

VAYNOR QUARRY

Appendix 7/3 to EclA – Bat Survey Report
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- Drawing EC3.1: Bat Roost Survey Locations
- Drawing EC3.2: Bat Activity Survey Locations

1.0 Introduction

This report has been prepared by SLR Consulting Limited (SLR) on behalf of Hanson UK (Hanson) and summarises the findings of a bat survey undertaken at Vaynor Quarry in Merthyr Tydfil, hereafter referred to as 'the site'.

The site is located immediately north of Trefechan and is centred on the National Grid Reference (NGR) SO 035 103 due to its extent it occurs within both the Merthyr Tydfil County Borough Council (MTCBC) and Brecon Beacons National Park Authority (BBNPA) administrative areas.

1.1 Background

In March 2017, SLR completed an initial desk-based report¹ to inform Baseline Hydrological/Hydrogeological Surveys at the site as required to inform a Hydrological Impact Assessment (HIA).

Following this in March 2018, an initial site habitat survey was undertaken in order to review the baseline ecological conditions at the site and help inform the requirement and scope of any follow-on surveys needed to complete an Ecological Impact Assessment (EcIA). This identified habitats with the potential to support roosting and foraging/commuting bats and so a survey specifically for bats was undertaken as set out in this report.

1.2 Legislative Context

All native UK species of bat are listed on Annex II and IV of the EEC Directive on the Conservation of Natural Habitats and Wild Fauna and Flora. This Directive is transposed into UK law through The Conservation of Habitats and Species 2018 Regulations. All bats are also listed on Schedule 5 of Wildlife & Countryside Act 1981 (as amended) and are afforded further protection under Section 9 of this Act. In brief, this legislation makes it offence to:

- deliberately kill, injure or take a bat;
- deliberately disturb a bat or bats in such a way as to be likely to impair their ability to survive, breed, or rear or nurture their young; to hibernate or migrate; or to affect significantly the local distribution or abundance of that species;
- damage or destroy the breeding or resting place of a bat;
- intentionally or recklessly obstruct access to a place that bats use for shelter or protection; and
- intentionally or recklessly disturb a bat whilst it is occupying a place which it uses for shelter or protection.

The Environment (Wales) Act puts in place the legislation needed to plan and manage Wales' natural resources in a more proactive, sustainable and joined-up way. Part 1 Section 6 of the Act introduces a new biodiversity duty, which replaces and enhances the biodiversity duties set out in the NERC Act 2006 and requires public authorities to seek to maintain and enhance biodiversity in the exercise of their functions and in so doing promote the resilience of ecosystems.

Section 7 of the Act lists living organisms and types of habitat in Wales, considered to be of key significance to sustain and improve biodiversity in relation to Wales, this includes eight species of bat.

¹ SLR Reference 406.00027.00434

1.3 Objectives of the Study

The principle aim of the study was to provide baseline information with respect to the presence or likely absence of bats within the site and to provide sufficient information to make an assessment of the likely impacts associated with the resumed operation of the quarry.

The EcIA then sets out information relating to the potential impacts to bats and the approach to mitigation, compensation and enhancement.

2.0 Methodology

The following section sets out the approach to achieve the objectives set out above. The approach taken to surveys was based upon recommendations contained within the Bat Conservation Trust (BCT) Guidelines² and BS8596: Surveying Bats in Trees and Woodland.

2.1 Desk-based Study

As part of the report, a background search for records of protected and notable species (including bats) was undertaken.

South East Wales Biodiversity Records Centre (SEWBReC) was instructed to complete a data search for pre-existing biological records, within a 2km search area based on the site National Grid Reference (SO 035103).

2.2 Bat Survey – Known or Potential Roosts

The potential for buildings, cliff faces and trees on site to provide bat roosting opportunities was identified during the initial habitat survey undertaken in March 2018. Following this, further surveys and inspections were undertaken as described below.

2.2.1 Buildings

A daytime internal and external inspection of all buildings/structures was undertaken in March 2018, to assess their potential to support bat roosts.

Field evidence of bats searched for included:

- live bats;
- staining, beneath or around a hole, caused by the natural oils in bat fur;
- scratch marks around a hole caused by bat claws;
- bat droppings beneath a hole, or resting area;
- bat droppings and/or insect remains beneath a feeding area;
- a characteristic odour of bats and/or droppings; and
- dead bats - usually young from a nursery roost site.

The buildings were then classified in accordance with the BCT guidelines in order to assess the need for further surveys. Table 2-1 below summarises the criteria used to assess and describe potential for buildings to be used by bats.

² Bat Conservation Trust (2016) *Bat Surveys – Good Practice Guidelines, 3rd Edition*.

Table 2-1
Summary of Roost Potential

Roost Potential	Description
Higher	Building/structure pre-20 th century or early 20 th century construction, close proximity to known roosts or good foraging habitat (including mature trees, parkland woodland, hedgerows, wetland), internal roof spaces, raised roof/wall tiles, gaps beneath ridge tiles, mortar missing in walls creating gaps in stone/brickwork.
Moderate (Medium)	As above, but features in poor condition (such as affected by water/wind ingress, highly illuminated, highly disturbed) <i>Or</i> Building/structure within 400m of woodland, hedgerows, lines of trees or wetland and with features that have potential to support bats
Lower	Modern, maintained buildings. Potential roost features in poor condition (such as affected by water ingress, highly illuminated or highly disturbed).
Negligible	No obvious features are present with the potential to support roosting bats.

