Vale of Glamorgan Schools - Ysgol Gymraeg Bro Morgannwg

Bat Roost Survey Report

Vale of Glamorgan Council

Project number: 60571314

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Quality information

Prepared by	Checked by	Approved by
CM	LN	ELB
CM	LN	ELB
Ecologist	Lisbeth Nash	Eleanor Ballard

Revision History

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Project number: 60571314

Prepared for:

Vale of Glamorgan Council

Prepared by:

AECOM Limited
1 Callaghan Square
Cardiff CF10 5BT
United Kingdom

T: +44 29 2067 4600
aecom.com

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Executive Summary

AECOM was commissioned by Vale of Glamorgan Council to undertake Bat Roost Surveys at the site of the proposed refurbishment and development of Ysgol Gymraeg Bro Morgannwg School in Barry, South Wales. A Preliminary Ecological Appraisal (PEA) completed by AECOM (AECOM, 2018a) identified buildings and trees with features suitable to support roosting bats. This report includes the methodologies and results of the bat roost surveys and outlines potential impacts and recommendations for mitigation and enhancement.

A Bat Activity Survey at the Site has been completed and report prepared by AECOM (AECOM, 2018b) which covers both adjoining Whitmore and Bro Morgannwg Sites. Impacts on commuting and foraging bats and recommendations for mitigating impacts on foraging and commuting habitat are be provided in this separate report.

The Ysgol Gymraeg Bro Morgannwg site ("the Site") is located in Barry, South Wales, CF62 8YU. OS grid reference ST1060669022. The Site is currently dominated by buildings, hardstanding, amenity grassland habitats, with broadleaved plantation woodland, rows of trees, standalone trees, dense scrub, scattered scrub, semi-improved grassland, poor semi-improved grassland, introduced shrub, and standing water (ornamental pond) (Figure 1).

The proposed development (HLM, Proposed Site Layout Option 4 YBM-HLM-00-00-DR-L- 00004 Revision P03, 02/08/2018) shown on Figure 3, includes the creation of a 3G sports pitch, Multi-Use Games Area (MUGA), grassed sports pitch and an access road and seven additional buildings. The new coach drop off area is located outside of the current Site boundary within Whitmore School. There is also the possibility of the creation of a 2G hockey pitch located in the south-west corner of the Site, which is not currently indicated on the Proposed Site Layout on Figure 3. Trees identified as being suitable to support roosting bats will not be removed as part of the development.

AECOM understand that refurbishment of existing school buildings is proposed and this includes; at Building 6, the addition of a mezzanine floor (which requires access to the loft space) infill panels over some windows, and replacing/ renewing roofs and the addition of cladding onto some of the other existing buildings. The final details of the refurbishment have not yet been decided, but it is understood that there will not be any roofing works on Buildings 5 or 6 and that there is no refurbishment element on Building 2. The proposed development works are due to commence in July/August 2019 and be completed by August/September 2021.

Dusk emergence/dawn re-entry surveys were undertaken on Buildings 2, 5, 6, 10 and 12 in August to September 2018 because the PEA (AECOM, 2018a) identified suitability for roosting bats in these buildings. Aerial inspections were completed on Bat Tree 1 and 2. Non-maternity summer roosts for at least one lone roosting common pipistrelle bat were confirmed in Buildings 2 and 6. No roosts were confirmed within the trees. However, the features were suitable, Bat Tree 1 has Low and Bat Tree 2 has Moderate suitability to support roosting bats.

No works are proposed to Building 2. Therefore, there will be no impact on roosting bats in Building 2. It is understood that there will not be any roofing works or works to soffits on Building 6 and as such the works will not block access for bats meaning that the roost feature will be retained. However, there is potential for bats to be temporarily disturbed and/or injured during the refurbishment works including the addition of a mezzanine floor (which requires access to the loft space) and infill panels over some windows. In the absence of mitigation, poorly designed lighting has the potential to disturb bats or damage or destroy a roost. The proposed construction of the new buildings (Figure 3) will not impact on the confirmed roosts in Buildings 2 and 6.

A European Protected Species Licence (EPSL) will be required, prior to any refurbishment works. A licence must be in place before works commence to allow the works to proceed in line with current UK and EU legislation.

The EPSL would include mitigation measures such as pre-works inspection, further emergence/re-entry surveys, compensatory roost boxes; avoidance and mitigation of light spill and post-construction monitoring of the compensatory roosts. Recommendations to enhance the value of the site include retention of onsite habitats, creation of new corridors through additional planting and incorporation of bat boxes into the building design (this will also satisfy an additional requirement under BREEAM LE04).

The Executive Summary is not a substitute for the full report; refer to the full text for further detail.

1. Introduction

1.1 Introduction

AECOM was commissioned by Vale of Glamorgan Council to undertake Bat Roost Surveys at the site of the proposed refurbishment and development of Ysgol Gymraeg Bro Morgannwg School in Barry, South Wales.

The Preliminary Ecological Appraisal (PEA) completed by AECOM (AECOM, 2018a) included a Preliminary Ground Level Bat Roost Assessment and identified buildings and trees with features suitable to support roosting bats.

This report includes the methodologies and results of the bat roost surveys and outlines potential impacts and recommendations for mitigation and enhancement.

A bat activity survey at the Site has been completed and report prepared by AECOM (AECOM, 2018b) which covers both adjoining Whitmore and Bro Morganwwg Sites. Impacts on commuting and foraging bats and recommendations for mitigating lighting impacts onto foraging and commuting habitat are not discussed in this report and are provided in this separate report: Bat Activity Survey Report (AECOM 2018b).

1.2 Site Location and Description

The Ysgol Gymraeg Bro Morgannwg site ("the Site") is located in Barry, South Wales, CF62 8YU, OS grid reference ST1060669022. To the north of the Site are the Barry Comprehensive School playing fields with the school grounds further north (development plans are proposed at Barry Comprehensive School which will be renamed Whitmore High School). To the east of the Site is Barry Hospital. Residential areas are located to the south and west and further east beyond the hospital.

The Site currently comprises buildings, hardstanding, broadleaved plantation woodland, rows of trees, standalone trees, dense scrub, scattered scrub, semi-improved grassland, poor semi-improved grassland, introduced shrub, amenity grassland and standing water (ornamental pond) (Figure 1).

1.3 Proposed Development

The proposed development (HLM, Proposed Site Layout Option 4 YBM-HLM-00-00-DR-L- 00004 Revision P03, 02/08/2018) shown on Figure 3, includes the creation of a 3G sports pitch, Multi-Use Games Area (MUGA), grassed sports pitch and an access road and seven additional buildings. The new coach drop off area is located outside of the current Site boundary within Whitmore School. There is also the possibility of the creation of a 2G hockey pitch located in the south-west corner of the Site, which is not currently indicated on the Proposed Site Layout on Figure 3. Trees identified as being suitable to support roosting bats will not be removed as part of the development.

AECOM understand that refurbishment of existing school buildings is proposed and this includes; at Building 6 the addition of a mezzanine floor (which requires access to the loft space) and infill panels over some windows. At other buildings this includes replacing/ renewing roofs and the addition of cladding onto some of the other existing buildings. The final details of the refurbishment have not yet been decided, but it is understood that there will not be any roofing works on Buildings 5 or 6 and that there is no refurbishment element on Building 2.

The proposed development works are due to commence in July/August 2019 and will be completed by August/September 2021.

1.4 Objectives

The objectives of the survey and report are:

- To establish the presence or likely absence of any bat roosts within the Site;
- To highlight any potential ecological constraints in relation to bats;
- To outline further survey work that may be required;

- To make suggestions for mitigation, compensation and enhancement of the natural features identified within the Site in respect to bats; and,
- To satisfy Mandatory Requirements under BREEAM LE04.

