Bat Activity Surveys Report

Land at Mercer Road, Horsham

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Contents

LIABILITIES:

Whilst every effort has been made to guarantee the accuracy of this report, it should be noted that living creatures are capable of migration and whilst protected species may not have been located during the survey duration, their presence may be found on a site at a later date.

The views and opinions contained within this document are based on a reasonable timeframe between the completion of the survey and the commencement of any works. If there is any delay between the commencement of works that may conflict with timeframes laid out within this document, or have the potential to allow the ingress of protected species, a suitably qualified ecologist should be consulted.

It is the duty of care of the landowner/developer to act responsibly and comply with current environmental legislation if protected species are suspected or found prior to or during works.

1.0 Introduction

Background

1.1 The Ecology Partnership Ltd was commissioned by Riverdale Developments Ltd to undertake update bat activity surveys of land at Mercer Road, Warnham, Horsham, West Sussex, RH12 3RL. Previous bat surveys were conducted in 2017, 2018 and 2020 as the PEA identified areas of woodland on site and along the site boundaries with potential to support roosting bats. Several linear features such as tree lines and hedgerows were identified along the site boundary. These were considered to provide good foraging and commuting opportunities for bats, as such activity transect surveys were recommended.

1.2 An update ecological walkover and PEA confirmed that the site had not materially changed, with the site being actively managed and under agricultural management. The tree lines and hedgerows around the site were still present, and still provided opportunities for foraging and commuting bats.

1.3 This report presents the results of The Ecology Partnership's surveys in and around the site so far, which aims specifically to assess how bats are using the site over the course of the 2017, 2018 & 2020 survey season and the 2024 survey season.

1.4 Section 2 of this report sets out the methodology of The Ecology Partnership's survey and the results in Section 3 and the implications discussed in Section 4. Conclusions are provided for in chapter 5 of this report.

Site Context and Status

1.5 The site is characterised by a number of fields, used as horse paddocks, with associated margins, the site is split into two separate parcels by Mercer Road. It totals c. 14.6ha. It is situated within a rural setting close to Warnham Railway Station, north of Horsham in West Sussex (central grid reference: TQ 17340 33825). The red line boundary for the site is shown below (Figure 1).

Figure 1: Approximate location of the redline boundary and survey area

Description of Proposed Development

1.6 Current proposals are for a new housing estate, with associated access and landscaping.

Legislation

1.7 Under the NERC Act (2006) it is now the duty of every Government department in carrying out its functions "*to have regard, so far as it is consistent with the proper exercise of those functions, to the purpose of conserving biological diversity in accordance with the Convention*".

1.8 Bats are covered by the following relevant legislation: the Wildlife and Countryside Act (1981) (as amended); the Countryside and Rights of Way Act, 2000; the Natural Environment and Rural Communities Act (NERC, 2006); and by the Conservation of Habitats and Species Regulations (2010).

1.9 Under the WCA 1981 it is an offence to:

- intentionally, recklessly or deliberately disturb a roosting or hibernating bat i.e. disturbing it whilst it is occupying a structure or place used for shelter or protection)
- intentionally or recklessly obstruct access to a roost (i.e. a structure or place used for shelter or protection).

1.10 Under the CHSR 2010 it is an offence to:

- deliberately capture (or take), injure or kill a bat
- intentionally, recklessly or deliberately disturb a bat, in particular (i) any disturbance which is likely to impair their ability to survive, to breed or reproduce, or to rear or nurture their young; (ii) any disturbance which is likely to impair their ability in the case of hibernating or migratory species, to hibernate or migrate; or (iii) any disturbance which is likely to affect significantly the local distribution or abundance of the species to which they belong
- damage or destroy a breeding site or resting place (roost) of a bat.

2.0 Methodology

Bat Transect Activity Surveys

2.1 Five dusk activity surveys were carried out on 24th July, 31st August and 25th September 2017, 10th May and 18th June 2018 and followed BCT guidelines (Collins, 2016). Subsequent bat transect surveys took place on 28th July, 19th August and 13th September 2020. Two predetermined transect routes were agreed and followed for the duration of the survey, during which bat flyovers and activity were recorded. The transect routes were walked twice during the surveys. Both transect routes were designed to follow linear features such as hedgerows and tree lines which bats are known to use as commuting corridors. The dusk surveys started at sunset and observations were maintained until at least 2 hours after sunset. Four Anabat Express static recording devices were also deployed over five consecutive nights on 31st August, 25th September 2017, 10th May and 18th June 2018. Subsequent Anabat Express static recording devices were deployed on 28th July, 10th August and 19th September 2020.

2.2 Update surveys followed BCT guidance 2023 following the night time bat walkover (NBW) methodology. The updated surveys took place on the 29th May, 2nd July and 4th September

2024. This involved reviewing potential roost sources and flight lines followed by walking a set route (Figure 2). Surveyors were equipped with one of the following recording devices: Anabat Walkabout, Batlogger and/ or an Echo Meter Touch.

2.3 Anabat Express static recording devices were established across the site. The recording devices were placed within treelines and hedgerows that was considered suitable for use by commuting or foraging bats in order to gauge activity levels and species diversity on site (see Figure 2).

Figure 2: Walked routes 1 (blue) and 2 (yellow) with the locations of the anabats (white dot)

Limitations

2.4 It should be noted that whilst every effort has been made to provide a comprehensive description of the site, no single investigation could ensure the complete characterisation and prediction of the natural environment.

2.5 The Anabats recording ability are limited by the quantity of insect noise picked up over the bat calls, which varies over the season. This is a limit of the zero-crossing functionality of the Anabat recording devices.

3.0 2017/2018/2020 Results

Bat Transect Surveys

3.1 Bat activity surveys have been carried out in July, August & September 2017, May & June 2018 and, July, August and September 2020. The following section, summarises the results from these surveys per transect route.

3.2 Two bat surveyors followed the predetermined routes illustrated in Figure 2 above. Activity levels, foraging and commuting behaviour were recorded and species were identified using bat detectors. Surveyors were on site 15 minutes before sunset until 2 hours after sunset. Anabat remote recording devices were placed around the site in the same locations each month as shown in Figure 2. The date, time and weather conditions during for each monthly survey is shown in Table 1.

Table 1: Summary of the date, time and weather conditions during each monthly survey.

