

BAT SURVEY REPORT

NOVEMBER 2023

Castlefield Viaduct Urban Park

Duke Street

Manchester

M3 4RU

U R B A N
G R E E N



QUALITY MANAGEMENT

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NON-TECHNICAL EXECUTIVE SUMMARY

The National Trust have developed land at Castlefield Viaduct in Castlefield, Manchester (hereafter referred to as ‘the site’). The proposals include the expansion of an elevated urban park with integrated active travel hub that is open to the public within a disused railway viaduct.

Urban Green have been appointed to complete Bat Surveys and a Report of the results. Following nocturnal surveys undertaken in 2021, surveys identified two non-breeding summer roosts within the site, and the activity surveys showed the site to be used frequently for foraging common pipistrelle.

Updated surveys, in the form of emergence and activity surveys, were instructed as part as an ongoing monitoring scheme. Two emergence and one re-entry survey were undertaken on site and confirmed the presence of a non-breeding summer roost in Structure 1, previously identified in the 2021 surveys.

Six activity surveys were completed on site as well as the deployment of two static detectors a month over six months, between April and September (inclusive). The results confirm what had been identified within the original activity surveys, that the site was used frequently by common pipistrelle, utilising the unmanaged habitats for foraging.

Despite the confirmation of the site for foraging bats, the development of the urban park has seen a reduction in activity, most notably foraging, within the eastern side of the viaduct. Comparisons between original and updated survey results are made to assess where potential losses and gains have been made regarding foraging and commuting bats.

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1 Introduction

1.1 Background to the Scheme

The National Trust have developed land at Castlefield Viaduct in Castlefield (hereafter referred to as 'the site'). The proposals include the expansion of an elevated urban park with integrated active travel hub that is open to the public within a disused railway viaduct.

Urban Green have been appointed to undertake a monitoring scheme on bat activity on following nocturnal and activity surveys undertaken at the site by Urban Green in 2021.

The author of the report is Toby Mills QCIEEM, BSc, Assistant Ecologist at Urban Green. Toby has experience providing ecological consulting services for a range of development schemes across the UK, including residential and commercial schemes.

1.2 Site Context

The site is located at National Grid Reference SJ 83013 97624 and comprises a total area of 0.59ha. Figure 1 shows the sites extent, including the extent of development as of this report.

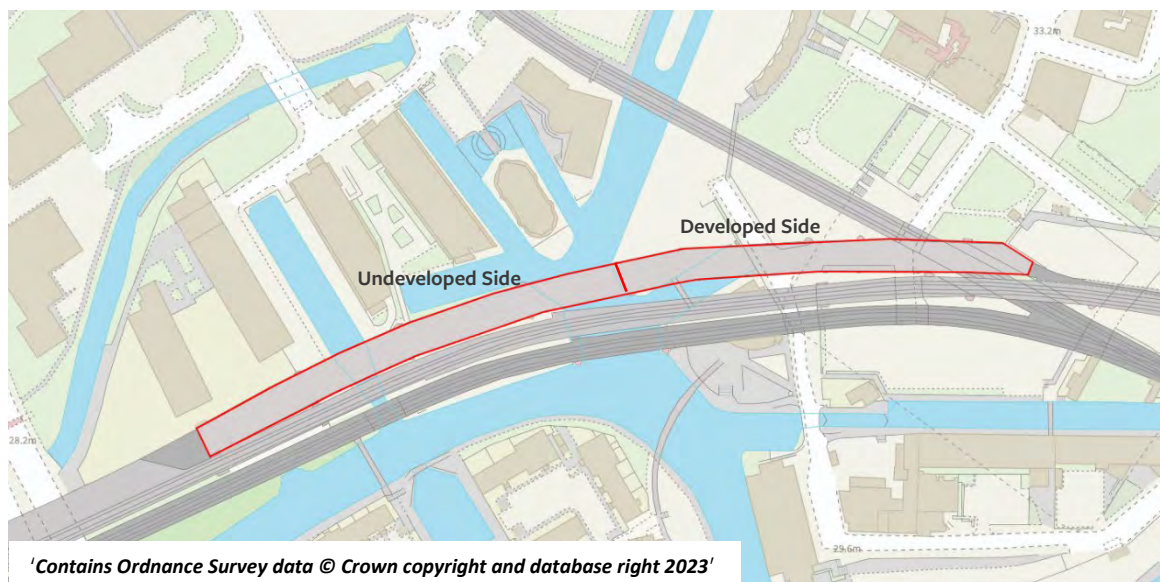


Figure 1 – Site Extent

The site is located in a densely urban area of Manchester city centre, adjacent to an active tram line. The site is also located above the Bridgewater Canal and approximately 260m east of the River Irwell. Buildings surrounding the site are mixed commercial and residential buildings to the north, with high-density residential apartments to the south. Due to the site's location close to the city centre, there is a high level of disturbance present from main roads and public transport, such as the A635 (M) present approximately 75m west of the site.

1.3 Purpose of this Report

This report has been produced to demonstrate the results of nocturnal bat surveys which were completed at the site. The surveys were conducted to confirm presence of roosting bats, and nocturnal bat activity surveys which were conducted to confirm the presence of bats utilising the sites habitats for foraging and commuting. Comparison to previous bat surveys to assess whether the site is still

actively being used will be conducted within this survey. Appropriate enhancements regarding results will be recommended. The report has been produced in as a part of the ongoing monitoring scheme.

Relevant UK legislation of the protection of all UK bats are detailed in Appendix 1.

2 Previous Surveys

2.1 Bat Survey Report (Urban Green, 2021b)

Following the assessment of S1 featuring moderate bat roosting potential, three emergence surveys were undertaken on site. Bat activity was recorded throughout the emergence surveys, with all activity attributed to common pipistrelle (*Pipistrellus pipistrellus*). Foraging activity was mainly recorded around S1 and along the viaduct.

In total, two common pipistrelle roosts were located along the northern aspect of Structure 1, with a peak count of three individuals foraging on site at one time. The low number of bats recorded using these roosts indicated that they are non-breeding summer roosts for low numbers of common pipistrelle, which is a relatively common and widespread species of bat.

A total of five activity surveys were conducted, including the deployment of four static bat detectors, over four months, from 14/06/21 to 01/09/21. Only activity pertaining to common pipistrelle was recorded during each activity survey. The peak count of bats at any one time was three, with that peak being recorded during every activity survey. A total of thirty-eight passes was the highest recorded at a listening point, which occurred during Activity Survey 2, at listening point 9.

Common pipistrelle also contributed to the majority of calls recorded through the static detectors, with only three calls relating to noctule (*Nyctalus noctula*) and two calls relating to unidentified *Myotis* species. Overall, a total of 7751 common pipistrelle calls were recorded, with an average of 310 calls per night.

