



THE  
ENVIRONMENTAL  
PROJECT CONSULTING  
GROUP

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**Lower Stumble Exploration Site**  
**Land off London Road, Balcombe**  
**near Haywards Heath, West Sussex**

**BAT SURVEY**

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Client: Cuadrilla Resources Ltd  
Cuadrilla House, Stowe Court, Stowe Street,  
Lichfield, Staffordshire WS13 6AQ  
Site: Land off London Road, Balcombe, West Sussex  
Project: Bat Survey  
Bat Surveys: Ron Allen, Dean Swensson, Steve Bega  
Report date: 7 September 2013  
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**1.0 INTRODUCTION, LEGISLATION AND SUMMARY**

**1.1 INTRODUCTION**

Cuadrilla Resources Ltd, have commissioned this Bat Survey to provide assurance that bats (European protected species) are not affected by the drilling operations on site; or, should there be potential for adverse impact that sufficient precautions are in place to avoid such impact.

As well as an initial day time visit to assess the potential of the site and its surroundings to support bats, two emergence/re-entry and transect activity bat surveys have been undertaken.

Background to the site is provided in the 22 October 2009 Ecological Appraisal and the 17 May 2013 Pre-works update report.

**1.2 SUMMARY OF LEGISLATION**

All UK bat species are strictly protected under UK/European law through being listed on Annex IV of the Habitat Regulations (2010) and Schedule 5 of the Wildlife and Countryside Act (1981). This makes it an offence to deliberately or recklessly:

- Capture, injure or kill a bat;
- Disturb a bat in a way that would affect its ability to survive, breed or rear young or affect the local distribution and abundance of the species;

- Damage or destroy a roost.

If a proposed development would contravene any of the above points, a European Protected Species (EPS) licence would be required before further works that may impact upon bats or their places of shelter (roost) could take place.

### Relevant Planning Policy

Under the government's National Planning Policy Framework (NPPF) and section 41 of the Natural Environment and Rural Communities Act (NERC) local authorities are obliged to consider how a proposed development can protect and enhance local biodiversity interests.

### 1.3 SUMMARY

Several trees in the vicinity had potential to support roosting bats and the site and its surroundings also had potential to support roosting and foraging bats. A nearby railway bridge also had potential roosting cavities.

Emergence and re-entry surveys were undertaken of the potential roosting sites and transect surveys were undertaken over night around the edge of the drilling compound.

No bats were recorded or suspected of having emerged or re-entered either the ivy covered trees to the east of the access road nor the features identified in the brick work of the railway bridge to the north of the site.

Early and late registrations of Common Pipistrelle within the woodland adjacent to the south-east boundary and the single registration of *Myotis* species bat flying north from the railway bridge would suggest however that there could be roosts within close proximity and that these are either located outside of the near vicinity of the site or that have not been detected through the surveys carried out to date.

The greatest level of activity registered has been from Common Pipistrelle bats. Soprano Pipistrelle, Noctule, Serotine and an unidentified *Myotis* species bat were recorded both on the static bat detectors and during activity surveys but to a much lower level of frequency and activity.

Common Pipistrelles were observed and registered significantly at greater frequency along the south-eastern boundary and at a lesser degree along the north-eastern and then along the south-western boundaries.

Bats were seen to be using the tree lines around the rig sites boundary for commuting but also foraging, with some bats actively foraging around the artificial light sources from security and operational lighting. Apart from the young plantation to the north, the site is well screened by trees avoiding significant light spillage into these areas.

Apart from the possible benefit provided by foraging around the site lighting, it is considered that there are no adverse affects on bats arising from the site activity and in particular, no roosts are affected. On the basis of these surveys, there are no adverse affects on bats such that licensing would be required.

It is recommended however, that flood lighting is re-aligned to avoid light spillage to the north and reduce spillage across the other boundaries and also that the level of lighting reduced if possible.

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## 2.0 BAT SURVEY METHODS

### 2.1 GUIDANCE

The survey was carried out in accordance with current best practice guidelines published by the Bat Conservation Trust (2012).

Each surveyor was equipped with up to two bat detectors (either an Anabat SD1/2, Petterson D240x, or Bat Box Duet) and a recorder (as appropriate) to record unidentified calls for subsequent computer analysis. The surveyor marked bat activity on supplied plans of the site. Every bat sighting during a survey and/or echolocation heard was marked down as a bat registration.

### 2.2 WALK OVER SURVEY

Prior to the commencement of the night-time surveys a walk over of the site and surrounding vicinity was undertaken on the 5<sup>th</sup> August 2013 by Ron Allen, Steve Bega and Dean Swensson (Natural England licensed bat surveyor with 13 years bat survey experience).