2.2.2 Cliff/Quarry Faces

Due to height and general health and safety considerations i.e. loose rock, an assessment of roosting potential in the cliff faces was completed approximately 10 meters from the toe of the quarry faces.

The inspection was based around recording the presence of any caves/tunnel entrances or fissures which may be used by bats.

2.2.3 Trees

An inspection of trees within the site was undertaken; this involved an initial ground-based assessment and inspection of each tree using close focussing binoculars. The trees were then assessed as to whether further survey was required in accordance with the BCT guidelines as follows:

- Negligible: Negligible habitat features on site likely to be used by roosting bats.
- Low: A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential
- Moderate: A tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status
- High: A tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.

2.2.4 Roost Detection Surveys

Following the initial daytime assessments, a series of dusk (emergence) and dawn (re-entry) surveys were subsequently undertaken in order to identify any roost locations present in the site.

A range of bat detection equipment was used during the surveys, including heterodyne and frequency division bat detectors with sound recording equipment, automated ANABAT detectors and night-vision scope/infra-red illuminators. The equipment used was selected during each survey to meet the data gathering requirements and setting of the feature being surveyed; however it is not appropriate or necessary to use all equipment simultaneously.

In accordance with published BCT guidelines, dusk surveys commenced at least 15 minutes before local sunset time and continued for at least 1.5 hours after local sunset time, with dawn surveys commencing at least 1.5 hours before local sunrise time and ending at local sunrise time.

2.3 Bat Activity Surveys

2.3.1 Manual Activity Surveys

The site habitats were initially assessed as comprising a range of negligible to higher value foraging and commuting habitat for bats. The majority of the site being assessed as negligible due to the dominance of bare rock and lack of vegetation. As such, activity surveys of the site were undertaken on a seasonal basis (i.e. Spring, Summer and Autumn) in 2018.

The surveys comprised of walked transects, with two transect routes being used during the survey period to ensure all areas were sampled. The transect surveys were designed to encompass the range of habitats present i.e. they were not biased towards/against habitats of recognised high value to bats. The transect routes were amended from the two-hour route in May to three hour long transects due to the detection of lesser horseshoes (*Rhinolophus hipposideros*) in accordance with BCT guidelines. Listening Stations (LS) were used, with five minutes stationary recording undertaken at each LS.

2.3.2 Automated Activity Survey

The automated survey was undertaken using static bat detectors (ANABAT Express Detectors) at four pre-determined locations as shown on Drawing EC3.2. The automated survey collected data over five consecutive nights, each detector was set with a recording period from half an hour prior to local sunset until half an hour after local sunrise.

2.3.3 Data Analysis

This report refers to 'registrations'; that is a single sound file captured by an automated detector. It is important to note that registrations do not necessarily relate to the numbers of bats that may be present; a large number of registrations can equally result from one bat passing a detector many times/feeding overhead, or many bats passing only once.

Data was analysed using Analook software (Titley Electronics) and Kaleidoscope Pro by experienced personnel from SLR.

A selection of files were also analysed using the 'Measures' and 'Slope' features of Analook, with reference to known species sonograms, that enable a comparison to be made based on individual call characteristics.

Due to the similarity of echolocation calls made by Myotis bat species, the calls relating to the group have been classified as Myotis species. Due to the similarity of Myotis bat calls between individual species, indicative species identifications are made though analysis of 'Slope' (measured in octaves per second) although such identifications are provisional only.

Similarly, analysis of the automated survey data indicates the presence of noctule and serotine although due to the difficulty in accurately determining these registrations, data has been collectively grouped as 'big bat' for the purpose of comparing bat activity.

2.4 Survey Personnel

The survey work was led by Mr Chris Mitchell, Mr Eric Palmer and Mr Robert Williams with assistance from Ms Mellissa Hill and Ms Phillippa Dean.

All roost detection surveys were undertaken by SLR's in house ecologists with experience of undertaking bat surveys.

2.5 Limitations of the Survey

Internal inspection of Building 3 was not possible due to being unable to gain access, however the internals were assessed to an extent from the windows and the building has been surveyed on the basis of having 'moderate' suitability.

It should be noted that a lack of evidence of a protected species does not necessarily preclude it from being present at a later date. In relation to use of habitats by bat species, use of a particular area of land can vary seasonally basis and from day to day.

Certain bat species, such as brown long-eared bat and lesser horseshoe bat have echolocation characteristics that mean they are less easily recorded than other species, due to directionality and varying attenuation of calls. Due to the variation in detectability of different bat species, direct comparisons between the number of registrations for each species cannot be made.