3 Methods

3.1 Nocturnal Bat Surveys

3.1.1 Emergence/Re-entry surveys

One re-entry and two emergence surveys were undertaken following guidance set out in Collins (2023). All surveys were conducted by suitably qualified ecologists. The surveys were conducted using handheld BatScanner, Echo Meter Touch and Anabat Scout bat detectors. Surveyors were positioned around the feature to observe the roost that had been identified in previous surveys. The emergence surveys began at least 15 minutes before sunset until approximately 1.5 to 2 hours after sunset. The re-entry surveys started approximately 1.5 to 2 hours before sunrise, until 15 minutes after sunrise.

Summary of survey details are provided in Table 2, and Figure 2 provides a plan illustrating surveyor position. Surveyor survey results sheets are available upon request.

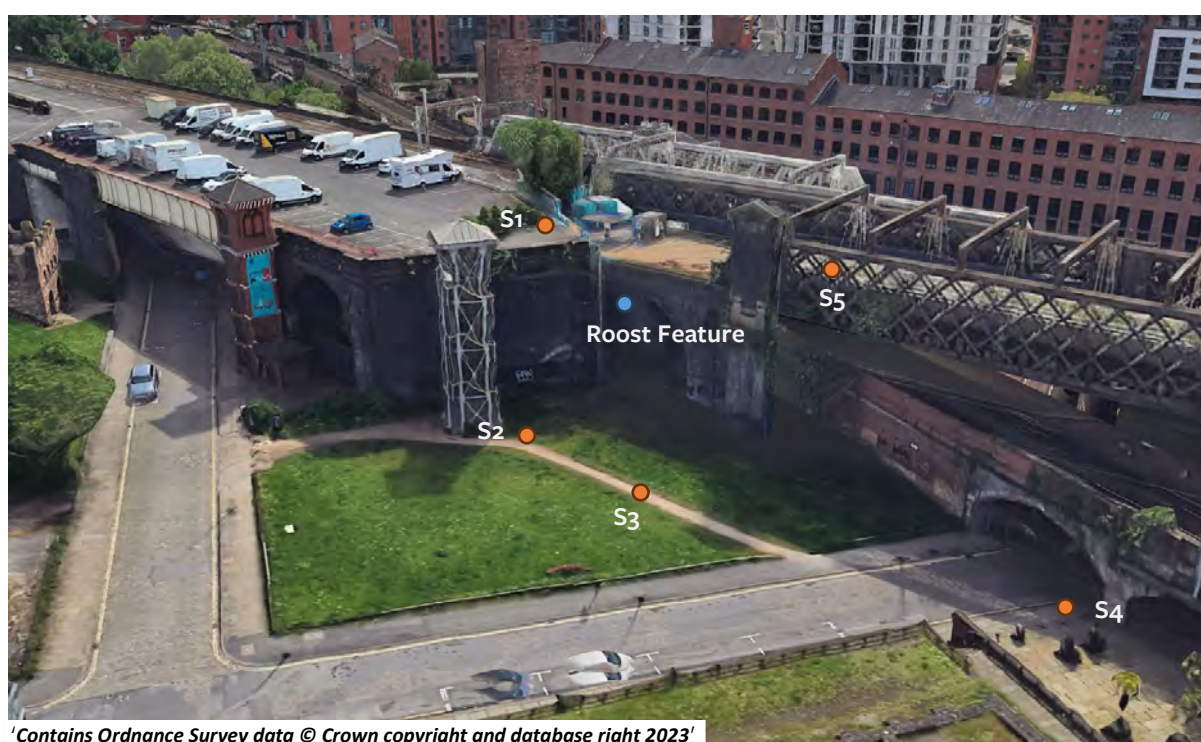


Figure 2 – Surveyor vantage points

Table 2 - Emergence/Re-entry Survey Details

Date	Sunset/sunrise time	Survey time	Surveyors	Weather conditions at start
10/05/23	20:54	20:39-22:39	S1- Siobhan Smyth S2- Jennie Furby S3- Barney Gardner S4- Adam Ousby S5- Zack Maskill	Temp: 12°C Cloud cover: 7/8 oktas Wind: 2 Beaufort Precipitation (Ppt): light rain during survey
14/07/23	04:58	03:28-05:13	S1- Siobhan Smyth S2- Emily Grimwood S3- Jenny Darby S4- Toby Mills	Temp: 13°C Cloud cover: 8/8 oktas Wind: 1 Beaufort Precipitation (Ppt): None

Date	Sunset/sunrise time	Survey time	Surveyors	Weather conditions at start
03/08/23	21:02	20:47-22:32	S1- Emily Grimwood S2- Siobhan Smyth S3- Barney Gardner S4- Adam Ousby S5- Jenny Darby	Temp: 17°C Cloud cover: 3/8 oktas Wind: 0 Beaufort Precipitation (Ppt): None

Barney Gardner QCIEEM – Assistant Ecologist with two years’ bat survey experience.

Toby Mills QCIEEM – Assistant Ecologist with two years’ bat survey experience.

Jennie Furby – Seasonal Ecologist with two years’ bat survey experience.

Siobhan Smyth – Seasonal Ecologist with one year’s bat survey experience.

Adam Ousby – Seasonal Ecologist with one year’s bat survey experience.

Emily Grimwood – Seasonal Ecologist with one year’s bat survey experience.

Jenny Darby – Seasonal Ecologist with one year’s bat survey experience.

Zack Maskill – Seasonal Ecologist with one year’s bat survey experience.

3.1.2 Bat Activity Surveys

Six activity surveys were undertaken following guidance set out in Collins (2023), spanning from April to September 2023 (inclusive) with a minimum period of two weeks between each survey, and at least one survey completed each month. All surveys were conducted by two suitably qualified ecologists. The survey effort involved two surveyors walking a pre-determined transect route, recording observations of bats, such as number of passes, peak count, species, and behaviour (e.g. commuting or foraging), using an Anabat Scout bat detector, which also recorded activity for further analysis. The routes also included Listening Points, which involved stopping for a minimum of 5 minutes to record data at a specific point within the transect route.

The predetermined route ensured coverage of all habitat types and features along the viaduct.

Summary of the survey details are provided in Table 3. Appendix 2 provides a plan illustrating the transect route. Surveyor results are available upon request.

Table 3 – Activity Survey Details

Survey	Date	Start (Sunset) - End	Surveyors	Weather conditions at sunset
Survey 1 (April)	11/04/23	20:02-22:02	Barney Gardner Max Grindle	Temp: 9°C Cloud cover: 8/8 oktas Wind: 2 Beaufort Precipitation (Ppt): Occasional
Survey 2 (May)	04/05/23	20:44-22:44	Barney Gardner Adam Ousby	Temp: 13°C Cloud cover: 8/8 oktas Wind: 2 Beaufort Precipitation (Ppt): none

Survey	Date	Start (Sunset) - End	Surveyors	Weather conditions at sunset
Survey 3 (June)	05/06/23	21:32-23:32	Barney Gardner Adam Ousby	Temp: 14°C Cloud cover: 4/8 oktas Wind: 1 Beaufort Precipitation (Ppt): None
Survey 4 (July)	31/07/23	21:07-22:57	Toby Mills Nathan Morton	Temp: 13°C Cloud cover: 8/8 oktas Wind: 2 Beaufort Precipitation (Ppt): None
Survey 5 (August)	16/08/23	20:35-22:24	Toby Mills Adam Ousby	Temp: 19°C Cloud cover: 3/8 oktas Wind: 1 Beaufort Precipitation (Ppt): None
Survey 6 (September)	12/09/23	19:32-21:21	Toby Mills Nathan Morton	Temp: 14°C Cloud cover: 4/8 oktas Wind: 2 Beaufort Precipitation (Ppt): None

Max Grindle QCIEEM – Ecologist with two years’ bat survey experience.