1.5 Legislation

All bats and their roosts in Wales are fully protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). They are also included in Schedule 2 of the Conservation of Habitats and Species Regulations 2017, known as The Habitats Regulations. The Wildlife and Countryside Act 1981 was amended by the Countryside and Rights of Way Act 2000 (CRoW) which adds an extra offence of recklessly disturbing roosting bats or obstructing access to their roosts; makes species offences arrestable, increases the time limits for some prosecutions and increases penalties.

The Wildlife and Countryside Act, the Habitats Regulations and the CRoW Act, together make it an offence, among other things, to recklessly, deliberately or intentionally:

- Capture, injure or kill any wild animal which is a European Protected Species (EPS),
- Disturb wild animal of any such species; and
- Damage or destroy a breeding or resting site of any such animal.

Disturbance is defined as that which is likely:

- To impair their ability:
  - To survive, to breed or reproduce, or to rear or nurture their young;
  - In the case of animals of a hibernating or migratory species, to hibernate or migrate; or,
  - To affect significantly the local distribution or abundance of the species to which they belong.

A bat roost is defined as "any structure or place (including trees) which any bat uses for shelter and protection". Because bats tend to re-use the same roosts, legal opinion is that the roost is protected whether or not the bat(s) are present at the time.

If the proposed works are likely to destroy or disturb bats or their roosts, then a European Protected Species License (EPSL) will be required from Natural Resources Wales (NRW), which would be subject to appropriate mitigation and working methods to protect bats.

This is a brief summary of the legislation. When dealing with individual cases, the client is advised to consult the full texts of the relevant legislation and obtain further legal advice.

1.6 Quality Assurance

This survey and subsequent report was undertaken in line with AECOM's Integrated Management System (IMS). Our IMS places great emphasis on professionalism, technical excellence, quality, environmental and Health and Safety management. All staff members are committed to establishing and maintaining our certification to the international standards BS EN ISO 9001:2015 and 14001:2004 and BS OHSAS 18001:2007. In addition our IMS requires careful selection and monitoring of the performance of all sub consultants and contractors.

All AECOM Ecologists who worked on this project are members of (at the appropriate level) the Chartered Institute of Ecology and Environmental Management (CIEEM) and follow their code of professional conduct (CIEEM, 2017) when undertaking ecological work.

2. Methodology

2.1 Desk Study

The desk study was completed as part of the AECOM BREEAM Report undertaken in July 2018 (AECOM 2018a). In relation to bats, the objectives of the desk study were to review the existing information available in the public domain to identify the following:

- Special Areas of Conservation (SACs) and Sites of Special Scientific Interest (SSSIs) designated for bats within a 10 km radius of the Site Boundary paying due regard to Bat Conservation Trust (BCT) guidelines (Collins, 2016), using the Multi Agency Geographic Information for the Countryside (MAGIC) website (NE, 2017);
- Bat records up to 2 km from the Site Boundary, purchased from the South East Wales Biodiversity Records Centre (SEWBReC);
- Ancient Semi-Natural Woodland (ASNW), Plantation on Ancient Woodland Site (PAWS), Restored Ancient Woodland Site (RAWS) or Ancient Woodland Site of Unknown category (AWSU) within or adjacent to the Site using Ancient Woodland Inventory 2011 dataset downloaded from the spatial dataset website, called Lle (NRW, 2017);
- The Section 7 list of Species of Principal Importance for Conservation of Biological Diversity in Wales;
- Features of ecological interest surrounding the Site, and features connecting these habitats (e.g. hedgerows, watercourses, railway lines) using aerial photographs and Ordnance Survey (OS) maps; and,
- The County Ecologist and Glamorgan Bat Group were consulted regarding locally designated site citations, local bat records not available from SEWBReC and any local knowledge about the area.

2.2 Bat Roost Surveys

2.2.1 Preliminary Ground Level Assessment

During the PEA (AECOM, 2018a), all buildings, structures and trees within the Site were assessed for their suitability to support roosting bats using category descriptions drawn from Collins, 2016 and Mitchell-Jones, 2004.

Bat surveys were recommended to confirm presence, or likely absence bat roosts. The following surveys, in Table 2.1, were recommended.

Table 2.1 Bat Roost Survey Effort

Building/Tree No.	Bat Roost Suitability	Number of Survey Visits Required	Timing
B2	Low	One survey on each suitable feature (dusk emergence or dawn re-entry).	May- August
B5	Low	One survey on each suitable feature (dusk emergence or dawn re-entry).	May- August
B6	Low	One survey on each suitable feature (dusk emergence or dawn re-entry).	May- August
B10	Moderate	Two separate surveys on each suitable feature to include one dusk emergence and one dawn re-entry.	May -September.
B12	Low	One survey on each suitable feature (dusk emergence or dawn re-entry).	May- August
Bat Tree 1	Low	No further surveys recommended. Optional Climbed Inspection - to potentially rule out the feature.	Climbed Inspections can be at any time of year. Any follow up roost surveys will be May- September 2019.
Bat Tree 2	High	Climbed Inspection – Followed by activity surveys if inspection results require it.	

Buildings 1, 3, 4, 7, 8, 9, 11, 13 and 14 had Negligible roost suitability, in the absence of Potential Roost Features (PRF) and therefore no surveys were recommended.

Bat Tree 2 is not being felled and emergence or re-entry surveys are not recommended at this stage.

Emergence or re-entry surveys are not required on Tree 1, which has Low suitability to support roosting bats.

2.2.2 Building Emergence/ Re-Entry Surveys

Dusk emergence surveys and dawn re-entry surveys were completed at the Site. The locations of the Buildings and positions of surveyors are shown on Figure 2. Positions of surveyors were directed by the results of the daytime assessment for PRF.

Surveys paid due regard to Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins, 2016). Each survey consisted of a surveyor stood at a vantage point looking at features on the building identified during the bat roost assessment. Surveyors positioned themselves so that bats could be observed leaving suitable roost features. Bat activity was also recorded if observed by the surveyors.

Dusk emergence surveys started at least 15 minutes before sunset and continued for 1.5 hours. Dawn re-entry surveys started 1.5 hours before sunrise and continued until 15 minutes after sunrise, except on one occasion (Limitations Section 2.3).

Broadband frequency division detectors (BatLogger M) were used and digital recordings were made to assist with species identification if required and to confirm identifications made in the field.

The weather conditions during the surveys were recorded and were considered favourable for bat surveys). Survey dates and weather conditions for buildings are given in Table 2.2.