3.0 Results

3.1 Desk Study and Pre-Existing Information

SEWBRc identified eight species of bat with the search area including common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*), noctule (*Nyctalus noctula*), Daubenton's bat (*Myotis daubentonii*), brown long-eared bat (*Plecotus auritus*), lesser horseshoe bat, serotine bat (*Eptesicus serotinus*) and an unconfirmed Myotid species (*Myotis sp.*).

3.2 Bat Survey - Known or Potential Roosts

3.2.1 Buildings

The results of the preliminary building inspection and assessment are shown in Table 3-1 below and the locations shown on Drawing EC3.1.

Table 3-1
Building/Structure Descriptions

Reference	Description	Photograph
Building 1	Large single skin metal corrugated building/shed structure; open at both ends with open areas in the corrugated sides. Metal frame with a brick foundation, with tipped scree piles inside. Fox den in tipped scree located inside. Negligible bat potential.	
Building 2	Large single skin corrugated building/shed structure; open at both ends with open area in the corrugated sides with small holes in roofing and sides from damage. Metal frame with a brick foundation. Tipped gravel inside. Negligible bat potential.	

Reference	Description	Photograph
Building 3	Vandalised boarded up office, brick walls with concrete tiled roof, single storey. North side of the building – missing roof tile, holes under eaves into roof felt lining, gaps around chimney, air brick, large hole above doorway into roof and hole in wall where piping was previously. Eastern gable end – minor holes and gaps in soffit, window smashed but with window guard covering this (too small for a bat to fit through). South side – gaps under soffit, missing tile, gaps under ridge tiles, gap in wall between extension of building. Western gable end – gaps in soffit and hole in brick work. Moderate suitability for bats.	
Small Water Tank 1	Metal corrugated tank on concrete base. Negligible bat potential.	
Small Water Tank 2	Corrugated metal structure with negligible bat potential.	

As the presence of bats in Building 3 could not be discounted during the preliminary survey, further surveys were undertaken, the timings and survey conditions are shown in Table 3-2 below.

Table 3-2
Building 3 - Weather Conditions, Timings and Results

Survey Date	Surveyors	Timings	Weather Conditions
6 th June 2018 Dusk	Chris Mitchell & Phillippa Dean	Start time: 21:00 End time: 22:35 Local sunset time: 21:37	Start temperature: 16.5°C; end temperature: 15.5°C. Start cloud cover: 0/8 th ; end: 0/8 th . Precipitation: 0. Calm
23 rd July 2018 Dusk	Phillippa Dean	Start time: 21:00 End time: 22:47 Local sunset time: 21:16	Start temperature: 17.6°C; end temperature: 17.2 °C. Start cloud cover: 3/8 th ; end: 3/8 th . Precipitation: 0. Calm
25 th July 2018 Dawn	Phillippa Dean	Start time: 04:50 End time: 05:24 Local sunrise time: 05:24	Start temperature: 14.4°C; end temperature: 14.4°C. Start cloud cover: 0/8 th ; end: 0/8 th . Precipitation: 0. Calm
30 th August 2018 Dawn	Phillippa Dean & Melissa Hill	Start time: 04:44 End time: 06:25 Local sunrise time: 06:20	Start temperature: 7.8°C; end temperature: 7.7°C. Start cloud cover: 0/8 th ; end: 1/8 th . Precipitation: 0. Calm

Table 3-3 below summarises the results of the surveys completed on Building 3.

Table 3-3
Building 3 Roost Survey Results

Survey Date	Results
6 th June 2018 Dusk	A serotine was recorded at 21:39 foraging over the site with multiple passes. Three individual common pipistrelles were heard within the western gable end soffit at 21:40, followed by the emergence of one common pipistrelle at 21:49, 12 minutes after local sunset. A further two common pipistrelles emerged, one at 21:50 and the last at 21:57.
23 rd July 2018 Dusk	The first bat detected was a common pipistrelle at 21:58, 42 minutes after local sunset but not seen. A single noctule was recorded at 22:08 flying over the site during the survey. An unidentified myotis species was heard at 22:29 and not recorded again. The last common pipistrelle was identified at 22:38 but not seen. No emergences from the building.
25 th July 2018 Dawn	A soprano pipistrelle was recorded at 05:01 and was seen to re-enter the western gable end at the apex of the soffit, 23 minutes prior to local sunrise. At 05:05 a common pipistrelle was recorded at was seen to emerge from the bottom of the panel of the right boarded up window and did not re-enter.

Survey Date	Results
30 th August 2018 Dawn	An unidentified big bat was detected at 05:22 flying over the site. Two common pipistrelles were observed flying around the eastern gable end, at 05:48 one was seen to enter the building under the soffit on the northern side towards the eastern end, followed by the second common pipistrelle. No re-entries were observed on the western gable end. The last call was recorded was an unidentified big bat at 05:58 flying over the site.

The roost detection surveys confirmed the presence of a roost within both ends of the roofing, with both common pipistrelle and soprano pipistrelle observed emerging and re-entering the building during the surveys. The numbers recorded were low, with a maximum of three individuals observed emerging in one survey.

3.2.2 Cliff/Quarry Faces

Following completion of the daytime assessment, a suite of surveys were undertaken. The surveys targeted faces within the western and eastern voids as shown on Drawing EC3.1 and set out in Table 3-4 and Table 3-5 below.