Nathan Morton – Seasonal Ecologist with one years’ bat survey experience.

When possible, two Anabat Express static detectors were deployed at the site for a maximum of five days across six deployment periods from April to September. One static was placed on either the developed (east) side or the undeveloped (west) side of the viaduct on each deployment period.

Dates of deployment and associated weather conditions are detailed within Table 4.

Table 4 – Static Deployment Weather

Deployment	Date	Sunset/sunrise time	Temperature		Precipitation
Deployment 1 (April)	11/04/23	20:02-06:17	High: 9°C	Low: 3°C	Rainfall
	12/04/23	20:03-06:14	High: 7°C	Low: 5°C	Some Rain
	13/04/23	20:05-06:12	High: 10°C	Low: 4°C	None
	14/04/23	20:07-06:10	High: 6°C	Low: 0°C	None
	15/04/23	20:09-06:07	High: 13°C	Low: 8°C	None
Deployment 2 (May)	04/05/23	20:43-05:27	High: 13°C	Low: 10°C	Some Rain
	05/05/23	20:45-05:25	High: 14°C	Low: 10°C	None
	06/05/23	20:47-05:23	High: 13°C	Low: 12°C	None
	07/05/23	20:48-05:21	High: 17°C	Low: 12°C	None
	08/05/23	20:50-05:19	High: 15°C	Low: 10°C	None
Deployment 3 (June)	05/06/23	21:31-04:43	High: 19°C	Low: 10°C	None
	06/06/23	21:32-04:42	High: 14°C	Low: 10°C	None
	07/06/23	21:33-04:42	High: 16°C	Low: 7°C	None

Deployment	Date	Sunset/sunrise time	Temperature		Precipitation
Deployment 4 (July)	08/06/23	21:34-04:41	High: 18°C	Low: 8°C	None
	09/06/23	21:35-04:41	High: 21°C	Low: 12°C	None
	31/07/23	21:07-05:24	High: 15°C	Low: 13°C	Some Rain
	01/08/23	21:05-05:25	High: 17°C	Low: 13°C	Some Rain
	02/08/23	21:03-05:27	High: 16°C	Low: 14°C	Some Rain
	03/08/23	21:01-05:29	High: 18°C	Low: 14°C	None
	04/08/23	20:59-05:30	High: 16°C	Low: 12°C	Some Rain
	16/08/23	20:35-05:49	High: 21°C	Low: 14°C	None
Deployment 5 (August)	17/08/23	20:33-05:53	High: 21°C	Low: 15°C	None
	18/08/23	20:31-05:54	High: 19°C	Low: 17°C	Some Rain
	19/08/23	20:29-05:56	High: 20°C	Low: 14°C	None
	20/08/23	20:27-05:58	High: 21°C	Low: 12°C	None
Deployment 6 (September)	12/09/23	19:32-06:38	High: 15°C	Low: 7°C	None
	13/09/23	19:30-06:40	High: 16°C	Low: 13°C	Some Rain
	14/09/23	19:27-06:41	High: 17°C	Low: 14°C	Some Rain
	15/09/23	19:25-06:43	High: 19°C	Low: 13°C	None
	16/09/23	19:23-06:45	High: 15°C	Low: 14°C	None

The data collected on the static detector was analysed to provide further evidence of the sites use by foraging and commuting bats, using Anabat Insight software. Please refer to Figure 3 for static location points.

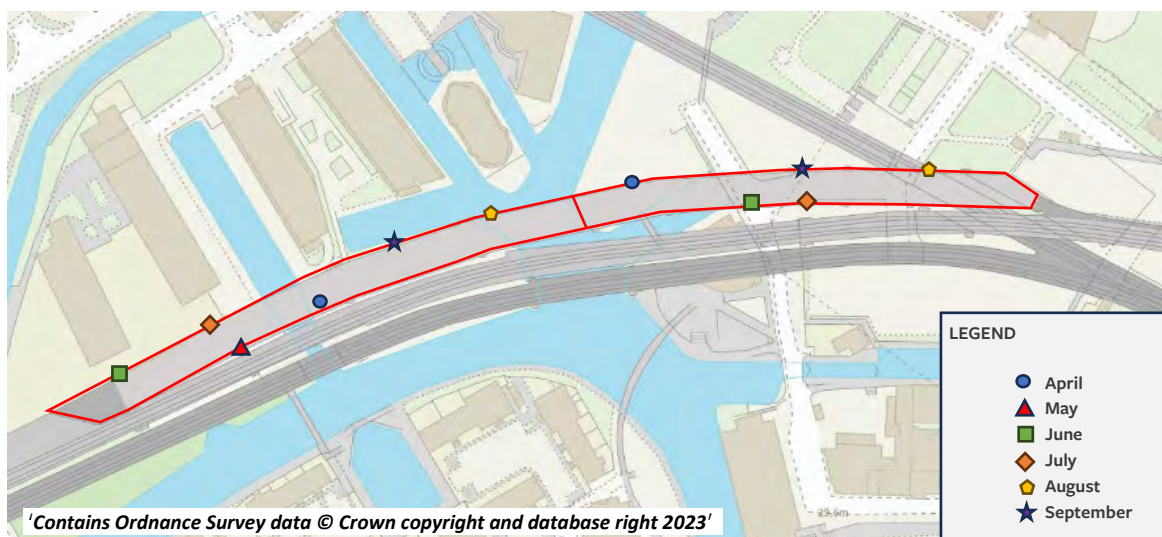


Figure 3 – Static detector deployment locations

3.2 Constraints to the Survey

Due to conflicts in scheduling and weather conditions, the activity survey completed in July could only be completed on the last day of the month, and the static data from this survey was mostly recorded within August. This is not ideal, as it had caused a gap in data between Activity Survey 3 and 4. Despite this, both surveys were still completed during the optimal survey period (Collins, 2023).

Only three days of static information were available from the easternmost static, placed out in April. This is due to a lack of data from the third day, and a technical fault leading to missing data on the fifth day. This will not have a significant impact on the results, however, as surveys in April are more weather dependent (Collins, 2023), and temperature levels were at a high of 10°C throughout the 5-day survey period in April. Only one static dataset was returned within May due to a technical fault with one of the static detectors.

Due to the surveys being conducted by observation during low light conditions, this may cause constraint of visual assessments. No surveyors were visually constrained during the survey, other than that of low light conditions, and all potential roosting features were observed throughout the survey period.