Table 2.2 Emergence and Re-entry Survey Dates and Weather Conditions

Building No.	Date	Sunset / Sunrise	Start Time	End Time	Surveyors	Weather (start)	Weather (end)
B2	01/08/2018	21:01	20:46	22:31	LN – NRW Bat Licensed Ecologist LF - Ecologist	Wind (Mph): 0.0 Cloud cover: 3/8 Temperature (°C): 19.3 Humidity: 75.4% Precipitation: No rain during the survey or in the day before.	Wind (Mph): 0.8 Cloud cover: 6/8 Temperature (°C): 16.8 Humidity: 100% Precipitation: No rain during the survey or in the day before.
B5 and B6 north east corner.	02/08/2018	05:38	04:08	05:38	LF - Ecologist	Wind (Mph): 0.0 Cloud cover: 6/8 Temperature (°C): 19.4 Humidity: 76.9% Precipitation: No rain during the survey or in the day before.	Wind (Mph): 0.8 Cloud cover: 8/8 Temperature (°C): 18.3 Humidity: 81.8% Precipitation: No rain during the survey or in the day before.
B6	20/08/2018	20:26	20:11	21:56	LN – NRW Bat Licensed Ecologist CM – Ecologist	Wind (Beaufort): 4 Cloud cover: 8/8 Temperature (°C): 18.8 Humidity: 82.6% Precipitation: No rain during the survey or in the day before. Misty during survey.	Wind (Beaufort): 4 Cloud cover: 8/8 Temperature (°C): 17.7 Humidity: 91.2% Precipitation: No rain during the survey or in the day before. Misty during survey.
B6	25/09/2018	19:05	18:50	20:35	LN – NRW Bat Licensed Ecologist LF - Ecologist	Wind (Mph): 0.6 Cloud cover: 1/8 Temperature (°C): 15.6 Humidity: 63.4% Precipitation: No rain during the survey or in the day before.	Wind (Mph): 0.8 Cloud cover: 0/8 Temperature (°C): 13.0 Humidity: 71.5% Precipitation: No rain during the survey or in the day before.
B10	16/08/2018	20:32	20:17	22:02	LN – NRW Bat Licensed Ecologist UJ – Senior Ecologist CM – Ecologist	Wind (Beaufort): 6 Cloud cover: 0/8 Temperature (°C): 16.2 Humidity: 78.7% Precipitation: No rain during the survey or in the day before.	Wind (Beaufort): 2 Cloud cover: 0/8 Temperature (°C): 15.0 Humidity: 69.3% Precipitation: No rain during the survey or in the day before.
B10	04/09/2018	06:28	04:58	06:43	LN – NRW Bat Licensed Ecologist LJ – NRW Bat Licensed Ecologist LF – Ecologist	Wind (Beaufort): 1 Cloud cover: 8/8 Temperature (°C): 15.0 Humidity: Not recorded Precipitation: No rain during the survey or in the night before.	Wind (Beaufort): 1 Cloud cover: 8/8 Temperature (°C): 15.0 Humidity: Not recorded Precipitation: No rain during the survey or in the night before.
B12	02/08/2018	05:38	04:08	05:38	LN – NRW Bat Licensed Ecologist	Wind (Mph): 0.0 Cloud cover: 6/8 Temperature (°C): 19.4 Humidity: 76.9% Precipitation: No rain during the survey or in the day before.	Wind (Mph): 0.8 Cloud cover: 8/8 Temperature (°C): 18.3 Humidity: 81.8% Precipitation: No rain during the survey or in the day before.

2.2.3 Tree Aerial Inspections

Following the Ground Level Roost Assessment (AECOM, 2018a), Bat Tree 1 was assessed as having 'Low and Bat Tree 2 High' bat roost suitability (Table 2.1). These trees were subject to a PRF aerial inspection. The locations of the trees are shown on Figure 2.

Aerial inspections of Bat Tree 1 and 2 were completed at the Site on 03 December 2018.

These climbed aerial inspections paid due regard to Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins, 2016), Bat Workers Manual (Mitchell-Jones and McLeish, 2004) and Bats and Woodland Management (Forestry Commission, 2005).

Trees were inspected using ladders. Once accessed, features were examined in detail using a torch and endoscope to inspect (where possible) the full extent of the features and search for bats or evidence of bat activity (e. g. droppings, urine stains, odour, feeding remains, scratch marks, grease stains, wear marks). Where necessary, trees were re-categorised following the inspection.

2.3 Data Analysis

Calls were checked and verified by a suitably experienced ecologist. Bat echolocation call analysis was undertaken where required with support from reference material including the British Bat Calls Species Identification Guide (Russ, 2012). The AnalookW software programme (Version 4.4a) was used to analyse bat echolocation calls.

2.4 Limitations

Bat surveys offer only 'snapshots' of the location being assessed and do not take account for potential future changes in abundance or diversity of bats at a given site. However, by completing surveys according to best practice, the risks of providing unrepresentative assessments are diminished.

The methodology adopted and the sources of information used by AECOM in providing its services are outlined in this Report. The work described in this Report was conducted between July 2018 and November 2018 and is based on the conditions encountered and the information available during the said period of time. The scope of this Report and the services are accordingly factually limited by these circumstances. AECOM disclaim any undertaking or obligation to advise any person of any change in any matter affecting the Report, which may come or be brought to AECOM's attention after the date of the Report.

The dawn re-entry survey on Building 5 finished at sunrise rather than 15 minutes after sunrise as recommended in Collins, 2016. Professional judgement was applied and the decision taken to finish the survey at sunrise as no bats had been seen or heard for 48 minutes before sunrise. This is not considered to be a limitation to the survey.

3. Results

3.1 Desk Study

Table 3.1 Desk Study Results

Designation/ Feature	Description
Designated Sites for bats within 10km	There are no designated sites for bats within 10km.
Bat Records from the last 10 years within 2 km	Bats: Whiskered Myotis mystacinus (nearest record 1.0 km east), common pipistrelle Pipistrellus pipistrellus (including one activity record returned from within the Site), pipistrelle species Pipistrellus pipistrellus agg (roost record 2.0 km west)., brown long-eared Plecotus auritus (nearest record 0.1 km north), lesser horseshoe Rhinolophus hipposideros (confidential roost record approximately 3.4 km north of the Site).
Priority Species – Section 7 List	The following bat species are listed on Section 7 Species of Principal Importance in Wales: Barbastelle bat Barbastella barbastellus, Bechstein's bat, Myotis bechsteinii, noctule, common pipistrelle, soprano pipistrelle, brown long-eared bat, greater horseshoe bat Rhinolophus ferrumequinum, and lesser horseshoe bat Rhinolophus hipposideros.
Surrounding Land Use	The Site is located in Barry. To the north of the Site are the Barry Comprehensive School playing fields with the school grounds further north. Further north is the residential area of Colcot beyond which is a golf club with grassland and scattered woodland which extends into farmland beyond linked by hedgerows. To the east of the Site is Barry Hospital. Further east are residential areas with some scattered parkland and greenspace including a recreational park, a cemetery and allotments located east of Colcot Road. To the south of the Site are residential areas. Industrial buildings are located further to the south towards Barry Docks. To the west of the Site is the outskirts of Colcot. Beyond the residential areas are fields and scattered woodland blocks linked by hedgerows.
Ancient Woodland	2.76 Ha of ASNW is located approximately 15 m from the western Site Boundary and forms the Cwm Talwg Woodlands LNR. There is no ASNW, RAWS or PAWs within the Site Boundary.
Tree Protection Orders (TPOs)	There are no trees with a TPOs within or adjacent to the Site Boundary.
Council Ecologist and Local Specialist Recorders	The County Ecologist responded stating all records are submitted to SEWBReC. The local Bat Group were contacted; no response has been received to date.

3.2 Bat Roost Surveys

3.2.1.1 Emergence and Re-entry Survey on Buildings

Results are summarised in Table 3.2.

Building 2 was confirmed as a non-maternity, summer roost for at least one lone roosting common pipistrelle bat.

Building 6 was confirmed as a non-maternity, summer roost for at least one lone roosting common pipistrelle bat.

Bat activity detected during the emergence and re-entry surveys, comprised of passes or foraging and commuting common and soprano pipistrelle bats.

Flood lighting present on, or illuminating, Buildings 1, 2, 10 and 12 reduced the suitability for bats of some of the roost features and on the surrounding habitat.