All trees were assessed and investigated for suitable features that could be used by bats for roosting. Suitable tree features that bats might use as roost sites may include holes, fissures, crevices and cracks within the main trunk or lateral branches. These features can be obscured by ivy and heavily clad old growth ivy can also be used by bats to roost behind and underneath. Trees with such features were noted on a plan during the walkover survey and the features photographed and mapped.

**Figures 1 and 2** show features identified within trees in the vicinity of the drilling site. In addition, the wider landscape was assessed to evaluate the likely usage of any habitats by bats as potential foraging areas and/or commuting routes. Linear features such as water ways, ditches, hedgerows and woodland edges are generally regarded as attractive features and resources used by bats during commuting and foraging.



**Figure 1** Oak tree with dead crown located approximately 25 metres from the North-east corner of the site access road.



**Figure 2** Ivy covered trees located to the East of the access road and within near vicinity of the access gateway. A single pine tree is also situated here, which includes dead wood with fissures and an open cavity.

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## 2.3 EMERGENCE AND RE-ENTRY SURVEYS

### 2.3.1 ZONE OF INFLUENCE

Given the differing structure of the surrounding woodland habitats and the generally enclosed location of the drilling site, investigation of potential roosting features was limited to within 50 metres of drilling location. This distance was considered to be within reasonable vicinity of the site and sufficient (given the character of the surrounding landscape) as to contain any direct or indirect influences from the drilling operations on flight paths from roosting sites or commuting routes and foraging areas.

### 2.3.2 TREE SURVEYS

During the emergence and re-entry surveys 2 experienced bat surveyors were positioned to view those previously identified features with potential for use by roosting bats.

Surveyors were positioned and in place 15 minutes prior to sunset during the emergence surveys and one hour prior to sunrise during the dawn survey. All bat registrations were noted and marked on a site plan.

## 2.4 GENERAL BAT ACTIVITY SURVEYS

### 2.4.1 Static bat detectors

Two static bat detectors (Anabat SD1/2) were positioned in different locations on the boundary of the site during each of the four survey periods. These static detectors recorded bat echolocation calls throughout the four survey periods from at least 15 minutes prior to sunset through until 10 minutes after sunrise. Recorded registrations from the bat detectors were then analysed with all bat echolocation calls identified where possible (however, some *Myotis* bat echolocation calls are extremely difficult to differentiate and where these calls are unable to be identified to species these would be recorded as *Myotis* species).

From these recordings it was possible to assess the species and frequency of passes by bats at these locations although this use of static detectors will not provide a clear result for the number of individual bats using the area other than at any one given time during a recorded registration period.

**Plan 1** shows the location of the 2 Anabat recordable bat detectors during both surveys. These remote recorders were placed on the drill site boundary facing outwards and at an approximate 45 degree angle facing upwards from the rig site.

### 2.4.2 Transect Surveys

After each emergence survey both surveyors together walked the boundary of the drilling site and, as shown on **Plan 1** and noted any bat activity between and at 11 pre-determined points around the boundary. This was carried out to further inform the survey of activity within and around the boundary of the application site and enable where possible direct observation of bat activity and if at all possible the numbers of bats using these areas at any given time. Surveyors stayed at each pre-determined point for approximately 5-10 minutes before moving on to the next point.

### 2.4.3 Information recorded

The following information was recorded where possible during both transect and emergence and re-entry surveys:

- bats seen or heard;
- species/genus (if known);

- time;
- behaviour (feeding, commuting, social calling or swarming); and
- flight direction

Behaviour was identified by flight patterns and call characteristics as heard on the bat detector.

Weather conditions (wind speed and direction, cloud cover, rainfall) were also recorded at the start and end of each survey.

Surveys were undertaken on:

- 12-13<sup>th</sup> August 2013
- 14-15<sup>th</sup> August 2013
- 27-28<sup>th</sup> August 2013
- 29-30<sup>th</sup> August 2013.

These survey dates coincide with the period when bats are active. Timings of surveys were guided by *Bat Surveys – Good Practice Guidelines* (BCT 2010).

Emergence surveys commenced approximately 15 minutes before sunset and finished 1 to 1 and half hours after sunset.

Transect surveys then continued after each emergence survey.

Dawn surveys commenced at least 1hr prior to sunrise.

## 3.0 SURVEY RESULTS

### 3.1 WALK-OVER SURVEY

During the walk over survey both the drilling site and the surrounding vicinity were investigated.

The drilling site consists of a semi hard standing access road leading through a wooded landscape for about 130 metres leading to the hard standing compound covering an approximate area of 80 x 50 metres. The drilling rig is located centrally in this area surrounded by various welfare cabins, machinery and flood lights. There are no trees within the rig site.