Survey date	Time of sunset	Weather conditions
24th July 2017	20:59	Conditions were good, with a light breeze and temperature starting 17°C and then dropping to 16°C at the end of the survey.
31st August 2017	19:54	Conditions were dry with scattered cloud cover. The temperature was initially 15°C, dropping to 11°C by the end of the survey.
25th September 2017	18:58	Conditions were overcast with a light breeze. The temperature was initially 18°C, dropping to 16°C by the end of the survey.
10th May 2018	20:37	Conditions were dry with a light breeze and 40% cloud cover. The temperature was initially 13°C, dropping to 10°C by the end of the survey.

18th June 2018	21:19	Conditions were overcast with a light breeze. The temperature remained at 17°C, till the end of the survey.
28th July 2020	21:10	Conditions were warm with scattered cloud. The temperature remained at 18°C, till the end of the survey.
19th August 2020	20:13	The conditions were warm with 10% cloud cover. The temperature remained at 24°C, till the end of the survey.
13th September 2020	19:19	Conditions were clear with a light breeze. The temperature remained at 21°C, till the end of the survey.

Summary of the bat activity transects

2017/2018 surveys

3.10 The 2017/2018 surveys indicated a variable level of bat activity across the site and the surveys. The most recorded bat species were common pipistrelle and soprano pipistrelle. The treelines running along mercer road and the woodland to the north of the site were considered to be the features with the highest levels of bat activity. The bat activity in the rest of the site was considered to be sporadic and comprised of commuting individuals and opportunistic foraging.

2020 surveys

3.11 The 2020 surveys found that common pipistrelles were the bat species using the site most frequently. The linear features on site such as the woodland edges, hedgerows and treelines were considered to be of value to bats owing to the activity in these areas. Overall, the site was considered to be no greater than local level importance for foraging and commuting bats, owing to the presence of high levels of common species.

Anabat Express Static Recorders

2017/2018 surveys

3.12 During the 2017/2018 surveys, four Anabat Express static recording devices were deployed across the site from August to September 2017 and May to June 2018. A total of 9,512 bat registrations were recorded over the survey period comprising of nine bat species. The most frequently recorded species on site was common pipistrelle, accounting for approximately 61% of all registrations (Table 2). The bat species on site were as follows; barbastelle, brown long-eared bat, leisler, myotis sp., noctule, nathusius's pipistrelle, common pipistrelle, soprano pipistrelle and serotine.

Table 2: Total number of bat recordings by species across the site during the 2017/2018 surveys.

Bat Species	Total number of recordings	Percentage of calls
Barbastelle	5	0.05%
Brown Long-eared Bat	55	0.58%
Leisler's	7	0.07%
Myotis sp.	118	1.24%
Noctule	1434	15.08%
NSL[1]	35	0.37%
Nathusius's Pipistrelle	2	0.02%
Common Pipistrelle	5,801	60.99%
Soprano Pipistrelle	2,026	21.30%
Serotine	29	0.30%

[1]*Due to difficulties in identifying noctule/serotine/leisler to species level, some calls were grouped together as NSL*

2020 surveys

3.13 During the 2020 surveys, four Anabat Express static recording devices were deployed across the site in July, August and September 2020. A total of 24,259 bat registrations were recorded over the survey period comprising of seven bat species. The most frequently recorded bat species on site was common pipistrelle, accounting for approximately 69% of all registrations (Table 3). The bat species on site were as follows; brown long-eared bat, leisler, myotis sp., noctule, common pipistrelle, soprano pipistrelle and serotine.

Table 3: Total number of bat recordings by species across the site during the 2020 surveys

Bat Species	Total number of recordings	Percentage of calls
Brown Long-eared Bat	94	0.39%
Leisler's	114	0.47%
Myotis sp.	1178	4.85%
Noctule	1490	6.14%
Common Pipistrelle	16,816	69.32%
Soprano Pipistrelle	4,502	18.56%
Serotine	65	0.27%

4.0 2024 Results

Bat Transect Surveys

4.1 Night time bat walkover surveys have been carried out in 29th May, 2nd July and 4th September 2024. The following section, summarises the results from the night time bat walkover surveys and the remote recording undertaken on site in May, July and September 2024.

4.2 The date, time and weather conditions during for each monthly survey is shown in **Table 4**.

Table 4: Summary of the date, time and weather conditions during each monthly survey.

Survey date	Time of sunset	Weather conditions
29th May 2024	21:04	Conditions were good, with no breeze and temperature starting 15°C and then dropping to 14°C at the end of the survey. Cloud cover approximately 50%
2nd July 2024	21:18	Conditions were warm with 5% cloud cover and no wind. The temperature was initially 16°C, dropping to 15°C by the end of the survey.
4th September 2024	19:39	Condition were warm with 90% cloud cover with a light breeze. The temperature was initially 16°C, dropping to 15°C by the end of the survey.

Night Time Bat Walkover Survey

4.3 The first survey was conducted on the 29th May 2024. During the surveys, individual common pipistrelles (*Pipistrellus pipistrellus*) and soprano pipistrelles (*Pipistrellus pygmaeus*) were observed foraging and commuting the edge habitat features in addition to frequently foraging around several of the mature oak trees within these features. The first common pipistrelle recorded was approximately 15 minutes after sunset, at 21:20 along the north-western aspect of the site. Common and soprano pipistrelle were recorded along the edge habitats, around the mature oaks within the tree lines and hedgerows. Several noctules were recorded high above the site. Noctules were not recorded foraging but commuting across the site. At 21:49, a brown long-eared bat (*Plecotus auritus*) was recorded commuting south along the railway line to the west of the site.

4.4 The second survey was conducted on the 2nd July. The first bat recorded was a common pipistrelle at 21:35 which was heard but not seen in the northern aspect of the site. Common pipistrelles were recorded from approximately 21:35 onwards around the edges of the site, notably around the tree lines / hedgerows and the areas of woodland to the north and the south of the site. Soprano pipistrelles were recorded from approximately 21:43 onwards, observed mainly on the southern and eastern boundaries of the site. One pass by a brown long-eared bat was recorded at 22:22 in the southern aspect of the site. The activity across the site was considered to be reasonably low and restricted to edge habitats.

4.5 The final night time bat walkover was conducted on the 4th September 2024. The first bat was recorded at 20:00 and was recorded as a noctule. In total 7 common pipistrelles and 3 soprano pipistrelles were recorded, largely along the boundary vegetation along the northern and western boundaries of the site. A total of 4 noctules were recorded across the site during the survey, with a myotis bat (*Myotis sp.*) species recorded in the northern extent of the site a 20:46. The last bat was recorded at 20:50. No other bat species were recorded during the night time bat walkover survey.

