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For and on behalf of
Bloor Homes South Midlands

ENVIRONMENTAL STATEMENT
APPENDICES

Milton Keynes East,
Land at Willen Road,
Willen Road,
Newport Pagnell,
Milton Keynes

Prepared by
DLP Planning Ltd
Bedford

October 2021

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Appendix 3.1

Scoping Opinion

Planning Service – Development Management

Reply to Elizabeth Verdegem
Call 01908 252462 Ref 20/01181/EIASCO
E-mail elizabeth.verdegem@milton-keynes.gov.uk

Wednesday 14th October 2020

Graham Robinson
DLP Planning Limited
4 Abbey Court
Fraser Road
Priory Business Park
Bedford
MK44 3WH

Dear Mr Robinson

Reference: 20/01181/EIASCO
Location: Land At Willen Road, Willen Road, Newport Pagnell, Milton Keynes
Proposal: EIA Scoping Opinion request made in relation to the land at Willen Road for up to 800 dwellings with associated works

The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended)

I refer to your request for an EIA Scoping Opinion regarding the development set out above, received 4th August 2020 under Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended).

This letter constitutes Milton Keynes Council's opinion on the proposed scope of the Environment Statement that would be required to accompany any planning application for the above development. This is the Council's opinion at the current time, which may be subject to change based on significant changes to the proposal or wider circumstances.

In addition, it should be made clear that there are likely to be additional planning requirements which do not form part of this Scoping Opinion which should be discussed separately.

The Site

The application site is approximately 42 hectares south of the A422, east of Willen Road and west of the River Ouzel. It is mostly agricultural land, peppered with clusters of dwellings (which do not form part of the site), while the southern part of the site is a sand & gravel quarry in the final stages of being worked and restored.

The agricultural land is designated as grade 3, and there is little vegetation across the site. Most of the site is in Floodzone 1, with Floodzone 2 and 3 forming a floodplain near the River

Ouzel to the east of the site. There are no listed buildings on or adjacent to the site, the closest being 800 metres to the south-east.

The River Ouzel and adjacent land buffer form a wildlife corridor, and the area is a mixture of amber and red risk zones for Great Crested Newts. Aside from evidence of protected species records, there are no other wildlife designations within the application site.

The site forms part of the Milton Keynes East (MKE) site allocation which is allocated to deliver around 5000 homes, employment, schools, local centres, green infrastructure, public transport infrastructure, and other associated infrastructure.

The Proposal

The proposal is for up to 800 homes, primary school, local centre, and associated infrastructure, green space, landscaping, and playing fields. The proposal is likely to come forward in the form of a hybrid planning application.

The green space will form new wildlife corridors, linear park and formal green spaces, and be used for drainage attenuation, recreation and biodiversity enhancement. No built development will take place in flood zones 2 or 3, and trees and hedgerow will be retained where possible.

Two vehicular access points are proposed on the east side of Willen Road. Pedestrian and cycle links will be provided to and through the site, including connections to existing footpaths FP014 and FP015. The main roads will be designed to allow public transport access.

Scoping Opinion

This Scoping Opinion is issued under The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended). The Council has consulted the consultation bodies as described in Regulation 2(1), and required under Part 4, Regulation 15 (4):

Natural England
Environment Agency

The following officers/organisations have also been consulted:

MKC Archaeological Officer
MKC Conservation Officer
MKC Landscape Architect
MKC Environmental Health Officer
MKC Highways Officer
MKC Countryside Officer (Ecology)
MKC Urban Design
MKC Flood and Water Management (LLFA)
MKC Development Plan (Planning Policy)
Historic England

Highways England
Anglian Water
Bedford Group of Internal Drainage Boards
Central Bedfordshire Council

In addition, the following parties have been notified of the Scoping Opinion request:

Moulsoe Parish Council
Newport Pagnell Town Council
Great Linford Parish Council
Campbell Park Parish Council
Ward councillors for Newport Pagnell ward
Ward councillors for Broughton ward
Ward councillors for Olney ward

Considerations

Notwithstanding the submitted information and following comments, the Environmental Statement must include the information required by Schedule 4 of The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended).

The following topic areas have been identified by the applicant as requiring inclusion and assessment in the Environmental Statement:

<u>Ecology/Biodiversity</u>

The assessments to be undertaken on the existing ecology on the site is agreed. It is highly likely the Phase 2 surveys will be required and these must be undertaken at the appropriate time. Without further information regarding the initial surveys it is not possible to provide further advice on this subject, but further scope on the Ecology work can be provided during pre-application advice, for inclusion in the ES.

Use of the survey work to inform the masterplanning is agreed, as is the provision of a green infrastructure strategy for the site. The strategy must demonstrate a biodiversity offsetting approach to show a net gain using the appropriate biodiversity impact assessment metric and follow the mitigation hierarchy, as outlined in the NPPF paragraph 170 and Policy NE3 of Plan:MK.

Consideration and protection of ecology and biodiversity habitats during the construction phase is agreed.

It is recommended that you consider the advice provided by Natural England in their consultation response for additional advice the extent of information included in the ES.

<u>Archaeology</u>

The scope of archaeological investigation, identification and mitigation is agreed. You should follow the advice and guidance set out in Historic England's response and the comments from the Council's Archaeological Officer.

Further Considerations

The following areas have not been considered by the applicant for inclusion in the ES. They have been raised by consultees and are considered necessary for inclusion as they are likely to give rise to significant impacts, either alone or cumulatively with the whole MKE:

Transport and Traffic

The cumulative impacts on traffic and transport infrastructure as part of the MKE allocation are considered to be significant. While it is acknowledged that a Transport Assessment (TA) will be necessary for the submission of the planning application, it is considered that the impacts are significant enough that they will require inclusion in the ES. The cumulative impact and must be considered on the existing highway network, and any proposals and mitigation considered as part of the other development coming forward.

Further advice on the scope of the TA can be provided and agreed as part of pre-application advice.

Landscape and Views

The cumulative and standalone introduction of 800 homes and associated infrastructure amongst the rest of the MKE allocation within the rural area is considered likely to give rise to significant landscape and visual impacts. MKE is likely to be visible from various vantage points due to the typography of the land either side of the M1, and have a significant impact on the character of the area. A Landscape Visual Impact Assessment (LVIA) should be prepared at an early stage to inform the design process and baseline photography carried out in December to February to achieve satisfactory baseline visual data and consider worst case scenarios. Further scope on LVIA information required can be agreed as part of the pre-application process, for inclusion in the ES.

Air Quality, Noise and Vibration - construction

Construction of this scale is considered likely to cause significant impacts to the existing residents, through both scale, location and duration of impact. An assessment of the impacts on air quality, dust, noise and vibration during the construction period should be included in the ES.

Other issues

Air Quality, Noise and Vibration - operational

Operationally it is considered unlikely that any existing sources of noise (such as the A422), odour etc would be likely to have significant adverse impacts in the long term, provided an

appropriate layout is proposed. These topics should be covered as part of the planning application, but are not likely to be significantly enough to require coverage as part of the ES.

Drainage

While it is identified that part of the site is within flood zone 2 and 3, it is identified that no built form is proposed in these areas. Provided this remains the case for the application, it is considered that flood risk and drainage do not need to form part of the scope of the Environmental Statement.

Climate Change and Resilience

The Council has made a commitment to reducing the borough's contribution to climate change and encouraging sustainability throughout the borough. Therefore, issues of sustainability, carbon neutrality and climate change are considered important topics that should be fully assessed in the application, but given the size of the scheme are not considered necessary for inclusion in the ES.

Socio-Economic

As the proposal is part of MKE which is to effectively become a separate settlement in the borough, any considerations of socio-economic factors should be considered in light of the rest of the MKE allocation, and integration between the two development being brought forward by the separate landowners/developers. Provided that planning policy is complied with in terms of mix, tenure and type of housing, and some coordination is had between parties on the masterplanning work, it is considered that socio-economic impacts would not be significant and not require inclusion as part of an ES. Evidence should be provided within the application that the education/local centre provision proposed is sufficient for the likely future demographic make-up of the site, with consideration of the provision in the remainder of MKE.

Ground Conditions and Contamination

Consideration needs to be given the previous sand & gravel extraction on the site and an assessment made of the ground conditions as part of the application process. Provided these assessments are carried out and any mitigation requirements followed, the impacts are unlikely to be significant for inclusion as a topic in the ES.

Historic built environment

Aside from the archaeological assets, there are no designated built heritage assets which are likely to be significantly impacted by this development. However, it is likely a Heritage Statement will be required to clarify the distance to the nearest listed buildings, and the potential impacts on those assets should be considered as part of the LVIA work.

Cumulative Impacts

It is noted that your submission states the "remaining parts of the wider allocation, including the allocation wide infrastructure application for MKE, will be coming forward at a later stage," but as set out above, it is considered highly necessary to consider the cumulative impacts of the whole of MKE as part of the ES. It is expected that both main applications by the main landowners will be submitted in the first quarter of 2021, both are currently subject

to Scoping Opinion, and are in pre-application discussions. While the construction periods may well be different due to the varying scale of the developments, the timings will not be so significantly different that the impacts should not be considered cumulatively.

Conclusion
In taking account of the information provide, considering the specific characteristics of the development and the environmental features likely to be significantly affected by the development, it is considered that the key environmental issues have been identified within the Scoping Report submitted, but that additional topics require coverage in an Environmental Statement. The approach to the Environment Statement to be submitted with the planning application is therefore considered acceptable, subject to the additional topics and comments above.

Further discussions regarding the other supporting information required for the application (in accordance with the Council's Local Validation List and other national validation requirements) can be discussed during pre-application discussions. You are encouraged to review the consultee comments received, which contain specific and generic advice, and are available on the Council's public access website.