3.3 Lifespan of Reports

In accordance with the BCT guidance (Collins, 2023), the details of this report will remain valid for a period of **18 months** from the date of the first survey (i.e. until 11th October 2024). After this date, this assessment should be reviewed to determine whether any update surveys are required.

4 Results

4.1 Emergence/re-entry Surveys

4.1.1 Dusk Emergence – 10/05/23

Bat activity was recorded throughout the survey, with unidentified bat species (*Chiroptera* sp.) and common pipistrelle recorded commuting and foraging throughout the survey, in proximity of all vantage positions.

The first bat was recorded at 21:05 (approximately 11 minutes after sunset), recorded by S2, followed by S4 a minute later, observed arriving from the east, over the staircase leading to the car park. Most activity recorded was heard but not seen by most surveyors, most often thought to be foraging activity, as S1-S4 all recorded activity up until ~ten minutes before the survey's end at 22:39.

The roost previously identified was reconfirmed, by emergence of a single unidentified bat, at 21:15, observed by S3. The roost was located under the bridge - the same feature previously identified. S3 was unable to identify to species level, though records from nearby S2 at the same time denote a common pipistrelle commuting. As the roost was previously identified as a non-breeding summer roost for common pipistrelle, it is likely that the emerging bat can assumed to be common pipistrelle.

4.1.2 Dawn Re-entry – 14/07/23

During the dawn re-entry survey, bat activity was more limited, with S1 and S4 only recording one pass throughout the survey. The first activity was attributed to common pipistrelle at 03:59 (approximately 59 minutes before sunrise), recorded by S2, S3 and S4. At 04:35, a pass was recorded by S2 and S3, followed by the final pass, recorded at 04:45 by S2.

No bat activity was recorded in relation to the building or any of the PRFs surveyed.

4.1.3 Dusk Emergence – 03/08/23

Bat activity was recorded throughout the survey at all surveyor positions, with all activity related to common pipistrelles foraging and commuting.

There was a higher level of activity throughout than was recorded during the dawn re-entry survey, with each surveyor consistently recording activity. The first activity recorded was related to S4 at 21:06, approximately 4 minutes after sunset, attributed to a commuting bat. Following this, activity was recorded at S2 and S3, related to commuting bats at 21:14 and 21:15. Both commuting and foraging activity was recorded throughout the survey consistently until 21:14, where S1, S3 and S5 recorded their final activity, with S2 and S4 recording until the end of the survey.

No activity was recorded in relation to the building or any of the PRFs surveyed.

4.2 Nocturnal Bat Activity Surveys

4.2.1 Activity Survey 1 – 11/04/23

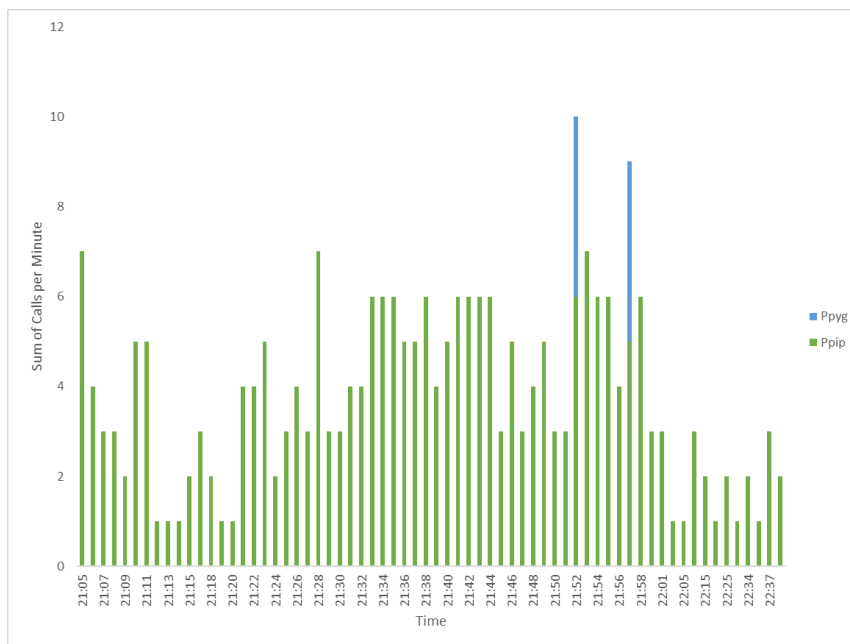
Throughout the survey, only two passes were recorded, at 21:14 (1 hour, 12 minutes after sunset), attributing to common pipistrelle, and a peak count of one bat.

4.2.2 Activity Survey 2 – 04/05/23

Throughout the survey, a total of 253 passes were identified, attributing to 245 common pipistrelle passes, and rare occurrences of soprano pipistrelle (*Pipistrellus pygmaeus*), with 8 passes recorded. A

peak count of two individual common pipistrelle were recorded, at 21:24. The first activity was recorded at 21:05 (23 minutes after sunset), when five passes of common pipistrelle were recorded at Listening Point 3.

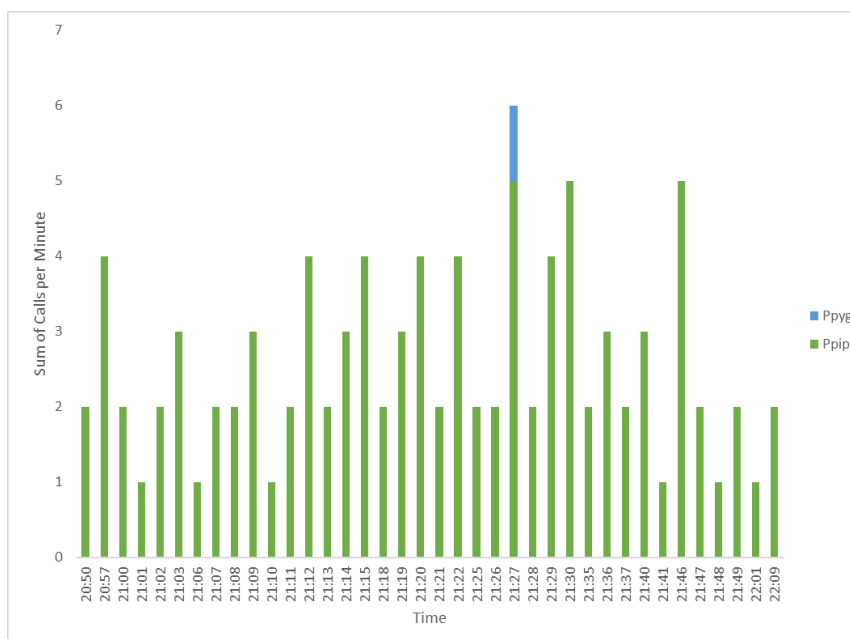
Figure 4 – Calls per Minute during Activity Survey 2



4.2.3 Activity Survey 3 – 05/06/23

A total of 98 calls were recorded throughout the survey, attributed predominantly to common pipistrelle, with a single soprano pipistrelle pass. The first activity was recorded at 22:00, 28 minutes after sunset, pertaining to a commuting common pipistrelle. Activity was recorded consistently throughout the next hour, with most of the activity relating to foraging common pipistrelle, at a peak count of 1.