Table 3-4
Cliff Face Surveys – Surveyors, Timings and Weather Conditions

Survey date	Cliff Face Reference	Surveyors	Timings	Weather Conditions
9 th July 2018 Dusk	1 & 7	Phillippa Dean & Melissa Hill	Start time: 21:15 End time: 23:05 Local sunset time: 21:31	Start temperature: 15.4°C; end temperature: 14.8°C. Start cloud cover: 1/8 th ; end: 0/8 th . Precipitation: 0. Light breeze.
10 th July 2018 Dawn	2 & 3	Phillippa Dean & Melissa Hill	Start time: 03:18 End time: 05:15 Local sunrise time: 05:05	Start temperature: 14.2°C; end temperature: 14.5°C. Start cloud cover: 5/8 th ; end: 3/8 th . Precipitation: 0.
10 th July 2018 Dusk	10, 11 & 12	Phillippa Dean & Melissa Hill	Start time: 21:15 End time: 23:05 Local sunset time: 21:29	Start temperature: 15.1°C; end temperature: 14.9°C. Start cloud cover: 5/8 th ; end: 2/8 th . Precipitation: 0.
11 th July 2018 Dawn	8 & 9	Phillippa Dean & Melissa Hill	Start time: 03:31 End time: 05:17 Local sunrise time: 05:05	Start temperature: 14.4°C; end temperature: 15°C. Start cloud cover: 7/8 th ; end: 4/8 th . Precipitation: 0.
23 rd July 2018 Dusk	2 & 3	Eric Palmer & Melissa Hill	Start time: 21:00 End time: 22:47 Local sunset time: 21:16	Start temperature: 17.6°C; end temperature: 16.9°C. Start cloud cover: 3/8 th ; end: 2/8 th . Precipitation: 0.

Survey date	Cliff Face Reference	Surveyors	Timings	Weather Conditions
24 th July 2018 Dawn	10, 11 & 12	Phillippa Dean, Eric Palmer & Melissa Hill	Start time: 03:50 End time: 05:30 Local sunrise time: 05:23	Start temperature: 16.8°C; end temperature: 16°C. Start cloud cover: 7/8 th ; end: 7/8 th . Precipitation: 0.
24 th July 2018 Dusk	4, 5, 8 & 9	Phillippa Dean, Eric Palmer & Melissa Hill	Start time: 21:00 End time: 22:45 Local sunset time: 21:15	Start temperature: 16.1°C; end temperature: 15.6°C. Start cloud cover: 2/8 th ; end: 0/8 th . Precipitation: 0.
25 th July 2018 Dawn	1, 6 & 7	Phillippa Dean, Eric Palmer & Melissa Hill	Start time: 05:54 End time: 05:36 Local sunrise time: 05:24	Start temperature: 14.4°C; end temperature: 14.3°C. Start cloud cover: 0/8 th ; end: 0/8 th . Precipitation: 0.
29 th August 2018 Dusk	13 & 14	Phillippa Dean & Melissa Hill	Start time: 19:50 End time: 20:38 Local sunset time: 20:08	Start temperature: 14°C; end temperature: 13°C. Start cloud cover: 3/8 th ; end: 2/8 th . Precipitation: 0.
30 th August 2018 Dusk	4 & 5	Phillippa Dean & Melissa Hill	Start time: 19:50 End time: 21:36 Local sunset time: 20:06	Start temperature: 12°C; end temperature: 10°C. Start cloud cover: 4/8 th ; end: 0/8 th . Precipitation: 0.
31 st August 2018 Dawn	1, 2 & 3	Phillippa Dean & Melissa Hill	Start time: 04:50 End time: 06:30 Local sunrise time: 06:22	Start temperature: 7°C; end temperature: 7°C. Start cloud cover: 0/8 th ; end: 0/8 th . Precipitation: 0.
13 th September 2018 Dusk	13 & 14	Chris Mitchell & Phillippa Dean	Start time: 19:20 End time: 21:00 Local sunset time: 19:34	Start temperature: 12°C; end temperature: 11°C. Start cloud cover: 8/8 th ; end: 8/8 th . Precipitation: 0.

Table 3-5
Cliff Face Roost Detection Surveys

Survey Date	Cliff Face Reference	Results
9 th July 2018 Dusk	1	A single unidentified myotis species was recorded at 22:33 62 minutes after local sunset. At 23:08 a common pipistrelle was detected foraging and social calling with multiple passes up until the last call at 23:16. No emergences from the cliff faces.