Anabat Express Static Recorders

4.6 A total of four Anabat Express static recording devices were deployed across the site in May, July and September 2024.

4.7 A total of 2,238 bat registrations were recorded over the survey period and these comprised of at least seven separate species (Table 4).

4.8 Throughout the survey period, common pipistrelles were most frequently recorded, accounting for approximately 49% of the total recordings (Table 4). This was followed by soprano pipistrelles which accounted for approximately 18% of the total calls whilst the remaining species accounted for approximately 33% of the total calls (Table 5).

Table 5: Total number of bat recordings by species across the site

Bat Species	Total number of recordings	Percentage of calls
Barbastelle	1	0.04%
Myotis	61	2.73%
Noctule	16	0.71%
Pipistrelle sp.	405	18.10%
Common Pipistrelle	1,101	49.20%
Soprano Pipistrelle	650	18.35%
Nathusius's Pipistrelle	1	0.04%
Serotine	3	0.13%

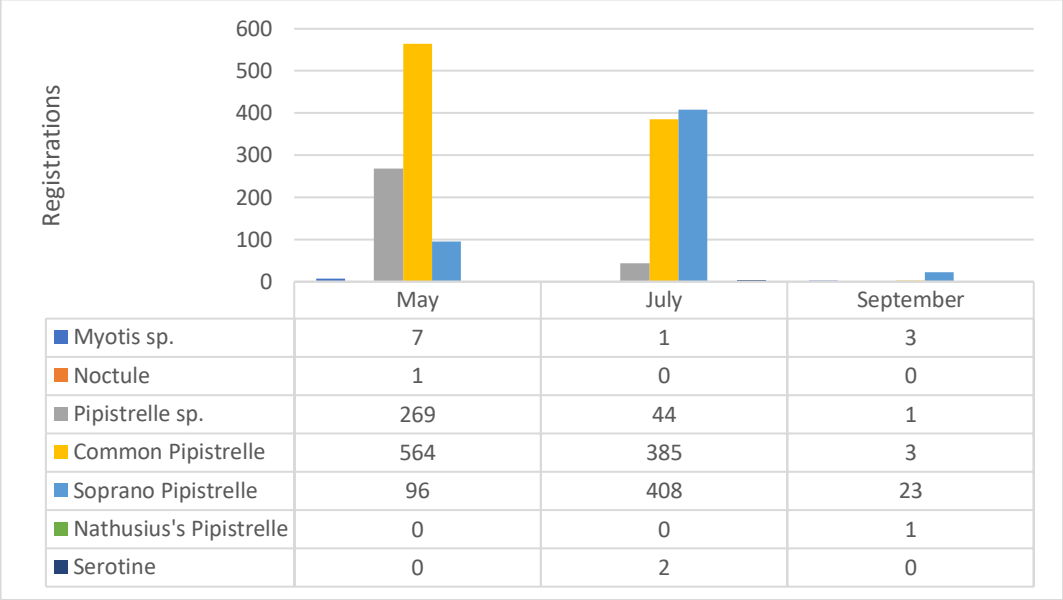
4.9 The highest level of activity across the site was recorded in May, where 1,096 passes were recorded.

4.10 In terms of activity across the differing locations of the site, table 6, identifies the number of passes per anabat location. It can be seen that AB1 supported the most call registrations across May, July and September. There was an technical issue with AB2 during the July survey which meant that data could not be obtained.

Table 6: Call Registrations by Location of Anabat

Anabat location	Total number of passes per month			
	May	July	September	Total
AB1	937	840	31	1,808
AB2	54	0	0	54
AB3	26	3	198	227
AB4	79	64	6	149
Total	1,096	907	235	-

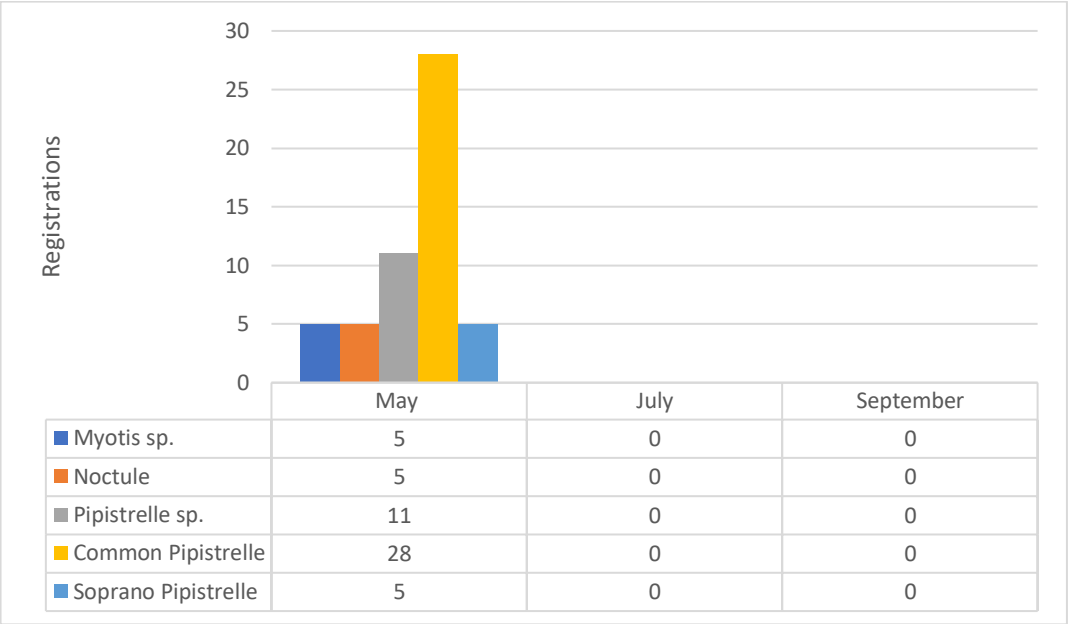
4.11 In terms of species composition per anabat location, the use of the site across all locations was reasonably consistent in terms of species composition. Figure 3, 4 ,5 & 6 show the bat passes analysis from each anabat during the three surveys.



	May	July	September
Myotis sp.	7	1	3
Noctule	1	0	0
Pipistrelle sp.	269	44	1
Common Pipistrelle	564	385	3
Soprano Pipistrelle	96	408	23
Nathusius's Pipistrelle	0	0	1
Serotine	0	2	0

Figure 3: Bat Passes recorded during the three surveys by AB1.

