 2017 (spring, summer and autumn), which included walked transect and automated detector surveys. The area covered during the activity survey included areas of suitable bat foraging and commuting habitat within approximately 30 m of the Scheme (hereafter referred to as the 'Study Area'). Suitable habitats within the Study Area include woodland and scrubland, covering approximately 5.75 hectares.

During the walked transect surveys common pipistrelle, soprano pipistrelle and Myotis species were recorded using the habitats within the Study Area for commuting and foraging. Automated detector surveys returned two species of bat, namely common pipistrelle and noctule.

Mitigation and enhancement measures have been recommended within this report. The measures include landscape planting in order to retain or enhance connectivity to commuting and foraging habitats as well as forming a buffer between wider foraging and commuting habitat and the Scheme. Sensitive lighting schemes have also been recommended, covering both construction and operational phases.

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# 1 INTRODUCTION

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## 1.1 PROJECT BACKGROUND

- 1.1.1. WSP was instructed by Highways England to conduct bat activity surveys in support of the proposed widening scheme of the A1 between Birtley and Coal House.
- 1.1.2. The A1 Birtley to Coalhouse Scheme, hereafter referred to as "the Scheme", is 6.5km in length and will include replacement of Allerdene Bridge. Most of the work will take place within the highway boundary, however, some additional land will be required alongside the A1 at certain points to enable the additional lanes to be constructed.
- 1.1.3. The Scheme will provide additional capacity by widening to four lanes between junction 65 and 67 on the southbound carriageway and three lanes with an additional lane to help manage traffic joining and leaving the A1 between junctions on the northbound carriageway. It also includes a replacement structure of Allerdene Bridge to the immediate south of the current structure, which will tie in to the existing junction 67 Coal House roundabout. The Scheme will also look to install electronic signage to provide driver information along the road.

## 1.2 ECOLOGICAL BACKGROUND

- 1.2.1. WSP (then WSP | Parsons Brinckerhoff) undertook a Preliminary Ecological Appraisal (PEA)<sup>1</sup> during 2015 (WSP|PB, 2016), which identified potential foraging and commuting habitat for bats within the Scheme Footprint. Habitats identified include woodland, scattered trees, scrub, hedgerows, and poor semi-improved grassland measuring approximately 5.75 ha. Roosting habitats, including the Allerdene Bridge which is scheduled for demolition, are being considered in a separate report (WSP, 2017).
- 1.2.2. Woodland and hedgerows adjacent to the Scheme provide connectivity to features within the wider landscape including optimal foraging and commuting habitat.
- 1.2.3. The desk study carried out as part of the PEA in 2015 returned records of brown long-eared bat *Plecotus auritus*, common pipistrelle *Pipistrellus pipistrellus*, noctule *Nyctalus noctula* and soprano pipistrelle *Pipistrellus pygmaeus* within 1 km of the Scheme (WSP|PB, 2016). The details of these records were not confirmed by the Ecological Records Centre.

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<sup>1</sup> The Preliminary Ecological Appraisal report in question is titled Extended Phase 1 Habitat Survey; however, in this report it has been referred to as a PEA report.

## 1.3 BRIEF AND OBJECTIVES

1.3.1. WSP was commissioned to undertake bat activity surveys within potential bat commuting and foraging habitats along or immediately adjacent to the Scheme (the area covered during the bat activity surveys is hereafter referred to as the 'Study Area'). The objectives of the survey were to:

- Identify the species composition of bats utilising the land within the Study Area;
- Provide an indication of relative bat activity levels throughout the Study Area;
- Evaluate the value of the habitats within the Study Area for bats and any key areas of activity;
- Enable recommendations for how proposals should account for bats with respect to legislation, planning and biodiversity policy; and
- Provide information to guide recommendations for appropriate mitigation and enhancement measures to provide an overall biodiversity gain in respect to bats.

## 2 METHODOLOGY

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### 2.1 SURVEY RATIONALE

- 2.1.1. The PEA undertaken during 2015 (WSP|PB, 2016) utilised the Second Edition of the Bat Conservation Trust (BCT) Bat Surveys Good Practice Guidelines (Hundt, et.al. 2012) to classify the habitat suitability for bats. However, following the publication of the Third Edition of the Guidelines (Collins, 2016); this later edition was utilised to determine the required survey effort.
- 2.1.2. A number of suitable habitats are present within the Study Area, including woodland (continuous and woodland rides), scattered trees, scrub, hedgerows and poor semi-improved grassland, which typically provide a mosaic of suitable foraging and commuting habitats. However, the Study Area is exposed to disturbance effects from the adjacent A1, which reduces the habitat suitability for bats (Berthinussen and Altringham, 2012). This is considered to create an impact on both the species composition and overall activity levels.
- 2.1.3. Therefore, given the perceived disturbance, it is considered that the Study Area provides 'Low' suitability habitat for bats as defined in the Guidelines (Collins, 2016).
- 2.1.4. As per Table 8.3 in Collins (2016) for such sites with 'Low' suitability habitat, the following visit frequency and timing for activity and automated detector surveys is recommended:
- Walked transect Survey: single survey visit per season (spring – April/May, summer – June/July/August, autumn – September/October) in appropriate weather conditions for bats; and
  - Automated Detector Survey: single location per transect, data to be collected on five consecutive nights per season (spring – April/May, summer – June/July/August, autumn – September/October) in appropriate weather conditions for bats.
- 2.1.5. Given that the project includes widening of an existing scheme and no additional severance of habitats will occur, it is considered that additional surveys in line with the DEFRA guidelines (Berthinussen, A. and Altringham, J., 2015) would not be required. In addition, the guidance specifically states that areas of woodland should be avoided when designing surveys. However, this would not be achievable within this Study Area (Berthinussen, A. and Altringham, J., 2015).

### 2.2 DESK STUDY

- 2.2.1. The data search was undertaken as part of the PEA in order to identify records of legally protected or notable species in proximity to the Scheme (WSP|PB, 2016). For bat species, the search radius for records was 1 km from the Scheme Footprint. Data was sourced from:
- Environmental Records and Information Centre North East (ERIC NE);
  - Durham Bat Group; and
  - EnVIS data from Area 14 MAC.



- 2.2.2. The search radii were selected with regard for the Institute of Environmental Assessment guidelines (IEA, 1995) and Chartered Institute of Ecology and Environmental Management Guidelines for Preliminary Ecological Appraisal (CIEEM, 2013), the guidance available at the time.
- 2.2.3. The desk study was updated in March 2018 with an updated data search requested from ERIC NE. The search radius for bats was extended to 2km from the Scheme Footprint.

### **2.3 WALKED TRANSECT SURVEYS**

- 2.3.1. A walked transect route was designed using the Bat Conservation Trust Good Practice Guidelines (BCT, 2016) around the suitable habitats for bat foraging and commuting identified in the PEA (WSP|PB, 2016). The habitats comprised woodland, grassland, scrubland, buildings and hardstanding.
- 2.3.2. The transect route is shown in **Figure 2**. The activity transect route was split into three sections. On occasions where the transect began at Point Count (PC) 1 surveyors walked from PC1 to 2 and then doubled back on themselves before driving to the start of section two and PC3. PC 3-4 were walked before surveyors walked over to the remained of section 3 (PC5-7), finishing south east of the Angel of the North. Surveyors walked back to the start of section 3 (15minutes) and then commenced section 4 and PCs 8-10. Time spent walking between sections totalled an estimated 20mins. This process was done in reverse when starting at PC10.
- 2.3.3. The walked transect route was surveyed in line with the requirements for a 'Low' suitability site, including a single visit per survey season, namely: spring, summer and autumn. It was walked at a constant pace by two surveyors, in order for them to record bat activity (seen and/or heard) along the route. The direction of travel along the transect routes alternated between the first, second and third bat activity surveys to ensure that the various habitats were surveyed at different times. Five minute long point counts were conducted at each of the 10 sample point location. Sample points were mapped at locations along the transect route, which exhibit features suitable for bat foraging or commuting (i.e. hedgerow or woodland ride) or where significant changes to the type of habitat were identified.
- 2.3.4. The habitats and areas to the south of the Scheme have been omitted from the survey effort as drawings and information available at the time of survey show the Scheme Footprint narrowing at the southern half of the Study Area. Current Highways General Arrangement drawings illustrate that works south of Junction 66 are localised to within the highway boundary and the central reservation, with few locations where a land grab outside the highway boundary is required (WSP 2018). Land grabs outside of the highway boundary are located north of the southbound carriageway; these habitats include thin swathes of semi improved grassland and scattered broadleaved trees totalling approximately 0.6 hectares (excluding habitats within the highway boundary).

**Table 2-1 - Bat activity transect point count description**

| <b>Point count</b> | <b>Grid reference</b> | <b>Habitat description</b>                                                                                                                   |
|--------------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| 1                  | NZ 25149<br>58481     | On gravel track adjacent to broadleaved woodland, semi-improved grassland and fence line. Section 1.                                         |
| 2                  | NZ 25460<br>58463     | On gravel track adjacent to a small area of broad-leaved woodland, semi-improved grassland and the East Coast Mainline Railtrack. Section 1. |
| 3                  | NZ 25724<br>58273     | In a clearing within mixed species plantation woodland adjacent to the A1. Section 2.                                                        |
| 4                  | NZ 25706<br>58378     | Near the edge of mixed species plantation woodland adjacent to the A1 and further woodland. Section 2.                                       |
| 5                  | NZ 25825<br>58271     | In a clearing within mixed species plantation woodland adjacent to the A1. Section 2.                                                        |
| 6                  | NZ 26093<br>57973     | In a cleared ride (for telephone cable) within mixed species woodland adjacent to the A1. Section 2.                                         |
| 7                  | NZ 26477<br>57717     | On a footpath between two swathes of mixed species plantation woodland. Section 2.                                                           |
| 8                  | NZ 25805<br>58163     | On a footpath/clearing within mixed species woodland. Section 3.                                                                             |
| 9                  | NZ 25897<br>57944     | At the end of footpath/clearing where woodland becomes more dense. Section 3.                                                                |
| 10                 | NZ 26174<br>57772     | Within area of broad-leaved woodland, under high canopy. Section 3.                                                                          |

- 2.3.5. The surveys were conducted using a hand-held bat detector (BatBox Duet frequency division and heterodyne). When bats were heard and/or seen, the time, location and behaviour was recorded and flight paths were mapped by hand, where possible. Bat detector data was recorded onto a digital recorder for subsequent analysis using Batsound sonogram analysis software, in order to identify bat calls to species/species group level.
- 2.3.6. Surveys were carried out in accordance with BCT guidelines at the time of commission (Collins, 2016). The dusk transect surveys commenced approximately 15 minutes before or at sunset and continued for approximately two to three hours. Details of survey dates and times, sunset times, and weather conditions are provided in **Table 2-2** below.

**Table 2-2 - Survey times and conditions for the walked transect surveys**

| Date     | Surveyors | Sunset /Sunrise Time | Start Time | End Time | Temp (°C) Start-End | Rain | Cloud Cover (Otkas) Start-End) | Wind (Beaufort) Start-End |
|----------|-----------|----------------------|------------|----------|---------------------|------|--------------------------------|---------------------------|
| 17.05.17 | BL & GB   | 21.12                | 20.54      | 23.35    | 14-13               | None | 3-5                            | 2-2                       |
| 03.07.17 | BL & GB   | 21.47                | 21.33      | 23.51    | 14-14               | None | 4-7                            | 1-1                       |
| 18.10.17 | BL & DdP  | 18.00                | 17.45      | 20.20    | 12-11               | None | 8-7                            | 3-3                       |

## 2.4 AUTOMATED DETECTOR SURVEYS

- 2.4.1. As per BCT guidelines (Collins, 2016), a single static detector location was surveyed for at least five consecutive nights in each survey window, spring (April/May), summer (June/July/August) and autumn (September/October).
- 2.4.2. An SM2 Bat+ Detector (SM2) was used for the automated detector survey. The SM2 unit was positioned at shoulder height in a tree, with the microphone angled perpendicular to the trunk. The tree was situated on the edge of a woodland ride approximately 50m north of the southbound carriageway. The microphone was pointing north, away from the A1 along the edge of the woodland. The woodland habitat is connected to further woodland both to the east and west. The SM2 location is shown on **2**.
- 2.4.3. The detector was programmed to record in full spectrum mode from at least 30 minutes before sunset until 30 minutes after sunrise. Details of survey dates and times, sunset/sunrise times, weather conditions and locations are provided in Appendix A.

## 2.5 BAT CALL ANALYSIS

- 2.5.1. Bat calls from the walked transects were analysed using Batsound analysis software to identify bat calls to species level. A bat pass is considered to be a distinct bat call heard on the detector. If activity was continuous, any clear break in activity would result in a second pass being recorded.
- 2.5.2. The automated detector (SM2) files were analysed in zero-crossing format using Analook software to identify bat registrations to species level as far as possible. The SM2 WAV files were converted to zero-crossings using Kaleidoscope software. The automated detector analysis enables confirmation of species or species group based on call parameters and the relative activity of different species of bats by counting the minimum number of bats recorded within discrete sound files.
- 2.5.3. Once triggered by ultrasound, the SM2 detectors record sound files with a duration of 15 seconds, which may contain a number of individual bat calls (or passes), or discrete groups

of ultrasound ‘pulses’. The assessment of relative bat activity between species is based on the relative abundance of recorded calls of each species within each survey period (i.e. each walked transect survey or period of automated monitoring per month) and across the combined study period.

- 2.5.4. It should be recognised that a series of separate sound files may represent a series of different bats commuting within the range of an automated detector, or a smaller number of bats repeatedly triggering the detector (e.g. a single bat making repeated foraging passes within the range of a detector).
- 2.5.5. Where possible, bat calls are identified to species level with reference to published data (Russ, 2012). However, species of the genus *Myotis* are grouped together in most cases as their calls are similar in structure and have overlapping call parameters, making species identification problematic (Russ, 2012). For *Pipistrellus* species the following criteria based on measurements of peak frequency are loosely used to classify calls:
- Common pipistrelle *Pipistrellus pipistrelles*  $\geq 42$  and  $<49$ KHz;
  - Soprano pipistrelles *Pipistrellus pygmaeus*  $\geq 51$ KHz;
  - Nathusius’ pipistrelle *Pipistrellus nathusii*  $<39$ KHz;
  - Common/soprano pipistrelle  $\geq 49$  and  $<51$ KHz; and
  - Common/Nathusius’ pipistrelle  $\geq 39$  and  $<42$ KHz.
- 2.5.6. In addition, the following categories are used for calls, which cannot be identified with confidence due to the overlap in call characteristics between species or species groups:
- *Myotis/Plecotus* sp.;
  - *Nyctalus* sp. (either Leisler’s bat *Nyctalus leisleri* or noctule *Nyctalus noctula*);
  - Serotine *Eptesicus serotinus/Nyctalus* sp.; and
  - Serotine/*Plecotus* sp.
- 2.5.7. The Bat Activity Index (BAI – bat passes per hour or per night) can be used to compare activity in different parts of a site or at different times, but again does not represent the number of bats present. The BAI of each species was calculated for each walked transect survey and automated detector survey.

## 2.6 SURVEY PERSONNEL

- 2.6.1. All surveys were undertaken by experienced bat surveyors all of which are members of CIEEM.

## 2.7 SITE/SPECIES EVALUATION

- 2.7.1. Assessment methods have been undertaken with reference to Wray et al. (2010), i.e. the Scheme’s foraging/commuting habitats were assigned a value using the following geographic frame of reference, which has been adapted from CIEEM (2016) guidelines:
- International;
  - National;

- Regional;
- County;
- District, Local or Parish; and
- Negligible (Not Important).

2.7.2. Individual values were calculated for each species, with the overall site value defined as the highest value obtained for any individual species (usually the least common species present). Details of the habitat valuation system are provided in Appendix B.

## 2.8 LIMITATIONS

- 2.8.1. The walked transect route was designed using the Scheme Footprint available at the time of survey. The drawings illustrated the Scheme Footprint narrowing in the southern half making it difficult to accurately incorporate all habitats into the transect route. Where the Scheme Footprint narrows, safe access to habitats would have been difficult and therefore the route would have covered the swathes of woodland from outside of the Scheme and the results of which may potentially have impacted the accuracy of our findings by returning data which may not pertain to the Scheme. As per BCT best practice guidelines, complementary methods such as spot counts were included in the survey effort for the longest recommended period of 5 minutes (BCT, 2016). The spot counts were located in habitat areas representative of the Scheme.
- 2.8.2. As the works south of junction 66 are localised to the central reservation and small areas of the soft estate and land north of the southbound carriageway, it is not considered that the omission of these areas from survey is a limitation to the study.
- 2.8.3. During the automated detector surveys, rain showers occurred during two nights in the spring and a single night in the summer. These showers were light and short in duration and are not expected to impact the validity of the recordings.
- 2.8.4. In addition, the automated detector surveys were undertaken for differing durations. The spring automated detector was in place for 13 consecutive nights, above the current survey requirements, whilst the summer and autumn were each in place for 5 consecutive nights. The data was manipulated in to bat passes per night to ensure that the data was comparable. Therefore, the difference between the spring and, summer and autumn automated detector survey periods is not considered to be a constraint when comparing data. Therefore, it is considered that the automated detector surveys results are valid.
- 2.8.5. The autumn automated detector survey was installed in September but the autumn activity survey was carried out in October. This is not expected to impact the validity of the recordings nor the conclusions drawn from data comparisons.



### 3 RESULTS

#### 3.1 ORIGINAL DESK STUDY

3.1.1. Bat records returned through the desk study included four species of bat. A summary can be found in **Table 3-1** below.

**Table 3-1 - Desk study bat data**

| Species             | No of Records | Roost Records | Distance and Direction of Nearest Record | Notes                  |
|---------------------|---------------|---------------|------------------------------------------|------------------------|
| Brown long-eared    | 1             | N/A           | 1.7 km north west                        | Closest to junction 67 |
| Common pipistrelle  | 18            | N/A           | 1.7 km north west                        | Closest to junction 67 |
| Noctule             | 5             | N/A           | 1.9 km south                             | Closest to junction 67 |
| Soprano pipistrelle | 11            | N/A           | 1.7 km north west                        | Closest to junction 67 |

3.1.2. The desk study returned one Site of Nature Conservation Importance (SNCI), which is known to support bat roosts. Birtley Northside SNCI lies approximately 250 m west of the southern end of the Scheme. “Several roosts” of “Pipistrellus pipistrellus” were recorded within the citation.

3.1.3. Other sites returned by the desk study did not list bats as significant features and these sites include:

- Lamesley Reedbeds Local Wildlife Site;
- Long Acre Dene LWS;
- Long Acre Wood SNCI;
- Bowes Railway Line SNCI;
- Lamesley Meadows SNCI;
- Birtley Union Brickworks SNCI;
- Dunkirk Farm West SNCI;
- Ravensworth Ponds and Woods SNCI;
- Sheddons Hill SNCI;
- Dunkirk Pond SNCI; and
- River Team Woodlands LWS.