Yours faithfully,

Elizabeth Verdegem
Team Leader - West Team
Development Management

Countersigned by



Paul Keen
Team Leader - East Team
Development Management

For and on behalf of the Head of Planning

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Appendix 6.1

Gazetteer of Heritage Assets

APPENDIX 6.1 GAZETTEER OF HERITAGE ASSETS AND RECORDING EVENTS WITHIN THE ASSESSMENT AREA

Identifier	Triskelion Unique Identifier	Status	Asset Type	Grid Reference	Description
MKHER ID: MMK934	2	Non-Designated	Monument	Grid Ref: Centred SP 87448 42218 (219m by 252m)	West Caldecote Iron Age enclosures. OCCUPATION SITE (Early Iron Age to Roman - 800 BC to 409 AD). Geophysical survey carried out during M1 widening revealed a substantial settlement with a number of features, including annular and rectilinear enclosures. (1) Geophysical survey carried out during M1 widening revealed a substantial settlement with a number of features, including annular and rectilinear enclosures. Probably of more than one period, shapes suggest ia/RB date. Associated Events: EMK761 Quarry West of Caldecotte Farm Area A (Event - Survey); EMK915 Willen Road (Caldecote) gravel quarry (Event - Intervention).
MKHER ID: MMK933	3	Non-Designated	Monument	Grid Ref: SP 87726 42101 (point)	West Caldecote Ring ditch. RING DITCH (Early Neolithic to Late Bronze Age - 4000 BC to 701 BC). Ring ditch visible on AP and various linear feature. (1) Ring ditch visible on AP and various linear features (bib1 - see cass 2052) (2) No trace of features on the ground (bib2- see cass 2052) (3) Ring ditch and linear features plotted at 1: 2500 (NMR method) (bib3- see cass 2052) (4) Later APs reveal additional features plotted at 1: 2500 (paper-strip method) (bib4- see cass 2052). Associated Events: EMK762 Quarry West of Caldecotte Farm Area b (Event - Survey).
MKHER ID: MMK503	4	Non-Designated	Find Spot	Grid Ref: SP 87850 41850 (point)	M1 widening evaluation site "B". FINDSPOT (Early Neolithic to Late Bronze Age - 4000 BC to 701 BC). Fieldwork for M1 widening scheme located a thin scatter of Late Neolithic/Early Bronze Age flint at SW End of this field. (1) Fieldwork for M1 widening scheme located a thin scatter of Late Neolithic/Early Bronze Age flint at SW End of this field. Finds consist of flakes (source 5) (2) Further work: 6 test pits were excavated. No features were found, and no artefacts recovered (source 6). Related Monuments: MMK502 Valley of River Lovat. Associated Finds: FMK5008 FLAKE. Associated Events: EMK401 M1 widening evaluation site "B" (Event - Intervention).
MKHER ID: MMK502	5	Non-Designated	Monument	Grid Ref: SP 87950 41900 (point)	Valley of River Lovat. Ring ditch with associated rectangular enclosure with rounded ends visible as cropmarks. RING DITCH (Early Neolithic to Late Bronze Age - 4000 BC to 701 BC). Ring ditch with associated rectangular enclosure with rounded ends visible as cropmarks. (1) Ring ditch with associated rectangular enclosure with rounded ends visible as cropmarks (source1-2) (2) Ring ditch, rectangular enclosure with rounded ends 80m to W,& 2nd possible enclosure to SW. Plotted at 1: 2 500 (NMR method) (source 3) (3) No trace of ring ditch on ground. It was circa 11m in diameter. Other features on MP (source 4). Related Monuments: MMK503 M1 widening evaluation site "B". Associated Finds: EMK559 M1 widening - OS Parcel 0023 (Event - Survey); EMK401 M1 widening evaluation site "B" (Event - Intervention).

Identifier	Triskelion Unique Identifier	Status	Asset Type	Grid Reference	Description
MKHER ID: MMK992	6	Non-Designated	Find Spot	Grid Ref: SP 87310 42520 (point)	Newport Pagnell Bypass. FINDSPOT (Early Mesolithic to Late Neolithic - 10000 BC to 2201 BC). 1) Blade, punch struck, found approx. 600m WNW of Caldecote Farm during fieldwalking on line of bypass (bib1). Associated Finds: FMK5354 BLADE (>1).
MKHER ID: MMK3965	7	Non-Designated	Find Spot	Grid Ref: SP 88180 41630 (point)	M1 widening evaluation site "A". FINDSPOT (Early Neolithic to Late Bronze Age - 4000 BC to 701 BC). (1) Fieldwork for M1 widening scheme located a scatter of Late Neolithic/Early Bronze age flint at the S E end of this field. Finds consist of flakes & cores (source 1) (2) Further work: 12 test pits failed to reveal any features. 11 further flakes were found, in no concentration (source 2). Associated Finds: FMK2129 ASSEMBLAGE FLINT; FMK3558 FLAKE FLINT; FMK3559 CORE FLINT. Associated Events: EMK400 M1 widening evaluation site "A", Field 1032 (Event - Intervention).
MKHER ID: MMK504	8	Non-Designated	Monument	Grid Ref: SP 88200 41920 (point)	Valley of River Lovat. SITE (Early Neolithic to Late Bronze Age - 4000 BC to 701 BC). (1) Visible as cropmark on AP at NGR (source 1) (linear feature nearby - see 01: 000). Related Monuments: MMK505 Valley of River Lovat.
MKHER ID: MMK505	9	Non-Designated	Monument	Grid Ref: SP 88220 41950 (point)	Valley of River Lovat. LINEAR FEATURE (Unknown date). 1) Straight linear feature visible as cropmark on APs. Plotted at 1: 2500 (nmr method) (source 2). Related Monuments: MMK504 Valley of River Lovat.
MKHER ID: MMK930	10	Non-Designated	Monument	Grid Ref: SP 88400 41860 (point)	Valley of River Lovat. RING DITCH (Early Neolithic to Late Bronze Age - 4000 BC to 701 BC). (1) Ring ditch with associated linear features visible on AP (bib1-2) (2) Linear features and part of possible square/rectangular enclosure plotted (with ring ditch) at 1: 2500 (NMR method) (bib3) (3) No trace on ground. sub-rect enclosure by ring ditch. L-shaped ditch crosses ring and apparently overlays it (bib4). Related Monuments: MMK929 Valley of River Lovat.
MKHER ID: MMK929	11	Non-Designated	Monument	Grid Ref: SP 88444 41894 (point)	Valley of River Lovat. RING DITCH (Early Neolithic to Late Bronze Age - 4000 BC to 701 BC). Ring ditch and associated linear features visible on AP. (1) Ring ditch and associated linear features visible on APs (bib1-2). (2) Ring ditch with central hole and associated (?) Linear features and part of enclosure (see 01: 000). plotted at 1: 2500 (NMR method) (bib3) (3) No trace of ring ditch or enclosures on the ground; an L- shaped ditch crosses ring and overlays it (bib4). Related Monuments: MMK930 Valley of River Lovat.
MKHER ID: MMK469	12	Non-Designated	Find Spot	Grid Ref: SP 88000 43000 (point)	Newport Pagnell Parish. FINDSPOT (Neolithic - 4000 BC to 2201 BC). 1) One ground celt of greenstone, exceptionally large, of oval outline with boldly convex faces, sharp sides and conical buttend (source 1-2). Associated Finds: FMK4987 AXEHEAD.

Identifier	Triskelion Unique Identifier	Status	Asset Type	Grid Reference	Description
MKHER ID: MMK982	13	Non-Designated	Find Spot	Grid Ref: SP 88120 42700 (point)	Caldecote Farm. FINDSPOT (Early Neolithic to Late Bronze Age - 4000 BC to 701 BC). (1) During systematic fieldwalking on line of Newport Pagnell bypass, various finds (all flints) made, mainly in E part of search area (see CAS record map) (finds: 00: 001-008) (bib1) (2) Report and discussion of find S (bib2) (3) Portion of site excavated prior to road works. Results negative (see notes, plans etc filed) (bib3). Associated Finds: FMK5344 FLAKE (>1) FLINT. Associated Events: EMK399 Caldecote Farm flint scatter (Event - Survey).
MKHER ID: MMK983	13	Non-Designated	Find Spot	Grid Ref: SP 88120 42700 (point)	300 m. WNW Caldecote Mill. FINDSPOT (Early Neolithic to Late Bronze Age - 4000 BC to 701 BC). (1) Found during fieldwalking: 4 short end/round scrapers (bib1) (2) Illus and further discussion (bib2). Associated Finds: FMK5345 SCRAPER (TOOL).
MKHER ID: MMK984	13	Non-Designated	Find Spot	Grid Ref: SP 88120 42700 (point)	300 m. WNW Caldecote Mill. FINDSPOT (Early Neolithic to Late Bronze Age - 4000 BC to 701 BC). (1) Specimen is fragmentary and the retouch, though bifacial, is somewhat casual. Illus (bib1-2). Associated Finds: FMK5346 UNIDENTIFIED OBJECT.
MKHER ID: MMK985	13	Non-Designated	Find Spot	Grid Ref: SP 88120 42700 (point)	300 m. WNW Caldecote Mill. FINDSPOT (Early Neolithic to Late Bronze Age - 4000 BC to 701 BC). (1) Chopping tool: an adze implement with retouch along 1 edge to produce a wedge. Illus (bib2). Associated Finds: FMK5347 ADZE.
MKHER ID: MMK986	13	Non-Designated	Find Spot	Grid Ref: SP 88120 42700 (point)	300 m. WNW Caldecote Mill. FINDSPOT (Early Neolithic to Late Bronze Age - 4000 BC to 701 BC. (1) Formed by careful working along 1 edge of a flake to leave a notch. Illus. (bib1-2). Associated Finds: FMK5348 FLAKE.
MKHER ID: MMK987	13	Non-Designated	Find Spot	Grid Ref: SP 88120 42700 (point)	300 m. WNW Caldecote Mill. FINDSPOT (Early Neolithic to Late Bronze Age - 4000 BC to 701 BC. 1) Belong to the common partially flaked variety (pps1960 26, 216). Illus (bib1-2). Associated Finds: FMK5349 UNIDENTIFIED OBJECT.
MKHER ID: MMK988	13	Non-Designated	Find Spot	Grid Ref: SP 88120 42700 (point)	Caldecote Farm. FINDSPOT (Early Neolithic to Late Bronze Age - 4000 BC to 701 BC). (1) Small blade with slight flat edge retouch. Illus (bib1-2) (2) From subsequent excavation; 1 utilised blade; 1 blade (plotted on filed plan) (bib3). Associated Finds: FMK5350 BLADE (>1)/ Associated Events: EMK399 Caldecote Farm flint scatter (Event - Survey).
MKHER ID: MMK989	13	Non-Designated	Find Spot	Grid Ref: SP 88120 42700 (point)	Caldecote Farm. FINDSPOT (Early Neolithic to Late Bronze Age - 4000 BC to 701 BC). (1) 1 retouched flake; 5 other flakes, some with edge damage/retouch; 16 waste flakes. Illus (bib1-2) (2) From subsequent excavation: 3 struck flakes (plotted on filed plan) (bib3). Associated Finds: FMK5351 FLAKE. Associated Events: EMK399 Caldecote Farm flint scatter (Event - Survey).