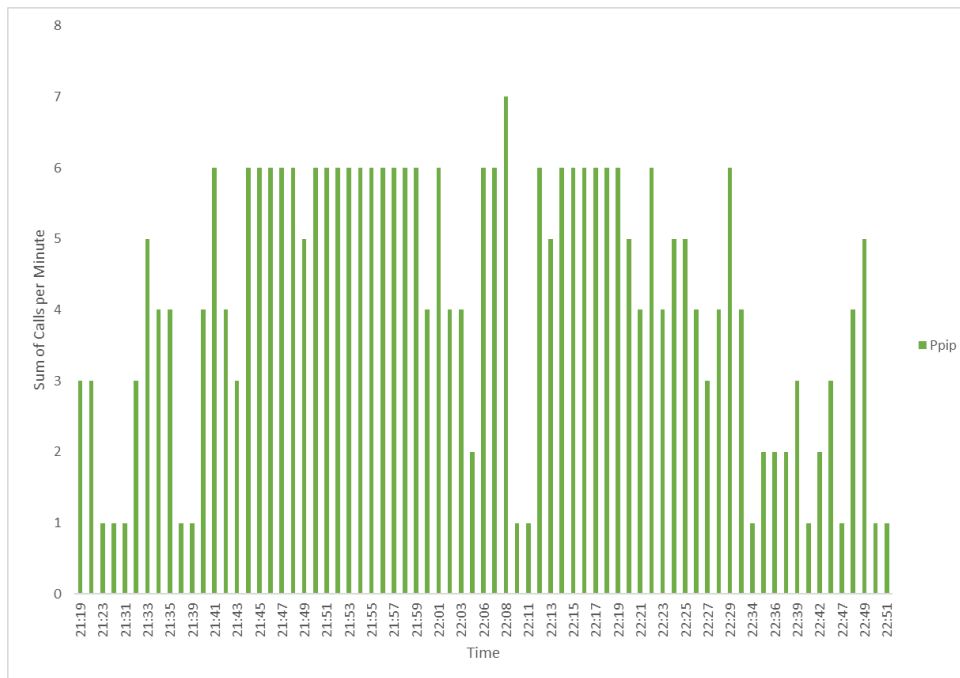
Figure 5 – Calls per Minute during Activity Survey 3



4.2.4 Activity Survey 4 – 31/07/23

A total of 305 calls were recorded throughout the survey, attributed entirely to common pipistrelle. The first recorded pass was identified at 21:24 as a commuting common pipistrelle. Minimal activity was recorded from Listening Points 1 to 4, though consistent foraging activity was recorded from Point 5 through to Point 10, after which sporadic activity was recorded until the end of the survey. Twenty-three instances of social calls by common pipistrelle were recorded, and a peak count of three individual common pipistrelle were recorded at one time. A significantly higher level of activity was recorded throughout the undeveloped half of the site, with constant activity recorded within the area.

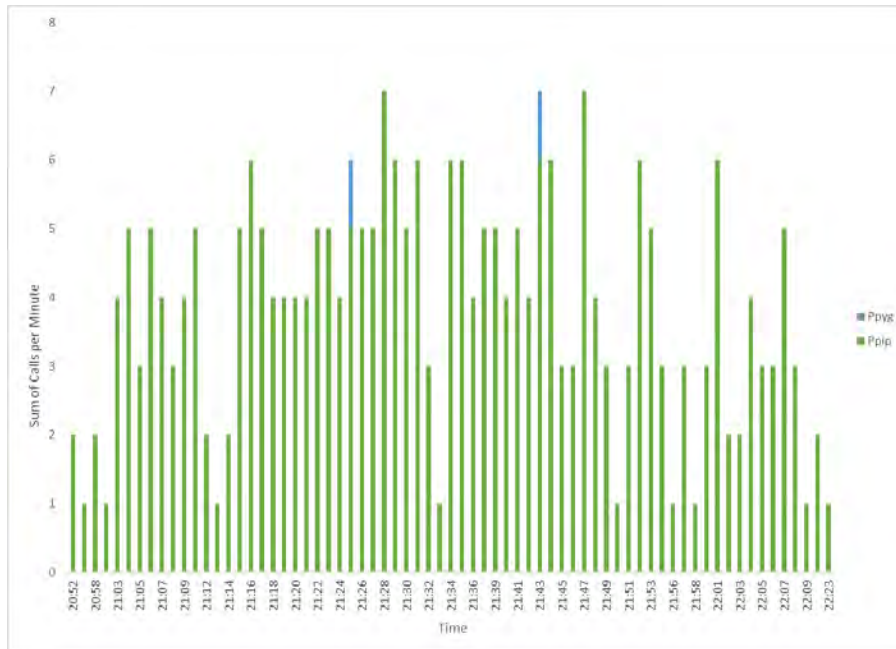
Figure 6 – Calls per Minute during Activity Survey 4



4.2.5 Activity Survey 5 – 16/08/23

A total of 264 bat calls were recorded during the survey, attributed predominantly to common pipistrelle, with two soprano pipistrelle calls recorded. The first activity was recorded at 20:59, 24 minutes after sunset, regarding a commuting common pipistrelle. Foraging was recorded sporadically from Listening Point 4, at 21:01, becoming constant between Points 5 to 10, from 21:09 to 21:52. From Point 11 onwards, foraging behaviour became more sporadic, with fewer individuals recorded at each point. There was a peak count of three bats at any one time, and one social call was identified.

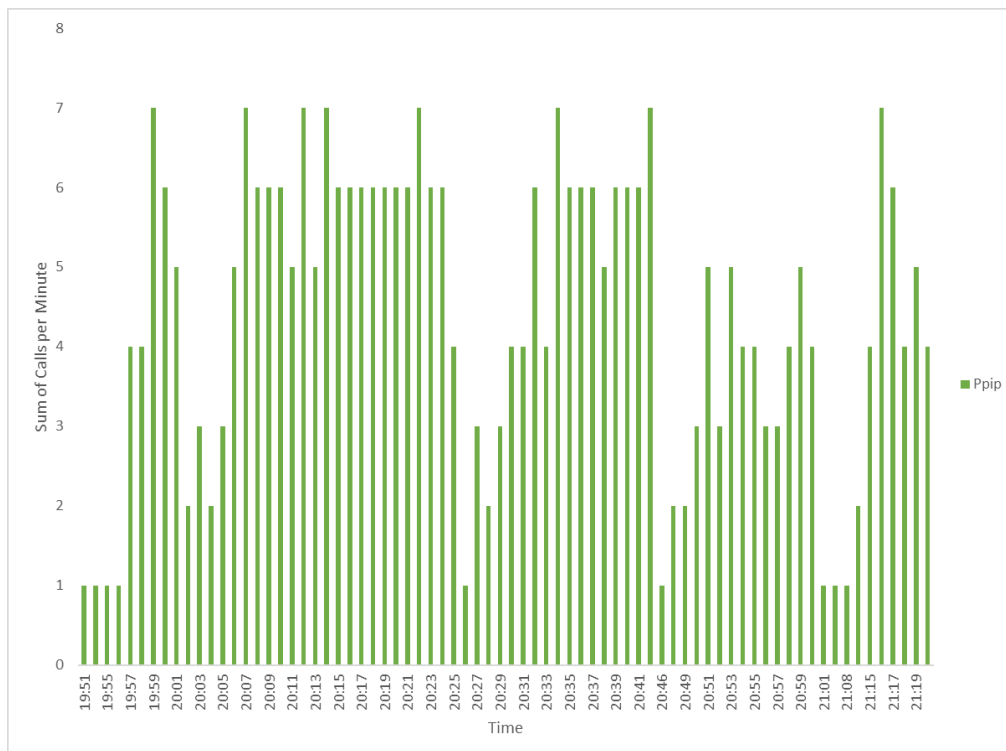
Figure 7 – Calls per Minute during Activity Survey 5