The surrounding landscape consists variously of mixed woodland, semi natural woodland, spruce plantation, and planted shelter screening. The surrounding tree cover obscures the site on three aspects with the north-western boundary having relatively less tree canopy to screen the drill site.

Four locations were identified within a 50 metre radius of the drill site as having features with potential to support roosting sites. These features and locations are shown on **Plan 1 and Figures 1 and 2**.

### 3.2 EMERGENCE/ACTIVITY AND DAWN RE-ENTRY SURVEY

#### 3.2.1 Timing and weather

Details of the timing of the emergence/re-entry & activity surveys and weather conditions are shown below:

**Table 1. Timing of emergence/activity & Dawn Re-entry surveys**

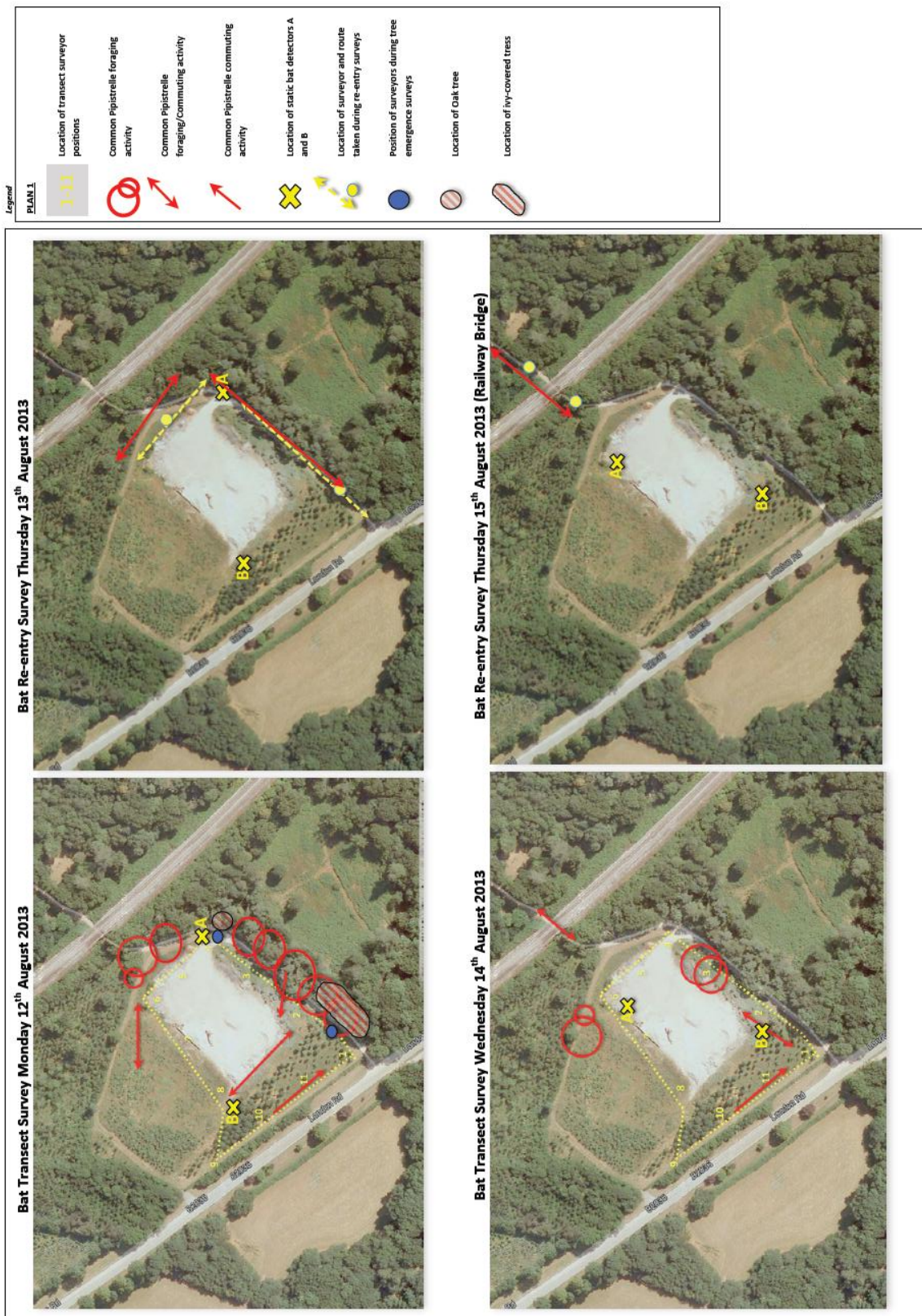
Date	Start/Finish Emergence/Activity	Sunset/Sunrise	End of Transect	Duration entire survey period
12 <sup>th</sup> August Pm	20:15-21:45	20:30	23:30 (90mins)	3hr 15 minutes
13 <sup>th</sup> August Am	04:30-05:55	05:43	-	1hr 20 minutes
14 <sup>th</sup> August Pm	20:10-22:00	20:25	23:08 (68)	2hr 58 minutes
15 <sup>th</sup> August Pm	04:30-05:55	05:46	-	1hr 25 minutes
27 <sup>th</sup> August Pm	19:40-23:05	19:59	23:05	3hr 25 minutes
28 <sup>th</sup> August Am	04:40-06:10	06:10	-	1hr 30 minutes
29 <sup>th</sup> August Pm	19:40-23:00	19:54	23:00	3hr 20 minutes
30 <sup>th</sup> August Am	04:45-06:15	06:13	-	1hr 30 minutes