## 3.2 2018 DESK STUDY UPDATE

- 3.2.1. Bat records returned through the desk study in March 2018 included three species of bat. A summary can be found in **Table 3-2** below.

**Table 3-2 - 2018 Update desk study bat data**

| Species             | No. of Records | Roost Records                                                                                   | Distance and Direction of Nearest Record | Notes                  |
|---------------------|----------------|-------------------------------------------------------------------------------------------------|------------------------------------------|------------------------|
| Common pipistrelle  | 93             | 5 roosts associated with a building demolition in 2014 (NZ2658559772. 2km north of Junction 66) | 1.2 km west                              | Closest to Junction 65 |
| Noctule             | 7              | None. Feeding and commuting                                                                     | 2.2 km south west                        | Closest to Junction 66 |
| Soprano pipistrelle | 9              | None. Feeding and commuting                                                                     | 1.4 km north                             | Closest to Junction 67 |

## 3.3 WALKED TRANSECT SURVEYS

- 3.3.1. At least three bat species were recorded during the walked transects, namely common pipistrelle, soprano pipistrelle and Myotis species.
- 3.3.2. During the walked transect surveys, 49 observations of bats were made (including bats that were heard not seen, as well as bat activity that was seen by surveyors). Within these observations of bat activity, a total of 110 bat passes were recorded during the three dusk surveys. **Figure 2** illustrates observations of bats made during the transect surveys and during the five minute point counts, which are recorded within **Table 3-3** below (See Appendix C for data). For example, where a single bat may have been viewed foraging along a treeline the survey map will have been illustrated, species (where possible) listed and behaviours recorded and may have made multiple passes in that time.
- 3.3.3. Of the total bat passes recorded, 89 passes were identified as common pipistrelle, 17 passes were made by soprano pipistrelle and 4 passes by Myotis sp. Therefore 81% of activity was common pipistrelle, 15% was soprano pipistrelle and 4% was Myotis sp.

**Table 3-3 - Summary of walked transect results**

| Survey Date | Transect Direction | Length of Survey (Hrs:Min) | No of bat passes per species (BAI <sup>2</sup> ) |             |             | No. of minutes after sunset before 1 <sup>st</sup> bat recorded | Activity                       |
|-------------|--------------------|----------------------------|--------------------------------------------------|-------------|-------------|-----------------------------------------------------------------|--------------------------------|
|             |                    |                            | C. Pip                                           | S.Pip       | Myotis      |                                                                 |                                |
| 17.05.17    | 1-10               | 2:52                       | 20<br>(6.97)                                     | 5<br>(1.74) | 1<br>(0.35) | 22                                                              | Foraging and commuting         |
| 03.07.17    | 10-1               | 2:24                       | 50<br>(20.83)                                    | 9<br>(3.75) | 0           | 30                                                              | Foraging and limited commuting |
| 18.10.17    | 1-10               | 2:35                       | 19<br>(7.36)                                     | 3<br>(1.16) | 3<br>(1.16) | 41                                                              | Commuting and foraging         |

C.Pip- Common Pipistrelle; S.Pip – Soprano Pipistrelle

### SPRING WALKED TRANSECT

- 3.3.4. During the spring walked transect the first bat was a common pipistrelle, recorded in section 2, near PC 3 in well-lit woodland and woodland edge habitat adjacent to the A1, at 21:34, 22 minutes after sunset. Surveyors observed no bats during the spring walked transect so no flight paths were recorded.
- 3.3.5. Foraging behaviour was not observed by surveyors but recorded at Point Counts (PCs) 3 and 4. Both PCs 3 and 4 are in woodland habitats. Further foraging behaviour was recorded at location C (**Figure 3.1**)
- 3.3.6. Spring walked transect peak activity was recorded in woodland (PCs 3, 4, 6 and 10) and woodland edge (PC 7). Activity recorded between point counts was also associated with woodland (close proximity to PCs 3, 4, 6, 10) and woodland edge with path habitat (close proximity to PC 7).

<sup>2</sup> BAI – Bat Activity Index

### SUMMER WALKED TRANSECT

- 3.3.7. During the summer walked transect the first bat was a common pipistrelle, recorded on the edge of a footpath leading to a well-lit roundabout adjacent to areas of woodland, at 22:17, 30minutes after sunset. Surveyors observed this single bat foraging on a footpath between two swathes of woodland (**Figure 4.3**, Green Circle A).
- 3.3.8. Summer walked transect peak activity was recorded in woodland habitat (PC 3), woodland edge (PC 7) and also along bare ground track and fence-line (PCs 1, 2).
- 3.3.9. The summer walked transect, returned activity recorded between point counts predominantly associated with bare ground track and fence-line (close proximity to PCs 1 – 2); woodland (close proximity to PC 5) and woodland edge habitats (close proximity to PC 7).

### AUTUMN WALKED TRANSECT

- 3.3.10. During the autumn walked transect, the first bat was a common pipistrelle, recorded in woodland and woodland edge habitat adjacent to the A1, at 18:41, 41 minutes after sunset. Surveyors observed no bats during the autumn walked transect, so no flight paths were recorded.
- 3.3.11. Autumn walked transect peak activity was recorded in woodland (PCs 4, 5, 8 and 10). Activity recorded between PCs was also associated with woodland (close to PC 9). See Appendix C for PC raw data

## 3.4 AUTOMATED DETECTOR SURVEYS

- 3.4.1. Two bat species were recorded via the automated detector surveys, namely common pipistrelle and noctule. **Table 3-4** provides a summary of the total bat passes recorded by the automated detector and the BAI values for the automated detector during its deployment. The location of automated detector is provided in **Figure 2**.

**Table 3-4 - Summary of the total bat passes and the bat activity index values for automated detector surveys**

| Month        | N. noctula   |           | C. Pipistrelle |           |
|--------------|--------------|-----------|----------------|-----------|
|              | Total passes | BAI value | Total passes   | BAI value |
| May          | 2            | 0.2       | 26             | 2.6       |
| July         | 0            | 0         | 8              | 1.6       |
| September    | 0            | 0         | 0              | 0         |
| Total Values | 2            | 0.1       | 5              | 1.7       |

- 3.4.2. The automated detector recorded 36 bat passes in total across the three recording periods. No bat passes were recorded during the September automated detector survey. Common pipistrelle and noctule were the only species recorded.



## 4 EVALUATION AND DISCUSSION

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### 4.1 DESK STUDY

- 4.1.1. The desk study highlighted Birtley Northside SNCI which supports “several roosts” of common pipistrelle bats. This SNCI lies 60 m west of the south of the Scheme Footprint. Works nearest to the SNCI are localised to the central reservation and the right hand lane and is therefore unlikely to impacts to the habitats south of the A1. Additionally, disturbance is unlikely to exceed that of general day-to-day use.
- 4.1.2. The habitat at the south of the northbound carriageway was excluded from further bat survey as the works here are limited and the areas of habitat here are isolated, sub-optimal and unlikely to experience disturbance exceeding that experienced on a daily basis. Therefore, the presence of common pipistrelle roosts within the neighbouring SNCI is not considered to constrain the Scheme. Within the 60m between the Scheme and Birtley Northside SNCI is an under construction residential development.

### 4.2 GENERAL ACTIVITY ACROSS THE SCHEME

- 4.2.1. The summer walked transect survey recorded the most bat activity with BAI scores of 20.83 and 3.75 for common pipistrelle and soprano pipistrelle respectively. The spring walked transect had BAI scores of 6.97, 1.74, and 0.35 for common pipistrelle, soprano pipistrelle and Myotis sp, respectively.
- 4.2.2. The lowest levels of activity were recorded during the autumn walked transect. BAI scores were 7.36, 1.16 and 1.16 for common pipistrelle, soprano pipistrelle and Myotis sp, respectively.
- 4.2.3. Activity during the walked transects was primarily located along the edge of woodland, along tracks/footpaths and inside the woodland within the Study Area.
- 4.2.4. The spring period of automated detector survey recorded the highest level of bat activity. The summer period of automated detector survey recorded less bat activity. The September period of automated detector survey recorded no bat activity.

### 4.3 FORAGING AND COMMUTING HABITAT

- 4.3.1. During the walked transects peak levels of activity were recorded adjacent to a fence, which boarded an area of scrub (See **Figure 6** – between Point Counts 1 and 2). All activity recorded at this location is within the Scheme, apart from bat activity point K, recorded during the summer transect (See **Figure 4.1**). This habitat type will be lost as part of the Scheme and it is important that landscaping proposals mitigate this. Recommendations are made in Section 5.
- 4.3.2. Point counts (PCs) 3 and 4 also picked up foraging and commuting activity during the spring, summer and autumn walked transects (other than no activity at PC 3 during the autumn transect). PCs 3 and 4 are situated in woodland and are well connected to further woodland, making them suitable habitat for foraging and potential commuting habitat. PC 3

lies within the Scheme Footprint and the commuting/foraging habitat is likely to be lost during construction and operational phases. PC 4 is outside the current Scheme Footprint and is therefore unlikely to be exposed to disturbance exceeding everyday levels. No evidence of management was recorded during surveys, only low levels of human disturbance. The woodland here is relatively small as it backs onto the A1, which causes disturbance, and also backs onto grassland, providing a mosaic of habitats. The variety of habitats provides foraging and commuting habitats and could account for the peak activity levels.

- 4.3.3. PCs 5 and 6 are situated in a large area of woodland east of PCs 3 and 4 (across Smithy Lane). Peak activity was recorded in the thin strip of juvenile and semi-mature woodland nearest to the A1. This section of the Study Area lies within the Scheme Footprint. PC 5 and the surrounding habitat east of Smith Lane is unlikely to be exposed to disturbance exceeding everyday levels as no works are anticipated at this location. PC 6 and the surrounding habitats are likely to be impacted by the Scheme through direct habitat loss to accommodate for lane widening and lengthening of the southbound exit slip at Elton Interchange. The quality of woodland varies here, from juvenile to semi-mature and mature trees; no evidence of management was recorded during surveys. This area of the Study Area is exposed to disturbance from the A1 and from irregular human disturbance. The woodland here is connected to more woodland and areas of amenity grassland and the Scheme is not expected to alter the habitat's carrying capacity.
- 4.3.4. Habitats between PCs 6 and 7 change from semi-mature woodland to thin swathes of woodland around the Angel of the North. The woodland undergoes management to prevent encroachment into the surrounding areas of grassland, scrubland and hedgerow. Embankment works are scheduled between PCs 6 and 7. Peak activity levels along this section of the transect route were located in the woodland near PC 7 and along the footpath, adjacent to a woodland strip at the most easterly part of the transect. The majority of the activity was recorded outside of the Scheme Footprint and away from Scheme embankment works. However, habitats where activity was recorded are present within the Scheme Footprint and therefore impacts to commuting and foraging habitats are likely to be caused by the Scheme during construction.
- 4.3.5. Limited activity was recorded at PC 8 during the autumn walked transect. Limited activity does not necessarily indicate that bats are not utilising the habitats, rather that they were not recorded during the periods surveyors were present. PC 8 is situated within the Scheme Footprint as is likely to be impacted through habitat loss associated with lane widening and spread of embankment earthworks. Effective landscape planting could be employed on all earthworks and embankments in order to mitigate against the effects of habitat loss.
- 4.3.6. Activity was recorded in woodland habitat within which PC 9 is situated. PC 9 is outside the Scheme Footprint but is located at the nearest suitable point (outside of woodland), as per BCT Good Practice Guidelines (Collins, 2016). There is likely to be limited impacts to the

habitats surrounding PC 9 as there is a very small section of lane widening, located within the existing highway boundary.

- 4.3.7. PC 10 and the surrounding area (towards PC 9) also recorded bat activity, during the spring, summer and autumn walked transects. The Study Area in this location is established woodland, which is quite large in size and offers commuting routes and foraging habitats in clearings and beneath the canopy. Peak activity was recorded within the Scheme Footprint and no impacts are anticipated as there is no scheduled lane widening at this location within the Scheme.

### Common Pipistrelle

- 4.3.8. Common pipistrelle were the most frequently occurring bat species recorded within the Study Area and present within all habitats. Common pipistrelle accounted for the majority of activity recorded for both automated (94% of activity) and walked transect surveys (77% of activity).
- 4.3.9. Bat activity index scores for common pipistrelle were 6.97, 20.83 and 7.36 for the spring, summer and autumn walked transects, respectively
- 4.3.10. During the spring walked transect common pipistrelle were recorded approximately 22 minutes after sunset in close proximity to Smithy Lane (**Figure 3.2** – Green Circle A) on 17th May 2017. Given that this individual was recorded around the typical emergence time (typically 25 – 35 minutes after sunset (Russ, 2012)), it is considered that the timing could indicate that a common pipistrelle roost could be present in close proximity to the start of Section 2. Further activity was also recorded during the same survey 75 m further along the transect route at PC 3.
- 4.3.11. A common pipistrelle was also recorded close to sunset during the summer walked transect survey. On 3rd July 2017, approximately 30 minutes after sunset a common pipistrelle was recorded foraging at the eastern end of the Scheme near PC 7 (**Figure 4.3** – Green Circle A). This is within normal emergence time for common pipistrelle but its proximity to sunset suggests that there could be a roost near to this section of the Study Area.
- 4.3.12. Common pipistrelle were recorded within 30 minutes before sunrise during the spring automated detector survey on 18th May. This supports the early common pipistrelle observations made in the spring and summer walked transect survey.
- 4.3.13. Bat activity index values for the automated detector recording periods for common pipistrelle was 1.6 for both spring and summer automated detector recordings. No common pipistrelle were recorded during autumn automated detector recordings. The overall BAI value for the automated detector period is 5.

### Soprano Pipistrelle

- 4.3.14. Soprano pipistrelle accounted for a small amount of the activity recorded during the walked transect surveys. Bat activity index scores for soprano pipistrelle were 1.74, 3.75, and 1.16

for the spring, summer and autumn walked transects, respectively. No soprano pipistrelle were recorded during any of the automated detector survey periods.

- 4.3.15. A bat activity index value of 1.74 was recorded during the spring dusk walked transect. Peak soprano pipistrelle activity was recorded in the semi-mature woodland around PC 6 and also within the more mature woodland south of the Scheme (**Figure 2** – Green Circle G).
- 4.3.16. Soprano pipistrelle passes were recorded during the summer walked transect. Peak soprano pipistrelle activity was recorded along the woodland edge and path habitat at PC 7, approximately 43 minutes after sunset. Soprano pipistrelles were also recorded in Section 1 for a total of three passes (**Figure 2** – Blue Squares G and J).
- 4.3.17. Three soprano pipistrelle passes was recorded during the autumn dusk activity survey. The passes were within the woodland between PC 9 and PC 10 in Section 3 (See **Figure 5.2**, Teal Circle B).

#### Noctule

- 4.3.18. Noctule were identified during the spring automated detector recording period. Two noctule were recorded approximately 53 minutes before sunrise on the 27th May and approximately 60 minutes after sunrise on the 18th May. Bat activity index values for the spring automated detector recording period for noctule sp. was 0.2 passes per night. Noctule were not detected during the walked transect surveys or during automated monitoring in summer or autumn.
- 4.3.19. It is likely that the noctule passes are individuals commuting through the Study Area.

#### Myotis sp

- 4.3.20. *Myotis* species were only identified during the spring and autumn walked transect survey, within woodland habitat on both occasions. During the autumn survey *Myotis* sp. was recorded within woodland habitat near PC 9 (See **Figure 5.2** – Purple Circle C). The BAI value for *Myotis* sp. during the autumn walked transect survey was 0.35 and 1.16, respectively.

## 4.4 SPECIES/SITE EVALUATION

- 4.4.1. Based on the assessment criteria shown in Appendix B (Wray et al. 2010) and scores shown in **Tables 4-1** and **4-2**, the commuting and foraging habitats within the Study Area are categorised as being of District, Local or Parish value (in accordance with criteria) for each of the bat species recorded. The Scheme would therefore be categorised as being of District, Local or Parish value for bats overall. The criteria used for assessment within both tables can be found within **Appendix B**.

**Table 4-1 - Commuting habitat scores**

| Species             | National Rarity | Activity | Site/Nearby Roost Potential | Type & Complexity of Linear Feature | Total Score | Value                    |
|---------------------|-----------------|----------|-----------------------------|-------------------------------------|-------------|--------------------------|
| Common pipistrelle  | 2               | 5        | 4                           | 4                                   | 15          | District/Local or Parish |
| Soprano pipistrelle | 2               | 5        | 4                           | 4                                   | 15          | District/Local or Parish |
| Noctule.            | 5               | 5        | 4                           | 4                                   | 15          | District/Local or Parish |

**Table 4-2 - Foraging habitat scores**

| Species             | National Rarity | Activity | Site/Nearby Roost Potential | Type & Complexity of Linear Feature | Total Score | Value                    |
|---------------------|-----------------|----------|-----------------------------|-------------------------------------|-------------|--------------------------|
| Common pipistrelle  | 2               | 5        | 4                           | 4                                   | 15          | District/Local or Parish |
| Soprano pipistrelle | 2               | 5        | 4                           | 4                                   | 15          | District/Local or Parish |
| Noctule             | 2               | 5        | 4                           | 4                                   | 15          | District/Local or Parish |

## 4.5 SUMMARY

- 4.5.1. Habitat loss as the result of the Scheme is not expected to sever any of the commuting and foraging habitats known to be used by bats. Vegetation clearance to accommodate for carriageway widening and the relocation of Allerdene Bridge will lead to a minor reduction in the carrying capacity of habitats present within the Study Area, due to habitat loss. The Study Area is predominantly sub-optimal habitat due to its proximity to the A1. However, optimal habitat located between and at PCs 1, 2, 3, 6, 7 and 8 will be lost or impacted as a result of the Scheme. These habitats include woodland and woodland edge which provide foraging and commuting opportunities and also grassland which likely supports a prey source for bats.
- 4.5.2. The area of land south of Junction 65, consisting of bare ground, scrub and fenceline, recorded peak activity during the bat activity surveys and will be lost as part of the Scheme.



This habitat needs to be replaced in order to prevent impacts to commuting and foraging habitats. Similarly, in order to reduce the permanent loss of habitat associated with the removal and replacement of Allerdene Bridge landscape planting on any earthworks, embankments and new areas of land will be necessary in order to achieve habitat connectivity and avoidance of channelling of bats towards the railway line.