Survey Date	Cliff Face Reference	Results
9 th July 2018 Dusk	7	The first bat detected was a lesser horseshoe at 22:13 and not recorded again during the survey, followed by a common pipistrelle at 22:14 foraging above the cliff face, 42 minutes after local sunset. A single unidentified big bat was heard at 22:26. The last call was a common pipistrelle at 23:20. No emergences from the cliff faces.
10 th July 2018 Dawn	2	A single common pipistrelle was detected at 03:40, with no further bats detected for the duration of the survey. No re-entries into the cliff faces.
10 th July 2018 Dawn	3	A single serotine call was heard at 03:20, with no further bats detected for the duration of the survey. No re-entries into the cliff faces.
10 th July 2018 Dusk	10 & 11	A common pipistrelle was identified foraging along the bench at 22:07, 38 minutes after local sunset. Multiple passes were recorded during the survey; the last call was detected at 22:39, no other species were recorded. No re-entries into the cliff faces.
10 th July 2018 Dusk	12	The first registration was a common pipistrelle at 22:13 foraging along the cliff face with multiple passes, 44 minutes after local sunset. A noctule was detected at 22:23 and was last heard at 23:02. A single unidentified myotis species was heard at 23:02. The call detected was a common pipistrelle at 23:18. No emergences from the cliff faces.
11 th July 2018 Dawn	8	A single unidentified myotis species call was detected at 03:45. A soprano pipistrelle was identified at 04:02 with multiple passes and was last heard at 04:14. A noctule was observed flying over the site at 04:16, 49 minutes prior to local sunrise. No re-entries into the cliff faces.
11 th July 2018 Dawn	9	The first call detected was a common pipistrelle at 03:28, and was last heard at 04:23, 45 minutes prior to local sunrise. No re-entries into the cliff faces.
23 rd July 2018 Dusk	2	A noctule was recorded at 21:50, 33 minutes after local sunset. A common pipistrelle was identified at 21:53 with multiple passes. At 22:28 a single soprano pipistrelle was detected. The last call recorded was a common pipistrelle at 22:48. No emergences from the cliff faces.
23 rd July 2018 Dusk	3	The first call recorded was a noctule at 21:49, 32 minutes after local sunset. A common pipistrelle was identified at 21:55 foraging between the scrub and cliff face with multiple passes, the last was recorded at 22:48. No emergences from the cliff faces.

Survey Date	Cliff Face Reference	Results
24 th July 2018 Dawn	10	No bats were recorded through the duration of the survey. No re-entries into the cliff faces.
24 th July 2018 Dawn	11	A single unidentified bat was observed flying above the quarry face; no other bats were recorded for the duration of the survey. No re-entries into the cliff faces.
24 th July 2018 Dawn	12	The first bat recorded was a single common pipistrelle call at 04:00. A soprano pipistrelle was heard at 04:24 with multiple passes up until the last call at 04:41, 44 minutes prior to local sunrise. No re-entries into the cliff faces.
24 th July 2018 Dusk	4	A noctule was detected at 21:40, 25 minutes after local sunset. No further bats were detected. No emergences from the cliff faces.
24 th July 2018 Dusk	5	The first registration recorded was a noctule at 21:40, 25 minutes after local sunset. No further bats were detected. No emergences from the cliff faces.
24 th July 2018 Dusk	8 & 9	The first call was single noctule at 21:39, 24 minutes after local sunset. A common pipistrelle was heard at 22:16 with multiple passes up until the last call at 22:39. No emergences from the cliff faces.
25 th July 2018 Dawn	1	No bats were recorded through the duration of the survey. No re-entries into the cliff faces.
25 th July 2018 Dawn	6	A single common pipistrelle was identified at 04:08 with no further bats detected. No re-entries into the cliff faces.
25 th July 2018 Dawn	7	A single common pipistrelle was detected at 04:28. No other bats were recorded during the survey. No re-entries into the cliff faces.
29 th August 2018 Dusk	13	No bats were detected up until 30 minutes after local sunset. No emergences from the cliff faces.
29 th August 2018 Dusk	14	No bats were detected up until 30 minutes after local sunset. No emergences from the cliff faces.

Survey Date	Cliff Face Reference	Results
30 th August 2018 Dusk	4	The first registration recorded was a single noctule call at 20:48, 42 minutes after local sunset. An unidentified big bat was detected at 20:54 with multiple passes up until the last recorded call at 21:23. No emergences from the cliff faces.
30 th August 2018 Dusk	5	The first call detected was a noctule at 20:33, 28 minutes after local sunset. Multiple passes were recorded up until the last call at 21:02. No further bat species were detected during the survey. No emergences from the cliff faces.
31 st August 2018 Dawn	1 & 3	A single unidentified bat was observed flying above the cliff ridge at 04:10. No further bats were recorded during the survey. No re-entries into the cliff faces.
31 st August 2018 Dawn	2 & 3	No bats were recorded through the duration of the survey. No re-entries into the cliff faces.
13 th September 2018 Dusk	13	A soprano pipistrelle was recorded at 19:55, 21 minutes after local sunset flying along the cliff ridge. A single unidentified myotis species was detected at 20:22, followed by an unidentified big bat at 20:24 which was last recorded at 20:40. A single common pipistrelle was heard at 21:27. No emergences from the cliff faces.
13 th September 2018 Dusk	14	The first registration detected was a noctule at 20:46, 72 minutes after local sunset, with the last call recorded at 20:48. No further bats were identified during the survey. No emergences from the cliff faces.