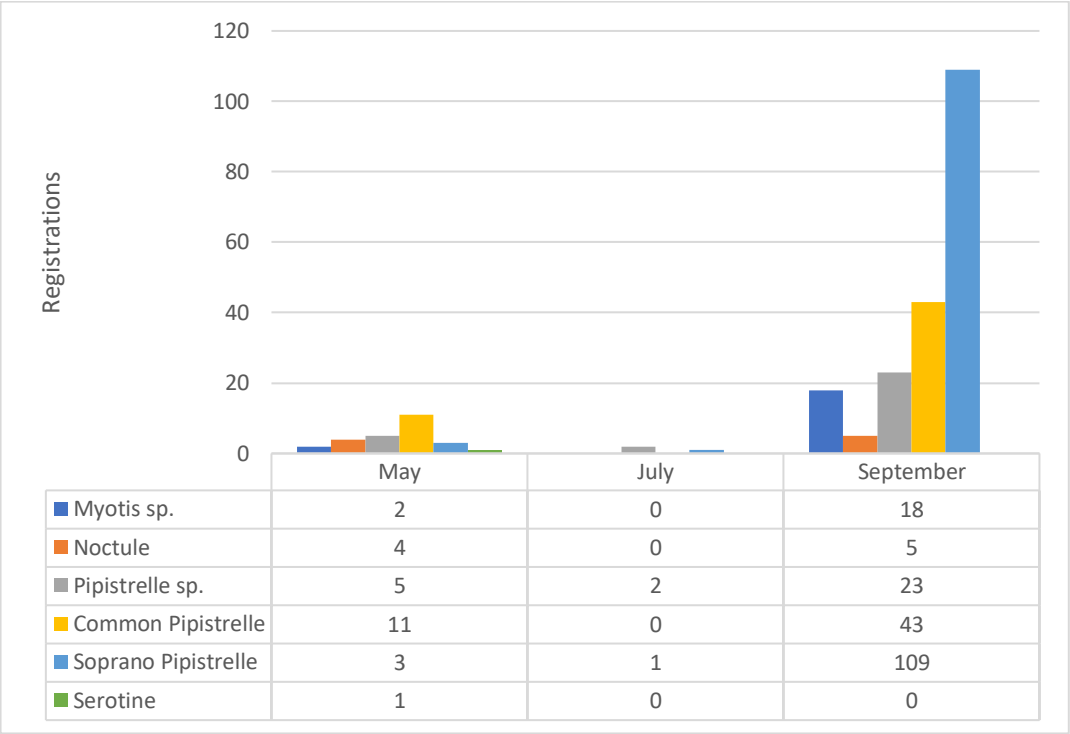
4.12 Seven species of bat were identified by AB1 (Figure 3), myotis sp., noctule, pipistrelle sp., common pipistrelle, soprano pipistrelle, nathusius's pipistrelle and serotine. The highest number of bat passes occurred during the May survey with a total of 937 passes, with 840 passes in July, and 31 passes in September. The species recorded with the most passes was common pipistrelle.



	May	July	September
Myotis sp.	5	0	0
Noctule	5	0	0
Pipistrelle sp.	11	0	0
Common Pipistrelle	28	0	0
Soprano Pipistrelle	5	0	0

Figure 4: Bat passes recorded during the three surveys by AB2.

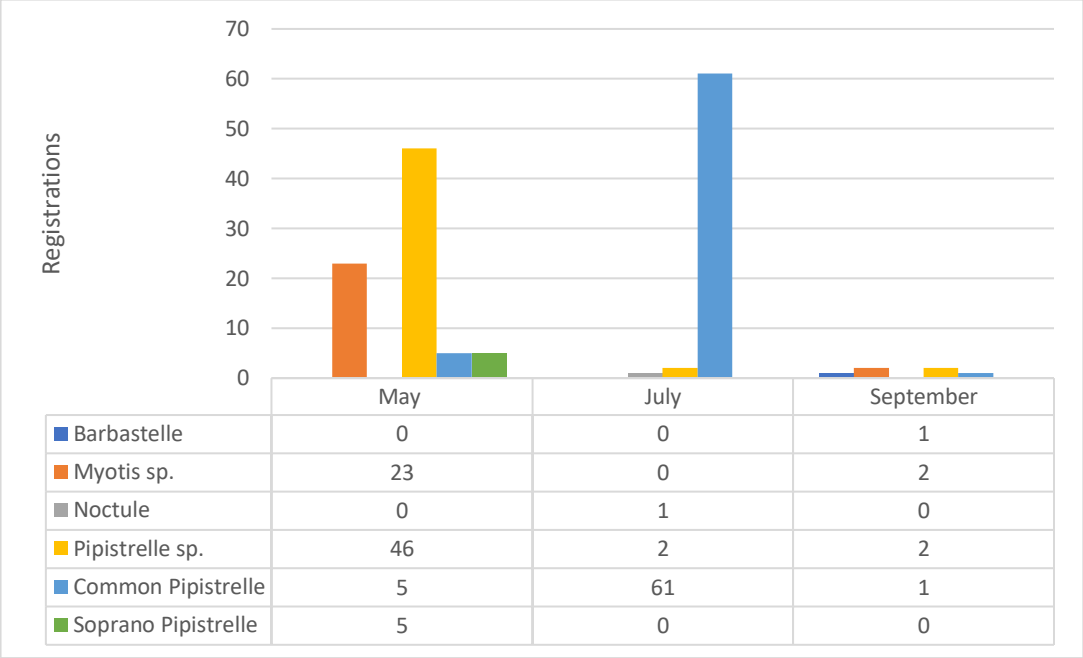
4.13 Five species of bat were identified by AB2 (Figure 4), myotis sp., noctule, pipistrelle sp., common pipistrelle and soprano pipistrelle. The highest number of bat passes was recorded in May with a total of 54 passes, whereas there were no passes recorded in this area during July and September, although it is noted there was a technical fault with the recorder in July. The species recorded with the most passes was common pipistrelle.



	May	July	September
Myotis sp.	2	0	18
Noctule	4	0	5
Pipistrelle sp.	5	2	23
Common Pipistrelle	11	0	43
Soprano Pipistrelle	3	1	109
Serotine	1	0	0

Figure 5: Bat passes recorded during the three surveys by AB3.