Identifier	Triskelion Unique Identifier	Status	Asset Type	Grid Reference	Description
MKHER ID: MMK990	13	Non-Designated	Find Spot	Grid Ref: SP 88120 42700 (point)	Caldecote Farm. FINDSPOT (Early Iron Age to Roman - 800 BC to 409 AD). (1) From excavation of site: 1 IA/Belgic? Sherd; 1 RB Sherd; 1 med? Sherd; 2 med bowl rims; 1 post-med Sherd (plotted on filed plan) (bib3). Associated Finds: FMK5352 POT. Associated Events: EMK399 Caldecote Farm flint scatter (Event - Survey).
MKHER ID: MMK5920	14	Non-Designated	Monument	Grid Ref: SP 88038 42405 (point)	Caldecote building circa 1815 (2). BUILDING (19th Century - 1801 AD to 1900 AD). Associated Events: EMK785 Caldecote Cottage, Caldecote (Event - Intervention).
MKHER ID: MMK93	15	Non-Designated	Monument	Grid Ref: SP 88010 42380 (point)	Caldecote Moat (1). MOAT (Medieval - 1066 AD to 1539 AD). (1) Small irregular shaped moat & part of deserted medieval village. (b4). (2) The 2"moats" are remains of manorial enclosures, part of a manorial complex. (Details of dimensions, condition etc. of these structures).
MKHER ID: MMK91	16	Non-Designated	Monument	Grid Ref: SP 88029 42288 (point)	Caldecote, Newport Pagnell. DESERTED SETTLEMENT (Medieval - 1066 AD to 1539 AD). (1) Caldecote noted as a deserted medieval village, with small irregular-shaped moat at SP 881 424 & a larger rectangular moat at SP 883 423 (Sources 4). (2) There is no evidence of house platforms or streets; the remains suggest a manorial complex rather than a village site.
MKHER ID: MMK5922	17	Non-Designated	Landscape	Grid Ref: SP 88203 42446 (point)	Caldecote: Avenue of trees/ track. TREE AVENUE (Undated).
MKHER ID: MMK87	18	Non-Designated	Site	Grid Ref: SP 88170 42290 (point)	Caldecote, Newport Pagnell. DESERTED SETTLEMENT (Medieval - 1066 AD to 1539 AD). Site of a medieval hamlet identified through soil marks on an aerial photograph. (1) Opinions differ on the exact nature of this site. A deserted medieval village., with 2 moats (b4) (2) or a small manorial complex with associated buildings, the "moats" being the remains of manorial enclosure (b5). Related Monuments: MMK88 Caldecote, Newport Pagnell; MMK89 Caldecote, Newport Pagnell.
MKHER ID: MMK5921	19	Non-Designated	Monument	Grid Ref: SP 88194 42303 (point)	Caldecotte buildings circa 1815 (3). BUILDING (Undated). Building shown on 1815 2" = 1 mile OS map.
MKHER ID: MMK7665	20	Non-Designated	Monument	Grid Ref: SP 88294 42379 (point)	Caldecote manorial site - NW pond. POND (16th Century to 17th Century - 1501 AD to 1700 AD); POND (17th Century to 18th Century - 1601 AD to 1800 AD). Filled-in linear pond 120m by 6-9m shown on the 1st edition OS Map. Crossed a bridge for straight access to Willen Road. Linked by a possible sluice to the river. Related Monuments: MMK5918 Caldecote Manorial Site. Associated Events: EMK751 Moat Cottage, Caldecote (Event - Intervention).

Identifier	Triskelion Unique Identifier	Status	Asset Type	Grid Reference	Description
MKHER ID: MMK90	21	Non-Designated	Place	Grid Ref: SP 88332 42322 (point)	Caldecote, Newport Pagnell. MANOR (Medieval - 1066 AD to 1539 AD); MANOR (18th Century - 1701 AD to 1800 AD). Caldecote mentioned in Domesday book, & there are many references to manor & mill in medieval period (b4). (1) 2 fees at Caldecote at Domesday, which later formed Caldecote Manor. Manor house existed here in 1426 & 1750; Caldecote Farm stands on site? (b3). (2) Was there formerly a mansion at Caldecote? (b1).
MKHER ID: MMK5919	22	Non-Designated	Monument	Grid Ref: SP 88310 42331 (point)	Caldecote building circa 1815 (1). BUILDING (19th Century - 1801 AD to 1900 AD).
MKHER ID: MMK7662	23	Non-Designated	Monument	Grid Ref: SP 88348 42281 (point)	Caldecote manorial site - SW Pond. POND (16th Century to 17th Century - 1501 AD to 1700 AD); POND (17th Century to 18th Century - 1601 AD to 1800 AD). Filled-in pond 80m x 10m shown on 2005 digital aerial photograph. Related Monuments: MMK5918 Caldecote Manorial Site.
MKHER ID: MMK7664	24	Non-Designated	Monument	Grid Ref: SP 88327 42355 (point)	Caldecote manorial site - internal pond. POND (16th Century to 17th Century - 1501 AD to 1700 AD); POND (17th Century to 18th Century - 1601 AD to 1800 AD). Probable filled-in pond 22m by 11m shown on 2005 digital aerial photograph. Related Monuments: MMK5918 Caldecote Manorial Site.
MKHER ID: MMK92	25	Non-Designated	Monument	Grid Ref: SP 88335 42340 (point)	Caldecote, Newport Pagnell. MANOR (Medieval - 1066 AD to 1539 AD). (1) Site appears to have been a small manorial complex with associated buildings, rather than a deserted medieval village. The limit of ridge & furrow gives some indication of the extent. Are the 2 "moats" remains of manorial enclosures?
MKHER ID: MMK5918	26	Non-Designated	Monument	Grid Ref: SP 88351 42328 (point)	Caldecote Manorial Site. COUNTRY HOUSE (16th Century to 17th Century - 1501 AD to 1700 AD); COUNTRY HOUSE (17th Century to 18th Century - 1601 AD to 1800 AD). Early 19th century maps show an attached tree lined avenue on the north which suggests a significant post medieval house on the site. Ponds are probably elements of an ornamental garden. (1) 2004 evaluation showed that the north pond was 9m wide and 1.75m deep (event 884). Related Monuments: MMK7661 Caldecote manorial site - SE Pond; MMK7662 Caldecote manorial site - SW Pond; MMK7663 Caldecote manorial site - NE Pond; MMK7664 Caldecote manorial site - internal pond; MMK7665 Caldecote manorial site - NW pond; MMK7671 Caldecote Manorial Site – Pond. Associated Events: EMK751 Moat Cottage, Caldecote (Event - Intervention).
MKHER ID: MMK7663	27	Non-Designated	Monument	Grid Ref: SP 88353 42365 (point)	Caldecote manorial site - NE Pond. POND (16th Century to 17th Century - 1501 AD to 1700 AD); POND (17th Century to 18th Century - 1601 AD to 1800 AD). Filled-in pond 17m by 24m situated adjacent to the river. Shown as a grass mark on 2005 Aerial photograph. Related Monuments: MMK5918 Caldecote Manorial Site.

Identifier	Triskelion Unique Identifier	Status	Asset Type	Grid Reference	Description
MKHER ID: MMK88	28	Non-Designated	Find Spot	Grid Ref: SP 88420 42330 (point)	Caldecote, Newport Pagnell. FINDSPOT (Medieval - 1066 AD to 1539 AD). Dredged material from river included post-medieval pottery (stoneware & earthenware), 5 medieval sherds, part of medieval green glazed tile, clay pipe bowls etc.(b6). (1) When river was dredged, workmen collected C13th-C18th pottery (b4). Related Monuments: MMK87 Caldecote, Newport Pagnell. Associated Finds: FMK5174 POT.
MKHER ID: MMK89	28	Non-Designated	Find Spot	Grid Ref: SP 88420 42330 (point)	Caldecote, Newport Pagnell. FINDSPOT (Iron Age - 800 BC to 42 AD). (1) Belgic rim sherd from riverbank (SP 8842 4233). Found with medieval & post-medieval pottery etc.(b6). MMK87 Caldecote, Newport Pagnell. Associated Finds: FMK5175 POT.
MKHER ID: MMK7661	29	Non-Designated	Monument	Grid Ref: SP 88402 42276 (point)	Caldecote manorial site - SE Pond. POND (16th Century to 17th Century - 1501 AD to 1700 AD); POND (17th Century to 18th Century - 1601 AD to 1800 AD). Pond 56m by 10m linked to river on north. Appears to form SE boundary of the manorial site. Related Monuments: MMK5918 Caldecote Manorial Site.
MKHER ID: MMK3423	30	Non-Designated	Monument	Grid Ref: SP 88220 42075 (point)	400 m. SE of Caldecote Farm. MOAT (Medieval - 1066 AD to 1539 AD). Possible moated site visible on aerial photograph, ridge and furrow appears to continue over it. (1) Possible moated site visible on MKDC APs. Ridge & furrow appears to continue over it. Plotted at 1:2500 (paper-strip method) (bib1) (2) Nothing visible on surface of field of young crop (bib2).
MKHER ID: MMK454	31	Non-Designated	Find Spot	Grid Ref: SP 88400 42600 (point)	River Ouzel, Caldecote Mill. FINDSPOT (Roman - 43 AD to 409 AD). (1) Roman pottery (00: 001) (2) Quern fragment (00: 002) Indicate a small riverside dwelling near the ford (of Viatores Road 175, CASS 04864). Find spot indicated by Mr M (MKDC) at NGR (source 3-4). Related Monuments: MMK455 River Ouzel, Caldecote Mill; MMK456 River Ouzel, Caldecote Mill; MMK457 River Ouzel, Caldecote Mill; MMK458 River Ouzel, Caldecote Mill. Associated Finds: FMK4976 POT.
MKHER ID: MMK1077	32	Non-Designated	Monument	Grid Ref: SP 88430 42650 (point)	Caldecote Mill, Newport Pagnell. WATERMILL (18th Century to Victorian - 1701 AD to 1900 AD). Watermill shown on 1788 Map. Sluices, millrace, leat still exist. (1) Map 1788 shows watermill approx at NGR (bib4) (2) Maps c1814& 1825 mark "Caldecote mill" (watermill) approx 1at NGR (bib6) (3) Very ancient mill at Caldecote (bib7(1862)) (4) Mill ceased working c1842 (bib10) (5) Destroyed by fire (bib8) (6) Early C20 house - on site of former millhouse? Sluices, millrace, leat still exist (bib11(1980)). Related Monuments: MMK1078 Caldecote Mill; MMK1079 Caldecote Mill.

Identifier	Triskelion Unique Identifier	Status	Asset Type	Grid Reference	Description
MKHER ID: MMK1078	32	Non-Designated	Place	Grid Ref: SP 88430 42650 (point)	Caldecote Mill. WATERMILL (Medieval - 1066 AD to 1539 AD); WATERMILL (17th Century - 1601 AD to 1700 AD). (1) Mill worth & son Domesday manor of Caldicote (bib1) (2) Possession of Tickford priory (bib3) (3)"Greatly in decay" at dissolution (bib8) (4) Documentary refs 1578 indicate Caldicote & Willen mills under 1 roof (bib2) (5) Estimate for rebuilding whole mill, 1680 (bib1) (6) NGR to site of "Caldicote mill" (bib11). Related Monuments: MMK1077 Caldecote Mill.
MKHER ID: MMK1079	32	Non-Designated	Place	Grid Ref: SP 88430 42650 (point)	Caldecote Mill. WATERMILL (18th Century - 1701 AD to 1800 AD). (1) In 1757 Wlm Backwell acquired -- the mill & land in Caldicote granted to Tickford priory (bib8) (2) Posse comitatus (1798) records 1 watermill at Newport Pagnell (but see CASS 4874) (bib5) (3) NGR to "Caldicote mill" (bib11).Related Monuments: MMK1077 Caldecote Mill.
MKHER ID: MMK991	33	Non-Designated	Find Spot	Grid Ref: SP 88310 42740 (point)	150 m. NW of Caldecote Mill. FINDSPOT (Early Medieval to Medieval - 410 AD to 1539 AD). 1) In systematic fieldwalking finds made were: approx 70 sherds, mostly? Potterspury type with light exterior, grey sandwich core; includes 4 rims, slashed med handle. Also 3 sherds in soapy fabric, ?leached shell, 1 with St.Neots style rim & radiate stamped on flat top . Found in checking line of by-pass (bib1). Associated Finds: FMK5353 POT.
MKHER ID: MMK3823	34	Non-Designated	Monument	Grid Ref: SP 88900 42260 (point)	600 m. SE Caldecote Mill. CURVILINEAR ENCLOSURE (Unknown date). Possible subcircular or semi-circular enclosure with double ditch. 1) Possible subcircular or semi-circular enclosure with double ditch visible on AP, adjacent to River Ouzel, circa 600m SE. Of Caldecote Mill (source 1).
MKHER ID: MMK7918	35	Non-Designated	Monument	Grid Ref: SP 88798 43046 (point)	London Road. DITCH (Early Iron Age to Roman - 800 BC to 409 AD). Gully with abraded late Iron Age / Roman pottery. Associated Events: EMK195 London Road (Event - Intervention).
MKHER ID: MMK978	36	Non-Designated	Monument	Grid Ref: SP 89060 42590 (point)	300 m. SE of Wepener. CURVILINEAR ENCLOSURE (Unknown date). (1) Oval ring visible as cropmark on AP. OS 1: 10000 map indicates site to be on the crest of a slight hill (bib1) (2) Plotted at 1: 2500 (paper-strip method) (bib2).
MKHER ID: MMK3385	37	Non-Designated	Place	Grid Ref: SP 89100 42600 (point)	Mill Field. WINDMILL (18th Century to Victorian - 1701 AD to 1900 AD). (1) Windmiller, John Richardson, at Newport Pagnell mentioned 1709 (bib1).
MKHER ID: MMK3400	38	Non-Designated	Monument	Grid Ref: SP 89000 42450 (point)	London Road. BRICKWORKS (19th Century to 20th Century - 1801 AD to 2000 AD). Site of 19th century brick works.

Identifier	Triskelion Unique Identifier	Status	Asset Type	Grid Reference	Description
MKHER ID: MMK3636	39	Non-Designated	Find Spot	Grid Ref: SP 88800 43200 (point)	Newport Pagnell?. FINDSPOT (Palaeolithic - 500000 BC to 10001 BC). (1) Finished axehead with soft hammer technique. Straight profile, thick cross section. Mottled ochreous patina. Lightly rolled. Found ?Newport Pagnell circa1900 (source 1) (2) Notes axe & pal flake from Newport Pagnell (source 2) (3) This& Stantonbury axe (cass 02200) are only 2 from Ouse. Mid acheulian. Probably from Bullard's gravel pit at NGR (source 3). Related Monuments: MMK3637 Newport Pagnell?. Associated Finds: FMK2059 AXEHEAD.
MKHER ID: MMK3637	39	Non-Designated	Find Spot	Grid Ref: SP 88800 43200 (point)	Newport Pagnell?. FINDSPOT (Palaeolithic - 500000 BC to 10001 BC). (1) 1 unretouched flake (source 2). Related Monuments: MMK3636 Newport Pagnell?. Associated Finds: FMK2060 FLAKE.
MKHER ID: MMK455	40	Non-Designated	Find Spot	Grid Ref: SP 88400 42600 (point)	River Ouzel, Caldecote Mill. FINDSPOT (Roman - 43 AD to 409 AD). Roman pottery including grey and calcite gritted wares. (1) Rim sherds of small jar, hard grey/black ware, cordon at neck base (2) Pie-dish, grey ware, scribed lines on body; both C2nd (3) Large bowl/jar sherd, wide flattened rim, projecting& rounded on outside, projecting to sharp edge internally, drab calcite gritted ware, Romano British? (4) Found by Mr B (source 2) (5) At NGR (source 4). MMK454 River Ouzel, Caldecote Mill. Associated Finds: FMK4977 POT.
MKHER ID: MMK456	40	Non-Designated	Find Spot	Grid Ref: SP 88400 42600 (point)	River Ouzel, Caldecote Mill. FINDSPOT (Roman - 43 AD to 409 AD). (1) Fragment of a puddingstone quern (2) Romano British pottery found with 1) (3) A small lead weight, pierced, net sinker? (4) Found at NGR by Mr B (source 2-4). Related Monuments: MMK454 River Ouzel, Caldecote Mill. Associated Finds: FMK4978 QUERN.
MKHER ID: MMK457	40	Non-Designated	Monument	Grid Ref: SP 88400 42600 (point)	River Ouzel, Caldecote Mill. FORD (Roman - 43 AD to 409 AD). (1) Precise position of original ford across Ouzel (on Viatores Road 175) is known, near to which Roman pottery & a quern indicate a small riverside dwelling. (map shows location) (source 3) (2) For full details of Roman Road 175 see CASS 04864. Related Monuments: MMK454 River Ouzel, Caldecote Mill.
MKHER ID: MMK458	40	Non-Designated	Find Spot	Grid Ref: SP 88400 42600 (point)	River Ouzel, Caldecote Mill. FINDSPOT (Medieval - 1066 AD to 1539 AD). FINDSPOT (18th Century - 1701 AD to 1800 AD). (1) Sherds of medieval pottery: rim sherd of cooking pot & bowl; base of jug (2) C18th pottery. Found by Mr B at River Ouzel, Caldecote Mill, White's Manor site (source 1). Related Monuments: MMK454 River Ouzel, Caldecote Mill. Associated Finds: FMK4979 POT.

Identifier	Triskelion Unique Identifier	Status	Asset Type	Grid Reference	Description
MKHER ID: MMK6063	41	Non-Designated	Monument	Grid Ref: SP 88669 43249 (point)	Newport Pagnell Union Workhouse (Renny Lodge Hospital). WORKHOUSE (19th Century to 20th Century - 1801 AD to 2000 AD). Workhouse constructed after 1836 to the designs of William P Roote in order to accommodate 300 inmates. (1) Workhouse constructed after 1836 to the designs of William P Roote in order to accommodate 300 inmates. The front section of the main building comprised of two storey ranges around a rectangular courtyard. At the rear was a single storey range forming the east side of the second semi-circular courtyard. Served 45 parishes. (bib 22834) (2. Workhouse later beacme Renny Lodge Hospital which closed in 1992 [bib 22835]. Associated Events: EMK854 Renny Lodge Hospital / workhouse (Event - Survey).
MKHER ID: MMK7674	42	Non-Designated	Place	Grid Ref: SP 88029 42287 (point)	Caldecotte Green. VILLAGE GREEN (18th Century to 20th Century - 1701 AD to 2000 AD). Maps from 1760 onwards show a triangular area with ponds and several buildings on the east and west sides in the C18th century. By the C20th century only 1 building was left on the east.
MKHER ID: EMK860	43	Event – Intervention – Trial Trench	N/A	Grid Ref: SP 87580 42260 (point)	Willen Road (Caldecote) gravel quarry (05/10/2005 - 04/11/2005). Trenches revealed a concentration of occupation on the west of the site. This was dated from the later pre-Roman Iron Age to the 4th century AD and comprised a series of ditched enclosures containing pits, gullies, slots, postholes and a possible pond. Trial trench evaluation of 5% of 18ha site. At least 3 potential circular structures were identified. The features and finds recovered suggest a Romano-British farmstead or hamlet. Additionally, a probable prehistoric ring ditch was revealed in the south east of the site. This was part excavated but no finds were recovered. Traces of ridge and furrow and later field boundaries were also revealed.
MKHER ID: EMK915	44	Event – Intervention – Excavation	N/A	Grid Ref: SP 87587 42269 (point)	Willen Road (Caldecote) gravel quarry (27/03/2006 - 01/01/2006). 2nd phase of excavations revealed part of an enclosed settlement dating from the late Iron Age to late Roman periods which included a series of enclosures, a large pond and a cremation cemetery. Associated monuments: MMK934 West Caldecote Iron Age enclosures (Monument MMK934)
MKHER ID: EMK761	45	Event – Survey - Magnetometry	N/A	Grid Ref: SP 87470 42270 (point)	Quarry West of Caldecotte Farm Area A (01/03/2004 - 01/03/2004). Magnetometer survey revealed enclosures further to the east of the Iron Age settlement site identified during M1 widening evaluation. Associated monuments: MMK934 West Caldecote Iron Age enclosures (Monument MMK934)

Identifier	Triskelion Unique Identifier	Status	Asset Type	Grid Reference	Description
MKHER ID: EMK762	46	Event – Survey - Magnetometry	N/A	Grid Ref: SP 87720 42120 (point)	Quarry West of Caldecotte Farm Area B (01/03/2004 - 01/03/2004). Magnetometer survey revealed the ring ditch identified on aerial photographs but there is a 5m variation between the two results. Associated monuments: MMK933 West Caldecote Ring ditch (Monument MMK933)
MKHER ID: EMK785	47	Event – Intervention – Watching Brief	N/A	Grid Ref: SP 88658 42411 (point)	Caldecote Cottage (11/10/2004 - 11/10/2004). Watching Brief of the foundation trenches to an existing building revealed up to 0.6m of topsoil and loam on top of River Terrace gravel comprising mid-orange sand and coarse flint gravel. No archaeological features noted. Associated monuments: MMK5920 Caldecote building circa 1815 (2) (Monument MMK5920)
MKHER ID: EMK1118	48	Event – Interpretation – Desk-Based Assessment	N/A	Grid Ref: SP 88006 42164 (point)	Land south of Caldecote Farm, Willen Road (01/08/2010 - 01/08/2010). Desk-based assessment of area of proposed aggregate extraction, concluding that the potential for the survival of archaeological remains is medium to high, as significant evidence of prehistoric activity, Bronze Age burial and Iron age and Roman occupation have been found close by. Two Bronze Age ring ditches and other possible features have been identified within the site boundaries from aerial photography.
MKHER ID: EMK1119	49	Event – Survey - Magnetometry	N/A	Grid Ref: SP 87930 42148 (point)	Land south of Caldecote Farm, Willen Road (01/09/2010 - 01/11/2010). A geophysical (magnetometer) survey of a 14 hectare site was carried out to the south of Caldecote Farm, on the north-east edge of Milton Keynes to inform proposals for gravel extraction. A geophysical (magnetometer) survey of a 14 hectare site was carried out to the south of Caldecote Farm, on the north-east edge of Milton Keynes to inform proposals for gravel extraction. Anomalies caused by former field boundaries, ridge and furrow ploughing, utility pipes and the re-alignment of Willen Road have been identified by the survey. A possible moated site previously identified on air photographs has not been located. No other anomalies of obvious archaeological potential have been identified. However, the increased level of magnetic variation and number of discrete anomalies in the area to the east of Caldecote Farm suggest that there may be buried remains associated with the former medieval settlement of Caldecote. On the basis of the geophysical survey the archaeological potential of the site as a whole is considered to be low but with a medium to high potential immediately east of Caldecote Farm.

Identifier	Triskelion Unique Identifier	Status	Asset Type	Grid Reference	Description
MKHER ID: EMK1120	50	Event – Intervention – Trial Trench	N/A	Grid Ref: SP 87960 42113 (point)	Land south of Caldecote Farm, Willen Road (04/10/2010 - 26/11/2010). Previous work (DBA and geophysical survey) on the site suggested that the medieval settlement of Caldecotte could extend into the northern part of the site. Evaluation trenching confirmed that remnants of medieval settlement are present at the north of Area A and that the centre and south formed part of the medieval open field system, findings consistent with the with the conclusions of the earlier phases of work. Recovered finds suggest that activity became less pronounced during the latter part of the medieval period and the north of Area A may have then been incorporated into an open agricultural landscape for a time until enclosed during the post medieval period. A small number of undated and dispersed postholes and shallow ditches were identified across the centre of the site. Their significance is currently uncertain. Distributed across the wider evaluation area were dispersed and undated shallow ditches indicative of the presence of a system of agricultural land division pre or post-dating the medieval open field system and pre-dating a final phase of post medieval enclosure. Limited prehistoric human activity may be defined by a relatively substantial pit within trench 32, which contained a small assemblage of flint artefacts of Neolithic/Bronze Age date. Attempts to radiocarbon date animal bone recovered from this pit were unsuccessful due to a paucity of extractable collagen.
MKHER ID: EMK1195	51	Event – Interpretation – Topographic	N/A	Grid Ref: SP 88100 42231 (point)	Land south of Caldecote Farm, Willen Road, Newport Pagnell (07/10/2013).
MKHER ID: EMK535	52	Event – Survey – Magnetometry	N/A	Grid Ref: SP 87550 42290 (point)	Land west of Caldecote Farm (01/01/2001 - 31/12/2001). Magnetometer survey revealed several clusters of magnetic anomalies which indicates a possible eastward extension of the known prehistoric settlement.
MKHER ID: EMK557	53	Event – Interpretation – Unsystematic Fieldwalking Survey	N/A	Grid Ref: SP 88150 41700 (point)	M1 widening - OS Parcel 0073 (Whitson Pasture, Pancoust) (14/01/1993 - 14/01/1993). 61 stints on 5 traverses. Late Neolithic/ Bronze scatter of 21 flints found at southern end of field.
MKHER ID: EMK558	54	Event – Interpretation – Unsystematic Fieldwalking Survey	N/A	Grid Ref: SP 87900 41850 (point)	M1 widening - OS Parcel 0001 (Calves Close) (14/01/1993 - 14/01/1993). 27 stints on 3 traverses. 4 flints found at N-W corner of field.

Identifier	Triskelion Unique Identifier	Status	Asset Type	Grid Reference	Description
MKHER ID: EMK751	55	Event – Intervention – Trial Trenching	N/A	Grid Ref: SP 88279 42341 (point)	Moat Cottage, Caldecote (25/03/2004 - 25/03/2004). The evaluation of an extension to Moat Cottage showed that the pond shown on early OS maps 9m wide and 1.75m deep. The earliest fill of the feature contained Victorian material. It is likely that the feature is part of a manorial complex. Associated monuments: MMK5918 Caldecote Manorial Site (Monument MMK5918); MMK7665 Caldecote manorial site - NW pond (Monument MMK7665).
MKHER ID: EMK399	56	Event – Interpretation – Unsystematic Fieldwalking Survey	N/A	Grid Ref: SP 88120 42700 (point)	Caldecote Farm flint scatter (01/10/1976 - 01/05/1977). Small sample of 26 struck flints found. Associated monuments: MMK982 Caldecote Farm (Find Spot MMK982); MMK988 Caldecote Farm (Find Spot MMK988); MMK989 Caldecote Farm (Find Spot MMK989); MMK990 Caldecote Farm (Find Spot MMK990).
MKHER ID: EMK400	57	Event – Intervention – Trial Trenching	N/A	Grid Ref: SP 88150 41650 (point)	M1 widening evaluation site "A", Field 1032 (01/11/1994 - 01/11/1994). 12 test pits did not reveal any sub-surface features. Associated monuments: MMK3965 M1 widening evaluation site "A" (Find Spot MMK3965).
MKHER ID: EMK401	58	Event – Intervention – Trial Trenching	N/A	Grid Ref: SP 87850 41830 (point)	M1 widening evaluation site "B" (01/11/1994 - 01/11/1994). 6 test pits did not encounter any archaeological deposits. Associated monuments: MMK502 Valley of River Lovat (Monument MMK502); MMK503 M1 widening evaluation site "B" (Find Spot MMK503).
MKHER ID: EMK765	59	Event – Intervention – Trial Trenching	N/A	Grid Ref: SP 88470 43230 (point)	London Road Allotments. The evaluation revealed some pits and gullies but these contained modern pottery.
MKHER ID: EMK854	60	Event – Interpretation – Building Survey	N/A	Grid Ref: SP 88680 43260 (point)	Renny Lodge Hospital / workhouse. The building survey of the demolished remains of Renny Lodge Hospital identified the original early C19th building plan, Enough remained to establish a coherent structural sequence comprising 3 phases of development and alteration.

Identifier	Triskelion Unique Identifier	Status	Asset Type	Grid Reference	Description
MKHER ID: EMK879	61	Event – Intervention – Trial Trenching	N/A	Grid Ref: SP 88680 43270 (point)	Renny Lodge. The excavation revealed at least 3 phases of late Iron Age/Romano-British activity on the site. Post-excavation assessment of fieldwork at former Renny Lodge Hospital site. The 1st phase (1st-mid 2nd C AD) comprised a field system and/or sub-square enclosure, with limited structural evidence including a shallow curvilinear ditch and a cobbled area. The 2nd phase was characterised by up to 3 ditched enclosures incorporated into the established field system. This was also the earliest phase for the roadside ditches defining the line of a Roman road and suggesting that the site comprised a small 2nd C roadside settlement. The final phase of Romano-British activity comprised re-cutting of some of the principal ditches and alterations to layout of features from phase 2. The medieval activity on the site chiefly comprised field ditches including a double ditched arrangement. The principal ditches of this phase may define a track or road perpendicular to the earlier Roman road.
MKHER ID: EMK195	62	Event – Intervention – Trial Trenching	N/A	Grid Ref: SP 88797 43049 (point)	London Road. Gully with abraded late Iron Age / Roman pottery.
MKHER ID: MMK5881		Non-Designated	Place	Grid Ref: Centred SP 90754 39016 (5835m by 9584m)	Woburn to Newport Pagnell Turnpike. TOLL ROAD (18th Century to Victorian - 1701 AD to 1900 AD). Woburn to Newport Pagnell Turnpike 1728. (1) The Woburn to Newport Pagnell Turnpike was set up in 1728 and added to the Hockcliffe to Woburn Trust. It later became the Northampton and Newport Pagnell Trust which existed until 1871. There were gates at Broughton and on the the south side of the Iron Bridge, Newport Pagnell. This was part of the main road from London to Manchester via Derby (2) Passes through the parishes of Woburn Sands; Wavendon; Broughton; Moulsoe; Newport Pagnell £) NGR given for point to SE of Broughton. Related Monuments: MMK6066 London End cottage 3.

dynamic development solutions ™

Appendix 6.2

Geoarchaeological Desk-based Assessment

Geoarchaeology

ARCA

January 2021

Report Number: 2021-5

LAND EAST OF WILLEN ROAD, NEWPORT PAGNELL: GEOARCHAEOLOGICAL DESK-BASED ASSESSMENT

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CONTENTS

Contents 3
Figures 3
Summary 4
1 Introduction 5
1.1 Project background 5
1.2 Location, topography and geology 5
1.3 Aims 6
2 Methodology 7
3 Results 8
3.1 Kellaways Formation 8
3.2 Oxford Clay Formation 9
3.3 Oadby Member Till 9
3.4 Felmersham Member 10
3.5 Alluvium 11
3.6 Made Ground 11
3.7 The Soil Profile 11
4 Assessment 12
4.1 Extent, nature and genesis of Quaternary sediments 12
4.2 Archaeological and palaeoenvironmental potential 13
5. Conclusions 14
6 Acknowledgements 15
7 Bibliography 15
8 Figures 17
Appendix 1: Borehole and Trial Pit Locations 25
Appendix 2: Borehole and Trial Pit Stratigraphy 27
Appendix 3: Stratigraphy 46

FIGURES

Figure 1. Map of the site with borehole and test pit locations. 17
Figure 2. Map of the site showing lithostratigraphic cross sections (five in number). 18
Figure 3. Lithostratigraphic cross section A to A'. Vertical exaggeration x20 19
Figure 4. Lithostratigraphic cross section B to B'. Vertical exaggeration x20 20
Figure 5. Lithostratigraphic cross section C to C'. Vertical exaggeration x20 21
Figure 6. Lithostratigraphic cross section D to D'. Vertical exaggeration x20 22
Figure 7. Lithostratigraphic cross section E to E'. Vertical exaggeration x20 23
Figure 8. Map of the thickness of the Soil Profile. 24

SUMMARY

A geoarchaeological desk-based assessment of geotechnical records and British Geological Survey (BGS) records on land east of Willen Road, Newport Pagnell, Buckinghamshire, was carried out at the request of Triskelion Heritage Ltd. Lithological data were taken from these records and transferred to a RockWorks 15 database for interpretation and analysis of lithostratigraphic cross sections.

The Jurassic bedrock, Kellaways Formation, lies between 51.65m OD (4.55m bgl) and 55.50m OD (1.5m bgl) in the north of the site. It is unconformably overlain by Oadby Member till that primarily occupies a buried valley /channel lying east to west across the centre and south of the site. The Felmersahm Member fluvial sand and gravel forms a terrace that unconformably overlies these units and, on occasion, is recorded in outcrop. An informal unit, the Soil Profile, consists of top soils and clayey units with varying amounts of sand and/or gravel. It is generally thin <0.50m, however, rare instances exist of thicker deposits. The unit is believed to be oxidised. Holocene Alluvium is mapped by the BGS as a thin border to the River Ouzel widening in the southeast of the site. No test pits or boreholes sample this unit on the site, however, 1.2m of clay is recoded in a borehole south of the site.

Thick Made Ground, which is believed to be modern backfill, is recoded in test pits in the quarry (under restoration) that lies on the southern border of the site. A single borehole in the centre of the site also records Made Ground that truncates the sand and gravel.

No significant organic remains are recorded in the stratigraphy.

1 INTRODUCTION

1.1 Project background

1.1.1 This report is a geoarchaeological desk-based assessment (DBA) of land east of Willen Road at Newport Pagnell, Buckinghamshire (henceforth 'the site'), carried out on behalf of Triskelion Heritage Ltd. The present report has been compiled using geological data held by the British Geological Survey (BGS) and from a prior geotechnical examination of the study area carried out by the Rolton Group Ltd in August 2020 for their client Bloor Homes. These data are derived from locations on the site itself and within a surrounding boundary area of approximately 150m. The research leading to the production of the present report was undertaken in December 2020 and January 2021.

1.1.2 The sections of the report are arranged as follows: Section 1 provides essential background to the project, i.e. the geographical and geological situation of the site, and the aims of the present work. Section 2 outlines the methodology employed in collecting and utilising the geological data. The lithostratigraphy of the study area is presented and interpreted in Section 3, while Section 4 assesses the significance of the lithological data recovered in relation to the aims that have been set. Conclusions are drawn in Section 5. A bibliography and appendices providing the locations and stratigraphy of the geological records that were used complete the report.

1.2 Location, topography and geology

1.2.1 The site occupies a sand and gravel outcrop formerly known as the First Terrace The Ouse on the west bank of the River Ouzel (or Lovat) a major northwards flowing tributary of the River Ouse in Newport Pagnell, Buckinghamshire. Willen Road marks the western boundary. The A422 trunk road in the north separates a small portion of the site north of the road. South of the site lies farmland and a disused quarry under restoration (Figure 1). Various buildings occupy the site: Caldecote Fam, Moat cottage and Caldecote Mill their presence implying they are sited above annual flood waters. Robinson Wild *et al* (2020 p11) note that the site is categorised as Enclosure (Pre 18th Century Regular) and Enclosure (20th Century) Meadow. The archaeological potential for is Medium/High and is associated with ridge-and-furrow and deserted medieval settlements/moats of which Caldecote is an example.

1.2.2 The elevation on the site varies from 62.00m OD in the very north at BGS borehole SP84SE858 to 56.20m OD at BGS borehole SP84SE400 on the north east margin. In general, however, ground elevation lies between 56.5m OD and 57.5m OD with minimum levels approaching the river. The area of the site is *c.* 0.32km^2.

1.2.3 The BGS map the bedrock of the site as the Kellaways Formation laid down during the Callovian Age of the Middle Jurassic (166 – 163 Ma). The lithology is a grey or blueish mudstone which can be silty or sandy and may present as siltstone and sandstone beds. Slightly younger Oxford Clay Formation is mapped in the locality and may be represented on the site at one borehole location (SP84SE47). A buried valley *c.* 0.5km wide is believed to exist trending east to west across the site and is part of a larger network in the Newport Pagnell area (Figure 2). It is filled with glacial deposits of sands and gravels and till (otherwise known as diamicton, a clay containing chalk and flint clasts laid down by a glacier). Although the BGS do not map the fill of this feature it is clear from borehole and test pit records that till is present on the site. The till is probably the Oadby Member and dates to the Anglian Stage *c.* 478 – 424ka.

1.2.4 Younger superficial deposits cover the site and are present as the Felmersham Member, a fluvial gravel with sand terrace previously known as the First Terrace of The Ouse. This Member dates to the Pleistocene Epoch. The BGS record it as *c.* 3m thick. Alluvium composing of unconsolidated clay, silt and sand and laid down in the Holocene (11.7ka – present), is mapped as a thin strip on the west bank of the meander bend of the River Ouzel widening to *c.* 100m in the south east of the site (Figure 2) (BGS 2010; 2013; 2021a; 2021b)

1.3 Aims

The aims of the DBA are twofold:

1.3.1 Determine the extent, nature and genesis of Quaternary sedimentation[1]; and

1.3.2 Assess the archaeological and palaeoenvironmental potential of Quaternary strata on the site.

[1] The Quaternary Period has two epochs: the Pleistocene (2.6 million years ago to 11,700 years ago) and the Holocene (11,700 to present day). The Devensian is the last glaciation to affect the British Isles, c. 70,000 – 11,700 years ago with one effect being the deposition of fluvial gravels.

2 METHODOLOGY

2.1 Data for the geoarchaeological DBA have been derived from the following sources:

- The BGS 1:50,000 and 1:10,000 maps (BGS 2010; 2013, 2021b);
- The BGS borehole record (BGS 2021b): 21 published records;
- Geotechnical work carried out by Rolton Group Ltd. This comprised of 14 test pits (Soak Away (SA) 1 – SA14); and 18 test pits (TP2, TP3, TP5, TP7, TP9 – TP11, TP13, TP14, TP29, TP31, TP36, TP38, TP42 – TP44, TP56 and TP57). The SA# were dug to a maximum of 1.5m bgl (below ground level) except one (SA13) which stopped at 2.5m; and the TP# were dug to a maximum of 3.80m bgl.

2.2 In total there are 21 borehole and 32 test pit records.

2.3 Lithological descriptions and positional data from the geotechnical investigations and the BGS borehole database were combined within a RockWorks database (RockWare 2013). The RockWorks software package was then used to plot the cross sections (five cross sections marked on Figure 2) and a map that models the thickness of the Soil Profile. For the latter, an inverse distance algorithm was used with a borehole cut off of 5%; that is to say, the data of a borehole /test pit does not extend beyond a radius of *c.* 50m. Location data for all records utilised in the compilation of this report are presented in Appendix 1, while lithological interpretations are given in Appendix 2. Appendix 3 lists the presence/absence of stratigraphic units.

2.4 The lithological unit descriptions of the geotechnical and BGS records have been interpreted in an informal classification. This reflects the often diverse geological terminology used in records that date from the mid-20th century while not losing any pertinent information. Descriptions are therefore based on the major lithology: clay, sand or gravel. They can be adjusted with the addition of one or two adjectival prefixes; for example: sandy gravelly clay, the major lithology of which is clay with lesser fractions of sand and gravel. Each unit is assigned to a formal stratigraphic unit, for example, the Felmersham Member or the Kellaways Formation. One exception is that the informal term 'Soil Profile' has been used to designate top soil were it is recorded, and directly underlying units of clay that may be presumed to be associated with the top soil and are not part of a gravel or sand

unit even though they may contain some sand and/or some gravel. It should be noted that a soil develops within the top portion of a sub-aerial geological deposit and as such is stratigraphically part of that deposit: the top soil is strictly the top of the Felmersham Member. On the site, the Soil Profile is the unit where Holocene archaeology will be found. Appendix 3 lists the boreholes and test pits and their stratigraphic units.

3 RESULTS

3.0.1 In the following discussion the lithology and stratigraphy of the site and its environs are described. Brief interpretations of the deposits are presented throughout prior to an overarching assessment in Section 4.

3.0.2 The stratigraphic units identified from youngest to oldest are:

1. Soil Profile (Holocene: subunits of top soil, gravelly clay/sandy gravelly clay and clay)

2. Made Ground (Holocene: modern)

3. Alluvium (Holocene: present on site but is only sampled in one borehole to the south of the site)

3. Felmersham Member (Late Pleistocene fluvial gravel with sand deposits)

4. Oadby Member (Anglian Stage till and associated outwash)

5. Oxford Clay Formation (Jurassic bedrock: a single outlying example)

6. Kellaways Formation (Jurassic bedrock mudstone)

These units are described in stratigraphic order from the oldest to the youngest in the following Section (see Figure 2 for borehole and trial pit locations).

3.1 Kellaways Formation

3.1.1 The Kellaways Formation is recorded in three BGS boreholes (SP84SE905, SP84SE884 and SP84SE400) and is suspected to be present in a further two boreholes (SP84SE859 and SP84SE857). These boreholes lie in the north of the site and one (SP84SE884)

beyond the northeast boundary (Figure 2). The deposit lies between 51.65m OD (4.55m bgl) in SP84SE400 and 55.50m OD (1.5m bgl) in SP84SE905 (Figure 3, Figure 4 and Figure 5).

3.1.2 The lithology recorded in the borehole logs is sparse in detail no more than 'hard/stiff blue clay'. On occasion the older underlying Cornbrash Member limestone is recorded. Hard/stiff blue clay would reflect the weathered top of the Kellaways Formation. The lack of any record of clasts particularly chalk or flint, implies that the deposit is not a glacial till.

3.1.3 Kellaways Formation is overlain by sand and gravels of the Felmersham Member except in SP84SE905 and SP84SE884 where it is overlain by deposits pertaining to the Soil Profile.

3.2 Oxford Clay Formation

3.2.1 The Oxford Clay Formation is recorded in SP84SE47 located in the centre east of the site. The deposit lies at 54.94m OD (4.30m bgl). The log record is detailed and includes definitive fossil identification. The deposit appears to be an outlier (surrounded by older rock; Kellaways Formation) lying on the northern margin of the buried valley incised into the bedrock by Pleistocene glacial action (Figure 2 and Figure 6).

3.2.2 The lithology is described as a stiff, grey, fissured, silty clay with some shells and occasional small pockets of sandy silt. The deposit is overlain by deposits of the Soil Profile.