No direct evidence of bats emerging or returning to roosts in the cliff faces were observed or suspected during the surveys. Individual common and soprano pipistrelle bats were recorded at times within 30 minutes of sunset/sunrise which indicate emergence may have been from within the site, potentially including quarry cliff face fissures.

3.2.3 Trees

The initial tree assessment was completed on the 13th March 2018. Trees were inspected within the site boundary and a single ash tree was identified with having moderate potential bat roost potential, however due to the location of the tree being outside of the proposed working area no further surveys were completed.

3.3 Bat Activity

3.3.1 Manual Activity Surveys

Table 3-6 below shows the timings and survey conditions for manual surveys which encompassed the whole site as shown on Drawing EC3.2.

Table 3-6
Manual Activity Surveys – Weather Conditions, Timings and Results

Survey Date	Surveyors	Timings	Weather Conditions
14 th May 2018 Dusk	Robert Williams & Phillippa Dean	Start time: 20:55 End time: 23:56 Local sunset time: 20:56	Start temperature: 16.5°C; end temperature: 12°C. Start cloud cover: 0/8 th ; end: 0/8 th . Precipitation: 0. Light breeze.
31 st July 2018 Dusk	Chris Mitchell & Phillippa Dean	Start time: 20:45 End time: 23:18 Local sunset time: 21:05	Start temperature: 16.9°C; end temperature: 15°C. Start cloud cover: 1/8 th ; end: 0/8 th . Precipitation: 0. Calm
12 th September 2018 Dusk	Chris Mitchell & Phillippa Dean	Start time: 19:17 End time: 21:40 Local sunset time: 19:36	Start temperature: 14°C; end temperature: 13°C. Start cloud cover: 2/8 th ; end: 1/8 th . Precipitation: 0. Calm

Table 3-7 below summarises manual bat activity survey results.

Table 3-7
Bat Activity Transects 1 and 2 Survey Results

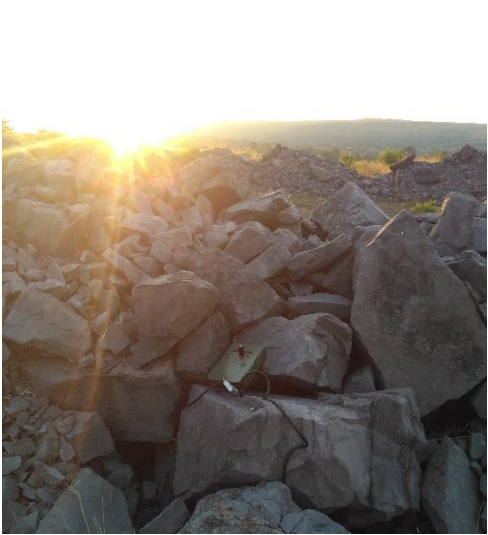
Survey Date	Results
14 th May 2018 Dusk	Transect 1, route walked LS1 – LS9-LS1 The first bat registration was detected at 21:22, 26 minutes after local sunset and was two common pipistrelles between LS2 and LS3 under the cover of the open barn. The last call detected was a common pipistrelle at LS1 at 23:59. Transect 2, route walked LS1-LS9-LS3-LS1-LS4-LS3 An individual a common pipistrelle was the first bat detected, foraging along the cliff face at 21:38, 42 minutes after local sunset between LS4 and LS5, with frequent passes up until LS9 at 22:29. At 22:02, 66 minutes after local sunset time, a soprano pipistrelle was heard but not seen once at LS7. Followed by an unidentified myotis at 22:04 which was heard but not seen once. A single unidentified big bat was recorded at 22:18 between LS8 and LS9. The last common pipistrelle call was detected at 23:23, between LS9 and LS3.
31 st July 2018 Dusk	Transect 1, route walked LS9 –LS1—LS2 The first registration was a noctule at 21:50, 45 minutes after local sunset time, between LS8 and LS7. Common pipistrelle was first heard at 22:44 between LS3 and LS2 but activity was

Survey Date	Results
	not seen. An unidentified myotis species was detected amongst two common pipistrelles foraging at 22:54 between LS2 and LS1 and not heard again during the transect. The final common pipistrelle call was heard at 23:04, followed by the last noctule recorded at 23:07 between LS1 and LS2. Transect 2, route walked LS9-LS1-LS2 The first call detected was a soprano pipistrelle at 21:40, 35 minutes after local sunset, foraging above the quarry face behind the pond at LS8, with multiple foraging passes with the last call detected at 21:46. Common pipistrelle was identified at 21:51 at LS7 and was last heard at 22:47 between LS2 and LS1.
12 th September 2018 Dusk	Transect 1, route walked LS1-LS9-LS8 A common pipistrelle was heard to be within the soffit of the western gable end of Building 3 and emerged at 19:51, 15 minutes after local sunset. A soprano pipistrelle was swiftly detected at 19:55 flying over, 19 minutes after local sunset and not heard again throughout the transect, both of which occurred at LS1. An unidentified myotis species was recorded at 20:22 and not identified during the transect again, followed by an unidentified big bat at 20:24 with multiple passes between LS3 and LS4. The last unidentified big bat call was at 20:40 at LS5, with the last common pipistrelle call was recorded at 21:27 at LS4. Transect 2, route walked LS1-LS7-LS3-LS2-LS1 The first registration detected was a common pipistrelle at 20:41 between LS4 and LS5, 64 minutes after local sunset, with the last call heard at 21:10 between LS6 and LS7. An unidentified big bat was recorded at 21:04 at LS6, with the last call detected shortly after at 21:14 at LS7.