Table 3.2 Bat Emergence and Re-entry Survey Results

Building No.	Surveyors*	Date	Results
B2	LN LF	01/08/2018	**Confirmed Roost.** At least one common pipistrelle emerged near the ridgeline at the rear of the roof, 33 minutes after sunset. Activity: Common and soprano pipistrelles were recorded forging over the garden and commuting along the plantation broadleaved woodland strip to the north of B2. There was security lighting positioned onto B1 which illuminated the east side of B2, this may reduce the suitability of the feature identified on the north-east corner of B2 Appendix A – Photographs 1, 2 and 3.
B5 and B6	LF	02/08/2018	No bats were recorded re-entering. Activity: Three common pipistrelle passes were recorded foraging within proximity of the building, likely using the broadleaved plantation woodland strip behind the surveyor. Appendix A – Photograph 5
B6	LN CM	20/08/2018	**Confirmed Roost.** One common pipistrelle was seen at the eastern corner of the building 17 minutes after sunset and is likely to have emerged from a feature either on the north-east corner of B6, from the soffit box along the eastern face of B6 or where the lower roof of Building 5 joins Building. The exact emergence location point could not be identified due to the height of the building and angle of the roof line. Activity: Common and soprano pipistrelles were observed foraging and commuting along the broadleaved plantation woodland strip north of B6. Common and soprano pipistrelles south side of B6 from west to east and commuting over the top of B6 heading north. Appendix A – Photographs 4, 5, 6 and 7.
B6	LN LF	25/09/2018	No bats were recording emerging from the building during this survey. Roost confirmed on 20/08/2018 survey. Activity: Common pipistrelles recorded foraging and commuting up and down the broadleaved plantation woodland strip to the north of B6, over the top of B5 and around the areas of amenity grassland to the south of B6. Appendix A – Photographs 4, 5, 6 and 7.
B10	LN UJ CM	16/08/2018	No bats were recording emerging from the building. Activity: Common pipistrelles were recorded; commuting from east to west along the south face of B10 and foraging and commuting within proximity of the west face of B10 over the school playing fields traveling from south to north. Two out of three security lights on the south face of B10 were switched on during the survey. This may reduce the suitability of some of the features identified on the south face of B10.
B10	LN	04/09/2018	No bats were recording emerging from the building.

Building No.	Surveyors*	Date	Results
	LJ LF		Activity: Four passes of common pipistrelle bats were recorded. Two out of three security lights on the south face of B10 were switched on during the survey. This may reduce the suitability of some of the features identified on the south face of B10.
B12	LN	02/08/2018	No bats were recorded re-entering the building and no bat activity was recorded. Security lighting was noted to be present on the south, east and west faces of the building, reducing the likelihood of the features identified being suitable for bats.

*LN = Licensed Bat Ecologist, UJ = Senior Ecologist, LJ = Senior Ecologist, LF = Licensed Bat Ecologist, and CM = Consultant Ecologist.

3.2.1.2 Aerial Inspection of Bat Trees

The results of the aerial inspections are given in Table 3.3.

Table 3.3 Results of Aerial Inspection

Tree No.	Aerial Inspection Notes	Initial Roost Suitability from Ground Level Survey	Roost Suitability following Aerial Inspection	Further Emergence / Re-entry Surveys
Bat Tree 1	The cavity was shallow and extended approximately 10 cm deep at a 45° angle. Some cobwebs were present over the top of the cavity. The feature was assessed as having Appendix A – Photographs 8 and 9.	Low	Low	No further surveys –
Bat Tree 2	A knothole had a 30cm cavity with cobwebs present at the top and slugs and woodlice inside. It was damp inside. No signs of bats were observed during the inspection. The lower cavity extends back 0.5 to 1 m and was covered with cobwebs, the cavity had some damp inside. No signs of bats were observed. The knothole and lower cavity are suitable to be used by bats, but are unlikely to support a roost of high conservation status. Bat Tree 2 was downgraded form High to Moderate after inspection. Appendix A – Photographs 10, 11 and 12.	High	Moderate	No further surveys –

4. Potential Impacts

4.1.1 Bats in Buildings

4.1.1.1 Roost Loss and Disturbance during Works

Building 2 was confirmed as a non-maternity, summer roost for at least one common pipistrelle bat. AECOM understand that there will be no refurbishment to Building 2. Therefore, there will be no direct impact to roosting bats within Building 2. There will be no loss or severance of the connecting broadleaved plantation woodland strip so acces to and the integrity of the roost will be unaffected.

Building 6 was confirmed as a non-maternity, summer roost for at least one lone roosting common pipistrelle bat. The bat is likely to have emerged from a feature either on the north-east corner of Building 6, from the soffit box along the eastern face of Building 6 or where the lower roof of Building 5 joins Building 6 (Appendix A, Photographs 5, 6 and 7). The exact emergence location point could not be identified due to the height of the building and angle of the roofline. The final details of the proposed refurbishment to Building 6 have not yet been decided, but it is understood that there will not be any roofing works or works to soffits on Building 6. As there are no external works and no works at the roof edge or soffit box then, the refurbishment works will not block access for bats meaning that the roost feature will be retained. There will be no loss or severance of the connecting broadleaved plantation woodland strip so access to the roost will be unaffected.

AECOM understand that refurbishment to Building 6 will include the addition of a mezzanine floor (which requires access to the loft space) and infill panels over some windows. These works have the potential to cause noise and vibration in proximity to the roost. Without mitigation, if works are completed between April and Mid October, when bats are active, there is the potential for roosting bats to be disturbed or injured by the proposed refurbishment works. If works are completed in winter, between Mid-October and end March, then bats are not likely to be present in the roost feature and disturbance to bats is less likely.

The proposed construction of new buildings (yellow areas on Figure 3) will not impact on the confirmed roosts Buildings 2 and 6.

4.1.1.2 External Lighting

External lighting plans have not been developed although AECOM understand that there is no new lighting proposed within areas which would impact the confirmed roosts in Buildings 2 and 6. If suitable roost features on buildings are illuminated their suitability to support roosting bats will be reduced. If bat roosts are present, in the absence of mitigation, poorly designed external lighting has the potential to disturb bats or damage or destroy a roost.

If any the proposed development plans, including the refurbishment element, change an ecologist should be consulted. Potential impacts on bat would need to be re-assessed and additional mitigation may be required.

4.1.2 Bats in Trees

4.1.2.1 Roost Loss

Bat Trees 1 and 2 are not being felled. There will be no direct impact on the Bat Trees.

4.1.2.2 External Lighting

Lighting plans have not been developed. If bat roosts are present, in the absence of mitigation, poorly designed lighting has the potential to disturb bats or damage or destroy a roost. If potential roost features on trees are lit their suitability to support roosting bats will be reduced.

5. Recommendations for Further Surveys and Mitigation

5.1 Further Surveys

5.1.1 Validity of Data

If refurbishment work is completed prior to November 2019, no further surveys would be required prior to applying for a European Protected Species Licence (Section 5.2). If the schedule is delayed, additional bat emergence and re-entry surveys may be required in accordance with guidance to inform the application for a licence.

5.1.2 Pre-Works Surveys

Further surveys may be required prior to demolition as part of the mitigation to be outlined in detail in a bat licence application method statement.

If refurbishment is due in summer (April - October) surveys will be required immediately prior to refurbishment. If refurbishment is due in winter (November to March), it is unlikely that further surveys will be required prior to refurbishment as this would be outside of the season of peak bat activity and unlikely to result in any useful information.

5.2 European Protected Species Licence

It is understood that there will not be any roofing works or works to soffits on Building 6 and as such the works will not block access for bats meaning that the roost feature will be retained. However, there is potential for bats to be temporarily disturbed during the refurbishment works.