**Table 2 Weather Conditions of Dawn/Dusk Surveys**

Date	Temp range during survey	Cloud cover %	Wind	General
12 <sup>th</sup> August (Evening)	18-16c	35%	None	Warm, numbers of insects on the wing. Dry throughout
13 <sup>th</sup> August (Dawn)	13-11c	20%	None	High numbers of insects on the wing. Dry throughout, calm & clear
14 <sup>th</sup> August (Evening)	16-14c	100%	Calm slight breeze	Calm intermittent showers. Insects noted on the wing.
15 <sup>th</sup> August (Dawn)	15-13.5c	100%	Calm slight breeze	Reasonable conditions with insects on the wing
27 <sup>th</sup> August (Evening)	14-16c	5%	Dry calm	Insects on the wing
28 <sup>th</sup> August (Dawn)	9-12c	0%	Calm/Clear	Insects noted

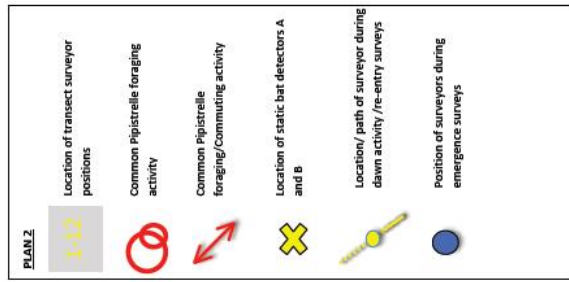
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29 <sup>th</sup> August (Evening)	17-18c	10%	Calm Dry	Insects on the wing
30 <sup>th</sup> August (Dawn)	14-16c	40%	Calm Dry	Insects noted



Plan 1 Survey layout and bat survey results 12/13 and 14/15 August 2013





Project Name: Balcombe  
 Client: Bat Survey Results  
 Title: Bat Survey Results  
 Date: 30<sup>th</sup> August 2013

Bat Re-entry Survey Wednesday 28<sup>th</sup> August 2013



Bat Re-entry Survey Friday 30<sup>th</sup> August 2013



Bat Transect Survey Tuesday 27<sup>th</sup> August 2013



Bat Transect Survey Thursday 29<sup>th</sup> August 2013



Plan 2 Bat survey results 27/28 and 29/30 August 2013

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## 3.2.2 Overview of Survey Results

### 3.2.2.1 Emergence/Activity Survey 12<sup>th</sup> August 2013

Prior to sunset surveyors were positioned as shown on **Plan 1** and facing towards previously identified features within the vicinity of the site, these being the oak tree with some dead upper crown and the area of ivy covered trees and the single pine tree with a cavity opening shown in **Figure 1 and 2**.

Due to dense woodland cover and restrictions in respect of health and safety the surveyor positioned at the north-east corner of the site was unable to view the crown of the dead oak. Positioning of the surveyor was as such to observe any activity within this general area of this particular location and closest vicinity to the feature. The other surveyor, covering the ivy covered trees along the south-eastern boundary and along the access road, had good visibility within the woodland given little understory cover and sufficient open breaks between the ivy covered trees to allow almost uninterrupted viewing.

The first bat registrations were all from Common Pipistrelle bats (*Pipistrellus pipistrellus*) with both surveyors registering in close succession two-three passes along the access track some 30 minutes after sunset. After this, at least three individual Common Pipistrelles were noted foraging throughout the emergence survey period along the access track and the northern boundary.

These bats were registered and observed as continuously foraging along the south-eastern and north-eastern boundaries following the linear outside line of the woodland edge the upper canopy of the trees which were being illuminated by the security lighting and working lights of the rig. No other species were noted.