3.3.2 Automatic Bat Activity Survey

The locations of the Anabat detectors are shown on Drawing EC3.2 and are briefly described in Table 3-8 below.

Table 3-8
Anabat Locations

Anabat	Description	Photograph
1	Located in the eastern void on the middle bench facing up at the cliff faces.	
2	Located on the central spine next to the haul road facing west across the grassland.	
3	Located on the edge of the northern grasslands facing up.	

Anabat	Description	Photograph
4	Located on a telegraph pole next to the haul road in the southern section of the site, facing north.	

The automated survey work was undertaken during the following periods:

- 02/05/2018 – 06/05/2018 – 5 nights recording;
- 12/07/2018 – 16/07/2018 – 5 nights recording; and
- 02/09/2018 – 06/09/2018 – 5 nights recording.

Table 3-9 provides a summary of the number of registrations per night for each species recorded at the Anabat locations shown on Drawing EC3.2.

Table 3-9
Summary of Bat Registrations by Anabat Location per Night

	Anabat	Noctule	Serotine	Common pipistrelle	Soprano pipistrelle	Brown long eared	Big Bats	Myotis bats	Lesser Horseshoe	Greater Horseshoe	Total
May											
02/05/2018	A1	0	0	15	0	0	27	0	0	0	42
	A2	0	0	2	0	0	12	0	1	0	15
	A3	0	0	0	0	0	0	0	0	0	0
	A4	0	0	0	0	0	0	1	0	0	1
03/05/2018	A1	0	0	28	0	0	17	0	0	0	45
	A2	0	0	3	0	0	2	0	4	0	9
	A3	0	0	0	0	0	0	0	0	0	0
	A4	0	1	1	0	0	0	1	0	0	3
04/05/2018	A1	1	4	33	0	0	2	0	0	0	40

	Anabat	Noctule	Serotine	Common pipistrelle	Soprano pipistrelle	Brown long eared	Big Bats	Myotis bats	Lesser Horseshoe	Greater Horseshoe	Total
	A2	0	0	8	2	0	8	0	2	0	20
	A3	0	0	8	2	0	0	0	0	1	11
	A4	0	0	0	0	0	0	0	0	0	0
05/05/2018	A1	0	0	25	0	0	2	0	0	0	27
	A2	0	1	12	3	0	4	0	5	0	25
	A3	0	0	3	1	0	0	0	0	0	4
	A4	0	0	4	1	0	0	2	0	0	7
06/05/2018	A1	0	6	16	1	0	5	0	0	0	27
	A2	0	4	7	0	0	0	0	4	0	15
	A3	0	0	2	0	0	0	0	0	0	2
	A4	0	0	1	0	0	1	2	0	0	4
July											
12/07/2018	A1	2	0	10	0	1	0	1	0	0	14
	A2	0	0	4	0	0	0	0	0	0	4
	A3	0	0	25	3	0	0	2	0	0	30
	A4	2	0	35	6	0	0	0	0	0	43
13/07/2018	A1	0	2	26	2	0	0	0	0	0	30
	A2	1	0	2	2	0	0	0	0	0	5
	A3	0	0	0	0	0	0	0	0	0	0
	A4	0	0	61	1	0	3	0	0	1	66
14/07/2018	A1	0	0	39	0	0	0	0	0	0	39
	A2	1	0	2	0	0	0	1	0	0	4
	A3	0	0	26	11	0	0	0	0	0	37
	A4	0	0	49	1	0	1	0	0	1	52
15/07/2018	A1	1	7	30	2	0	0	1	0	0	41
	A2	0	0	7	0	0	0	0	0	0	7
	A3	0	0	20	12	0	0	2	1	0	35
	A4	1	0	41	3	0	2	1	0	1	49

	Anabat	Noctule	Serotine	Common pipistrelle	Soprano pipistrelle	Brown long eared	Big Bats	Myotis bats	Lesser Horseshoe	Greater Horseshoe	Total
16/07/2018	A1	0	0	0	0	0	0	0	0	0	0
	A2	0	0	1	0	0	0	2	0	0	3
	A3	0	0	5	1	0	0	1	0	0	7
	A4	0	0	0	0	0	0	0	0	0	0
September											
02/09/2018	A1	9	0	16	3	0	1	3	3	0	35
	A2	11	0	11	1	0	1	0	1	0	25
	A3	1	0	9	1	0	2	0	0	0	13
	A4	27	0	8	4	0	18	1	2	0	60
03/09/2018	A1	3	0	0	1	0	3	0	0	0	7
	A2	0	0	0	0	0	0	0	0	0	0
	A3	1	0	0	0	0	0	0	0	0	1
	A4	0	0	9	0	0	2	0	5	0	16
04/09/2018	A1	0	0	5	2	0	0	0	0	0	7
	A2	0	0	1	0	0	0	0	0	0	1
	A3	0	0	10	0	0	0	0	0	0	10
	A4	2	0	4	1	0	5	2	3	0	17
05/09/2018	A1	1	0	0	0	0	4	1	1	0	7
	A2	0	0	1	0	0	0	0	0	0	1
	A3	0	0	0	0	0	0	0	0	0	0
	A4	0	0	7	0	0	1	0	3	0	11
06/09/2018	A1	0	0	1	0	0	0	2	0	0	3
	A2	0	0	0	0	0	0	0	0	0	0
	A3	0	0	0	0	0	0	0	0	0	0
	A4	0	0	3	0	0	0	0	3	0	6