4.14 Six species of bat were identified by AB3 (Figure 5), myotis sp., noctule, pipistrelle sp., common pipistrelle and soprano pipistrelle. The highest number of bat passes was recorded in September with a total of 198 passes, with 26 passes in May and 3 passes in July. The species recorded with the most passes was soprano pipistrelle.



	May	July	September
Barbastelle	0	0	1
Myotis sp.	23	0	2
Noctule	0	1	0
Pipistrelle sp.	46	2	2
Common Pipistrelle	5	61	1
Soprano Pipistrelle	5	0	0

Figure 6: Bat passes recorded during the three surveys by AB4.

4.15 Six species of bat were identified by AB4 (Figure 6), barbastelle, myotis sp., noctule, pipistrelle sp., common pipistrelle and soprano pipistrelle. The highest number of bat passes was recorded in May with a total of 79 passes, with 69 passes in July and 6 passes in September. The species recorded with the most passes was common pipistrelle. The southern anabat did record one barbastelle pass during the September survey, this was the only barbastelle pass recorded during the whole survey period during 2024.

4.16 AB1 recorded the most passes over the three surveys in comparison with the anabats located elsewhere on site. AB1 recorded a total of 1,808 passes, AB2 recorded a total of 54 passes, AB3 recorded a total of 227 passes, and AB4 recorded a total of 149 passes.

5.0 Discussion

Bat Species and Activity

5.1 The activity surveys in May, July and September 2024 identified that a variety of bat species were using the site, with common pipistrelles and soprano pipistrelle being the most frequently recorded species during the surveys. During the bat transect activity surveys key features used by bats were identified. In general moderate levels of bat activity was recorded

during the transect surveys. Bats were most frequently recorded along the linear boundary features along the northern, southern and western site boundaries, notably around areas of woodland and mature treelines. Lower levels of activity were recorded along eastern site boundary (adjacent to the road) with the majority of the activity in these areas comprising of individual bats occasionally foraging and/ or commuting along these features. Activity was dominated by common and soprano pipistrelles.

5.2 Anabat Express static recorders were also deployed on site for a series of five consecutive nights in May, July and September 2024. These detectors were used to provide supplementary data on the species of bat using the site and also the frequency of the species being recorded. These recorders revealed only moderate levels of bat activity on site and a number of other bat species were recorded using the site, including Nathusius pipistrelle, brown long-eared bat, noctule, serotine, myotis species and barbastelle.

Anabat Data

5.3 Higher levels of bat activity were recorded across the site on the Anabat detectors in comparison with the night time bat walkover surveys. However, it must be noted that remote recording does not distinguish between a single individual making numerous passes whilst foraging around a particular feature, and between more numerous individual bats commuting across the landscape. As such, the night time bat walkover surveys provide a good understanding of how a particular feature is being used.

5.4 The anabat data in 2017/2018 also revealed a greater diversity of species using the site with a total of nine species being recorded on site. Species recorded included barbastelle (*Barbastella barbastellus*), brown long-eared bats (*Plecotus auritus*), leisler's (*Nyctalus leisleri*), myotis species (*Myotis sp.*), noctules (*Nyctalus noctula*), nathusius pipistrelles (*Pipistrellus nathusii*) and serotines (*Eptesicus serotinus*), but these were recorded in lower frequencies relative to the common and soprano pipistrelles. Given that combined passes from these species made up less than 18% of the total, it is likely that these individuals use the site in low numbers on an occasional basis. However, all UK bat species are protected by European and UK legislation, consequently bats will need to be considered within design of the development.

5.5 The anabat data collected in 2020 revealed that common and soprano pipistrelles were recorded the most frequently, with other species accounting for less than 33% of the total registrations on site. During these static surveys, a total of seven bat species were identified.

5.6 The anabat data in 2024 identified similar species composition, with common and soprano pipistrelles being dominant. However, additional species, notably noctules and serotines (the big bats) and myotis, were also considered to be present in low numbers. The other species recorded, including Nathusius pipistrelles and barbastelles were limited, with only individual passes recorded on an occasional basis.

5.7 A total of 5 barbastelle calls were recorded throughout the survey period in 2017/2019, no calls recorded during the 2020 surveys and 1 call recorded during the 2024 surveys. Certainly, the site does not support significant levels of foraging or commuting activity for the species and given the absence of the species from the walked transect and the remote recording identifying only low records per night, and not on every night. As such it is considered most likely the activity comprises individual bats commuting across the site and is not a key foraging or commuting route, that being the site is not recorded every night or in high numbers on regular nights.

5.8 Barbastelle bats have a large home range, with studies indicating commuting bats travelling as far as 20km, often rapidly and directly over open habitats to reach foraging grounds (Zeale et al., 2012). Considering the limited number of passes recorded across the Anabat remote recording devices and walked transects, the site is not considered to be part of the core habitat for barbastelles and the site's redevelopment is not considered to impact the population present in the local area. Sensitive lighting, new tree planting and new hedgerows, as developed in the masterplan, will ensure negligible impacts to barbastelle bats. As no bechsteins were recorded, no impacts on this species is anticipated.

Recommendations and Enhancements

5.9 The transect / night time bat walkover and Anabat surveys indicate only moderate levels of bat activity on site. The results were predominantly skewed to specific areas of the site and were dominated by common and soprano pipistrelles. Despite this, all UK bat species are protected by European and UK law, consequently bats need to be considered within the design of the development.

5.10 It is important to provide habitat for foraging bats on site and ensure connectivity through the site in order to maintain the favourable conservation status of bats in the area post-development. As such, a number of recommendations have been provided.

5.11 Proposals for the site indicate that the development will largely occur in the open nature of the fields. In their current states, these fields are considered to be in a sub-optimal condition for foraging and commuting bats due to being species-poor and regularly managed as arable land.

5.12 The majority of the linear features on site are to be retained *in situ* as part of the proposals. It is recommended that new linear features, such as native-rich hedgerows and/ or treelines are created on site to maintain and enhance the existing local ecological network. Other linear features to be retained on site should also be enhanced through native species planting and feature-specific management.

5.13 As a number of bat species make use of the boundary features on site, it is recommended that light should be directed away from these features, maintaining these as 'dark corridors'. Key areas where directed low lighting should be used includes the north, western and southern edges of the site and the central hedgerows and treelines. This would minimise any potential impacts on light sensitive species such as barbastelles, brown long-eared bats and some myotis species (Stone *et al.*, 2012).