- 4.5.3. Lighting both during the construction phase and operational phase of the Scheme, could have a negative effect upon bat activity within the Study Area.
- 4.5.4. Further information will be included in a Construction Environmental Management Plan (CEMP)

## 5 CONCLUSIONS AND RECOMMENDATIONS

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### 5.1 FURTHER SURVEY

- 5.1.1. The bat activity survey was carried out in line with the BCT Good Practice Guidelines (2016) and it is therefore considered that the data gathered is adequate to inform the assessment of impacts. Therefore, no further surveys are required. Avoidance and mitigation measure outlined below are recommended in order to prevent disturbance to any commuting, foraging bats which are occupying roosts nearby but outside of the Study Area.

### 5.2 AVOIDANCE AND MITIGATION MEASURES

#### HABITAT

- 5.2.1. The habitat features within the Study Area are important for both foraging and commuting and should be left intact, where practicable. The habitats primarily comprise woodland and scrub, all of which were included in the walked transect route of the Study Area illustrated in **Figure 2**. Vegetation clearance will be necessary as part of the Scheme. Where vegetation is to be removed and where there is sufficient space for its replacement post-construction, landscape planting should be employed in order to replace areas lost. Targeted landscape planting would reduce the loss of commuting and foraging habitat and ensure connectivity to wider habitats is maintained.
- 5.2.2. Given the activity levels recorded in the northern end of the Scheme around J65 (south of A1, current alignment); landscape planting, post construction, should seek to provide a continuous pathway and corridors on the soft estate, within this area. Where it is practicable landscape planting should be included on the earthwork banks in order to retain and enhance the habitat currently present between PCs 1 and 2 south of Junction 65. This would further improve connectivity with the woodland east of the East Coast Mainline and with the Lamesley Pastures SNCI to the west of the Scheme. In addition, the newly located highway boundary fence could include a hedgerow, in order to enhance commuting and foraging away from the carriageway.
- 5.2.3. A grass margin must be retained between the carriageway and any landscape planting in order to avoid channelling any bats into live traffic.

#### LIGHTING

- 5.2.4. Given the predicted effects, it is recommended that a sensitive lighting scheme is designed where practical along known foraging and commuting areas (see **Figure 6.1-6.3**). Where possible, the sensitive lighting should focus on avoiding the habitats suitable for bats which are adjacent to the road network. The lighting scheme should apply to both construction and operational phases.
- 5.2.5. It is recommended that the lighting strategy for the Scheme seeks to:

- Use the minimum light levels necessary for the relevant task / function, this may equate to reducing light intensity, and/or using the minimum number or light sources or minimum column height;
- Use hoods, louvres or other luminaire design features to avoid light spill onto retained and newly created areas of vegetation likely to be used by foraging and commuting bats;
- Use narrow spectrum light sources where possible to lower the range of species affected by lighting, specifically avoiding shorter wave length blue light, using instead warm/neutral colour temperature <4,200 kelvin lighting (BCT, 2014); and
- Use light sources that emit minimal ultra-violet light to avoid attracting night-flying invertebrate species which in turn may attract bats to the light.

### 5.3 ECOLOGICAL ENHANCEMENT MEASURES

5.3.1. Planning policy promotes the inclusion of ecological enhancement (NPPF, 2012) and so accordingly it is recommended that consideration is given to the following enhancement measures. However, enhancements should be undertaken in areas where peak activity was recorded and new carriageway or structures are proposed. Otherwise in order to prevent bats utilising habitats in close proximity to the road, enhancement should be avoided in close proximity to the Scheme. Full details of enhancement measures will be included within the CEMP but would include the following:

- A continuation of linear hedgerow and tree lines within the landscaping scheme in order to improve foraging and commuting corridors across the Study Area and into the wider landscape for bats, would be an appropriate enhancement.
- Hedgerow species to be planted should include native species or species of local prominence, such as; hawthorn *Crataegus monogyna*, blackthorn *Prunus spinosa* and dog rose *Rosa canina*. Tree species which are best for supporting foraging bats if planted within linear features include oak *Quercus spp.* and birch *Betula spp.* species.
- The planting of species-rich grassland with grasses of differing heights, throughout any open areas of vegetation planned to be included within the Scheme design would be appropriate. Wild-flower meadows and species rich grassland attract invertebrates, a key feeding source for bats. The potential for these areas as a place for bat foraging would be increased if the linear features led to these areas. If included within the Scheme design, discussions should be had with Highways England officials regarding potential location restrictions.
- Bat boxes, which will encourage roosting bats, could be installed onto suitable trees/ buildings or mounted on poles. If installed, bat boxes should be installed in unlit areas on multiple aspects (including facing south, west or east) at a height of 3 m plus and have a clear flight path to the access point. The bat boxes should be located within existing or newly created suitable foraging and commuting habitats.

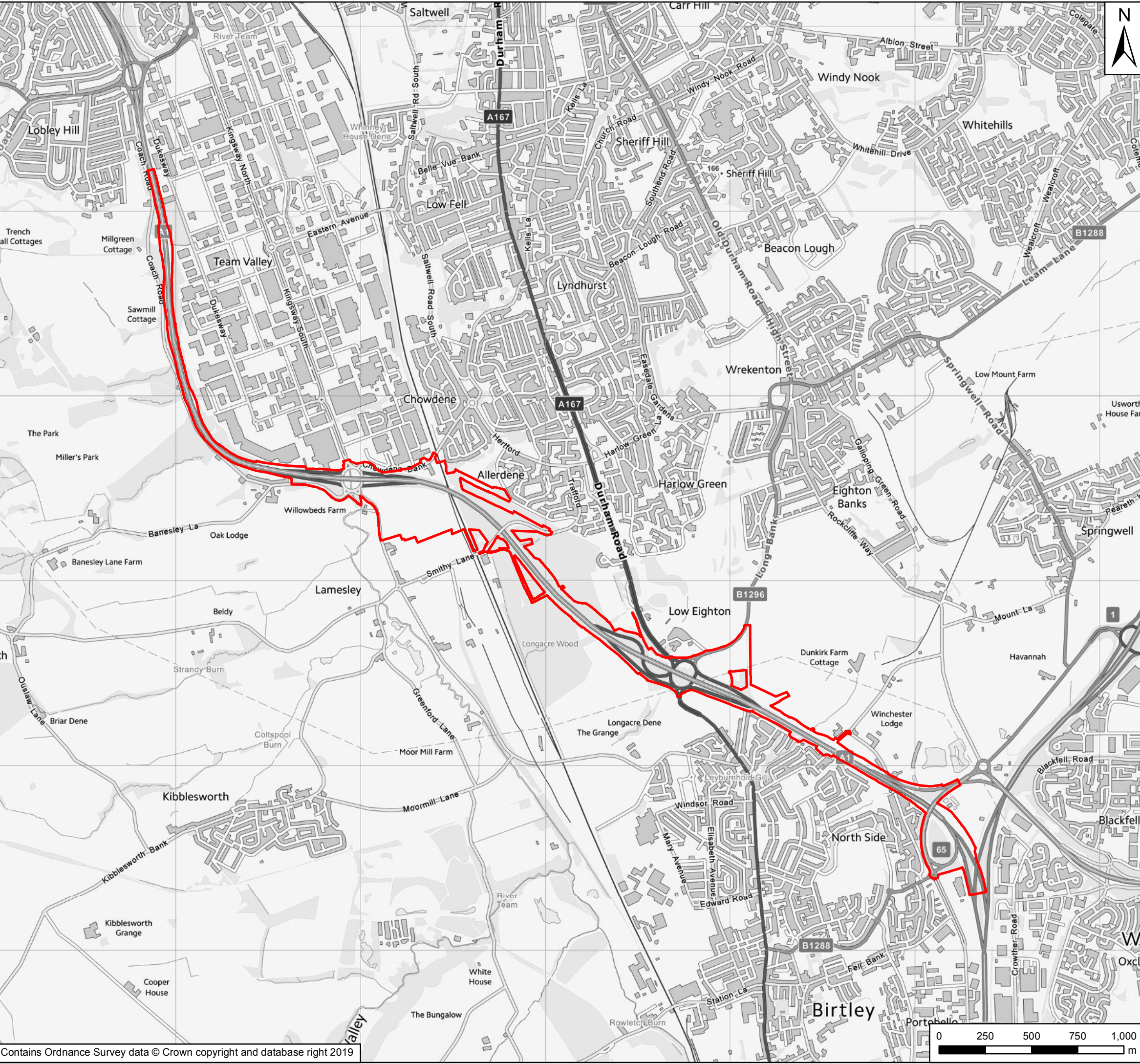
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**Key**  
 Scheme Footprint

**N**



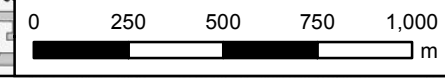
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| P03 | Apr 2019 | Third Issue  | GH | JR    | KS    |
| P02 | Mar 2019 | Second Issue | GH | JR    | KS    |
| P01 | Dec 2018 | First Issue  | GH | JR    | NJA   |

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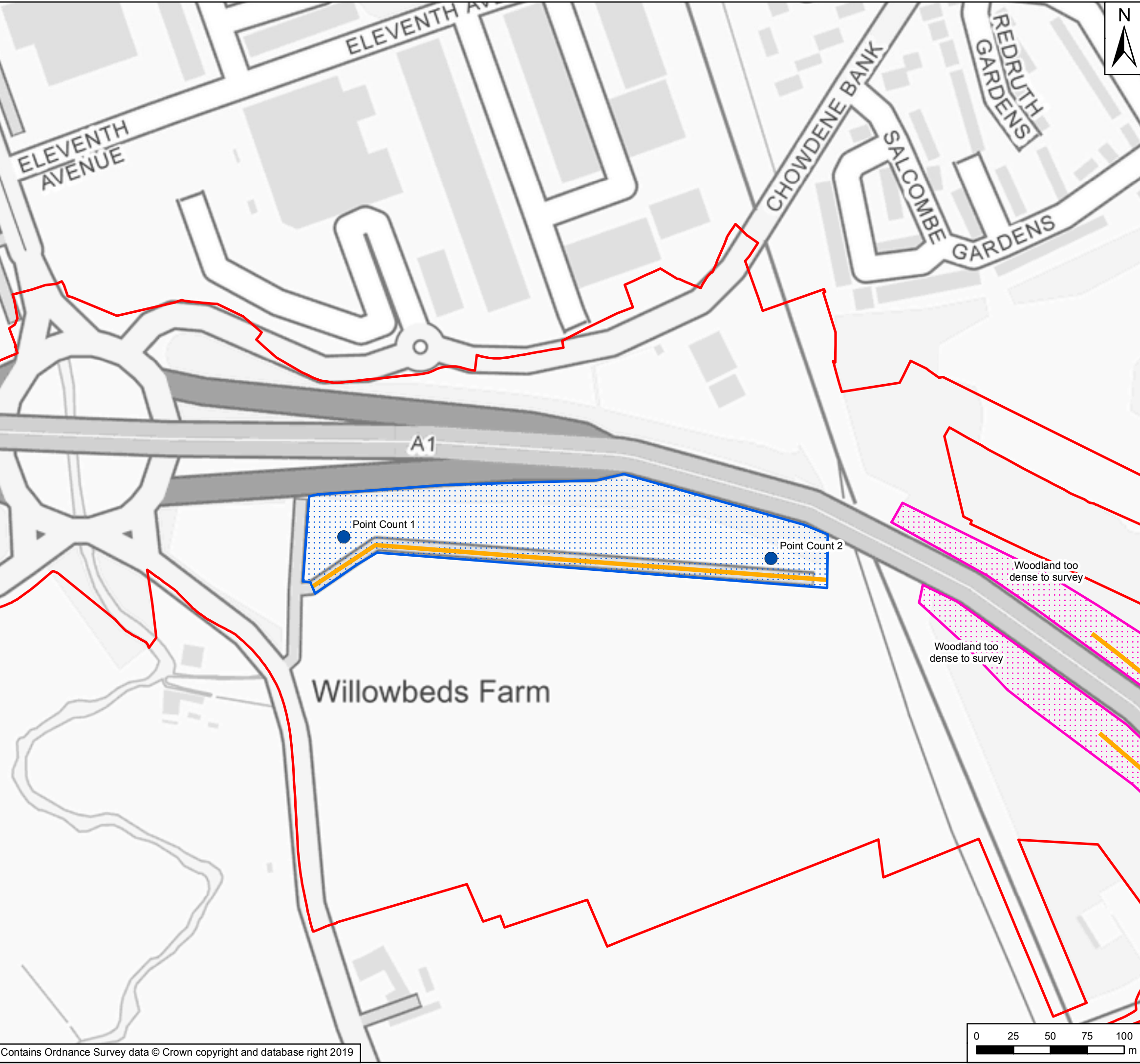
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| Drawing Number | HE PIN   | Originator | Volume    | Revision      |      |        |
| HE551462       |          | WSP        | 6.3       | P03           |      |        |
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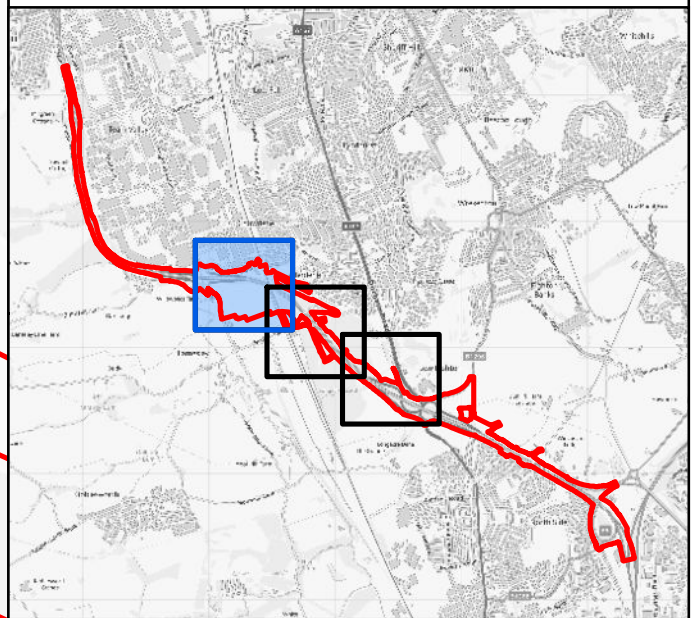




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| Key |                          |
|-----|--------------------------|
|     | Scheme Footprint         |
|     | Point Count              |
|     | SM2                      |
|     | Activity Survey Transect |
|     | Survey Section 1         |
|     | Survey Section 2         |
|     | Survey Section 3         |



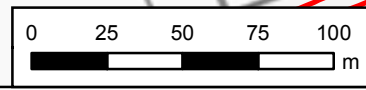
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| P02 | Mar 2019 | Second Issue | GH | JR    | KS    |
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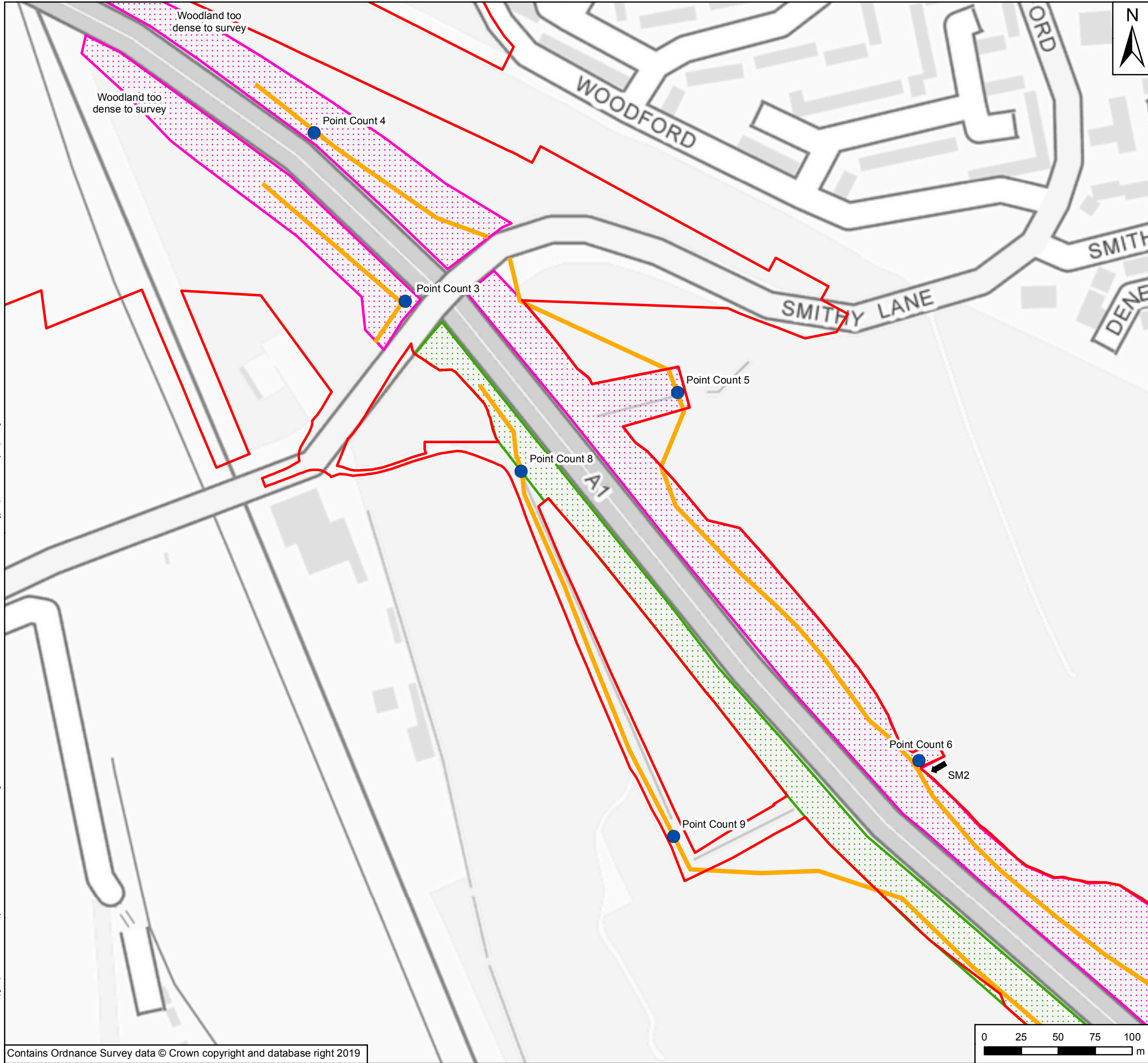


Client: **highways england**  
 Project Title: **A1 Birtley to Coal House Scheme**  
 Drawing Title: **Figure 2.1 Transect Route**