4.2.6 Activity Survey 6 – 12/09/23

A total of 324 bat calls were recorded, attributed entirely to common pipistrelle. The first activity was recorded at Point 4, attributed to sporadic foraging activity recorded at 19:57, 25 minutes after sunset. Points 5 to 10 recorded constant foraging activity, with activity becoming more occasional after Point 10. A peak count of three bats was recorded at any one time, and 14 social calls were identified.

Figure 8 – Calls per Minute during Activity Survey 6



4.3 Automated Static Detector Surveys

Overall, the majority of species calls identified within the static surveys were dominated by common pipistrelle, with rare occurrences of soprano pipistrelle and noctule, detailed within Table 5. All social calls recorded during the survey were attributed to common pipistrelle social calls.

Call frequency varied from month to month. The highest activity was recorded during July, with a total of 3,580 calls recorded throughout both statics during this month. Call frequency varied throughout each month, with less activity recorded in April and June than other months.

Species assemblage also varied between months, although not as drastically as call frequency. April and June only recorded common pipistrelle activity, whereas other months only recorded low levels of activity not relating to common pipistrelle; calls relating to soprano pipistrelle and noctule activity equate to <1% of all calls recorded throughout the entire deployment survey suite. May and September recorded the highest level of activity relating to these species, both with a total of 33 calls for soprano pipistrelle and noctule.

Social calls pertaining to common pipistrelle were identified during some of the months, but not during others. A lack of social calls were identified during May and June, with increasing levels of activity through July into September. A peak count of social calls was identified during September, with a total of 439 calls regarding social calling behaviour.

Table 5 – Detailed results from static deployments

Deployment		Date	Number of passes recorded				
			Common Pipistrelle	Soprano Pipistrelle	Noctule	Social calls	Total
Deployment 1 (April)	Static 1 (East)	11/04/23	1	0	0	0	1
		12/04/23	Not available				
		13/04/23	296	0	0	2	296
		14/04/23	No Calls Recorded				
		15/04/23	Not Available				
	Static 2 (West)	11/04/23	No Calls Recorded				
		12/04/23	Not available				
		13/04/23	383	0	0	17	383
		14/04/23	No Calls Recorded				
		15/04/23	623	0	0	39	623
Deployment 2 (May)	Static 1 (West)	04/05/23	247	0	0	0	247
		05/05/23	262	0	0	0	262
		06/05/23	352	19	2	0	373
		07/05/23	313	5	1	0	319
		08/05/23	378	6	0	0	384
Deployment 3 (June)	Static 1 (East)	05/06/23	84	0	0	0	84
		06/06/23	87	0	0	0	87
		07/06/23	47	0	0	0	47

Deployment		Date	Number of passes recorded				
			Common Pipistrelle	Soprano Pipistrelle	Noctule	Social calls	Total
		08/06/23	67	0	0	0	67
		09/06/23	159	0	0	0	159
	Static 2 (West)	05/06/23	13	0	0	0	13
		06/06/23	39	0	0	0	39
		07/06/23	31	0	0	0	31
		08/06/23	18	0	0	0	18
		09/06/23	346	0	0	0	346
Deployment 4 (July)	Static 1 (East)	31/07/23	207	1	0	0	208
		01/08/23	125	1	0	0	126
		02/08/23	289	3	1	0	293
		03/08/23	164	1	0	4	165
		04/08/23	No Calls Recorded				
	Static 2 (West)	31/07/23	375	0	0	0	375
		01/08/23	313	0	1	0	314
		02/08/23	854	2	0	0	856
		03/08/23	565	0	0	0	565
		04/08/23	675	3	0	0	678
Deployment 5 (August)	Static 1 (East)	16/08/23	48	0	0	0	48
		17/08/23	39	0	1	0	41
		18/08/23	No Calls Recorded				
		19/08/23	33	0	1	0	34
		20/08/23	191	2	1	1	194
	Static 2 (West)	16/08/23	252	1	0	10	253
		17/08/23	115	2	0	2	117
		18/08/23	42	0	0	0	42
		19/08/23	493	2	2	80	497
		20/08/23	438	4	1	110	443
Deployment 6 (September)	Static 1 (East)	12/09/23	49	0	2	0	51
		13/09/23	58	0	1	0	59
		14/09/23	97	1	0	4	98
		15/09/23	31	1	1	2	33
		16/09/23	9	0	0	0	9
		12/09/23	347	9	0	63	356
		13/09/23	371	11	0	22	382

Deployment		Date	Number of passes recorded				
			Common Pipistrelle	Soprano Pipistrelle	Noctule	Social calls	Total
	Static 2 (West)	14/09/23	578	1	0	74	579
		15/09/23	467	3	0	262	470
		16/09/23	137	3	0	12	140

4.4 Assessment

4.4.1 Nocturnal Emergence/Re-entry Surveys

Bat activity was recorded throughout the surveys with only common and widespread species being identified within the local area. Commuting and foraging activity was recorded both on the viaduct and around the roosting feature.

Through an emergence recorded during the first emergence bat survey, the non-breeding summer roost identified during the original 2021 surveys can be confirmed to still be active.

The low number of bats recorded emerging from the roost indicates that it is still a non-breeding summer roost for low numbers of common and widespread species of bat.

4.4.2 Nocturnal Bat Activity and Static Surveys

Bat activity recorded throughout both the activity surveys and static deployments indicate that the site is still used predominantly by common pipistrelle for foraging purposes. Noctule and soprano pipistrelle were also recorded on site, in limited abundance, suggesting the site is of limited value to these species.

A peak count of three individual common pipistrelle were recorded at any one time on site during the activity surveys, and a peak number of passes through site recorded on any night using static detectors was 1,143 calls, on 02/08/2023.