A European Protected Species Licence (EPSL) will be required, prior to any refurbishment works. A licence must be in place before works commence to allow the works to proceed in line with current UK and EU legislation.

A licence application can take up to six weeks to process, so it is advised that an application is submitted at least two months before the proposed start date to avoid any delays to the programme. Once an application is approved, works can then proceed with mitigation in place for bats. Detailed mitigation would be outlined in a bat licence application method statement, and would be subject to approval by Natural Resources Wales. This is likely to include supervision of demolition by a licensed bat ecologist and/or accredited agents and inclusion of compensatory roosts within the final scheme as outlined below.

5.3 Recommendations for Mitigation

A separate Bat Activity Survey Report (AECOM 2018b) has been produced which incorporates mitigation for impacts on foraging and commuting bats the Site. The mitigation below is provided in relation to bat roosts.

5.3.1 Pre-Works Inspection

A methodology to avoid injury to any roosting bats during redevelopment of the buildings will be outlined in detail in a bat licence method statement. This is likely to include a pre-works inspection.

To try to establish the exact roost access point on Building 6, an At-height inspection, undertaken by a bat licensed ecologist, is recommended prior to the commencement of the refurbishment.

It is recommended that the At-height inspection is undertaken using a Mobile Electronic Work Platform (MEWP), if access is feasible. The whole east face / lower edge roof line of Building 6 (Appendix A, Photograph 5) will be inspected. Any access points identified will be incepted by a suitably qualified ecologist with an endoscope, to confirm presence/ current use by bats.

The roof felt/tiles/panels, soffit and facia boards in high risk areas and in the vicinity of confirmed roosts will be inspected (or removed by hand, if needed) under supervision by a licensed bat ecologist or authorised agent. The soft stripping process would be included within the EPSL. Any bats found during the soft strip process would then legally be removed from the building by a licensed ecologist.

5.3.2 Compensatory Roosts

At least one common pipistrelle roost locations will be temporarily disturbed as a result of the refurbishment to Building 6. To provide a temporary roost to re-locate any bats found during the pre-works inspection/soft strip, one bat roost box will be placed in a tree in the broadleaved plantation woodland strip, north of Building 6. A 1FD Schwegler Bat Box (shown in Table 5.1) is recommended.

New roost provision will be situated away from light spill, with clear flight paths towards corridors and foraging areas known to be used by bats. Further information about bat box provision will be provided in an EPSL application.

Enhancement roost boxes designed into new buildings (recommended for benefits to biodiversity rather than for mitigation of roost loss) are discussed below in Section 5.4.

5.3.3 Breathable Roof Membranes

Avoid the use of Breathable Roofing Membranes (BRM) in the renovation of Building 6, Building 5 and Building 2.

Avoid the use of BRM in any building where enhancement bat boxes will be installed.

Many modern BRM fabrics are known to abrade over time and form loose fibres, in which bats often become entangled and die. For this reason no BRMs must not be used in bat roosting areas, even if partially partly covered with traditional bitumastic roof felt.

BRMs are installed in many buildings to allow the roof to breathe so that traditional ventilation is not required. Research by Bat Conservation Trust and University of Reading's Technologies for Sustainable Built Environment (TSBE) Centre shows that all non-woven roofing membranes, produced using spun-bond filaments pose a serious threat to bats as a result of entanglement. In addition, the functionally of the membranes is affected by the bats (BCT, 2013).

Only bituminous roofing felt that does not contain polypropylene filaments should be used. For example bitumen felt type 1F, which is hessian reinforced.

Building Regulations

It is sometimes wrongly stated that the use of bitumen felt in roofs does not comply with Building Regulations. The Building Regulations that apply to this situation are Parts C and Parts L. The Building regulations that apply to existing buildings are parts L1B (domestic), L2B (non-domestic) and Part C (condensation and ventilation).

The Building Regulations state that energy performance of the whole building needs to be improved where possible for existing buildings. When considering a pitched roof this is done by increasing levels of insulation to meet the recommended minimum. The Regulations state that contractors must "assess the condensation risk within the roof space and make appropriate provisions in line with part C relating to the control of condensation". Part C then goes on to recommend meeting the recommendations made in BS 5250:2011. In this document it is made clear that both High resistance (bitumen) and Low resistance (BRM) underlays are acceptable as long as appropriate ventilation is provided. The materials must comply with British standards, national technical certificate or another acceptable EU certificate (which bitumen felt does).

5.3.4 Further Mitigation

It is likely that the EPSL would include further mitigation measures such as post-construction monitoring of the compensatory roosts. Recommendations to maintain and increase the value of the site include retention of onsite habitats and bat corridors and improvements to existing habitats and creation of new corridors through additional planting will also be included.

5.3.5 Bats and External Lighting

The following recommendations in line with the BCT, 2009, BCT, 2014, ILP 2018 and Gunnell et. al., 2012, best practice guidance should be incorporated into any new lighting scheme at the Site:

- Any new external lighting must avoid light spill onto suitable bat roost features on Bat Trees 1 and 2
- Light spill onto roosts in Buildings 2 and 6 and any new bat boxes must be avoided;
- In the first instance, external lighting should be designed to avoid light spill onto boundary features including the broadleaved plantation woodland, rows of trees, linear scrub, and hedgerows; and;
- Light spill onto sensitive areas such as the Site boundaries which have the potential to be used by commuting and foraging bats and trees suitable to support roosting bats should be limited to levels of 3 Lux or less.

Suggestions for mitigating external lighting and achieving the lighting recommendations above are outlined in the ILP Guidance Note (ILP, 2018) and best practice guidance (BCT, 2009, BCT 2014 and Gunnell et. al., 2012). These include:

- Only light areas which need to be lit, and use the minimal level of lighting required to comply with guidance such as Institute of Lighting Engineers Guidance Notes for the Reduction of Obtrusive Light (2005);
- LED luminaires should be used where possible due to their sharp cut off, low intensity, good colour rendition and dimming capability.
- A warm white spectrum (ideally <2700Kelvin) should be adopted to reduce blue light component.
- Eliminate bare lamps and any upward pointing light;
- The spread of light should be at or near the horizontal. Flat cut off lanterns are best;
- Use narrow spectrum lamps. Using lamps with the lowest UV output possible, avoid white and blue spectrums of light;
- Lights should peak higher than 550 nm or use glass lanterns to filter UV light;
- Reduce the height of lighting columns;
- Direct lighting to where needed and avoid spillage e.g. direct lighting towards the building front/foot path and design the luminaire appropriately, including the use of shields to avoid spillage behind the lamps onto adjacent habitats. Footways could, for example, be lit using bollards to keep the light below the tree canopy;
- Street lights can be located so that rear shields face the adjacent habitats or optics selected that stop back light thereby directing light into the task area, avoiding spill onto adjacent habitats.
- Where new lighting is proposed, use lighting modelling programs to indicate where the light spill will occur;
- Any external security lighting should be set to motion sensors and short (1 min) timers;
- Limit the times that the lights are on, to provide some dark periods;
- Avoid using reflective surfaces under lights; and
- Do not use a lamp greater than 150W for security lighting.

This will increase the value of the Site for a number of other nocturnal species, as well as for bats.

5.4 Recommendations for Enhancing Site Ecology

5.4.1 Enhancement Bat Boxes

BREEAM credit LE04 requires ecological enhancement. Bat boxes are recommended on the new buildings to provide roosting opportunities for bats. This is not a legal requirement but an option for enhancement; an additional requirement under LE04.

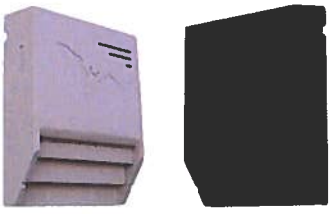
It is recommended a minimum of three boxes of various designs are incorporated into the building at design stage or erected onto suitable trees.