5.14 Dark corridors must be maintained along the linear features highlighted as important. Lighting can alter bat behaviour significantly in terms of light avoidance with some species unable to cross lit areas even at low light levels. In addition, lighting can affect the availability

of insect prey with some groups attracted to lights, creating a 'vacuum effect' in adjacent habitats. Some of the species on site, such as brown long-ears, barbastelles and *Myotis* species, are known to avoid all street lights (Stone *et al.,* 2009, 2012, 2015), meaning that development could seriously impact the abundance of these species on site post-development without careful design and mitigation.

5.15 Where lighting is required on site, a sensitive lighting scheme must be implemented. Again collaboration between a lighting professional and ecologist may be required in order to help design this scheme but measures should include:

- The impact on bats can be minimised by the use of Light emitting diodes (LEDs) instead of mercury, fluorescent or metal halide lamps where glass glazing is preferred due to their sharp cut-off, lower intensity and their dimming capability. Lighting should be directed to where it is needed and light spillage avoided.
- This can be achieved by the design of the luminaire and by using accessories such as hoods, cowls, louvres and shields to direct the light to the intended area only.
- Soft landscape planting should also be used as a barrier or manmade features such as walls or fencing with planted climbers where required within the build can be positioned so as to form a barrier between any development and the linear features used by bats.

5.16 Bollard lighting is recommended to be used across the site, along internal streets where possible, in place of full street lighting (Figure 7). The retained central linear features, edges of the woodland and the southern and western edges of the site are recommended to be maintained as dark corridors with no lighting installed in these areas. This will maintain the integrity of these corridors for foraging bats. Warm-white or red lights are recommended to be used if health and safety concerns are great as these are said to limit the impact on insects and therefore bat activity.

Figure 7: Use of red bollard lights are considered to be 'bat friendly'

5.17 It is recommended that new roosting opportunities are created on site through installing bat boxes on retained mature treelines along the site boundaries and those running through the centre of the site. This would enhance the site for local bat populations and would provide further roosting opportunities. Recommended boxes include:

- Low Profile WoodStone Bat Box – A general purpose bat box that supports a range of species (Figure 8). These can be hung on trees and buildings in a variety of heights and aspects in order to provide a variety of micro-climates.
- Large Multi Chamber WoodStone Bat Box – This is a multipurpose box designed for larger colonies and a range of bat species including pipistrelles, noctules and brown long-eared bats. These should be hung on mature trees around the site (Figure 8).

Figure 8: Low Profile Woodstone Bat Box (left) and Large Multi Chamber WoodStone Bat Box (right)

5.18 Incorporating specially designed bat boxes into the design can enhance the habitat on site for bats. Suitable bat boxes include a variety of wooden bat boxes, such as an improved cavity box, a double chamber bat box and other wood-based varieties.

5.19 To further enhance the local bat population and provide roosting opportunities within the new development, it is recommended that integrated bat boxes/tubes be incorporated into the structure of the new buildings (Figure 9). These provide good opportunities for crevice dwelling species such as pipistrelles. The opening of the bat box/tube will be the only section visible and they are designed so that they require little to no maintenance. Several of these tubes can be established in a row together providing a good-sized roost space. The bat tubes should be inserted as high up as possible in the brickwork. Habibat, in association with the Bat Conservation Trust, provide a range of boxes which are unfaced for render or designed to match the brickwork of the building.

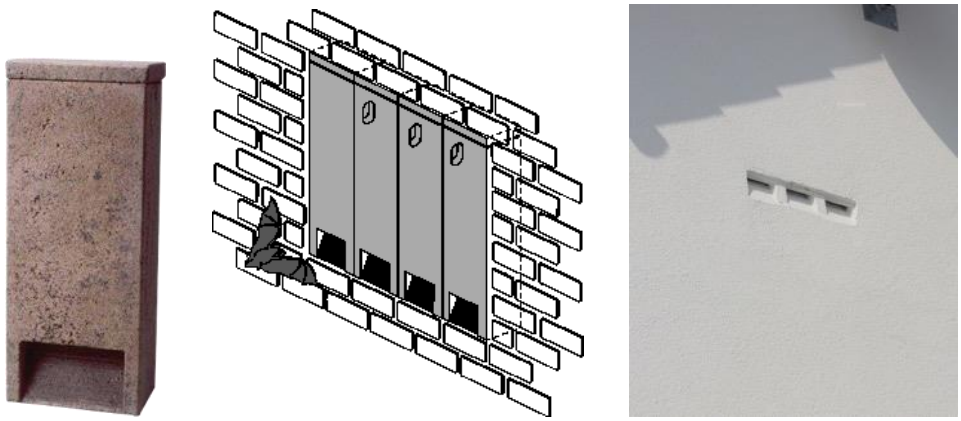


Figure 9: Use of bat tubes recommended within newly built houses on site

6.0 Conclusions

6.1 Moderate levels of bat activity were recorded during transect surveys in 2017/2018, 2020 and night time bat walkover surveys in 2024. Activity on site was dominated by common and soprano pipistrelles which are both common and widespread.

6.2 In 2017/2018, and 2020 Anabat detectors recorded greater levels of bat activity on site than previously indicated by the transects. Similarly to the transect surveys, activity was

dominated by common and soprano pipistrelles. A number of other species not previously identified on site were also recorded including nathusius' pipistrelles, brown long-eared bats, serotines and barbastelles.

6.3 In 2024, anabats established in May, July and September across the site, identified similar species composition, with the remote recordings being dominated by common and soprano pipistrelles. Noctules were the third most recorded species during the survey period. Other species, including serotine, myotis, Nathusius and barbastelle bats, were recorded infrequently.

6.4 The development proposals are largely restricted to the arable fields, which offer negligible habitat for foraging bats.

6.5 It is considered that the development proposals retain the key ecological networks. The proposals show significant planting proposals along the northern aspect of the site, but also through the site's development footprint. Treelines, native hedgerows, species rich grassland and new native scrub planting, are recommended to be incorporated into the detailed landscape proposals.

6.6 It is considered that this would be sufficient to mitigate for the potential loss of linear features on site for the new access route onto site. It is also considered that these measures would also improve the overall ecological value of the site for a range of other native species. The above recommendations for habitat retention, mitigation and compensation would be considered sufficient to ensure the development would not impact upon the favourable conservation status of bats within the local area post-development.