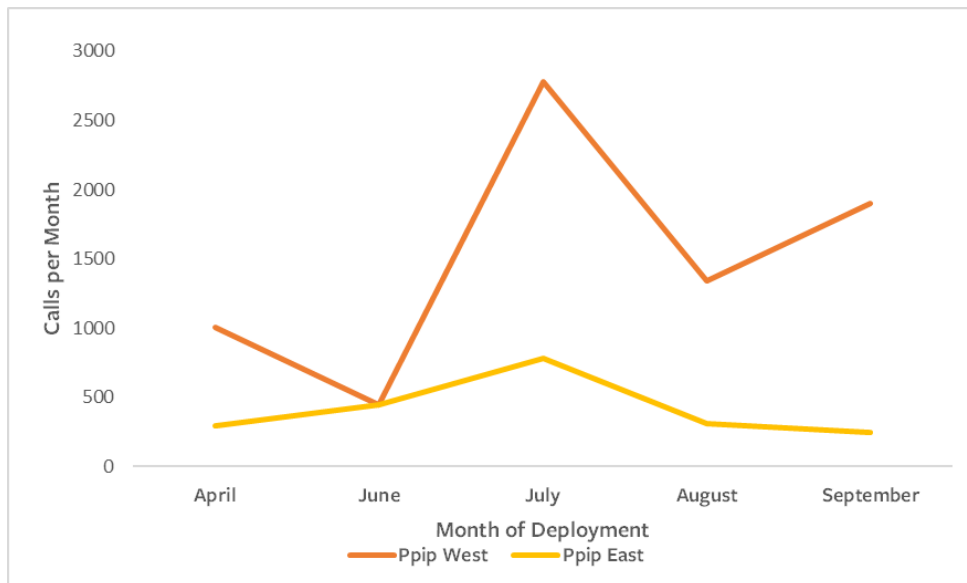
In total, 11,204 bat calls were recorded over the five-month period through static detectors, and 1,246 recorded during activity surveys using an Anabat Scout; a total of 12,450 calls. The majority were attributed to common pipistrelle; 99.1% of all calls recorded, 742 of which included social calls. A breakdown of the calls observed can be found within Table 6.

Table 6 – Total species observed and number of calls throughout activity surveys and static deployment

Survey Method	Species	Number of Observations	Observation % within Survey Method
Activity Surveys	Common pipistrelle	1,235 (38 social)	99.1%
	Soprano pipistrelle	11	0.9%
	Total	1,246	
Static Deployment	Common pipistrelle	11,108 (704 social)	99.15%
	Soprano Pipistrelle	81	0.72%
	Noctule	15	0.13%
	Total	11,204	

These results reaffirm the conclusions of the previous surveys, which assessed that the scrub on site has high value for foraging. Comparing results regarding the developed side (east) to the undeveloped side (west), there are at least a higher or equal number of calls per month for each month in which both sides were recorded. A graph showing the disparity between the two datasets is shown in Figure 9.

Figure 9 – A line graph showing the difference in common pipistrelle calls per month between each side of the Viaduct



5 Comparison with previous surveys

5.1 Nocturnal Emergence/Re-entry Surveys

Throughout the original suite of surveys completed in 2021, emergences were recorded during two of the three surveys, relating to three common pipistrelle on each occasion. Foraging was also recorded on each occasion, with activity recorded around the roost and throughout the viaduct.

Comparatively, fewer bat emergences were observed during the updated surveys, with one common pipistrelle emergence over three surveys, and less activity was also recorded, with no foraging activity recorded during the re-entry survey, although both foraging and commuting activity was recorded during both emergence surveys.

A drop in observed emergences may be coincidental, as a similar level of commuting and foraging activity was recorded throughout the emergence surveys. The lack of activity recorded during the re-entry survey may have been due to external factors. For example, the time at which bats return to their roosts can be inconsistent and weather dependent.

The roost was previously identified as a transitional, non-breeding roost. These roosts are normally used for short periods of time by a few individuals, either on waking from hibernation or in the period prior to hibernation (Collins, 2023). Therefore, it is possible that the roost was not in current use at the time of the surveys when no emergences were identified.

5.2 Activity Surveys and Static Deployment

The activity recorded during the updated surveys was similar to that identified during the original surveys. For example, both the original and updated surveys recorded a peak count of three bats, with common pipistrelle dominant and foraging activity recorded throughout site. Despite this, all the activity described in the updated surveys was recorded within the unmanaged, western side of the viaduct, which has remained in the same condition as before development began.

High levels of activity were recorded throughout the viaduct before development began; Activity Survey 4 in 2021 recorded the highest peak number of passes at Listening Point 12, which is located within the developed, eastern side of the viaduct. There was a significant reduction in activity on the developed side of the viaduct, with only occasional foraging, and mostly commuting behaviour identified on this side during the updated surveys.

The similarities between the original and updated surveys were exemplified by the data collected during static deployments. The abundance of passes recorded per night by the statics were, on average, similar between the original and the updated deployment surveys completed on the undeveloped side, and, other than the rare occurrences of *myotis* species during the original deployment, or soprano pipistrelle during the updated deployment, featured similar species composition. Details on the average number of common pipistrelle passes per night between the original and updated deployments are available in Table 7.

Table 7 – Comparing the average number of common pipistrelle passes per night between the original and updated static deployments

Month of deployment	Average no. of common pipistrelle passes per night		
	Original 2021 Deployment	Updated 2023 Deployment - West	Updated 2023 Deployment - East
June	322	89	88
July	348	556	157
August	N/A	268	62
September	254	380	49

Detectors placed on the undeveloped western side of viaduct, despite having more varied results, recorded a similar number of passes as the original deployments, whereas the statics placed on the developed side recorded less than both the original and undeveloped side on most occasions.

The data returned from the updated June deployments provided outlying data, as there was no significant difference in average number of calls per night between either side of the viaduct, and the average number of calls overall were significantly lower than other data sets collected throughout the 2023 survey suite.

The results from 2023, comparative to either side and previous results, show that the number of calls per night are higher within the western side post-development, and lower on the eastern side post-development. This is not necessarily an indication of higher levels of activity overall, but the condensation of activity into the undeveloped side of the viaduct. This is further identified through the comparison of activity survey results, where a peak count of three bats was identified in both 2021 and 2023.

There may be several reasons for the reduction in activity throughout the developed side of the viaduct. One possibility is the light pollution; artificial lighting can have an impact on bat activity and foraging. Bat Activity and Artificial Lighting in the UK (BCT and ILP, 2023) states that slower-flying, broad winged species, such as *myotis* species, avoid illuminated commuting and foraging routes. The introduction of light into a previously low-lit environment may have fragmented flightpaths or foraging habitats, causing bats to forage on the undeveloped side.

Another key factor in foraging preference in bat species is presence of invertebrate prey. The shrubby, sparsely vegetated land, minimal management, and larval plants such as ragwort (*Senecio jacobaea*) provides sufficient habitat for invertebrate prey to develop, in turn providing suitable foraging opportunities for bats. The colonisation of newly created garden habitats by invertebrates may take time, and could be limited by several factors, including connectivity to similar surrounding habitats, and habitat suitability amongst other factors.