3.3.3 Summary of Bat Activity Surveys

Further consideration and interpretation of bat activity, by species, is provided below taking both the manual and automated survey results into account.

Overall, the transect and automatic surveys identified an assemblage of common pipistrelle, soprano pipistrelle, brown long-eared, noctule, serotine, lesser horseshoe, greater horseshoe (*Rhinolophus ferrumequinum*) and unidentified *Myotis* bats foraging and commuting within the site.

No direct evidence of bats roosting was recorded during the transect surveys. The timing of bat observations was, however, such that individual common and soprano pipistrelle could potentially be roosting individually in quarry fissures nearby.

Common pipistrelle

This species was the most frequently recorded during the automated surveys (64.7%) and manual activity surveys (61%). Due to this species being widespread across the UK and having high detectability it is to be expected. Common pipistrelle was recorded throughout the site; activity peaked in the eastern void along cliff faces and haul road bunds where tree/scrub lines exist.

Soprano pipistrelle

This species was not as frequently recorded within the site during the automated surveys (6.8%) and the manual activity surveys (14%).

Noctule

Is one of two of the big bats considered to be using the site for foraging and commuting and is the more easily detectable species accounting for 6.5% of calls recorded during the automated surveys and 3.1% in the manual activity surveys.

Big bats

Big bats accounts for similar calls made by both noctule and serotine bats. This group accounted for 12.5% of the automated surveys and 15.6% of the manual activity surveys.

Serotine

This species was attributed to 2.5% of automated survey registrations and was not detected during the manual activity surveys.

Myotid bats

Myotid bats accounted for 2.6% of the automated survey calls and 6.3% of the manual activity surveys. The registrations categorised as 'unidentified myotis' are considered to encompass Daubenton's bat and Brandt's bat (*Myotis brandtii*) due to the habitat present within the site and the characteristics of the calls recorded.

Brown long eared

This species can also be very difficult to detect due to its echolocation characteristics, feeding behaviour and typically late emergence period.

This species was the most infrequently recorded species within the site during the activity surveys, with 0.1% of registrations being recorded during the automated surveys and not being detected during the manual activity surveys. Due to the above characteristics, this may be an underrepresentation.

Lesser Horseshoe

Lesser horseshoe bats can be difficult to detect due to the short range of their echolocation. This species was recorded from all anabat locations, albeit at low numbers of registrations, with an evident peak in registrations during September. This is most likely attributed to seasonal variation in the use of local roost sites, in particular the likely increased use of Nant Glais caves to the east as the mating season approaches.

With records relating to a roost in the adjacent SSSI Nant Glais Caves activity of the species within the site was considered likely, with the foraging and commuting activity accounting for 3.8% of the automated surveys.

Greater Horseshoe

This species can also be difficult to detect and was identified less frequently within the site, attributing to 0.4% of the automated survey registrations.

Given this species was recorded infrequently from A3 and A4 during Spring and Summer only, this is considered likely to represent occasional commuting through the site.

4.0 Summary and Conclusions

A suite of bat survey and assessment work has been undertaken between March and September 2018 by a team of experienced bat surveyors from SLR.

It is considered that the survey effort, methods used and the weather conditions during the survey period were suitable and appropriate to enable the survey aims to be met and to enable the completion of the EcIA including the development of a mitigation strategy.

The surveys have identified the presence of roosts, including the former weighbridge and a likely use of quarry faces to be affected by quarry development works. The surveys identified foraging and commuting activity, albeit this largely relates to relatively low numbers of common and widespread species such as common pipistrelle utilised discrete areas of the site.

The presence of a rarer bat species, lesser horseshoe bat and greater horseshoe bat, has also been identified although this is attributed to occasional commuting rather than roosting or sustained foraging.

All bat roosts receive protection under the legislation set out in Section 1 of this report. The resumption of quarrying has the potential to cause offences under the legislation which protects all species of bat. It would therefore be necessary to obtain a European Protected Species (EPS) development licence where an offence may be committed. The licence essentially permits actions affecting EPS which would otherwise be illegal.

Licences are normally only granted following receipt of full planning permission (where required) and the satisfactory discharge of any relevant conditions. An EPS licence is, however, required for works which may affect an EPS regardless of whether planning permission exists.

Further details regarding potential impacts and mitigation requirements are provided in the main EcIA.

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