Biodiversity for Low and Zero Carbon Buildings: A Technical Guide for New Builds (Williams, 2010) suggests various ways of including a roost void compliant with Building Regulations within a variety of modern structures. Products such as cavity bat boxes, bat bricks and bat tiles could also be used to match external fabrics. Alternatively, roost space could be provided by fitting pre-made bat boxes to the external face of the new or refurbished buildings. The choice of bat box should be suitable for crevice dwelling species. Example roost provisions to incorporate on buildings or trees are shown in Table 5.1.

Encouraging these species onto a site also provides an interesting educational opportunity. If bats are present, local bat groups or local ecological companies may be willing to lead talks and walks in the school grounds, involving staff, students and the wider community.

All new roost provision should be situated away from light spill, with clear flight paths towards corridors and foraging suitable to be used by bats. Advice from a suitably qualified ecologist should be sought when drawing up the specifications for bat roosts and locations. Bat boxes should be positioned at least 4 m above ground level to protect any resident bats from disturbance or predation by domestic pets. Each box can be positioned with a different orientation between south east and south west to provide a range of microclimate options.

Table 5.1 Examples of Bat Roost Box Options

Bat Roost Provision		Designed for Trees/Buildings?
Schwegler 1WQ Summer and Winter Bat Roost https://www.wildcareshop.com/summer-and-winter-bat-roost.html http://www.nhbs.com/title/161275/1wq-schwegler-summer-winter-bat-roost		Buildings
Schwegler 1WI Summer and Winter Bat Box https://www.wildcareshop.com/schwegler-1wi-summer-and-winter-bat-box.html http://www.nhbs.com/title/177079/1wi-schwegler-summer-and-winter-bat-box		Buildings
Bat Slope for 1MF Bat and Swift Nest Box http://www.nhbs.com/bat-slope-for-1mf-bat-and-swift-nest-box		Buildings
Habibat Bat Box - Custom Brick Facing http://www.nhbs.com/title/183578/habibat-bat-box-custom-brick-facing		Buildings
1FTH Schwegler Universal Bat Summer Roost http://www.nhbs.com/title/203503/1fth-schwegler-universal-bat-summer-roost		Buildings
1FD Schwegler Bat Box http://www.nhbs.com/title/177076/1fd-schwegler-bat-box		Trees

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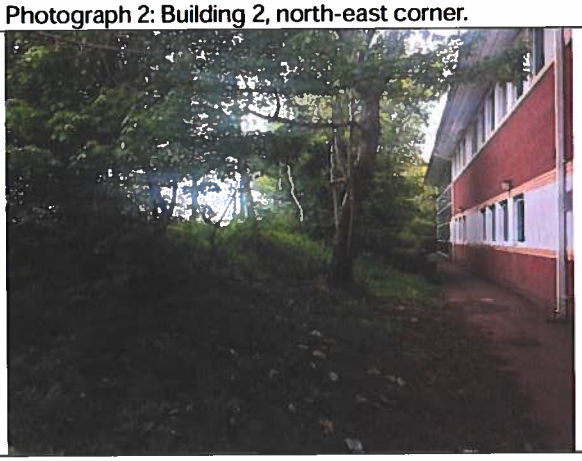
7. Appendix A: Site Photographs

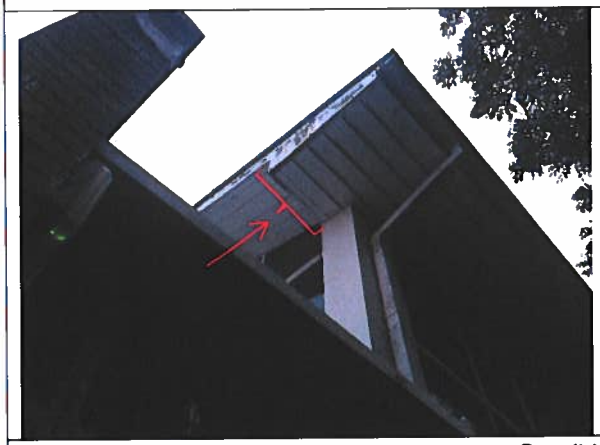
Photograph 1: Building 2, east and south faces.

Photograph 2: Building 2, north-east corner.

Photograph 3: Building 2, west face.



Photograph 4: Building 6, north face and broadleaved plantation woodland strip.



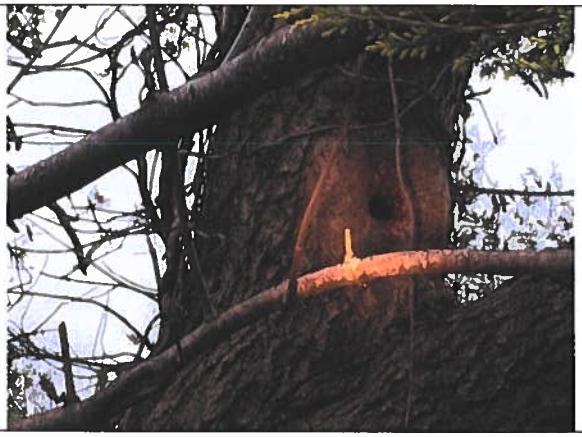
Photograph 5: Building 6 – north-east corner. Possible roost exit/re-entry point on edge of soffit. But this edge cannot be seen from ground.

Photograph 6: Building 6. This feature was not used by roosting bats as an exit/re-entry point.

Photograph 7: Building 6 – Soffit box on west end. Possible roost exit/re-entry point along this edge, or where lower roof of B5 joins B6.

Photograph 8: Bat Tree 1. The red circles indicate the area of bat interest.

Photograph 9: Bat Tree 1, a close up of the knothole.



Photograph 10: Bat Tree 2, close up of knothole.

Photograph 11: Bat Tree 2. knothole

Photograph 12: Bat Tree 2, the lower cavity

Figure 1 Phase 1 Habitat Map

Figure 1Target Notes

Target Note Number	Description
TN1	A raised herb planter with mint, rosemary, forget me not, cherry and ornamental plant species.
TN2	An area of garden fly tipping waste within the Site (Appendix B: Photograph 22).
TN3	Possible location of bird's nest. This is mossy and view is restricted.
TN4	Gulls observed nesting on the roof near the chimney
TN5	Evidence of nesting gulls. There is nest material behind one of the roof chimneys on the north side of Building 8 (Appendix B: Photographs 35 and 36).
TN6	There is a gull on a nest on the west side of the roof of Building 11 (Appendix B: Photographs 37 and 38).
TN7	Pond in Courtyard 1 (Appendix B: Photographs 12 and 13).
TN8	Pond in Courtyard 2 (Appendix B: Photograph 15).
TN9	The area of amenity grassland to the north and west of Building 2 could not be accessed and has mapped using aerial photography.
TN10	The strip of broadleaved plantation woodland to the north of Building 2 could not be accessed and has mapped using aerial photography.
TN11	Wooden garden shed within Courtyard 1. This has no potential for roosting bats.