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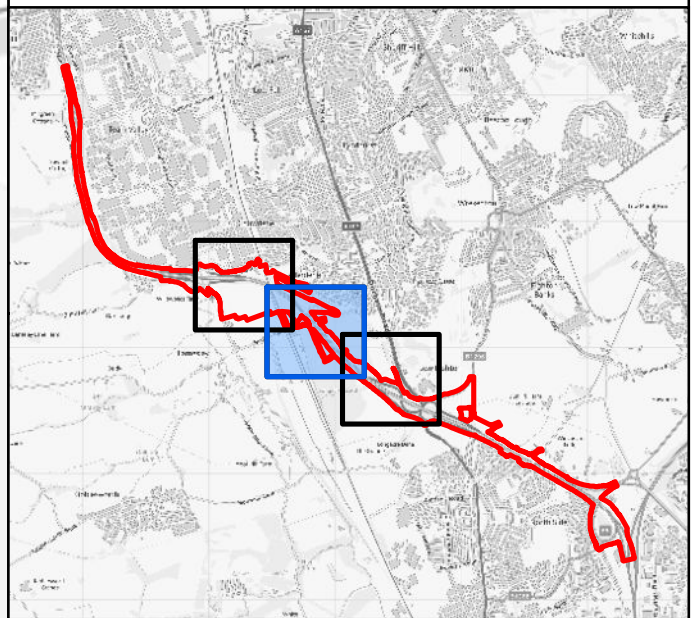






**Key**

- Scheme Footprint
- Point Count
- ↖ SM2
- Activity Survey Transect
- Survey Section 1
- Survey Section 2
- Survey Section 3



| Rev | Date     | Description  | By | Chk'd | App'd |
|-----|----------|--------------|----|-------|-------|
| P03 | Apr 2019 | Third Issue  | GH | JR    | KS    |
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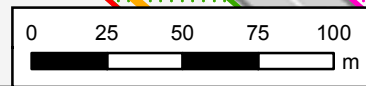
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Client

Project Title: **A1 Birtley to Coal House Scheme**

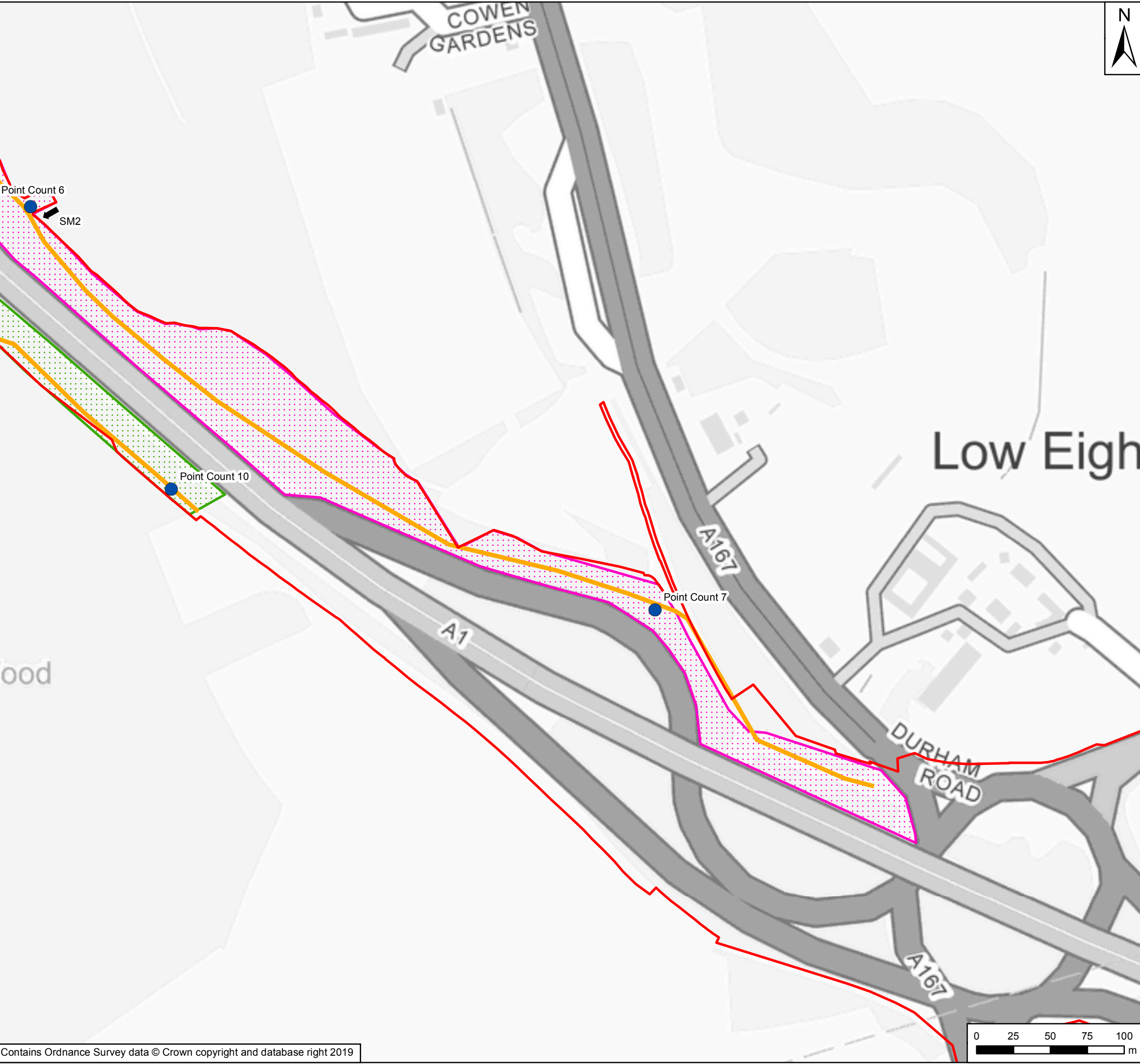
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| Drawing Number | Originator | Volume        | Revision  |            |      |        |
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| B2CH           |            | PW Stage Code |           |            |      |        |
| Section        | Type       | ID            | Direction | Type       | Role | Number |

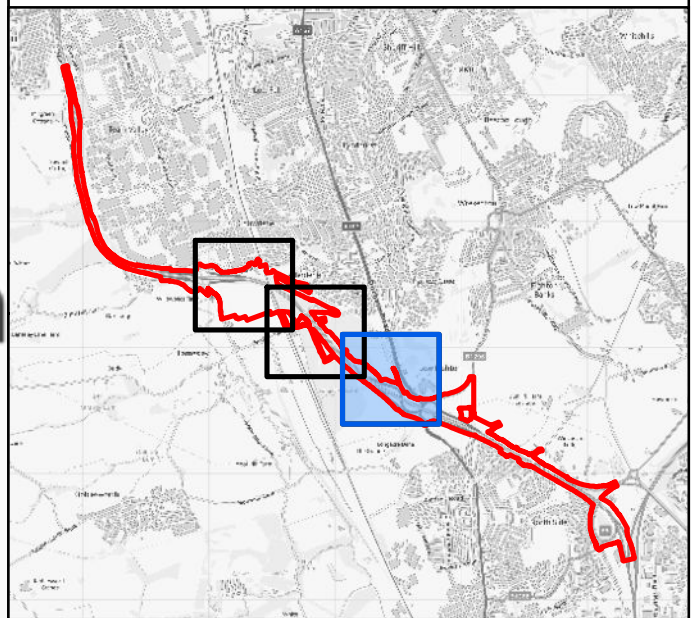




User Name: UKGDH001 Date Saved: 16/04/2019 16:53:25  
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| Key |                          |
|-----|--------------------------|
|     | Scheme Footprint         |
|     | Point Count              |
|     | SM2                      |
|     | Activity Survey Transect |
|     | Survey Section 1         |
|     | Survey Section 2         |
|     | Survey Section 3         |



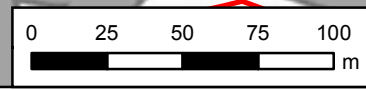
| Rev | Date     | Description  | By | Chk'd | App'd |
|-----|----------|--------------|----|-------|-------|
| P03 | Apr 2019 | Third Issue  | GH | JR    | KS    |
| P02 | Mar 2019 | Second Issue | GH | JR    | KS    |
| P01 | Dec 2018 | First Issue  | GH | JR    | NJA   |

Suitability: \_\_\_\_\_ Status: \_\_\_\_\_  
 PINS Reference Number: TR010031

Client:

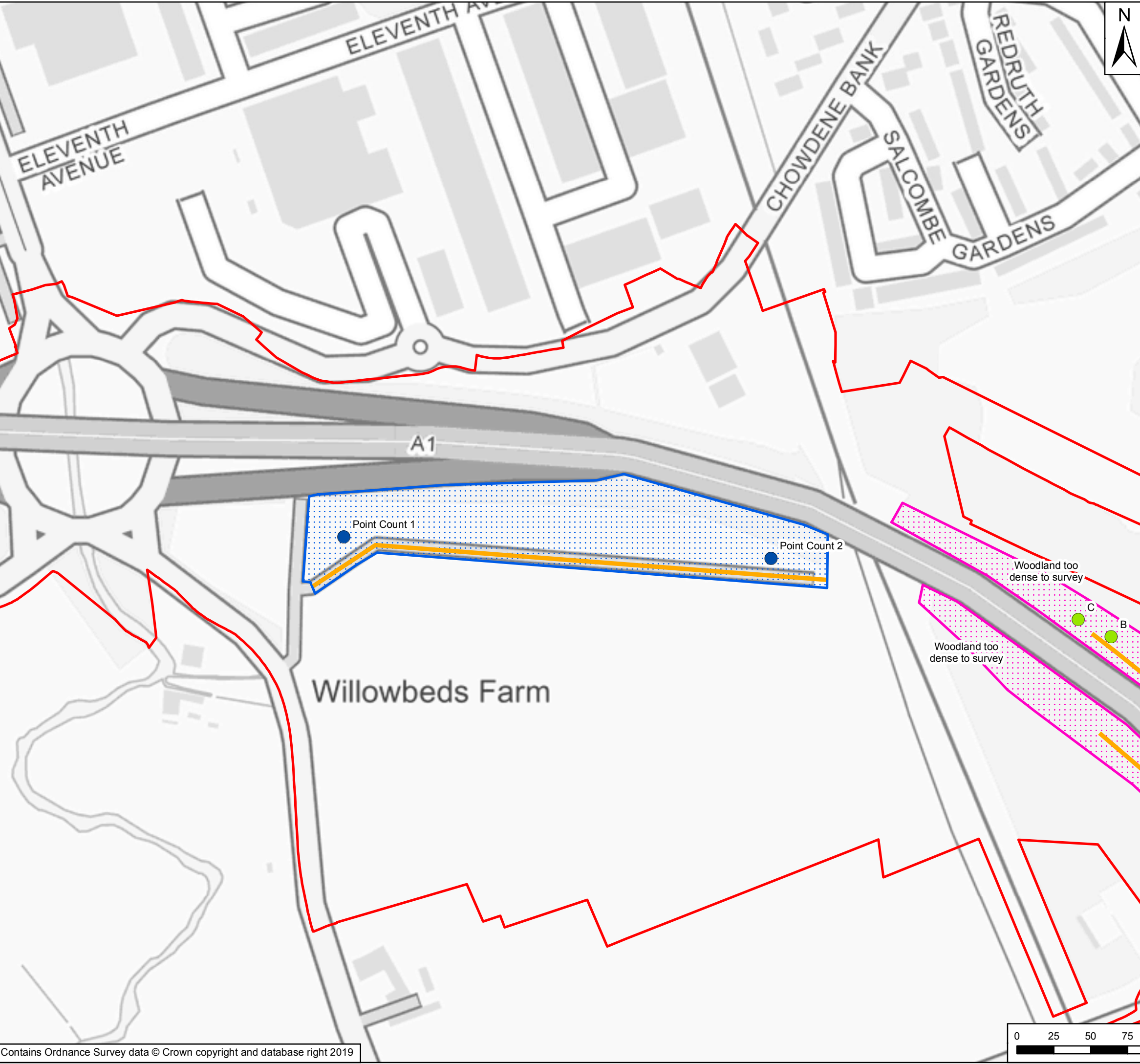
Project Title: A1 Birtley to Coal House Scheme  
 Drawing Title: Figure 2.3 Transect Route

| Scale          | Drawn      | Checked  | Approved  | Authorised |      |        |
|----------------|------------|----------|-----------|------------|------|--------|
| 1:2,500        | GH         | JR       | KS        | NJA        |      |        |
| Original Size  | Date       | Date     | Date      | Date       |      |        |
| A3             | Dec 2019   | Dec 2019 | Dec 2019  | Dec 2019   |      |        |
| Drawing Number | Originator | Volume   | Revision  |            |      |        |
| HE551462       | WSP        | 6.3      | P03       |            |      |        |
| PW Stage Code  |            |          |           |            |      |        |
| B2CH           |            |          |           |            |      |        |
| Section        | Type       | ID       | Direction | Type       | Role | Number |

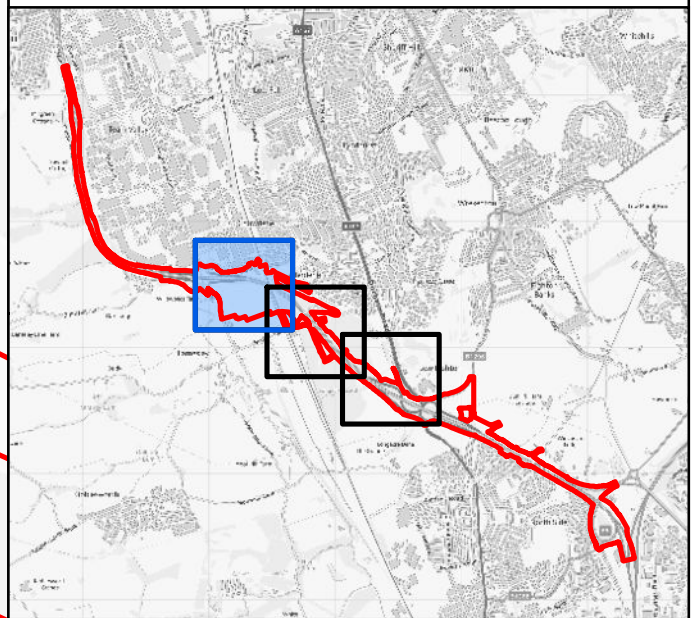




User Name: UKGDH001 Date Saved: 16/04/2019 16:56:20  
 Document Path: \\uk.wsgroup.com\central\data\Projects\700419\A1BCH PCF Stage 3 and 4\03 Shared\EI A and flood risk\01 Model\GIS\MXD\Environmental Statement\Ecology Reports\Bat Activity Report\Figure 3.1 to 3.3 - Spring Activity Survey.mxd



| Key |                          |
|-----|--------------------------|
|     | Scheme Footprint         |
|     | Point Count              |
|     | C. Pip                   |
|     | S. Pip                   |
|     | SM2                      |
|     | Activity Survey Transect |
|     | Survey Section 1         |
|     | Survey Section 2         |
|     | Survey Section 3         |



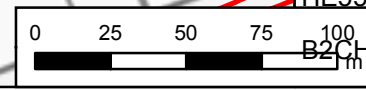
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|-----|----------|--------------|----|-------|-------|
| P03 | Apr 2019 | Third Issue  | GH | JR    | KS    |
| P02 | Mar 2019 | Second Issue | GH | JR    | KS    |
| P01 | Dec 2018 | First Issue  | GH | JR    | NJA   |

Suitability: \_\_\_\_\_ Status: \_\_\_\_\_  
 PINS Reference Number: TR010031

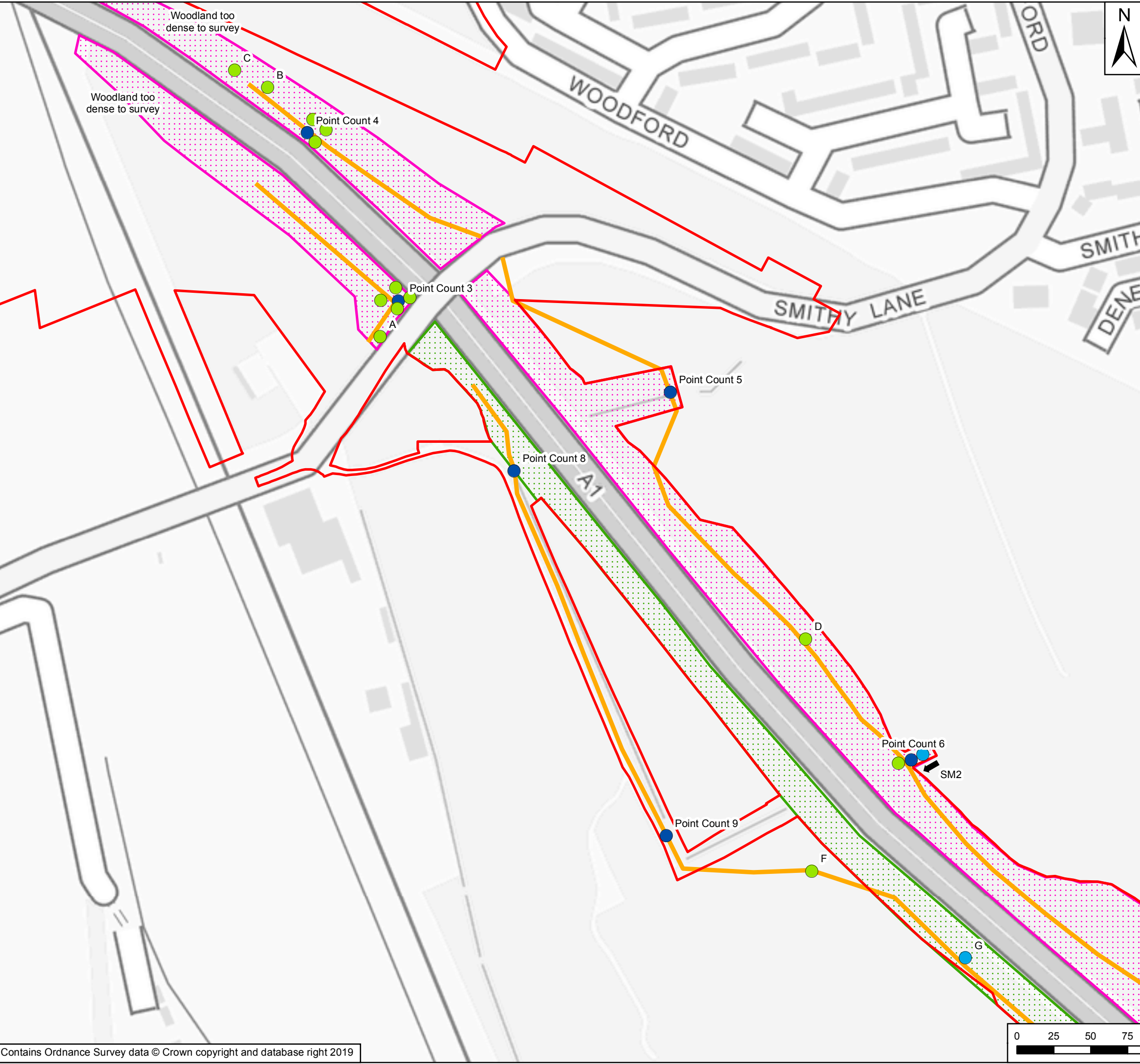


Client: \_\_\_\_\_  
 Project Title: A1 Birtley to Coal House Scheme  
 Drawing Title: Figure 3.1 Spring Activity Survey