6 Recommendations

During surveys undertaken in 2023, a non-breeding summer roost was confirmed to be active on site, supporting a low number of common pipistrelle. Bat activity was recorded foraging and commuting, attributed to common pipistrelle, with similar activity recorded within activity and static deployment surveys, with higher levels of activity identified within the undeveloped side of the viaduct.

Based on the results of the activity surveys, the native, unmanaged habitats of scrub on the viaduct provide more value for foraging bat species on site than the habitats found in the developed side. This should be considered going forward, as any developments or changes to the habitats created on the developed side should consist of more native and shrubby species to provide a better habitat for foraging bats. Subsequently, any further development on site should look to recreate similar habitats that will attract high numbers of invertebrates on site to provide similar foraging opportunities.

Following previous results from the 2021 emergence surveys, with the roost on site regularly identified as a transitional roost, this suggests that there may be no suitable locations for maternity roosts to form on the viaduct. Therefore, it is recommended that bat boxes be installed to provide more suitable habitats for local bat populations¹. These should include both standard bat boxes and maternity bat boxes, which will increase the abundance and diversity of roosting spaces on site, and in turn, encourage more bat roosting on site. Examples of suitable bat boxes are listed within Table 8.

Table 8 – bat box specification

Bat Box Type	Image
<p>Vivara Pro Causa Maternity Bat Box</p> <p>Specifications: Height: 780mm Width: 510mm Depth: 165mm Weight: 12kg</p>	
<p>Improved Crevice Bat Box – double chamber</p> <p>Specifications: Height of back panel: 335mm Internal height of roost chamber: 197mm External depth of roost chamber: 69mm External depth including roof overhang: 101mm External width: 166mm Weight: 1.4kg</p>	

¹ Due to Phase 1 of Castlefield Viaduct being a temporary scheme, the risk of having to vacate the site and removing bat boxes that have been inhabited would negatively impact local populations of bat. Therefore, it is recommended that the installation of bat boxes on site is reserved until a permanent scheme is developed.

7 Conclusion

This Bat Survey Report has met its objectives, by demonstrating the following:

- The results of the nocturnal bat surveys, including emergence/re-entry, activity, and static deployment surveys, detailed in Section 4.
- A comparison of the results gathered from the updated surveys with results from the surveys previously completed in 2021, detailed in Section 5.

8 References

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Urban Green (2021b). Bat Survey Report of Castlefield Viaduct Urban Park. Ref: UG_922_ECO_BSR_01.

Appendix 1 - Relevant Legislation

Legislation relating to European Protected Species (e.g. bats)

European Protected Species and their resting places (e.g. bat roosts) are protected under the Wildlife and Countryside Act 1981 (as amended), the Countryside and Rights of Way (CROW) Act 2000, and the Conservation of Habitats and Species Regulations 2017.

The Conservation of Habitats and Species Regulations 2017 transpose the European Union's 'Habitats Directive' (Council Directive 92/43/EEC) on the Conservation of Natural Habitats and of Wild Fauna and Flora (EC Habitats Directive) into UK law. The Regulations provide for the designation and protection of 'European Sites', the protection of 'European Protected Species' (EPS), and the adaptation of planning and other controls for the protection of European Sites. EPS are listed on Schedule 2 of the Conservation of Habitats and Species Regulations 2017.

Appendix 2 – Bat Activity Survey Maps

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Legend

 Red Line Boundary

 Route

Bat Activity

 Sparse

 Dense

Species recorded:

Ppip

N



0 10 20 40 Meters



A: Ground Floor, The Tower,
Deva City Office Park, Trinity Way,
Manchester M3 7BF

T: +44 (0) 161 312 3131

weareurbangreen.co.uk

Client: **National Trust**

Project: **Castlefield Viaduct**

Title: **Bat Transect Maps
April 2023**

Issue: **01**

Drawn:
CL

Checked:
TM

Approved:
JH

Project:
UG922

Scale @ A3:
1:1050

Date:
08/11/2023

Dwg No:
UG_922_ECO_BTM_01_APRIL

Revision:
01

Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community, Esri Community Maps Contributors, Esri UK, Esri, HERE, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS

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Legend

- Polylines
- Red Line Boundary

Bat Activity

- Sparse
- Dense

Species recorded:

Ppip
Ppyg



A: Ground Floor, The Tower,
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Client: **National Trust**

Project: **Castlefield Viaduct**

Title: **Bat Transect Map
May 2023**

Issue: **01**

Drawn: CL	Checked: TM	Approved: JH
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Project: UG922	Scale @ A3: 1:1050	Date: 08/11/2023
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Dwg No: UG_922_ECO_BT_M01_MAY	Revision: 01
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Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community, Esri Community Maps Contributors, Esri UK, Esri, HERE, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS

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Legend

Red Line Boundary

Route

Bat Activity

Sparse

Dense

Species recorded:

Ppip

Ppyg

0 10 20 40 Meters



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Client: National Trust

Project: Castlefield Viaduct

Title: Bat Transect Map
June 2023

Issue: 01

Drawn: CL

Checked: TM

Approved: JH

Project: UG922

Scale @ A3: 1:1050

Date: 08/11/2023

Dwg No: UG_922_ECO_BT_M_01_JUNE

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Legend

- Routes
- Red Line Boundary

Bat Activity



Species recorded:
Ppip
Social



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Title:
**Bat Transect Map
July 2023**

Issue:
01

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Project: UG922	Scale @ A3: 1:1050	Date: 08/11/2023
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Dwg No: UG_922_ECO_BT_M_01_JUL	Revision: 01
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Legend

- Route
- Red Line Boundary

Bat Activity



Species recorded:
Ppip
Ppyg
Social



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Client: **National Trust**

Project: **Castlefield Viaduct**

Title: **Bat Transect Map
August 2023**

Issue: **01**

Drawn: CL	Checked: TM	Approved: JH
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Project: UG922	Scale @ A3: 1:1050	Date: 08/11/2023
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Dwg No: UG_922_ECO_BT_M_01_AUG	Revision: 01
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Legend

- Routes
- Red Line Boundary

Bat Activity

- Sparse
- Dense

Species recorded:

Ppip
Social



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Client: National Trust

Project: Castlefield Viaduct

Title: Bat Transect Map
September 2023

Issue: 01

Drawn: CL	Checked: TM	Approved: JH
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Project: UG922	Scale @ A3: 1:1050	Date: 08/11/2023
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Dwg No: UG_922_ECO_BT_M_01_SEPT	Revision: 01
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Legend

-  Red Line Boundary
-  Route

Static Detectors

- 
-  Ppip
-  Social
-  Noc
-  Nyctalus
-  Ppyg

0 12.5 25 50 Meters

**U R B A N
G R E E N**

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Client: **National Trust**

Project: **Castlefield Viaduct**

Title: **Static Bat Detectors
April - September 2023**

Issue: **01**

Drawn: CL	Checked: TM	Approved: JH
Project: UG922	Scale @ A3: NTS	Date: 21/11/2023
Dwg No: UG_922_ECO_BDS_01		Revision: 01

Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community, Esri Community Maps Contributors, Esri UK, Esri, HERE, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS