M5 Junction 10 Improvements Scheme

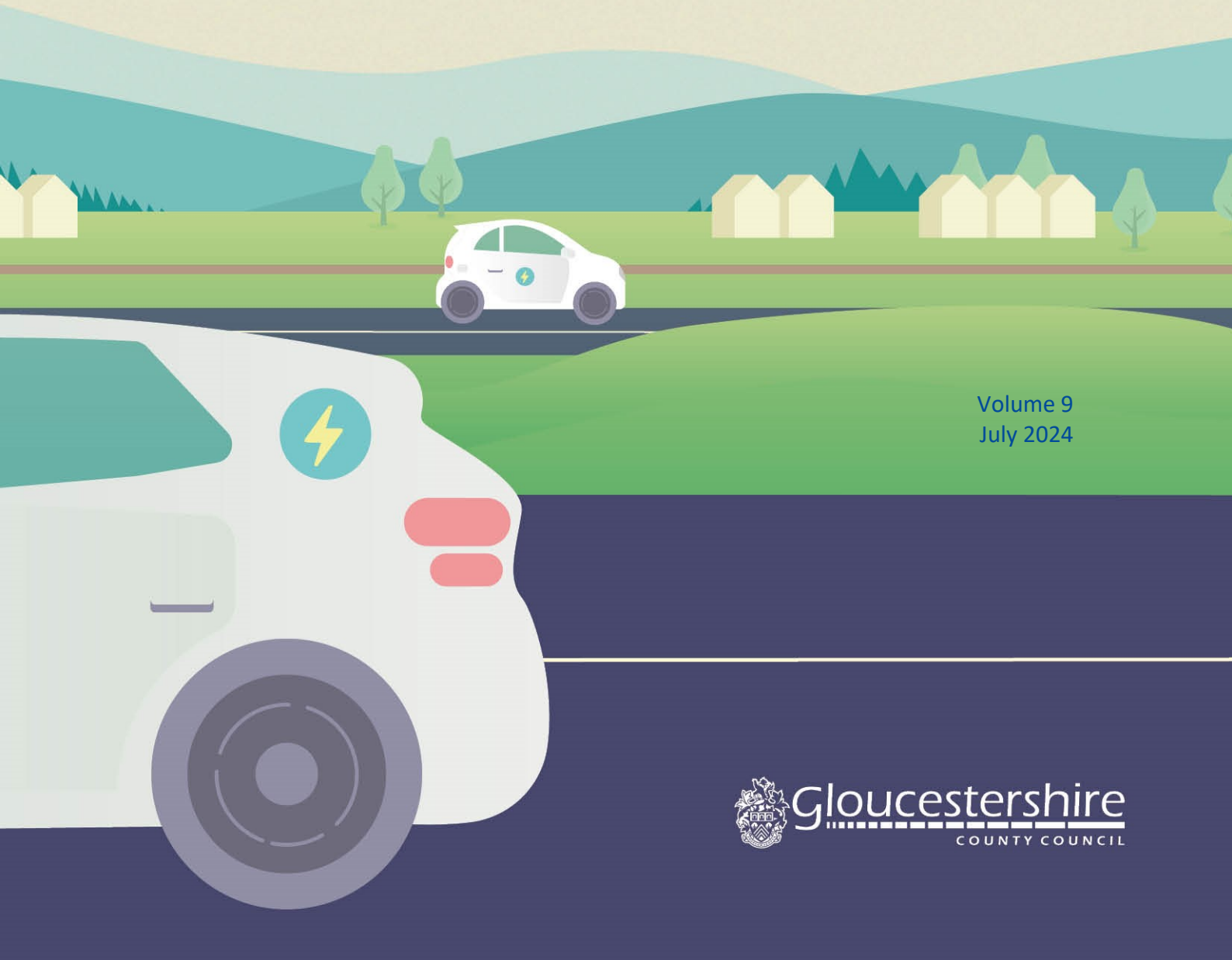
Bat Roost Technical Appendix Addendum

TR010063 - APP 9.45

Rule 8(k)

Planning Act 2008

Infrastructure Planning (Examination Procedure) Rules 2010



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Infrastructure Planning

Planning Act 2008

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M5 Junction 10 Improvements Scheme

Development Consent Order 202[x]

Bat Roost Technical Appendix Addendum

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Contents

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Executive Summary

This Addendum presents the results of the bat roost surveys undertaken in 2023, which were not included within the Environmental Statement (ES) submitted as part of the Development Consent Order (DCO) application in January 2024.

Access restrictions during the survey period to inform the ES (between 2019 and 2022) resulted in a number of structures and trees remaining unsurveyed or partially surveyed for roosting bats. In order to undertake a robust impact assessment, it was necessary to predict the bat roosts present within the unsurveyed and partially surveyed structures and trees, utilising existing survey information and taking a reasonably precautionary approach.

The purpose of the 2023 surveys was to reduce the reliance on roost prediction and add certainty to the precautionary conclusions presented in the ES. It was also anticipated that the results of the 2023 surveys may necessitate refinement of the mitigation and compensation package for roosting bats presented in the ES.

This Addendum therefore discusses the implications of the results of the 2023 bat roost surveys on the assessment of impacts to roosting bats presented within Chapter 7 of the ES – Biodiversity (Application document TR010063 / APP 6.5). It also updates some of the mitigation and compensation measures for roosting bats presented in Chapter 7 – Biodiversity of the ES (Application document TR010063 / APP 6.5) and Technical Appendix 7.15 – Bat Mitigation Strategy (Application document TR010063 / APP 6.15).

Throughout the bat active season (May to September) of 2023 a total of 33 preliminary bat roost assessments, 29 emergence surveys and 11 internal surveys were undertaken. Surveys focused on structures where impacts are expected to be highest and levels of survey data lowest. The 2023 surveys resulted in the identification of three additional roosts in structures and additional information was obtained about four known roosts, allowing further characterisation of the roosts.

Following the completion of the 2023 surveys, 26 structures and 11 trees potentially impacted by the Scheme remain with incomplete surveys. The approach to predicting the likelihood of bats present is presented in Appendix D and differs from the approach detailed within the ES. It has been revised following consultation with Natural England, taking into account the results of the 2023 surveys and accounting for localised refinement of impacts. Nineteen roosts are now predicted to be present within partially surveyed structures and 11 roosts are now predicted to be present within partially surveyed / unsurveyed trees.

Taking into account the known and predicted assemblage of species recorded roosting within the survey area, which includes Annex II species, the bat roost resource is considered to remain a resource of Regional importance for biodiversity as reported within the ES.

In order to reflect the results of the 2023 surveys and the refinement of impacts, the mitigation and compensation package for roosting bats has been updated. This has resulted in a small reduction in the levels of compensation proposed for roosting bats, reflected in a decrease in the compensatory roost provision. This updated package is presented in the draft European Protected Species Mitigation Licence (EPSML) for bats which Natural England have approved, as evidenced by the Letter of No Impediment (LoNI) received in March 2024, which is included in Appendix D of the Statement of Common Ground (SoCG) with Natural England (Application document TR010063 / APP 8.5).

Taking into account the embedded and essential mitigation measures, bats could potentially be subject to a minor adverse residual effect as a result of loss and disturbance of roosts. For a resource of Regional importance for biodiversity, this results in a slight adverse residual effect, which is not significant. Despite the precautionary approach reported in the ES, the level of residual impact remains the same as that presented in Chapter 7 of the ES – Biodiversity (Application document TR010063 / APP 6.5) and is not a change of the overall conclusion.

1. Introduction

1.1. Terms of Reference

1.1.1. AtkinsRéalis was commissioned by Gloucestershire County Council (GCC) to undertake a suite of bat surveys to inform the Environmental Statement (ES) for the M5 Junction 10 Improvements Scheme (hereafter referred to as 'the Scheme').

1.1.2. The purpose of the bat surveys was to assess the use of the habitats within the Scheme by commuting, foraging and roosting bats; provide recommendations to enable compliance with legislation and policy; and, where appropriate, identify the need for avoidance, mitigation, compensation, or enhancement.

1.1.3. The ES was written based on results of surveys completed up to the end of the 2022 survey season. In 2023, additional gap filling surveys to supplement the information used to inform the ES were undertaken.

1.1.4. This report is an addendum to Technical Appendix 7.3 – Bat Surveys (Application document TR010063 / APP 6.15). It summarises the results of bat roost surveys undertaken in 2023, which were not included within the ES submitted as part of the Development Consent Order (DCO) submission in December 2023. It discusses the implications of the results of the 2023 bat roost surveys on the assessment of impacts to roosting bats presented within Chapter 7 of the ES – Biodiversity (Application document TR010063 / APP 6.5). It also updates some of the mitigation and compensation measures for roosting bats presented in Chapter 7 – Biodiversity of the ES (Application document TR010063 / APP 6.5) and Technical Appendix 7.15 – Bat Mitigation Strategy (Application document / APP 6.15).

1.2. Background and purpose

1.2.1. The study area for roosting bats was generally approximately 40 m from the Scheme Boundary as this is the maximum distance over which impacts to roosting bats as a result of the Scheme are anticipated, this is referred to throughout the ES as the Zone of Influence (ZoI)[1]. However, not all structures or trees within this zone will experience impacts as a result of the Scheme.

1.2.2. During surveys undertaken in 2022 and in preceding years there were 329 structures, 353 individual trees and 105 tree groups identified within the study area. Of the structures, 151 structures were surveyed in full[2], 72 structures were partially surveyed, and 106 structures were not surveyed at all. Of the trees, 319 trees and all 105 tree groups were surveyed in full, 22 trees were partially surveyed, and 12 trees were not surveyed at all. The lack of surveys undertaken at the unsurveyed and partially surveyed structures and trees was due to difficulties with obtaining access.

[1] The study area was extended more than 40 m from the Scheme Boundary to include the entire area between the Link Road and the M5 motorway in order that the potential risk of fragmentation could be fully assessed. In addition, there are a number of locations where the study area was less than 40 m, as described in paragraph 2.2.9 of Technical Appendix 7.3 – Bat Surveys (application document APP-088 and APP-089).

[2] Full survey effort is considered to be the completion of the required number of surveys as detailed within the 2016 Bat Conservation Trust Good Practice Guidelines (Collins, J. (ed) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London). In September 2023, an update to the 2016 Guidelines was published. As this was after the bulk of the bat survey work for the Scheme had been undertaken, surveys for the Scheme were undertaken broadly in accordance with the 2016 Guidelines. The roost survey methodology for structures remains largely the same in the 2023 guidelines, when compared to the 2016 guidelines, although with more of an emphasis on the use of night vision aids (NVAs). NVAs were used routinely during the surveys for this Scheme. For trees, the emphasis in the 2023 guidelines has shifted away from emergence surveys of trees, with a preference for multiple aerial inspections, or alternatively, if unsafe to climb, emergence surveys supported by NVAs. This aligns with the approach taken for this Scheme for tree surveys. Therefore, the update in guidance is not considered to be a limitation.

1.2.3. For the purposes of informing the ES, it was therefore necessary to predict the bat roosts present within the unsurveyed/partially surveyed structures and trees, utilising the existing survey data and taking a reasonably precautionary approach. The approach taken is described in Section 2.6 of Technical Appendix 7.3 – Bat Surveys (Application document TR010063 / APP 6.15). The roosts predicted to be present within unsurveyed/partially surveyed structures/trees are summarised in paragraphs 7.6.38 – 7.6.40 of Chapter 7 – Biodiversity of the ES (Application document TR010063 / APP 6.5) and the predicted impacts to roosts potentially present within unsurveyed/partially surveyed structures/trees are detailed in paragraphs 7.8.59 – 7.8.60 and Tables 7-13 and 7-14 of Chapter 7 – Biodiversity of the ES (Application document TR010063 / APP 6.5).

1.2.4. The purpose of the 2023 surveys was to reduce the reliance on roost prediction and add certainty to the precautionary conclusions presented in the ES. It was also anticipated that the results of the 2023 surveys may necessitate refinement of the mitigation and compensation package presented in the ES. Both Chapter 7 – Biodiversity of the ES (Application document TR010063 / APP 6.5) and Technical Appendix 7.15 – Bat Mitigation Strategy (Application document TR010063 / APP 6.15 (paragraphs 7.4.38 and 2.1.3 respectively)) state that further surveys would address gaps in the bat roost survey data, and it therefore may be necessary to refine the mitigation and compensation package proposed in the ES, in consultation with Natural England. Therefore, this Addendum also updates some of the mitigation and compensation measures for roosting bats presented in those documents. Mitigation and compensation for commuting or foraging bats remains as detailed within the ES.

2. Methodology

2.1.1. In order to address gaps in the bat roost survey data, as a result of unsurveyed or partially surveyed structures and trees, further survey work was undertaken in the active bat season (May to September) of 2023. The primary focus of the surveys was structures/trees where levels of survey were lowest (i.e. unsurveyed structures/trees) and impacts highest (i.e. structures demolished or trees felled).

2.1.2. Not all structures or trees within the study area will experience impacts as a result of the Scheme. For example, where a structure or tree is located on the opposite side of a building or behind a dense treeline or hedgerow which would attenuate noise and vibration, it is not considered that the structure or tree will experience any disturbance impacts as a result of the Scheme.

2.1.3. Furthermore, where the proposed works are minor, no impacts to structures or trees located adjacent to the works are anticipated. Minor works only, including the installation of signage and minor works to pavements are proposed along the western extent of Stanboro Lane, along The Green and along parts of the B4634 to the east and west of the Link Road. In addition, there are a number of structures and trees[3] where works will be timed to avoid disturbance impacts, or the installation of acoustic barriers will prevent any disturbance impact. These were not the focus of the 2023 survey work, and were therefore not surveyed 2023.

2.2. 2023 Surveys

2.2.1. The 2023 survey work comprised Preliminary Bat Roost Assessments (PBRA) of 33 structures where no surveys had been undertaken. Emergence surveys were undertaken of 29 structures where PBRA surveys assessed them to be of low, moderate or high bat roosting suitability. All emergence surveys were undertaken in line with the Bat Conservation Trust Good Practice Guidelines[4] and the Interim Guidance on Night Vision Aids (NVA)[5]. In line with the NVA guidance, no dawn surveys were undertaken and all bat surveys were supported by the use of infrared cameras.

2.2.2. Internal surveys were undertaken of nine structures due to be demolished, where asbestos surveys had been completed, and a further two open outhouses at risk of temporary disturbance during construction.

2.2.3. The survey methodology for the PBRAs, emergence surveys and internal surveys was as detailed within Technical Appendix 7.3 – Bat Surveys (Application document TR010063 / APP 6.15) (Section 2.3.1 – 2.3.7 and 2.3.22 – 2.3.27). Where individual 2023 surveys were subject to limitations, this is detailed within Appendix A of this Addendum.

2.2.4. The conclusion following the 2023 surveys is that there are 118 structures within the study area that could potentially be impacted by the Scheme. Of these 118 structures, 30 are considered to provide negligible suitability for roosting bats. Of the remaining 88 structures, following the 2023 survey work a total of 63 have been surveyed in full, and a further 25 have been partially surveyed but require additional surveys in order to align with the Bat Conservation Trust Good Practice Guidelines[4]. Each of these partially surveyed structures was therefore assessed on a case by case basis in order to predict the likely presence of a bat roost within each building, as detailed in Section 2.3 below.

[3] Where access has not been possible this has been detailed within Appendix A and Appendix B of the TA - Bat Surveys.

[4] Collins, J. (ed) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London

[5] Interim Guidance Note: Use of night vision aids for bat emergence surveys and further comment on dawn surveys. Bat Conservation Trust, May 2022

2.2.5. The conclusion following the 2023 surveys is that there are 195 individual trees within the study area that could potentially be impacted by the Scheme. Of these 195 trees, 157 are considered to provide negligible or low suitability for roosting bats. Of the remaining 38 trees, following the 2023 survey work, a total of 27 have been surveyed in full and a further nine have been partially surveyed. Two trees have not been surveyed at all. The approach to predicting the bat roosts present within unsurveyed/partially surveyed trees is discussed in Section 2.3 below.

2.2.6. An overview of which structures and trees have been surveyed can be found within Figure 1A in Appendix E.

2.3. Predicting roosts in partially surveyed/unsurveyed structures and trees

2.3.1. The approach taken with regard to the unsurveyed/partially surveyed structures and trees is presented in detail within the Compensation Strategy provided in Appendix D, as provided to Natural England as part of the draft bat mitigation licence.

2.3.2. The approach to predicting the likelihood of bats present within structures has been revised following consultation with Natural England, taking into account the results of the 2023 surveys and accounting for the localised refinement of impacts. The approach differs from the occupancy rate approach detailed within the ES. The updated predictions are based on a case-by-case assessment of each structure during which any existing information about the structure was reviewed and the bat roost suitability of the structure was assessed as negligible, low, moderate or high in line with the Bat Conservation Trust Good Practice guidelines[4]. These categories were applied for horseshoe bats, void dwelling bats (excluding horseshoe bats) and crevice dwelling bats. The next step was to compare the structure with other, similar, fully surveyed structures to help predict the likely presence of a bat roost, the species present and the type of roost.

2.3.3. All trees where surveys are incomplete are assumed on a precautionary basis to have bat roosts present when considering compensation. As a precaution, unsurveyed trees were assumed to provide high suitability bat roosting habitat. This approach remains as per the ES.

2.3.4. The following horseshoe, void dwelling, crevice dwelling and tree roosting species could potentially be present:

- Horseshoe bats: Lesser horseshoe bats.
- Void dwelling: Brown long-eared, Natterer's, Daubenton's, whiskered and Brandt's, but predominantly brown long-eared and Natterer's.
- Crevice dwelling: common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, Natterer's, Daubenton's, whiskered, Brandt's, Leisler's and serotine, but predominantly common pipistrelle and soprano pipistrelle.
- Tree roosts: Common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, Bechstein's, Natterer's, Daubenton's, whiskered, Brandt's, Leisler's, noctule and barbastelle, but predominantly noctule and Natterer's.

3. Results

3.1.1. The results of the 2023 surveys identified roosts within three additional structures BU_1027, BU_48 and BU_667, as shown on Figure 1B in Appendix E. Furthermore, additional surveys provided further clarity on the species and type of roosts present within BU_668, BU_1030, BU_963 and BU_981.

3.1.2. A summary of the surveys undertaken in 2023 is provided within Appendix B and subsequent roost assessment in 0.

3.1.3. A summary of the confirmed roosts within the study area following the 2023 surveys is given in Table 3-1, below. This provides an update to Table 3-6 in Technical Appendix 7.3 – Bat Surveys (Application document TR010063 / APP 6.15). Updates following the 2023 surveys and change in status are given in red text, with any original text struck through. For completeness, all confirmed roosts have been included regardless of whether they were surveyed in 2023.

Table 3-1 - Confirmed roosts summary (note, updates are shown in red text, with original text struck through)

Structure/ tree reference[6]	Summary of survey results	Surveys complete?[7]	Roost characterisation[8]	Likely Impact of Scheme
BU_1027	Structure originally assigned as moderate suitability. No evidence of bats recorded during PBRA but no internal survey possible. Two common pipistrelle bats were recorded emerging from the porch roof tiles and under the ridge tiles, and a soprano pipistrelle emerged from under the lead flashing in early July 2023. Two pipistrelles were seen emerging from under the eaves, a *Myotis* (assumed to be whiskered, Brandt's or Natterer's) emerged from the soffit of the porch and a pipistrelle species emerged from the lintel on the ground floor southern window at the beginning of September 2023. One common pipistrelle emerged from the eaves of the gable end at the end of September 2023. No internal survey or hibernation survey has been undertaken.	No Outstanding: • internal • hibernation	Common pipistrelle – day and transitional roost; Soprano pipistrelle – day roost; and *Myotis* (Whiskered, Brandts or Natterer's) – day roost	Demolished
BU_667	No evidence recorded during PBRA and internal, and it was originally assigned moderate suitability. A common pipistrelle was recorded emerging from the northern gable end at the beginning of August 2023. No bats were recorded emerging during surveys in May 2022 or September 2023. No hibernation survey has been undertaken.	No Outstanding: • hibernation	Common pipistrelle - day roost	Demolished
BU_48	No evidence recorded during PBRA, and it was originally assigned low suitability. No internal access was possible. A common pipistrelle was observed emerging during a survey in mid-August 2023 from a gap in the doorway, assumed to be roosting internally. Two further roost characterisation emergence surveys are required. The structure is not considered suitable to support hibernating bats.	No Outstanding: • two emergence surveys	Common pipistrelle - day roost	Temporary Disturbance
BU_1030	No evidence recorded during PBRA and it was originally assigned moderate suitability; however no internal survey possible. Two common pipistrelle bats emerged from apex in late August 2020.	No Outstanding: • internal	Common pipistrelle - day roost	Demolished

[6] As shown in Figure 1B in Appendix E.
[7] Note, surveys being completed does not preclude the need for update surveys. Conversely, if surveys are incomplete but no impacts are anticipated then further surveys would not be required.
[8] All survey data limitations (i.e. when surveys such as internal assessments, hibernation or emergence / re-entry surveys remain outstanding), have been considered within the survey methodology limitations section, see Appendix A for 2023 surveys and Appendix A of Technical Appendix 7.3 – Bat Surveys (application document APP-088 and APP-089) for surveys prior to 2023. Where additional assumptions are being made within the roost characterisation based on lack of survey data, i.e. if all three emergence / re-entry surveys were completed outside of the maternity period, then these assumptions are stated within the table and the roost characterisation has taken account of these limitations.

Structure/ tree reference[6]	Summary of survey results	Surveys complete?[7]	Roost characterisation[8]	Likely Impact of Scheme
	One unknown bat species (not echolocating) emerged from the soffit gap at the back of the building in mid-September 2021. One unknown bat species emerged from the soffit on the southern elevation in July 2023, the same location as the mid-September 2021 roost. A common pipistrelle also emerged from the gable end on the northern aspect of the property in July 2023. A hibernation survey has not been undertaken.	• hibernation		
BU_1034	No evidence recorded during PBRA and it was originally assigned moderate suitability; however no internal survey possible. Two common pipistrelle bats were recorded emerging from the south east corner of the house in August 2019. Three common pipistrelle bats showed swarming behaviour as well as three soprano pipistrelle bats also showing swarming behaviour in September 2021. No hibernation survey undertaken.	No Outstanding: • internal • hibernation	Common pipistrelle – day and mating roost; and Soprano pipistrelle – mating roost	Structure retained but potential for roost to be subject to temporary disturbance during construction.
BU_1039	No evidence recorded during PBRA and it was originally assigned moderate suitability; however no internal survey possible. One possible emergence of a non-echolocating bat in mid-September 2021, which was assumed to be roosting. No bats were recorded emerging in September 2021 and May 2022. No hibernation survey undertaken.	No Outstanding: • internal • hibernation	Common pipistrelle – day roost	Demolished
BU_1042	No evidence recorded during PBRA and it was originally assigned moderate suitability. An internal survey was undertaken with no bat access points identified and no evidence of roosting bat recorded. A single soprano pipistrelle was recorded emerging in August 2020. A possible emergence was recorded from the western gable end in June 2023. No bats were recorded emerging in July 2021 No hibernation survey undertaken.	No Outstanding: • hibernation	Soprano pipistrelle – day roost	Demolished
BU_370	Only an external PBRA was carried out prior to all access being refused (where the structure was defined as high bat roosting suitability). However, during the PBRA, the tenant made an un-verified comment about seeing a bat leave the structure.	No Outstanding: • internal	Bat – unknown roost (assumed, with limitations)	~~Structure retained but potential for roost to be subject to temporary~~

Structure/ tree reference[6]	Summary of survey results	Surveys complete?[7]	Roost characterisation[8]	Likely Impact of Scheme
	No hibernation survey was possible due to access.	• hibernation • three emergence/re-entry survey		~~disturbance during construction.~~ Within the ZoI, but no impacts anticipated
BU_376	During the PBRA, the structure was assigned as high suitability. A single common pipistrelle bat emerged during the mid-July 2019 emergence survey. In June 2021 three common pipistrelle bats emerged in total from two locations. No bats were seen to emerge in mid-September 2020. No hibernation activity. DNA was collected on window below soffit on eastern gable end, below a gap between soffit box and wall (3 m in height) on 12/01/2022. It was confirmed to be common pipistrelle.	Yes	Common pipistrelle – day roost	Structure retained but potential for roost to be subject to temporary disturbance during construction.
BU_507	During the PBRA, the structure was assigned as high suitability. A concentration of lesser horseshoe droppings were collected on 28/10/2020 (confirmed by DNA) from in the middle room of the extension, which was accessed via an open door. One soprano pipistrelle returned to roost on the east side of the porch under the tiles in June 2021 and again in April 2022. No bat activity was recorded in the hibernation period.	Yes	Soprano pipistrelle – day roost; and Lesser horseshoe – day/ feeding roost	Demolished
BU_610	During the PBRA, the structure was assigned as high suitability. In June 2021 a noctule bat emerged from the base of the chimney on the same night that a common pipistrelle also emerged from a gap under a tile. No emergences in mid-July 2021 and only a single common pipistrelle emergence in early August 2021. No bat activity was recorded in the hibernation period.	Yes	Common pipistrelle – day roost; and Noctule – day roost	Demolished
BU_611	During the PBRA, the structure was assigned as high suitability. A concentration of lesser horseshoe droppings were collected on 28/10/2020 (confirmed by DNA) from in the extension, which can be accessed via an open door. Droppings of lesser horseshoe were also collected within the loft space of the property on 16/02/2022.	Yes	Lesser horseshoe – day roost	Demolished

Structure/ tree reference[6]	Summary of survey results	Surveys complete?[7]	Roost characterisation[8]	Likely Impact of Scheme
	No bats emerged from this property during surveys in June to August 2021. No bat activity was recorded in the hibernation period.			
BU_614	PBRA recorded no evidence of bats, the structure was assigned as high suitability. During the single emergence survey in April 2022 a single soprano pipistrelle bat emerged from the western gable end.	No Outstanding: • hibernation • two emergence/re-entry surveys	Soprano pipistrelle – day roost	~~Structure retained but potential for roost to be subject to temporary disturbance during construction.~~ Structure retained and no disturbance impacts are expected as a result of additional mitigation measures
BU_638	PBRA recorded no evidence of bats, the structure was assigned as high suitability. During May and August 2021 no roosting was recorded. In early July 2021 two common pipistrelle bats were recorded emerging. In September 2021, an incidental sighting (while surveying BU_735) of a common pipistrelle bat was seen to re-enter the structure during a re-entry survey. During the hibernation survey, common pipistrelles were recorded within the roof void towards the end of February, and again in late March. At the time of recording the common pipistrelles the temperature within the roof void was 17°C after a cooler period suggesting that the bats had likely come out of torpor. In the absence of further information, it has been assumed that the common pipistrelle(s) were hibernating somewhere within the structure.	Yes	Common pipistrelle – day roost and hibernation roost	~~Structure retained but potential for roost to be subject to temporary disturbance during construction.~~ Structure retained and no disturbance impacts are expected as a result of additional mitigation measures
BU_653	PBRA recorded no evidence of bats, the structure was assigned as low suitability. During the first survey in June 2021 a non-echolocating bat, believed to be a pipistrelle species based on visual characteristics, emerged from the soffit box on the north west aspect of the property. No bats emerged from the structure in August and September 2021 surveys.	Yes	Common pipistrelle – day roost; Soprano pipistrelle – day roost	Demolished

Structure/ tree reference[6]	Summary of survey results	Surveys complete?[7]	Roost characterisation[8]	Likely Impact of Scheme
	No bat activity was recorded in the hibernation period.			
BU_694	PBRA found evidence of lesser horseshoe and brown long-eared (confirmed by DNA) from concentrations of droppings found in the main loft space on 16/02/2022. During the PBRA, the structure was assigned as high suitability. During emergence surveys in June and August 2021 and July 2022 no evidence of roosting bats was recorded. No bat activity was recorded in the hibernation period.	Yes	Lesser horseshoe – day roost; and Brown long-eared – day roost	Demolished
BU_709	PBRA recorded a concentration of lesser horseshoe droppings (confirmed by DNA) in the extension which can be accessed via an open door, collected on 28/10/2020. The structure was assigned as high suitability. During two emergence surveys in June and August 2021 no evidence of roosting bats was recorded. In July 2022 a non-echolocating bat (assumed to be a lesser horseshoe) was seen entering the outhouse doorway and emerging a few minutes later from the same doorway. No bat activity was recorded in the hibernation period.	Yes	Lesser horseshoe – day roost	Demolished
BU_723	The structure was assigned as low suitability. Based on the droppings recorded throughout the barn the structure is considered likely to be a feeding or night roost for bats (no DNA analysis completed). During the August 2021 survey four common pipistrelle bats appeared to drop from inside roof of barn and flew around inside. Additionally, a *Myotis* was assumed to be roosting in the barn based on its behaviour, assumed mostly likely to be a Natterer's bat based on call data analysis. During the mid-September 2021 survey, a further common pipistrelle bat emerged from an unknown location. No hibernation suitability.	Yes	Common pipistrelle – day roost; and *Myotis* (assumed to be Natterer's) – day roost	~~Structure retained but potential for roost to be subject to temporary disturbance during construction.~~ Structure retained and no disturbance impacts are expected

Structure/ tree reference[6]	Summary of survey results	Surveys complete?[7]	Roost characterisation[8]	Likely Impact of Scheme
BU_735	PBRA recorded no evidence of bats, the structure was assigned as high suitability. Two common pipistrelle bats were recorded roosting in September 2021 re-entry survey. Emergence surveys in May and July 2021 saw no emergences.	No Outstanding: • hibernation	Common pipistrelle – day roost	~~Structure retained but potential for roost to be subject to temporary disturbance during construction.~~ Structure retained and no disturbance impacts are expected
BU_819	PBRA recorded a concentration of lesser horseshoe droppings (confirmed by DNA) in the extension which can be accessed via an open door, collected on 28/10/2020. The structure was assigned as high suitability. Two common pipistrelle bats were recorded roosting in August 2021 re-entry survey. Two emergence surveys in July 2021 saw no emergences.	No Outstanding: • hibernation	Lesser horseshoe - transitional roost; and Common pipistrelle – day roost	Demolished
BU_963	PBRA recorded no evidence of bats, the structure was assigned as moderate suitability. An internal survey was undertaken whereby bat droppings were identified within the roof void and confirmed to be, from DNA analysis, soprano pipistrelle. In July 2019 and 2021, no bats emerged. In late August 2019 a single soprano pipistrelle was recorded roosting within the property.	No Outstanding: • hibernation	Soprano pipistrelle – day roost	Demolished
BU_972	PBRA recorded no evidence of bats, although there was no internal access. The structure was assigned as moderate suitability. In early September 2021 a non-echolocating bat was recorded emerging from behind fascia board, considered likely to be a pipistrelle. Two further bats (common pipistrelle) emerged from the south elevation and the window frame. In late September 2021 a single common pipistrelle bat emerged. In May 2022 no bats were seen to emerge. No hibernation suitability.	No Outstanding: • internal	Common pipistrelle – day roost[9]	Demolished

[9] Although the first bat was an unconfirmed pipistrelle as all other bats emerging were common pipistrelle it was considered on balance to be most likely to be a common pipistrelle.

Structure/ tree reference[6]	Summary of survey results	Surveys complete?[7]	Roost characterisation[8]	Likely Impact of Scheme
BU_965	PBRA and hibernation survey recorded no evidence of bats. The roof space was boarded with the roof lining in good condition. No bat evidence was identified. The structure was assigned as moderate suitability. A single non-echolocating bat was seen to emerge in September 2020. It was assumed to be a common pipistrelle based on the time of emergence combined with the later bat record of a common pipistrelle roosting at this location. In July 2021 a single common pipistrelle bat was seen to emergence from the same location. An incidental sighting in May 2021 (while surveying BU_1005) of a brown long-eared bat emerging from this structure was also recorded.	No Outstanding: • one emergence/re-entry survey	Common pipistrelle – day roost; and Brown long-eared – day roost	Demolished
BU_981	PBRA recorded no evidence of bats. The roof space was lined with sarking boarding and no access to the roof space itself was identified. The structure was assigned as high suitability. Six emerging common pipistrelle and soprano pipistrelle bats from four different locations on the structure in mid-June 2021, plus one non-echolocating bat assumed to be a pipistrelle. In July 2021 a common pipistrelle and a non-echolocating bat were recorded emerging. No bats were recorded emerging in June 2023. No hibernation bat activity recorded.	Yes	Common pipistrelle – day roost; and Soprano pipistrelle – day roost	Demolished

Structure/ tree reference[6]	Summary of survey results	Surveys complete?[7]	Roost characterisation[8]	Likely Impact of Scheme
BU_987	PBRA recorded no evidence of bats. The roof space has been converted into multiple crawl spaces within the eaves, no access points or evidence of bats were observed. The structure was assigned as low suitability. In early September 2020, a single soprano pipistrelle bat emerged from the apex of south gable end. Two soprano pipistrelle bats emerged from the same feature in late August 2021. No bats were recorded emerging in September 2023.	No. Outstanding: • hibernation	Soprano pipistrelle – maternity[10] roost (assumed, with limitations)	Demolished
Tree 86	The tree was assigned as high suitability. No evidence was recorded during the PBRA, emergence or hibernation surveys. However, a male Natterer's bat was recorded to be likely[11] roosting in this tree on the 30/05/2021 for one night, during the radio tracking surveys.	Yes	Natterer's – day roost (assumed, with limitations)	Tree retained but potential for roost to be subject to temporary disturbance during construction.
Tree 576	The tree was assigned as high suitability. During the summer tree inspections in 2020, this feature was inspected and found to have a single noctule bat present in mid-August and early September. No hibernation bat activity recorded.	Yes	Noctule – day roost	Tree retained but potential for roost to be subject to temporary disturbance during construction.
Tree 578	The tree was assigned as high suitability. During the summer tree inspections in 2020, this feature was inspected and in mid-August found to have a single noctule bat present. In early September this feature was found to have a small number (likely 3) noctule bats present. No hibernation bat activity recorded.	Yes	Noctule – day roost	Tree retained but potential for roost to be subject to temporary disturbance during construction.
Tree 496	The tree was assigned as moderate suitability.	Yes	Barbastelle – transitional roost	Felled

[10] In the absence of further emergence / re-entry survey data during the early summer period, this has been assumed on a precautionary basis to be a maternity roost, as this structure is to be demolished and was considered to have a high potential that a maternity colony may be present.
[11] The location of this roost is only assumed as triangulated points from radio tracking have a radius of error for each plotted point, this is generally estimated to be 20 m within the ranges worked with.

Structure/ tree reference[6]	Summary of survey results	Surveys complete?[7]	Roost characterisation[8]	Likely Impact of Scheme
	During the initial ground level inspections of this tree a single barbastelle was recorded at the end of October 2019. All subsequent inspections in 2020 showed no evidence of roosting bats.			
Tree 627	The tree was assigned as high suitability. No evidence of bats was recorded during the PBRA survey. During the tree climbing inspections this tree was originally assessed to have low suitability to support roosting bats due to a large open feature. During a transect in October 2019, a single noctule was observed emerging from the tree, so the suitability assessment of the tree was increased to confirmed, requiring three emergence/tree climb surveys during the activity period. In May 2022 no bats were recorded roosting. Two emergence/re-entry surveys are outstanding. No hibernation activity was recorded.	No. Outstanding: • two emergence/re-entry surveys	Noctule – day roost	Within the ZoI, but no impacts anticipated
BU_11	The structure was assigned as moderate suitability. Confirmed lesser horseshoe droppings recorded during the PBRA survey on 03/03/2022 with droppings found in the loft space at the northern gable end under the central beam of the garage. No bats recorded during the one emergence survey.	No. Outstanding: • internal • hibernation • two emergence/re-entry surveys	Lesser horseshoe – day roost	Structure retained and no disturbance impacts are expected through additional mitigation measures
BU_357	Droppings recorded during the PBRA (no DNA analysis carried out) suggest the structure is likely to be a feeding or night roost. The structure was assigned as high suitability. No emergences were recorded during the two emergence surveys. No hibernation suitability.	No. Outstanding: • one emergence/re-entry survey • DNA analysis	Unknown species – Night/ feeding roost	~~Between the Link Road and the M5, potential for fragmentation~~ Structure located between the Link Road and the M5 and due to embedded mitigation measures implemented no impacts anticipated
BU_364	The structure was assigned as moderate suitability. Soprano pipistrelle droppings scattered throughout open barn during the PBRA survey, which were collected on 22/08/2019.	No. Outstanding:	Soprano pipistrelle – Night/ feeding roost	~~Between the Link Road and the M5, potential for fragmentation~~

Structure/ tree reference[6]	Summary of survey results	Surveys complete?[7]	Roost characterisation[8]	Likely Impact of Scheme
	No bats seen to emerge from the structure during both emergence surveys in September 2019 and August 2020. No hibernation suitability.	• one emergence/re-entry survey		Structure located between the Link Road and the M5 and due to embedded mitigation measures implemented no impacts anticipated
BU_378	During the PBRA, the structure was assigned as high suitability. Dropping were collected on 17/09/2019 (common pipistrelle, from DNA). No emergences were recorded during the surveys. A brown long-eared bat was using the structure for a hibernation roost based on droppings collected during the hibernation survey on 12/01/2022 from within the cold room and the workshop.	Yes	Common pipistrelle – Night/ feeding roost; and Brown long-eared hibernation roost	~~Structure retained but potential for roost to be subject to temporary disturbance during construction.~~ Within the ZoI, but no impacts anticipated
BU_661	No evidence was recorded during the PBRA survey. The structure was assigned as high suitability. No bats seen to emerge from the structure during both emergence surveys; one emergence/re-entry survey and a hibernation survey are outstanding. In May 2021, an incidental sighting (while surveying BU_735) of a brown long-eared bat was assumed to have emerged from BU_661. In June 2021, a further incidental sighting (while surveying BU_705) of a single pipistrelle bat was assumed to have emerged from BU_661.	No. Outstanding: • internal • hibernation • one emergence/re-entry survey	Common pipistrelle – day roost; and Brown long-eared – day roost	Structure retained and no disturbance impacts are expected through additional mitigation measures
BU_668	The structure was assigned as moderate suitability. Lesser horseshoe droppings recorded within the structure during PBRA on 16/02/2022. In May 2022, a single common pipistrelle and a lesser horseshoe bat were recorded emerging from the structure. In September 2023 four lesser horseshoe bats were recorded emerging. The structure was assessed not to have any suitability to support maternity or hibernation roosts and therefore no further surveys are considered required to characterise the roost.	Yes	Lesser horseshoe – day / transitional roost; and Common pipistrelle – day roost	Structure retained and no disturbance impacts are expected through additional mitigation measures
BU_705	No evidence was recorded during the PBRA survey. The structure was assigned as low suitability. No evidence of roosting was recorded in June and September 2021.	No. Outstanding:	Common pipistrelle – day roost	Within the ZoI, but no impacts anticipated

Structure/ tree reference[6]	Summary of survey results	Surveys complete?[7]	Roost characterisation[8]	Likely Impact of Scheme
	In August 2021, while surveying BU_646, a common pipistrelle entered and roosted in the south-east corner of the shed. No hibernation suitability.	• one emergence/re-entry survey		
BU_737	No evidence was recorded during the PBRA survey. The structure was assigned as moderate suitability. In July and August 2021, a single common pipistrelle was recorded emerging. In September 2021 three common pipistrelle bats were recorded emerging from two locations.	No. Outstanding: • hibernation	Common pipistrelle – day/transitional roost	Within the ZoI, but no impacts anticipated ~~(retained and protected with an acoustic barrier)~~
BU_747	Bat droppings recorded on stored fire wood (no DNA analysis) during the PBRA inspection. The structure was assigned as high suitability. In September 2019, one lesser horseshoe bat emerged. No hibernation suitability.	No. Outstanding: • DNA analysis • two emergence/re-entry surveys (one in early summer)	Lesser horseshoe – transitional/day roost[12]	~~Between the Link Road and the M5, potential for fragmentation~~ Structure located between the Link Road and the M5 and due to embedded mitigation measures implemented no impacts anticipated
BU_751	No evidence was recorded during the PBRA survey, although no internal access was possible. The structure was assigned as high suitability. A maximum of four common pipistrelle bats emerged from the west elevation in late July 2019. During the same survey an assumed brown long-eared bat was seen returning to the roost but was not echolocating. In September 2020, a brown long-eared bat (no echolocation was picked up) emerged from wooden slats on the gable end.	No. Outstanding: • internal • hibernation • one emergence/re-entry survey (in early summer)	Common pipistrelle – day roost; and Brown long-eared – day roost	~~Between the Link Road and the M5, potential for fragmentation~~ Structure located between the Link Road and the M5 and due to embedded mitigation measures implemented no impacts anticipated
BU_752	Natterer's bat droppings were recorded during the PBRA survey with droppings collected on 18/07/2019 from the ground floor room and scattered underneath the roof. The structure was assigned as high suitability.	No. Outstanding: • hibernation	Natterer's –maternity / day / night roost; Brown long-eared – day roost; and	~~Between the Link Road and the M5, potential for fragmentation~~

[12] This structure was assessed to provide bat roosting opportunities for a low conservation status roost only (i.e. small numbers of bats only), and therefore despite no emergence / re-entry survey data during the early summer period, it has not been assumed on a precautionary basis to be a maternity roost.

Structure/ tree reference[6]	Summary of survey results	Surveys complete?[7]	Roost characterisation[8]	Likely Impact of Scheme
	In mid-August 2019, a lesser horseshoe bat was seen through a window roosting before the survey began, then also recorded feeding and hanging on a perch. During the same survey a *Myotis* (likely to be Natterer's based on DNA and bat calls analysis) returned to the roost 5 minutes after sunset, and a *Myotis* (also assumed to be Natterer's) emerged 10 minutes after sunset, although the exact roost site was not observed. A further *Myotis* (also assumed to be a Natterer's) emerged 17 minutes after sunset, however, the location it came from could not be confirmed. In late September 2020 no bats were seen to emerge or re-enter the structure. In May 2021 radio tracking surveys tracked a Natterer's, female, adult bat in breeding condition (raised nipples) roosing within 20 m of this structure, therefore on a precautionary basis this structure is assumed to be a maternity/satellite roost for Natterer's.	• one emergence/re-entry survey (in early summer)	Lesser horseshoe – day roost	Structure located between the Link Road and the M5 and due to embedded mitigation measures implemented no impacts anticipated
BU_753	No evidence was recorded during the PBRA survey, although no internal access was possible. The structure was assigned high suitability. During the survey in mid-September 2019 a single bat that was not echolocating was seen to emerge from the property. In late July 2020 a soprano pipistrelle bat was seen to emerge from the property, and it was concluded that the bat in the previous year may also have been a pipistrelle bat. No hibernation activity was recorded.	No. Outstanding: • one emergence/re-entry survey (in early summer)	Soprano pipistrelle – day roost	~~Between the Link Road and the M5, potential for fragmentation~~ Structure located between the Link Road and the M5 and due to embedded mitigation measures implemented no impacts anticipated
BU_757	Bat droppings were recorded during the PBRA survey (no DNA analysis). The structure was assigned as high suitability. In early September 2019, a lesser horseshoe bat was observed emerging from its roost. In late September 2020 at least four common pipistrelle bats emerged from the gable brick wall. A further incidental sighting was recorded in July 2019 when surveying BU_751, when a possible brown long-eared re-entry was recorded. One emergence/re-entry survey and a hibernation survey are outstanding.	No. Outstanding: • hibernation • DNA analysis • one emergence/re-entry surveys (in early summer)	Common pipistrelle – mating roost; Brown long-eared – day roost; and Lesser horseshoe – day roost	~~Between the Link Road and the M5, potential for fragmentation~~ Structure located between the Link Road and the M5 and due to embedded mitigation measures implemented no impacts anticipated

Structure/ tree reference[6]	Summary of survey results	Surveys complete?[7]	Roost characterisation[8]	Likely Impact of Scheme
BU_761	A single dropping was found on caravan inside shed during PBRA (no DNA analysis completed). The structure was assigned as high suitability. A single emergence survey was conducted in late September 2020, A peak total count of two *Myotis* (from call analysis assessed to be Natterer's), were recorded emerging. During the same survey a brown long-eared bat was recorded within the barn. No hibernation suitability.	No. Outstanding: • DNA analysis • two emergence/re-entry surveys (one in early summer)	Brown long-eared bat – night/ feeding roost; and *Myotis* (assumed to be Natterer's) – transitional roost.[13]	~~Between the Link Road and the M5, potential for fragmentation~~ Structure located between the Link Road and the M5 and due to embedded mitigation measures implemented no impacts anticipated
BU_762	The structure was assigned as high suitability during the PBRA. Droppings recorded outside the structure (no DNA analysis has been carried out), no internal survey completed. In early September 2019 a common pipistrelle bat was seen to enter during a re-entry survey. Two common pipistrelle bats were recorded emerging (two different locations) in mid-September 2020.	No. Outstanding: • internal • hibernation • DNA analysis • one emergence/re-entry survey (early summer)	Common pipistrelle – mating/transitional roost	~~Between the Link Road and the M5, potential for fragmentation~~ Structure located between the Link Road and the M5 and due to embedded mitigation measures implemented no impacts anticipated
BU_763	A surveyor observed bat droppings in doorway at the beginning of survey on 09/09/2020 (no DNA survey undertaken). The structure was assigned as high suitability during the PBRA. In mid-August 2019, no bats were recorded emerging. In early September 2020, roosting pipistrelle species were recorded under the northern apex of the structure, 15 and 25 minutes after sunset, both assumed to be common pipistrelle (based on later emerging species and emergence times). During the same survey, *Myotis* (assumed based on call ID to be Natterer's) were seen to emerge (two in total, with one briefly re-entering). Additionally, an incidental sighting of an emerging common pipistrelle bat in late September 2020 (while surveyors were completing a survey of an adjacent structure) was observed.	No. Outstanding: • internal • hibernation • DNA analysis • one emergence/re-entry survey (early summer)	Common pipistrelle – mating/transitional roost; and *Myotis* (assumed to be Natterer's) – transitional roost[14]	~~Between the Link Road and the M5, potential for fragmentation~~ Structure located between the Link Road and the M5 and due to embedded mitigation measures implemented no impacts anticipated

[13] This structure was assessed to provide bat roosting opportunities for a low conservation status roost only (i.e. small numbers of bats only), and therefore despite no emergence / re-entry survey data during the early summer period, it has not been assumed on a precautionary basis to be a maternity roost..
[14] This structure was assessed to provide bat roosting opportunities for a low conservation status roost only (i.e. small numbers of bats only), and therefore despite no emergence / re-entry survey data during the early summer period, it has not been assumed on a precautionary basis to be a maternity roost.

Structure/ tree reference[6]	Summary of survey results	Surveys complete?[7]	Roost characterisation[8]	Likely Impact of Scheme
BU_765	Small number of droppings recorded during PBRA; likely from brown long-eared and pipistrelle bats (no DNA analysis carried out) on cars at western end of structure. The structure was assigned as high suitability. A re-entry survey in mid-August 2019 and an emergence survey in mid-September 2020 were carried out with no bats recorded roosting in the structure. No hibernation suitability. No internal survey possible due to a lack of access.	No. Outstanding: • DNA analysis • one emergence/re-entry survey (early summer)	Unknown species (potentially brown long-eared or pipistrelle) – day roost	~~Between the Link Road and the M5, potential for fragmentation~~ Structure located between the Link Road and the M5 and due to embedded mitigation measures implemented no impacts anticipated
BU_766	Scattered droppings (Natterer's, common pipistrelle and soprano pipistrelle from DNA analysis) and moth wing fragments (likely to be feeding remains) collected on 18/07/2019 during PBRA. The structure was assigned as high suitability. A single emergence survey was completed in early September 2019 and no emergences were recorded. Two emergence/re-entry surveys are outstanding. No hibernation suitability.	No. Outstanding: • two emergence/re-entry surveys (one in early summer)	Natterer's – Night/ feeding roost; Common pipistrelle – Night/feeding roost; and Soprano pipistrelle – Night/feeding roost (all assumed[15] with limitations)	~~Between the Link Road and the M5, potential for fragmentation~~ Structure located between the Link Road and the M5 and due to embedded mitigation measures implemented no impacts anticipated
BU_771	No evidence was recorded during the PBRA survey, although no internal access was possible. The structure was assigned as high suitability. In late August 2019, no roost was recorded. In mid-September 2020 one common pipistrelle emerged from the lower, left gable end. Additionally, an incidental sighting in September 2019 (while surveying BU_762) also recorded one common pipistrelle roosting.	No. Outstanding: • internal • hibernation • two emergence/re-entry surveys (one in early summer)	Common pipistrelle – transitional roost	~~Between the Link Road and the M5, potential for fragmentation~~ Structure located between the Link Road and the M5 and due to embedded mitigation measures implemented no impacts anticipated
BU_834	No evidence was recorded during the PBRA survey. The structure was assigned as high suitability.	Yes	Common pipistrelle – day roost	~~Structure retained but potential for roost to be subject to temporary disturbance during~~

[15] This structure was assessed to provide bat roosting opportunities for a low conservation status roost only (i.e. small numbers of bats only), and therefore despite no emergence / re-entry survey data during the early summer period, it has not been assumed on a precautionary basis to be a maternity roost.

Structure/ tree reference[6]	Summary of survey results	Surveys complete?[7]	Roost characterisation[8]	Likely Impact of Scheme
	One common pipistrelle emerged from the east facing roof pitch in July 2021. No emergences were recorded in September 2020 or July 2021. No hibernation suitability.			~~construction.~~ Within the ZoI, but no impacts anticipated
BU_850	No evidence was recorded during the PBRA survey, although no internal access was possible. The structure was assigned as high suitability. A single common pipistrelle emerged from the gable end in early September 2019.	No. Outstanding: • internal • hibernation • two emergence/re-entry surveys (one in early summer)	Common pipistrelle – day roost	~~Between the Link Road and the M5, potential for fragmentation~~ Structure located between the Link Road and the M5 and due to embedded mitigation measures implemented no impacts anticipated
BU_853	No evidence was recorded during the PBRA survey. During a survey in late June 2019, two *Myotis* (likely to be Natterer's from sound analysis) emerged from a lifted roof tile and the open front of the shed. A brown long-eared bat was seen to emerge from the barn also. A survey in late July 2019 recorded no bats emerging. No hibernation suitability.	No. Outstanding: • one emergence/re-entry survey (early summer)	*Myotis* (assumed to be Natterer's) – Day roost; and Brown long-eared – Day roost	~~Between the Link Road and the M5, potential for fragmentation~~ Structure located between the Link Road and the M5 and due to embedded mitigation measures implemented no impacts anticipated
BU_854	Scattered droppings (Natterer's, common pipistrelle and brown long-eared from DNA analysis) were collected on 18/07/2019 during the PBRA inspection. The structure was assigned as high suitability. In late June 2019, A peak total count of nine common pipistrelle bats were observed emerging out of the main barn (maximum of three seen at one time. Additionally, two *Myotis* (assumed to be Natterer's from DNA analysis) emerged from the barn. In late July 2019, a single common pipistrelle was recorded returning to roost during a re-entry survey. In late May 2021, no bats were recorded emerging. A hibernation survey is outstanding.	No. Outstanding: • hibernation	Common pipistrelle – maternity roost; Natterer's – day roost; and Brown long-eared – day roost	~~Between the Link Road and the M5, potential for fragmentation~~ Structure located between the Link Road and the M5 and due to embedded mitigation measures implemented no impacts anticipated

Structure/ tree reference[6]	Summary of survey results	Surveys complete?[7]	Roost characterisation[8]	Likely Impact of Scheme
BU_855	Scattered droppings (common pipistrelle from DNA analysis) were collected on 18/07/2019 during the PBRA inspection. The structure was assigned as high suitability. In September 2019 no emergences were recorded. In May 2021 two common pipistrelle bats emerged.	No. Outstanding: • hibernation • one emergence/re-entry survey	Common pipistrelle – day roost	~~Between the Link Road and the M5, potential for fragmentation~~ Structure located between the Link Road and the M5 and due to embedded mitigation measures implemented no impacts anticipated
BU_857	Scattered droppings (Natterer's, common pipistrelle and whiskered from DNA analysis) were collected on 18/07/2019 during the PBRA inspection. The structure was assigned as high suitability. In August 2019 and September 2020 no emergences were recorded. No hibernation suitability. .	No. Outstanding: • one emergence/re-entry survey	Common pipistrelle – Night/feeding roost; Natterer's – Night/feeding roost; and Whiskered – Night/ feeding roost	~~Between the Link Road and the M5, potential for fragmentation~~ Structure located between the Link Road and the M5 and due to embedded mitigation measures implemented no impacts anticipated
BU_862	No evidence was recorded during the PBRA survey, although no internal access was possible. The structure was assigned as low suitability. In July 2020 a peak total count of six common pipistrelle bats emerged from three locations. In late September 2020 and early August 2021, no bats emerged. No hibernation activity was recorded.	No. Outstanding: • internal	Common pipistrelle – day roost	Within the ZoI, but no impacts anticipated ~~(retained and protected with noise barrier, if necessary)~~
BU_990	No evidence was recorded during the PBRA survey, although no internal access was possible. The structure was assigned as high suitability. In late July 2019 a single bat emerged from the end of the barn, assumed to be common pipistrelle. In mid-August 2019 no bats were seen to enter the structure. In late July 2020, one common pipistrelle bat was seen to emerge from the northern gable. No hibernation suitability.	No. Outstanding: • internal	Common pipistrelle – day roost	Within the ZoI, but no impacts anticipated ~~(retained and protected with acoustic barrier, if necessary)~~

Structure/ tree reference[6]	Summary of survey results	Surveys complete?[7]	Roost characterisation[8]	Likely Impact of Scheme
BU_992	During the PBRA inspection whiskered bat droppings were collected on 31/07/2019 (confirmed by DNA analysis). The structure was assigned as high suitability. In July 2019 four common pipistrelle bats were recorded emerging from two locations. In mid-August 2019 a single common pipistrelle bat emerged from the raised roof tiles nearest to the chimney stack. In July 2019, two common pipistrelle bats emerged. Additionally, in August 2019 when surveying BU_990 a common pipistrelle bat was recorded re-entering BU_992. No hibernation survey possible as there is no roof void based on the asbestos report.	No. Outstanding: • internal	Common pipistrelle – day roost; Whiskered – transitional roost	Within the ZoI, but no impacts anticipated ~~(retained and protected with acoustic barrier, if necessary)~~
Tree 101	The tree was assigned as moderate suitability. No evidence of bats was recorded during the GLTA survey. Three emergence/re-entry surveys are outstanding. During the ALBST in late May 2021 a male Natterer's bat was recorded roosting for the day (day roost) at this location. Due to the inaccuracy of radio tracking the exact location of this bat roost is unknown. As Tree 101 is a tree located within 20 m of this grid reference, on a precautionary basis it was assumed that Tree 101 is a Natterer's day roost. No hibernation activity was recorded.	No. Outstanding: • three emergence/re-entry surveys	Natterer's – day roost	Tree retained and no disturbance impacts are expected through additional mitigation measures
Tree 675	The tree was assigned as moderate suitability. No evidence of bats was recorded during the GLTA survey. In May 2022 a bat noctule bat was recorded from the direction of the tree. Due to the survey limitations (only access on one side of the tree was possible) it is assumed that the bat emerged from the tree. Two emergence/re-entry surveys are outstanding. No hibernation activity was recorded.	No. Outstanding: • two emergence/re-entry surveys	Noctule – day roost	Within the ZoI, but no impacts anticipated
BU_1034a	No evidence was recorded during the PBRA survey, although no internal access was possible. However, during the PBRA the owner made an un-verified comment about seeing dead bats within this structure on two occasions. Three emergence/re-entry surveys in 2021 and 2022 have been completed and no bats have been recorded roosting.	No. Outstanding: • internal • hibernation	Former unknown species – unknown roost (assumed, with limitations)	~~Demolished~~ Structure retained but potential for roost to be subject to temporary disturbance during construction.

3.1.4. Following the 2023 surveys, a total of 26 structures anticipated to be impacted by the Scheme remain partially surveyed. Three of these (BU_1537, BU_978 and BU_1025) are not predicted to support roosting bats. Five of these already have roosting bats confirmed, but no additional bat roosts are predicted (BU_963, BU_1039, BU_972, BU_819 and BU_965). Seven of these already have roosting bats confirmed, and additional bat roosts are predicted (BU_1027, BU_1034, BU_48, BU_987, BU_1030, BU_1042 and BU_667). The remaining ten do not have roosting bats confirmed, but roosting bats are predicted (BU_1432, BU_1098, BU_45, BU_54, BU_966, BU_983, BU_1041, BU_1014, BU_1091 and BU_1527).

3.1.5. In addition, following the 2023 surveys nine trees anticipated to be impacted by the Scheme remain partially surveyed and two trees have not been surveyed at all. All of these trees are predicted to support roosting bats.

3.1.6. The predicted roost types and species, and likely impact of the Scheme for structures and trees with no/incomplete surveys is detailed below in Table 3-2.

Table 3-2 - Predicted roosts in unsurveyed and partially surveyed structures and trees

Structure or tree number[16]	Predicted roost	Potential Impact of Scheme
BU_1432	Crevice dwelling bat roost supporting solitary/small numbers of bats	Temporary Disturbance
BU_1027	Crevice dwelling bat roost supporting solitary/small numbers of hibernating bats (in addition to the known roost (as detailed in Table 3-1 above)).	Demolished
BU_1034	Crevice dwelling bat roost supporting solitary/small numbers of hibernating bats (in addition to the known roosts (as detailed in Table 3-1 above)).	Temporary Disturbance
BU_1098	Features suitable for solitary or small numbers of hibernating bats.	Culvert Extended – temporary disturbance
BU_45/BU_54	Two crevice dwelling bat roost supporting solitary/small numbers of bats. One void dwelling bat roost supporting solitary/small numbers of bats.	Demolished
BU_48	One void dwelling bat roost supporting solitary/small numbers of bats. One lesser horseshoe bat roost supporting solitary/small numbers of bats. (in addition to the known roosts (as detailed in Table 3-1 above)).	Temporary Disturbance
BU_987	Crevice dwelling bat roost supporting solitary/small numbers of hibernating bats (in addition to the known roost (as detailed in Table 3-1 above)).	Demolished

[16] Where multiple references are listed it is considered that the roost may be in any of the structures, and these have been grouped due to their locality and similar construct.

Structure or tree number[16]	Predicted roost	Potential Impact of Scheme
BU_1030	Crevice dwelling bat roost supporting solitary/small numbers of hibernating bats (in addition to the known roost (as detailed in Table 3-1 above)).	Demolished
BU_1042	Crevice dwelling bat roost supporting solitary/small numbers of hibernating bats (in addition to the known roost (as detailed in Table 3-1 above)).	Demolished
BU_966/ BU_983/ BU_1041	One void dwelling bat roost supporting solitary/small numbers of bats Crevice dwelling bat roost supporting solitary/small numbers of bats One crevice dwelling bat roost supporting solitary/small numbers of hibernating bats	Demolished
BU_1014	Crevice dwelling bat roost supporting solitary/small numbers of bats	Temporary Disturbance
BU_1091	Crevice dwelling bat roost supporting solitary/small numbers of bats	Temporary Disturbance
BU_1527	Features suitable for larger numbers of hibernating bats	Demolished
BU_667	Crevice dwelling bat roost supporting solitary/small numbers of hibernating bats (in addition to the known roost (as detailed in Table 3-1 above)).	Demolished
Tree 727	High suitability tree predicted to support a maternity roost	Temporary disturbance
Tree 736	High suitability tree predicted to support a maternity roost	Temporary Disturbance
Tree 660	High suitability tree predicted to support a maternity roost	Felled
Tree 663	Moderate suitability trees predicted to support solitary/small numbers of bats	Felled
Tree 664	Moderate suitability trees predicted to support solitary/small numbers of bats	Felled
Tree 512	Moderate suitability trees predicted to support solitary/small numbers of bats	Temporary Disturbance
Tree 649	Moderate suitability trees predicted to support solitary/small numbers of bats	Temporary Disturbance
Tree 241	High suitability tree predicted to support a maternity roost	Temporary Disturbance
Tree 656	Moderate suitability trees predicted to support solitary/small numbers of bats	Felled

Structure or tree number[16]	Predicted roost	Potential Impact of Scheme
Tree 596	Moderate suitability trees predicted to support solitary/small numbers of bats	Felled
Tree 240	Moderate suitability trees predicted to support solitary/small numbers of bats	Temporary Disturbance

3.1.7. Figure 1B in Appendix E displays the identified confirmed roosts and the predicted roosts.

3.1.8. The predicted roosts across structures and trees can be summarised as:

- One lesser horseshoe bat roost supporting solitary/small numbers of bats that would be temporarily disturbed.
- Three void dwelling bat roosts supporting solitary/small numbers of bats, one of which would be temporarily disturbed and two lost.
- Six crevice dwelling bat roosts supporting solitary/small numbers of bats, three of which would be temporarily disturbed and three lost.
- Eight hibernation roosts supporting solitary/small numbers of crevice dwelling bats, two of which would be temporarily disturbed and six lost.
- One hibernation roost supporting larger numbers of hibernating bats that would be lost.
- Four high suitability trees predicted to support a maternity roost, three of which would be temporarily disturbed and one lost.
- Severn moderate suitability trees predicted to support solitary/small numbers of bats, three of which would be temporarily disturbed and four lost.

3.1.9. As stated in Section 2.2, the approach to predicting the likelihood of bats present within partially surveyed/unsurveyed structures and trees has been revised following consultation with Natural England, taking into account the results of the 2023 surveys and accounting for the localised refinement of impacts. As detailed above, 19 roosts are now predicted to be present within partially surveyed structures and 11 roosts are now predicted to be present within partially surveyed/unsurveyed trees. Previously, and as reported in Chapter 7 of the ES – Biodiversity (Application document TR010063 / APP 6.5), 39 roosts were predicted to be present within partially surveyed/unsurveyed structures impacted by the Scheme and 34 roosts were predicted to be present within partially surveyed/unsurveyed trees impacted by the Scheme.

4. Evaluation

4.1.1. Taking into account the 2023 survey data, a small number of additional low conservation status bat roosts have been identified. Following a revised approach to predicting the presence of roosting bats coupled with localised refinements of impacts, fewer bat roosts are predicted within partially surveyed/unsurveyed structures and trees that will be impacted by the Scheme.

4.1.2. Taking into account the known and predicted assemblage of species recorded roosting within the survey area, which includes Annex II species, the bat roost resource is considered to remain a resource of Regional importance for biodiversity, as per the Biodiversity Chapter of the ES (Application document TR010063 / APP 6.5).

5. Potential Impacts

5.1. Embedded and Additional Mitigation measures

5.1.1. Mitigation, compensation and enhancement measures have been embedded at the design stage to minimise or compensate for impacts on biodiversity, or to provide enhancements. Embedded mitigation measures for roosting bats include:

- Provision of alternative roost habitat through construction of two compensatory bat roost structures.

5.1.2. Additional essential mitigation measures for roosting bats are required, as detailed within Chapter 7 - Biodiversity of the ES (Application document TR010063 / APP 6.5) and Technical Appendix 7.15 - Bat Mitigation Strategy (Application document TR010036 / APP 6.15). This includes the provision of alternative roosting habitat in the form of crevice dwelling bat structures, bat boxes (suitable for non-breeding roosts, maternity roosts or hibernation roosts), horseshoe night roosts and the retention or creation of tree roosting features. Dark corridors will be maintained around all roosting habitat. The locations of the alternative roosting provision will be as close as possible to the original roost locations, and within the same quadrant[17] .

5.1.3. As explained in Section 1.2 above, it was anticipated that the results of the 2023 surveys may necessitate refinement of the mitigation and compensation package for roosting bats as presented in the ES. Table 5-1 below presents the additional essential mitigation measures for roosting bats as presented in paragraph 7.8.149 of Chapter 7 - Biodiversity of the ES (Application document TR010063 / APP 6.5) and paragraph 2.3.36 of Technical Appendix 7.15 - Bat Mitigation Strategy (Application document TR010063 / APP 6.15), alongside a refined package of mitigation and compensation informed by the 2023 survey data that has been agreed with Natural England. This refined package is presented in the draft Bat Mitigation Licence which Natural England have approved, as evidenced by the Letter of No Impediment (LoNI) received from Natural England in March 2024, which is included in Appendix D of the Statement of Common Ground (SoCG) with Natural England (Application document TR010063 / APP 8.5).

5.1.4. Overall, the refined mitigation package has resulted in a reduction in the level of compensatory roost provision, with fewer structures (crevice dwelling bat roost structures and horseshoe night roosts) proposed, but in some cases an increase in the number of bat boxes.

Table 5-1 - Additional essential mitigation measures for roosting bats

Quadrant	Additional essential mitigation measures for roosting bats as presented in Chapter 7 - Biodiversity of the ES (Application document TR010063 / APP 6.5) and Technical Appendix 7.15 - Bat Mitigation Strategy (Application document TR010063 / APP 6.15)	Refined package of additional essential mitigation measures for roosting bats
Northern	Three crevice dwelling bat roost structures Five artificial bat boxes for crevice dwelling species One artificial maternity bat box	One crevice dwelling bat roost structure Four artificial bat boxes for small numbers of crevice dwelling hibernating bats. Five artificial bat boxes for crevice dwelling species. Six artificial maternity/hibernation bat boxes.

[17] Different sectors of the Scheme are referred to as 'quadrants,' defined by the A4019 and the M5. Northern quadrant – north of the A4019 and west of the M5; Eastern quadrant – north of the A4019 and east of the M5; Southern quadrant – south of the A4019 and east of the M5; Western quadrant – south of the A4019 and west of the M5

Quadrant	Additional essential mitigation measures for roosting bats as presented in Chapter 7 - Biodiversity of the ES (Application document TR010063 / APP 6.5) and Technical Appendix 7.15 - Bat Mitigation Strategy (Application document TR010063 / APP 6.15)	Refined package of additional essential mitigation measures for roosting bats
	One tree roosting feature.	One tree roosting feature.
Eastern	Two horseshoe night roosts Three hibernation bat boxes One tree roosting feature	One artificial bat box for crevice dwelling species.
Southern	Three horseshoe night roosts Two crevice dwelling bat roost structures Five hibernation bat boxes One artificial maternity bat box.	Ten artificial bat boxes for small numbers of crevice dwelling hibernating bats. Eight artificial bat boxes for crevice dwelling species. Two artificial maternity/hibernation bat boxes. Three tree roosting features.
Western	One artificial bat box for crevice dwelling species Two tree roosting features	Two tree roosting features.

5.1.5. Retained roosts will be protected through localised implementation of sensitive timing of works or acoustic barriers to avoid disturbance impacts.

5.1.6. Acoustic barriers are detailed in paragraph 2.2.2 of Technical Appendix 7.15 - Bat Mitigation Strategy (Application document TR010063 / APP 6.15). Structures and trees detailed within paragraphs 2.2.1 and 2.2.4 have been refined, with measures to retain roosts detailed as per the below bullet points. These are also shown on Figure 1E in Appendix E. Each of these locations will be protected through localised implementation of sensitive timing of works or acoustic barriers to avoid disturbance impacts this is recorded within 7.4 Register of Environmental Actions and Commitments (Application document TR010063 / APP 7.4) row B15.

- Roosts within BU_638 (common pipistrelle day roost and hibernation roost), BU_735 (common pipistrelle day roost) and BU_661 (common pipistrelle and brown long-eared bat day roost) north of the Order limits on the north side of the A4019 at Uckington.
- Along the south side of the A4019, east of the fire station. There are approximately 24 residential properties along the A4019 in this location set back approximately 15 m from the Order limits, all of which will be retained and will remain occupied during the works. Roosting bats have been confirmed at BU_11 (a lesser horseshoe day roost) and BU_614 (a soprano pipistrelle day roost), however it has not been possible to survey many of these properties as a result of access restrictions, and it is possible that additional bat roosts are present. In any case, this is already a highly disturbed location, and widening of the A4019 will take place to the north, ensuring that the majority of the works will take place on the opposite side of the road. Therefore, significant disturbance impacts are not anticipated, although it is proposed to implement an acoustic barrier here as a precaution, to ensure that impacts are avoided.
- At BU_668, BU_645 and Tree 665 along Moat Lane. BU_668 is located approximately 15 m from the Order limits with minor works and demolition works located approximately 27 m from the structure. BU_645 and Tree 665 are located approximately 5-10 m from the Order limits, but works here are very minor, with demolition works located approximately 40 m away. Surveys of BU_668 recorded a lesser horseshoe mating and day roost and a common pipistrelle day roost. BU_645 is partially surveyed, assessed to provide high suitability for crevice dwelling bat

species. Tree 665 is also partially surveyed and was assessed to provide moderate suitability for tree roosting bats.

- At Tree 101, which is located within the Order limits approximately 7 m south of the River Chelt. Tree 101 supports a Natterer's day roost. In this area, the works comprise improvements restricted to the river channel to improve hydromorphological and ecological diversity.
- At Tree 273 which is located approximately 10 m from the Order limits where a compound will be located. Tree 273 is a partially surveyed tree that was assessed to provide high suitability for tree roosting bats.
- At BU_984 and BU_989 unsurveyed structures located north of Junction 10, at the informal Traveller site to the east of the motorway. At this location, works are required to the motorway embankments approximately 20 m west of the structures, a compound is located to the south and an access track will be constructed immediately south of the structures to provide access to the informal Traveller site. If access can be arranged, further surveys may confirm the likely absence of roosting bats. Alternatively, works will be appropriately timed or acoustic barriers will be installed to avoid disturbance impacts.

5.1.7. Works which would impact on known roosts, or predicted bat roosts, will be carried out under a Natural England European Protected Species (EPS) licence. This will require the presence of an appropriately licensed ecologist for the duration of the works in accordance with the method statement agreed with Natural England.

5.1.8. Pre-construction surveys will be undertaken prior to tree felling or the demolition of buildings. Surveys may need to be updated to ensure that any new roosts are identified, and that the current status of roosts are understood, and surveys will also be required where access has prevented surveys being undertaken to-date. If any new roosts are identified these would need to be included in the EPSML.

5.1.9. Demolition of structures or felling of trees with features suitable to support roosting bats, but where surveys have not confirmed the presence of bats, will be completed under precautionary working methods (non-licensed method statement) under guidance from an appropriately licensed ecologist.

5.2. Impacts

5.2.1. Impacts to bat roosts include permanent loss through felling or demolition, or temporary disturbance during the construction phase. No permanent disturbance impacts are expected as noise levels and lighting levels will remain below baseline levels for all structures and trees.

5.2.2. Considering the above embedded and additional mitigation, as shown on Figure 1F in Appendix E the impact of roost loss or temporary disturbance has been reduced as far as feasible.

5.2.3. Table 5-2 below provides a summary of bat roosts to be lost or temporarily disturbed. This provides an update to Table 7-12 within Chapter 7 of the ES – Biodiversity (Application document TR010063 / APP 6.5). Updates following the 2023 surveys are given in red text, with any original text struck through.

Table 5-2 - Summary of known bat roosts to be lost or temporarily disturbed, accounting for the 2023 bat surveys (note, updates are shown in red text, with original text struck through)

Species	Roost type	Total number demolished or felled	Total number at risk of temporary disturbance during construction
Common pipistrelle	~~Maternity roost (Assumed with limitations)~~	~~1~~	
	~~Day/hibernation~~		~~1~~
	~~Day/mating roost~~		~~1~~
	~~Night/feeding roost~~		~~1~~
	Day roost	~~6~~ 9	~~10~~ 3
	~~Day/transitional~~		~~1~~
	Mating		1
	Transitional	1	
Soprano pipistrelle	Maternity roost (Assumed with limitations)	1	
	Mating roost		1
	Day roost	~~4~~ 6	~~1~~
Common or soprano pipistrelle	Day roost	~~1~~ 2	
Lesser horseshoe	Day~~/night/feeding~~ roost	4	~~2~~
	Transitional roost	1	
Noctule	Day roost	1	2
Barbastelle	Transitional roost	1	
Brown long-eared	Day roost	2	~~1~~
	~~Hibernation roost~~		~~1~~
Myotis (assumed to be Natterer's)	Day roost		1
Myotis (assumed to be Whiskered/Brandts or Natterer's)	Day roost	1	

Species	Roost type	Total number demolished or felled	Total number at risk of temporary disturbance during construction
~~Natterer's~~	~~Day roost~~		~~1~~
~~Whiskered~~	~~Transitional~~		~~1~~
~~Unknown~~	~~Unknown~~		~~1~~
Total		~~22~~ 29	~~26~~ 8

5.2.4. No impacts as a result of roost loss or disturbance are anticipated to the remaining roosts identified given their location at a sufficient distance beyond the footprint of the works, the proposed works at any particular location, features present that would attenuate noise or due to mitigation measures that the Scheme has committed to that would avoid impacts. This includes any structures or trees between the M5 and Link Road, where due to mitigation no fragmentation impacts are expected to occur.

5.2.5. Further consideration is given to predicted bat roosts as detailed Table 3-2. Impacts to predicted roosts are detailed within Table 5-3 below:

Table 5-3 - Summary of predicted bat roosts to be lost or temporarily disturbed, accounting for the 2023 bat surveys

Predicted Species within Roost	Roost type	Total number demolished or felled	Total number at risk of temporary disturbance during construction
Crevice dwelling (common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, Natterer's, Daubenton's, whiskered, Brandt's, Leisler's and serotine, but predominantly common pipistrelle and soprano pipistrelle)	Solitary/small numbers non-breeding roost	3	3
	Solitary or small hibernating roost	6	2
Void dwelling (Brown long-eared, Natterer's, Daubenton's, whiskered and Brandt's, but predominantly brown long-eared and Natterer's.)	Solitary/small numbers non-breeding roost	2	1
Horseshoe (Lesser horseshoe bat)	Solitary/small numbers non-breeding roost		1

Predicted Species within Roost	Roost type	Total number demolished or felled	Total number at risk of temporary disturbance during construction
Tree dwelling (Common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, Bechstein's, Natterer's, Daubenton's, whiskered, Brandt's, Leisler's, noctule and barbastelle, but predominantly noctule and Natterer's.)	Solitary/small numbers non-breeding roost	4	3
	Maternity/breeding roost	1	3
Crevice dwelling or void dwelling	Larger numbers of hibernating bats (estimated 30 individuals)	1	
Total		**17 (This figure was 32 in the ES)**	**13 (This figure was 41 in the ES)**

5.2.6. The details of known and predicted roosts to be lost through felling or demolition can be found in Figure 1C and those to be considered at risk of temporary disturbance in Figure 1D in Appendix E.

5.2.7. The 2023 survey work, which was not reported in the ES, coupled with localised refinements of impacts, has confirmed that a precautionary approach was taken when considering unsurveyed/partially surveyed structures and trees, and the predicted roosts and impacts presented in the ES are an over-estimation.

6. Residual Effects

6.1.1. Taking into account any updates presented here, and considering the embedded and essential mitigation measures, bats could potentially be subject to a minor adverse residual effect as a result of loss and disturbance of roosts. For a resource of Regional importance for biodiversity, results in a slight adverse residual effect, which is not significant. Despite the precautionary approach reported in the ES, this remains the same as that presented in Chapter 7 of the ES – Biodiversity (Application document TR010063 / APP 6.5) and is not a change of the overall conclusion.

Appendices

Appendix A. 2023 Survey Limitations

Survey Type	Structure or Tree Reference	What the Limitation was	How significant the limitation is considered to be
PBRA	BU_1424	It was not possible to access the western aspect of the property due to health and safety concerns, due to a dog being present within the garden.	This was not considered a significant limitation as features had been identified that would require further surveys, and the roof was visible through binoculars from a distance.
Internal	BU_981	The loft space was only partially accessible due to not being fully boarded throughout.	As full surveys were undertaken including a hibernation static deployment this is not considered to be a significant limitation.
Internal	BU_966	The loft space was only partially accessible due to not being fully boarded throughout. Only one of the two required emergence surveys has been undertaken.	As a precaution, the presence of a roost within the property (or adjacent properties without full surveys) is assumed. This is not considered to be a significant limitation.
Internal	BU_1006	The loft space had no boarding, and so was only safely visible from the loft hatch entrance.	As full surveys were undertaken of this property, this is not considered to be a significant limitation.
Emergence	BU_1098	Due to significant overgrown vegetation, surveyors were unable to identify the exact location of the western culvert entrance and therefore surveyed the vegetation at the end of the culvert on 12/09/2023. The eastern culvert entrance remains inaccessible for health and safety reasons.	As the feature is significantly overgrown due to vegetation on the road verge, which is managed in the same manner on the east and west road verges it is highly likely that the culvert is inaccessible to bats. However, as a roost has been predicted on a precautionary basis this is not considered to be a significant limitation.
Emergence	BU_45	The camera battery for the infrared camera on the northern aspect of the house ran out 20 minutes prior to the end of the survey on 10/08/2023.	A surveyor continued to observe the structure, however without use of an NVA. In the absence of any other emergence surveys undertaken this is considered a limitation, however this structure has been predicted to support a roost and therefore this is not considered a significant limitation to the impact assessment.

Survey Type	Structure or Tree Reference	What the Limitation was	How significant the limitation is considered to be
PBRA / Emergence	BU_589	The southern and eastern aspect of BU_589 was not closely accessible for the survey on 10/08/2023 due to vegetation and storage of items.	This is not considered to be a significant limitation as the structure was predominantly metal and surveys of adjacent buildings did not record high levels of bat activity which would have indicated a roost nearby.
Emergence	BU_1527	There was heavy rain immediately prior to and during the survey on 11/07/2023.	As pipistrelle bats were recorded foraging throughout, this is not considered to be a significant limitation to the survey results.
Emergence	BU_1044	Rain was recorded intermittently throughout the survey on 28/06/2023, and the survey was therefore called off at one hour after sunset.	Although a proportion of the survey was missed, the survey covered the period when the majority of bats emerge. This, combined with the results of the previous survey, where no bats were recorded emerging, is considered to provide sufficient evidence to conclude a likely absence of roosting bats.
Emergence	BU_1522	Due to significant overgrown vegetation, surveyors on 27/09/2023 were unable to identify the exact location of the western culvert entrance and therefore surveyed the vegetation at the end of the culvert. The eastern culvert entrance remains inaccessible due to a lack of land access.	As the feature is significantly overgrown due to vegetation on the road verge, which is managed in the same manner on the east and west road verges it is highly likely that the culvert is inaccessible to bats. Furthermore, on the basis that the structure was re-assessed in 2023 to provide low bat roosting suitability, this survey was not required as only one emergence survey is required for low suitability structures.
Emergence	BU_1027	On the third emergence survey, 20/09/2023, there was intermittent rain at the beginning of the survey.	As the rain did not last the full survey, and emergences of bats were recorded between the rain showers this is not considered to be a significant limitation.
Emergence	BU_1042	On the survey on 21/06/2023, the infra red lights failed.	This is not considered a significant limitation as the Canon XA series cameras have inbuilt infrared lights, and surveyors continued to observe the building.

Survey Type	Structure or Tree Reference	What the Limitation was	How significant the limitation is considered to be
Emergence	BU_1045	The survey on 14/09/2023 did not begin until 5 minutes prior to sunset.	As no bats were heard or seen on the full spectrum detectors during set up, this is not considered to be a significant limitation.
Emergence	BU_668	The survey on 19/09/2023 began 5 minutes after sunset due to delays.	As bat emergences were recorded, and the first record of a bat was 30 minutes after the survey start time this is not considered to be a significant limitation.
Emergence	BU_1528	The survey on 01/08/2023 had no access to the northern aspect due to no land access.	The camera on the western gable end was able to record the tiles facing north which were the primary roosting feature identified, therefore this is not considered to be a significant limitation.

Appendix B. 2023 Structure Survey Results

Where cells for specific surveys are highlighted red, surveys have not yet been completed. Where surveys have been completed, this is highlighted in green.
Updates following the 2023 surveys are shown in red text.

Feature	Brief description of structure	PBRA Results	PBRA Survey Date	Hibernation suitability	Hibernation Survey	Roost Survey 1	Roost Survey 2	Roost Survey 3	Surveys complete	Access Limitations (Any further limitations are detailed in the section below)
BU_1006	A two-storey residential building with a dual pitched gable roof.	Moderate	14/12/2020	No typical hibernating sites identified, given the metal construct considered unlikely to support hibernating bats	N/A	Dusk 20/07/2023	Dusk 14/09/2023	N/A	Yes	
BU_19	A gable ended metal shed / workshop.	Low	10/08/2023	No typical hibernating sites identified, given the metal construct considered unlikely to support hibernating bats	N/A	Dusk 10/08/2023	N/A	N/A	Yes	
BU_25	A gable ended metal shed / workshop.	Low	10/08/2023	No typical hibernating sites identified, given the metal construct considered unlikely to support hibernating bats	N/A	Dusk 10/08/2023	N/A	N/A	Yes	
BU_45	Two-storey semi-detached residential property with a hipped slate imitation tiled roof. Extension at the northern elevation. Internally the loft space is open and lined with sarking boarding. This property is attached to BU_819	Moderate	10/08/2023	No typical hibernating sites identified however no internal survey completed	N/A	Dusk 08/07/2021	Dusk 10/08/2023	N/A	No – due to limitations	The dusk undertaken on 08/07/2021 was shorter at the householders request and should therefore be repeated.
BU_48	A gable ended metal shed / workshop. A door is present on the western gable end with damage.	Confirmed (no internal access)	10/08/2023	No typical hibernating sites identified, given the metal construct considered unlikely to support hibernating bats	N/A	Dusk 10/08/2023	No access	No access	No	Access retracted. No internal access
BU_589	A gable ended metal shed / workshop.	Low	10/08/2023	No typical hibernating sites identified, given the metal construct considered unlikely to support hibernating bats	N/A	Dusk 10/08/2023	N/A	N/A	Yes	
BU_836	A two-storey gable ended residential property with slate roof tiles.	Moderate	27/07/2021	No typical hibernating sites identified however no internal survey completed	N/A	Dusk 12/07/2023	Dusk 07/09/2023	N/A	Yes	No internal access
BU_359	A single storey mono-pitched wooden cladded garage or workshop.	Low	27/07/2021	No typical hibernating sites identified however no internal survey completed	N/A	Dusk 12/07/2023	N/A	N/A	Yes	No internal access
BU_1432	A two-storey gable ended residential property with concrete roof tiles.	Moderate	27/09/2023	No typical hibernating sites identified however no internal survey completed	No access at appropriate time of year	No access	No access	No access	No	No access for emergence surveys
BU_1014	A single storey fronted workshop with metal roof, leading to a rear two storey height workshop with concrete roof and ridge tiles.	Low	20/09/2023	No typical hibernating sites identified however no internal survey completed	No access at appropriate time of year	No access	No access	No access	No	No access for emergence surveys
BU_1091	A two storey residential building with concrete roof tiles and ridge tiles	Moderate	20/09/2023	No typical hibernating sites identified however no internal survey completed	No access at appropriate time of year	No access	No access	No access	No	No access for emergence surveys
BU_1027	A two-storey residential building with a gabled and hipped roof with clay roof tiles.	Confirmed *(no internal access)*	21/08/2019	No typical hibernating sites identified however no internal survey or close inspection completed	No access at appropriate time of year	Dusk 06/07/2023	Dusk 04/09/2023	Dusk 20/09/2023	No	No access possible during the hibernation period
BU_1030	A two-storey residential building with a cross tabled roof with slate roof tiles.	Confirmed *(no internal access)*	31/07/2019	No typical hibernating sites identified however as bats have been confirmed to roost, hibernation is considered possible	No access at appropriate time of year	Dusk 28/08/2020	Dawn 30/07/2021	Dusk 27/07/2023	No	No access possible during the hibernation period
BU_1042	A two-storey residential brick building with a cross gabled roof of concrete or clay roof tiles.	Confirmed	31/07/2019	No typical hibernating sites identified however as bats have been confirmed to roost, hibernation is considered possible	No access at appropriate time of year	Dusk 18/08/2020	Dawn 22/07/2021	Dusk 21/06/2023	No	No access possible during the hibernation period
BU_1044	A single-storey brick building with a dual pitched gable ended clay roof tile.	Moderate *(no internal access)*	18/11/2020	No typical hibernating sites identified however no internal survey completed	N/A	Dusk 09/05/2022	Dusk 28/06/2023	N/A	Yes	No internal access
BU_1045	A two-storey residential building with a dual pitched gable ended slate tiled roof.	Low *(No internal access)*	12/04/2022	No typical hibernating sites identified however no internal survey completed	N/A	Dusk 14/09/2023	N/A	N/A	Yes	No internal access

Feature	Brief description of structure	PBRA Results	PBRA Survey Date	Hibernation suitability	Hibernation Survey	Roost Survey 1	Roost Survey 2	Roost Survey 3	Surveys complete	Access Limitations (Any further limitations are detailed in the section below)
BU_1045a	Single storey brick wood store with a tiled pitched roof and open on one side.	Low	12/04/2022	No	N/A	Dusk 14/09/2023	N/A	N/A	Yes	
BU_1045b	Single storey wooden workshop.	Low	12/04/2022	No typical hibernating sites identified however no internal survey completed	N/A	Dusk 14/09/2023	N/A	N/A	Yes	No internal access
BU_1098	Two pre-cast concrete culverts running under the M5.	Moderate – revised in 2023 from high potential following a re-assessment of on site conditions and the culvert inspection report	18/01/2022	Yes *(no internal access, based on results within the culvert inspection report only)*	No access – as licence agreement to access land/pond could not be gained in time	Static survey of both the culvert entrances (as a replacement to a single traditional bat emergence survey) 04/05/2022 to 24/05/2022	Dusk 12/09/2023	No access	Yes	No access to undertake a hibernation survey
BU_1522	A single pipe pre-cast concrete culvert flowing underneath the M5, south of J10. Only the culvert entrances can be seen.	Low Revised in 2023 from high to low following a re-assessment of the on site conditions and the culvert report where excessive flooding was observed, entrances blocked by vegetation and few crevices internally	27/07/2021	Yes	SM4 deployed at each end of the culvert between 13/12/2021 and 03/01/2022 only one passing LHS recorded	Dusk 04/05/2022	Dusk 27/09/2023 Note, survey not required as only one emergence survey is required for low suitability structures.	N/A	Yes	
BU_1527	A culvert running beneath the A4019 north west to south east. One side (north of the A4019) entrance not visible due to overgrown vegetation. The entrance south of the A4019 is visible and the entrance is approximately 1.5 m tall, with very little water present. There is a large void (with open entrance) that leads to two culverts. Assumed on a precautionary basis to be High as it may provide hibernation habitat within the joints of the culvert.	High	04/05/2022	Yes (assumed)	No survey	Static survey detectors used between 04/05/2022 and 24/05/2022 on southern culvert entrance only[18]	Dusk 11/07/2023	Dusk 11/09/2023	No	No hibernation survey undertaken
BU_1528	A single storey brick bus stop with a dual pitched clay tiled roof with clay roman roof and ridge tiles.	Moderate	12/04/2022	N/A	N/A	Dawn 28/04/2022	Dusk 01/08/2023	N/A	No	
BU_667	Single storey, gable-ended building with dual-pitched double Roman interlocking clay tiled roof Extensive growth of ivy and staghorn sumac. This building is only accessible internally by BU_718 via the single open archway	Confirmed	25/08/2020 (internal completed 09/03/2022)	No typical hibernating sites identified however as bats have been confirmed to roost, hibernation is considered possible	No typical hibernating sites identified however as bats have been confirmed to roost, hibernation is considered possible	Dusk 05/02/2022	Dusk 02/08/2023	Dusk 18/09/2023	No	No access during the hibernation period was possible
BU_668	Single storey brick open outhouse with tiled roof. Property is predominantly covered in ivy and has a single open door .	Confirmed	09/03/2022	No typical hibernating sites identified however as bats have been confirmed to roost. Considered unlikely to provide sufficient stable temperature	No access	Dusk 10/05/2022	Dusk 19/09/2023	Not considered required for roost characterisation	Yes	
BU_963	Two storey brick residential building with cross gabled roof laid with simple, flat concrete tiles.	Confirmed	01/08/2019	No typical hibernating sites identified however as bats have been confirmed to roost, hibernation is considered possible	Required – no access at appropriate time of year	Dusk 03/07/2019	Dawn 21/08/2019	Dusk 07/07/2021	No	No access for hibernation at appropriate times of year
BU_964	Two storey brick residential building with slate imitation tiled roof, gable fronted porch and two gable dormers on the northern aspect.	Low *(no internal access)*	03/12/2020	No typical hibernating sites identified however no internal survey completed	Completed (by landowner placing static in the loft due to internal access) not required	Dusk 26/09/2023	N/A	N/A	Yes	No Internal access

[18] The one static survey that was conducted instead of an emergence survey, due to this survey limitation was not assessed to be able to sufficiently determine it base were roosting within the culvert, therefore it is assessed that surveys are still outstanding

Feature	Brief description of structure	PBRA Results	PBRA Survey Date	Hibernation suitability	Hibernation Survey	Roost Survey 1	Roost Survey 2	Roost Survey 3	Surveys complete	Access Limitations (Any further limitations are detailed in the section below)
BU_965	Two storey residential building with a hipped slate tiled roof. A cross gabled extension is present to the south of the main house. Conservatory in south-eastern corner of house.	Confirmed	31/07/2019	No	Completed	Dusk 07/09/2020	Dusk 26/07/2021	Not completed	No	Access retracted. No access in 2023 for health and safety concerns.
BU_966	Residential building with two newer extensions. Main building has a hipped pitched slate tiled roof Concrete block modern single storey extension on the southern elevation, with asbestos slates.	Moderate	24/07/2019	No typical hibernating sites identified	N/A	Dusk 28/09/2020	No access	N/A	No	Access retracted. No access in 2023 for health and safety concerns.
BU_981	Residential property with a cross gabled clay tiled roof Wooden cladding on front gable end and porch roof.	Confirmed	03/12/2020	No	Static deployed19/01/2021 – 25/03/2021	Dusk 15/06/2021	Dusk 08/07/2021	Dusk 26/06/2023	Yes	
BU_987	Two-storey multi-pitched residential building with several extensions. Main house has a gabled hipped roof. Entire eastern aspect is a new extension.	Confirmed	24/07/2019	No typical hibernating sites identified however as bats have been confirmed to roost, hibernation is considered possible	No access at appropriate time of year	Dusk 01/09/2020	Dusk 31/08/2021	Dusk 25/09/2023	No	Access retracted

Appendix C. Confirmed Bat Roost Assessment

Updates following the 2023 surveys are shown in red text

Table C-1 - Survey Results BU_1030

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
31/07/2019	N/A Daytime inspection (external only)	BU_1030	N/A	Air temp: 20 (˚C), no rain, cloud cover 8, wind speed 2
Comments: Atkins: SK and RM				
Visual inspection: An occupied residential building with a butterfly roof with two pitched roofs with gable ends. Slate roof tiles which are flush to the roof. Two dormers with lead flashing at the base where they meet the main roof. Large gap where the ridge tile meets the lead flashing. Plastic soffit boxes and timber bargeboards on the gable ends. Red brick chimney. Red brick around door frame. Walls are brick, rendered with concrete and painted. Lead flashing on eastern chimney is lifted. Conservatory on eastern extension consists of brick and glass. Hole under apex on eastern aspect above conservatory. Skylight in rear of property. Missing tile on eastern aspect of southern elevation. Gaps under southern bargeboard. Broken tile on the southern aspect to west of pitched roof end. Garage corrugated asbestos roof, slightly pitched. Access under the roof through into garage.				
Hibernation survey: Not completed as landowner refused internal access in 2021-2022, as well as in winter 2020 / 2021 landowners stated there was only a small loft and refused static deployment.				
28/08/2020	19:49 to 21:34 (sunset = 20:04)	BU_1030	Batlogger M, EMT 2 x 2, Scout	Air temp: 14.3 to 12.7 (˚C), no rain, cloud cover 8, wind speed 2/3
Comments: Biocensus: FW, HC, HS and JC				
Roost survey results: (species and numbers, roost location, access points (include number of them) and dimensions where appropriate): Noctules commuting/foraging overhead, single passes from common pipistrelle, *Myotis* and long-eared bat. Two common pipistrelle bats emerged from apex, under the bargeboard, of the eastern facing gable end and flew south at 20:30 and 20:36 (26 and 32 minutes after sunset)				
13/09/2021	19:12 to 20:57 (sunset = 19:27)	BU_1030	EMT 2 x 4, canon XA15 with 2 x Eerel 140 LED IR Lamps	Air temp: 18 to 17 (˚C), no rain, cloud cover 7/6, wind speed 1
Comments: Biocensus: AR, AH, AK and NS				
Roost survey results: (species and numbers, roost location, access points (include number of them) and dimensions where appropriate): Surveyors on the south side of the house (AH) saw one unknown species (not echolocating) emerge from the bargeboard from the south facing gable end.				
27/07/2023	20:51 to 23:06 (sunset = 21:06)	BU_1030	Batlogger x 2 Canon camera and infrared light x2	Air temp 20 (˚C), no rain, cloud cover 7/8, wind speed 1
Comments: Atkins: HW, AP, Limitations: One batlogger detector was turned off at 21:49 due to recording error. One infrared light failed.				
Roost survey results: (species and numbers, roost location, access points (include number of them) and dimensions where appropriate): Low levels of foraging Pipistrelles.. Noctules were heard at 22:20 and 22:30 and there were low levels of pipistrelle foraging throughout the survey. A possible re-entry, to a south-west gap under the fascia board at the back of the house, was seen at 21:49. At 22:15 a possible emergence from the front of the house was picked up by the infrared camera, the batlogger confirmed the species as common pipistrelle. It was not possible to pinpoint the exact location of the emergence due to light on the property.				
Photos/ diagrams:   				
Roost Characterisation: Common pipistrelle – day roost				

Table C-2 - Survey Results BU_963

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
01/08/2019 28/09/2023	N/A Daytime inspection (01/08/2019), Internal inspection (28/09/2023)	BU_963	N/A	Daytime inspection: Air temp: 20 (˚C), no rain, cloud cover 8, wind speed 2 Internal Inspection: Air temp: 16 (˚C), no rain, cloud cover 8, wind speed 2
Comments: Atkins: Daytime inspection: SK and RM, Internal inspection: RM and IL				
Visual inspection Two storey residential structure likely constructed from brick with rendered and painted walls which appear intact. Cross gabled roof laid with simple, flat concrete tiles. Gaps behind timber fascia boards which extend under the eaves of the structure. Ridge tiles appear to be concrete and there are slight gaps under the ridge tiles. Red brick chimney with lead flashing. No bargeboards. The roof tiles are mostly flush to the roof. Some missing mortar under roof tiles on southern gable end. Internal: Bitumen felt lining. Three roof spaces accessible for bats. Main space boarded with chimney and brick gable ends. Insulation in the other two sections, breeze block gable.				
DNA analysis: Date collected 29/09/2023 – soprano pipistrelle				
Hibernation survey – no access at the appropriate time of year, and the landowner was uncomfortable deploying a static detector during Covid-19				
03/07/2019	21:15 to 23:30 (sunset = 21:30)	BU_963	Walkabout x 4	Air temp: 24 to 21 (˚C), no rain, cloud cover 0, wind speed 0
Comments: Atkins: SK, RM, EM and RJ				
Roost survey results: (species and numbers, roost location, access points (include number of them) and dimensions where appropriate): No bats emerged. Species recorded included soprano pipistrelle, *Myotis*, common pipistrelle and noctule. Several serotine were also recorded.				
21/08/2019	04:28 to 06:15 (sunrise = 05:58)	BU_963	Batlogger M and EMT 2 x 2	Air temp: 12 to 17 (˚C), no rain, cloud cover 0, wind speed 1/ 0
Comments: Biocensus: NW, AM, JS and AB				
Roost survey results: (species and numbers, roost location, access points (include number of them) and dimensions where appropriate): Species recorded during the survey included common and soprano pipistrelle, noctule, *Myotis* and once suspected serotine (not recorded). One soprano pipistrelle was recorded circling the gable end to the south before roosting within a crack in the concrete on the southern gable end at 05:36 (32 minutes before sunrise).				
07/07/2021	21:12 to 23:22 (sunset = 21:27)	BU_963	EM Touch and Walkabout	Air temp: 18 (˚C), no rain, cloud cover 6, wind speed 1
Comments: Biocensus: BM GW, AB and PP				
Roost survey results: (species and numbers, roost location, access points (include number of them) and dimensions where appropriate): No bats observed emerging by any surveyor. One surveyor observed a single bat (BM) on a brief pass.				
Photos/ diagrams:  				
Roost Characterisation: Soprano pipistrelle – day roost				

Table C-3 - Survey Results BU_981

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
03/12/2020 28/09/2023	N/A Daytime external inspection(03/12/2020) and internal inspection (28/09/2023)	BU_981	N/A	Daytime inspection: Air temp: 5 (˚C), very light rain, cloud cover 8, wind speed 1 Internal Inspection: Air temp: 16 (˚C), no rain, cloud cover 8, wind speed 2
Comments: Atkins: SK and RM (external) RM and IL (internal)				
Visual inspection. Residential property with a cross gabled roof. Roof tiles are clay with clay ridge tiles. Gable on front, southern aspect. Catslide roof forming the porch roof from front gable end. Gable ends on east and western aspect. Wooden cladding on front gable end and porch roof. Walls are red brick. Modern uPVC windows. Roof timbers extend over external walls. Closed timber soffit around structure. The property has three chimneys; one central to the property, one on the northern aspect of the property and on the flat roof extension on the northern aspect. East aspect has two bay windows with the upstairs acting as a bay dormer, between these windows there are hanging tiles. On the eastern aspect gable end there is further timber cladding. Some lead flashing. Extension on north aspect has flat roof with a timber fascia. Timber box present above window on northern aspect. No gable end on western aspect. Small single storey extension with mono pitch tiled roof and wooden fascia. Rear aspect to the north has a hipped style roof. Emergence features: Wooden cladding sufficiently lifted to allow roosting opportunities. Closed soffit on gable end may have small gaps. Roof tiles are slipped and uneven, with some missing roof tiles. Some lifting under ridge tiles. The hanging tiles on the eastern aspect are generally loose and lifted. On the south east corner there is a gap at the base of the roof tiles behind the guttering. Indent above front window appears to be a bird nesting site. Internal: The roof space is lined with sarking boarding. There is a brick central chimney, insulation and some boarding. Not fully accessible. No obvious access points.				
19/01/2021 – 25/03/2021	Hibernation static deployment	BU_981	Swift and EasyLog USB - Lascar temperature and humidity data logger	Between 6.5 and 21 (˚C)
Comments: Atkins: RM and TS, however deployed internally by landowner				
Hibernation results: No bat activity was recorded				
15/06/2021	21:15 to 23:05 (sunset = 21:29)	BU_981	Walkabout x3 and EMT x2	Air temp: 17 to 15 (˚C), no rain, cloud cover 0, wind speed 1
Comments: Biocensus: KS,DT, WF, NB and AB				
Roost survey results: (species and numbers, roost location, access points (include number of them) and dimensions where appropriate: The following bats emerged: • From the hanging tiles on the eastern facing gable:1 x soprano pipistrelle (21:43), 1 common pipistrelle (22:24) and 2 pipistrelle species (22:09); • From the top right of the south facing gable end heading past the copper beach tree into the adjacent lane – 1 x non-echo-locating bat (21:51); • Emerged from the eaves of the house – 1 x common pipistrelle (21:50); and • Emergence from the roof tiles – 1 x common pipistrelle (22:09). Six emerging pipistrelle bats from four different locations on the structure (one soprano pipistrelle, two pipistrelle species of bat and three common pipistrelles) and one additional non-echo locating bat assumed to be a pipistrelle). Other activity included common pipistrelle and noctule passes				
08/07/2021	21:12 to 23:27 (sunset = 21:27)	BU_981	Walkabout x 4, Canon XA11 IR	Air temp: 19 (˚C) no rain, cloud cover 7, wind speed 1
Comments: Biocensus: FL, NM, WF and PP				
Roost survey results: (species and numbers, roost location, access points (include number of them) and dimensions where appropriate): Common pipistrelle emerged at 21:42 (15 minutes after sunset). A non-echo-locating bat emerged from the wooden cladding at 21:51 (24 minutes after sunset), this was seen by two surveyors, with no bat calls recorded.				
26/06/2023	21:16 to 23:31 (sunset at 21:31)	BU_981	Batlogger M2 x 4 Canon camera and infrared light x4	Air temp:
Comments: Atkins: RM, AP.				
Roost survey results: (species and numbers, roost location, access points (include number of them) and dimensions where appropriate: No bat emergence recorded, numerous passes of pipistrelle species and Myotis.				
Photos/ diagrams:   				
Roost Characterisation: Common pipistrelle – day roost, Soprano pipistrelle – day roost, Pipistrelle species – day roost				

Table C-4 - Survey Results BU_987

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
24/07/2019 28/09/2023	N/A Daytime inspection (external only)(24/07/2019) and Internal inspection (28/09/2023)	BU_987	N/A	Daytime Inspection: Air temp: 20 (˚C), no rain, cloud cover 2, wind speed 2 Internal Inspection: Air temp: 16 (˚C), no rain, cloud cover 8, wind speed 2
Comments: Atkins: Daytime inspection: SK and RM, Internal inspection: RM and IL				
Visual inspection Two-storey multi pitch residential structure in residential street with several extensions. Main house with gabled roof, attached to southern elevation is an extension with hipped roof. A further two hipped roof extensions are attached to eastern elevation. On southern hipped extension and one of the eastern hipped extensions roof tiles appear to be asbestos. New extension to south and further new extension to southeastern laid with imitation slate tiles throughout which are simple, flat. Rendered brick walls in good condition with no obvious entry points. Closed soffits with minor access. Minor lifting of the ridge tiles. Decorative half timbering present on front (north) gable end of house. Decorative bargeboard has small access points behind. Gaps on eaves under the soffit board. Entire eastern aspect is a new extension.				
Access refused for hibernation survey				
01/09/2020	19:35 to 21:20 (sunset = 19:50)	BU_987	Scout x 2, EMT 2 and Walkabout	Air temp: 16 to 14 (˚C), no rain, cloud cover 1, wind speed 2
Comments: Biocensus: TS, FT, HC and LS				
Roost survey results: (species and numbers, roost location, access points (include number of them) and dimensions where appropriate: Noctule, *Myotis*, common pipistrelle and soprano pipistrelle bats recorded during the survey. A single soprano pipistrelle bat emerged from the apex of south gable end and flew SW at 20:09 (19 minutes after sunset).				
31/8/2021	19:43 to 21:58 (sunset = 19:58)	BU_987	EMT 2 and Samsung tablets x 4 plus one infra red Canon XA15 and two x Eerel 140 LED Infra red lamps	Air temp: 16 (˚C), no rain, cloud cover 3, wind speed 2
Comments: Biocensus: PP, SN, NS and AK				
Roost survey results: (species and numbers, roost location, access points (include number of them) and dimensions where appropriate: Two emergences recorded from the same feature (from very top of the roof where it looks like loose lead flashing is present), of soprano pipistrelle (20:09 and 20:12, 12 and 15 minutes after sunset).				
25/09/2023	18:46 to 21:01 (sunset = 19:01)	BU_987	Batlogger x4 Canon camera and infrared lights x4	Air temp: 17 to 14 (˚C), no rain, cloud cover 3/5, wind speed 0/1
Comments: Atkins: WP, ME, Limitations: Both surveyors at front of the house due to safety concerns.				
Roost survey results: (species and numbers, roost location, access points (include number of them) and dimensions where appropriate: No emergences seen. Nyctaloid, pipistrelle, and myotis bats heard throughout survey. Two bats seen continuously foraging in the back garden at 19:10, seen from the front of the house.				
Photos/ diagrams: 				
Roost Characterisation: Soprano pipistrelle – maternity roost				

Table C-5 - Survey Results BU_1027

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
21/08/2019	N/A, Daytime inspection	BU_1027	N/A	Air temp: 18 (˚C), no rain, cloud cover 4, wind speed 0
Comments: Atkins SK and IH				
Visual inspection. Residential building with gabled and hipped roof, laid with plain clay tiles and clay ridge. Decorative timber bargeboards present (not able to see underneath). Appears to have closed timber soffits along elevations. Walls rendered and painted. Modern uPVC windows. Brick chimney. Garage with duo pitched roof laid with plain clay tiles attached to east elevation of house. Security light present on garage				
Hibernation survey. Not completed as landowner refused internal access in 2021-2022, as well as in winter 2020 / 2021				
06/07/2023	21:13 to 23:28 (sunset = 21:29)	BU_1027	Batlogger M2 x 4 Canon camera and infrared light x4	Air temp: 17 to 16 (˚C), rain 0, cloud cover 1, wind speed 2
Comments: Atkins: RM, HW, BC, AP, Limitations: Infrared light on one camera failed.				
Roost survey results: (species and numbers, roost location, access points (include number of them) and dimensions where appropriate: Emergence of a bat at 22:52 from under the lead flashing between the house and garage on the southern facing aspect no bat calls were recorded at this time. Emergence at 21:54 from ridge tiles on south west aspect confirmed as common pipistrelle. Emergence at 21:57 from roof riles on porch on south west aspect, confirmed as pipistrelle species. Common pipistrelle bats and Soprano pipistrelle bats seen and heard foraging and commuting.				
04/09/2023	19:34 to 21:49 (sunset = 19:49)	BU_1027	Batlogger M2 x 4 Canon camera and infrared light x4	Air temp: 22 to 19 (˚C), rain 0, cloud cover 0, wind speed 0
Comments: Atkins EH, ME				
Roost survey results: (species and numbers, roost location, access points (include number of them) and dimensions where appropriate: Two pipistrelles were seen emerging from under the eave of the front roof on the east side at 20:08 (location shown in image below). Noctule bats were heard and seen foraging at 20:03 and commuting at 20:44. Pipistrelles were heard throughout the survey. The camera located at the front west of the building recorded a possible emergence at 20:11 from soffit of the porch. Bat emergence from the window frame of the ground floor window, detected by infrared camera at 20:37 confirmed to be pipistrelle species.				
20/09/2023	18:57 to 19:12 (sunset = 19:12)	BU_1027	Batlogger M2 x 4 Canon camera and infrared light x4	Air temp: 15 to 14 (˚C), rain 2 to 0, cloud cover 8 to 4, wind speed 1
Comments: Atkins: RM, AP, Limitations: Moderate rain at survey start, cameras were turned on at 19:00, no bats seen or heard during this time. Intermittent rain throughout survey				
Roost survey results: (species and numbers, roost location, access points (include number of them) and dimensions where appropriate: One pipistrelle was seen and heard emerging from under the eaves, the south eastern aspect of the gable end, and flew south to west at 19:33.				
Photos/ diagrams: 				
Roost Characterisation: Common pipistrelle – day and transitional roost, Soprano pipistrelle – day roost, *Myotis* species – day roost				

Table C-6 - Survey Results BU_1042

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
31/07/2019 28/09/2023	N/A PBRA (external only) (31/07/2019), Internal inspection (28/09/2023)	BU_1042	N/A	PBRA: Air temp: 20 (˚C), no rain, cloud cover 8, wind speed 2 Internal Inspection: Air temp: 16 (˚C), no rain, cloud cover 8, wind speed 2
Comments: Atkins: PBRA: SK and RM, Internal inspection: RM and IL				
Visual inspection results: Two storey residential building constructed from red brick with cross-gabled roof. Flat, plain clay tiles. Concrete/ clay ridge tiles. Some roof tiles have recently been replaced. Ventilation slit and brick on eastern aspect. House sparrow entered in the ridge from gable end apex of the house. Red brick chimney with lead flashing at the base. Closed soffit box. Bay window on eastern aspect with a closed laminate soffit box. Appears to have dry ridge system. Gaps where dormers meet main roof in valley. Hole in apex on western gable end. Access to soffit box on the southern aspect of the house. Internal: Bitumen roof lining. Fully boarded with breeze block gable end. Other end not lined with large brick chimney breast.				
DNA: no droppings collected				
Hibernation survey – not completed				
18/08/2020	20:25 to 21:55 (sunset = 20:25)	BU_1042	Batlogger x 2, Anabat Scout, EMT 2	Air temp: 21 (˚C), rain 0/1, cloud cover 6/8, wind speed 2
Comments: JC, LC, AB, HS, Limitations: None				
Roost survey results: Single soprano pipistrelle emerged at 20:38 from under ridge tile of western gable end, then flew west.				
22/07/2021	03:15 to 05:30 (sunrise = 05:15)	BU_1042	EMT 2 x 2	Air temp: 18 down to 17 (˚C), no rain, cloud cover 0/1, wind speed 0
Comments: AR, NS, JM and AH, , Limitations: None				
Roost survey results: No emergence was recorded				
21/06/2023	21:16 to 23:31 (sunset = 21:31)	BU_1042	Batlogger x 4 Canon camera and infrared light x4	Air temp: 20 down to 17 (˚C), no rain, cloud cover 3/8, wind speed 1
Comments: Atkins: RM, BC Limitations: Infra red light failed on two cameras after 23:16.				
Roost survey results: No emergence was recorded. Soprano pipistrelles were heard foraging and commuting throughout survey.				
Photos/ diagrams: 				
Roost characterisation: Soprano pipistrelle – day roost				

Table C-7 - Survey Results BU_667

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
25/08/2020	N/A, Daytime inspection (external only)	BU_667	N/A	Air temp: 18(˚C), rain 3, cloud cover 8, wind speed 2
Comments: Atkins SK EE				
Visual inspection. Single storey building with duo pitched roof laid with double roman (interlocking) clay tiles and clay ridge tiles. Timber cladding present on gable ends. Extensive growth of ivy and staghorn sumac limited access and visibility fof the rest of building				
Hibernation survey: Not completed				
05/05/2022	20:25 to 22:40 (sunset = 20:40)	BU_667	Batlogger x 2	Air temp: 16 down to 11 (˚C), no rain, cloud cover 1, wind speed 2
Comments: Atkins: HW, RD				
Roost survey results: (species and numbers, roost location, access points (include number of them) and dimensions where appropriate: Common pipistrelle bats seen and heard foraging throughout survey, passing east to west.				
02/08/2023	20:42 to 22:30 (sunset = 20:57)	BU_667	Batlogger x2	Air temp: 17 down to 16 (˚C), no rain, cloud cover 8, wind speed 2/ 3
Comments: Atkins CG, CB, Limitations: Light showers throughout survey. Heavy ivy cover obscured view.				
Roost survey results: (species and numbers, roost location, access points (include number of them) and dimensions where appropriate: Emergence of one Common Pipistrelle from North gable end at 21:11. Brief passes from common pipistrelles throughout survey. Noctule bats heard commuting multiple times during survey. Myotis bat seen foraging at 21:43. At 21:05 the camera detected a bat utilising the building for foraging or a potential night roost/ feeding roost.				
18/09/2023	19:02 to 21:17 (sunset = 19:17)	BU_667	Batlogger x2	Air temp: 13, rain 5, cloud cover 7, wind speed 2
Comments: Atkins: WP, ME, Limitations: Light drizzle and breeze for 20 minutes at the start of the survey.				
Roost survey results: (species and numbers, roost location, access points (include number of them) and dimensions where appropriate: No emergences seen. Pipistrelles heard throughout survey. Myotis bats heard from 20:19 onwards.				
Photos/ diagrams: 				
Roost Characterisation: Common pipistrelle – day roost				

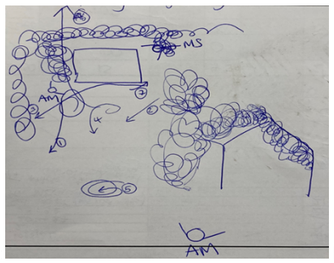
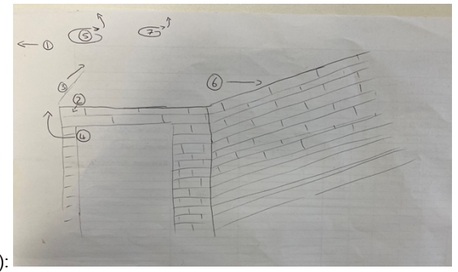
Table C-8 - Survey results BU_48

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
10/08/2023	N/A, Daytime inspection (external only)	BU_48	N/A	Air temp: 23, no rain, cloud cover 4, wind speed 1
Comments: Atkins: RM and EH				
Visual inspection results: Large metal agricultural barn. Comprises of metal walls with a metal sheet roof with a metal ridge. Partially damaged door on the western aspect. Part of the southern aspect is bordered by an adjacent building (BU_25). Gaps under the metal roof sheeting that could allow direct access to the barn. A gap in the door on the western aspect of the building that would allow horseshoe access. No classic hibernation or non-classic hibernation opportunities are considered likely.				
Hibernation survey: Not completed as landowner refused access until 2023				
10/08/2023	20:27 to 22:42 (sunset at 20:42)	BU_48	Batlogger M2 and Canon Infra red x 2 (XA40 and XA55)	Air temp: 23 to 20, no rain, cloud cover 4 to 7 and wind speed 1 to 2-3.
Comments: RM and EH Limitations: heavy ivy coverage on the northern aspect and building to southern aspect. Cameras on the gable ends, but surveyors watched the northern aspect without a survey aid.				
Roost survey results: (species and numbers, roost location, access points (include number of them) and dimensions where appropriate: A single bat was observed emerging from the damaged door on the western aspect at 21:21 confirmed to be common pipistrelle.				
Survey 2 – Not complete				
Survey 3 – Not complete				
Photos/ diagrams: 				
Roost Characterisation: Common pipistrelle – day roost				

Table C-9 - Survey results BU_965

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
31/07/2019 28/09/2023	PBRA (external only) (31/07/2019), Internal inspection (28/09/2023)	BU_965	N/A	PBRA: Air temp: 20 (˚C), no rain, cloud cover 8, wind speed 2 Internal Inspection: Air temp: 16 (˚C), no rain, cloud cover 8, wind speed 2
Comments: Atkins: PBRA: SK and RM, Internal inspection: RM and IL				
Visual inspection results: Two storey residential building with a hipped roof laid with slate tiles. A cross gabled extension is present to the south of the main house. Ridge tiles also slate, some gaps are present. Walls are rendered and painted. Broken slate tile on the porch. Decorative boarding on porch with no access beneath. Red brick chimney with lead flashing. Air vents under eaves. Concrete window ledge, wooden framed timber around windows. Possible holes under eaves on western elevation of the house. Any wasps observed around western elevation likely access to roof somewhere. Juliette balcony on southern aspect of house. Conservatory in south-eastern corner of house. Loose flashing around chimney. Some loose tiles allowing access. Garage on eastern aspect bitumen felted and flat with a plywood fascia. Internal description: A long (approximately 6m) L-shaped roof space. Some boarded insulation. Wooden roof trusses. Bitumen felt roof of which one section has been newly replaced. Droppings were sent off for analysis and confirmed to be pygmy shrew.				
19/01/2021 to the 25/03/2021	Hibernation static deployment	BU_965	Swift and EasyLog USB – Lascar temperature and humidity data logger	temps between 2.5 and 30.5 (˚C) over the time period
Comments: Atkins: however, deployed internally by landowner (due to no internal access)				
Hibernation results: No bat activity was recorded				
07/09/2020	19:26 to 21:11 (sunset = 19:41)	BU_965	Scout x 2, EM2 and Bat Logger M. Canon XA series IR camera used	Air temp: 17 to 16 (˚C), rain 0, cloud cover 7/8, wind speed 2
Comments: Biocensus: JC, LC, LS and AB, Limitations: None				
Roost survey results: A single non-echolocating bat emerged at 19:58 (17 minutes after sunset) from the ridge of the roof then flew west. It was assumed to be a common pipistrelle based on the time of emergence combined with the later bat record of a common pipistrelle roosting at this location. Single pipistrelle (21:47) bat seen emerging from neighbours shed, which back onto the garden – bat foraged around garden for a while until it disappeared. No emergences for this property. Noctules and *Myotis* also recorded, not much activity by the end of the survey.				
26/07/2021	20:53 to 23:08 (sunset = 21:00)	BU_965	Walkabout x 4	Air temp: 23 to 21 (˚C), rain 0, cloud cover 5/7, wind speed 0/2
Comments: Biocensus: PP, HMC, AB and FT, Limitations: None				
Roost survey results: A single common pipistrelle bat was seen to emergence at 21:40 from the ridge then passed close to the top of the building (the same location as the previous roost).				
19/05/2021	20:47 to 22:32 (sunset = 21:02)	BU_1005 (incidental sighting of BU_965)	EMT 2 x 4	Air temp: 14 to 10 (˚C), rain 0, cloud cover 1/2, wind speed 2
Comments: Biocensus: NS, CT, JM and LM Limitations: No access to the east side of the house				
Roost survey results: Two brown long-eared bats picked up from the back of the house with one of them emerging from neighbouring structure (BU_965).				
Survey 3 – not completed				
Photos/ diagrams: 				
Roost characterisation: Common pipistrelle – day roost, Brown long-eared bat– day roost				

Table C-10 - Survey Results BU_668

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
09/03/2022	Daytime inspection	BU_668	N/A	Air temp: 10 (˚C), rain 2, cloud cover 7, wind speed 1
Comments: Atkins: RM and AP Limitations: Unable to fully inspect inside due to dirt and ivy, however old lesser horseshoe shaped droppings observed				
Visual inspection: A single storey open outhouse. A single door that is open on the northern aspect of the property. Property has roof tiles and brick walls but is predominantly covered in ivy. The open door provides clear internal access for all bat species. The external ivy covering provides some suitability for crevice dwelling, and may also cover other features.				
DNA: date collected 09/03/2022 – Lesser horseshoe				
Hibernation survey required – not completed however not considered suitable to support hibernating bats.				
10/05/2022	20:32 to 22:47 (sunset = 20:47)	BU_668	Walkabout x 4 and Canon camera and infra-red lighting	Air temp: 15 down to 12 (˚C), no rain, cloud cover 8, wind speed 2 / 1
Comments: Middlemarch: AM and MS Limitations: One elevation was completely covered with ivy. All other elevations had some level of ivy obscuring the view.				
Roost survey results: (species and numbers, roost location, access points (include number of them) and dimensions where appropriate: Common pipistrelle bat was seen to emerge from the roof on the northern elevation, top left from the open door where the roof is covered in vegetation at 21:11 (24 minutes after sunset)), then fly north. A lesser horseshoe bat was seen to emerge (21:14) from the open door on the northern elevation, then fly along the building There was regular bat activity throughout the survey. Above the bramble in the field is a good sheltered location for foraging. Lesser horseshoe bat emerged from the doorway and flew at a height of 1.5m along the side of the structure (3 on the first plan and 4 on the second plan below), following the hedgerow away, heading south. Bat emergence was not visible on camera footage.				
19/09/2023	19:14 to 21:14 (sunset = 19:14)	BU_668	Batlogger M2 x2 and Canon camera and infra-red lighting x2	Air temp: 17 (˚C), light showers throughout, cloud cover 8, wind speed gusts of up to 6
Comments: Atkins: BC and EG Limitations: Survey did not begin until sunset, but this was no considered to be a significant limitation. Weather was sub-optimal throughout however emergence of bats was recorded.				
Roost survey results: (species and numbers, roost location, access points (include number of them) and dimensions where appropriate: three lesser horseshoe bats were seen to emergence from the gap above the door on the northern elevation (at 19:38, 19:44 and 19:55). Lesser horseshoe bats were recorded foraging throughout the survey.				
Survey 3 – no access. Not considered required for roost characterisation				
Photos/ diagrams:  Emergence flight path:  Emergence location (MS): 				

Appendix D. Compensation Strategy

M5 Junction 10 Improvements Scheme

Bat Survey 2023 Update

Appendix 4 Compensation Strategy

Date: 10/01/24

Gloucestershire COUNTY COUNCIL

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Contents

Tables

Figures

1. Introduction

1.1. Purpose of the report

1.1.1. The purpose of this report is to address gaps in the bat roost survey data, as a result of unsurveyed or partially surveyed structures/trees, by predicting the likely presence of a bat roost, the species present and type of roost, taking a reasonably precautionary approach.

1.1.2. This report then goes on to set out the compensation package proposed, taking into account both the known and predicted bat roosts. Following this, the report sets out the design parameters for the compensatory features proposed.

1.2. Potential roost features requiring compensation

1.2.1. There are 296 structures, 356 individual trees and 105 tree groups within 40 m of the Scheme Boundary. This is the maximum distance over which impacts to roosting bats as a result of the Scheme are anticipated. The basis for this is discussed further in Section 2 of the Bat Survey Technical Appendix that formed part of the Environmental Statement (ES) (Technical Appendix 7.3 – Bat Survey (application document TR010063 – APP 6.15)).

1.2.2. However, not all structures or trees within this zone will experience impacts as a result of the Scheme, and compensation is not required for roosts where there would be no impact. For example, structures/trees located on the opposite side of a building or behind a dense treeline or hedgerow that would attenuate noise and vibration are unlikely to experience any disturbance impacts as a result of the Scheme. Furthermore, where the proposed works are minor, no impacts to structures/trees located adjacent to the works are anticipated. Minor works only, including the installation of signage and minor works to pavements are proposed along the western extent of Stanboro Lane, along The Green and along parts of the B4634 to the east and west of the Link Road.

1.2.3. In addition, there are a number of structures and trees where either works will be timed to avoid disturbance impacts, or acoustic barriers will be installed in order to avoid disturbance impacts. Such measures will be implemented in the following locations:

- At BU_661, BU_735 and BU_638 north of the Order limits on the north side of the A4019 at Uckington, where common pipistrelle day/ /hibernation and brown long-eared day roosts have been recorded.
- Along the south side of the A4019, east of the fire station. There are approximately 24 residential properties along the A4019 in this location set back approximately 15 m from the Order limits, all of which will be retained and will remain occupied during the works. Roosting bats have been confirmed at BU_11 (a lesser horseshoe day roost) and BU_614 (a soprano pipistrelle day roost), however it has not been possible to survey many of these properties as a result of access restrictions, and it is possible that additional bat roosts are present. In any case, this is already a highly disturbed location, and widening of the A4019 will take place to the north, ensuring that the majority of the works will take place on the opposite side of the road. Therefore, significant disturbance impacts are not anticipated, although it is proposed to implement an acoustic barrier here as a precaution, to ensure that impacts are avoided.
- At BU_668, BU_645 and Tree 665 along Moat Lane. BU_668 is located approximately 15 m from the Order limits with minor works and demolition works located approximately 27 m from the structure. BU_645 and Tree 665 are located approximately 5-10 m from the Order limits, but works here are very minor, with demolition works located approximately 40 m away. Surveys of BU_668 recorded a lesser horseshoe mating and day roost and a common pipistrelle day roost. BU_645 is partially surveyed, assessed to provide high suitability for crevice dwelling bat species.

Tree 665 is also partially surveyed and was assessed to provide moderate suitability for tree roosting bats.

- At Tree 101, which is located within the Order limits approximately 7 m south of the River Chelt. Tree 101 supports a Natterer's day roost. In this area, the works comprise improvements restricted to the river channel to improve hydromorphological and ecological diversity.
- At Tree 273 which is located approximately 10 m from the Order limits where a compound will be located. Tree 273 is a partially surveyed tree that was assessed to provide high suitability for tree roosting bats.
- At BU_984 and BU_989 unsurveyed structures located north of Junction 10, at the informal Traveller site to the east of the motorway. At this location, works are required to the motorway embankments approximately 20 m west of the structures, a compound is located to the south and an access track will be constructed immediately south of the structures to provide access to the informal Traveller site. If access can be arranged, further surveys may confirm the likely absence of roosting bats. Alternatively, works will be appropriately timed or acoustic barriers will be installed to avoid disturbance impacts.

1.2.4. Structures/trees within these areas are not included within this European Protected Species Mitigation Licence (EPSML) as they are considered to be outside of the Zone of Influence (ZoI) for this EPSML.

1.2.5. The ZoI for this EPSML has therefore been established taking into account: the proposed works at a particular location; any features present that would attenuate noise such that disturbance impacts as a result of the Scheme are not anticipated; and any mitigation measures that the Scheme has committed to that would avoid disturbance impacts to structures/trees supporting/potentially supporting roosting bats.

1.2.6. The ZoI therefore includes those structures/trees that will be demolished/felled as a result of the Scheme, and where it is considered that disturbance impacts during construction cannot be avoided. As described in the Method Statement, measures to minimise impacts to bats present/potentially present will be implemented, such as undertaking works outside of key sensitive periods including the breeding and hibernation period. Where the impact is temporary disturbance, such measures may result in the impact being avoided entirely, and the ZoI for this EPSML may be further refined for the final bat licence application once the construction programme is more clearly defined. For example, BU_1098 is a partially surveyed culvert that will be extended as part of the Scheme. A hibernation survey is outstanding and on a precautionary basis the structure is assumed to support solitary or small numbers of hibernating bats. Undertaking the works to the structure outside of the hibernation period would avoid direct impacts to this structure. However, in the absence of more detailed construction information in the area surrounding the culvert, compensation has been included on a precautionary basis at this stage.

1.2.7. Permanent disturbance during the operational phase of the Scheme is not anticipated, and this has been confirmed via noise and lighting modelling of the completed operational Scheme.

1.2.8. There are 118 structures within the ZoI for this EPSML. Of these 118 structures, 30 are considered to provide negligible suitability for roosting bats. Of the remaining 88 structures, 63 have been surveyed in full (broadly in line with the Bat Conservation Trust (BCT) good practice survey guidelines)[1], and a further 25 have been partially surveyed

[1] Collins, J. (ed.) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London. Updated guidelines were published in September 2023, after the bulk of the survey work for the Scheme had been undertaken. However, the roost survey methodology for structures remains largely the same, although with more of an emphasis on the use of night vision aids (NVAs). NVAs were used routinely during the surveys for this Scheme. For trees, the emphasis in the 2023 guidelines has shifted away from emergence surveys of trees, with a preference for multiple aerial inspections, or alternatively, if unsafe to climb, emergence surveys supported by NVAs. This aligns with the approach taken for this Scheme for tree surveys. The roost surveys undertaken for this Scheme are therefore considered to align broadly with the new guidelines. Ultimately, and most importantly, the survey methods employed are considered robust enough to ensure a high level of confidence in the conclusions drawn.

(i.e. the full number of surveys recommended by the guidelines has not been completed). Numerous attempts were made to complete surveys these structures however access was either refused or not forthcoming or was withdrawn part way through the survey (this is detailed in Appendix 6 of the draft bat licence application). It was not considered appropriate to undertake detailed assessments/surveys from adjacent land parcels or Public Rights of Way (PRoW) and use it as evidence as part of the environmental assessment. This is because it could result in challenge during the Examination phase of the project and would therefore present a risk to the project. In addition, collecting data in this way would jeopardise relationships with landowners and would put surveyors in a difficult position.

1.2.9. There are 195 individual trees within the ZoI for this EPSML. Of these 195 trees, 157 are considered to provide negligible or low suitability for roosting bats. Of the remaining 38 trees, 27 have been surveyed in full, and a further nine have been partially surveyed. This leaves two trees that have not been surveyed at all. All of the 89 tree groups within the ZoI for this EPSML, are considered to provide negligible or low suitability for roosting bats, and all surveys are complete.

2. Methodology

2.1.1. The methodology for predicting the roost resource present within unsurveyed/partially surveyed structures/trees is set out below.

2.2. Structures

2.2.1. Each partially surveyed structure (there are no unsurveyed structures within the EPSML ZoI) was assessed on a case-by-case basis, as presented in Section 3, but the broad methodology followed is presented below.

2.2.2. The assessment was completed by two licensed bat workers, with each structure assessed by a licensed bat worker and their judgements reviewed and checked by another licensed bat worker.

2.2.3. The bat roost suitability of the structure was assessed as negligible, low, moderate or high in line with the BCT good practice survey guidelines[2] as detailed in Table 2-1. These categories were applied for horseshoe bats, other void dwelling bats and crevice dwelling bats. This was considered appropriate given that bats within these groups require the same broad roosting features, as follows:

- Horseshoe Bats - Bats that require at least a letter box sized access point into a void. This generally excludes occupied residential properties as access points of this size are very unlikely.
- Void Dwelling Bats (Excluding Horseshoe Bats) - Bats that require a generally undisturbed void to fly/light sample within (i.e. long-eared bats or Natterer's bats that are known to light sample). This category of bats does not require a fly through access point like horseshoes, and instead can utilise the void via crevice features.
- Crevice Dwelling Bats - Bats that require a crevice feature to roost, and do not need a void.

2.2.4. This assessment was based on existing information about the structure gathered from the Preliminary Bat Roost Assessment (PBRA). In addition, information provided by the client about a structure, for example if the client had provided detailed structural reports for culverts, then this information was also taken into consideration.

Table 2-1 – Information taken from Table 4.1 of the BCT Good Practice Survey Guidelines

Suitability	Description of Roosting Feature
Negligible	Negligible habitat features on site likely to be used by roosting bats.
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation).
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only– the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).

[2] Collins, J. (ed.) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn).

Suitability	Description of Roosting Feature
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by a larger number of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.

2.2.5. Alongside this assessment, the location of the structure and surrounding habitat was also considered. The following general parameters are listed from 'low' to 'high' in terms of suitability for bats:

- Structures in built up areas where there is limited or no connectivity to the wider landscape from hedgerows, or extensive disturbance due to lighting or noise, such as at the eastern extent of the A4019 as it approaches the Gallagher Retail Park.
- Structures in a more rural setting where hedgerows, tree lines and agricultural fields link the location to the surrounding habitats.
- Areas that have been found during surveys to show high levels of bat activity, this includes the northern quadrant, close to Stanboro Lane, around Moat Lane in the southern quadrant and also along the River Chelt corridor.

2.2.6. Existing information about the structure was reviewed, and the extent of the gaps in the survey data were assessed in order to establish the level of confidence that could be placed in the results of existing emergence/re-entry data. For example, for a high suitability structure that has had two out of the three emergence surveys undertaken in optimum conditions, it may be possible to have a high level of confidence in the existing results, or at least have a high level of confidence that a maternity roost is not present.

2.2.7. A final step was to compare the partially surveyed structure with other, similar structures that have been surveyed. This was undertaken in order to help predict the likely presence of a bat roost, the species present and the type of roost with a higher degree of confidence. An assessment has been undertaken of all of the structures where roosting bats have been confirmed across the Scheme to identify types of structures and features within the structures used by lesser horseshoe, void dwelling and crevice dwelling bat species, in order to identify roosting preferences for these species groups. This assessment is presented in Section 2.4.

Hibernation

2.2.8. Only structures meeting the below criteria were subject to bat hibernation surveys:

- High hibernation suitability recorded during the PBRA and where hibernating bats were assessed likely to be present (e.g. a tunnel).
- Evidence of bats was recorded (during the PBRA and/or emergence/re-entry surveys).

2.2.9. Structures assessed to have negligible bat hibernation suitability, where no evidence of bats had previously been recorded (during the PBRA and emergence/re-entry surveys), were not subject to bat hibernation surveys. This was set out in the Bat Survey Protocol (report reference GCCM5J10-ATK-EBD-ZZ-RP-LE 000001-C01), which was shared with Natural England on 27/07/2021, and is also set out in the Bat Survey Technical Appendix that formed part of the ES (Technical Appendix 7.3 – Bat Survey (application document TR010063 – APP 6.15).

2.2.10. However, surveys were limited by access restrictions, and due to hibernation surveys requiring internal access, they were severely limited by Covid-19 restrictions.

2.2.11. For structures where the required hibernation surveys are incomplete or partially complete, hibernation suitability was assessed by the likelihood of the structure to have classic hibernation opportunities which are considered to be tunnels, caves or cellars that

could support large numbers of hibernating bats. It is acknowledged, however, that small numbers of bats may utilise non-classic hibernation habitats present in residential buildings. The assessment of the likelihood of hibernating bats being present within partially surveyed structures has been undertaken on a case-by-case basis and is presented in Section 3.

Approach to compensation provided

2.2.12. In designing the compensation, the approach is to provide like-for-like or better conditions compared to what is present/predicted to be present and will be impacted.

2.2.13. For partially surveyed structures where a bat roost is predicted to be present, to ensure that compensatory features provide at least the same opportunities as present/predicted to be present within the existing structures, the approach shown in Table 2-2 was followed to determine the level of compensation appropriate to the predicted roost suitability.

Table 2-2 – How the Structure's Bat Roost Suitability is Translated into the Compensatory Features Provided

Structure's Predicted Bat Roost Suitability	Compensation Provided Based on the Predicted Bat Roost Suitability
Low or moderate suitability	Features suitable for small numbers of non-breeding bats
High suitability	Features suitable for maternity colonies
Non- classic hibernation habitat	Features suitable for solitary or small numbers of hibernating bats
Classic hibernation habitat	Features suitable for larger numbers of hibernating bats

2.2.14. A set of design parameters for the compensatory structures is provided in Section 5. The detailed design of the compensatory structures will be undertaken post-planning, to inform the final bat licence application, and will be based on the agreed design parameters set out here.

2.2.15. This document refers to different sectors of the Scheme as follows, and as defined primarily by the A4019 and the M5:

- Northern quadrant – north of the A4019 and west of the M5
- Eastern quadrant – north of the A4019 and east of the M5
- Southern quadrant – south of the A4019 and east of the M5
- Western quadrant – south of the A4019 and west of the M5

2.2.16. The M5 is a major barrier to bats, with the River Chelt culvert beneath the M5 the only safe crossing point beneath this road along this stretch of motorway. The A4019 is less of a barrier to bats, being narrower and currently unlit, and bats have been recorded crossing this road. Although the Scheme will light stretches of this road, the road will be widened and traffic levels will increase, dark corridors will be maintained with hop overs at key locations and a large underpass will be constructed as part of the Scheme to create a traffic free route across this road as part of the Scheme's embedded mitigation. Nevertheless, consideration has been given to the location of the roosts/predicted roosts to ensure that the compensation is sited as close to impacts as possible.

2.3. Trees

2.3.1. All trees where surveys are incomplete are assumed on a precautionary basis to have bat roosts present when considering compensation. As a precaution, unsurveyed trees were assumed to provide high suitability bat roosting habitat.

2.3.2. In addition, in order to ensure no net loss of the roost resource, compensation has also been provided for all moderate and high suitability trees to be felled, even if surveys are complete and no roosting bats have been identified.

2.3.3. Impacts to high suitability trees are compensated with features suitable for maternity or hibernation colonies. Impacts to moderate suitability trees are compensated for with features suitable for small numbers of non-breeding bats.

2.4. Species assemblage

2.4.1. For the predicted roosts, it has been necessary to predict the species present within the roost and type of roost, taking into account the known species assemblage and species abundance within the survey area, and the features potentially present. Consideration has been given to the rarity of the bat species potentially present, based on the widespread/rarer/rarest categories in the Bat Mitigation Guidelines[3], as well as the importance of the roost predicted, using Table 3.2 of the Bat Mitigation Guidelines[3] for guidance.

2.4.2. Regarding horseshoe bats, greater horseshoe bats were recorded infrequently during the activity surveys. No roosts for greater horseshoe have been recorded, and greater horseshoe were never recorded less than 53 minutes after sunset, suggesting there are no roosts close by, as this species usually emerges 25 to 28 minutes after sunset[4]. Therefore, greater horseshoe are not considered to be roosting within the study area and the predicted horseshoe roosts are all considered to be lesser horseshoe bat roosts. Across the Scheme (both within the EPSML ZoI and within the wider area) 13 structures were identified which support lesser horseshoe bat roosts. The majority of roosts were day roosts, with four transitional roosts and one night roost. For void dwelling bats, brown long-eared, Natterer's and whiskered bats have been recorded using voids for light sampling across the Scheme. Across the Scheme (both within the EPSML ZoI and within the wider area) 15 structures were identified which support void dwelling bat roosts, some of which supported multiple roosts. The majority of these were brown long-eared bat day roosts (nine roosts), with one brown long-eared night roost, one Natterer's maternity roost, five Natterer's day roosts, two Natterer's transitional roosts, one Natterer's feeding perch and one whiskered bat night roost. Therefore, these void dwelling species and roost types are considered most likely to be present within the predicted void dwelling roosts. However, in addition to Natterer's and whiskered, the Myotis species assemblage across the Scheme also includes Daubenton's, and Brandt's[5] and these are also known to utilise voids for light sampling. Therefore, these are also considered within the void dwelling species assemblage.

2.4.3. For crevice dwelling bats in structures, all roosts recorded were for common and soprano pipistrelle bats, except for one whiskered bat transitional roost. Across the Scheme (both within the EPSML ZoI and within the wider area) 43 structures were identified which support crevice dwelling bat roosts. Regarding the pipistrelle bat roosts, the majority of roosts were day roosts, with the exception of three maternity roosts, four mating roosts, four night roosts, five transitional roosts and one feeding roost. Therefore, these crevice dwelling species and roost types are considered most likely to be present within the predicted crevice dwelling roosts. However, species assemblage across the Scheme also includes Nathusius' pipistrelle, *Myotis* species (which could include Natterer's,

[3] Reason, P.F. and Wray, S. (2023). UK Bat Mitigation Guidelines: a guide to impact assessment, mitigation and compensation for developments affecting bats. Chartered Institute of Ecology and Environmental Management, Ampfield.
[4] http://battreehabitatkey.co.uk/wp-content/uploads/2017/06/AEcol-REVIEW-OF-EMERGENCE-AND-RETURN-EMPIRICAL-DATA-2017-Ver.-4.pdf
[5] Alcathoe are not known in the area and have therefore been excluded from this list

Daubenton's and Brandt's[6]) Leisler's and serotine bats (all known to utilise crevices). Therefore, the predicted structure crevice dwelling bat roosts could include bats from this species assemblage.

2.4.4. Across the Scheme (both within the EPSML ZoI and within the wider area) eight bat roosts were identified within trees. Four of these were noctule roosts, two were Natterer's roosts, one was a barbastelle roost and one was a Bechstein's roost (see below). Based on bat species known in the vicinity, that are known to roost within trees (Bat Roosts in Trees)[7], the following species could potentially be present within the tree roosts: Common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, Bechstein's, Natterer's, Daubenton's, whiskered, Brandt's, Leisler's, noctule and barbastelle.

2.4.5. Regarding Bechstein's (one of the 'rarest' bats as defined in the Bat Mitigation Guidelines[3] and an Annex II species), one Bechstein's roost was recorded within a tree outside of the study area, a day roost supporting a single bat on three occasions in 2020. No Bechstein's were trapped during the Advanced Licence Bat Survey Techniques (ALBST) and the habitat was considered sub-optimal for this species. Therefore, the presence of a maternity roost within unsurveyed/partially surveyed trees is considered to be very unlikely, and only small numbers of roosts of individual/small numbers of bats are predicted.

2.4.6. Regarding barbastelle (one of the 'rarest' bats as defined in the Bat Mitigation Guidelines[3] and an Annex II species), one barbastelle roost was recorded within a tree in the study area, a transitional roost supporting a single bat in 2020, with all subsequent inspections showing no evidence of use by bats. Barbastelle were recorded infrequently during the activity surveys, and the habitat was considered sub-optimal for this species (a woodland specialist). Therefore, the presence of a maternity roost within unsurveyed/partially surveyed trees is considered to be very unlikely, and only small numbers of roosts of individual/small numbers of barbastelle within trees are predicted.

2.4.7. To summarise:

- Horseshoe bats: Lesser horseshoe bats.
- Void dwelling: Brown long-eared, Natterer's, Daubenton's, whiskered and Brandt's, but predominantly brown long-eared and Natterer's.
- Crevice dwelling: common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, Natterer's, Daubenton's, whiskered, Brandt's, Leisler's and serotine, but predominantly common pipistrelle and soprano pipistrelle.
- Tree roosts: Common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, Bechstein's, Natterer's, Daubenton's, whiskered, Brandt's, Leisler's, noctule and barbastelle, but predominantly noctule and Natterer's.

2.5. Assessment of structures with confirmed roosts

2.5.1. As described above, in order to help predict the likely presence of a bat roost, the species present and the type of roost with a higher degree of confidence, an assessment has been undertaken of all of the structures where roosting bats have been confirmed across the Scheme to identify types of structures and features within the structures used by lesser horseshoe, void dwelling and crevice dwelling bat species, in order to identify roosting preferences for these species groups. This assessment is set out below. Photographs of structures within the EPSML ZoI are included in Appendix 3 of the licence application

[6] Alcathoe are not known in the area and have therefore been excluded from this list
[7] Bat Roosts in Trees: A Guide to Identification and Assessment for Tree Care and Ecology Professionals

Assessment of features used by lesser horseshoe bats

2.5.2. Across the Scheme (both within the EPSML ZoI and within the wider area) 13 structures were identified which support lesser horseshoe bat roosts.

2.5.3. Five of these (BU_507, BU_611, BU_709, BU_819 and BU_694) are located to the north of the A4019 and support lesser horseshoe bat day roosts, with the exception of BU_819 which supports a transitional roost. All of these structures are very similar, comprising two-storey semi-detached former residential properties, which have now become derelict. They are constructed from red brick, have hipped roofs with imitation slate tiles and concrete ridge tiles, and chimneys with lead flashing at the base. A key feature of these properties is the presence of an extension to the rear (north) of the properties comprising an outhouse with an external toilet. The doors to these outhouses were left open, and lesser horseshoe bat droppings were recorded in the outhouses associated with BU_507, BU_611, BU_709 and BU_819 beneath roof trusses and peeling paint. At BU_611, lesser horseshoe bat droppings were also identified within the loft space, which was accessible through the door of the property, which had been left open, and the open loft hatch. At BU_694, lesser horseshoe bat droppings were identified throughout the main property, including in the kitchen, in a bedroom and in the loft space. BU_694 had recently been broken into and used for rough sleeping prior to the internal inspection being undertaken, and it is considered likely that the damage to the building during this time facilitated horseshoe bat access to the main property.

2.5.4. Beyond the EPSML ZoI, within the eastern quadrant, BU_1050 was identified as a lesser horseshoe transitional roost located north of the A4019 along The Green within a loft space associated with a residential garage. The building is gable ended with clay roof tiles and has a large roof space used for storage approximately 5 m long, 5 m wide and 2.5 m high to the apex. Access to the roof space is possible from large access points at the eaves which are entirely open.

2.5.5. Another outhouse type structure (BU_668, outside of the EPSML ZoI within the southern quadrant) was found to support a lesser horseshoe day and mating roost to the south of the A4019, along Moat Lane. The structure comprises an ivy clad single storey brick built outhouse with a tiled roof and an open door on the northern aspect. Lesser horseshoe bat droppings were found within the structure beneath stored farm equipment, and lesser horseshoe bats were recorded emerging through the open doorway.

2.5.6. Three lesser horseshoe bat day/night roosts were identified at Butler's Court complex of agricultural buildings, located between the M5 and the Link Road, outside of this EPSML ZoI within the southern quadrant. One roost (BU_747) was within a timber framed shed with flat corrugated asbestos roof, one brick wall and three corrugated asbestos walls, and a concrete floor. The remaining two roosts (BU_752 and BU_757) were recorded within red brick barn/outbuilding structures with large open elevations and wooden roof trusses.

2.5.7. Three further lesser horseshoe roosts were recorded outside of the EPSML ZoI within the southern quadrant, at BU_11, BU_567 and BU_574.

2.5.8. BU_11 is a lesser horseshoe day roost located on the southern side of the A4019 within a loft space associated with a residential garage. The building was approximately 8 m long, 3 m wide with a 1 m high loft space. The building was dual pitched and gable ended with three missing bricks on the southern gable end allowing bat access, as lesser horseshoe bat droppings were identified at the northern gable end of the loft.

2.5.9. BU_567 is a lesser horseshoe day roost located south of the A4019 within an unoccupied farm building around Moat Lane. The house was unoccupied with lesser horseshoe droppings identified within the property within the kitchen, bathroom, and bedroom. It is likely that access to this property was via the chimney or a propped open window in the stairwell but this has not been confirmed.

2.5.10. BU_574 is a lesser horseshoe likely transitional roost located south of the A4019 in an outbuilding, a stable tack room, associated with a complex of farm buildings around Moat Lane. Droppings were identified beneath the central ridge of the sarking boarding. Access to this roost was through the open door, no other entrances were identified.

2.5.11. No lesser horseshoe roosts have been identified within the northern or western quadrants.

2.5.12. All 13 lesser horseshoe roosts identified across the Scheme were within unoccupied buildings where human disturbance was limited. Six roosts were in unoccupied residential properties, with five being derelict and unoccupied for some time and only one being occupied within six months prior to undertaking the internal inspection. The remaining seven lesser horseshoe roosts were identified in outbuildings and garages, predominantly brick built structures. Three roosts (BU_567, BU_11 and BU_1050) were accessed through 'letter-box' type access points such as chimneys or partially open windows. The other ten roosts were associated with buildings with large access points including open doorways or an open side to the building. This suggests that occupied/recently occupied residential properties are very unlikely to contain horseshoe bat roosts given the likely absence of suitable access points. It is recognised that there are a number of residential properties that have recently become unoccupied due to having been purchased to facilitate the Scheme. However, due to the concern around potential antisocial behaviour, they have been fully secured and are visited frequently by a security company. This is considered likely to prevent any damage to the property which could facilitate lesser horseshoe bat access.

Assessment of features used by void dwelling bats

2.5.13. Across the Scheme (both within the EPSML ZoI and within the wider area) 15 structures were identified which support void dwelling bat roosts.

2.5.14. Nine of these (BU_751, BU_752, BU_757, BU_761, BU_763, BU_766, BU_853, BU_854 and BU_857) were located at Butler's Court complex of agricultural buildings, located between the M5 and the Link Road, outside of this EPSML ZoI within the southern quadrant. Six of these structures comprised brick barns or outbuildings and one was a timber framed lean-to, generally with an opening on the gable end in the form of a window or open door. They all supported brown long-eared or Natterer's day or transitional roosts. However, a Natterer's maternity roost was identified within BU_854 where the timber roof truss enters the wall, beneath the lath and plaster, and the bats were observed light sampling within the barn prior to emergence. Two more open structures, including an open fronted Dutch style barn (BU_761) and a shed/barn used for caravan parking (BU_857), were identified as a whiskered bat night roost, a Natterer's bat feeding roost, a brown long-eared bat night roost and a Natterer's bat transitional roost.

2.5.15. Also in the southern quadrant, a brown long-eared bat day roost was recorded at BU_965 along Withybridge Gardens. BU_965 is a two storey recently occupied residential building with a hipped roof laid with slate tiles and a cross gabled extension to the south. Potential roosting features include possible holes under the eaves and potential access into the roof space, although the exact location that the bat emerged from was not identified. The roof space is 2.5 m tall to the apex, 2.5 m wide and 6 m long.

2.5.16. A further brown long-eared day and hibernation roost was recorded in BU_378 in the southern quadrant, just north of the B4634 outside of this EPSML ZoI. This was within a lean-to constructed from breeze block with corrugated asbestos sheet roofing. The southern aspect is open leading into a garage, but the structure is further compartmentalised and a 'cool room' is present where brown long-eared bat droppings and feeding remains were recorded during the winter.

2.5.17. BU_567 is a Natterer's day roost located in the southern quadrant, south of the A4019 outside of this EPSML ZoI. The roost is located in a stable block associated with a complex of farm buildings around Moat Lane. Droppings were identified beneath the central ridge of the sarking boarding with bats likely utilising the space between the sarking boarding and roof/ridge tiles to roost. Access to this roost was through the open

stable door, with the bats predicted to utilise the stable room for light sampling prior to emerging.

2.5.18. A Myotis (Assumed to be Natterer's) and brown long-eared day roosts were identified north of the A4019 within adjacent structures, again outside of this EPSML ZoI within the eastern quadrant (BU_723 and BU_661 respectively). The structures comprised an open brick walled barn with a corrugated (potentially asbestos) roof and an outdoor workshop / garage.

2.5.19. A brown-long eared bat day roost was identified within BU_694, a vacant and derelict former residential property located north of the A4019 towards the eastern extent of the Scheme in the eastern quadrant. The roost was identified within the property itself with droppings collected within the kitchen. The access point to the roost was not identified. BU_694 had recently been broken into and used for rough sleeping prior to the internal inspection being undertaken, and it is considered likely that the damage to the building during this time facilitated brown long-eared bat access.

2.5.20. No void dwelling bat roosts were identified in the northern or western quadrants.

2.5.21. Of the 15 structures with identified void dwelling bat roosts, 13 were found in agricultural buildings or other outbuildings/lean-to type structures, predominantly constructed from brick where there are large access points and the void was used for light sampling. One vacant and derelict former residential property supported a brown long-eared roost within the main part of the house, but it is likely that damage to the structure facilitated access. The only occupied/recently occupied structure where void dwelling bats were recorded was BU_965, where the brown long-eared bat was predicted to access under the eaves into a large roof void Consequently, it has been concluded that void dwelling bats are more likely to be present within non-residential structures, or vacant residential structures that have become derelict. Any occupied/recently occupied residential buildings without full surveys are considered unlikely to support a void dwelling bat roost, unless there is possible access under the eaves into a roof void with a tall apex.

Assessment of features used by crevice dwelling bats.

2.5.22. Across the Scheme (both within the EPSML ZoI and within the wider area) 43 structures were identified which support crevice dwelling bat roosts. All of these roosts were common and soprano pipistrelle roosts, except for one whiskered bat transitional roost. Regarding the pipistrelle bat roosts, the majority of roosts were day roosts or other non-breeding roosts (four mating roosts, four night roosts, five transitional roosts and one feeding roost) with the exception of two maternity roosts in the southern quadrant.

2.5.23. In the northern quadrant, common and soprano pipistrelle bats were recorded roosting in five residential properties including BU_1027 (recently occupied), BU_1034 (occupied), BU_963 (occupied), BU_981 (recently occupied) and BU_992 (occupied, outside of this EPSML ZoI). Pipistrelle bats were also recorded roosting within two outbuildings within the northern quadrant, BU_1039 and BU_972, and a barn at BU_990.

2.5.24. In the eastern quadrant, common and soprano pipistrelle bats were recorded roosting in seven residential properties including BU_507, BU_610 and BU_819 (unoccupied residential properties which have now become derelict), BU_638, BU_735, BU_705 and BU_737 (outside of this EPSML ZoI). Common pipistrelle bats were also recorded roosting in three non-residential structures in the eastern quadrant including BU_661, (an outdoor workshop outside of this EPSML ZoI), BU_48 and BU_723 (two agricultural barns, the latter is outside of this EPSML ZoI).

2.5.25. In the southern quadrant, a total of 24 structures were recorded to support common and soprano pipistrelle bats, 11 residential properties and 13 non-residential properties. Two common pipistrelle roosts were identified within residential properties at Mill House Farm, now beyond this EPSML ZoI within BU_753 and BU_762. At BU_850, a residential property at Butler's Court, a common pipistrelle bat roost was identified. Eight further

residential properties supporting common/soprano pipistrelle bat roosts were identified including BU_1030, BU_1042, BU_965 and BU_987 (all along Withybridge Gardens, BU_987 supported a pipistrelle maternity roost); at BU_653 along the A4019; and BU_376, BU_614 and BU_862 (the latter two are outside of this EPSML ZoI).

2.5.26. Thirteen non-residential structures were recorded to support crevice dwelling bats in the southern quadrant. Seven non-residential structures were recorded to support common and soprano pipistrelle bats at Butler's Court complex of agricultural buildings, located between the M5 and the Link Road, outside of this EPSML ZoI. These included BU_751, BU_757, BU_763, BU_766, BU_854, BU_855 and BU_857. These structures comprised brick barns or outbuildings. BU_854 supported a common pipistrelle maternity roost. Common pipistrelle roosts were also recorded at BU_771 and BU_364, a large open fronted barn and a Dutch barn respectively, at Mill House Farm. Four other barns/lean-to/outhouse structures were also recorded to support common and soprano pipistrelle bats including: BU_834, BU_378, BU_668 and BU_667 (outside of this EPSML ZoI).

2.5.27. In addition, a whiskered bat transitional roost was identified at BU_992 at Barn Farm, in the northern quadrant, (outside of this EPSML ZoI). The structure comprised an occupied brick farmhouse. Whiskered bat droppings were identified, by eDNA analysis, in the porch on the southern elevation. The porch is constructed from timber with clay tiles on a pitched roof. Bats are presumed to roost in a crevice behind the timber frame between the porch and the house. A further Myotis bat roost was identified within BU_1027, predicted to be a Natterer's, Whiskered or Brandt's bat. Two individuals were recorded roosting, one under the lead flashing between the garage and main house and one emerged from the fascia/soffit box of the porch roof.

2.5.28. Crevice dwelling bats were found to roost in a wide range of structures including occupied and unoccupied residential properties, as well as non-residential properties including barns, lean-to's and outhouses. Features utilised by crevice dwelling bats included: beneath lead flashing; raised roof and ridge tiles; from the eaves and gable ends; from the soffit box; around window frames; beneath hanging tiles, wooden cladding, fascia or barge boards; from cracked or missing bricks. The presence of/potential presence of these features in particular has been used to help inform predicted crevice dwelling bat roosts.

Assessment of features used by hibernating bats

2.5.29. Across the Scheme (both within the EPSML ZoI and within the wider area) hibernation surveys have been undertaken at 38 structures. Only two structures were found to support hibernating bats, BU_378 and BU_638 (both outside of this EPSML ZoI).

2.5.30. BU_378 is a lean-to structure constructed from breeze block with corrugated asbestos sheets for a roof. The south elevation is open leading into one section of the building used as a garage and for storage. The remainder of the building is compartmentalised, including a 'cool room' comprised of timber within the wider structure. Brown long-eared bat droppings were identified in the 'cool room' and in the garage/storage area, and feeding remains were identified in the 'cool room' during January 2022. A brown long-eared bat was recorded once on the static bat detector in February 2022, which was placed in the 'cool room.' The 'cool room' within this structure is a key feature for hibernation.

Photo 2-1 BU_378 showing the 'cool room' comprised of wood (shown in the left of photograph) located within the outbuilding where evidence of hibernating brown long-eared bats was confirmed.

Photo 2-2 BU_378 external showing lean to with access points in the brick work to the cool room.

2.5.31. BU_638 is a large two-storey house with several roof aspects in a poor state of repair. It has a cross-gabled roof with a rear mono pitched two-storey extension, clay roof and ridge tiles and red brick chimneys. There is lead flashing present on the extension, bargeboards with a soffit box present and windows with timber frames. The southern gable end has a potential access point in the form of a vent at the apex of the elevation. A static bat detector was deployed by the landowner into the roof space and common pipistrelle was recorded in February and March 2021. The presence of/potential presence of these features, in particular the clay roof and ridge tiles, the presence of the vent on the southern gable end and steep roof pitch, have therefore been considered as favourable for hibernating bats and have been used to help inform predicted hibernation bat roosts.

Photo 2-3 BU_638 confirmed common pipistrelle hibernation roost within the roof void.

3. Results

3.1. Partially surveyed structures

Table 3-1 – Assessment of partially surveyed structures

Structure reference and photo	Quadrant	Impact as a result of the Scheme	Surveys undertaken to date and results and any outstanding surveys	Further desk based assessment and justification	Prediction
BU_1432 	N	Temporary disturbance	External PBRA undertaken on 27/09/2023. Two storey occupied residential building located within a commercial compound along the A4019 at the western extent of the Scheme. The roof is dual pitch with gable ends and concrete roof and ridge tiles. The walls are concrete rendered. On the eastern aspect there is a wooden boarded overhang with no gaps and slate imitation tiles. On the northern aspect there is one long wooden extension with plastic and tiled roofing. On the western aspect there is a conservatory comprised of wood with a tiled roof and a skylight. On the southern aspect there is a soffit box. The property has lead flashing between the extensions on the east and west and the main house. Potential bat roosting features identified include a gap in the soffit box on the south eastern aspect, although this is likely more suitable for nesting birds. There are gaps under the roof and ridge tiles on all aspects and lead flashing on all aspects is lifted with gaps underneath it. The structure was assessed to provide moderate suitability for crevice dwelling and void dwelling bat species. The structure is not suitable for horseshoe bats. No classic	The presence of void dwelling bat species within BU_1432 is considered to be very unlikely. Almost all of the void dwelling bat roosts were found within agricultural buildings/outbuildings or lean-to type structures with large access points. Only two void dwelling bat roosts were found within residential properties, one of which was vacant and derelict. The other residential property had access under the eaves and a roof void with a tall apex. BU_1432 does not exhibit any of these features. Furthermore, void dwelling bat roosts have only been recorded within structures in the southern and eastern quadrants, not the northern quadrant. On this basis, void dwelling bats are not anticipated within BU_1432. Given the features present on the structure, its moderate suitability, and known roosts within the northern quadrant (all non-breeding roosts, predominantly common pipistrelle and soprano pipistrelle bats), it is assumed that this structure could support solitary/small numbers of non-breeding crevice dwelling bats. The features on this structure, in particular the shallow pitch of the roof and concrete tiles, are not similar to BU_638 which is known to support solitary/small numbers of hibernating common pipistrelle bats. Therefore, the	Crevice dwelling bat roost supporting solitary/small numbers of bats.

			hibernation opportunities are present. This structure is in an area of moderate habitat suitability in the northern quadrant. The habitat provides limited foraging opportunities as it is predominantly agricultural land, but there are some connected linear habitat features including hedgerows and ditches. Two emergence surveys are required. In the event that roosting bats are identified, then further roost characterisation surveys may be required and a hibernation survey would be required.	likelihood of hibernating bats being present in BU_963 is considered to be very low.	
BU_1027	N	Demolished	External PBRA undertaken on 21/08/2019. Recently occupied residential building with gabled and hipped roof with plain clay tiles and clay ridge tiles. Decorative timber bargeboards are present (not able to see	The features on this structure, including the roof tiles and gable end, are similar to BU_638 which is known to support solitary/small numbers of hibernating common pipistrelle bats. As a precaution, and given the absence	In addition to the known roosts, it is predicted that solitary or small numbers of crevice dwelling

			underneath). The structure appears to have closed timber soffits along elevations. Walls are rendered and painted, there are modern uPVC windows and a brick chimney. There is a garage with a duo pitched roof with plain clay tiles attached to the east elevation of the house. A security light is present on the garage. The structure was assessed to provide moderate suitability for crevice and void dwelling bat species. The structure is not suitable for horseshoe bats. No classic hibernation opportunities are present. This building is in an area of high habitat suitability along Stanboro Lane due to the presence of suitable commuting and foraging habitats, and interconnected linear features including wet ditches, tree lines, plantation woodland and agricultural fields. A high level of bat activity was recorded during activity surveys here. Three emergence surveys have been undertaken: • 06/07/2023 dusk - two common pipistrelle, one pipistrelle species and one Myotis bat observed emerging • 04/09/2023 dusk - two common pipistrelle bats emerging • 20/09/2023 dusk – no emergence observed. The roost is characterised as a common pipistrelle day and transitional roost, a soprano pipistrelle day roost and a Myotis (Assumed to be whiskered, Brandt's or Natterer's) day roost. The roost surveys	of classic hibernation opportunities, solitary/small numbers of hibernating crevice dwelling bats are assumed to be present. No void dwelling bats have been recorded roosting within this property during the emergence surveys and no roosts of void dwelling bats have been confirmed within the northern quadrant. Furthermore, features on this property do not resemble BU_378 where brown long-eared bats have been confirmed hibernating. As a result, it is considered reasonable to assume that this property does not support any summer or winter roosts of void dwelling bat species.	hibernating bats are also present.

			confirmed that bats were using crevices beneath tiles, lead flashing and the eaves. A hibernation survey is required.		
BU_1034 	N	Temporary disturbance	External PBRA undertaken on 01/08/2019. BU_1034 is an occupied residential property located along Stanboro Lane. It is a red brick structure with a gable ended roof with clay double roman roof tiles and concrete ridge tiles. Gaps are evident under the ridge tiles on the southern gable end. On the eastern aspect of the building there is a timber soffit box with small areas of possible access underneath. The timber soffit box on the western elevation has a small access point between the box and the wall. The southern chimney has some lifted tiles below in the eastern aspect. There is	The features on this structure, including the roof tiles and gable end, are similar to BU_638 which is known to support solitary/small numbers of hibernating common pipistrelle bats. As a precaution, and given the absence of classic hibernation opportunities, solitary/small numbers of hibernating crevice dwelling bats are assumed to be present. No void dwelling bats have been recorded roosting within this property during the emergence surveys and no roosts of void dwelling bats have been confirmed within the northern quadrant. Furthermore, features on this property do not resemble BU_378 where	In addition to the known roosts, it is predicted that solitary or small numbers of crevice dwelling hibernating bats are also present.

			evidence of some lifted or broken tiles across the roof. The structure was assessed to provide high suitability for crevice and void dwelling bat species. The structure is not suitable for horseshoe bats. No classic hibernation opportunities are present. This building is in an area of high habitat suitability along Stanboro Lane due to the presence of suitable commuting and foraging habitats, and interconnected linear features including wet ditches, tree lines, plantation woodland and agricultural fields. A high level of bat activity was recorded during activity surveys here. Three emergence surveys have been undertaken: • 13/08/2019 dusk – two common pipistrelle emergences from the south east corner of the house • 09/09/2021 dawn – swarming behaviour of common pipistrelle observed but no roosts confirmed • 21/09/2021 dusk - swarming behaviour of common pipistrelle behaviour observed The roost is characterised as a common pipistrelle mating roost. A hibernation survey is required.	brown long-eared bats have been confirmed hibernating. As a result, it is considered reasonable to assume that this property does not support any summer or winter roosts of void dwelling bat species.	

BU_963 	N	Demolished	External PBRA undertaken on 01/08/2019, and internal survey on 28/09/2023. BU_963 is located along Stanboro Lane. It is a two storey residential property with a cross gabled roof with simple flat concrete roof tiles. There are gaps behind timber fascia boards which extend under the eaves of the building, slight gaps under the ridge tiles and some missing mortar under the roof tiles. Internally, there are three roof spaces accessible for bats. The structure was assessed to provide high suitability for crevice and void dwelling bat species. The structure is not suitable for horseshoe bats. No classic hibernation opportunities are present. This building is in an area of high habitat suitability along Stanboro Lane due to the presence of suitable commuting and foraging habitats, and interconnected linear features including wet ditches, tree lines,	BU_963 does not support features that resemble BU_378 or BU_638 (where the presence of small numbers of hibernating bats has been confirmed) and the likelihood of hibernating bats being present in BU_963 is considered to be very low.	No additional roosts (in addition to the known roost) are predicted.

			plantation woodland and agricultural fields. A high level of bat activity was recorded during activity surveys here. Three emergence/re-entry surveys have been undertaken: • 03/07/2019 dusk – no emergence • 21/08/2019 dawn – one soprano pipistrelle returned to the roost • 07/07/2021 dusk – no emergence The roost is characterised as a soprano pipistrelle day roost. A hibernation survey is required.		

BU_1537 	E	Demolished	External PBRA undertaken on 02/03/2021 BU_1537 is a wooden shed with a wooden pitched roof with some damaged bitumen felt. The wooden walls and roof are in a poor state of repair. There are large access points across the structure, although it is not possible to determine how much shelter is available. The structure was assessed to provide low suitability for crevice, void dwelling, and horseshoe bat species. No classic hibernation opportunities are present. This structure is in an area of moderate habitat suitability between agricultural land parcels in the eastern quadrant. The habitat provides limited foraging opportunities but there are some connected linear habitat features including hedgerows and ditches. One emergence survey is required. In the event that roosting bats are identified, then further roost characterisation surveys may be required and a hibernation survey would be required.	BU_1537 has been compared to other similar fully surveyed structures to assess the likelihood of roosting bats being present. Surveys of buildings with a similar structure including BU_969a and BU_641c[8] have not recorded roosts. In addition, no roosts have been identified under bitumen felt across the Scheme. Based on the low suitability of the structure and considering that surveys have demonstrated that similar structures have not supported roosting bats, it is considered entirely reasonable to assume that this structure does not support a bat roost.	Not predicted to be a roost.

[8] BU_641c is beyond the ZoI so full details are not included within this licence application.

BU_45 	E	Demolished	External PBRA undertaken on 10/08/2023. BU_45 is a semi-detached occupied residential property along the A4019, east of junction 10. It has a concrete tiled hipped roof with concrete ridge tiles and a chimney is present with lead flashing at the base. To the rear (north) of the property there is an outbuilding attached to the property which has a dual pitched gable ended roof with roof tiles and ridge tiles. The roof has a number of lifted roof tiles and ridge tiles which present numerous opportunities for crevice dwellers and there is some lifted lead flashing at the base of the chimney. There are some opportunities for void dwellers if access is possible to the roof space. No features suitable for horseshoe access are present. The structure was assessed to provide moderate suitability for crevice and void dwelling bat species. The structure is not suitable for horseshoe bats. No classic hibernation opportunities are present. This structure is in an area of moderate habitat suitability between agricultural land parcels in the eastern quadrant. The habitat provides limited foraging opportunities but there are some connected linear habitat features including hedgerows and ditches. Two emergence/re-entry survey has been undertaken: • 08/07/2021 dusk – no emergence, although the survey was severely constrained as the surveyors were asked to leave the property at 22.00 • 10/08/2023 dusk – no emergence	BU_45 and BU_54 are similar in locality and structure to adjacent properties along the A4019 (BU_709, BU_694, BU_610, BU_611, BU_507, BU_803 and BU_819). A number of these (BU_507, BU_611, BU_709, BU_819, BU_964) support lesser horseshoe day/transitional roosts, however BU_45 and BU_54 are inhabited and therefore are not suitable for horseshoe bats. The similar surrounding structures also support soprano pipistrelle (BU_507), common pipistrelle (BU_610 and BU_819), noctule (BU_610) and brown long-eared day roosts (BU_694). On this basis, it is assumed that BU_45 and BU_54 also support small numbers of crevice dwelling bats. As it is very unusual to find a noctule utilising a structure, noctule are not predicted to be present in BU_45 or BU_54. As discussed in Section 2.4, the presence of a void dwelling bat roost within an occupied residential property is very unlikely unless there is access under the eaves into a roof void with a tall apex. Both BU_45 and BU_54 could have a large roof space potentially similar in size and structure to other properties where void dwelling bats have been recorded (e.g BU_694 and BU_965), and as it has not been possible to rule out access points into the roof space, the presence of a void dwelling bat roost is assumed as a precaution. However, given that brown long-eared bats were recorded in the similar surrounding structures less frequently, it is assumed that just one of the structures supports small numbers of void dwelling bats. BU_45 and BU_54 are two of a number along the A4019 of a similar build, where hibernation	Across BU_45 and BU_54 the following roosts are predicted: Two crevice dwelling bat roosts supporting solitary/small numbers of bats. One void dwelling bat roost supporting solitary/small numbers of bats.

			On the basis that one of the surveys was severely constrained, one further emergence is required. In the event that roosting bats are identified, then further roost characterisation surveys may be required and a hibernation survey would be required.	surveys have been undertaken (BU_709, BU_694, BU_610, BU_611, BU_507). No hibernation roosts were recorded in these similar structures and it is therefore reasonable to assume that hibernating bats are likely absent from BU_45 and BU_54.	
BU_54 	E	Demolished	External PBRA undertaken on 02/03/2021. BU_54 is a semi-detached occupied residential property along the A4019, east of junction 10. It is a two storey red brick building with a single storey extension on the northern aspect. It has clay tiles and clay ridge tiles on the hipped roof and two chimneys. There is lifted lead flashing at the		

			base of the chimneys, missing mortar on the west chimney all the way around and lifted and broken roof tiles. On the extension the roof tiles are very damaged with gaps under the roof tiles and ridge tiles. The soffit boxes on the main building and extension are all flush apart from in the south west corner where there is a gap of 1cm by 20cm. There are gaps in the mortar underneath the window on the southern aspect and a waste pipe has lifted felt on the northern aspect. The structure was assessed to provide moderate suitability for crevice and void dwelling bat species. The structure is not suitable for horseshoe bats. No classic hibernation opportunities are present. This structure is in an area of moderate habitat suitability between agricultural land parcels in the eastern quadrant. The habitat provides limited foraging opportunities but there are some connected linear habitat features including hedgerows and ditches. Two emergence surveys are required. In the event that roosting bats are identified, then further roost characterisation surveys may be required and a hibernation survey would be required.		

BU_48 	E	Temporary Disturbance	External PBRA undertaken on 10/08/2023. BU_48 is a large metal agricultural barn located north of the A4019 at the eastern extent of the Scheme. It comprises metal walls with a metal sheet roof with a metal ridge. There is a partially damaged door on the western aspect. Part of the southern aspect is bordered by an adjacent building (BU_25). There are gaps under the metal roof sheeting that could allow direct access to the barn and a gap in the door on the western aspect of the building that would allow horseshoe access. The structure was assessed to provide low suitability for crevice dwelling, void dwelling and horseshoe bat species. The structure is not suitable for hibernating bats being	Despite the surveys not being complete, the structure does not provide suitable features for larger numbers of bats, and there is therefore a high level of confidence in the common pipistrelle day roost characterisation. The presence of a lesser horseshoe bat roost and a void dwelling bat roost supporting solitary/small numbers of bats is considered to be low given that these species have been found to roost predominantly within brick built structures. However, BU_48 is relatively similar to BU_747 (see Section 2.4) which was found to support a lesser horseshoe bat day roost. It is also similar to BU_761 and BU_857 which were identified as a night roost/feeding roost/transitional roost. Therefore, as a precaution BU_48 is also assumed to be a roost for lesser horseshoe bats and void	In addition to the known roost, lesser horseshoe and void dwelling bat roosts supporting solitary/small numbers of bats is also predicted.

			comprised of metal and therefore does not have a stable temperature or humidity throughout the winter. This structure is in an area of moderate habitat suitability between agricultural land parcels in the eastern quadrant. The habitat provides limited foraging opportunities but there are some connected linear habitat features including hedgerows and ditches. One emergence has been undertaken: • 10/08/2023 dusk –a common pipistrelle bat was observed emerging through the gap in the door. The roost is characterised as a common pipistrelle day roost. Two further emergence surveys are required.	dwelling bats supporting solitary/small numbers of bats, most likely a night roost or feeding perch. The structure is not predicted to be a hibernation roost as it is not suitable for hibernating bats as it is comprised entirely of metal and would not provide a stable temperature throughout hibernation.	

BU_819 	E	Demolished	External PBRA undertaken on 25/09/2020 and internal inspection on 09/03/2022. BU_819 is a semi-detached residential building (attached to BU_45) along the A4019, east of junction 10. It is unoccupied and has become derelict. The roof is hipped and comprises of slate imitation tiles with concrete ridge tiles, many of which have been replaced, and three chimneys with lead flashing at each of their bases. Some of the ridge tiles on the southern elevation are lifted. There are some gaps between the closed soffit box and the wall. There is some lifted lead flashing at the base of the chimney. There is a large gap around the waste pipe on the north west corner of the building. On the northern elevation, at the rear of the property, there is an extension which is an original outhouse. The slate imitation tiles on the extension to the north are mostly flush to the roof with some evidence of lifting. On the northern elevation there is a waste pipe under the guttering, with a potential access point for bats. There are small gaps in the soffit box above the door to the extension either side of the door approximately 2 to 4 cm. An original door to the outhouse remains, which has been left open allowing bats	BU_819 is one of a number along the A4019 of a similar build, where hibernation surveys have been undertaken (BU_709, BU_694, BU_610, BU_611, BU_507). No hibernation roosts were recorded in these similar structures. In addition, BU_819 does not support features that resemble BU_378 or BU_638 (where the presence of small numbers of hibernating bats has been confirmed). It is therefore reasonable to assume that hibernating bats are likely absent from BU_819.	No additional roosts (in addition to the known roosts) are predicted.

			access to the external toilet. A number of bat droppings were found and collected for DNA analysis. They were confirmed to be lesser horseshoe bat droppings. The structure was assessed to provide moderate suitability for crevice dwelling, void dwelling and horseshoe bats. No classic hibernation opportunities are present. The building is in an area of moderate habitat suitability with expanses of grassland, scrub, ruderal and hedgerows north of the property. Three emergence/re-entry surveys have been undertaken: • 08/07/2021 dusk – no emergence • 22/07/2021 dusk – no emergence • 09/08/2021 dusk – two common pipistrelle bats emerged. The roost is characterised as a lesser horseshoe transitional roost and a common pipistrelle day roost. A hibernation survey is required.		
BU_987 	S	Demolished	External PBRA undertaken on 24/07/2019 and internal inspection undertaken on 28/09/2023. BU_987 is a two-storey multi pitch recently occupied residential property located along Withybridge Gardens. It has several extensions. The main house has a gabled roof, and an extension to the south has a hipped roof. A further two hipped roof extensions are attached to eastern elevation. On the southern hipped extension and one of the eastern hipped extensions the roof tiles appear to be asbestos. There	The features on this structure, in particular the gable ends and multi-pitched roof, are similar to BU_638 which is known to support solitary/small numbers of hibernating common pipistrelle bats. As a precaution, and given the absence of classic hibernation opportunities, solitary/small numbers of hibernating crevice dwelling bats are assumed to be present.	In addition to the known roost, solitary or small numbers of crevice dwelling hibernating bats are predicted.

			is a new extension to the south and a further new extension to the south-east with imitation slate tiles throughout which are simple, flat. The walls are rendered brick in good condition with no obvious entry points. There are closed soffits with minor access and minor lifting of the ridge tiles. Decorative half timbering is present on the front (north) gable end of the house. Decorative bargeboard has small access points behind. There are gaps on the eaves under the soffit board. The entire eastern aspect is a new extension. No signs of bats were identified during the internal and external inspections. The structure was assessed to provide low suitability for crevice and void dwelling bats. The structure is not suitable for horseshoe bats. No classic hibernation opportunities are present. The building is in an area of moderate habitat suitability with agricultural land, plantation woodland and scrub to the south. Three emergence surveys have been undertaken: • 01/09/2020 dusk – a soprano pipistrelle emergence from the apex of the south gable end • 31/08/2021 dusk – two emergences of soprano pipistrelle from loose lead flashing along the ridge • 25/09/2023 dusk – no emergence The roost is characterised as a soprano pipistrelle maternity roost on a precautionary basis due to an absence of surveys during the maternity period.		

			A hibernation survey is required.		
BU_1030 	S	Demolished	External PBRA undertaken on 31/07/2019. BU_1030 is an occupied residential building located along Withybridge Gardens. It has a butterfly roof with two pitched roofs with gable ends. The structure has slate roof tiles which are flush to the roof and two dormers with lead flashing at the base where they meet the main roof. There is a large gap where the ridge tile meets the lead flashing. There are plastic soffit boxes and timber bargeboards on the gable ends and a red brick chimney with lifted lead flashing. The conservatory on the eastern extension consists of brick and glass and there is a hole under the apex on the eastern aspect above the conservatory. There is a skylight in the rear of the property. There is a missing tile on the eastern aspect of the southern elevation, gaps under the southern bargeboard and a broken tile on the southern aspect to the west of the pitched	The features on the structure including access to the gable end apex and brick chimneys are similar to BU_638, which is known to support solitary/small numbers of hibernating common pipistrelle bats. As a precaution, and given the absence of classic hibernation opportunities, solitary/small numbers of hibernating crevice dwelling bats are assumed to be present.	In addition to the known roost, solitary or small numbers of crevice dwelling hibernating bats.

			roof end. The garage has a corrugated asbestos roof which is slightly pitched. There is access under the roof through into the garage. The structure was assessed to provide moderate suitability for crevice dwelling bat species. The structure is not suitable for void dwelling or horseshoe bats. No classic hibernation opportunities are present. The building is in an area of moderate habitat suitability with agricultural land, plantation woodland and scrub to the south. Three emergence surveys have been undertaken: • 28/08/2020 dusk – two common pipistrelle bats emerged from the gable end apex. • 13/09/2021 dusk – one non-echolocating bat emerging from the soffit box on the southern facing aspect. • 27/07/2023 dusk – a common pipistrelle emerged from the northern aspect likely under the roof tiles. The roost is characterised as a common pipistrelle day roost. A hibernation survey is required.		

BU_1042 	S	Demolished	External PBRA undertaken on 31/07/2019 and internal inspection on 28/09/2023. BU_1042 is a recently occupied residential property located along Withybridge Gardens. It is a two storey residential building constructed from red brick with a cross-gabled roof. There are flat, plain clay tiles and concrete / clay ridge tiles. Some roof tiles have recently been replaced. There is a ventilation slit and brick on the eastern aspect. A house sparrow entered in the ridge from gable end apex of the house. There is a red brick chimney with lead flashing at the base, a closed soffit box, a bay window on the eastern aspect with a closed laminate soffit box. The structure appears to have dry ridge system. There are gaps where dormers meet the main roof in the valley, a hole in the apex on the western gable end and access to the soffit box on the southern aspect of the house. Internal: Two individual roof voids in each of the gable ends. One was fully boarded across its base with breeze block gable end and bitumen roof felt lining. The other was not lined with direct visibility to the tiles, with	The features on this structure, in particular the clay roof tiles, gable ends and multi-pitched roof, are similar to BU_638 which is known to support solitary/small numbers of hibernating common pipistrelle bats. As a precaution, and given the absence of classic hibernation opportunities, solitary/small numbers of hibernating crevice dwelling bats are assumed to be present.	In addition to the known roost, it is predicted that solitary or small numbers of crevice dwelling hibernating bats are also present.

			a large brick chimney breast. The base of the roof space was not boarded. No evidence of bat was identified. The structure was assessed to provide moderate suitability for crevice and void dwelling bat species. The structure is not suitable for horseshoe bats. No classic hibernation opportunities are present. The building is in an area of moderate habitat suitability with agricultural land, plantation woodland and scrub to the south. Three emergence surveys have been undertaken: • 18/08/2020 dusk – soprano pipistrelle emerged from under ridge tile of western gable end • 22/07/2021 dawn – no re-entry • 21/06/2023 dusk – possible emergence from western gable end The roost is characterised as a soprano pipistrelle day roost. A hibernation survey is required.		
BU_966 	S	Demolished	External PBRA undertaken on 24/07/2019 and internal inspection on 28/09/2023.	Along Withybridge Gardens there are a total of 14 residential properties. Four buildings with roosts have been identified to date within three	Across BU_966, BU_983 and BU_1041 the

			BU_966 is a two storey recently occupied residential property located along Withybridge Gardens. Potential roosting features include a small hole behind the barge board on the western elevation. Gaps were identified beneath the roof tiles and ridge tiles, and under loose flashing around the chimney. Gaps that would allow access to behind the soffit box were also identified. Internally both of the roof spaces have a bitumen felt roof lining. The roof space is square and is fully boarded with breeze blocks at the gable end. The other was not lined, with a large brick chimney breast. No signs of bats were identified during the internal and external inspections. The structure was assessed to provide moderate suitability for crevice and void dwelling bat species. The structure is not suitable for horseshoe bats. No classic hibernation opportunities are present. The building is in an area of moderate habitat suitability with agricultural land, plantation woodland and scrub to the south. One emergence survey has been undertaken: • 28/09/2020 dusk – no emergence One further emergence survey is required. In the event that roosting bats are identified, further roost characterisation surveys may be required and a hibernation survey would be required.	structures where summer roost surveys are fully completed (BU_987, BU_1030 and BU_1042) and one structure where summer roost surveys are partially complete (BU_965). BU_965 is missing one emergence survey only, but it is considered that the roost can be reliably characterised based on the information already gathered. The confirmed roosts comprise a soprano pipistrelle maternity roost (BU_987), a common pipistrelle maternity and day roost (BU_1030), a soprano pipistrelle day roost (BU_1042) and a common pipistrelle and brown long-eared day roost (BU_965), Of the remaining ten properties, seven have been fully surveyed and no roosting bats have been identified. In order to predict the presence of bats in the remaining three partially surveyed structures (BU_966, BU_983 and BU_1041) consideration has been given to the proportion of structures with confirmed bat roosts, and this has been applied to the remaining three structures. Of the 11 surveyed structures, four support crevice dwelling bats, which is 36%. It is therefore assumed that approximately 36% of the remaining three structures support a crevice dwelling bat roost, which equates to one structure. Based on the moderate suitability of the structures, this has been assumed to be a roost supporting small numbers of bats. Of the 11 surveyed structures, one supports a void dwelling bat, which is 9%. It is therefore assumed that 9% of the remaining three structures support a void dwelling bat roost, which is 0.27. This has been rounded to one void dwelling roost supporting solitary/small numbers of bats as a precaution. BU_966, BU_983 and BU_1041 are gable	following roosts are predicted: One crevice dwelling bat roost supporting solitary/small numbers of bats. One void dwelling bat roost supporting solitary/small numbers of bats. Solitary or small numbers of crevice dwelling hibernating bats.

				ended and/or have a hipped roof with concrete roof tiles and ridge tiles. The features on these buildings, in particular the gable end and tile composition, are similar to BU_638 (where solitary/small numbers of hibernating common pipistrelle bats have been recorded). Therefore a hibernation crevice dwelling roost is predicted.	
BU_983 	S	Demolished	External PBRA undertaken on 31/07/2019. BU_983 is a two storey recently occupied residential property with a single storey extension located along Withybridge Gardens. The roof is hipped and laid with plain, flat clay tiles and there are clay ridge tiles. There is a red brick chimney with lead flashing. There appear to be gaps under the ridge tiles particularly on the dormers, missing mortar from the ridge tiles and		

			missing mortar on the north-eastern edge of the pitched roof. Ventilation in the roof appears to be tiles missing for each vent, evident on the southern roof elevation and eastern roof elevation of the extension to the east. There are gaps under the soffit box of the southern aspect, to the west above patio doors. The structure was assessed to provide moderate suitability for crevice and void dwelling bat species. The structure is not suitable for horseshoe bats. No classic hibernation opportunities are present. The building is in an area of moderate habitat suitability with agricultural land, plantation woodland and scrub to the south. Two emergence surveys are required. In the event that roosting bats are identified, then further roost characterisation surveys may be required and a hibernation survey would be required.		
BU_1041 	S	Demolished	External PBRA undertaken 31/07/2019. BU_1041 is a recently occupied residential property located along Withybridge Gardens with a cross gabled roof laid with simple, plain clay tiles and clay ridge tiles with missing mortar. There is a porch with a mono-pitched roof, the underside of which is boxed off with plastic panelling. A large opening was identified on the western underside of the porch into a cavity. A number of gaps under roof tiles, ridge tiles and under lead flashing were identified. Access to the soffit box which runs along the northern and southern aspects of the house was identified. A ventilation slit on the		

			southern gable end may allow access into the roof space if there is no mesh. The structure was assessed to provide moderate suitability for crevice and void dwelling bat species. The structure is not suitable for horseshoe bats. No classic hibernation opportunities are present. The building is in an area of moderate habitat suitability with agricultural land, plantation woodland and scrub to the south. Two emergence surveys are required. In the event that roosting bats are identified, then further roost characterisation surveys may be required and a hibernation survey would be required.		
BU_978 	S	Demolished	External PBRA undertaken on 03/12/2020. An internal inspection was undertaken at the same time and no signs of bats were identified. BU_978 is a painted wooden workshop along Withybridge Gardens with some small windows. It is gable ended with a wooden bargeboard and bitumen felt roof. The roof over hangs the wooden walls. There is a gap under the roof, above the door which would allow access by a bat. The door is flush. Internally the timber is clean inside, and it is possible that if there were evidence of bats this could have been cleaned up whilst cleaning the workshop. The structure was assessed to provide low suitability for crevice and void dwelling bat species. The structure is not suitable for horseshoe bats. No classic hibernation opportunities are present.	BU_978 has been compared to other similar fully surveyed structures to assess the likelihood of roosting bats being present. Surveys of buildings with a similar structure including BU_969a and BU_641c[9] have not recorded bat roosts. In addition, no roosts have been identified under bitumen felt across the entire Scheme. Based on the low suitability of the structure and considering that surveys have demonstrated that similar structures have not supported roosting bats, it is considered entirely reasonable to assume that this structure does not support a bat roost.	Not predicted to be a roost.

[9] BU_641c is beyond the ZoI so full details are not included within this licence application.

			The building is in an area of moderate habitat suitability with agricultural land, plantation woodland and scrub to the south. One emergence survey is required. In the event that roosting bats are identified, then further roost characterisation surveys may be required and a hibernation survey would be required.		
BU_1025 	S	Demolished	External PBRA undertaken on 31/07/2019. BU_1025 is a large timber shed in a garden along Withybridge Gardens. It has timber shiplap clad walls and a bitumen felted roof which is mono pitched. The eaves are tight to the roof. There are gaps under the fascia board but it was not possible to determine how far they extend. The structure was assessed to provide low suitability for crevice and void dwelling bat species. The structure is not suitable for horseshoe bats. No classic hibernation opportunities are present. The building is in an area of moderate habitat suitability with agricultural land, plantation woodland and scrub to the south. One emergence survey is required. In the event that roosting bats are identified, then further roost characterisation surveys may be required and a hibernation survey would be required.	BU_1025 has been compared to other fully surveyed structures to assess the likelihood of roosting bats being present. Surveys of buildings with a similar structure including BU_969a and BU_641c[10] have not recorded roosts. In addition, no roosts have been identified under bitumen felt across the entire Scheme. Based on the low suitability of the structure and considering that surveys have demonstrated that similar structures have not supported roosting bats, it is considered entirely reasonable to assume that this structure does not support a bat roost.	Not predicted to be a roost.

[10] BU_641c is beyond the ZoI so full details are not included within this licence application.

BU_1014 	S	Temporary disturbance	External PBRA and internal inspection undertaken on 20/09/2023. BU_1014 is a workshop located along the A4019, east of junction 10. It comprises a brick structure with an extension. The building is single storey, gable ended with one chimney and no roof void. The roof on the extension is mono pitched corrugated metal, and the main building has concrete roof and ridge tiles. This property is situated immediately adjacent to the A4019 with features limited to some lifted roof tiles on the main pitch, and gaps under the corrugated metal. The structure was assessed to provide low suitability for crevice dwelling bat species. The structure is not suitable for void dwelling or horseshoe bats. No classic hibernation opportunities are present. This building is in an area of moderate habitat suitability, with the A4019 located to the north and agricultural fields with tree lines and hedgerows to the south. One emergence survey is required. In the event that roosting bats are identified, then further roost characterisation surveys may be required and a hibernation survey would be required.	In the absence of detailed survey data, taking into account the limited roosting opportunities for crevice dwelling bat species, but taking a precautionary approach, it is assumed that this structure could support solitary/small numbers of non-breeding crevice dwelling bats. BU_963 does not support features that resemble BU_378 or BU_638 (where the presence of small numbers of hibernating bats has been confirmed) and the likelihood of hibernating bats being present in BU_1014 is considered to be very low.	Crevice dwelling bat roost supporting solitary/small numbers of bats.

BU_1091 	S	Temporary disturbance	External PBRA undertaken on 20/09/2023. BU_1091 is a two storey occupied residential brick building located along the A4019, east of junction 10. The property is cross gabled with concrete roof tiles and concrete ridge tiles. There is one brick chimney. It is known from discussions with the landowners that there are two smaller roof voids within each cross gable with small apex heights. It is therefore considered less suitable for void dwelling bats. The structure was assessed to provide moderate suitability for crevice dwelling bat species, with limited suitability for void dwelling species. The structure is not suitable for horseshoe bats. No classic hibernation opportunities are present. This building is in an area of moderate habitat suitability, with the A4019 located to the north and agricultural fields with tree lines and hedgerows to the south. Two emergence surveys are required. In the event that roosting bats are identified, then further roost characterisation surveys may be required and a hibernation survey would be required.	In the absence of detailed survey data, and considering the moderate suitability of the structure, it is assumed that this structure supports a crevice dwelling bat roost supporting solitary/small numbers of bats. The features on this structure, in particularly the pitch of the gable ends and the roof tiles, are not similar to BU_638 or BU_378 (where hibernating bats have been recorded). Therefore no hibernation roosts are predicted.	Crevice dwelling bat roost supporting solitary/small numbers of bats.
BU_1527	E/S	Demolished	External PBRA undertaken on 04/05/2022. BU_1527 is a culvert under the A4019. One side (north of the A4019) is so overgrown with vegetation, that the culvert entrance is	Although the summer roost surveys did not follow a standard approach given the constraints associated with surveying this structure, it is considered that they are	Features suitable for larger numbers of hibernating bats.

			not visible. The entrance south of the A4019 is visible and the entrance is approximately 1.5 m tall, with very little water present. There is a large void (with open entrance) that leads to two culverts. No internal inspection was possible, and no inspection reports are available for this structure. In the absence of detailed information, a precautionary approach has been taken and the structure was assessed to provide high suitability for crevice, void dwelling and horseshoe bats. It is also considered that BU_1527 could provide classic hibernation opportunities. The structure spans between the eastern and southern quadrants which are predominantly agricultural, therefore the habitat is of moderate suitability. Two emergence surveys have been undertaken from the south of the culvert: • 11/07/2023 dusk – no emergence • 11/09/2023 dusk – no emergence In addition, a static detector was deployed at the southern entrance between 04/05/2022 to 24/05/2022. A hibernation survey is required.	sufficient to conclude, with reasonable certainty, that roosting bats are likely absent. As a precaution, and in the absence of detailed hibernation survey data, BU_1527 has been assumed to provide hibernation habitat suitable for larger numbers of bats, as the habitat could mimic a cave and provide a stable temperature and high humidity levels. However, it is acknowledged that larger hibernation sites are rare in the UK[3], and this has been taken into account when considering the number of hibernating bats that could be present within the Method Statement.	

BU_667 	S	Demolished	External PBRA undertaken on 25/08/2020. BU_667 is a single storey building with duo pitched roof laid with double roman (interlocking) clay tiles and clay ridge tiles. Timber cladding is present on the gable ends. Extensive growth of ivy and staghorn sumac limited access and visibility of the rest of the building. The structure was assessed to have moderate suitability for crevice, void dwelling and horseshoe bats. No classic hibernation opportunities are present. The structure is located along Moat Lane in an area of high habitat suitability. Three emergence surveys were undertaken: • 05/05/2022 dusk – no emergence • 02/08/2023 dusk – emergence of a common pipistrelle from the wooden cladding on the northern gable end • 18/09/2023 dusk – no emergence BU_667 has been characterised as a common pipistrelle day roost. A hibernation survey is required.	The features on the structure including the clay roof and ridge tiles are similar to BU_638, which is known to support solitary/small numbers of hibernating common pipistrelle bats. As a precaution, and given the absence of classic hibernation opportunities, solitary/small numbers of hibernating crevice dwelling bats are assumed to be present.	In addition to the known roost, it is predicted that solitary or small numbers of crevice dwelling hibernating bats are also present.

3.2. Trees

Table 3-2 – Unsurveyed/partially surveyed trees

Quadrant	Suitability	Trees To Be Felled/Disturbed Where No Surveys Have Been Undertaken	Trees To Be Felled/Disturbed Where Surveys are partially complete
Northern	High	Trees at risk of temporary disturbance[11]: 727 and 736 (2)	Tree to be felled: Tree 660 (1)
	Moderate	-	Trees to be felled: Tree 663, 664 (2) Trees at risk of temporary disturbance: 512, 649 (2)
Southern	Confirmed	-	
	High	-	Tree at risk of temporary disturbance: Tree 241 (1)
	Moderate	-	Trees to be felled: Tree 656 and 596 and (2) Trees at risk of temporary disturbance: Tree 240 (1)
Eastern	-	-	-
Western	-	-	-
Total	**-**	**2**	**9**

[11] All assumed high as no surveys have been completed

4. Proposed compensation for known and predicted roosts

4.1.1. Taking account of the known roosts as well as the predicted roosts, and the impacts of the Scheme, the proposed compensation is set out in Table 4-1 , split by quadrants.

4.1.2. All known and predicted bat roosts that are proposed to be demolished/felled have been represented in red. All roosts that will be subject to temporary disturbance have been represented in green.

4.1.3. For each compensatory feature, the total number that will be provided is shown in the brackets and in bold.

4.1.4. In designing the compensation package, the approach is to provide like-for-like or better conditions compared to what is present/predicted to be present and impacted. Detailed design parameters for the compensatory bat roost structures are provided in Section 5.

4.1.5. Where bat boxes are proposed to compensate the loss of maternity, hibernation and mating roosts, at least two bat boxes (suitable for the species and roost) per roost impacted are provided. This is in line with discussions with Natural England on 19/07/2023.

Table 4-1 – Compensation for Bat Roosts to be Impacted as a Result of the Scheme

	Mitigation measures	Northern Quadrant	Eastern Quadrant	Southern Quadrant	Western Quadrant	Total
Compensatory Bat Structure	**Void suitable for lesser horseshoes/ void dwelling and light sampling species**	-	**(1 structure with 2 voids)** BU_611 and BU_694 lesser horseshoe day roosts to be lost.	**(1 structure with 2 voids)** BU_965 brown long-eared day roost to be lost. BU_966/BU_983/BU_1041 predicted void dwelling bat roost supporting solitary/small numbers of bats to be lost	-	**4**
	Lean-to/ compartments within the compensatory bat structure	-	**(1 structure with 4 lean-to/ compartments and 4 bat boxes within the lean-to/compartments (1 in each) to provide roosts for void dwelling bats with a light sampling area)** BU_507 and BU_709 lesser horseshoe day roosts and BU_819 lesser horseshoe transitional roost, to be lost. BU_694 brown long-eared day roost to be lost. BU_45/54 predicted void dwelling bat roost supporting solitary/small numbers of bats. BU_48 predicted lesser horseshoe roost supporting solitary/small numbers of bats, to be temporarily disturbed. BU_48 predicted void dwelling bat roost supporting solitary/small numbers of bats, to be temporarily disturbed.	**(1 structure with 2 lean-to/compartments and 2 bat boxes within the lean-to/compartments (1 in each) to provide roosts for void dwelling bats with a light sampling area)** *Not required, but provided as an enhancement*	-	**6** **(4 on the eastern structure and 2 on the southern structure)**
	Crevices Features (Non-Maternity) Within the Structure	-	**(1 structure with 10 crevice features)** Compensation for: BU_507 soprano pipistrelle day roost to be lost. BU_610 common pipistrelle day roost to be lost. BU_610 noctule day roost to be lost. BU_819 common pipistrelle day roost to be lost. BU_48 common pipistrelle day roost to be temporarily disturbed. BU_54 predicted crevice dwelling bat roost supporting solitary/small numbers of bats, to be lost. BU_45 predicted crevice dwelling bat roost supporting solitary/small numbers of bats, to be lost.	**(1 structure with 10 crevice features)** Compensation for: BU_1030, BU_667 and BU_965 common pipistrelle day roosts, to be lost. BU_1042 soprano pipistrelle day roost to be lost. BU_653 common and soprano pipistrelle day roosts to be lost. BU_376 common pipistrelle day roost to be temporarily disturbed. BU_966/BU_983/BU_1041 predicted crevice dwelling bat roost supporting solitary/small numbers of bats, to be lost. BU_1091 and BU_1014 predicted crevice dwelling bat roost supporting solitary/small numbers of bats, to be temporarily disturbed.	-	**20** **(10 in the eastern quadrant and 10 in the southern quadrant)**
	Crevice Features (Maternity) Within the Structure	-	**(1 structure with 1 maternity crevice feature)** *Not required, but provided as an enhancement*	**(1 structure with 1 maternity crevice feature)** BU_987 soprano pipistrelle maternity roost to be lost.		**2**
	Cool Tower within the compensatory structure for larger numbers of	-	**(1)** BU_1098 (Barn Farm Culvert) predicted solitary or small	**(1)** BU_1527 predicted feature suitable for larger numbers of hibernating bats, to be lost.	-	**2**

	Hibernating Bats[12]		numbers of crevice dwelling and void dwelling hibernating bats.			
Crevice Dwelling Bat Structure	**Crevice Dwelling Bat Structure (each with at least one bat feature suitable for maternity[13] and ten other roosting features)**	**(1 structure with at least 14 roosting features)** BU_972 common pipistrelle day roost to be lost. BU_981 common and soprano pipistrelle and pipistrelle species day roosts to be lost. BU_1027 common pipistrelle day roost, soprano pipistrelle day roost, common pipistrelle transitional roost, Myotis (assumed to be Whiskered, Brandt's or Natterer's) day roost, to be lost. BU_1039 pipistrelle species day roost to be lost. BU_963 soprano pipistrelle day roost to be lost. BU_1034 common pipistrelle day and mating roost to be temporarily disturbed. BU_1034 soprano pipistrelle mating roost to be temporarily disturbed. BU_1432 predicted crevice dwelling bat roost supporting solitary/small numbers of bats, to be temporarily disturbed.	-	-	-	**1** **(1 structure with at least 14 roosting features)**
Artificial Bat Boxes	**Hibernation bat box (for Small Numbers of Bats)**	**(4)** BU_1027 predicted solitary or small numbers of crevice dwelling hibernating bats, to be lost. BU_1034 predicted solitary or small numbers of crevice dwelling hibernating bats, to be temporarily disturbed.	-	**(10)** BU_667, BU_966/BU_983/BU_1041, BU_987, BU_1042 and BU_1030 predicted solitary or small numbers of crevice dwelling hibernating bats, to be lost.	-	**14**
	Artificial Crevice Bat Box	**(5)** Trees 663 and 664 moderate suitability trees predicted to support solitary/small numbers of bats, to be lost. Trees 512, and 649 moderate suitability trees predicted to support solitary/small numbers of bats, to be temporarily disturbed. Tree 499 moderate suitability tree to be lost. Tree is fully surveyed and no roosting bats identified, but compensation is provided to ensure no loss of roost resource.	**(1)** Tree 281 moderate suitability tree to be lost. Tree is fully surveyed and no roosting bats identified, but compensation is provided to ensure no loss of roost resource.	**(8)** Tree 656 and 596 moderate suitability trees predicted to support solitary/small numbers of bats, to be lost. Tree 240, moderate suitability tree predicted to support solitary/small numbers of bats, to be temporarily disturbed. Trees 124, 125, 236, 252 and 253 moderate suitability trees to be lost. Trees are fully surveyed and no roosting bats identified, but compensation is provided to ensure no loss of roost resource.	-	**14**
	Artificial Maternity / Hibernation Bat Boxes	**(6)** Tree 660 high suitability tree predicted to support a maternity roost, to be lost. Trees 727 and 736 high suitability trees predicted to support a maternity roost, to be temporarily disturbed.	-	**(2)** Tree 241 high suitability tree predicted to support a maternity roost, to be temporarily disturbed.	-	**8**

[12] This will follow the approximate design of the Lesser Horseshoe 'Cool Tower' as detailed on The Vincent Wildlife Trust's publications section of their website: https://www.vwt.org.uk/wp-content/uploads/2017/02/The-Lesser-Horseshoe-Cool-Tower.pdf

[13] Bat Tower at Ravenglass Railway. Cumbria (original case study requiring update) - Bat Conservation Trust (bats.org.uk)

Tree Features	**Tree Roosting Feature**	**(1)** Tree 496 barbastelle transitional roost to be lost.	-	**(3)** Tree 86 Natterer's day roost to be temporarily disturbed. Tree 237 and 235A high suitability trees to be lost. Trees are fully surveyed and no roosting bats identified, but compensation is provided to ensure no loss of roost resource.	**(2)** Tree 576 and Tree 578 noctule day roosts to be temporarily disturbed.	**6**

5. Design parameters for compensatory features

5.1.1. The purpose of this section is to agree a set of design parameters with Natural England, to provide assurance that like-for-like or better conditions will be incorporated into the compensatory features. The detailed design of the compensatory structures will be undertaken post-planning, to inform the final bat licence application, and will be based on the agreed design parameters set out here.

5.1.2. In section 5.1 the large compensatory bat structures are described. For the eastern and then the southern quadrant, the bat roosts to be compensated for are listed, followed by a description of the structure(s) design and the reason for each feature.

5.1.3. The compensatory crevice dwelling bat structure is described in Section 5.2, and then artificial bat boxes in 5.3 and tree roosting features in 5.4. In each of sections 5.2 to 5.4, the bat roosts to be compensated for are described, followed by a description of the compensatory feature(s)' design and the reason for each feature.

5.2. Large compensatory bat structures

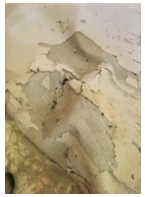
Eastern quadrant

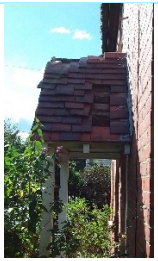
5.2.1. Table 5-1 below details the bat roosts that the compensatory structure in the eastern quadrant compensates for, and the features required to effectively compensate for impacts to these roosts.

Table 5-1 – Eastern Quadrant Compensatory Structure

Known or Predicted Roost, Impact and Structure (if known)	Roost Type	Roost Location and Dimensions (if known)	Roost Photos	Roost Details	Compensation provided
Loss of BU_611	Lesser horseshoe day roost. No bats seen, droppings collected.	House loft void where droppings were identified Size: 5 m long x 3 m wide x 2 m high Outdoor toilet Size: 2 m long x 1 m wide x 2 m / 3 m high		Red brick construction and the tiled roof was lined with wooden sarking. An access point for bats could not be confirmed, however not all of the loft space was accessible for inspection during the survey (due to thick loft insulation concealing access routes through the void). There was a missing half brick between this roof void and the adjacent roof void (BU_610), and a chimney was present that could be used by this species to access the void. During the emergence surveys no bats were recorded to enter or exit the property to confirm access points.	Compensatory structure with at least two voids – comprising a void within the ground floor for bats and an additional purpose-built loft void suitable for lesser horseshoes / void dwelling and light sampling species.
Loss of BU_694	Lesser horseshoe day roost. No bats seen, droppings collected.	House (entire, but droppings were concentrated in the roof void and first floor bedroom) Size: 5 m long x 3 m wide x 2 m high		Red brick construction and the tiled roof was lined with wooden sarking. The residential property was derelict and therefore bats had access to the whole property through a missing loft hatch. Evidence of droppings was recorded throughout, however accumulations of droppings were concentrated below the ridge beam in the loft and below one of the light fittings in a first floor bedroom. During emergence surveys no bats entered or exited from the property to confirm access points. As with BU_611, the whole of the loft void could not be accessed, however there was potential access between the adjacent roof void, and a chimney was	

Known or Predicted Roost, Impact and Structure (if known)	Roost Type	Roost Location and Dimensions (if known)	Roost Photos	Roost Details	Compensation provided
				present that could be used by this species to access the void.	
Loss of BU_507	Lesser horseshoe day / feeding roost. No bats seen, droppings collected.	Outdoor toilet Size: 2 m long x 1 m wide x 2 m / 3 m high		All three of these roosts were in outdoor toilets of very similar construction at the rear of derelict properties. They were constructed from brick (that had been whitewashed). The roof tiles had no interior lining. Bats are assumed to access these roosts via the doors that were left open (as no other access points were identified).	Four lean-to / compartments on the exterior of, or within, the compensatory bat structure with four bat boxes within the lean-to/compartments to provide roosts for void dwelling bats with a light sampling area. In combination these provide eight compensatory features, as each individual lean-to/compartment
Loss of BU_709	Lesser horseshoe – day / feeding roost.	Outdoor toilet Size: 2 m long x 1 m wide x 2 m / 3 m high			
Loss of BU_819	Lesser horseshoe transitional roost. No bats seen, droppings collected.	Outdoor toilet Size: 2 m long x 1 m wide x 2 m / 3 m high			

Known or Predicted Roost, Impact and Structure (if known)	Roost Type	Roost Location and Dimensions (if known)	Roost Photos	Roost Details	Compensation provided
Loss of BU_694	Brown long-eared day roost. No bats seen, droppings collected.	House (entire, but droppings were concentrated in the roof void) Size: 5 m long x 3 m wide x 2 m high	 	Red brick construction and the tiled roof was lined with wooden sarking. The residential property was derelict and therefore bats had access to the whole property through a missing loft hatch. Evidence of droppings was recorded throughout, however accumulations of droppings were concentrated below the ridge beam in the loft and below one of the light fittings in a first floor bedroom. During emergence surveys no bats entered or exited from the property to confirm access points. As with BU_611, the whole of the loft void could not be accessed, however there was potential access between the adjacent roof void, and a chimney was present that could be used by this species to access the void.	void compensates for a lesser horseshoe roost, and each lean-to/compartment void containing a bat box also provides a roost feature for a light-sampling bat species e.g. long-eared bat. Also see further explanation after this table.
Loss of BU_45/54	Predicted void dwelling bat roost supporting solitary/small numbers of bats	Unknown	 	N/A	

Known or Predicted Roost, Impact and Structure (if known)	Roost Type	Roost Location and Dimensions (if known)	Roost Photos	Roost Details	Compensation provided
Temporary disturbance of BU_48	Predicted lesser horseshoe roost supporting solitary/small numbers of bats	Unknown		N/A	
Temporary disturbance of BU_48	Predicted void dwelling bat roost supporting solitary/small numbers of bats	Unknown		N/A	
Loss of BU_507	Soprano pipistrelle – day roost.	Under roof tile		A soprano pipistrelle bat was seen to re-enter the roost on the east side of the porch under the tiles in June 2021 and again in April 2022.	At least ten crevice features (non-maternity) within the compensatory bat structure
Loss of BU_610	Common pipistrelle – day roost	Under roof tile		A common pipistrelle bat was seen to emerge from underneath a roof tile on the north western aspect of the outhouse roof in June 2021, and from underneath a roof tile on the north side of the roof in August 2021.	

Known or Predicted Roost, Impact and Structure (if known)	Roost Type	Roost Location and Dimensions (if known)	Roost Photos	Roost Details	Compensation provided
Loss of BU_610	Noctule day roost	Under lead flashing around the base of the chimney		A noctule emerged from underneath the lead flashing at the base of the chimney in June 2021.	
Loss of BU_819	Common pipistrelle day roost	Under guttering		Two common pipistrelle bats emerged from beneath the guttering on the south west aspect of the house in August 2021.	
Temporary disturbance of BU_48	Common pipistrelle day roost	Bat emerged from gap in damaged door		A single common pipistrelle bat was observed emerging from the damaged door on the western aspect of the structure in August 2023.	

Known or Predicted Roost, Impact and Structure (if known)	Roost Type	Roost Location and Dimensions (if known)	Roost Photos	Roost Details	Compensation provided
Loss of BU_54	Predicted crevice dwelling bat roost supporting solitary/small numbers of bats	Unknown		N/A	
Loss of BU_45	Predicted crevice dwelling bat roost supporting solitary/small numbers of bats	Unknown		N/A	
Temporary disturbance of BU_1098 (Barn Farm culvert)	Predicted solitary or small numbers of crevice dwelling hibernating bats	Unknown		N/A	Cool tower within the compensatory structure for solitary or small numbers of hibernating bats

5.2.2. Although five structures will be lost where the presence of lesser horseshoe bats have been confirmed (BU_611, BU_694, BU_507, BU_709 and BU_819), it is likely that these structures are used by only a small number of lesser horseshoe bats. This is because no bats were recorded during the internal survey, and no lesser horseshoe bats were seen emerging throughout all of the emergence/re-entry surveys. The only other evidence of lesser horseshoe bats is from recent bat droppings (confirmed via DNA analysis) in these structures. Therefore, it is proposed that the five structures can be compensated for adequately with a single structure that provides a range of micro-habitats to mimic the lesser horseshoe roosts to be lost.

5.2.3. In addition, BU_48 (to be temporarily disturbed) is predicted to support a lesser horseshoe roost supporting solitary/small numbers of bats. BU_48 is also predicted to support a void dwelling bat roost supporting solitary/small numbers of bats. BU_694 (to be lost) supports a known brown long-eared day roost and either BU_45 or BU_54 (to be lost) is predicted to support a void dwelling bat roost supporting solitary/small numbers of bats.

5.2.4. To compensate for the above, a structure with a void within the ground floor, and a roof void suitable for lesser horseshoe bats or void dwelling and light sampling bat species will be provided. Four additional lean-to/compartments will be provided on the exterior or within the structure mimicking the outhouse toilets and four bat boxes within the lean-to/compartments providing roosting and light sampling opportunities is proposed. Taking into account the impacts, and as no high conservation status roosts for lesser horseshoe or void dwelling bats are to be lost, or predicted to be lost, this is considered appropriate compensation to maintain the favorable conservation status of the local population of these species.

5.2.5. Additionally, seven crevice dwelling bat roosts supporting solitary/small numbers of bats are known or predicted to be lost or disturbed in this quadrant. These will be compensated for with ten crevice dwelling bat features within the structure. Therefore, there will be no impact on the favourable conservation status of crevice dwelling bats in this quadrant. A crevice feature suitable for a maternity roost will also be incorporated into the structure as an enhancement.

5.2.6. Finally, the potential temporary disturbance of a hibernation roost for solitary or small numbers of crevice dwelling hibernating bats has been compensated for with a cool tower that can provide hibernation habitat for large numbers of bats. This is considered to be an overall enhancement.

5.2.7. The design parameters for the compensatory bat roost structure within the eastern quadrant are outlined in Table 5-2 below.

Table 5-2 – Compensatory Roost Requirements (Eastern Quadrant)

	Eastern Quadrant Specifications	**Reason for Requirement**
General construction	The building will include a pitched roof with two gable walls. A fly through access point suitable for lesser horseshoe bats (approximately 30 cm wide by 20 cm tall) will be incorporated into one of the gable walls.	To allow access for lesser horseshoe bats.
	Secure door on the structure.	To allow future access but to deter trespassing.
	The structure will contain at least one un-insulated cavity wall that is accessible from the top of the wall.	To support crevice dwelling bat species such as pipistrelle bats.
	A chimney will be included in the design.	This will allow additional access for horseshoe bats, as the exact

	Eastern Quadrant Specifications	Reason for Requirement
		access points for BU_611 and BU_694 were unknown.
	Any roof lining will be Type 1F bitumastic felt.	General requirements to support roosting bats.
Internal ground floor and roof voids	The size of the ground floor and roof voids will each be at least 5 m by 5 m each. The roof will be lined with wooden sarking internally and will be of an 'open construction', to allow bats to fly freely within the voids. A wooden ridge board must be present in the roof void and wooden boards will be fixed to the ceiling within the ground floor void to allow bats to hang on to.	To mimic the habitat within BU_611 and BU_694 (lesser horseshoe day roosts to be lost) and provide conditions suitable for a range of void dwelling species.
	Apex height within the roof void and the ceiling height will be at least 2.8 m each (Bat Mitigation Guidelines[14])	To provide conditions suitable for a range of void dwelling bat species, following best practice guidelines.
	Internal timbers will be rough sawn.	To allow bats to easily grip
	No loft hatch will be present to allow access between all floors, however an open fly through will be present 0.75 m by 0.75 m (to allow future ladder access)	To mimic BU_694
	Insulated ceiling, with purlins (or false purlins)	To allow horseshoes to hang freely in these areas
Lean-to / compartments	Three lean-to/compartments will be at least 1 m by 2 m, by 2.5 m high compartments (likened to the outhouses). These will be open access for lesser horseshoe bats but discourage trespassers if located on externally to the compensatory structure (an example would be a locked half door, with a metal grate above). There will be an additional larger lean-to attached to the exterior of the structure (the length of the structure (5 m) and 2 m in width). All of the lean-to / compartments will have internal roosting features for crevice and void dwelling bats species, to allow void dwelling bats the opportunity to light sample prior to emergence.	To mimic BU_507, BU_709 and BU_819 (lesser horseshoe day roosts to be lost). To provide compensation for BU_694 (brown long-eared day roost to be lost); BU_45/54 predicted void dwelling bat roost supporting solitary/small numbers of bats to be lost; and BU_48 predicted lesser horseshoe and void dwelling bat roost supporting solitary/small numbers of bats to be temporarily disturbed.
Crevice dwelling features	At least ten points approximately 20mm high by 50 mm wide each leading to a crevice at between 20 mm and 50 mm deep, and/or tiles, lead flashing, soffit box, cladding and fascia.	To provide crevice roosting features as compensation for: Loss of BU_507, BU_610, BU_819, BU_54, BU_45; and temporary disturbance of BU_48.

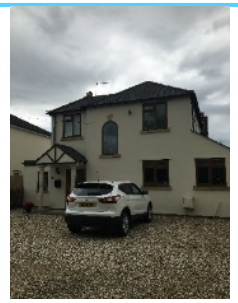
[14] Reason, P.F. and Wray, S. (2023). UK Bat Mitigation Guidelines: a guide to impact assessment, mitigation and compensation for developments affecting bats. Chartered Institute of Ecology and Environmental Management, Ampfield.

	Eastern Quadrant Specifications	Reason for Requirement
	All access points will be a minimum of 2 m from ground level.	
Crevice maternity dwelling feature	One access point approximately 20mm high by 50 mm wide leading to a 50 mm deep and 1m by 1 m cavity. This will be on a south or south-eastern elevation (and able to receive direct sunlight, with no obstructions) and should be either made from a dark material (i.e. slate) or should be painted black to retain early summer warmth. The access points should be a minimum of 2m from ground level.	As an enhancement.
Cool tower	Earth floor, made from breeze block (or similar), within the centre, or toward the north of the structure (no light should be able to penetrate the cool tower walls). This will be sealed with the exception of one access point that is 0.75 m wide by 0.5 m high. The structure will be approximately 2 m wide and 2 m in length, and at least 2 m tall. It will have rough sawn timber internally for hanging bats as well as at least five crevices for roosting bats.	To provide hibernation features for large numbers of bats as compensation/enhancement for the temporary disturbance of BU_1098, a predicted hibernation roost supporting solitary/small numbers of bats.

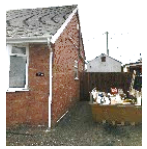
Southern quadrant

5.2.8. Table 5-3 below details the bat roosts that the compensatory structure in the southern quadrant compensates for, and the features required to effectively compensate for impacts to these roosts.

Table 5-3 – Southern Quadrant Compensatory Structure

Known or Predicted Roost, Impact and Structure (if known)	Roost Type	Roost Location and Dimensions	Roost Photos	Roost Details	Compensation provided
Loss of BU_965	Brown long-eared day roost	Unknown, exact location was not seen		BU_965 is a two storey recently occupied residential building with a hipped roof laid with slate tiles and a cross gabled extension to the south. Potential roosting features include possible holes under the eaves and potential access into the roof space, although the exact location that the bat emerged from was not identified. The roof space is 2.5 m tall to the apex, 2.5 m wide and 6 m long.	Compensatory structure with at least two voids – comprising a void within the ground floor for bats and an additional purpose-built loft void suitable for lesser horseshoes / void dwelling and light sampling species.
Loss of BU_966/BU_983/BU_1041	Predicted void dwelling bat roost supporting solitary/small numbers of bats	Unknown	 	N/A	

Known or Predicted Roost, Impact and Structure (if known)	Roost Type	Roost Location and Dimensions	Roost Photos	Roost Details	Compensation provided
					
Loss of BU_1030	Common pipistrelle – day roost	Under the bargeboard and fascia board		Two common pipistrelle bats emerged from under the bargeboard at the apex of the eastern facing gable end in August 2020. A bat (Assumed to be a common pipistrelle) emerged from under the bargeboard on the south facing gable end in September 2021. A common pipistrelle re-entered under the fascia board on the south west aspect of the structure in July 2023.	At least ten crevice features (non-maternity) within the compensatory bat structure
Loss of BU_965	Common pipistrelle – day roost	Ridge of the roof		A single common pipistrelle bat was recorded emerging from underneath the ridge of the roof in September 2020 and July 2021.	
Loss of BU_667	Common pipistrelle – day roost	North gable end		A single common pipistrelle bat emerged from the north gable end in August 2023.	

Known or Predicted Roost, Impact and Structure (if known)	Roost Type	Roost Location and Dimensions	Roost Photos	Roost Details	Compensation provided
Loss of BU_1042	Soprano pipistrelle – day roost	Under ridge tile		A single soprano pipistrelle emerged from underneath the ridge tile of the western gable end in August 2020.	
Loss of BU_653	Common or soprano pipistrelle – day roost	Soffit box on the north west aspect		A single pipistrelle bat emerged from the soffit box on the north western aspect of the structure in June 2021.	
Temporary disturbance of BU_376	Common pipistrelle – day roost	Soffit on southern gable and southern gable wall		Two common pipistrelle bats emerged from the soffit on the southern elevation, and one further common pipistrelle bat emerged from the southern gable end in June 2021.	
Loss of BU_966/BU_983/BU_1041	Predicted crevice dwelling bat roost supporting solitary/small numbers of bats,	Unknown		N/A	

Known or Predicted Roost, Impact and Structure (if known)	Roost Type	Roost Location and Dimensions	Roost Photos	Roost Details	Compensation provided
			 		
Temporary disturbance of BU_1091	Predicted crevice dwelling bat roost supporting solitary/small numbers of bats	Unknown		N/A	
Temporary disturbance of BU_1014	Predicted crevice dwelling bat roost supporting solitary/small	Unknown		N/A	

Known or Predicted Roost, Impact and Structure (if known)	Roost Type	Roost Location and Dimensions	Roost Photos	Roost Details	Compensation provided
	numbers of bats				
Loss of BU_987	Soprano pipistrelle assumed maternity roost	Apex of south gable end, potentially underneath loose lead flashing.		A single soprano pipistrelle bat emerged from the apex of the southern gable in September 2020. Two soprano pipistrelle bats emerged from the same location, where it appears that there is loose lead flashing, in August 2021.	Maternity crevice feature within the compensatory bat structure
Loss of BU_1527	Predicted hibernation roost suitable for larger numbers of hibernating bats.	Unknown		Unknown	Cool tower within the compensatory structure for larger numbers of hibernating bats

5.2.9. Within the southern quadrant, BU_965, which supports a brown long-eared day roost, will be lost. BU_966, BU_983 and BU_1041 will also be lost and it is predicted that one of these will support a void dwelling bat roost of solitary/small numbers of bats.

5.2.10. These roosts will be adequately compensated for with the voids within the compensatory roost structure, based on the structure providing a void within the ground floor and one void in the roof void suitable for void dwelling and light sampling bat species. In addition, two lean-to/compartments will be provided on the exterior or within the structure and two bat boxes within the lean-to/compartments are proposed to provide further roosting and void dwelling bat light sampling opportunities, as an enhancement.

5.2.11. BU_987, a soprano pipistrelle maternity roost, will be lost and will be compensated for with a crevice feature suitable for a maternity roost. Additionally, ten crevice dwelling bat roosts supporting solitary/small numbers of bats are known or predicted to be lost (BU_1030, BU_667, BU_965, BU_1042, BU_653 known roosts and predicted roosts within BU_966/BU_983/BU_1041, BU_1091 and BU_1014) or disturbed (BU_376) in this quadrant. These will be compensated for with ten crevice dwelling bat features within the structure.

5.2.12. The loss of BU_1527, a predicted hibernation roost suitable for larger numbers of hibernating bats will be compensated for with a cool tower that can provide hibernation habitat for large numbers of bats.

5.2.13. Based on the compensation provided within the structure, there will be no impact on the favourable conservation status of the local bat population.

5.2.14. The design parameters for the compensatory bat roost structure within the southern quadrant are outlined in Table 5-4 below.

Table 5-4 – Compensatory Roost Requirements (Southern Quadrant)

	Southern Quadrant Specifications	Reason for Requirement
General construction	The building will include a pitched roof with two gable walls. A fly through access point suitable for lesser horseshoe bats (approximately 30 cm wide by 20 cm tall) will be incorporated into one of the gable walls.	To allow access for lesser horseshoe bats as enhancement given known usage across the Scheme.
	Secure door on the structure.	To allow future access but to deter trespassing.
	The structure will contain at least one un-insulated cavity wall that is accessible from the top of the wall.	To support crevice dwelling bat species such as pipistrelle bats.
	A chimney will be included in the design.	This will allow additional access for horseshoe bats.
	Any roof lining will be Type 1F bitumastic felt.	General requirements to support roosting bats.
Internal ground floor and roof voids	The size of the ground floor and roof voids will be at least 5 m by 5 m each. The roof will be lined with wooden sarking internally and will be of an 'open construction', to allow bats to fly freely within the void. A wooden ridge board will be present in the roof void and wooden boards will be fixed to	To provide roosting / light sampling opportunities for void dwelling bats as compensation for loss of BU_965 (brown long-eared day roost) and BU_966/BU_983/BU_1041 (one predicted void dwelling bat roost supporting solitary/small numbers of bats).

	Southern Quadrant Specifications	Reason for Requirement
	the ceiling within the ground floor void to allow bats to hang on to.	
	Apex height within the roof void and the ceiling height will be at least 2.8 m (Bat Mitigation Guidelines[15])	To provide conditions suitable for brown long-eared bats and other void dwelling species, following best practice guidelines.
	Internal timbers will be rough sawn.	To allow bats to easily grip
	No loft hatch will be present to allow access between all floors, however an open fly through will be present 0.75 m by 0.75 m (to allow future ladder access)	To allow bats easy access throughout the different habitats within the structure
	Insulated ceiling, with purlins (or false purlins)	To allow horseshoes (known to be present in the area) to hang freely in these areas.
Lean-to / outhouse	Two lean-to/compartments will be constructed at least 1 m by 2 m, by 2.5 m high. They will be open access for lesser horseshoe bats but discourage trespassers (an example would be a locked half door, with a metal grate above). All of the lean-to / compartments will have internal roosting features for crevice and void dwelling bats species, to allow void dwelling bats the opportunity to light sample prior to emergence.	To provide enhancement features suitable for a wide range of bat species.
Crevice dwelling features	At least ten points approximately 20 mm high by 50 mm wide each leading to a crevice at between 20 mm and 50 mm deep and/or tiles, lead flashing, soffit box, cladding and fascia. All access points will be a minimum of 2 m from ground level.	To provide crevice roosting features as compensation for: Loss of BU_1030, BU_965, BU_667, BU_1042, BU_653, BU_966/BU_986/BU_1041; and temporary disturbance of BU_1091 and BU_1014.
Crevice maternity dwelling feature	One access point approximately 20 mm high by 50mm wide leading to a 50 mm deep and 1 m by 1 m cavity. This will be on a south or south-eastern elevation / roof elevations (and able to receive direct sunlight, with no obstructions) and should be either made from a dark material (i.e. slate) or should be painted black to retain early summer warmth. The access points will be a minimum of 2 m from ground level.	To provide crevice roosting maternity features as compensation for loss of BU_987 (soprano pipistrelle assumed maternity roost).
Cool tower	Earth floor, made from breeze block (or similar), within the centre, or toward the north of the structure (no light should be able to penetrate the cool tower walls). This will be sealed with the exception of one access point that is 0.75 m wide by 0.5 m	To provide hibernation features for large numbers of bats as compensation for the loss of BU_1527, a predicted hibernation roost for larger numbers of bats.

[15] Reason, P.F. and Wray, S. (2023). UK Bat Mitigation Guidelines: a guide to impact assessment, mitigation and compensation for developments affecting bats. Chartered Institute of Ecology and Environmental Management, Ampfield.

	Southern Quadrant Specifications	Reason for Requirement
	high. The structure will be approximately 2 m wide and 2 m in length, and at least 2 m tall. It will have rough sawn timber internally for hanging bats as well as at least five crevices for roosting bats.	

5.3. Compensatory crevice dwelling bat structure

5.3.1. A compensatory crevice dwelling structure is proposed in the northern quadrant. Table 5-5 below details the bat roosts that the compensatory crevice dwelling structure compensates for, and the features required to effectively compensate for impacts to these roosts.

Table 5-5 – Northern Quadrant – Compensatory Crevice Dwelling Bat Structure

Known or Predicted Roost, Impact and Structure (if known)	Roost Type	Roost Location and Dimensions	Roost Photos	Roost Details	Compensation provided
Loss of BU_972	Common pipistrelle day roost	Various crevices.		One common pipistrelle bat emerged from behind the fascia board, another from an unknown crevice on the southern elevation (possibly from near the corner of the door) and one further bat emerged from the window frame, in September 2021. Again in September 2021, a common pipistrelle emerged from the south east corner of the building.	**One** compensatory crevice dwelling bat roost structure with at least **14** roosting features.
Loss of BU_981 (three roosts)	Common pipistrelle day roost, soprano pipistrelle day roost and pipistrelle species day roost	Various crevices.		Four bats emerged from underneath hanging tiles on the eastern facing gable. One bat emerged from the top right of the south facing gable end. One bat emerged from the eaves. One bat emerged from underneath the roof tiles. One bat emerged from underneath wooden cladding on the gable wall.	

Known or Predicted Roost, Impact and Structure (if known)	Roost Type	Roost Location and Dimensions	Roost Photos	Roost Details	Compensation provided
Loss of BU_1027	Common pipistrelle day roost, soprano pipistrelle day roost, common pipistrelle transitional roost and Myotis day roost.	Various crevices		A Myotis bat emerged from under the lead flashing between the house and the garage, a common pipistrelle emerged from the ridge tiles on the south west aspect and a further pipistrelle bat emerged from under the roof tiles on the porch on the south west aspect in July 2023. Two pipistrelle bats emerged from under the eaves of the front roof on the east aspect, a further possible emergence of Myotis was recorded from the soffit of the porch and a pipistrelle bat emerged from the window frame of the ground floor window in September 2023. Again in September 2023, one pipistrelle was recorded emerging from under the eaves, from the same location as mentioned above.	

Known or Predicted Roost, Impact and Structure (if known)	Roost Type	Roost Location and Dimensions	Roost Photos	Roost Details	Compensation provided
Loss of BU_1039	Pipistrelle species day roost	Unknown		A possible bat emergence was recorded from the south west gable in September 2021. No obvious potential roosting features were identified.	
Loss of BU_963	Soprano pipistrelle day roost	Crack in the concrete on the southern gable end.		One soprano pipistrelle bat was recorded circling the gable end to the south before roosting within a crack in the concrete on the southern gable end in August 2019	
Temporary disturbance of BU_1034	Common pipistrelle day and mating roost and soprano pipistrelle mating roost.	Under barge board, behind sofit box and potentially under roof tiles.	 	Two common pipistrelle bats emerged from under the barge board and from behind the soffit box in August 2019. In September 2021, common and soprano pipistrelle bats were observed swarming near to the southern wall and roof tiles, but did not appear to emerge or re-enter the structure.	

Known or Predicted Roost, Impact and Structure (if known)	Roost Type	Roost Location and Dimensions	Roost Photos	Roost Details	Compensation provided
Temporary disturbance of BU_1432	Predicted crevice dwelling bat roost supporting solitary/small numbers of bats.	Unknown		N/A	

5.3.2. The design parameters for the crevice dwelling bat roost structure within the northern quadrant are outlined in Table 5-6 below. This is based on a similar design to the bat tower at Ravenglass Railway in Cumbria[16].

Figure 1 - Example Crevice Dwelling Bat Structure[17]

Table 5-6 – Compensatory Crevice Dwelling Bat Structure- Roost Requirements

	Features	Reason for Requirement
General construction	Permanent structure at least 1.5 m by 1.5 m and at least 3 m tall (to the apex)	To ensure permanent roosting features.
	At least 14 access points approximately 20 mm high by 50 mm wide each leading to a crevice at between 20 mm and 50 mm deep and/or tiles, lead flashing, soffit box, cladding and fascia. All access points will be a minimum of 2 m from ground level.	To provide at least 14 crevice roosting features.
	The roost will be protected from one in five year floods	General requirements to support roosting bats in perpetuity
	Internal crevices will be made from rough saw materials that allow bats to grip within the roost	To ensure sufficient roosting features within the structure for crevice dwelling bats
	The structure will include a pitched roof, that is tiled	To mimic roof roosting features

[16] https://www.bats.org.uk/our-work/buildings-planning-and-development/roost-replacement-and-enhancement/case-studies/bat-tower-at-ravenglass-railway-cumbria
[17] Example take from the Bat Conservation Trust: https://www.bats.org.uk/our-work/buildings-planning-and-development/roost-replacement-and-enhancement/case-studies/bat-tower-at-ravenglass-railway-cumbria

5.4. Artificial bat boxes

5.4.1. Table 5-7 below details the bat roosts that the artificial bat boxes compensate for, across the Scheme. Bat boxes will be made up of the following bat boxes (or similar):

- Large multi chamber Woodstone bat box (maternity and winter roosting);
- 2F Schwegler bat box
- 1FF Schwegler bat box with built-in panel
- 1WQ Schwegler summer bat roost (maternity and winter roosting)
- Causa maternity bat box (maternity)
- 1FW bat hibernation box (hibernation)

5.4.2. All will be located at least 3 m from ground level, and a bird box will be mounted in a similar location to avoid the bat boxes being used by birds. Exact location of the bat boxes will be agreed by the on-site bat worker during the detailed design stage. Where bat boxes are being provided as compensation for a maternity, mating or hibernation roost these are being provided as two bat boxes for each roost.

Table 5-7 – Artificial Bat Boxes (Hibernation, Maternity and Standard)

Known or Predicted Roost, Impact and Structure (if known)	Roost Type	Roost Details	Roost Photos	**Compensation provided**
Loss of BU_1027	Predicted solitary or small numbers of crevice dwelling hibernating bats	Unknown		Four hibernation bat boxes in the northern quadrant
Temporary disturbance of BU_1034	Predicted solitary or small numbers of crevice dwelling hibernating bats	Unknown		
Loss of Tree 663	Moderate suitability tree predicted to support solitary/small numbers of bats	Unknown		Five bat boxes in the northern quadrant

Known or Predicted Roost, Impact and Structure (if known)	Roost Type	Roost Details	Roost Photos	**Compensation provided**
Loss of Tree 664	Moderate suitability tree predicted to support solitary/small numbers of bats	Unknown		
Temporary disturbance of Tree 512	Moderate suitability tree predicted to support solitary/small numbers of bats	Unknown		
Temporary disturbance of Tree 649	Moderate suitability tree predicted to support solitary/small numbers of bats	Unknown		

Known or Predicted Roost, Impact and Structure (if known)	Roost Type	Roost Details	Roost Photos	**Compensation provided**
Loss of Tree 499	Moderate suitability tree. Tree is fully surveyed and no roosting bats identified, but compensation is provided to ensure no loss of roost resource.	N/A	N/A	
Loss of Tree 660	High suitability tree predicted to support a maternity roost.	Unknown		Six maternity bat boxes in the northern quadrant
Temporary disturbance of Tree 727	High suitability tree predicted to support a maternity roost.	Unknown	N/A	
Temporary disturbance of Tree 736	High suitability tree predicted to support a maternity roost	Unknown	N/A	
Loss of Tree 281	Moderate suitability tree. Tree is fully surveyed and no roosting bats identified, but compensation is provided to ensure no loss of roost resource.	N/A	N/A	One bat box in the eastern quadrant

Known or Predicted Roost, Impact and Structure (if known)	Roost Type	Roost Details	Roost Photos	**Compensation provided**
Loss of BU_667	Predicted solitary or small numbers of crevice dwelling hibernating bats	Unknown		Ten hibernation bat boxes in the southern quadrant
Loss of BU_966/BU_983/BU_1041	Predicted solitary or small numbers of crevice dwelling hibernating bats	Unknown	  	

Known or Predicted Roost, Impact and Structure (if known)	Roost Type	Roost Details	Roost Photos	**Compensation provided**
Loss of BU_987	Predicted solitary or small numbers of crevice dwelling hibernating bats	Unknown		
Loss of BU_1042	Predicted solitary or small numbers of crevice dwelling hibernating bats	Unknown		
Loss of BU_1030	Predicted solitary or small numbers of crevice dwelling hibernating bats	Unknown		

Known or Predicted Roost, Impact and Structure (if known)	Roost Type	Roost Details	Roost Photos	**Compensation provided**
Loss of Tree 656	Moderate suitability tree predicted to support solitary/small numbers of bats	Unknown		Eight bat boxes in the southern quadrant

Known or Predicted Roost, Impact and Structure (if known)	Roost Type	Roost Details	Roost Photos	**Compensation provided**
Loss of Tree 596	Moderate suitability tree predicted to support solitary/small numbers of bats	Unknown		
Temporary disturbance of Tree 240	Moderate suitability tree predicted to support solitary/small numbers of bats	Unknown		
Loss of Trees 124, 125, 236, 252 and 253	Moderate suitability trees. Trees are fully	N/A	N/A	

Known or Predicted Roost, Impact and Structure (if known)	Roost Type	Roost Details	Roost Photos	**Compensation provided**
	surveyed and no roosting bats identified, but compensation is provided to ensure no loss of roost resource.			
Temporary disturbance of Tree 241	High suitability tree predicted to support a maternity roost	Unknown		Two maternity bat boxes in the southern quadrant

5.5. Tree roosting features

5.5.1. Table 5-8 details the compensatory tree roosting features, and which bat roosts they compensate for, across the Scheme.

5.5.2. These features will be created from sectionally felled trees that would be lost as a result of the Scheme, where they have high potential/confirmed roost features. The tree limb with bat roost features will be strapped onto a retained tree to preserve the roosting features in the locality. An example is shown in Figure 2 below. Alternatively, features could be created on retained trees.

Figure 2 - Example of a Tree Roosting Feature

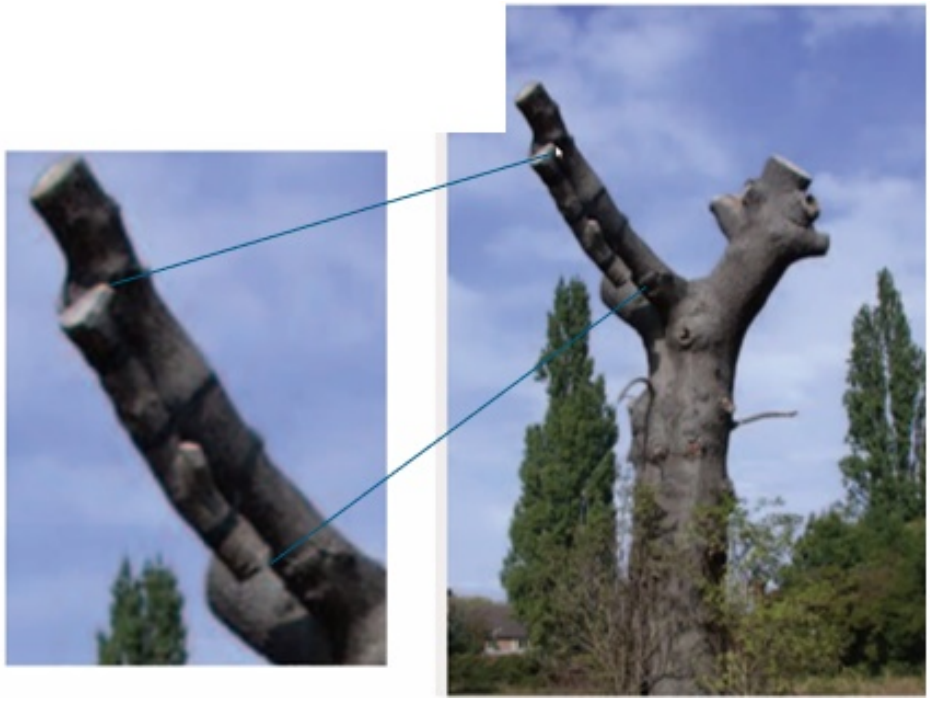
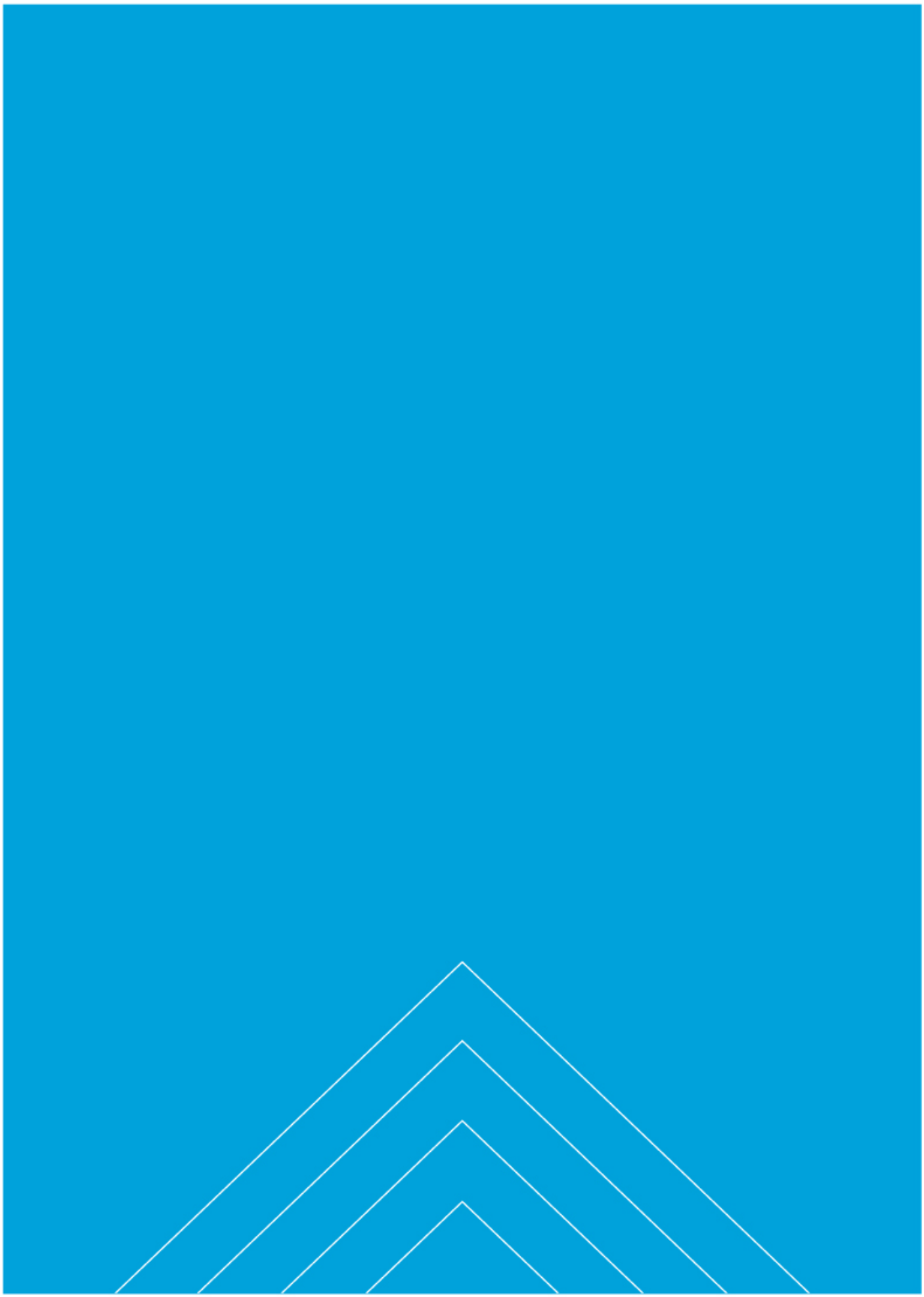


Table 5-8 – Tree Roosting Features

Known or Predicted Roost, Impact and Structure (if known)	Roost Type	Roost Photos	Roost location and dimensions	Compensatory Requirements
Loss of Tree 496	Barbastelle transitional roost	 	Mature willow tree with a small knot hole on the south east aspect, 1m high. The knot hole was very shallow, no deeper than 10 cm.	One tree roosting feature in the northern quadrant.
Temporary disturbance of Tree 86	Natterer's day roost		Dead ash tree. Roost location and dimensions unknown.	Three tree roosting feature in the southern quadrant.

Known or Predicted Roost, Impact and Structure (if known)	Roost Type	Roost Photos	Roost location and dimensions	Compensatory Requirements
Loss of Tree 237 and 235A	Tree 237 and 235A high suitability trees. Trees are fully surveyed and no roosting bats identified, but compensation is provided to ensure no loss of roost resource.	N/A	N/A	
Temporary disturbance of Trees 576 and 578	Noctule day roosts	 	Tree 576, a mature ash tree had a woodpecker hole 8m high extending inwards approximately 20 cm which was found to have a single noctule bat present in August 2020. Tree 578, an over mature ash tree had a woodpecker 10 m high extending upwards 8 cm and back and down approximately 40 cm which was found to have a single noctule present in August 2020 and three noctule bats present in September 2020.	Two tree roosting features in the western quadrant.



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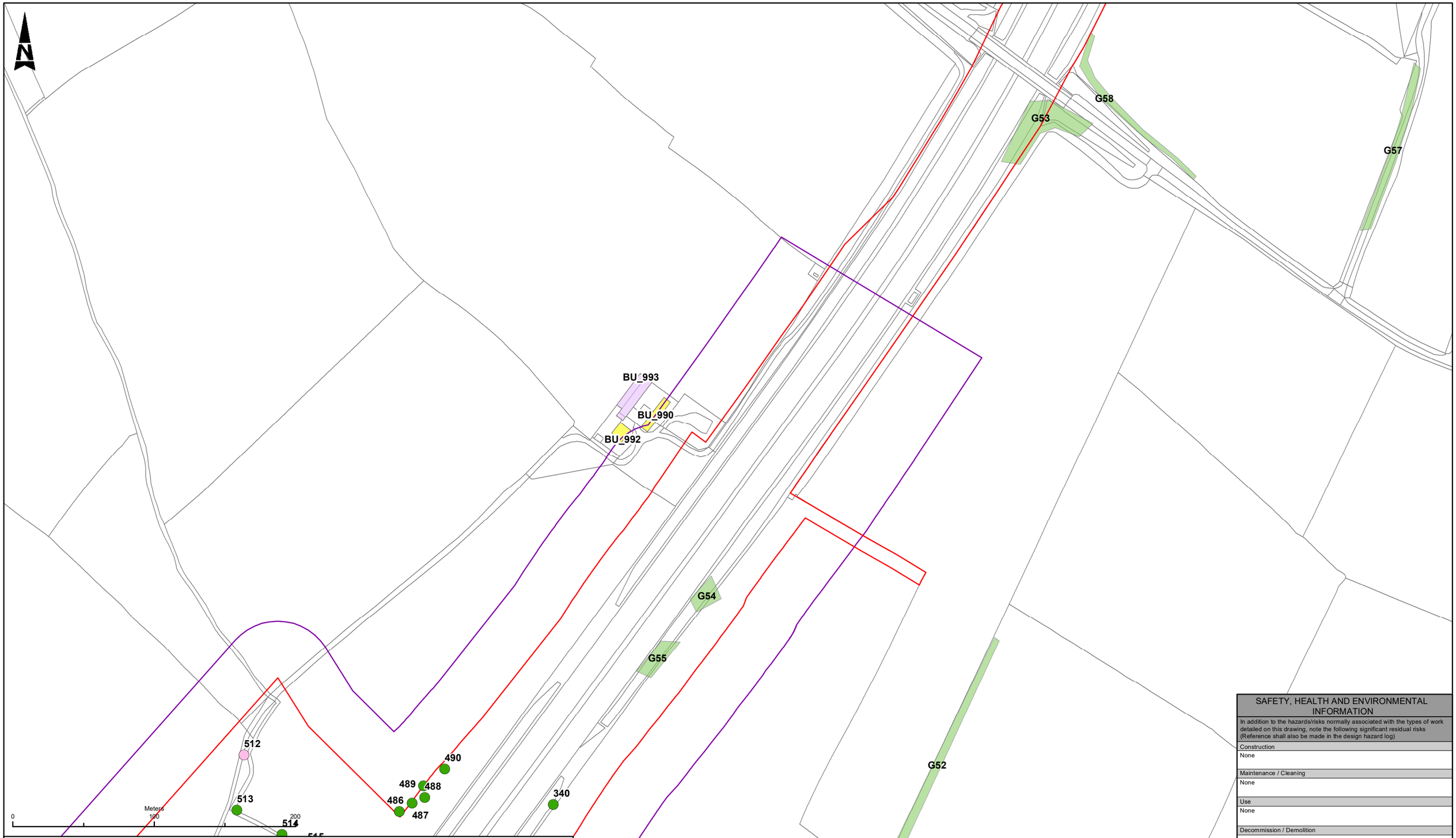
Appendix E. Figures

Figure reference	Document title	Sheet	Document number	Revision
1A	Survey Area	1 of 11	GCCM5J10-ATK-ELS-ZZ-GS-GI-400001	0
1B	Confirmed and predicted bat roosts	1 of 3	GCCM5J10-ATK-ELS-ZZ-GS-GI-400002	0
1C	Bat Roosts to be destroyed through demolition or feeling as a resulting of the scheme	1 of 3	GCCM5J10-ATK-ELS-ZZ-GS-GI-400003	0
1D	Bat roosts that may be subject to temporary disturbance	1 of 3	GCCM5J10-ATK-ELS-ZZ-GS-GI-400004	0
1E	Bat roosts to be retained and protected	1 of 1	GCCM5J10-ATK-ELS-ZZ-GS-GI-400005	0
1F	Specification for mitigation and compensation	1 of 1	GCCM5J10-ATK-ELS-ZZ-GS-GI-400006	0

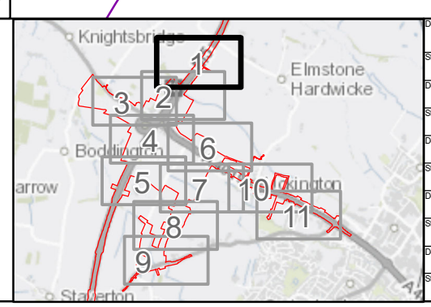


LEGEND

- ORDER LIMITS
- BAT ROOST ZONE OF INFLUENCE
- SURVEYED STRUCTURES
- PARTIALLY SURVEYED STRUCTURES
- UNSURVEYED STRUCTURES

TREES

- SURVEYED TREES
- PARTIAL SURVEY TREES
- UNSURVEYED TREES - APPROXIMATE LOCATION
- SURVEYED TREE GROUPS



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Construction
None

Maintenance / Cleaning
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Use
None

Decommission / Demolition
None

Project Title: M5 Junction 10 Improvement

Drawing Title: FIGURE 1A SURVEY AREA

Drawing Number: GCCM5J10-ATK-EBD-ZZ-GS-GI-400001
(Project | Originator | Volume | Location | Type | Role | Number)

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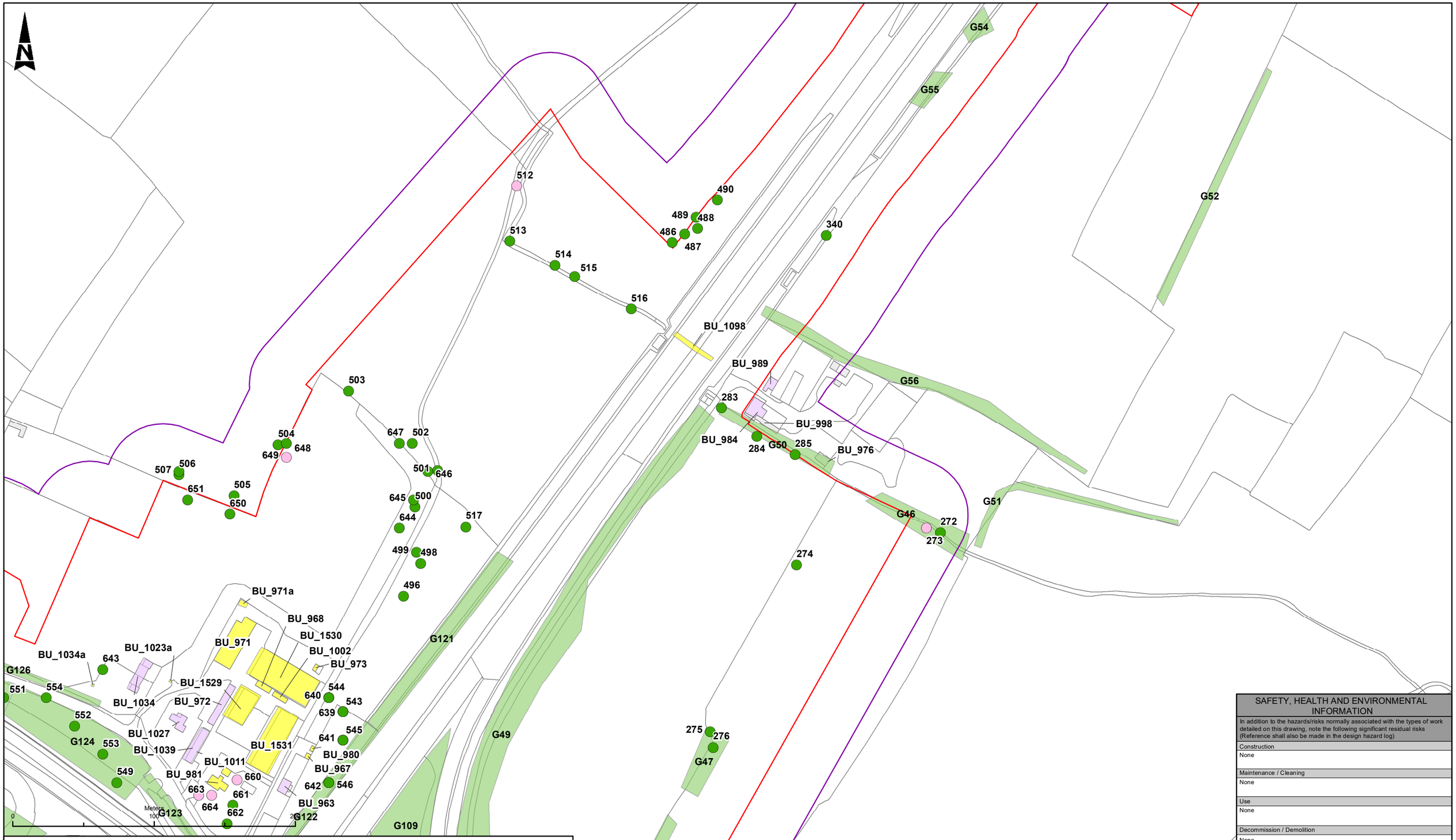

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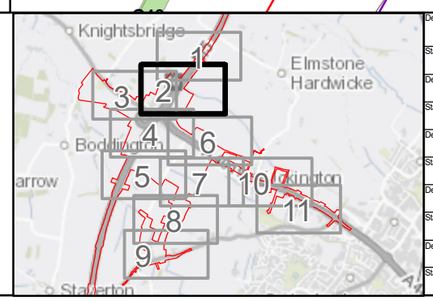

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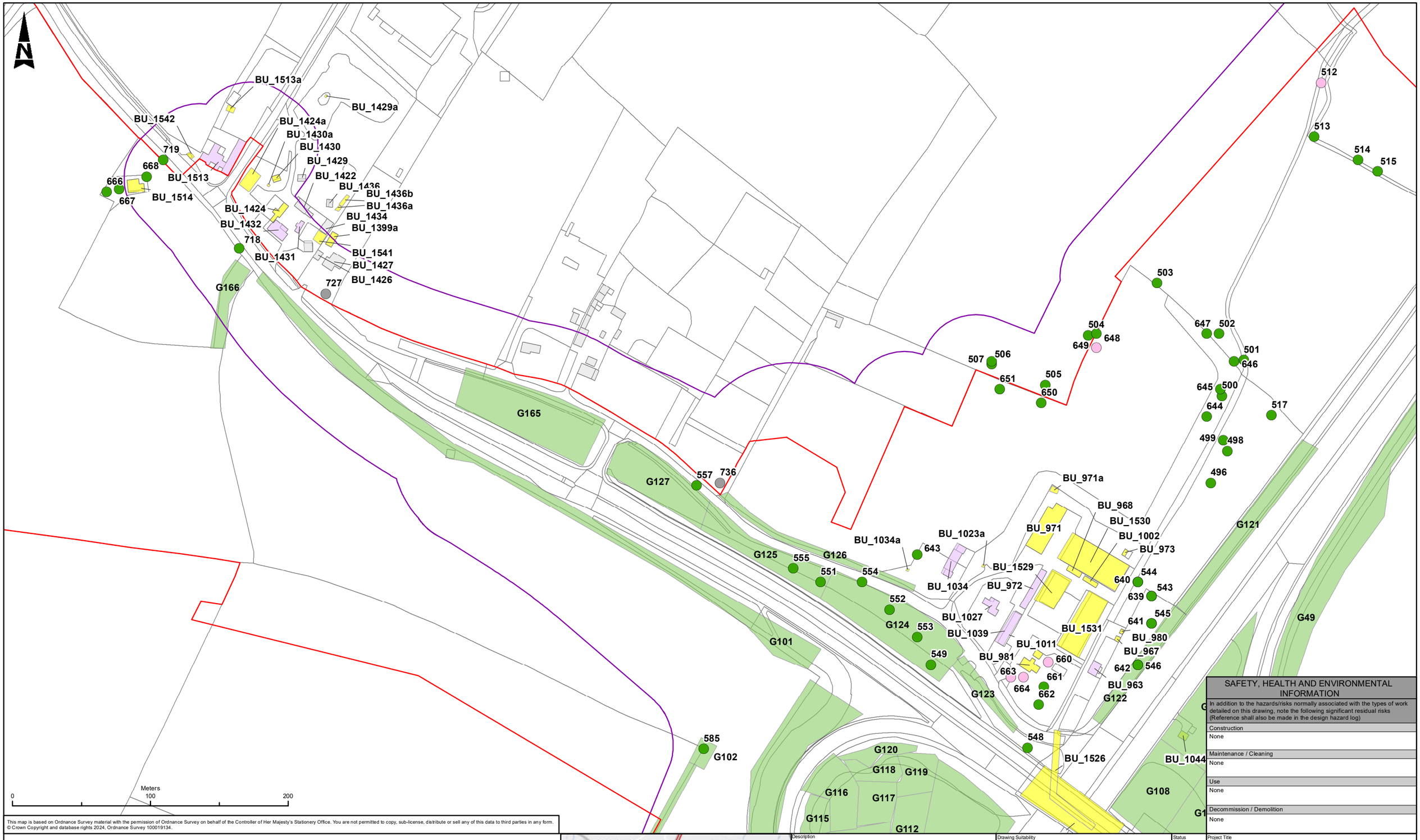

LEGEND

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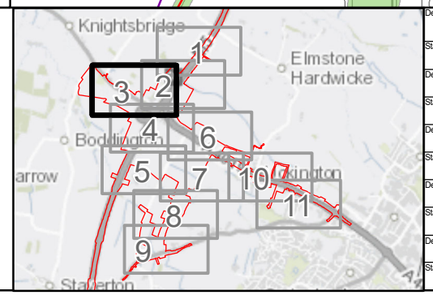

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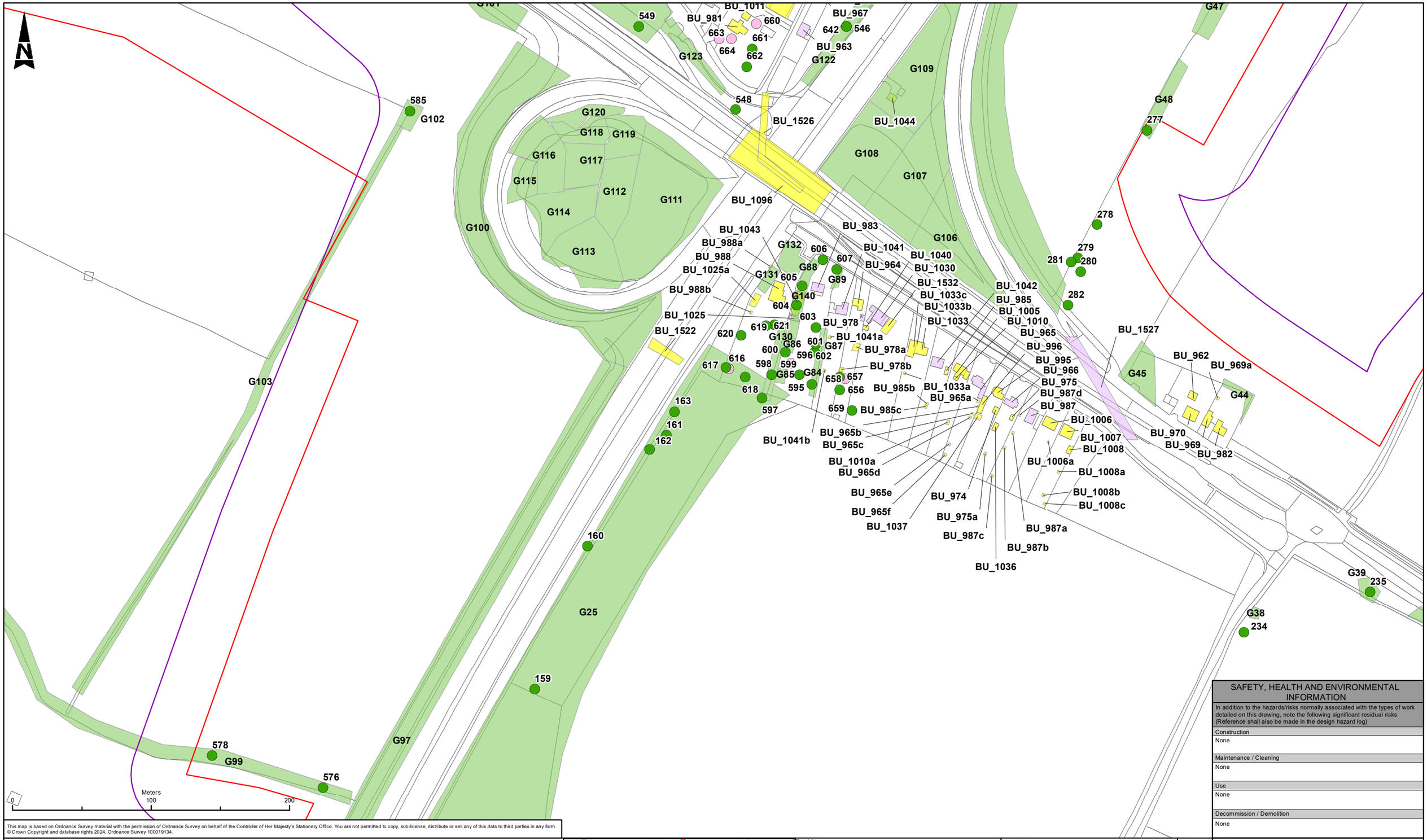

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LEGEND

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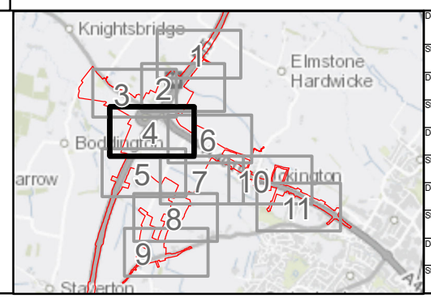

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SURVEY AREA

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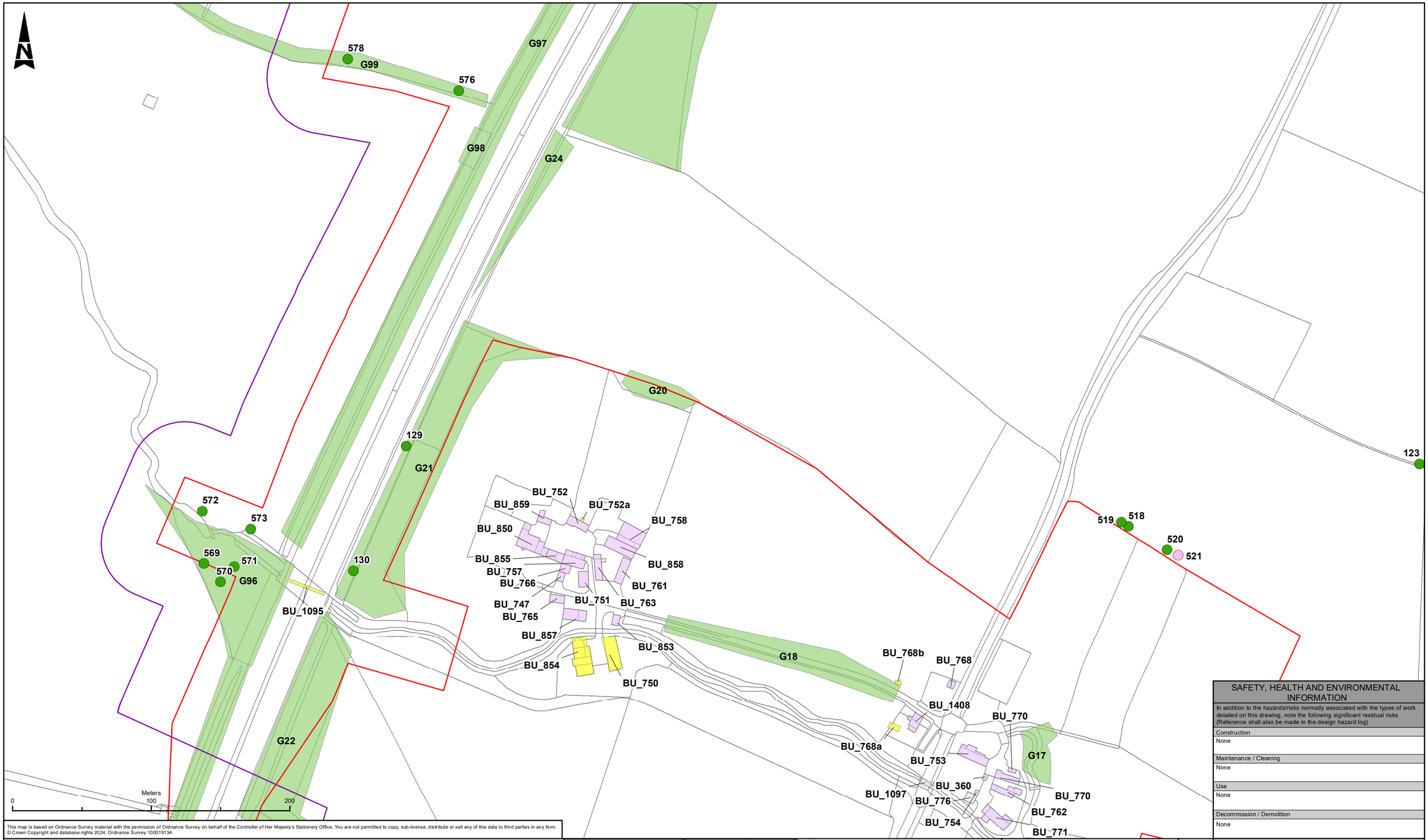

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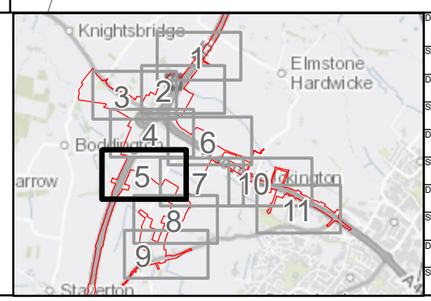

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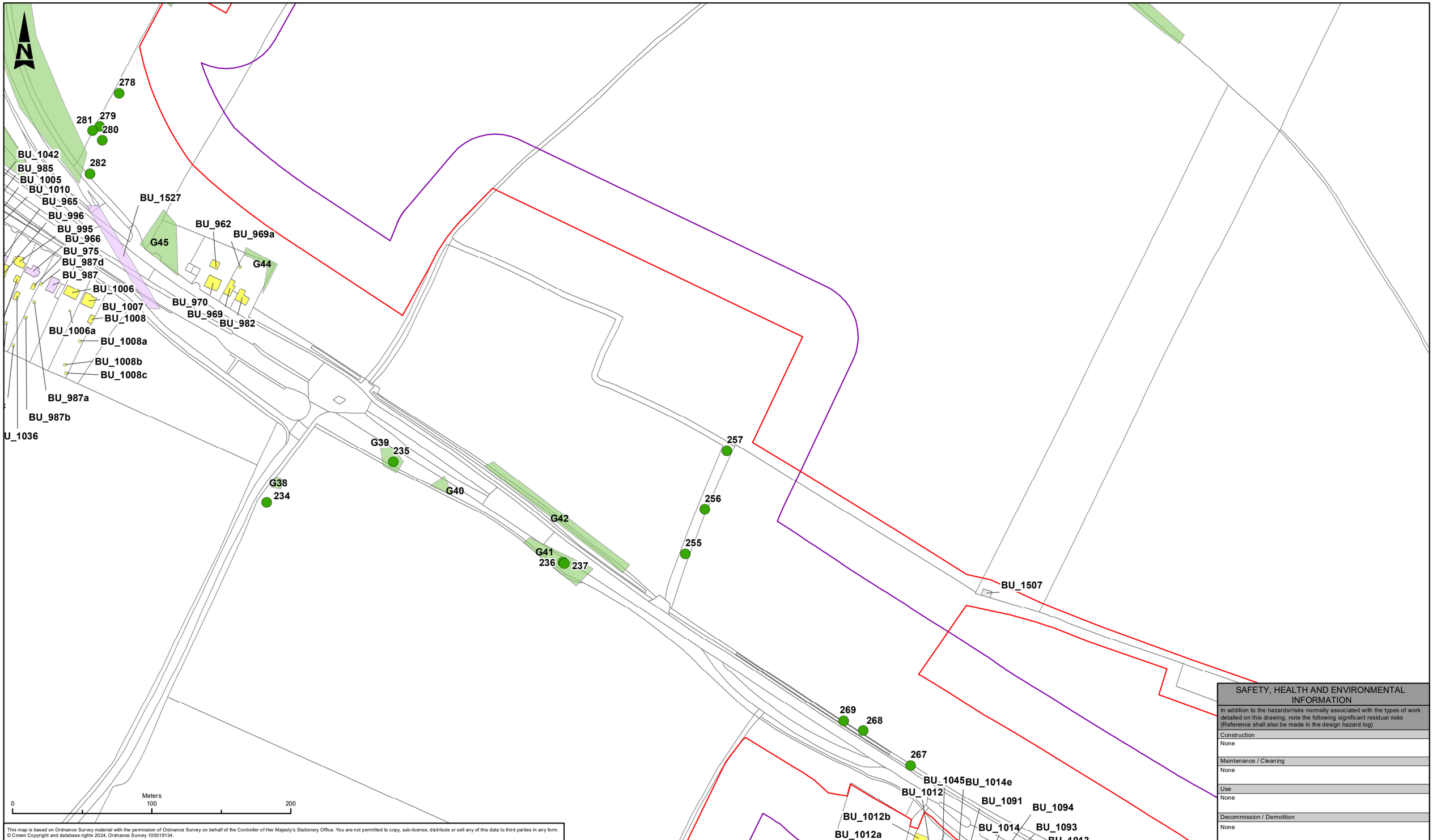

LEGEND

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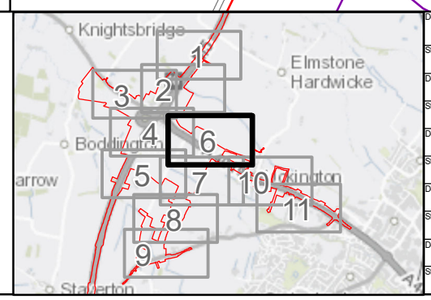
- UNSURVEYED TREES - APPROXIMATE LOCATION
- SURVEYED TREE GROUPS



Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
PUBLISHED	A1	P01	LG	RM	LH	TT	08/03/24

Drawing Suitability: PUBLISHED — Status: A1

ATKINS
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Client: Gloucestershire County Council

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

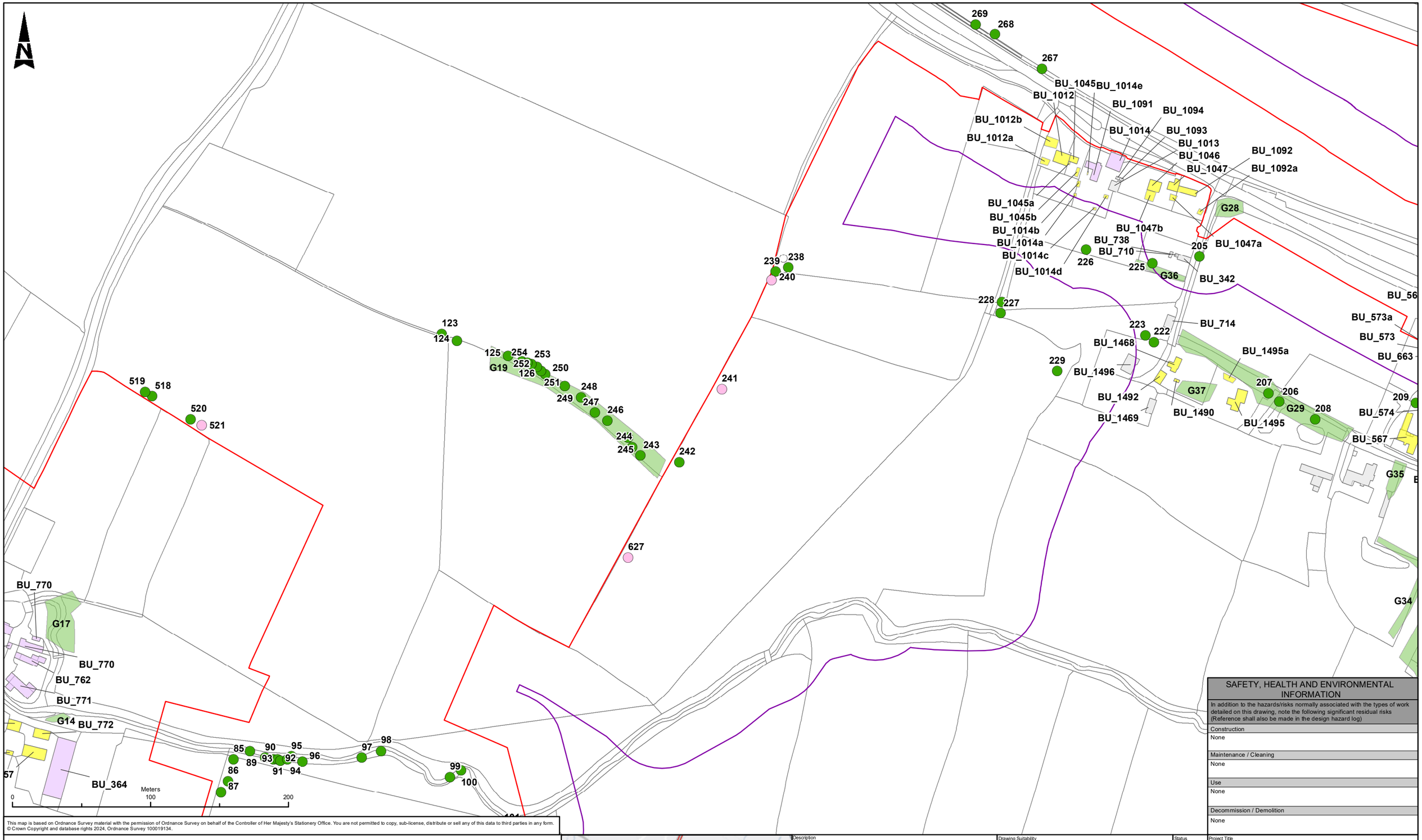
Decommission / Demolition
None

Project Title: M5 Junction 10 Improvement

Drawing Title: FIGURE 1A SURVEY AREA

Drawing Number: GCCM5J10-ATK-EBD-ZZ-GS-GI-400001
(Project | Originator | Volume | Location | Type | Role | Number)

Original Size:	Scale	Project Ref:	Sheet:	Rev:
A3	1:2,500	5214106	6 of 11	P01

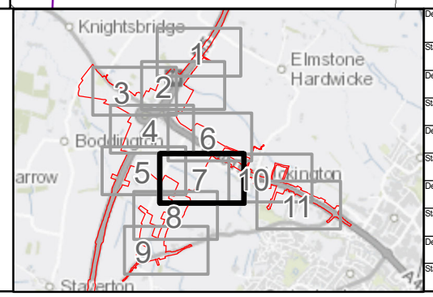


LEGEND

- ORDER LIMITS
- BAT ROOST ZONE OF INFLUENCE
- SURVEYED STRUCTURES
- PARTIALLY SURVEYED STRUCTURES
- UNSURVEYED STRUCTURES

TREES

- SURVEYED TREES
- PARTIAL SURVEY TREES
- UNSURVEYED TREES - APPROXIMATE LOCATION
- SURVEYED TREE GROUPS



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Description	PUBLISHED						
Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date	
A1	P01	LG	RM	LH	TT	08/03/24	

Drawing Suitability: PUBLISHED

Status: A1

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

Decommission / Demolition
None

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Client: Gloucestershire County Council

Project Title: M5 Junction 10 Improvement

Drawing Title: FIGURE 1A SURVEY AREA

Drawing Number: GCCM5J10-ATK-EBD-ZZ-GS-GI-400001

Project	Originator	Volume	Location	Type	Role	Number
GCCM5J10	ATK	EBD	ZZ	GS	GI	400001

Original Size:	Scale	Project Ref:	Sheet:	Rev:
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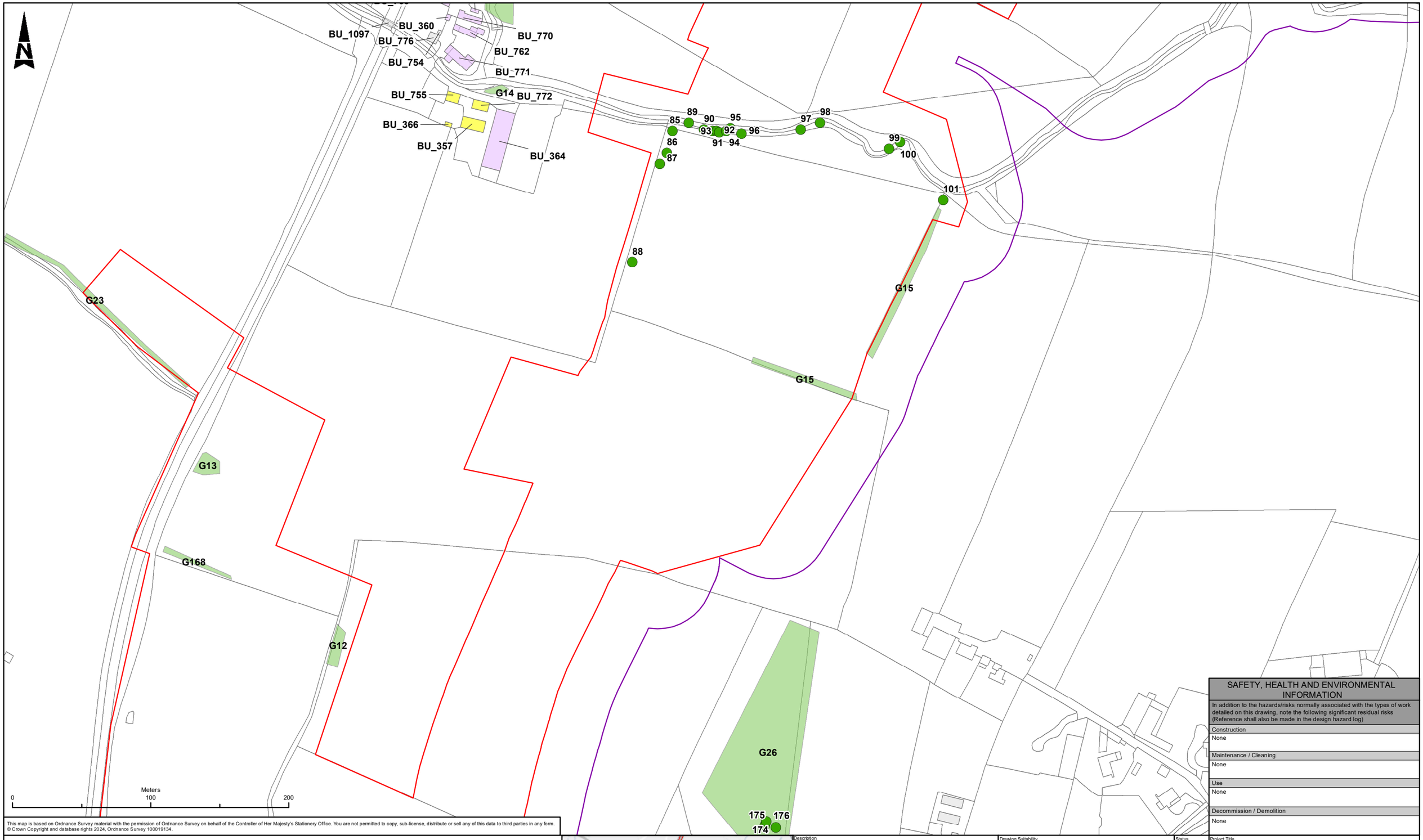
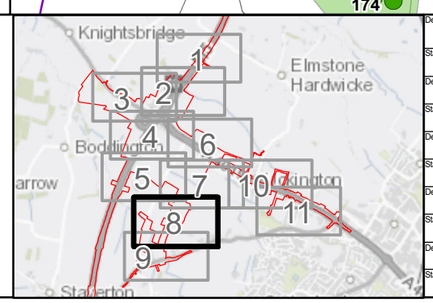


LEGEND

- ORDER LIMITS
- BAT ROOST ZONE OF INFLUENCE
- SURVEYED STRUCTURES
- PARTIALLY SURVEYED STRUCTURES
- UNSURVEYED STRUCTURES

TREES

- SURVEYED TREES
- PARTIAL SURVEY TREES
- UNSURVEYED TREES - APPROXIMATE LOCATION
- SURVEYED TREE GROUPS



Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
PUBLISHED	A1	P01	LG	RM	LH	TT	08/03/24

Drawing Suitability: **PUBLISHED**

Status: **A1**

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

Decommission / Demolition
None

Project Title: M5 Junction 10 Improvement

Drawing Title: FIGURE 1A SURVEY AREA

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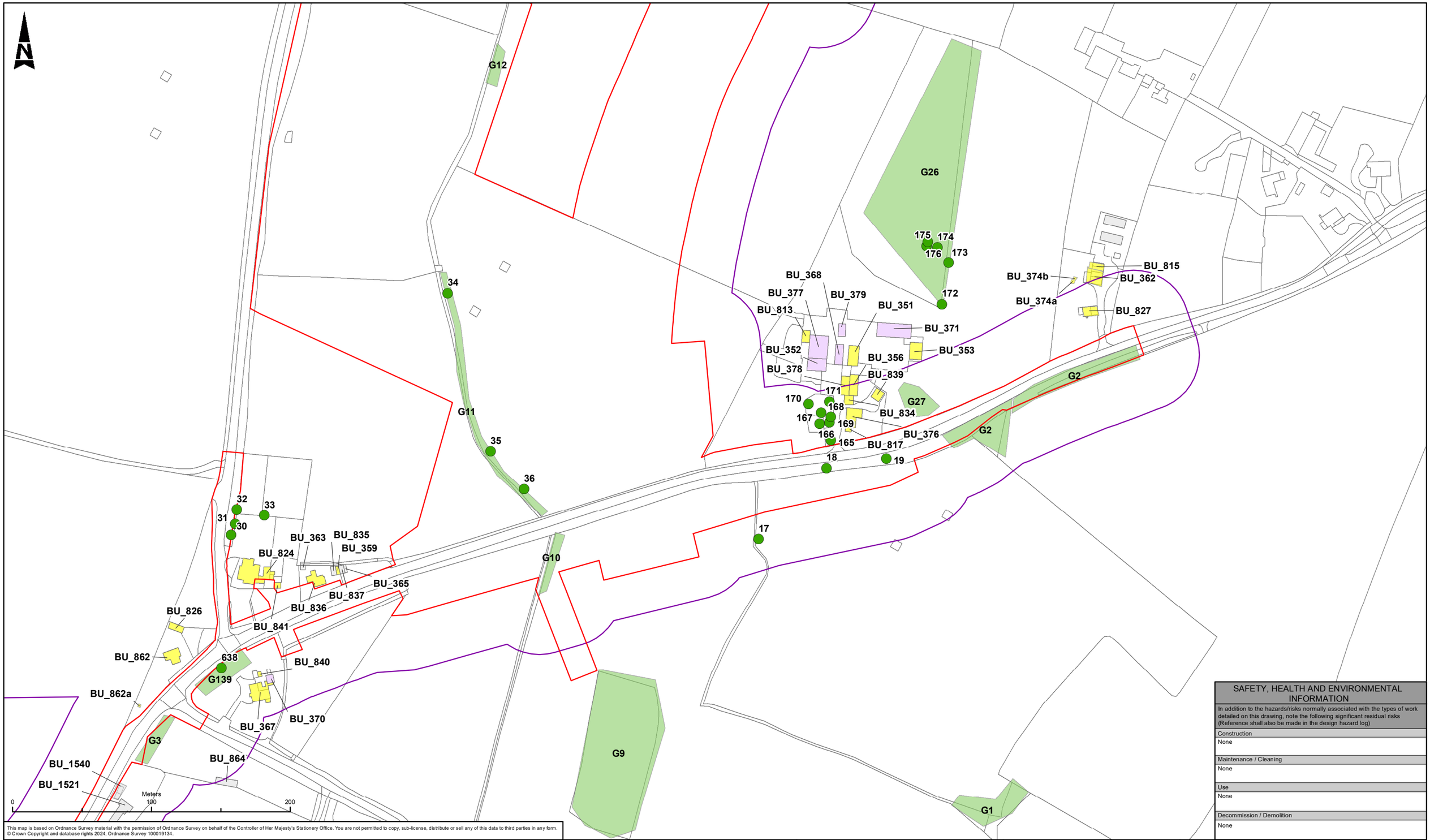
Client: Gloucestershire County Council

Drawing Number: GCCM5J10-ATK-EBD-ZZ-GS-GI-400001
(Project | Originator | Volume | Location | Type | Role | Number)

Original Size:	Scale	Project Ref:	Sheet:	Rev:
A3	1:2,500	5214106	8 of 11	P01

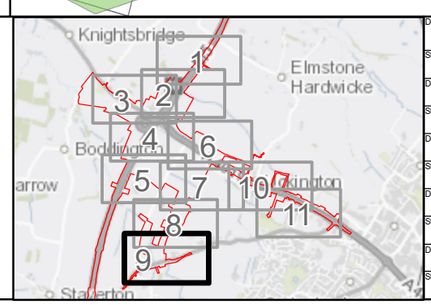


LEGEND

- ORDER LIMITS
- BAT ROOST ZONE OF INFLUENCE
- SURVEYED STRUCTURES
- PARTIALLY SURVEYED STRUCTURES
- UNSURVEYED STRUCTURES

TREES

- SURVEYED TREES
- PARTIAL SURVEY TREES
- UNSURVEYED TREES - APPROXIMATE LOCATION
- SURVEYED TREE GROUPS



Description							
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Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date	
A1	P01	LG	RM	LH	TT	08/03/24	

Drawing Suitability: **PUBLISHED**

Status: **A1**

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

Decommission / Demolition
None

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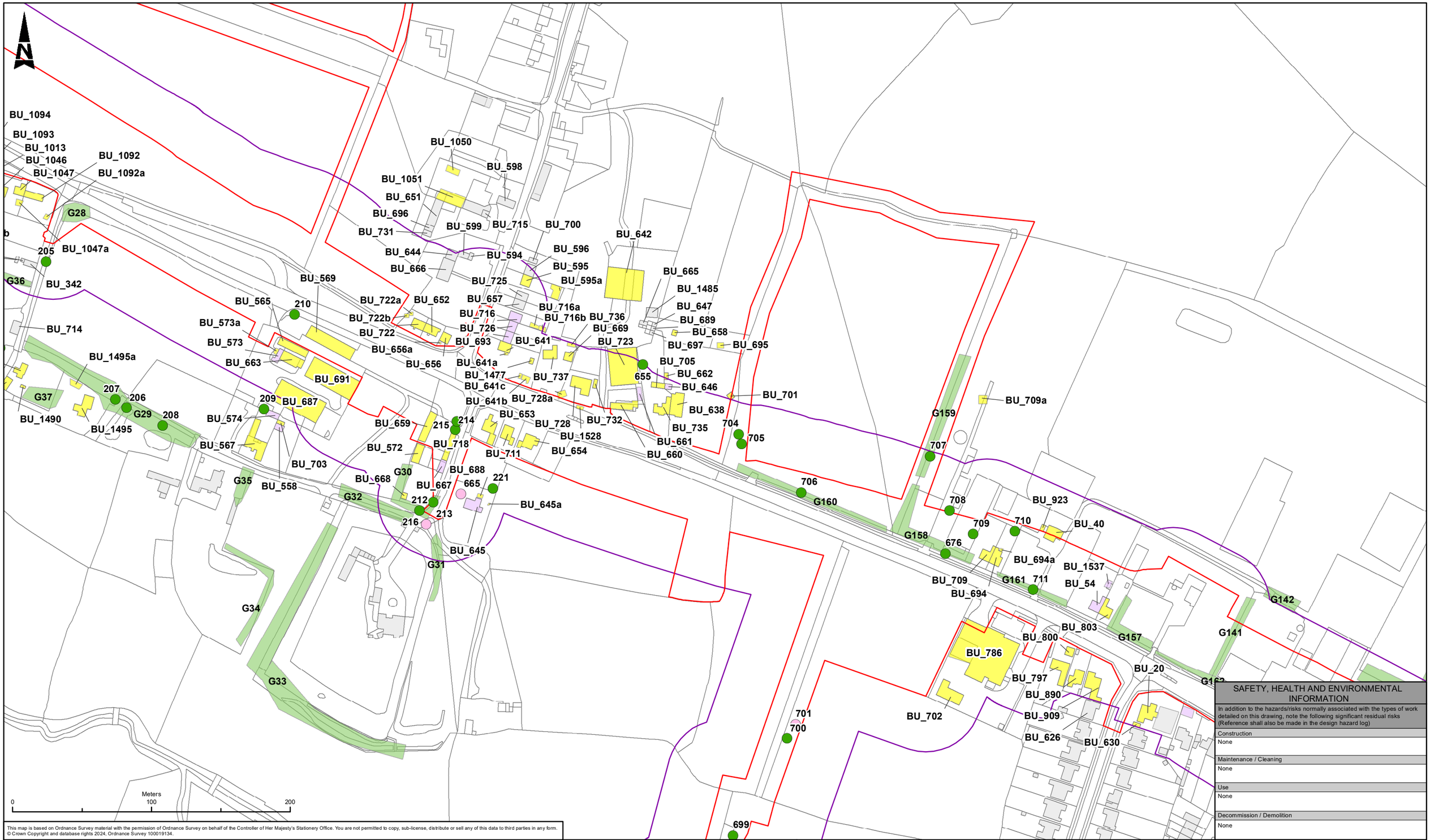
Client: Gloucestershire County Council

Project Title: M5 Junction 10 Improvement

Drawing Title: FIGURE 1A
SURVEY AREA

Drawing Number
Project | Originator | Volume
GCCM5J10-ATK-EBD-ZZ-GS-GI-400001
Location | Type | Role | Number

Original Size:	Scale	Project Ref:	Sheet:	Rev:
A3	1:2,500	5214106	9 of 11	P01

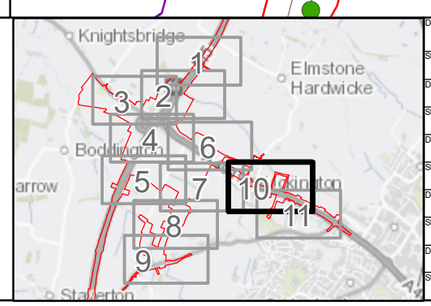


LEGEND

- ORDER LIMITS
- BAT ROOST ZONE OF INFLUENCE
- SURVEYED STRUCTURES
- PARTIALLY SURVEYED STRUCTURES
- UNSURVEYED STRUCTURES

TREES

- SURVEYED TREES
- PARTIAL SURVEY TREES
- UNSURVEYED TREES - APPROXIMATE LOCATION
- SURVEYED TREE GROUPS



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Description PUBLISHED	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
	A1	P01	LG	RM	LH	TT	08/03/24

Drawing Suitability: **PUBLISHED**

Status: **A1**

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

Decommission / Demolition
None

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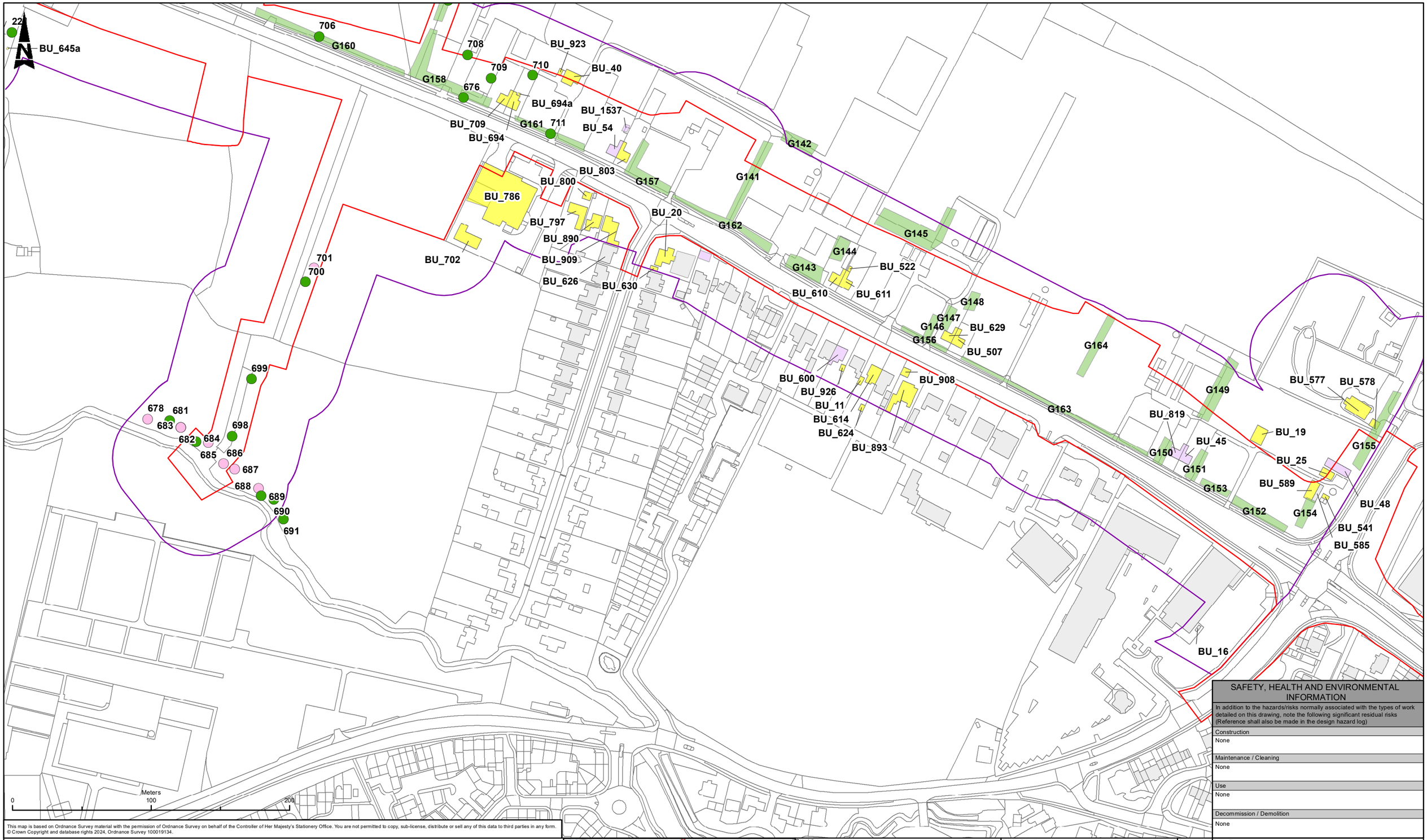
Client: Gloucestershire County Council

Project Title: M5 Junction 10 Improvement

Drawing Title: FIGURE 1A
SURVEY AREA

Drawing Number
Project | Originator | Volume
GCCM5J10-ATK-EBD-ZZ-GS-GI-400001
Location | Type | Role | Number

Original Size:	Scale	Project Ref:	Sheet:	Rev:
A3	1:2,500	5214106	10 of 11	P01

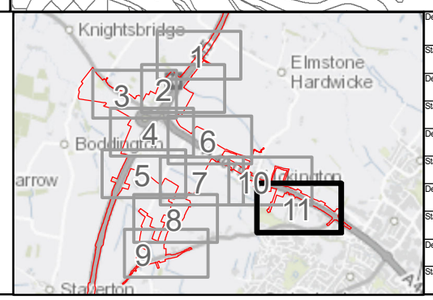


LEGEND

- ORDER LIMITS
- BAT ROOST ZONE OF INFLUENCE
- SURVEYED STRUCTURES
- PARTIALLY SURVEYED STRUCTURES
- UNSURVEYED STRUCTURES

TREES

- SURVEYED TREES
- PARTIAL SURVEY TREES
- UNSURVEYED TREES - APPROXIMATE LOCATION
- SURVEYED TREE GROUPS



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Description

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Description

Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date

Description

Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date

Description

PUBLISHED

Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
A1	P01	LG	RM	LH	TT	08/03/24

Drawing Suitability: **PUBLISHED**

Status: **A1**

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

Decommission / Demolition
None

Project Title: M5 Junction 10 Improvement

Drawing Title: FIGURE 1A SURVEY AREA

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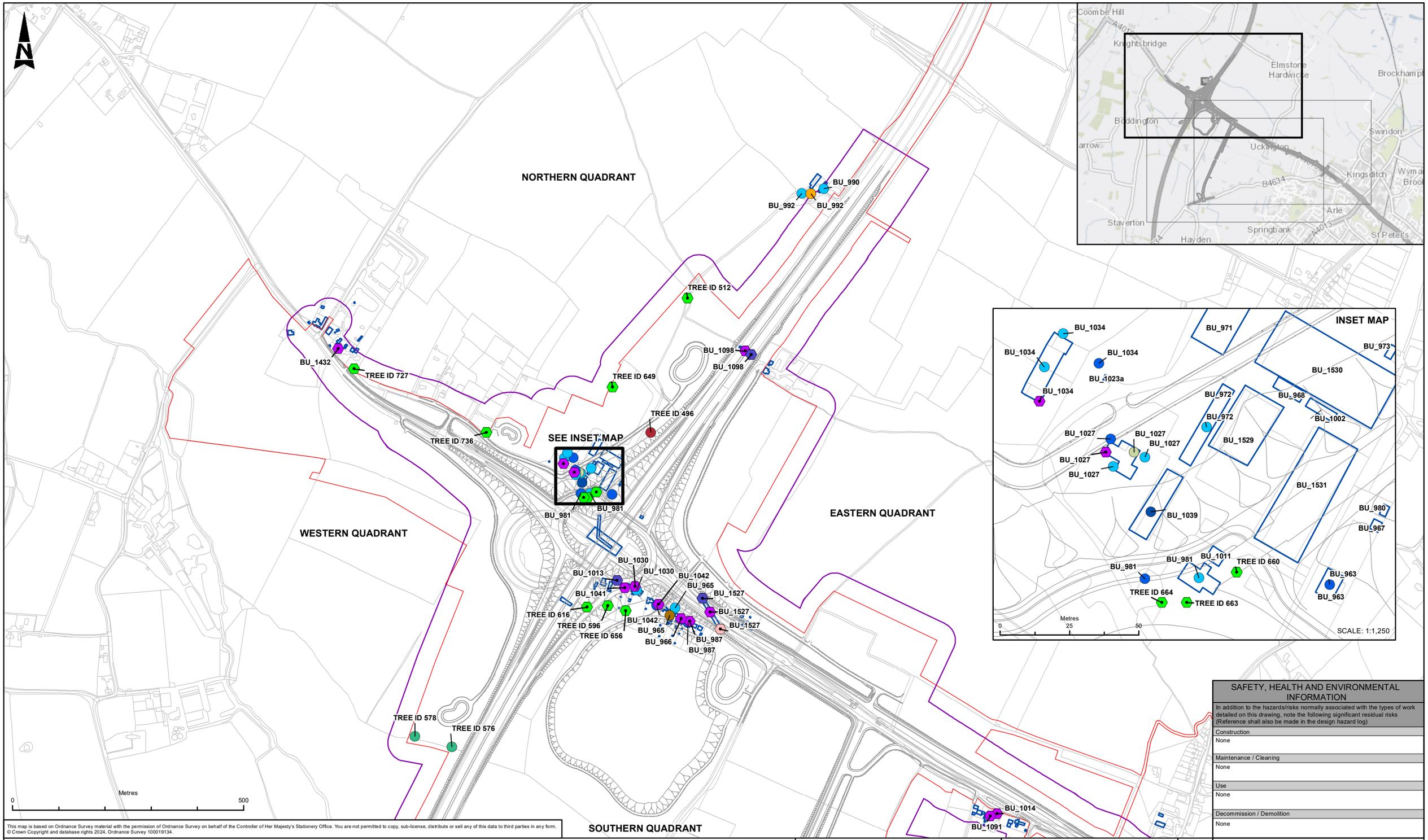
Drawing Number: GCCM5J10-ATK-EBD-ZZ-GS-GI-400001

(Project | Originator | Volume | Location | Type | Role | Number)

Original Size:	Scale	Project Ref:	Sheet:	Rev:
A3	1:2,500	5214106	11 of 11	P01



LEGEND

- ORDER LIMITS
- SCHEME ALIGNMENT
- BAT ROOST ZONE OF INFLUENCE
- STRUCTURE

SPECIES

- BAT
- BROWN LONG-EARED
- COMMON PIPISTRELLE
- LESSER HORSESHOE
- MYOTIS (ASSUMED TO BE WHISKERED OR BRANDTS)
- MYOTIS (ASSUMED TO BE NATTERER'S)
- NATTERER'S
- NOCTULE
- PIPISTRELLUS SPECIES
- SOPRANO PIPISTRELLE
- WHISKERED

BAT SPECIES (TREES)

- BARBASTELLE
- NATTERER'S
- NOCTULE

PREDICTED SPECIES

- PREDICTED CREVICE DWELLING BAT
- PREDICTED LESSER HORSESHOE BAT
- PREDICTED VOID DWELLING BAT

PREDICTED SPECIES (TREE)

- PREDICTED TREE DWELLING BAT

LOCATION OF BAT SPECIES POINTS IS INDICATIVE

Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description						
Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description						
Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
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Description PUBLISHED						
Status A1	Revision P01	Drawn LG	Checked LH	Reviewed CC	Authorised TT	Issue Date 08/03/24

PUBLISHED | **A1**

M5 Junction 10 Improvements Scheme

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Client: Gloucestershire County Council

Drawing Title

FIGURE 1B
CONFIRMED AND PREDICTED BAT ROOSTS

Drawing Number

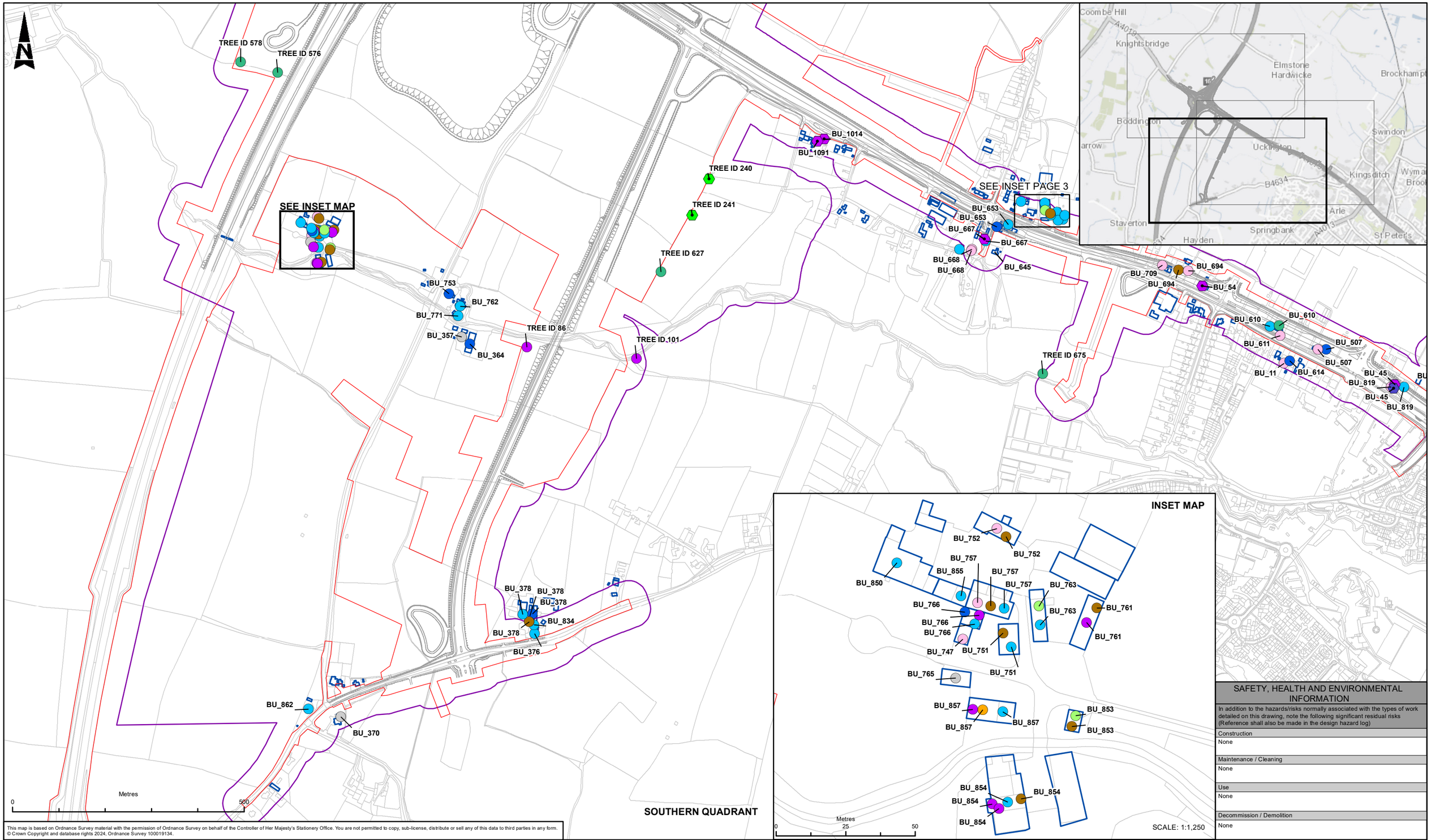
Project | Originator | Volume
GCCM5J10-ATK-EBD-ZZ-GS-GI-400002
Location | Type | Role | Number

Original Size:	Scale	Project Ref:	Sheet:	Rev:
A3	1:7,500	5214106	1 of 3	P01

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction	None
Maintenance / Cleaning	None
Use	None
Decommission / Demolition	None



LEGEND

- ORDER LIMITS
- SCHEME
- BAT ROOST ZONE OF INFLUENCE
- STRUCTURE

SPECIES

- BAT
- BROWN LONG-EARED
- COMMON PIPISTRELLE
- LESSER HORSESHOE
- MYOTIS (ASSUMED TO BE WHISKERED OR BRANDTS)
- MYOTIS (ASSUMED TO BE NATTERER'S)
- NATTERER'S
- NOCTULE
- PIPISTRELLUS SPECIES
- SOPRANO PIPISTRELLE
- WHISKERED

BAT SPECIES (TREES)

- BARBASTELLE
- NATTERER'S
- NOCTULE

PREDICTED SPECIES

- PREDICTED CREVICE DWELLING BAT
- PREDICTED LESSER HORSESHOE BAT
- PREDICTED VOID DWELLING BAT

PREDICTED SPECIES (TREE)

- PREDICTED TREE DWELLING BAT

LOCATION OF BAT SPECIES POINTS IS INDICATIVE

Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description PUBLISHED	Status A1	Revision P01	Drawn LG	Checked LH	Reviewed CC	Authorised TT	Issue Date 05/03/24

Drawing Suitability: **PUBLISHED**

Status: **A1**

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Client: Gloucestershire County Council

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction	None
Maintenance / Cleaning	None
Use	None
Decommission / Demolition	None

Project Title: M5 Junction 10 Improvements Scheme

Drawing Title: FIGURE 1B
CONFIRMED AND PREDICTED BAT ROOSTS

Drawing Number

Project	Originator	Volume	Location	Type	Role	Number
GCCM5J10	ATK	EBD	ZZ	GS	GI	400002

Original Size:	Scale	Project Ref:	Sheet:	Rev:
A3	1:7,500	5214106	2 of 3	P01

EASTERN QUADRANT

SOUTHERN QUADRANT

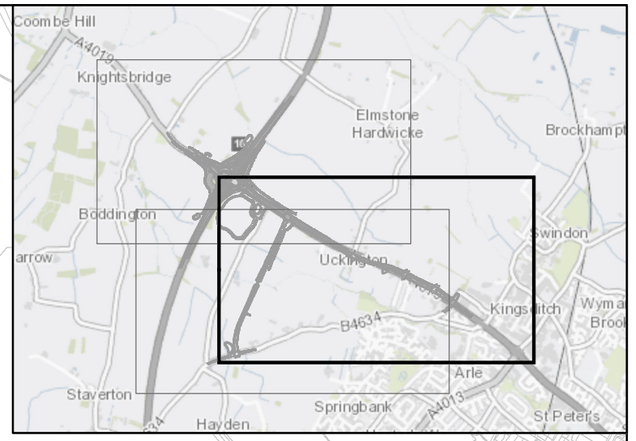
SEE INSET MAP

INSET MAP

SCALE 1:1,250

Metres 0 25 50

Metres 0 500



LEGEND

- ORDER LIMITS
- SCHEME
- BAT ROOST ZONE OF INFLUENCE
- STRUCTURE

SPECIES

- BAT
- BROWN LONG-EARED
- COMMON PIPISTRELLE
- LESSER HORSESHOE
- MYOTIS (ASSUMED TO BE WHISKERED OR BRANDTS)
- MYOTIS (ASSUMED TO BE NATTERER'S)
- NATTERER'S
- NOCTULE
- PIPISTRELLUS SPECIES
- SOPRANO PIPISTRELLE
- WHISKERED

BAT SPECIES (TREES)

- BARBASTELLE
- NATTERER'S
- NOCTULE

PREDICTED SPECIES

- PREDICTED CREVICE DWELLING BAT
- PREDICTED LESSER HORSESHOE BAT
- PREDICTED VOID DWELLING BAT

PREDICTED SPECIES (TREE)

- PREDICTED TREE DWELLING

LOCATION OF BAT SPECIES POINTS IS INDICATIVE

Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description						
Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description						
Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
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Description PUBLISHED						
Status A1	Revision P01	Drawn LG	Checked LH	Reviewed CC	Authorised TT	Issue Date 08/03/24

PUBLISHED | **A1**

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Gloucester
GL1 2TH
Tel: 08000 514 514
www.atkinsglobal.com

Client: Gloucestershire County Council

M5 Junction 10 Improvements Scheme

Drawing Title

FIGURE 1B
CONFIRMED AND PREDICTED BAT ROOSTS

Drawing Number

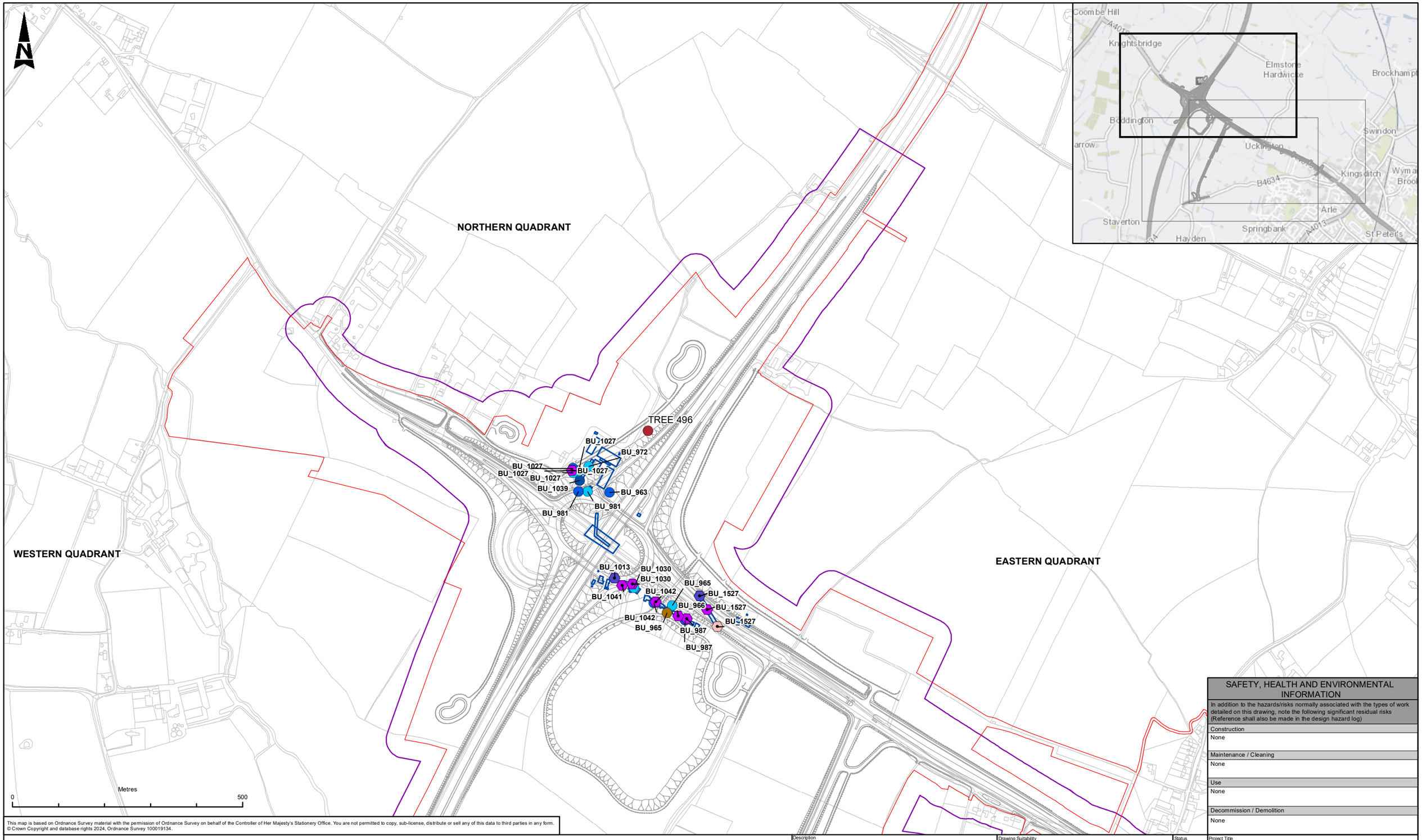
Project | Originator | Volume
GCCM5J10-ATK-EBD-ZZ-GS-GI-400002
Location | Type | Role | Number

Original Size:	Scale	Project Ref:	Sheet:	Rev:
A3	1:7,500	5214106	3 of 3	P01

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction	None
Maintenance / Cleaning	None
Use	None
Decommission / Demolition	None



LEGEND

- ORDER LIMITS
- SCHEME
- BAT ROOST ZONE OF INFLUENCE
- STRUCTURE

SPECIES

- BAT
- BROWN LONG-EARED
- COMMON PIPISTRELLE
- LESSER HORSESHOE
- MYOTIS (ASSUMED TO BE WHISKERED OR MYOTIS (ASSUMED TO BE NATTERER'S)
- NATTERER'S
- NOCTULE
- PIPISTRELLUS SPECIES
- SOPRANO PIPISTRELLE
- WHISKERED

BAT SPECIES (TREES)

- BARBASTELLE
- NATTERER'S
- NOCTULE

PREDICTED SPECIES

- PREDICTED CREVICE DWELLING BAT
- PREDICTED LESSER HORSESHOE BAT
- PREDICTED VOID DWELLING BAT

LOCATION OF BAT SPECIES POINTS IS INDICATIVE

Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
PUBLISHED	A1	P01	JM	LH	CC	TT	07/03/24

Drawing Suitability: PUBLISHED

Status: A1

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

Decommission / Demolition
None

Project Title: M5 Junction 10 Improvements Scheme

Drawing Title: FIGURE 1C
BAT ROOSTS TO BE DESTROYED THROUGH DEMOLITION OR FELLING AS A RESULT OF THE SCHEME

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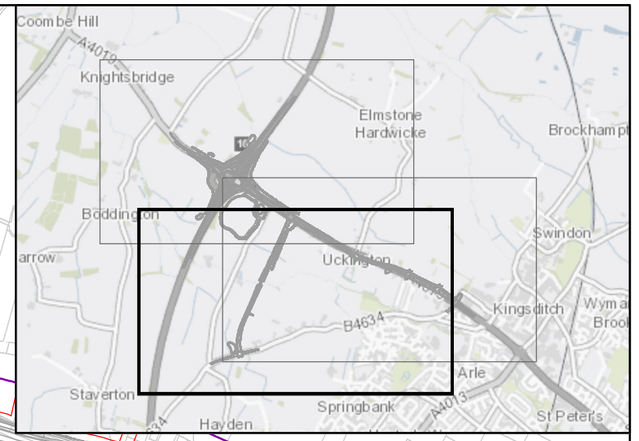
Bearland
Gloucester
GL1 2TH
Tel: 08000 514 514
www.atkinsglobal.com

Client: Gloucestershire County Council

Drawing Number: GCCM5J10-ATK-EBD-ZZ-GS-GI-400003

Project	Originator	Volume	Location	Type	Role	Number
GCCM5J10	ATK	EBD	ZZ	GS	GI	400003

Original Size:	Scale	Project Ref:	Sheet:	Rev:
A3	1:7,500	5214106	1 of 3	P01



BU_653
BU_653
BU_667
BU_667
BU_709
BU_694
BU_694
BU_54
BU_610
BU_610
BU_611
BU_507
BU_507
BU_45
BU_819
BU_45
BU_819

SOUTHERN QUADRANT

Metres
0
500

LEGEND

- ORDER LIMITS
- SCHEME
- BAT ROOST ZONE OF INFLUENCE
- STRUCTURE

SPECIES
- BAT
- BROWN LONG-EARED
- COMMON PIPISTRELLE
- LESSER HORSESHOE
- MYOTIS (ASSUMED TO BE WHISKERED OR
- MYOTIS (ASSUMED TO BE NATTERER'S)
- NATTERER'S
- NOCTULE
- PIPISTRELLUS SPECIES
- SOPRANO PIPISTRELLE
- WHISKERED

BAT SPECIES (TREES)
- BARBASTELLE
- NATTERER'S
- NOCTULE

PREDICTED SPECIES
- PREDICTED CREVICE DWELLING BAT
- PREDICTED LESSER HORSESHOE BAT
- PREDICTED VOID DWELLING BAT

LOCATION OF BAT SPECIES POINTS IS INDICATIVE

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

Decommission / Demolition
None

Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
PUBLISHED	A1	P01	JM	LH	CC	TT	07/03/24

Drawing Suitability: **PUBLISHED**
Status: **A1**

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Client: Gloucestershire County Council

Project Title: M5 Junction 10 Improvements Scheme

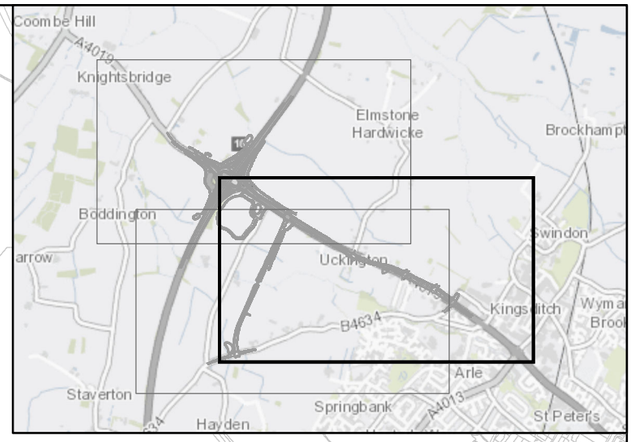
Drawing Title: FIGURE 1C
BAT ROOSTS TO BE DESTROYED THROUGH DEMOLITION OR FELLING AS A RESULT OF THE SCHEME

Drawing Number: GCCM5J10-ATK-EBD-ZZ-GS-GI-400003
(Project | Originator | Volume | Location | Type | Role | Number)

Original Size:	Scale	Project Ref:	Sheet:	Rev:
A3	1:7,500	5214106	2 of 3	P01

EASTERN QUADRANT

SOUTHERN QUADRANT



Metres
0
500

LEGEND

- ORDER LIMITS
- SCHEME
- BAT ROOST ZONE OF INFLUENCE
- STRUCTURE

SPECIES

- BAT
- BROWN LONG-EARED
- COMMON PIPISTRELLE
- LESSER HORSESHOE
- MYOTIS (ASSUMED TO BE WHISKERED OR MYOTIS (ASSUMED TO BE NATTERER'S)
- NATTERER'S
- NOCTULE
- PIPISTRELLUS SPECIES
- SOPRANO PIPISTRELLE
- WHISKERED

BAT SPECIES (TREES)

- BARBASTELLE
- NATTERER'S
- NOCTULE

PREDICTED SPECIES

- PREDICTED CREVICE DWELLING BAT
- PREDICTED LESSER HORSESHOE BAT
- PREDICTED VOID DWELLING BAT

LOCATION OF BAT SPECIES POINTS IS INDICATIVE

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

Decommission / Demolition
None

Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
PUBLISHED	A1	P01	JM	LH	CC	TT	07/03/24

Drawing Suitability: PUBLISHED
Status: A1

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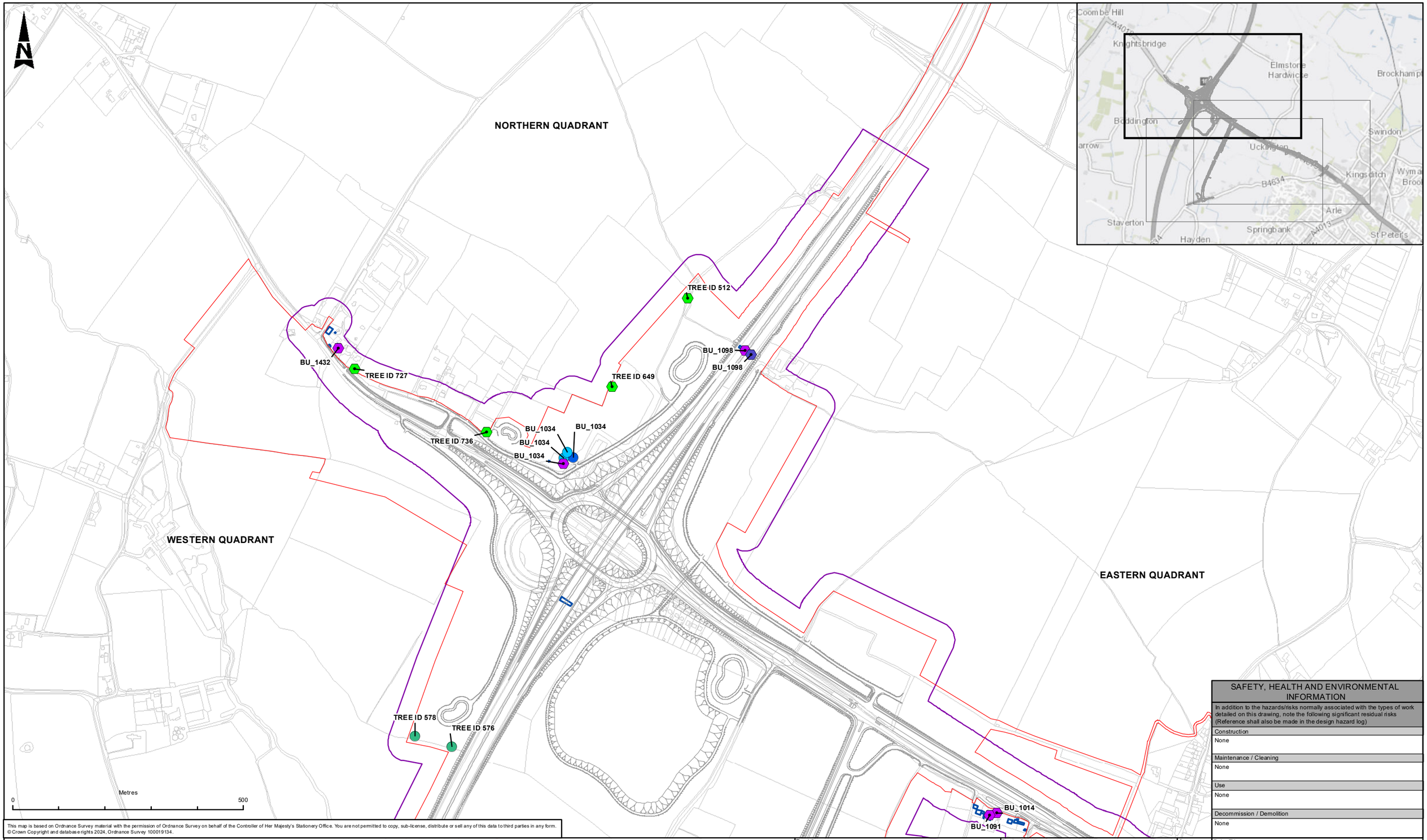
Client: Gloucestershire County Council

Project Title: M5 Junction 10 Improvements Scheme

Drawing Title: FIGURE 1C
BAT ROOSTS TO BE DESTROYED THROUGH DEMOLITION OR FELLING AS A RESULT OF THE SCHEME

Drawing Number: GCCM5J10-ATK-EBD-ZZ-GS-GI-400003
(Project | Originator | Volume | Location | Type | Role | Number)

Original Size:	Scale	Project Ref:	Sheet:	Rev:
A3	1:7,500	5214106	3 of 3	P01



LEGEND

- ORDER LIMITS
- SCHEME ALIGNMENT
- BAT ROOST ZONE OF INFLUENCE
- STRUCTURE

SPECIES
- COMMON PIPISTRELLE
- SOPRANO PIPISTRELLE

BAT SPECIES (TREES)
- NATTERER'S
- NOCTULE

PREDICTED SPECIES
- PREDICTED CREVICE DWELLING BAT
- PREDICTED LESSER HORSESHOE BAT
- PREDICTED VOID DWELLING BAT

PREDICTED SPECIES (TREE)
- PREDICTED TREE DWELLING BAT

LOCATION OF BAT SPECIES POINTS IS INDICATIVE

Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
PUBLISHED	A1	P01	LG	LH	CC	TT	08/03/24

Drawing Suitability: PUBLISHED

Status: A1

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

Decommission / Demolition
None

Project Title: M5 Junction 10 Improvements Scheme

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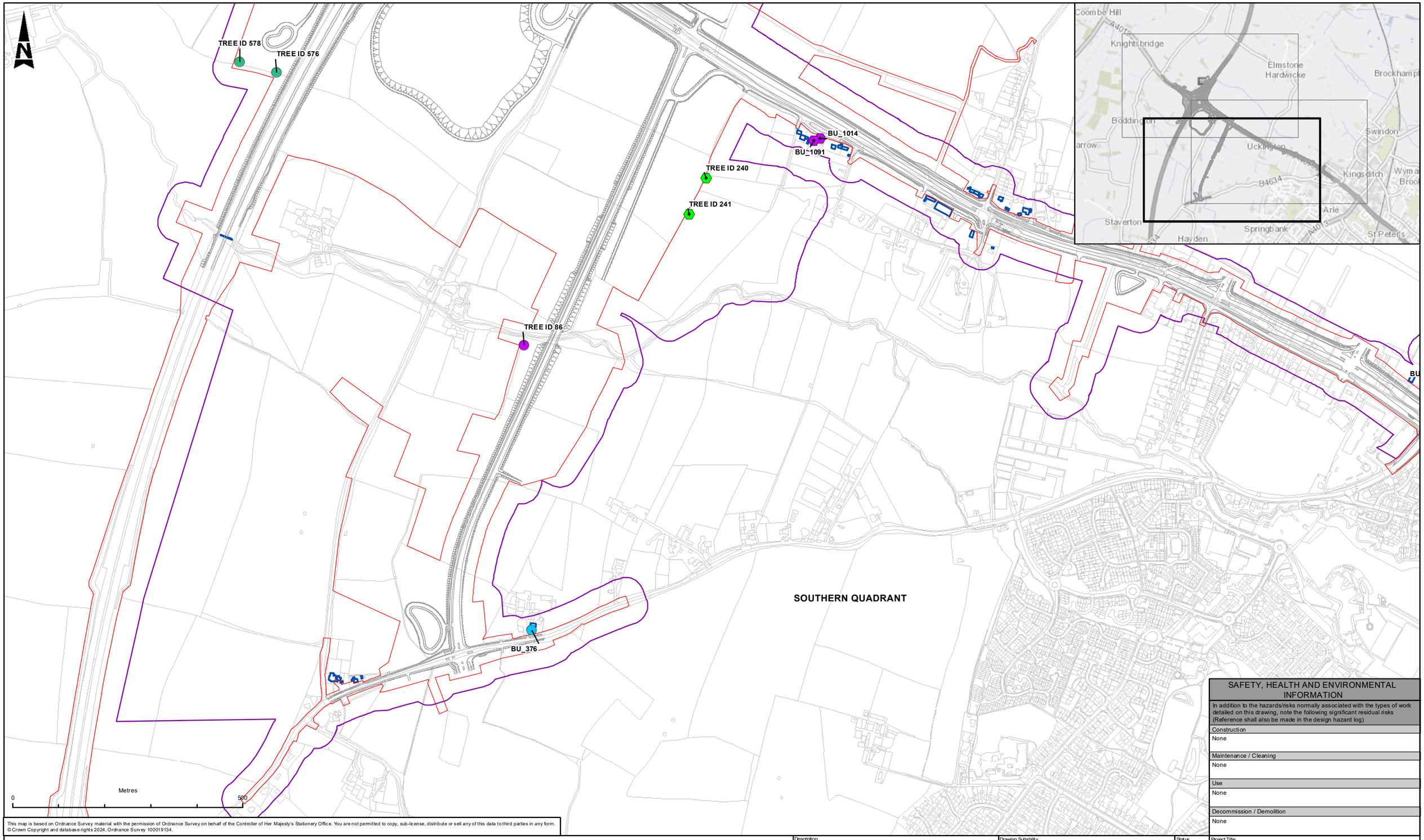
Drawing Title

FIGURE 1D
BAT ROOSTS THAT MAY BE SUBJECT TO TEMPORARY DISTURBANCE

Drawing Number: GCCM5J10-ATK-EBD-ZZ-GS-GI-400004

Project	Originator	Volume	Location	Type	Role	Number
GCCM5J10	ATK	EBD	ZZ	GS	GI	400004

Original Size:	Scale	Project Ref:	Sheet:	Rev:
A3	1:7,500	5214106	1 of 3	P01



LEGEND

- ORDER LIMITS
- SCHEME ALIGNMENT
- BAT ROOST ZONE OF INFLUENCE
- STRUCTURE

SPECIES
- COMMON PIPISTRELLE
- SOPRANO PIPISTRELLE

BAT SPECIES (TREES)
- NATTERER'S
- NOCTULE

PREDICTED SPECIES
- PREDICTED CREVICE DWELLING BAT
- PREDICTED LESSER HORSESHOE BAT
- PREDICTED VOID DWELLING BAT

PREDICTED SPECIES (TREE)
- PREDICTED TREE DWELLING BAT

LOCATION OF BAT SPECIES POINTS IS INDICATIVE

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

Decommission / Demolition
None

Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
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Drawing Suitability: PUBLISHED — Status: A1

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Project Title: M5 Junction 10 Improvements Scheme

Drawing Title: FIGURE 1D
BAT ROOSTS THAT MAY BE SUBJECT TO TEMPORARY DISTURBANCE

Drawing Number: Project | Originator | Volume
GCCM5J10-ATK-EBD-ZZ-GS-GI-400004
Location | Type | Role | Number

Original Size:	Scale	Project Ref:	Sheet:	Rev:
A3	1:7,500	5214106	2 of 3	P01

EASTERN QUADRANT

SOUTHERN QUADRANT

BU_1014

BU_1091

TREE ID 240

TREE ID 241

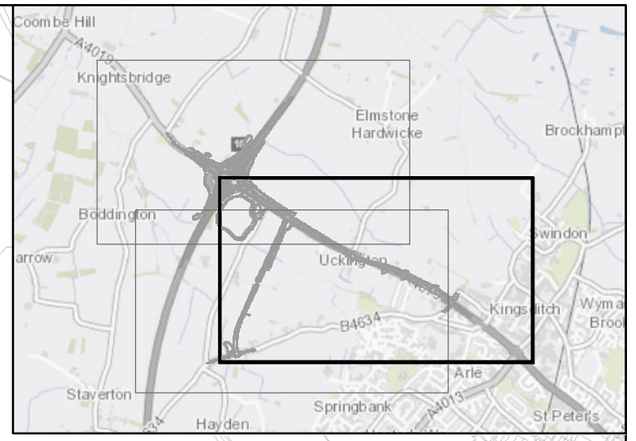
TREE ID 86

BU_376

BU_48

BU_48

BU_48



0 Metres 500

LEGEND

- ORDER LIMITS
- SCHEME ALIGNMENT
- BAT ROOST ZONE OF INFLUENCE
- STRUCTURE

SPECIES
- COMMON PIPISTRELLE
- SOPRANO PIPISTRELLE

BAT SPECIES (TREES)
- NATTERER'S
- NOCTULE

PREDICTED SPECIES
- PREDICTED CREVICE DWELLING BAT
- PREDICTED LESSER HORSESHOE BAT
- PREDICTED VOID DWELLING BAT

PREDICTED SPECIES (TREE)
- PREDICTED TREE DWELLING BAT

LOCATION OF BAT SPECIES POINTS IS INDICATIVE

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

Decommission / Demolition
None

Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
PUBLISHED	A1	P01	LG	LH	CC	TT	08/03/24

Drawing Suitability: PUBLISHED — Status: A1

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Client: Gloucestershire County Council

Project Title: M5 Junction 10 Improvements Scheme

Drawing Title: FIGURE 1D
BAT ROOSTS THAT MAY BE SUBJECT TO TEMPORARY DISTURBANCE

Drawing Number: Project | Originator | Volume
GCCM5J10-ATK-EBD-ZZ-GS-GI-400004
Location | Type | Role | Number

Original Size:	Scale	Project Ref:	Sheet:	Rev:
A3	1:7,500	5214106	3 of 3	P01

NORTHERN QUADRANT

WESTERN QUADRANT

EASTERN QUADRANT

SOUTHERN QUADRANT

BU_990
BU_992
BU_992

SEE INSET MAP A

SEE INSET MAP B

SEE INSET MAP C

TREE 627

TREE 101

TREE 675

BU_668
BU_668

BU 11
BU_614

BU_378
BU_378
BU_378
BU_834

BU_862
BU_370

Metres
0 100 200 300 400 500

INSET MAP A

BU_859
BU_752a
BU_752
BU_752
BU_758
BU_757
BU_855
BU_757
BU_858
BU_850
BU_757
BU_763
BU_766
BU_763
BU_761
BU_766
BU_766
BU_761
BU_747
BU_751
BU_751
BU_765
BU_857
BU_857
BU_857
BU_853
BU_853
BU_854
BU_854
BU_854
BU_750
BU_854

Metres
0 25 50

SCALE 1:1,250

INSET MAP B

BU_723
BU_723
BU_662
BU_705
BU_732
BU_646
BU_728
BU_661
BU_638
BU_661
BU_638
BU_735

Metres
0 25 50

SCALE 1:1,250

INSET MAP C

BU_753
BU_770
BU_360
BU_770
BU_776
BU_762
BU_771
BU_755
BU_772
BU_357
BU_366
BU_364

Metres
0 25 50

SCALE 1:1,250

LEGEND

- ORDER LIMIT
- PROPOSED SCHEME
- ZONE OF INFLUENCE
- STRUCTURE

SPECIES

- BAT
- BROWN LONG-EARED
- COMMON PIPISTRELLE
- LESSER HORSESHOE
- MYOTIS (ASSUMED TO BE WHISKERED OR BRANDTS)
- MYOTIS (ASSUMED TO BE NATTERER'S)
- NATTERER'S
- NOCTULE
- PIPISTRELLUS SPECIES
- SOPRANO PIPISTRELLE
- WHISKERED

BAT SPECIES (TREES)

- BARBASTELLE
- NATTERER'S
- NOCTULE

LOCATION OF BAT SPECIES POINTS IS INDICATIVE

Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
PUBLISHED	A1	P01	JM	LH	CC	TT	07/03/24

Drawing Suitability: PUBLISHED

Status: A1

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction: None

Maintenance / Cleaning: None

Use: None

Decommission / Demolition: None

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Client: Gloucestershire COUNTY COUNCIL

Project Title: M5 Junction 10 Improvement

Drawing Title: FIGURE 1E
BAT ROOSTS TO BE RETAINED AND PROTECTED

Drawing Number: Project | Originator | Volume
GCCM5J10-ATK-EBD-ZZ-GS-GI-400005
Location | Type | Role | Number

Original Size:	Scale	Project Ref:	Sheet:	Rev:
A3	1:12,500	5206696	1 of 1	P01

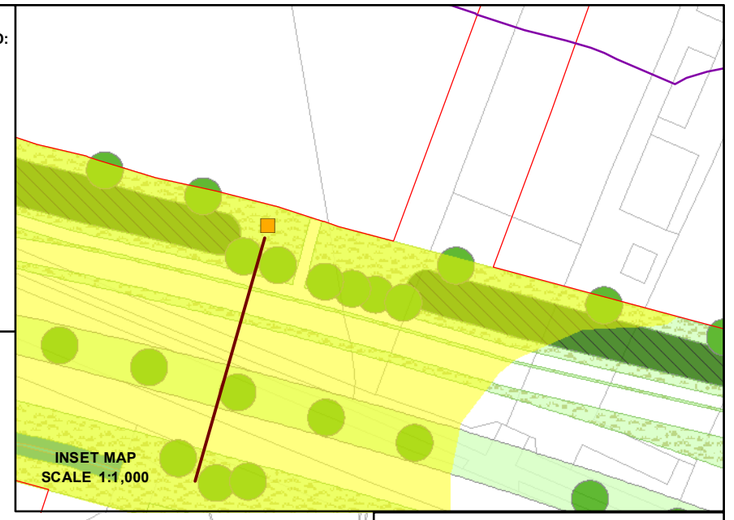
NORTHERN QUADRANT

NOTE:
THE FOLLOWING COMPENSATORY FEATURES ARE ALSO PROPOSED:
NORTHERN QUADRANT: ONE CREVICE DWELLING BAT ROOST STRUCTURE,FOUR HIBERNATION BAT BOXES, FIVE ARTIFICIAL BAT BOXES FOR CREVICE DWELLING SPECIES, SIX ARTIFICIAL MATERNITY/HIBERNATION BOXES, ONE TREE ROOSTING FEATURE.

EASTERN QUADRANT: ONE ARTIFICIAL BAT BOX FOR CREVICE DWELLING SPECIES.

SOUTHERN QUADRANT: TEN HIBERNATION BAT BOXES, EIGHT ARTIFICIAL BAT BOXES FOR CREVICE DWELLING SPECIES, TWO ARTIFICIAL MATERNITY/HIBERNATION BOXES, THREE TREE ROOSTING FEATURE

WESTERN QUADRANT: TWO TREE ROOSTING FEATURES. PRECISE LOCATIONS TO BE AGREED DURING DETAILED DESIGN.



WITHYBRIDGE (A4019) UNDERPASS TO LINK GREEN INFRASTRUCTURE TO THE NORTH AND SOUTH OF THE A4019

WESTERN QUADRANT

EASTERN QUADRANT

THE COMPENSATORY BAT ROOST STRUCTURE HAS BEEN LOCATED NORTH OF THE A4019, CLOSE TO THE EXISTING LESSER HORSESHOE BAT ROOSTS. ITS LOCATION WAS SELECTED TO ENSURE THAT IT ALIGNS WITH THE NORTH WEST CHELTENHAM DEVELOPMENT AREA'S GREEN CORRIDOR, BEING LOCATED ADJACENT TO A RETAINED LINEAR VEGETATION FEATURE, WHICH IS ALSO IDENTIFIED AS A DARK CORRIDOR.

SEE INSET MAP

THE COMPENSATORY BAT ROOST STRUCTURE HAS BEEN LOCATED WITHIN AN AREA OF WOODLAND PLANTING WITHIN THE FLOOD STORAGE AREA, WHICH IS AN AREA OF ARABLE FARMLAND WHICH WILL BE TRANSFORMED INTO AN AREA SUPPORTING WETLAND HABITATS SURROUNDED BY WOODLAND, SCRUB AND SPECIES-RICH GRASSLAND. WOODLAND AND SCRUB PLANTING LINK TO THE WITHYBRIDGE (A4019) UNDERPASS

A DARK CORRIDOR HAS BEEN INCLUDED ALONG THE A4019 AT THIS LOCATION TO LINK TO THE GREEN/DARK CORRIDOR WITHIN THE NORTH WEST CHELTENHAM DEVELOPMENT AREA NORTH OF THE A4019, AND THE AGRICULTURAL LAND SOUTH OF THE A4019.

SOUTHERN QUADRANT

Metres
0
500

LEGEND (CONT...)

- BAT ROOST ZONE OF INFLUENCE

LANDSCAPE DESIGN

- LE 1.2: GRASSLAND WITH BULBS
- LE 1.3: SPECIES RICH GRASSLAND
- LE 2.1: WOODLAND
- LE 2.2: WOODLAND EDGE
- LE 2.4: LINEAR BELTS OF TREES AND SHRUBS
- LE 2.5: SHRUBS WITH INTERMITTENT TREES
- LE 2.6: SHRUBS
- LE 2.8: SCRUB
- LE 3.1: AMENITY TREES AND SHRUB PLANTING
- LE 5.1: INDIVIDUAL TREES
- LE 6.1: WATER BODIES & ASSOCIATED PLANTS
- LE 6.2: BANKS AND DITCHES - SOWN WITH WET GRASSLAND
- LE 6.4: WET GRASSLAND WITH MARGINAL PLANTING
- LOWLAND MEADOWS
- EXISTING WATERCOURSES
- RETAINED VEGETATION
- EXISTING DWELLING AND GARDEN TO BE RETAINED

LEGEND

- ORDER LIMITS
- BAT ROOST ZONE OF INFLUENCE
- DARK CORRIDORS
- COMPENSATORY BAT ROOST STRUCTURE
- BAT HOP-OVER LOCATIONS

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

Decommission / Demolition
None

Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
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Project Title: M5 Junction 10 Improvement

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Client: Gloucestershire County Council

Drawing Title: FIGURE 1F
SPECIFICATION FOR MITIGATION AND COMPENSATION

Drawing Number: GCCM5J10-ATK-EBD-ZZ-GS-GI-400006
(Project | Originator | Volume | Location | Type | Role | Number)

Original Size:	Scale	Project Ref:	Sheet:	Rev:
A3	1:7,000	5214106	1 of 1	P01

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