### 3.2.2.2 Transect Survey Evening of 12<sup>th</sup> August

During the circular transect route around the periphery of the site, foraging activity from Common Pipistrelle bats was seen along the access track with a minimum of five individual bats being noted at any one time as foraging along the tree line to the east and west of the track with and into the close boundary of the rig site.

Further activity from Common Pipistrelle bats was noted along the northern boundaries and again along the outside of the woodland edge tree line with a minimum of three individual bats along this northern boundary. Foraging was continuous in these areas between transect positions 1-6.

At the north-western boundary, the higher tree canopy is replaced by a much lower open plantation of young spruce trees and light spill from the rig site is significant across this area. At position 6 a single Common Pipistrelle was noted to commute into this area but this was the only registration/observation of a bat within this area. The next registrations were not until positions 8 and 10 when up to two Common Pipistrelle bats were noted as commuting and foraging within close vicinity of the boundary of the lit rig site. Only single bats were noted at one time along this south-west side of the site although it was considered that multiple individuals were likely to be involved.

### 3.2.2.3 Static Bat detector Survey 12<sup>th</sup>-13<sup>th</sup> August

#### **Detector A**

The first registration was a Common Pipistrelle at 21:37. Four further Common Pipistrelle registrations were registered between 22:01-22:43 with increased activity through until 23:00 with a single Soprano Pipistrelle (*Pipistrellus pygmaeus*) then recorded at 23:25. Common Pipistrelle was then recorded on four occasions between 23:31-23:56 with another Soprano Pipistrelle at 00:00. Seven Common Pipistrelle registrations were then recorded up until 00:36

when activity stopped until 01:35 when a single Common Pipistrelle passed. At 01:51 both single Common and Soprano Pipistrelles were registered and then three further registrations of Common Pipistrelle were recorded with the last registration being at 02:13. There were no further registrations after this.

### **Detector B**

The first registration was of a Common Pipistrelle bat at 21:36, five further Common Pipistrelle registrations were then recorded between 21:48-22:34. Thirty three registrations all from Common Pipistrelle bats with at least 4 individuals at one given time were registered between 22:41-00:14. These were followed by a single registration of a Soprano Pipistrelle at 00:21.

Four sporadic registrations were then recorded by Common Pipistrelles between 00:24-02:02 with a very short likely commuting registration of a Noctule bat (*Nyctalus noctua*) registered at 02:07 and the final registration being at 02:09 of a Common Pipistrelle bat.

#### **3.2.2.4 Dawn Re-entry Survey 13<sup>th</sup> August**

During the dawn survey a surveyor was positioned again along the access road observing any activity within the group of ivy covered trees and the single pine with the open cavity feature. The second surveyor took a position with a slightly further northern location to observe any activity at the upper end of the access track leading towards the railway line and associated railway bridge.

Very few registrations were noted by either surveyor with two registrations from Common Pipistrelle noted by the northern placed surveyor at 04:51 and 04:52 briefly foraging along the northern tree lined boundary. The surveyor located at the southern end of the access track registered just one bat, again of a Common Pipistrelle recorded within the woodland at 04:48 which was also noted as briefly foraging up and down the access roadway.

#### **3.2.2.5 Emergence/Activity Survey 14<sup>th</sup> August 2013**

Surveyors were located at the western and eastern boundaries of the site and as shown on **Plan 1**.

A Common Pipistrelle bat was recorded emerging from the woodland on the eastern boundary of the site and observed foraging high within the tree canopy along the woodland edge at 20:33. Foraging and commuting activity of approximately three Common Pipistrelle bats were recorded along the woodland edge up towards the railway bridge between 20:38 – 21:21. A single registration of a Common Pipistrelle bat was recorded at the eastern corner of the site at 21:01.

Continuous foraging activity of approximately five Common pipistrelles was then recorded along the woodland edge of the main site entrance road at the south-eastern boundary of the site.

Bats were observed flying high in the well-lit tree canopies as well as in the lower darker areas surrounding the road during this emergence period. Commuting and foraging of approximately two Common Pipistrelle bats were recorded along the north-eastern boundary of the site. A single Common Pipistrelle bat was recorded commuting along the dark path on the south-western boundary parallel to The London Road at 21:50.

#### **3.2.2.6 Transect Survey Evening 14<sup>th</sup> August 2013**

Registrations and observations during the transect survey very much mirrored the previous survey. Common Pipistrelle bats were observed to continuously foraging along the access track and within the both the darker and lit upper canopy areas. At least five individual bats

were noted here at any one time.

Further observations along the north-east boundary woodland edge again recorded commuting and foraging Common Pipistrelles but with likely considered fewer individuals.