3.3 Oadby Member Till

3.3.1 The Oadby Member is recorded in 13 boreholes and 8 test pits (see Appendix 3 for identification). The deposit sub-crops between 52.75m OD in SP84SE880 (4.30m bgl) in the centre of the site and 58.70m OD (2.30m bgl) in SP84SE879 located south of the site on the southern edge of the quarry (Figure 2). The deposit is recorded to lie less than 2.20m from the ground surface in the eight test pits and three of the boreholes (SP84SE856, SP84SE402 and SP84SE10). On west of the site it is found closest to the ground surface at 1.10m bgl in TP13.

3.3.2 The deposit is described as a stiff blue or grey clay with the presence of chalk and or flint clasts. Shell may be recorded too which implies possible outwash lake deposits associated with the till. A detailed record for such possible lake deposits exists for

SP84SE397 located *c.* 200m to the northeast of the site (see Appendix 2).

3.3.3 The majority of the locations that record till lie within the margins of the buried valley (Figure 2, Figure 3, Figure 4, Figure 5, Figure 6 and Figure 7). Two outliers are found: one (SP84SE858) in the north of the site, north of the A422 trunk road; and the second is the above mentioned borehole SP84SE397.

3.3.4 The till is overlain by Felmersham Member in all the boreholes and test pits in which it is present.

3.4 Felmersham Member

3.4.1 The Felmersham Member is found in all the boreholes (except for three, see 3.4.2 below) and test pits on the site and in the environs. It lies between 55.43m OD (1.07m bgl) in SP84S859 located north of the A422 and 61.10m OD (0.90m bgl) in SP84SE858. This borehole lies *c.* 125m west of SP84S859 (Figure 2, Figure 3 and Figure 4).

3.4.2 There are difficulties in interpreting the records and in the following boreholes the deposit is classed as Soil Profile: SP84SE905 on the site north of the A422 and SP84SE884 *c.* 150m northeast of the site log 'loam and gravel' together which is classified here as Soil Profile, subunit sandy gravelly clay. SP84SE47 in the centre east of the site logs 'firm brown/grey mottled clay with gravel' interpreted as Soil Profile, subunit gravelly clay.

3.4.3 The Felmersham Member outcrops in seven boreholes (see Appendix 3, Figure 2 and Figure 8). At its maximum it lies at 1.35m bgl in SP84SE9 located on the northeast edge of the quarry. In 25 of 26 test pits located on the site the unit lies less than 0.51m bgl.

3.4.4 The lithology of the unit is described as fine to coarse gravel (2 – 64mm) composed of flint, chalk, sandstone and quartz clasts with the flint predominating. The clasts are sub-angular to sub-rounded. If sand is present then the gravels are be described as sandy gravels. Sand is rare without a gravel fraction (gravelly sand). Where it is recorded the sand is fine to coarse grade (0.125 – 1mm). Clay may also be present as a minor component. Recorded colours are orange brown, brown and yellow brown all of which suggest oxidation.

3.4.5 The thicknesses of the deposit ranges from 0.24m in TP36 on the southern border of the site with the quarry, to 4.30m in SP84SE880 in the centre of the site (Figure 6).

3.4.6 The Felmersham Member is succeeded by the Soil Profile except for SP84SE400 where it is truncated by Made Ground, and in the outcrop locations.

3.5 Alluvium

3.5.1 See Section 3.7.3 below.

3.6 Made Ground

3.6.1 Made ground is recorded in one borehole (SP84SE400) in the north east of the site and in six test pits (TP38, TP42 – TP44, TP56 and TP57) which are all located within the quarry south of the site (Figure 3 and Figure 4). Made Ground is recorded by the BGS as a deposit that contains man-made material and as such would include all archaeological strata. In SP84SE400 the deposit is described as 1.50m of clay, sand and gravel and no indication is given as to its classification as Made Ground: for example, brick or concrete would be expected to be noted.

3.6.2 In the test pits in the quarry Made Ground is between 1.66m thick (TP38) and 3.65m thick (TP57). The lithology is highly varied and includes organic material, flint, sandstone, quartz, brick, tile, concrete, wood, clinker, ash, clay sand and gravel. The deposits would appear to be modern backfill of the quarry.

3.7 The Soil Profile

3.7.1 Three deposits (subunits) pertain to the Soil Profile: top soil, clay, sandy clays/sandy gravelly clays. The Soil Profile is found in all the boreholes and test pits except for seven boreholes where the Felmersham Member outcrops (see Appendix 3). The unit ranges in thickness from 0.28m in SA07 east of the site near Caldecote farm, to 2.13m in SP84SE47 in the centre east of the site. The five lithostratigraphic cross sections depict the Soil Profile.

3.7.2 The subunit *top soil* is recorded in all the test pits and in ten boreholes (see Appendix 3). It ranges in thickness from 0.15m in SP84SE858 and SP84SE856 located in the north and southeast of the site respectively, to 0.61m in SP84SE47 in the centre east of the site.

3.7.3 The subunit *clay* is recorded in one borehole only (SP84SE877) found *c.* 100m southeast of the site on the flood plain mapped as Alluvium. This is the only record found on the Alluvium. The deposit is a grey brown clay, 1.20m thick and overlies gravel. No top soil is recorded.

3.7.4 The subunits *sandy clays /sandy gravelly clays* are recorded in ten boreholes and one test pit (see Appendix 3) and form a generally thick subunit from 0.75m in SP84SE858 in the far north of the site to 1.70m in SP84SE884 that lies *c.* 150m northeast of the site.

3.7.5 The lithology of the top soil is described in the modern test pits in more detail than is found in the older borehole records where the label 'top soil' or 'loam' suffices. In the test pits it is recorded as a sand with a varying amount of clay and with or without a minor gravel component. Colour is given as brown or light brown. The lithology of the subunit sandy clay/sandy gravelly clay are self-evident and recorded as such in the logs, and no further descriptions are given except, on occasion, the colour is noted as 'brown', indicative of oxidation.

4 ASSESSMENT

4.1 Extent, nature and genesis of Quaternary sediments

4.1.1 Within the site and its environs Jurassic mudstone forms a heavily weathered basement to the Quaternary sediments of the ancient River Ouzel valley. The mudstone bedrock (Kellaways and Oxford Clay Formations) has been deeply incised by glacial processes forming a valley or channel that occupies the majority of the site. This feature is filled with glacial till and sand and gravel deposits. The glacial till (Oadby Member) is also found beyond the confines of the buried valley. It is distinguished from the weathered top of the bedrock mudstone by the presence of chalk and flint clasts, lithologies not found in the Newport Pagnell area.

4.1.2 The Triassic bedrock and the fill of the buried valley are unconformably overlain by river sand and gravels (Felmersham Member) aggraded by the action of braided channels of the ancient River Ouzel in a periglacial environment most probably during the Late Devensian (Marine Isotope Stage 2, 15 –10ka). The lithology of the deposit is primarily flint gravels with subordinate sand, and is variable in thickness, up to 4.30m in SP84SE880 in the centre of

the site. The Felmersham Member forms a terrace across the entire site except for the margin of the River Ouzel where Holocene alluvium is mapped.

4.1.3 At the end of the Pleistocene, climatic amelioration brought about a stabilisation of the land surface and an end to channel gravel aggradation. Colonisation by plants reduced the supply of sediment and stream flow energy fell as a result of milder winters and the shift from surface to ground water drainage succeeding the melting of the permafrost. A high water table and propensity to flood often promoted the eventual formation of fresh water marshes and peat accumulation, however, no such organic deposits have been recorded on the site and its environs. It is possible that organic deposits exist in the southeast of the site where Alluvium is mapped (Figure 2). In this area there is only one record (SP84SE877) and that lies c. 100m southeast of the site. It does not record any organic deposits rather 1.20m of grey brown clay. The clay colour implies a fluctuating water table that is oxidising the sediment, a process incompatible with the preservation of organic remains. No marshy ground is recorded on the First Edition County Series map of 1881.

4.1.4 The Soil Profile formed during the Holocene. It includes clayey deposits that possibly occupy very local depressions in which flood alluvium accumulated at the end of gravel aggradation as the channels of the ancient Ouzel were reconfiguring to a meandering planform in response to the warming climate. With time, however, only unusually high flood waters would lay down clay and silt grade alluvium on the terrace, deposition being confined to the lower flood plain closer to the river. In general, the Soil Profile deposits appear to be more sandy which is particularly noticeable in the records of the top soil in the test pits. This reflects the close proximity to the ground surface of the terrace sand and gravels. The deposits are oxidised.

4.1.5 Ridge and furrow cover the north of the site (Robinson Wild *et al* 2020 p3) and will have affected the nature of the Soil Profile by creating an artificial and heavily oxidised stratigraphy. Oxidised buried soils may exist at the base of ridges and furrows will cut into the sand and gravel (Watson 2016).

4.2 Archaeological and palaeoenvironmental potential

4.2.1 The sand and gravel terrace deposits were probably laid down in cold conditions inhospitable to the presence of man. Human

groups were intermittently present during Devensian interstadials and the exploitation of river gravel is a possibility (White and Pettitt 2012). No Palaeolithic deposits are known from the site and only two artefacts of possible Palaeolithic date are recorded from the environs (Robinson Wild et al 2020 p19). The upper 1 – 2m of the deposit is probably oxidised as a result of a fluctuating water table. Nonetheless, since the sampling of these deposits can only properly be achieved by the recording of section faces (borehole cores are too small for lithological analysis) the potential to recover archaeological or palaeoenvironmental information must be Low.

4.2.2 The Soil Profile on the terrace is probably oxidised and as a result the palaeoenvironmental potential is Low. The potential for organic deposits to be preserved in the flood plain alluvium on the river bank and in the southeast of the site is a possibility but is also considered to be Low. Archaeological potential on the site has been classed as Medium/High (Robinson Wild *et al* 2020 p11).

5. CONCLUSIONS

5.1 The following conclusions are drawn:

5.1.1 The top of the bedrock mudstone is a weathered blue clay and lies as close as 1.50m to the ground surface. Weathered till may also present a similar lithology but will include flint and chalk clasts. On the site it has a minimum depth of 1.10m bgl (TP13). The till occupies the centre and south of the site located primarily within the buried valley.

5.1.2 The Felmersham Member sand and gravel outcrops or lies close to the surface across the site. It has a variable thickness with a maximum of 4.30m. the top 1-2m is probably oxidised.

5.1.3 On the site there are no test pits or boreholes that sample the floodplain alluvium which is mapped close to the River Ouzel. To the southeast of the site there is a single record (SP84SE877) of 1.20m of clay overlying gravel. On the terrace flood alluvium will be rare and incorporated into the Soil Profile.