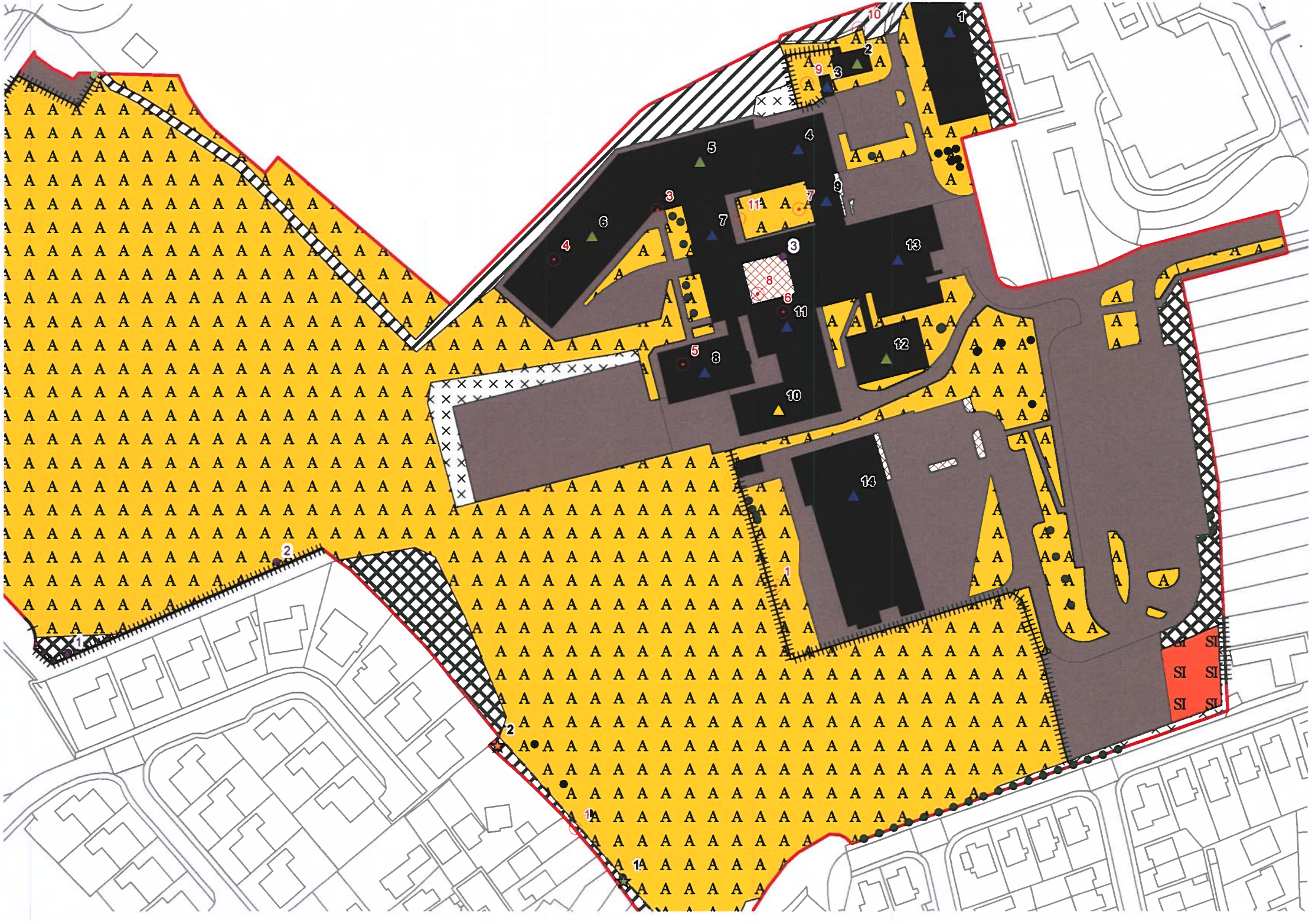

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Figure 2a Bat Roost Survey Locations

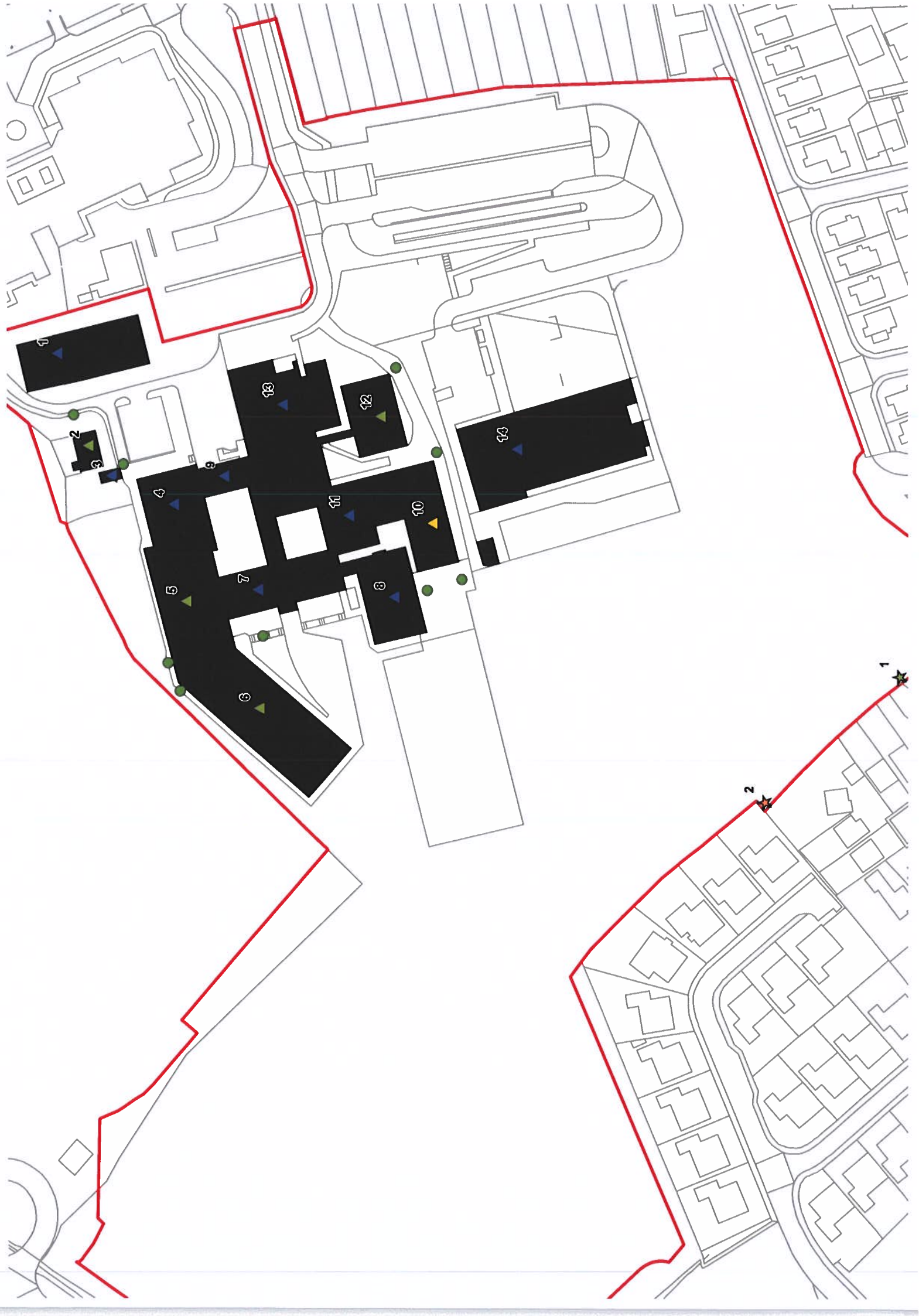
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Figure 3b Bat Roost Survey Results