The well lit spruce plantation on the north-west site boundary provided no bat registrations. The south-west boundary recorded no registrations during the transect survey.

### **3.2.2.7 Static Bat Detector Survey 14<sup>th</sup> – 15<sup>th</sup> August 2013**

#### ***Detector A Facing north on the north-west/north-east boundary***

First registration was of a Common Pipistrelle at 20:47 some 23 minutes after sunset.

Frequent registrations of Common Pipistrelle bats of up to three to four individuals at a time were then registered until 23:12. Two registrations from Soprano Pipistrelles were recorded at 23:38 and 23:39. Six registrations of Noctule bat were then recorded between 00:28-00:59. Over 20 registrations of likely commuting Common and Soprano Pipistrelle bats were then recorded between 01:14-04:23 with the very final Common Pipistrelle registration being at 04:30.

#### ***Detector B Facing south on the south-east/south-west boundary***

The first registration was of a Common pipistrelle bat at 20:49.

Eight registrations were then recorded of Common Pipistrelles until a Soprano Pipistrelle bat at 20:23.

37 registrations of Soprano and Common Pipistrelles were recorded between 20:23 and 21:39. A *Myotis* species bat was recorded at 21:39 and 21:56. Regular registrations of Common Pipistrelles were recorded between 21:40 and 22:05 with the second recording of a Soprano Pipistrelle at 22:11. Very frequent registrations of multiple Common Pipistrelle bats were recorded up until 00:23 with another recording of a Soprano Pipistrelle. A *Myotis* species was recorded at 00:36 with frequent recordings of Common and Soprano Pipistrelle bats leading up to 00:50. 11 sporadic registrations of Common and Soprano Pipistrelles were then recorded between 01:34 and 03:29. The final registration was of a Soprano Pipistrelle at 04:51.

### **3.2.2.8 Dawn Re-entry survey 15<sup>th</sup> August 2013**

Surveyor positions are shown on **Plan 1**. and being either side of the railway bridge to the north of the north-eastern boundary. Multiple registrations of Common pipistrelle bats were recorded commuting north and south under the Railway Bridge between 04:43 – 05:34. A single registration of a *Myotis* species was recorded at 04:55 commuting North under the railway bridge into the estate. This was the last registration recorded.

### **3.2.2.9 Emergence/Activity Survey 27<sup>th</sup> August 2013**

Prior to sunset surveyors were positioned as shown on **Plan 2**. One surveyor was located on the south-west boundary with the other surveyor on the very northern tip of the site.

A minimum of 2 Common Pipistrelle were noted continually foraging along the northern boundary tree line from 20:30 through until 21:02. This area was well lit with the light spillage illuminating the boundary tree line. The Common Pipistrelles as previously noted during prior surveys were foraging high and close to this tree line. A further minimum of 4 individual Common Pipistrelle bats were also noted by this surveyor to be foraging high along tree canopy above the site entrance in the north-east corner of the site and along the road towards the railway bridge. The other surveyor was positioned at the south-west boundary adjacent to

London Road. Here the surveyor registered minimal levels of commuting Common Pipistrelle and Myotis species bats. It was noted that this area was considerably cooler with a temperature reading suggesting that this area of the site closer to the London Road was 3 degrees lower than the actual site and northern boundary.

### **3.2.2.10 Transect Survey Evening of 27<sup>th</sup> August 2013**

Foraging from Common Pipistrelle bats considered likely to be from at least 4 individuals continued during the transect along the northern boundaries with further continued minimal registrations of activity along the south-west boundary line with both odd occasional registrations from Common Pipistrelle and Myotis species. Areas with least activity were the north-west boundary and the eastern side of the site and along the access road.

### **3.2.2.11 Static Bat detector Survey 27<sup>th</sup>-28<sup>th</sup> August**

#### ***Detector A*** (as shown on plan 1) Path Parallel to London Road

The First registration was of a Myotis Sp at 20:24.

Regular registrations of Myotis Sp and Common and Soprano Pipistrelles were recorded between 20:24 and 21:02. Single registrations of Common pipistrelles were recorded at 21:52 and 22:59. A Soprano pipistrelle was recorded at 23:14 followed by 3 recordings of Myotis at 23:38, 00:15 and 04:35. A common pipistrelle was recorded at 05:01 and Soprano pipistrelle at 05:04. 4 registrations of Common pipistrelle were recorded until the final registration at 05:35.