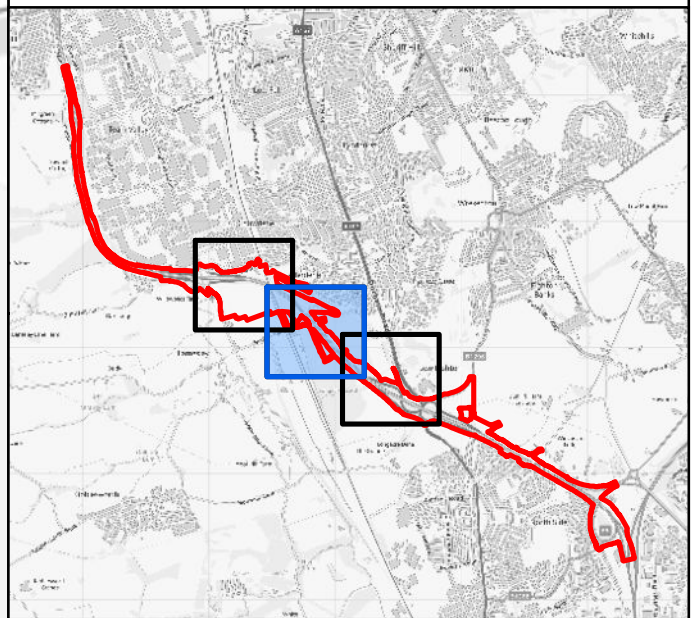
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|--------------------------|-----------------|----------------|----------------|-----------------|
| Scale: 1:2,500           | Drawn: GH       | Checked: JR    | Approved: KS   | Authorised: NJA |
| Original Size: A3        | Date: Dec 2019  | Date: Dec 2019 | Date: Dec 2019 | Date: Dec 2019  |
| Drawing Number: HE551462 | Originator: WSP | Volume: 6.3    | Revision: P03  |                 |
| PW Stage Code            |                 |                |                |                 |







- Key**
- Scheme Footprint
  - Point Count
  - C. Pip
  - S. Pip
  - ↖ SM2
  - Activity Survey Transect
  - Survey Section 1
  - Survey Section 2
  - Survey Section 3



| Rev | Date     | Description  | By | Chk'd | App'd | Status |
|-----|----------|--------------|----|-------|-------|--------|
| P03 | Apr 2019 | Third Issue  | GH | JR    | KS    |        |
| P02 | Mar 2019 | Second Issue | GH | JR    | KS    |        |
| P01 | Dec 2018 | First Issue  | GH | JR    | NJA   |        |

PINS Reference Number: TR010031



Client: **highways england**

Project Title: **A1 Birtley to Coal House Scheme**

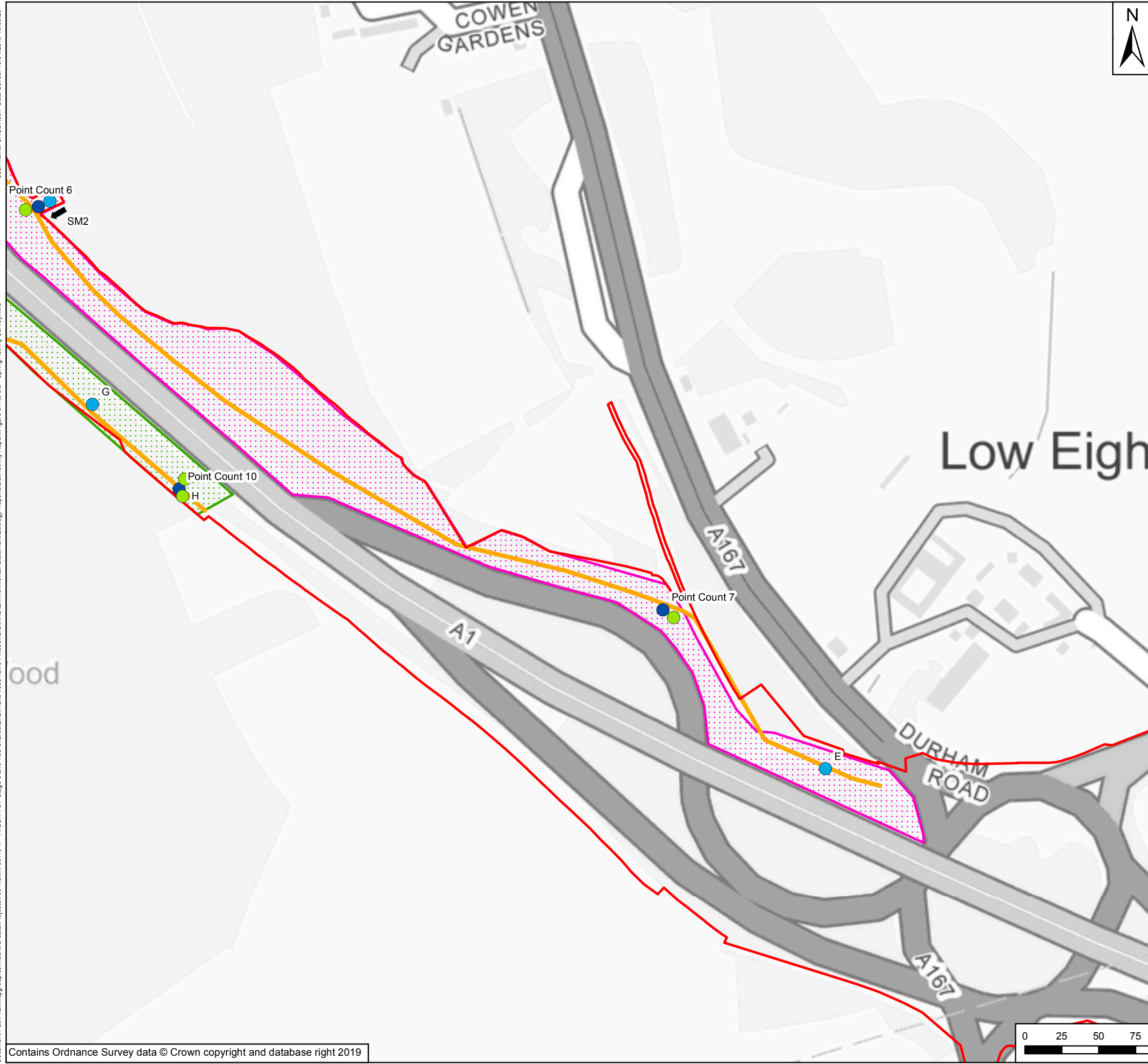
Drawing Title: **Figure 3.2 Spring Activity Survey**

| Scale          | Drawn      | Checked  | Approved | Authorised |
|----------------|------------|----------|----------|------------|
| 1:2,500        | GH         | JR       | KS       | NJA        |
| Original Size  | Date       | Date     | Date     | Date       |
| A3             | Dec 2019   | Dec 2019 | Dec 2019 | Dec 2019   |
| Drawing Number | Originator | Volume   | Revision |            |
| HE551462       | WSP        | 6.3      | P03      |            |
| PW Stage Code  |            |          |          |            |

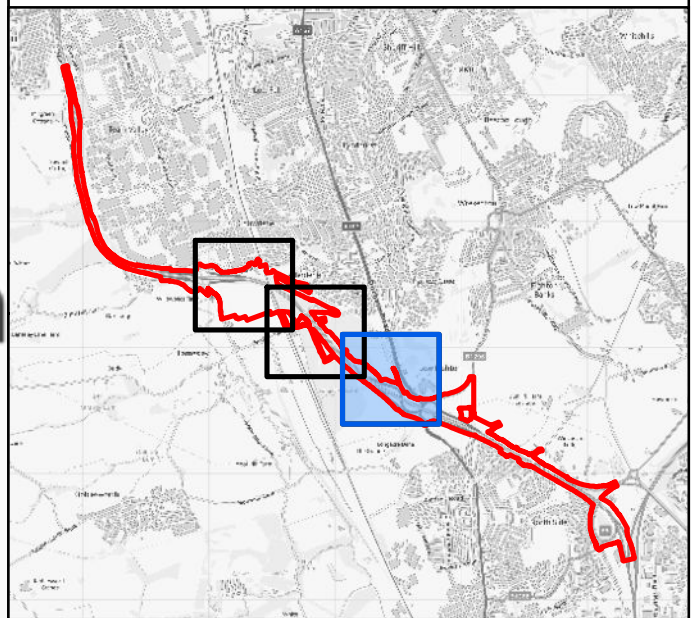




User Name: UKGDH001 Date Saved: 16/04/2019 16:56:20  
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- Key**
- Scheme Footprint
  - Point Count
  - C. Pip
  - S. Pip
  - ↙ SM2
  - Activity Survey Transect
  - Survey Section 1
  - Survey Section 2
  - Survey Section 3



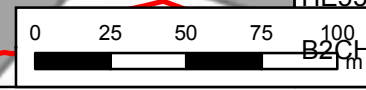
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|-----|----------|--------------|----|-------|-------|
| P03 | Apr 2019 | Third Issue  | GH | JR    | KS    |
| P02 | Mar 2019 | Second Issue | GH | JR    | KS    |
| P01 | Dec 2018 | First Issue  | GH | JR    | NJA   |

Suitability: \_\_\_\_\_ Status: \_\_\_\_\_  
 PINS Reference Number: TR010031

Client: highways england

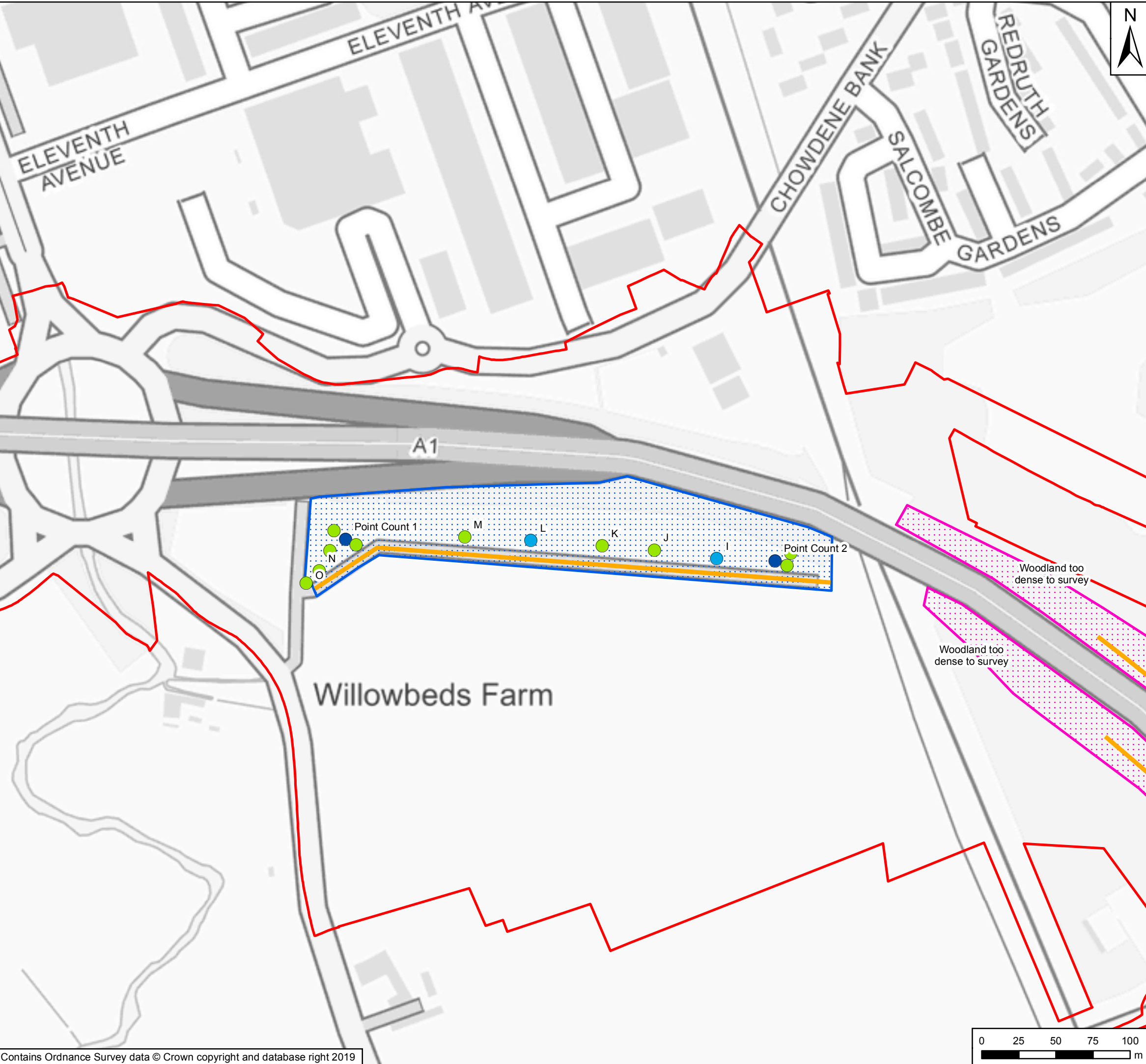
Project Title: A1 Birtley to Coal House Scheme  
 Drawing Title: Figure 3.3 Spring Activity Survey

| Scale          | Drawn      | Checked  | Approved | Authorised    |
|----------------|------------|----------|----------|---------------|
| 1:2,500        | GH         | JR       | KS       | NJA           |
| Original Size  | Date       | Date     | Date     | Date          |
| A3             | Dec 2019   | Dec 2019 | Dec 2019 | Dec 2019      |
| Drawing Number | Originator | Volume   | Revision |               |
| HE551462       | WSP        | 6.3      | P03      |               |
|                |            |          |          | PW Stage Code |



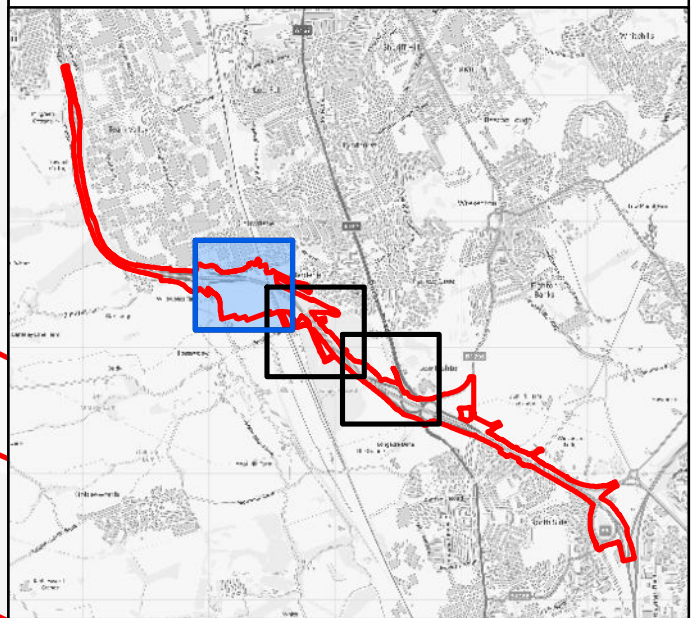


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**Key**

- Scheme Footprint
- Point Count
- C. Pip
- S. Pip
- ← Flight Path
- ↙ SM2
- Activity Survey Transect
- Survey Section 1
- Survey Section 2
- Survey Section 3



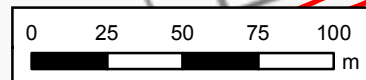
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| P03 | Apr 2019 | Third Issue  | GH | JR    | KS    |
| P02 | Mar 2019 | Second Issue | GH | JR    | KS    |
| P01 | Dec 2018 | First Issue  | GH | JR    | NJA   |

Suitability: \_\_\_\_\_ Status: \_\_\_\_\_  
 PINS Reference Number: TR010031

Client:

Project Title: A1 Birtley to Coal House Scheme  
 Drawing Title: Figure 4.1 Spring Activity Survey

|                          |                 |                |                |                 |      |        |
|--------------------------|-----------------|----------------|----------------|-----------------|------|--------|
| Scale: 1:2,500           | Drawn: GH       | Checked: JR    | Approved: KS   | Authorised: NJA |      |        |
| Original Size: A3        | Date: Dec 2019  | Date: Dec 2019 | Date: Dec 2019 | Date: Dec 2019  |      |        |
| Drawing Number: HE551462 | Originator: WSP | Volume: 6.3    | Revision: P03  |                 |      |        |
| B2CH                     |                 | PW Stage Code  |                |                 |      |        |
| Section                  | Type            | ID             | Direction      | Type            | Role | Number |