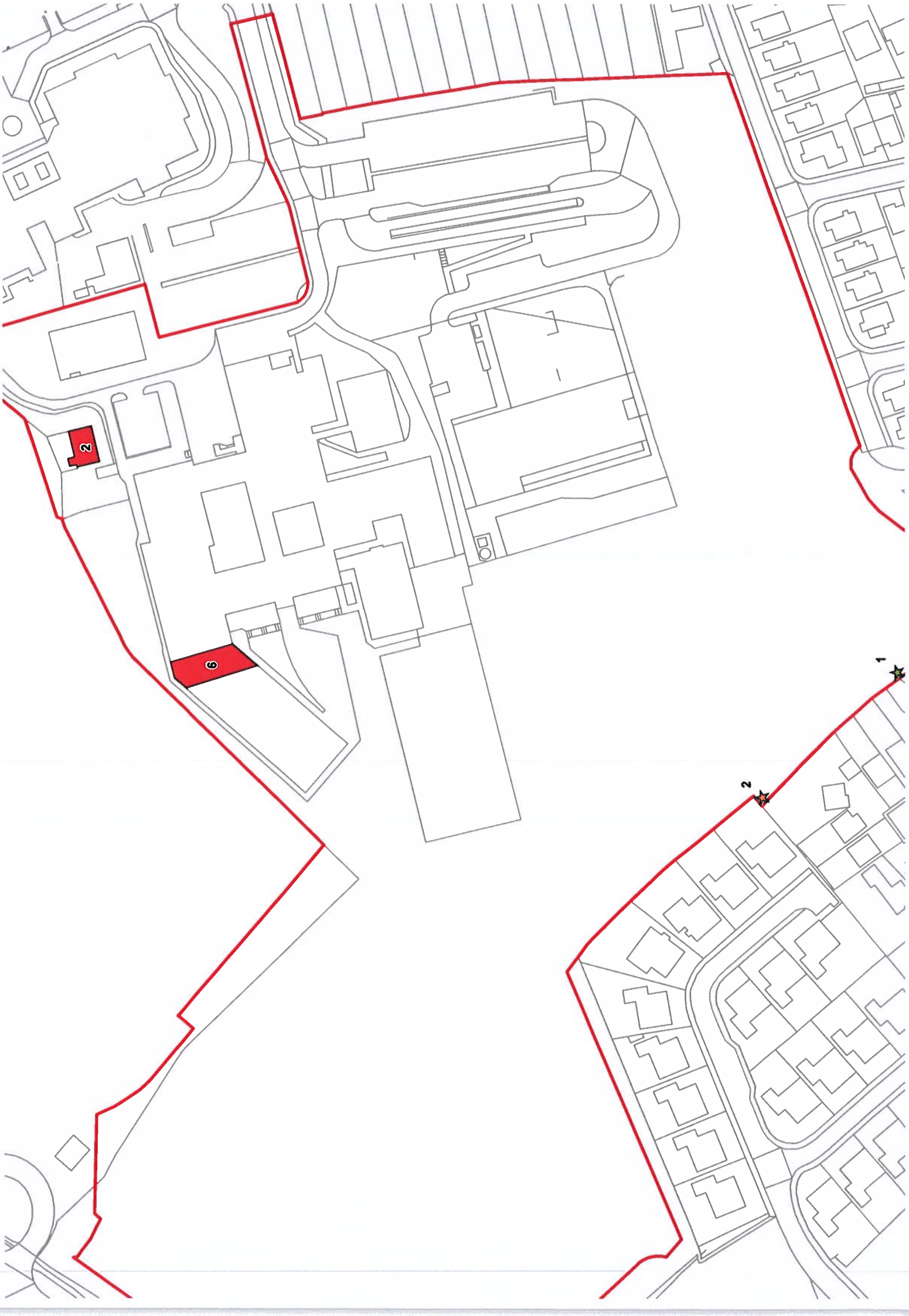
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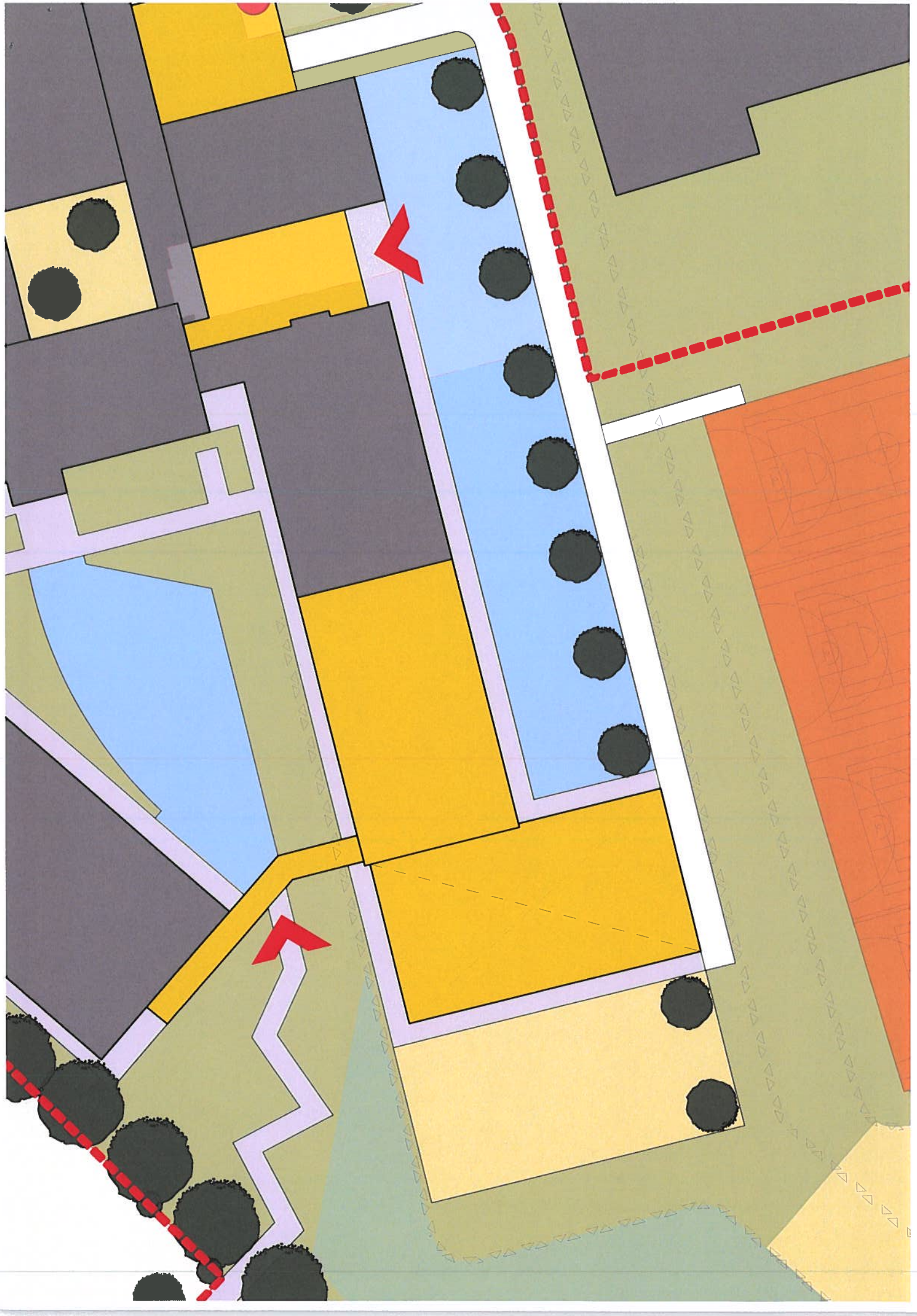
Figure 4 HLM, Proposed Site Layout Option 4 YBM-HLM-00-00-DR-L-00004 Revision P03, 02/08/2018



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