#### ***Detector B*** (as shown on plan 1) North tip of site

The first registration was of a Common pipistrelle at 20:30. Regular registrations of common pipistrelles were recorded between 20:33 and 22:18. A Soprano Pipistrelle was recorded at 23:05 followed by 2 recordings of Common pipistrelle at 23:18 and 23:38. 3 Registrations of common pipistrelles were recorded between 00:10 and 00:30 followed by a Serotine at 02:41. A Myotis Sp was recorded at 03:49 followed by regular registrations of Common and Soprano Pipistrelles between 05:01 and 05:43.

The final registration was of a Common Pipistrelle at 05:43

### **3.2.2.12 Dawn Re-entry Survey 28<sup>th</sup> August 2013**

Two Surveyors were positioned in the woodland east of the main site entrance as shown on **Plan 2**.

Low levels of foraging by Common Pipistrelle bats were recorded by both surveyors with most registrations being heard and not seen. A single common pipistrelle was however observed foraging high in the canopy of Ash and Pine trees close to the access road by surveyor along with another Common Pipistrelle that commuted north over the conifer plantation. These were relatively late and close to sunrise.

### **3.2.2.13 Emergence/Activity Survey 29<sup>th</sup> August 2013**

Surveyors were positioned on the southern side of the railway bridge and in the woodland to the east of the site access road and as shown on **Plan 2** during the first period of the emergence activity survey.

Commuting and foraging activity of at least 3 individual Common Pipistrelle and a single Soprano Pipistrelle was recorded in the open area of the woodland to the east of the access

road during the early period of the survey. Each of these 3 individual bats were noted as having commuted to this area from different locations, from the south, east and north.

Throughout the emergence period, faint foraging registrations of likely additional Common Pipistrelle individuals were recorded in the southern area of this woodland to the east of the access road.

A single Soprano Pipistrelle was recorded foraging under the railway bridge along with foraging and commuting activity by at least 3 individual Common Pipistrelles in the tree canopies long the north-eastern boundary between the woodland opening and the Oak in the corner of the conifer plantation.

Low levels of commuting were also recorded along the walkway parallel to London Road by both Common Pipistrelle and Myotis Species. This area is particularly dark and enclosed with none of the bats registered along here being observed.

No bats were recorded over the drill area.

#### **3.2.2.14 Transect Survey Evening 29<sup>th</sup> August 2013**

Again, surveyors noted mainly foraging and commuting Common Pipistrelle along and in particular the northern boundaries and eastern open woodland areas east of the access road along with foraging from at least 4 individual Common Pipistrelle and a single Soprano Pipistrelle along the actual access road. Just two registrations of Common Pipistrelle were noted along the boundary with London Road with a single registration of a Myotis species.

No bats were noted in the drill site.

#### **3.2.2.15 Static Bat Detector Survey 29<sup>th</sup> – 30<sup>th</sup> August 2013**

##### ***Detector A*** (as shown on plan 1) Path main site entrance

The first registration was of a Common Pipistrelle at 20:27.

Regular strong registrations of Common Pipistrelles were recorded between 20:29 and 21:21. A Soprano Pipistrelle was recorded at 22:17 followed by regular registrations of Common Pipistrelles between 22:37 and 23:57. A short registration of a Common pipistrelle was recorded at 00:14 followed by another at 00:48. Another Soprano Pipistrelle was recorded at 00:55.

A short recording of a Common pipistrelle was recorded at 01:00. This was the final registration. There was a malfunction with the Em3+ detector from this point onwards.

##### ***Detector B*** (as shown on plan 1) Accommodation cabins

The first registration was of a Common Pipistrelle at 21:05.

A Myotis Species bat was recorded at 22:20 followed by regular recordings of Common Pipistrelles between 22:21 and 23:05. A Noctule was recorded at 23:11.

Frequent registrations by Common Pipistrelle and Noctule bats were recorded between 23:13 and 23:36. Regular registrations of Myotis Sp and Common Pipistrelles were recorded between 23:42 and 00:05 followed by regular registrations of Common Pipistrelles between 00:28 and 01:00.

Myotis Species were recorded at 01:06 and 01:23. Common Pipistrelles were recorded frequently between 01:23 and 01:38 with another short Myotis Species call being recorded at

01:41. Registrations of Common Pipistrelles continued until 02:12 when regular registrations of a Noctule were also recorded until 03:16.

A short recording of a Serotine was registered at 03:32. Common pipistrelles continued to be recorded until the final registration at 03:51.

### **3.2.2.16 Dawn Re-entry 30<sup>th</sup> August 2013**

Surveyor positions are shown on **Plan 2**, with these being either side of the railway bridge to the north of the north-eastern boundary.

Multiple registrations of Common pipistrelle bats were recorded commuting north and south under the Railway Bridge between 04:43 – 05:34. A single registration of a *Myotis* species was recorded at 04:55 commuting North under the railway bridge into the estate. This was the last registration recorded.