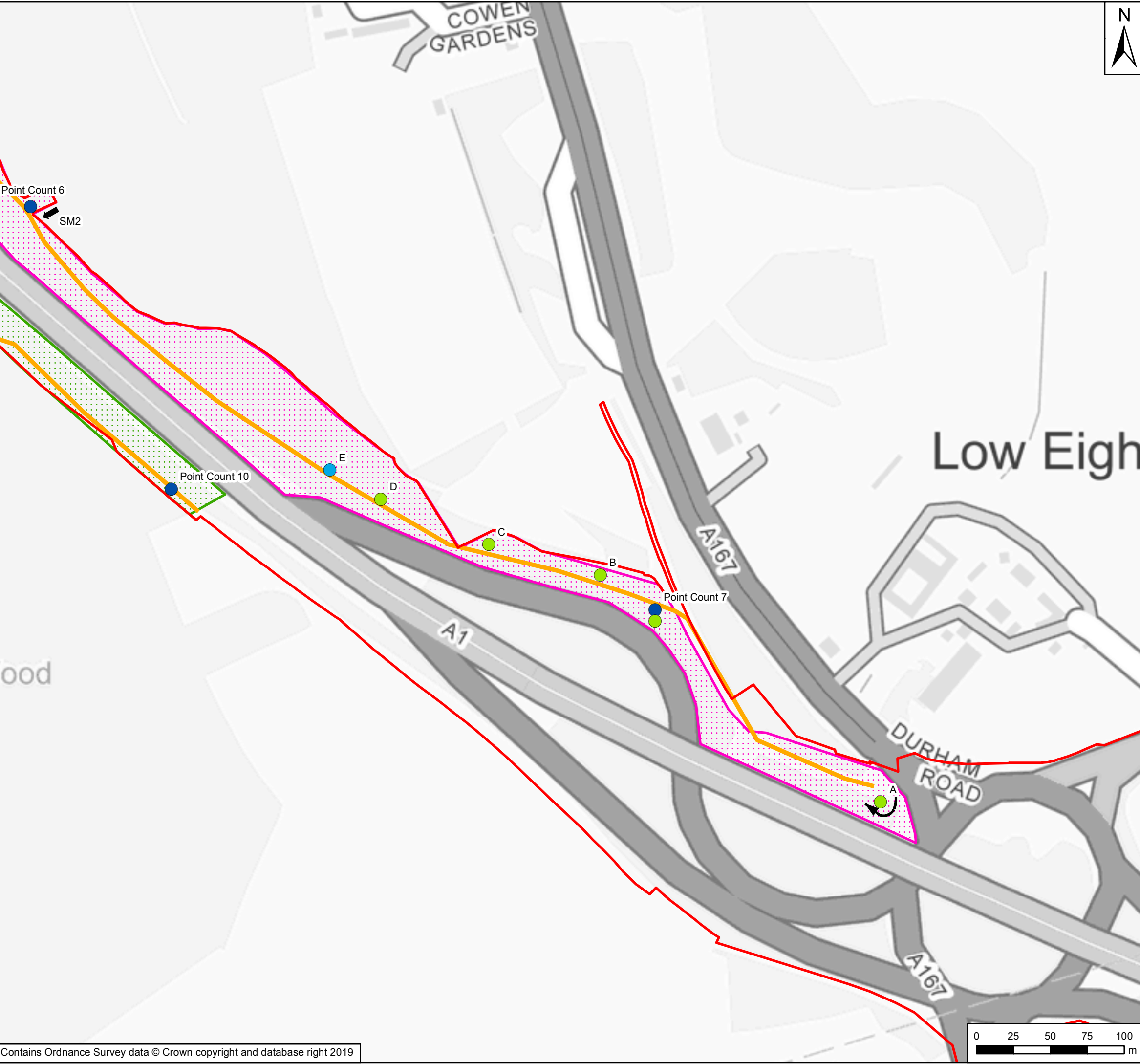




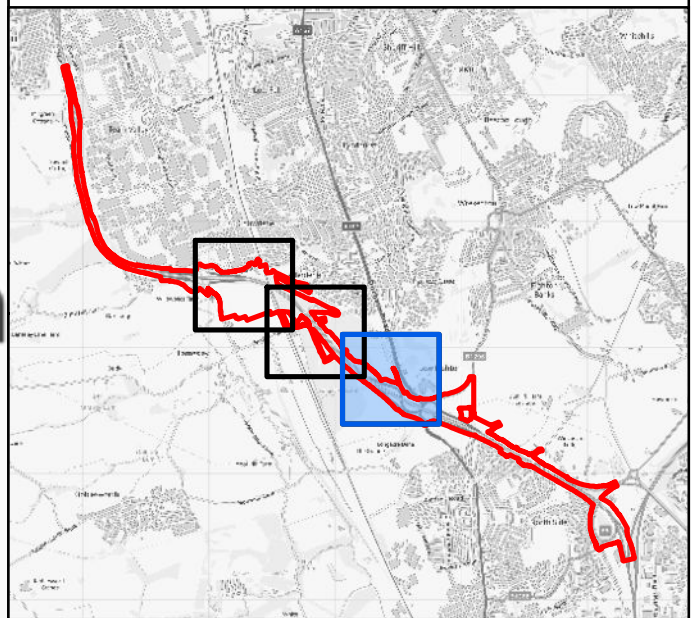




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- Key**
- Scheme Footprint
  - Point Count
  - C. Pip
  - S. Pip
  - ← Flight Path
  - ↙ SM2
  - Activity Survey Transect
  - Survey Section 1
  - Survey Section 2
  - Survey Section 3



| Rev | Date     | Description  | By | Chk'd | App'd |
|-----|----------|--------------|----|-------|-------|
| P03 | Apr 2019 | Third Issue  | GH | JR    | KS    |
| P02 | Mar 2019 | Second Issue | GH | JR    | KS    |
| P01 | Dec 2018 | First Issue  | GH | JR    | NJA   |

Suitability Status

PINS Reference Number TR010031

Client  highways england

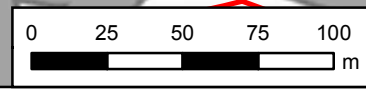
Project Title A1 Birtley to Coal House Scheme

Drawing Title Figure 4.3 Spring Activity Survey

| Scale         | Drawn    | Checked  | Approved | Authorised |
|---------------|----------|----------|----------|------------|
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| Original Size | Date     | Date     | Date     | Date       |
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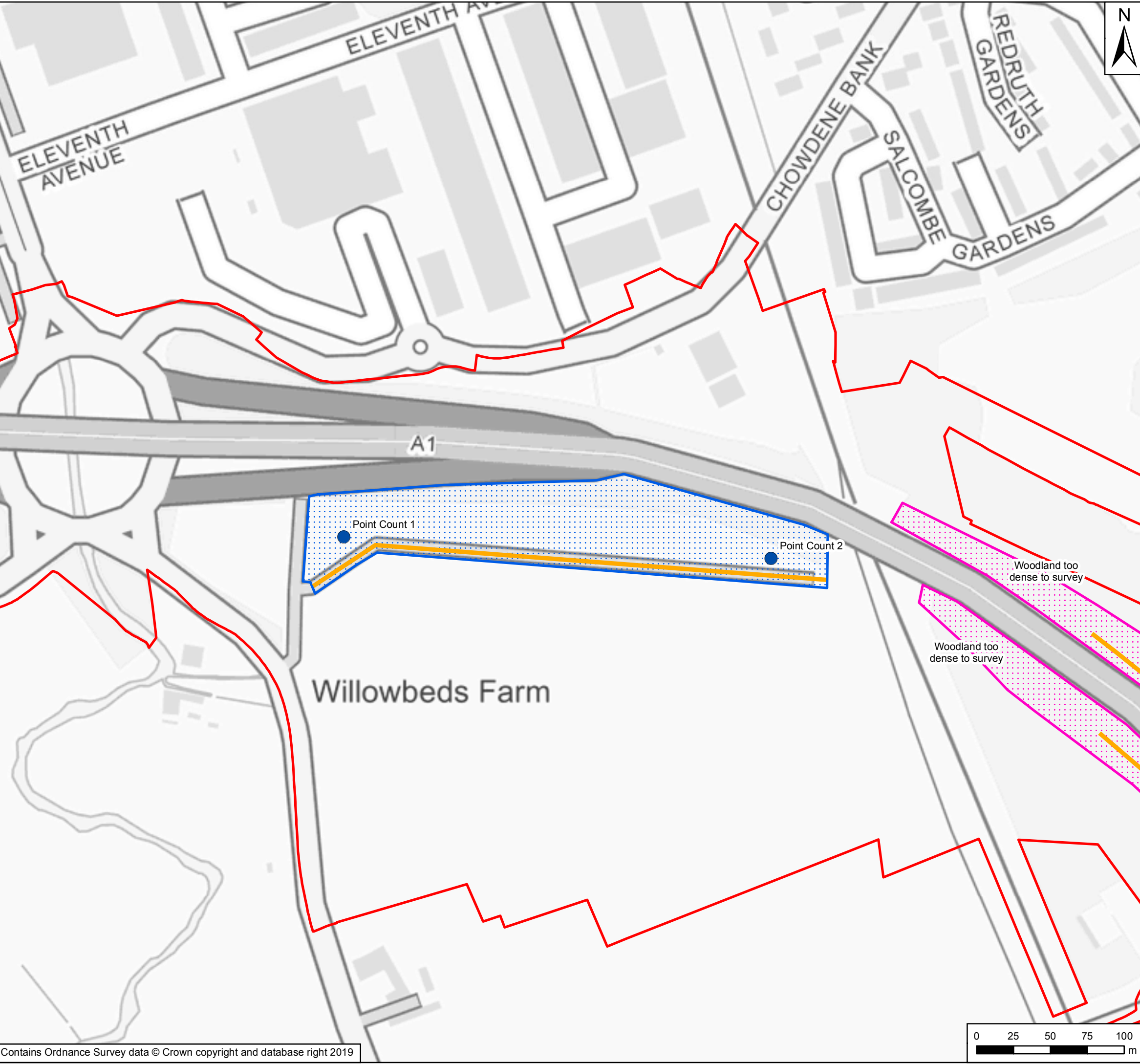
| Drawing Number | Originator | Volume | Revision |
|----------------|------------|--------|----------|
| HE551462       | WSP        | 6.3    | P03      |

| B2CH    |      |    |           |      |      |
|---------|------|----|-----------|------|------|
| Section | Type | ID | Direction | Type | Role |
|         |      |    |           |      |      |



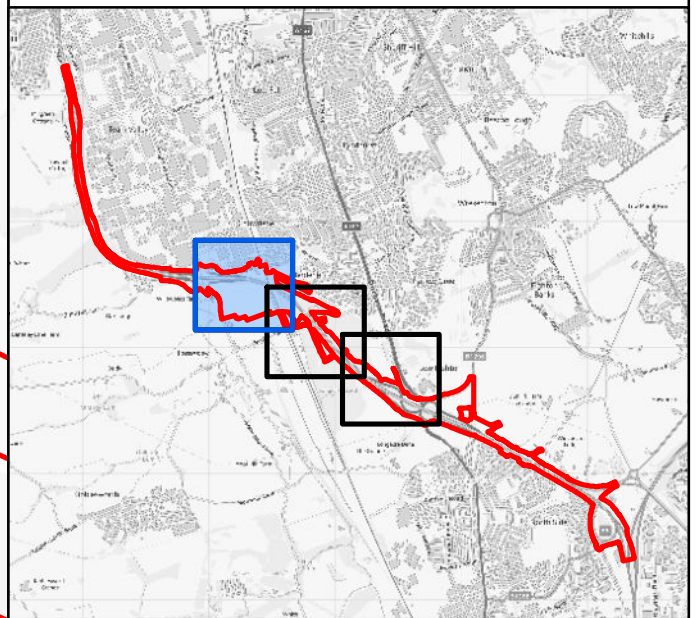


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**Key**

- Scheme Footprint
- Point Count
- C. Pip
- S. Pip
- Myotis
- Unknown Bat
- SM2
- Activity Survey Transect
- Survey Section 1
- Survey Section 2
- Survey Section 3



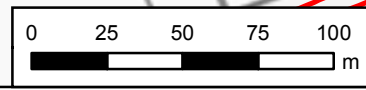
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|-----|----------|--------------|----|-------|-------|
| P03 | Apr 2019 | Third Issue  | GH | JR    | KS    |
| P02 | Mar 2019 | Second Issue | GH | JR    | KS    |
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Suitability: \_\_\_\_\_ Status: \_\_\_\_\_  
 PINS Reference Number: TR010031

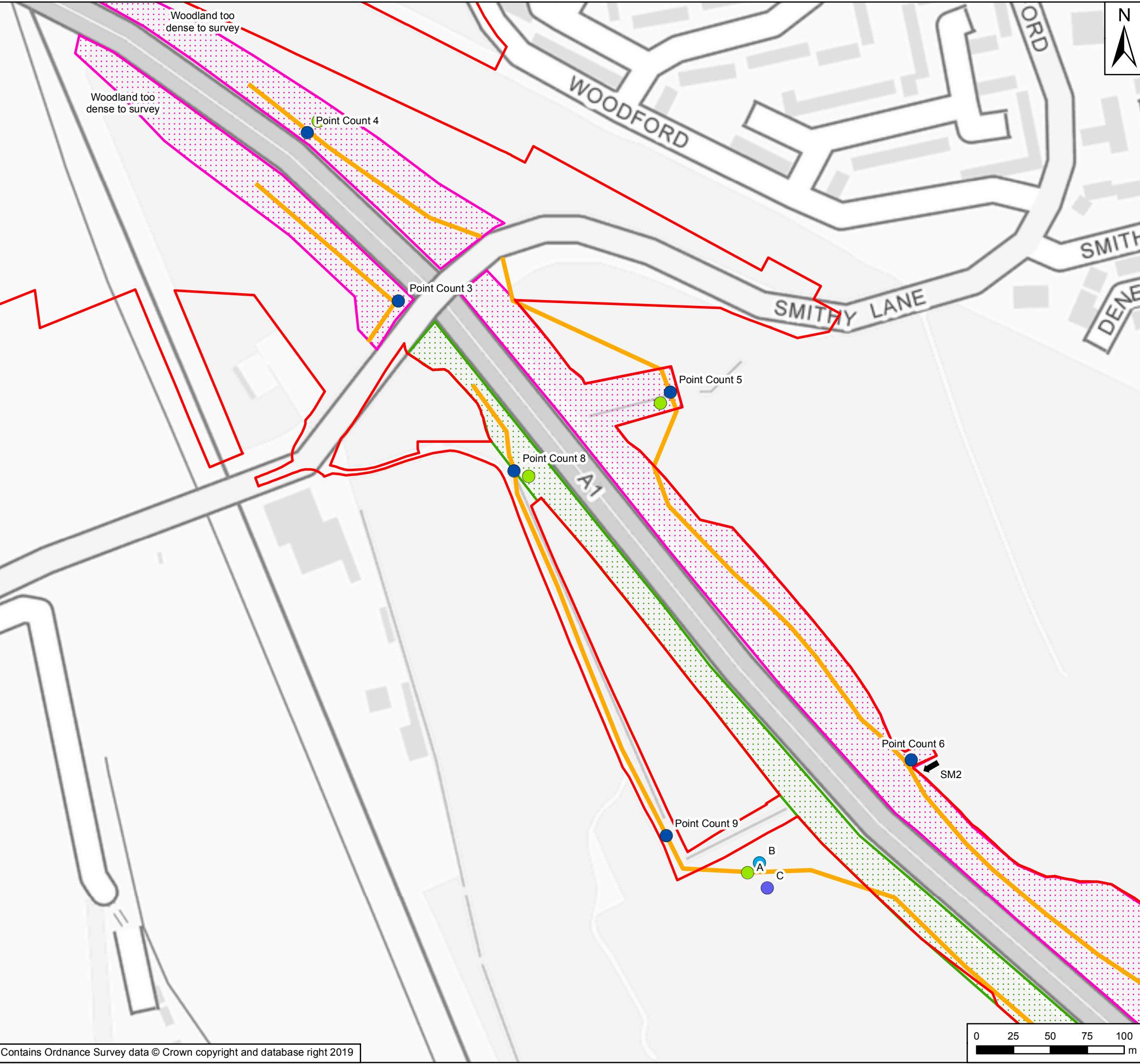


Project Title: A1 Birtley to Coal House Scheme  
 Drawing Title: Figure 5.1 Spring Activity Survey

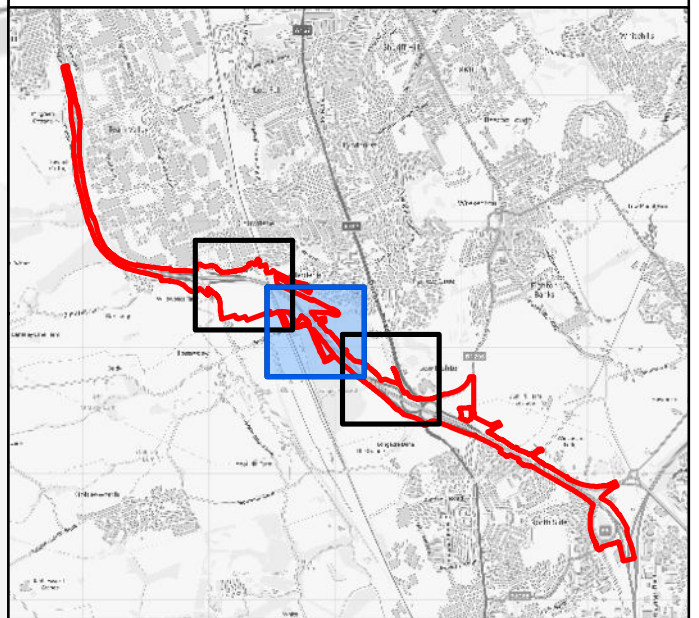
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| 1:2,500        | GH         | JR       | KS        | NJA        |      |        |
| Original Size  | Date       | Date     | Date      | Date       |      |        |
| A3             | Dec 2018   | Dec 2018 | Dec 2018  | Dec 2018   |      |        |
| Drawing Number | Originator | Volume   | Revision  |            |      |        |
| HE551462       | WSP        | 6.3      | P03       |            |      |        |
| PW Stage Code  |            |          |           |            |      |        |
| B2CH           |            |          |           |            |      |        |
| Section        | Type       | ID       | Direction | Type       | Role | Number |







- Key**
- Scheme Footprint
  - Point Count
  - C. Pip
  - S. Pip
  - Myotis
  - Unknown Bat
  - SM2
  - Activity Survey Transect
  - Survey Section 1
  - Survey Section 2
  - Survey Section 3



| Rev | Date     | Description  | By | Chk'd | App'd |
|-----|----------|--------------|----|-------|-------|
| P03 | Apr 2019 | Third Issue  | GH | JR    | KS    |
| P02 | Mar 2019 | Second Issue | GH | JR    | KS    |
| P01 | Dec 2018 | First Issue  | GH | JR    | NJA   |

Suitability: \_\_\_\_\_ Status: \_\_\_\_\_

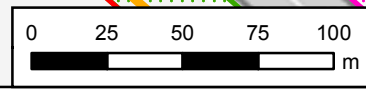
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Project Title: **A1 Birtley to Coal House Scheme**