7.0 References

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Appendix 1: Anabat Data 2017/2018

Table 1: Anabat data for 25th – 29th August 2017

Row Labels	Barb	BLE	Leis	Myotis	Noc	NSL	Pip45	Pip55	PipNat	Sero	Grand Total
August 2017	1	15	0	37	420	12	1402	1123	1	5	3016
AB1	0	2	0	4	175	2	1035	988	1	1	2208
2017-08-25		1		2	66	1	27	71		1	169
2017-08-26		1		2	66	1	38	123			231
2017-08-27					43		31	112	1		187
2017-08-28							78	135			213
2017-08-29							861	547			1408
AB2	0	3	0	18	113	3	277	105	0	3	522
2017-08-25		1		7	13		17	5			43
2017-08-26		1		3	18	1	20	1			44
2017-08-27		1		4	31		23	7		1	67
2017-08-28				1	41		13	6		2	63
2017-08-29				3	10	2	204	86			305
AB3	1	2	0	9	42	7	39	18	0	1	119
2017-08-25							6	1			7
2017-08-26		1		2	12	5	5	4			29
2017-08-27				2	15	1	5	4		1	28
2017-08-28		1		3	13	1	9	6			33
2017-08-29	1			2	2		14	3			22
AB4	0	8	0	6	90	0	51	12	0	0	167
2017-08-25		1		1	22		11	4			39
2017-08-26		2		2	22		9	1			36
2017-08-27		1		2	18		11	1			33
2017-08-28		4		1	28		20	6			59
2017-08-29											0

Table 2: Anabat data for 26th – 30th September 2017

Row Labels	Barb	BLE	Leis	Myotis	Noc	NSL	Pip45	Pip55	PipNat	Sero	Grand Total
September 2017	3	34	0	48	449	1	318	160	1	0	1014
AB1	0	10	0	3	288	0	0	123	0	0	424
2017-09-26		2		2	101			82			187
2017-09-27								6			6
2017-09-28		5		1	146			28			180
2017-09-29		3			38			5			46
2017-09-30					3			2			5
AB2	0	1	0	13	121	0	107	8	1	0	251
2017-09-26				4	84		46	1	1		136
2017-09-27							1				1
2017-09-28				4	11		31	2			48
2017-09-29				5	25		28	2			60
2017-09-30		1			1		1	3			6
AB3	1	16	0	8	20	0	40	17	0	0	102
2017-09-26	1	6		2	8		5	2			24
2017-09-27							8	4			12
2017-09-28		5		5	4		14	6			34
2017-09-29		5			4		8	3			20
2017-09-30				1	4		5	2			12
AB4	2	7	0	24	20	1	171	12	0	0	237
2017-09-26		2		2	4	1	32	1			42
2017-09-27	1			8	5		33	2			49
2017-09-28		4		6	1		47	2			60
2017-09-29	1	1		6	7		34	4			53
2017-09-30				2	3		25	3			33

Table 3: Anabat data for 11th – 15th May 2018

Row Labels	Barb	BLE	Leis	Myotis	Noc	NSL	Pip45	Pip55	PipNat	Sero	Grand Total
May 2018	0	1	0	8	321	0	2781	409	4	6	3530
AB1	0	0	0	3	43	0	1753	341	0	5	2145
2018-05-11				1	9		27	19			56
2018-05-12					6		9	4			19
2018-05-13				1	2		136	41			180
2018-05-14				1	9		896	204			1110
2018-05-15					17		685	73		5	780
AB2	0	0	0	5	65	0	82	18	3	1	174
2018-05-11					12		21	1	1		35
2018-05-12					2		4	2			8
2018-05-13				1	15		6	1			23
2018-05-14				1	8		23	7	2		41
2018-05-15				3	28		28	7		1	67
AB3	0	1	0	0	184	0	51	25	1	0	262
2018-05-11					37		14	7			58
2018-05-12					17		16	2			35
2018-05-13					75		4	5			84
2018-05-14		1			26		8	7			42
2018-05-15					29		9	4	1		43
AB4	0	0	0	0	29	0	895	25	0	0	949
2018-05-11					3		365	3			371
2018-05-12					6		370	12			388
2018-05-13					10		99	6			115
2018-05-14					2		48	1			51
2018-05-15					8		13	3			24

Table 4: Anabat data for 19th – 23rd June 2018

Row Labels	Barb	BLE	Leis	Myotis	Noc	NSL	Pip45	Pip55	PipNat	Sero	Grand Total
June 2018	1	2	5	9	139	21	984	150	0	14	1325
AB1	0	0	3	2	111	21	653	106	0	7	903
2018-06-19					2		22	25		1	50
2018-06-20			1	1	72	21	585	61		3	744
2018-06-21					18		14	3		3	38
2018-06-22				1	5		16	4			26
2018-06-23			2		14		16	13			45
AB2	1	2	2	1	14	0	121	22	0	3	166
2018-06-19			1	1			33	10		2	47
2018-06-20		2	1		5		58	11		1	78
2018-06-21					3		5	1			9
2018-06-22	1						9				10
2018-06-23					6		16				22
AB3	0	0	0	6	14	0	210	22	0	4	256
2018-06-19				3	2		184	6		3	198
2018-06-20				1			11	3		1	16
2018-06-21					4			2			6
2018-06-22				1	3		10	4			18
2018-06-23				1	5		5	7			18

Appendix 2: Anabat Data 2020

Table 1: Anabat data for 28th July – 1st August 2020

Row Labels	BLE	Leis	Myotis	Noc	Pip45	Pip55	Sero	Grand Total
July 2020	12	38	78	223	1231	140	40	1762
AB1	0	24	9	64	260	74	0	431
2020-07-28		2		8	11	3		24
2020-07-29		1	1	1	42	21		66
2020-07-30		20	5	6	158	28		217
2020-07-31		1	2	38	27	12		80
2020-08-01			1	11	22	10		44
AB2	10	10	8	22	391	16	0	457
2020-07-28			1		51	1		53
2020-07-29		2	1	5	89	2		99
2020-07-30	1	3	2	3	55	4		68
2020-07-31	6	5	3	9	130	3		156
2020-08-01	3		1	5	66	6		81
AB3	1	4	11	31	37	16	3	103
2020-07-28					2			2
2020-07-29					4	1		5
2020-07-30				25	9	3	3	40
2020-07-31	1	2	7	1	18	11		40
2020-08-01		2	4	5	4	1		16
AB4	1	0	50	106	543	34	37	771
2020-07-28			11	8	30	1	1	51
2020-07-29			11	23	31	3	5	73
2020-07-30			12	51	101	15	15	194
2020-07-31	1		11	15	229	6	14	276
2020-08-01			5	9	152	9	2	177