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## 4.0 SUMMARY AND EVALUATION OF RESULTS

No bats were recorded or suspected of having emerged or re-entered either the ivy covered trees to the east of the access road nor the features identified in the brick work of the railway bridge to the north of the site.

The dead crown of the oak which may contain suitable roosting features was not able to be viewed sufficiently due to vegetation cover and the distance the tree is away from any possible observation point.

Early and late registrations of Common Pipistrelle within the woodland adjacent to the south-east boundary and the single registration of *Myotis* species bats would suggest however that there could be roosts within close proximity and that these are either located outside of the near vicinity of the site or that have not been detected through the surveys carried out to date.

The greatest level of activity registered has been from Common Pipistrelle with other species; Soprano Pipistrelle, Noctule, Serotine and a currently unidentified *Myotis* species of bat being recorded on the static bat detectors and during activity surveys to a much lower level of frequency and activity.

Common Pipistrelles were observed and registered at greater frequency and observed in higher numbers foraging and commuting along the south-eastern and northern boundaries and to a lesser degree then along the south-western boundary.



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## 5.0 LIGHTING SPILL AND AVOIDANCE OF EFFECTS

### 5.1 LIGHTING SPILL

The surveys reported here took place while operational and security lighting has been in place. This lighting illuminated both the site with security lighting significantly illuminating across the young spruce plantation on the north-west boundary.

Lack of tree cover here means that this lighting illuminates both this boundary and beyond with considered significance up to 60-80 metres beyond the boundary.

Other boundaries have well-structured and differing canopy coverage and height which markedly reduces this light spillage into the wider area and deeper into the surrounding woodland.

Many nocturnal invertebrates will be attracted from surrounding woodland into the lit and light spillage areas. This is likely to change bats commuting and foraging activity. Different species have differing tolerances to light sources with both Common Pipistrelle and Serotine bats being known to prey upon invertebrates attracted by external lighting units. However, bats could have differing acceptances and tolerance levels in differing areas geographically or landscape environments. Research is ongoing in this field with many factors that are likely to determine tolerance levels between species and possibly individual bats. It is assumed that bats will also avoid lit areas due the likely increased possibility of predation from nocturnal and crepuscular predators.

The surveys presented here have provided an indication of the species currently using the area for both foraging and commuting. The effect of the lighting on these bats and whether bats have been impacted by the associated operations of the rig is difficult to determine given the lack of previous baseline data.

No suitable bat roosting features are present within the site. Several features were identified within close distance (50 metre radius) of the site with emergence and re-entry surveys being able to be carried out on most of these features. No roosts were identified although it is suspected that roosts are present within the slightly wider vicinity as bats were noted during early and late periods during the surveys.

### 5.2 AVOIDANCE OF EFFECTS FROM LIGHT SPILLAGE

The site is currently very well lit with light spillage into the surrounding woodland and plantations. This level of spillage should be reduced as much as is practically possible.

The simplest option is to ensure that all necessary lighting is directed into the drilling site with no light spread outside of the site. At the same time remove any lighting that is superfluous to real needs. Also, do not increase the lighting (such as along the access road).

To allow for any long term continuing works, screen planting could be provided particularly on the north-west boundary however this would take several years to become effective.

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## 6.0 GENERAL CONCLUSIONS

On the basis of this survey, there are no roosts directly affected by the proposals and no bats were recorded or suspected of having emerged or re-entered potential roost sites in ivy covered trees to the east of the access road nor the brick work of a railway bridge to the north of the site.

Early and late registrations of Common Pipistrelle within the woodland adjacent to the south-east boundary and the single registration of *Myotis* species bat flying north from the railway bridge would suggest however, that there could be roosts within close proximity and that these are either located outside of the near vicinity of the site or that have not been detected through the surveys carried out to date.

The greatest level of activity was from Common Pipistrelle bats. Soprano Pipistrelle, Noctule, Serotine and an unidentified *Myotis* species bat were also recorded but at a much lower activity level.

Bats were seen to be using the tree lines around the rig sites boundary for both commuting and foraging, with some bats actively foraging around the artificial light sources from security and operational lighting. Apart from the young plantation to the north, the site is well screened by trees avoiding significant light spillage into these areas.

Apart from the possible benefit provided by foraging around the site lighting, it is considered that there are no adverse affects on bats arising from the site activity and in particular, no roosts are likely to be affected.

On the basis of these surveys, there are no adverse affects on bats such that licensing would be required.

It is recommended however, that flood lighting is re-aligned to avoid light spillage to the north and also to reduce spillage across the other boundaries and that any unnecessary lighting is removed and no new lighting introduced.

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