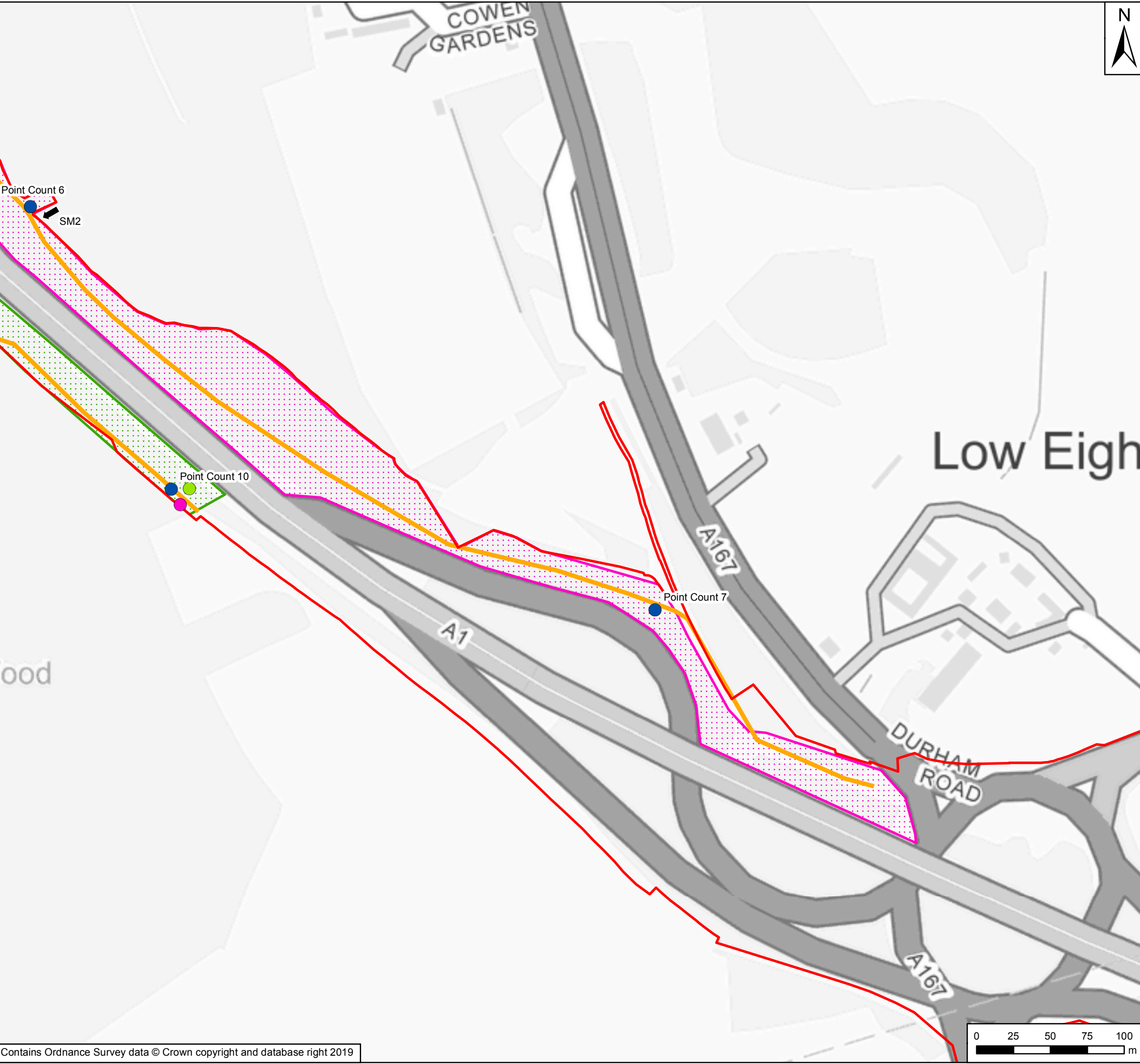
Drawing Title: **Figure 5.2 Spring Activity Survey**

| Scale          | Drawn      | Checked  | Approved  | Authorised |      |        |
|----------------|------------|----------|-----------|------------|------|--------|
| 1:2,500        | GH         | JR       | KS        | NJA        |      |        |
| Original Size  | Date       | Date     | Date      | Date       |      |        |
| A3             | Dec 2018   | Dec 2018 | Dec 2018  | Dec 2018   |      |        |
| Drawing Number | Originator | Volume   | Revision  |            |      |        |
| HE551462       | WSP        | 6.3      | P03       |            |      |        |
| B2CH           |            | ID       | Direction | Type       | Role | Number |
| Section        | Type       | ID       | Direction | Type       | Role | Number |



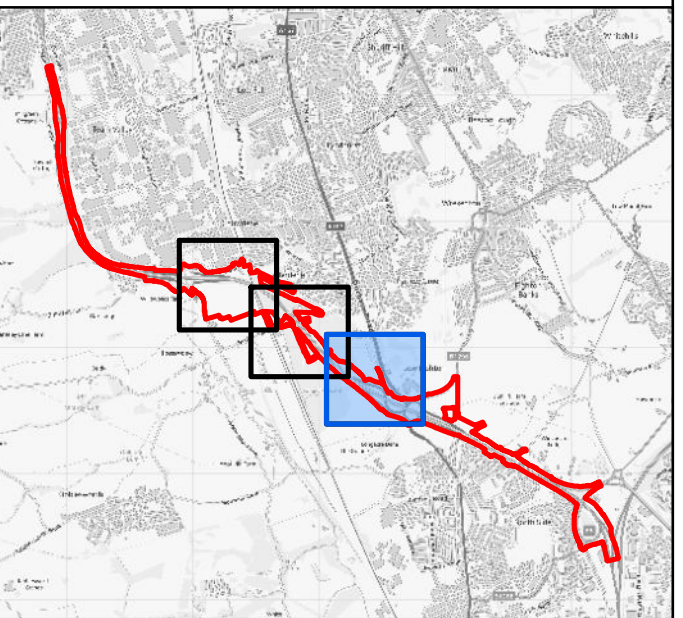


User Name: UKGDH001 Date Saved: 16/04/2019 17:06:44  
 Document Path: \\uk.wsggroup.com\central\data\Projects\700419\A1BCH PCF Stage 3 and 4\03 Shared\EI EIA and flood risk\01 Model\GIS\MXD\Environmental Statement\Ecology Reports\Bat Activity Report\Figure 5.1 to 5.3 - Autumn Activity Survey.mxd



**Key**

- Scheme Footprint
- Point Count
- C. Pip
- S. Pip
- Myotis
- Unknown Bat
- SM2
- Activity Survey Transect
- Survey Section 1
- Survey Section 2
- Survey Section 3



| Rev | Date     | Description  | By | Chk'd | App'd |
|-----|----------|--------------|----|-------|-------|
| P03 | Apr 2019 | Third Issue  | GH | JR    | KS    |
| P02 | Mar 2019 | Second Issue | GH | JR    | KS    |
| P01 | Dec 2018 | First Issue  | GH | JR    | NJA   |

Suitability: \_\_\_\_\_ Status: \_\_\_\_\_  
 PINS Reference Number: TR010031

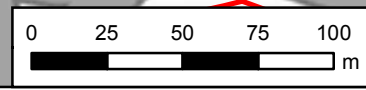
Client:

Project Title: A1 Birtley to Coal House Scheme  
 Drawing Title: Figure 5.3 Spring Activity Survey

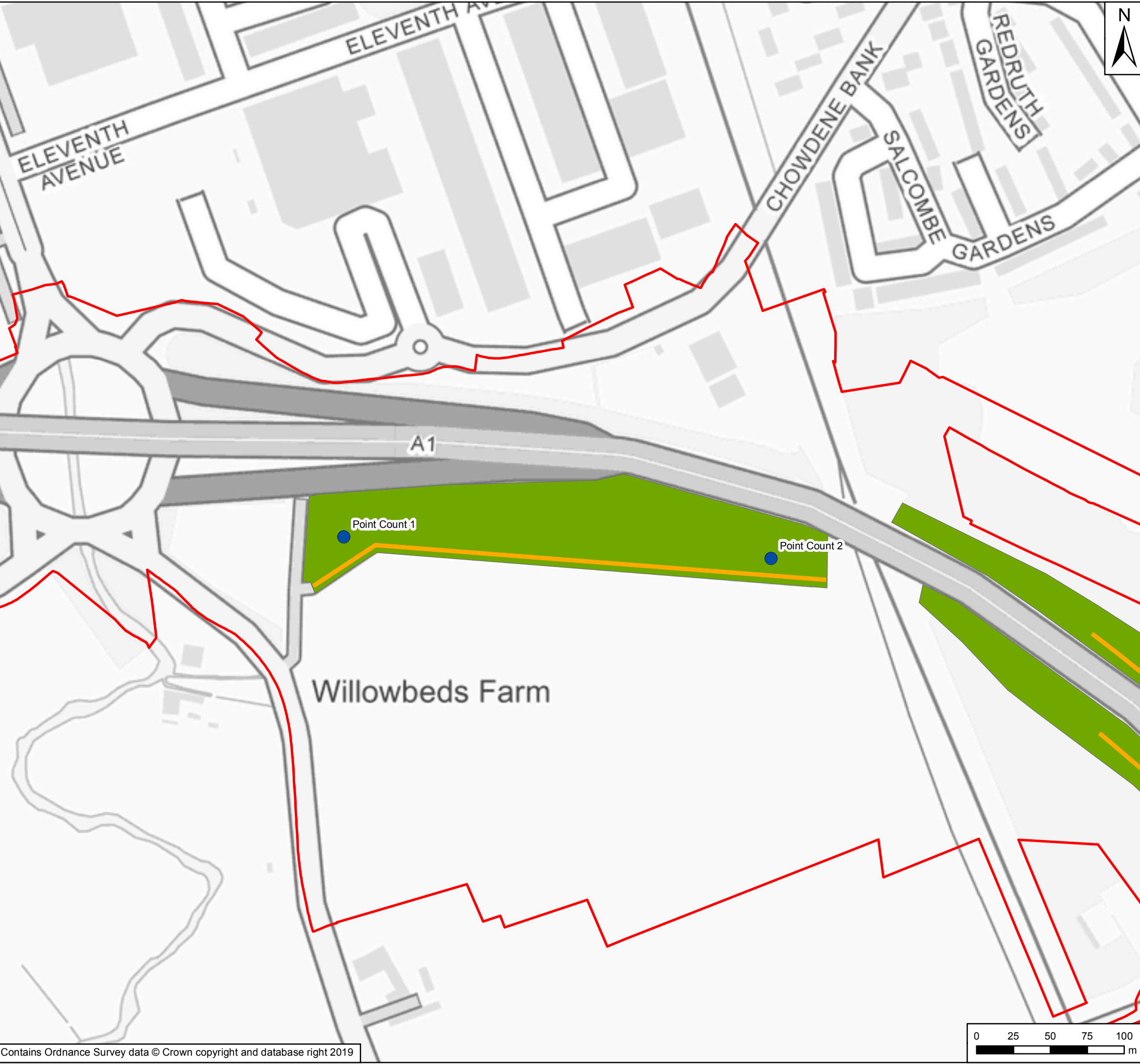
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| 1:2,500 | GH    | JR      | KS       | NJA        |

| Original Size | Date     | Date     | Date     | Date     |
|---------------|----------|----------|----------|----------|
| A3            | Dec 2018 | Dec 2018 | Dec 2018 | Dec 2018 |

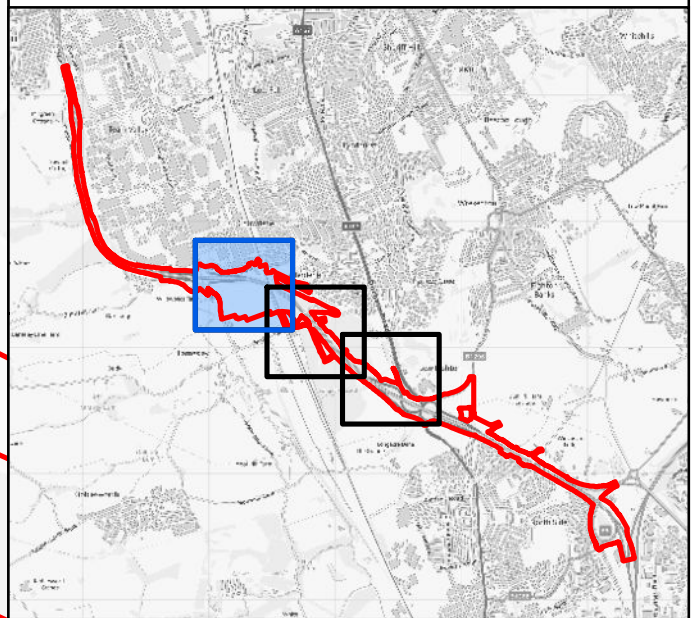
| Drawing Number | Originator | Volume | Revision |
|----------------|------------|--------|----------|
| HE551462       | WSP        | 6.3    | P03      |



User Name: UKGDH001 Date Saved: 16/04/2019 17:08:07  
 Document Path: \\uk.wsggroup.com\central\data\Projects\700419\A1BCH PCF Stage 3 and 4\03 Shared\EI A and flood risk\01 Model\GIS\MXD\Environmental Statement\Ecology Reports\Bat Activity Report\Figure 6.1 to 6.3 - Peak Activity.mxd



- Key**
- Scheme Footprint
  - Point Count
  - ↔ SM2
  - Activity Survey Transect
  - Peak\_Activity



| Rev | Date     | Description  | By | Chk'd | App'd |
|-----|----------|--------------|----|-------|-------|
| P03 | Apr 2019 | Third Issue  | GH | JR    | KS    |
| P02 | Mar 2019 | Second Issue | GH | JR    | KS    |
| P01 | Dec 2018 | First Issue  | GH | JR    | NJA   |

Suitability Status

PINS Reference Number TR010031

Client  highways england

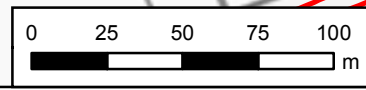
Project Title A1 Birtley to Coal House Scheme

Drawing Title Figure 6.1 Peak Activity

|               |          |          |          |            |
|---------------|----------|----------|----------|------------|
| Scale         | Drawn    | Checked  | Approved | Authorised |
| 1:2,500       | GH       | JR       | KS       | NJA        |
| Original Size | Date     | Date     | Date     | Date       |
| A3            | Dec 2018 | Dec 2018 | Dec 2018 | Dec 2018   |

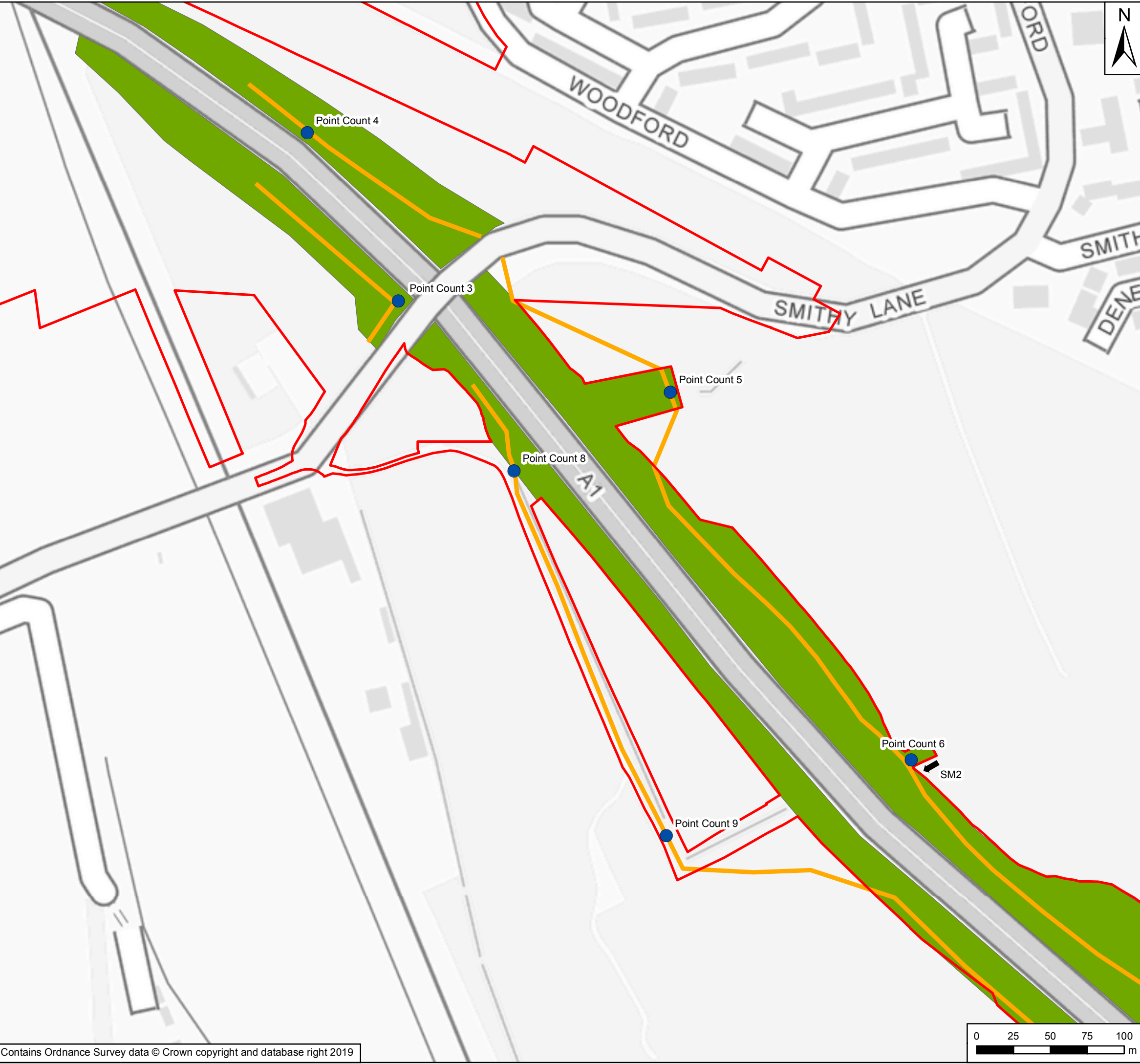
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|----------------|------------|--------|----------|
| Drawing Number | Originator | Volume | Revision |
| HE PIN         |            |        | P03      |
| HE551462       | WSP        | 6.3    |          |

|             |      |               |        |
|-------------|------|---------------|--------|
| <b>B2CH</b> |      | PW Stage Code |        |
| Section     | Type | ID            | Number |



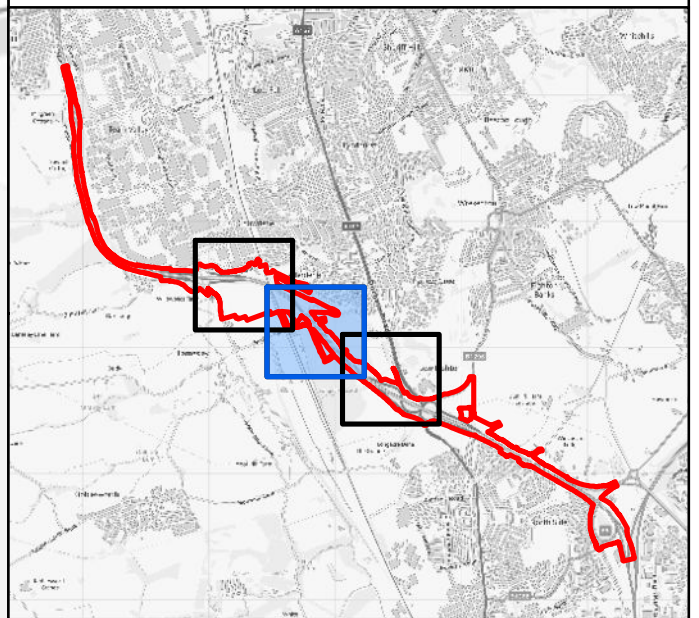


User Name: UKGDH001 Date Saved: 16/04/2019 17:08:07  
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**Key**