Table 2: Anabat data for 10th – 14th August 2020

Row Labels	BLE	Leis	Myotis	Noc	Pip45	Pip55	Sero	Grand Total
August 2020	32	71	87	556	2025	694	25	3490
AB1	1	38	21	333	723	494	0	1610
2020-08-10		4	3	49	41	75		172
2020-08-11		3	3	45	47	109		207
2020-08-12		4	4	48	74	120		250
2020-08-13		16	10	47	389	123		585
2020-08-14	1	11	1	144	172	67		396
AB2	13	4	22	57	525	51	5	677
2020-08-10	1		3	13	65	5	1	88
2020-08-11	1	3	4	9	76	7	1	101
2020-08-12	3		4	13	111	9		140
2020-08-13	3		4	7	155	20	2	191
2020-08-14	5	1	7	15	118	10	1	157
AB3	0	27	13	23	50	11	0	124
2020-08-10		5	4	7	12	1		29
2020-08-11		5	1	4	10	1		21
2020-08-12		16	3	3	15	4		41
2020-08-13		1	4	8	8	4		25
2020-08-14			1	1	5	1		8
AB4	18	2	31	143	727	138	20	1079
2020-08-10			5	19	131	15	6	176
2020-08-11	4		6	21	164	37	4	236
2020-08-12	6		8	56	219	16	10	315
2020-08-13	4		6	24	143	55		232
2020-08-14	4	2	6	23	70	15		120

Table 3: Anabat data for 19th – 23rd September 2020

Row Labels	BLE	Leis	Myotis	Noc	Pip45	Pip55	Sero	Grand Total
September 2020	50	15	1013	711	13560	3668	0	19017
AB1	1	4	55	195	1173	1042	0	2470
2020-09-19		1	37	23	874	731		1666
2020-09-20		1	13	59	232	254		559
2020-09-21			4	51	49	34		138
2020-09-22				55	9	15		79
2020-09-23	1	2	1	7	9	8		28
AB2	0	1	432	107	5503	747	0	6790
2020-09-19			2	3	1543	347		1895
2020-09-20			10	21	1929	215		2175
2020-09-21			7	48	291	22		368
2020-09-22			310	15	1474	155		1954
2020-09-23		1	103	20	266	8		398
AB3	27	10	507	371	6785	1834	0	9534
2020-09-19	6	4	42	50	2437	1094		3633
2020-09-20	3	3	30	87	2189	480		2792
2020-09-21	1		16	110	355	60		542
2020-09-22	12		313	83	1517	180		2105
2020-09-23	5	3	106	41	287	20		462
AB4	22	0	19	38	99	45	0	223
2020-09-19	6		3	14	20	16		59
2020-09-20	3		6	4	28	11		52
2020-09-21	1		5	8	14	4		32
2020-09-22	9		3	8	27	10		57
2020-09-23	3		2	4	10	4		23

Appendix 3: Anabat Data 2024

Table 1: Anabat data for 30th May – 3rd June 2024

Row Labels	Barb	Leis	Myotis	Noc	Pip	Pip45	Pip55	PipNat	Sero	Grand Total
May	0	0	37	10	331	608	109	0	1	1096
AB1	0	0	7	1	269	564	96	0	0	937
2024-05-30			3	1	66	131	25			226
2024-05-31			1		100	95	23			219
2024-06-01			1		87	91	6			185
2024-06-02			1		6	205	34			246
2024-06-03			1		10	42	8			61
AB2	0	0	5	5	11	28	5	0	0	54
2024-05-30			2		3	8	1			14
2024-05-31					1	10	1			12
2024-06-01			2		5	9	1			17
2024-06-02					2		1			3
2024-06-03			1	5		1	1			8
AB3	0	0	2	4	5	11	3	0	1	26
2024-05-30					1	2				3
2024-05-31					1	2	1			4
2024-06-01			1		2	3	1			7
2024-06-02			1	2		3				6
2024-06-03				2	1	1	1		1	6
AB4	0	0	23	0	46	5	5	0	0	79
2024-05-30			10		1		3			14
2024-05-31			1		7					8
2024-06-01			8		26	1				35
2024-06-02			3		6	1				10
2024-06-03			1		6	3	2			12

Table 2: Anabat data for 3rd – 7th July 2024

Row Labels	Barb	Leis	Myotis	Noc	Pip	Pip45	Pip55	PipNat	Sero	Grand Total
July	0	0	1	1	48	446	409	0	2	907
AB1	0	0	1	0	44	385	408	0	2	840
2024-07-03						82	267		2	351
2024-07-04					10	142	111			263
2024-07-05					1	62	7			70
2024-07-06					5	74	10			89
2024-07-07			1		28	25	13			67
AB2	0	0	0	0	0	0	0	0	0	0
2024-07-03										0
2024-07-04										0
2024-07-05										0
2024-07-06										0
2024-07-07										0
AB3	0	0	0	0	2	0	1	0	0	3
2024-07-03							1			1
2024-07-04					2					2
2024-07-05										0
2024-07-06										0
2024-07-07										0
AB4	0	0	0	1	2	61	0	0	0	64
2024-07-03					1	39				40
2024-07-04						15				15
2024-07-05					1	1				2
2024-07-06						6				6
2024-07-07				1						1

Table 3: Anabat data for 5th – 9th September 2024

Row Labels	Barb	Leis	Myotis	Noc	Pip	Pip45	Pip55	PipNat	Sero	Grand Total
September	1	0	23	5	26	47	132	1	0	235
AB1	0	0	3	0	1	3	23	1	0	31
2024-09-05					1		5			6
2024-09-06										0
2024-09-07			1			2	13	1		17
2024-09-08			2			1	5			8
2024-09-09										0
AB2	0	0	0	0	0	0	0	0	0	0
2024-09-05										0
2024-09-06										0
2024-09-07										0
2024-09-08										0
2024-09-09										0
AB3	0	0	18	5	23	43	109	0	0	198
2024-09-05			3		1	1	1			6
2024-09-06			5			2	6			13
2024-09-07			4	5	3	1	65			78
2024-09-08			3		18	33	21			75
2024-09-09			3		1	6	16			26
AB4	1	0	2	0	2	1	0	0	0	6
2024-09-05										0
2024-09-06										0
2024-09-07			1							1
2024-09-08			1		2	1				4
2024-09-09	1									1

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