- Scheme Footprint
- Point Count
- ↖ SM2
- Activity Survey Transect
- Peak\_Activity



| Rev | Date     | Description  | By | Chk'd | App'd |
|-----|----------|--------------|----|-------|-------|
| P03 | Apr 2019 | Third Issue  | GH | JR    | KS    |
| P02 | Mar 2019 | Second Issue | GH | JR    | KS    |
| P01 | Dec 2018 | First Issue  | GH | JR    | NJA   |

Suitability: \_\_\_\_\_ Status: \_\_\_\_\_

PINS Reference Number: TR010031

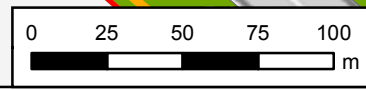
Client



Project Title: A1 Birtley to Coal House Scheme

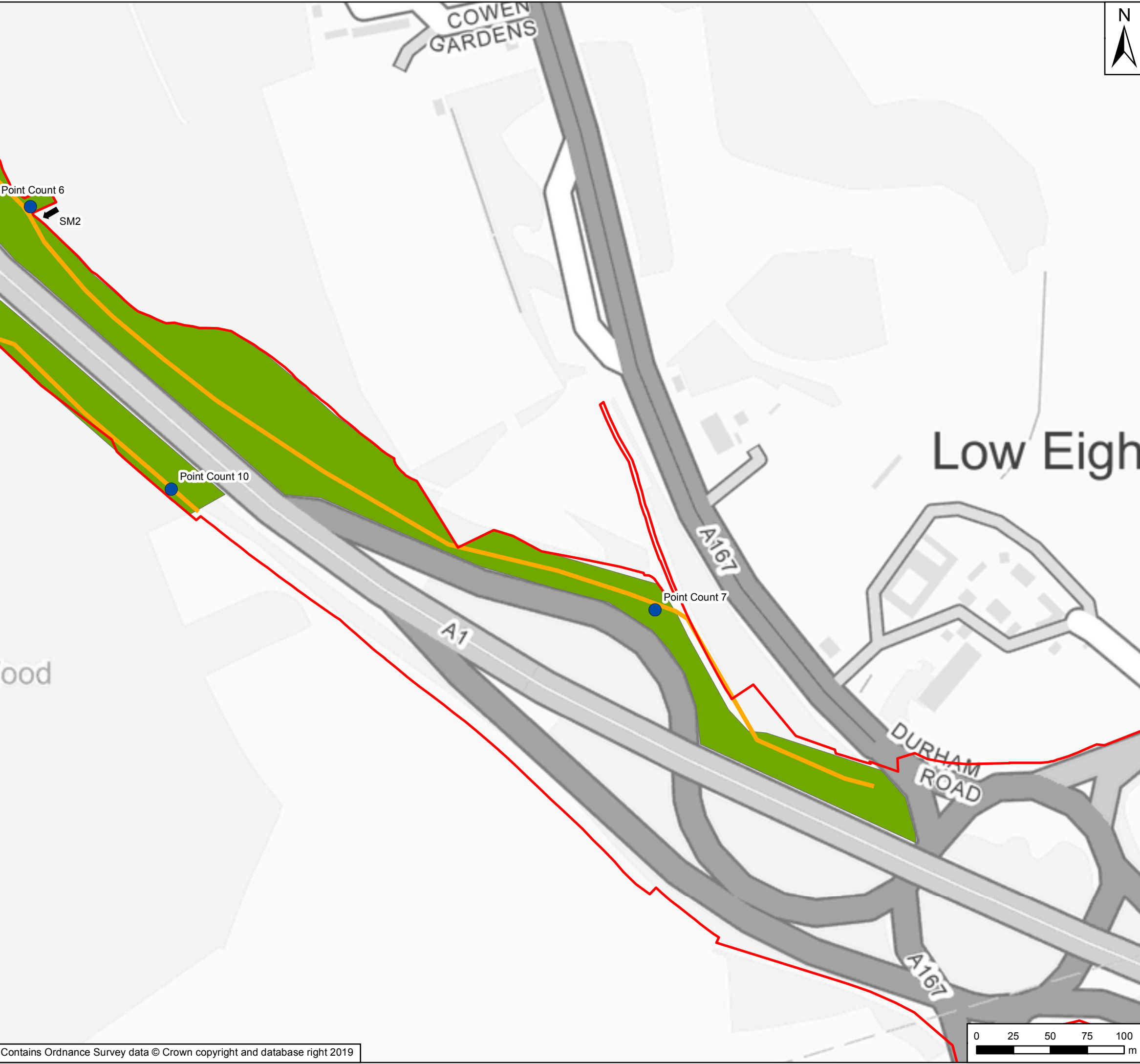
Drawing Title: Figure 6.2 Peak Activity

| Scale          | Drawn    | Checked    | Approved  | Authorised |      |        |
|----------------|----------|------------|-----------|------------|------|--------|
| 1:2,500        | GH       | JR         | KS        | NJA        |      |        |
| Original Size  | Date     | Date       | Date      | Date       |      |        |
| A3             | Dec 2018 | Dec 2018   | Dec 2018  | Dec 2018   |      |        |
| Drawing Number |          | Originator | Volume    | Revision   |      |        |
| HE551462       |          | WSP        | 6.3       | P03        |      |        |
| PW Stage Code  |          |            |           |            |      |        |
| B2CH           |          |            |           |            |      |        |
| Section        | Type     | ID         | Direction | Type       | Role | Number |

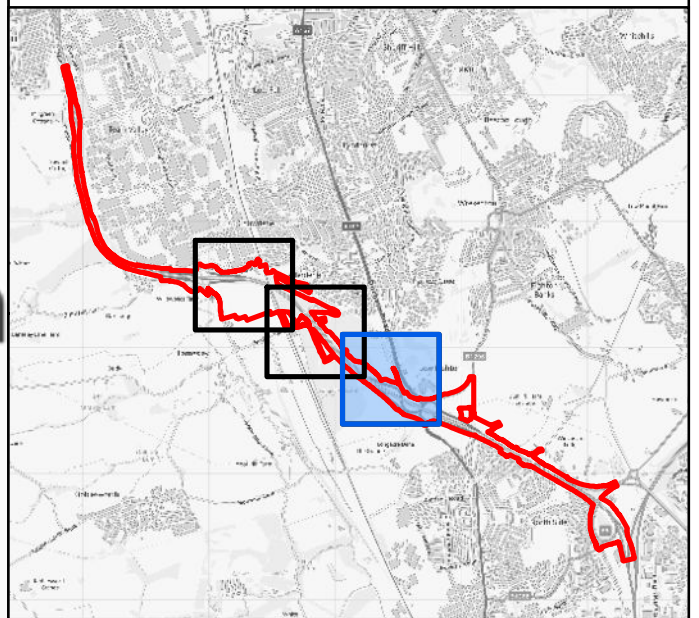




User Name: UKGDH001 Date Saved: 16/04/2019 17:08:07  
 Document Path: \\uk.wsggroup.com\central\data\Projects\700419\A1BCH PCF Stage 3 and 4\03 Shared\EI EIA and flood risk\01 Model\GIS\MXD\Environmental Statement\Ecology Reports\Activity Report\Figure 6.1 to 6.3 - Peak Activity.mxd



- Key**
- Scheme Footprint
  - Point Count
  - ↖ SM2
  - Activity Survey Transect
  - Peak\_Activity



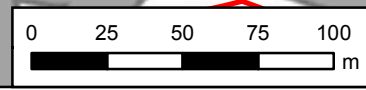
| Rev | Date     | Description  | By | Chk'd | App'd |
|-----|----------|--------------|----|-------|-------|
| P03 | Apr 2019 | Third Issue  | GH | JR    | KS    |
| P02 | Mar 2019 | Second Issue | GH | JR    | KS    |
| P01 | Dec 2018 | First Issue  | GH | JR    | NJA   |

Suitability: \_\_\_\_\_ Status: \_\_\_\_\_  
 PINS Reference Number: TR010031



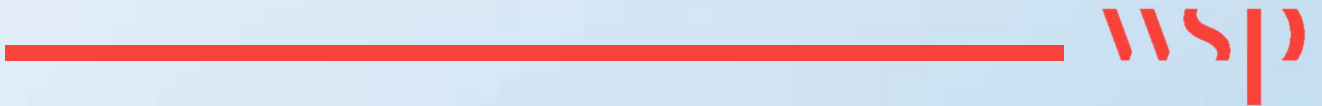
Project Title: A1 Birtley to Coal House Scheme  
 Drawing Title: Figure 6.3 Peak Activity

| Scale          | Drawn    | Checked    | Approved  | Authorised    |      |        |
|----------------|----------|------------|-----------|---------------|------|--------|
| 1:2,500        | GH       | JR         | KS        | NJA           |      |        |
| Original Size  | Date     | Date       | Date      | Date          |      |        |
| A3             | Dec 2018 | Dec 2018   | Dec 2018  | Dec 2018      |      |        |
| Drawing Number |          | Originator | Volume    | Revision      |      |        |
| HE551462       |          | WSP        | 6.3       | P03           |      |        |
| B2CH           |          |            |           | PW Stage Code |      |        |
| Section        | Type     | ID         | Direction | Type          | Role | Number |



# Appendix A

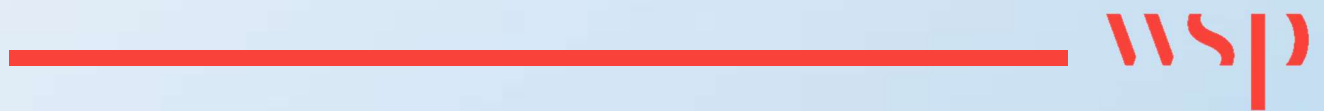
## **AUTOMATED DETECTOR SURVEY PERIOD**



| Survey Period | Date     | Sunrise | Sunset | Max temp (°C) | Min temp (°C) | Rain               |
|---------------|----------|---------|--------|---------------|---------------|--------------------|
| May           | 17.05.17 | 04:52   | 21:12  | 13            | 9             | None               |
|               | 18.05.17 | 04:53   | 21:13  | 12            | 8             | None               |
|               | 19.05.17 | 04:52   | 21:15  | 12            | 8             | Short shower       |
|               | 20.05.17 | 04:50   | 21:17  | 13            | 7             | Early rain shower  |
|               | 21.05.17 | 04:49   | 21:18  | 16            | 10            | None               |
|               | 22.05.17 | 04:47   | 21:20  | 18            | 9             | None               |
|               | 23.05.17 | 04:46   | 21:22  | 15            | 13            | None               |
|               | 24.05.17 | 04:44   | 21:23  | 19            | 12            | None               |
|               | 25.05.17 | 04:43   | 21:25  | 13            | 12            | None               |
|               | 26.07.17 | 04:41   | 21:26  | 20            | 11            | None               |
|               | 27.05.17 | 04:20   | 21:28  | 19            | 15            | None               |
|               | 28.05.17 | 04:39   | 21:29  | 13            | 11            | None               |
|               | 29.05.17 | 04:38   | 21:31  | 12            | 12            | None               |
| July          | 05.07.17 | 04:35   | 21:46  | 13            | 12            | None               |
|               | 06.07.17 | 04:36   | 21:45  | 18            | 14            | None               |
|               | 07.07.17 | 04:37   | 21:44  | 16            | 7             | None               |
|               | 08.07.17 | 04:39   | 24:44  | 16            | 7             | None               |
|               | 09.07.17 | 04:40   | 21:43  | 16            | 13            | Early light shower |
| September     | 06.09.17 | 06:22   | 19:46  | 13            | 11            | None               |
|               | 07.09.17 | 06:24   | 19:43  | 14            | 10            | None               |
|               | 08.09.17 | 06.26   | 19:41  | 12            | 10            | None               |
|               | 09.09.17 | 06.28   | 19:38  | 12            | 9             | None               |
|               | 10.09.17 | 06:30   | 19:36  | 12            | 9             | None               |

# Appendix B

## **SPECIES/SITE EVALUATION SYSTEM**



The valuation system used in this report is modified from Wray et al. (2010). Values are assigned using a geographic frame of reference as shown in Species/Site Evaluation System table below. The scores used to assign these values are calculated using Calculation of Foraging Habitat Scores table and Calculation of Commuting Habitat Scores table. 'National Rarity' values used in Calculation of Commuting Habitat Scores table and Categorisation of Bats by National Rarity table are based on the categorisation system shown in Categorisation of Bats by National Rarity table.

### Species/Site Evaluation System

| <b>Geographic Frame of Reference</b> | <b>Score</b> |
|--------------------------------------|--------------|
| Negligible.(Not important)           | 1-10         |
| District, Local or Parish            | 11-20        |
| County                               | 21-30        |
| Regional                             | 31-40        |
| National/UK                          | 41-50        |
| International                        | >50          |

### Calculation of Foraging Habitat Scores

| <b>National Rarity</b> | <b>Activity</b> | <b>Site/Nearby Roost Potential</b>                          | <b>Habitat Characteristics</b>                                                                                           |
|------------------------|-----------------|-------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| Common (2)             | Low (5)         | None (1)                                                    | Industrial or other site without established vegetation (1)                                                              |
|                        |                 | Small number (3)                                            | Suburban areas or intensive arable land (2)                                                                              |
| Rarer (5)              | Moderate (10)   | Moderate number / not known (4)                             | Isolated woodland patches, less intensive arable and/or small towns and villages (3)                                     |
|                        |                 | Large no. of roosts, or close to a SSSI for the species (5) | Larger or connected woodland blocks, mixed agriculture (small field sizes with well-grown and small villages/hamlets (4) |
| Rarest (20)            | High (20)       | Close to or within a SAC for the species (20)               | Mosaic of pasture (small fields), woodlands and wetland areas (5)                                                        |

### Calculation of Commuting Habitat Scores

| National Rarity | Activity      | Site/Nearby Roost Potential                                 | Habitat Characteristics                                                                        |
|-----------------|---------------|-------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| Common (2)      | Low (5)       | None (1)                                                    | Absence of (other) linear features (1)                                                         |
|                 |               | Small number (3)                                            | Unvegetated fences and large field sizes (2)                                                   |
| Rarer (5)       | Moderate (10) | Moderate number / not known (4)                             | Walls, gappy or failed hedgerows, isolated well-grown hedgerows, and moderate sized fields (3) |
|                 |               | Large no. of roosts, or close to a SSSI for the species (5) | Well- grown and well-connected hedgerows, small field sizes (4)                                |
| Rarest (20)     | High (20)     | Close to or within a SAC for the species (20)               | Complex network of mature well-established hedgerows, small fields and rivers/streams (5)      |

### Categorisation of Bats by National Rarity

| Rarity Within Range                  | England                                                                            | Wales                                                                     | Scotland                                              | Northern Ireland                                                             |
|--------------------------------------|------------------------------------------------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------|------------------------------------------------------------------------------|
| Common (population. over 100,000)    | Common Pipistrelle<br>Soprano Pipistrelle<br>Brown Long-eared                      | Common Pipistrelle<br>Soprano Pipistrelle                                 | Common Pipistrelle<br>Soprano Pipistrelle             | Common Pipistrelle<br>Soprano Pipistrelle                                    |
| Rarer (population. 10,000 - 100,000) | Lesser Horseshoe<br>Whiskered<br>Brandt's bat<br>Daubenton's Bat<br>Natterer's Bat | Lesser Horseshoe<br>Daubenton's Bat<br>Natterer's Bat<br>Brown Long-eared | Daubenton's Bat<br>Natterer's Bat<br>Brown Long-eared | Daubenton's Bat<br>Natterer's Bat<br>Leisler's Bat<br>Nathusius' Pipistrelle |

| Rarity Within Range               | England                                                                                                      | Wales                                                                                                                                                | Scotland                                                                                          | Northern Ireland |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|------------------|
|                                   | Leisler's Bat<br>Noctule<br>Nathusius'<br>Pipistrelle<br>Serotine                                            |                                                                                                                                                      |                                                                                                   | Brown Long-eared |
| Rarest (population. under 10,000) | Greater Horseshoe<br>Bechstein's Bat<br>Alcahoh Bat<br>Greater Mouse-eared<br>Barbastelle<br>Grey Long-eared | Greater Horse-shoe<br>Whiskered<br>Brandt's Bat<br>Bechstein's Bat<br>Alcahoh Bat<br>Noctule<br>Nathusius'<br>Pipistrelle<br>Serotine<br>Barbastelle | Whiskered<br>Brandt's Bat<br>Alcahoh Bat<br>Noctule<br>Nathusius'<br>Pipistrelle<br>Leisler's bat | Whiskered        |



# Appendix C

## **WALKED TRANSECT POINT COUNT DATA**



### Spring Walked Transect

| Point Count | Bat passes         |                     |                   |
|-------------|--------------------|---------------------|-------------------|
|             | Common pipistrelle | Soprano pipistrelle | <i>Myotis</i> sp. |
| 1           |                    |                     |                   |
| 2           |                    |                     |                   |
| 3           | 3                  |                     | 1                 |
| 4           | 5                  |                     |                   |
| 5           |                    |                     |                   |
| 6           | 1                  | 1                   |                   |
| 7           | 1                  |                     |                   |
| 8           |                    |                     |                   |
| 9           |                    |                     |                   |
| 10          | 2                  |                     |                   |

### Summer Walked Transect

| Point count | Bat passes         |                     |                   |
|-------------|--------------------|---------------------|-------------------|
|             | Common pipistrelle | Soprano pipistrelle | <i>Myotis</i> sp. |
| 10          |                    |                     |                   |
| 9           |                    |                     |                   |
| 8           |                    |                     |                   |
| 7           | 2                  |                     |                   |
| 6           |                    |                     |                   |
| 5           |                    |                     |                   |
| 4           |                    |                     |                   |
| 3           | 1                  |                     |                   |
| 2           | 5                  |                     |                   |
| 1           | 8                  |                     |                   |

---

### Autumn Walked Transect

| Point count | Bat passes         |                     |                   |
|-------------|--------------------|---------------------|-------------------|
|             | Common pipistrelle | Soprano pipistrelle | <i>Myotis sp.</i> |
| 1           |                    |                     |                   |
| 2           |                    |                     |                   |
| 3           |                    |                     |                   |
| 4           | 1                  |                     |                   |
| 5           | 5                  |                     |                   |
| 6           |                    |                     |                   |
| 7           |                    |                     |                   |
| 8           |                    |                     | 1                 |
| 9           |                    |                     |                   |
| 10          | 4                  | 2                   |                   |

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