5.1.4 Made Ground is recorded in the test pits in the quarry. It is also found in one location only (SP84SE400) in the centre east of the site where it truncates the top of the gravel terrace.

5.1.5 The Soil Profile is most likely oxidised a circumstance which is not conducive to the preservation of organic remains. The

palaeoenvironmental potential of the Soil Profile and the Felmersham Member is believed to be low. No archaeologically significant organic remains are recorded on or in the environs of the site.

6 ACKNOWLEDGEMENTS

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8 FIGURES

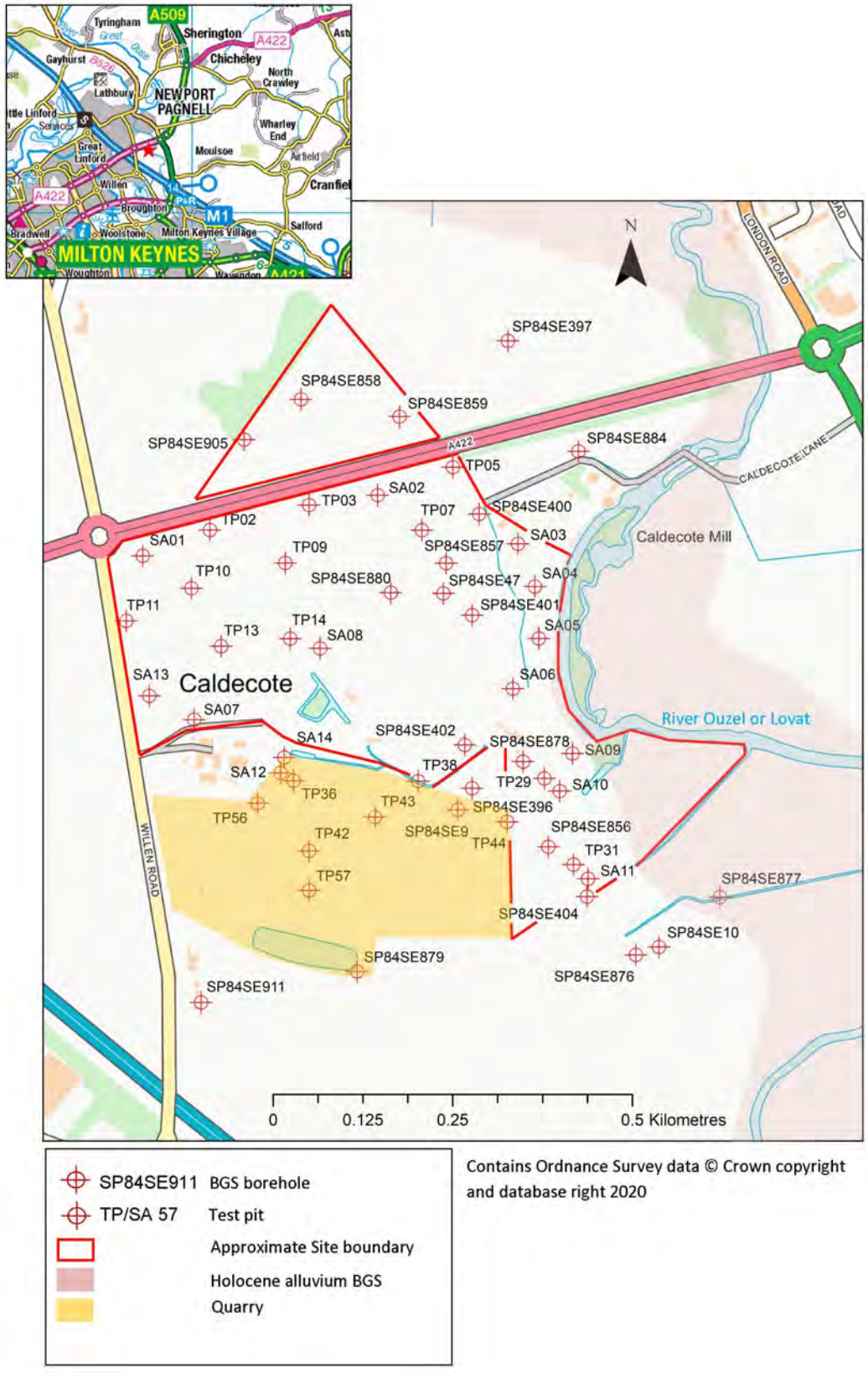


Figure 1. Map of the site with borehole and test pit locations.

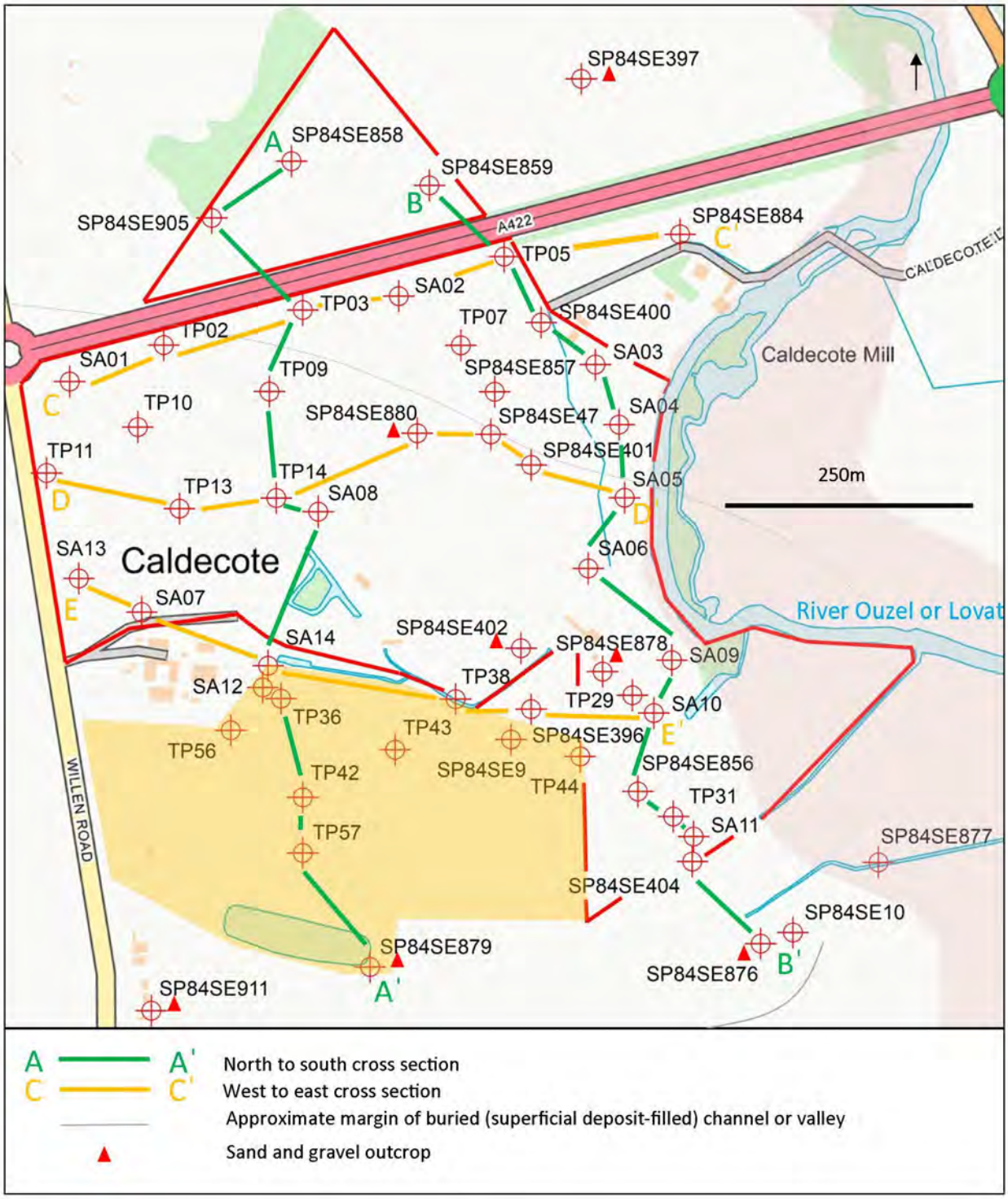


Figure 2. Map of the site showing lithostratigraphic cross sections (five in number).

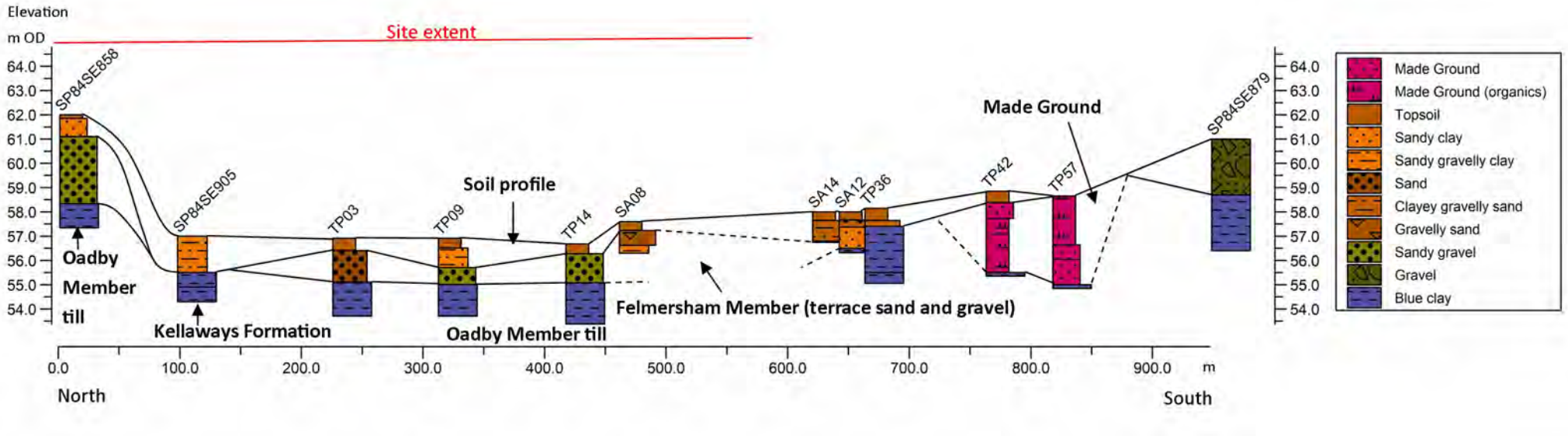


Figure 3. Lithostratigraphic cross section A to A'. Vertical exaggeration x20.

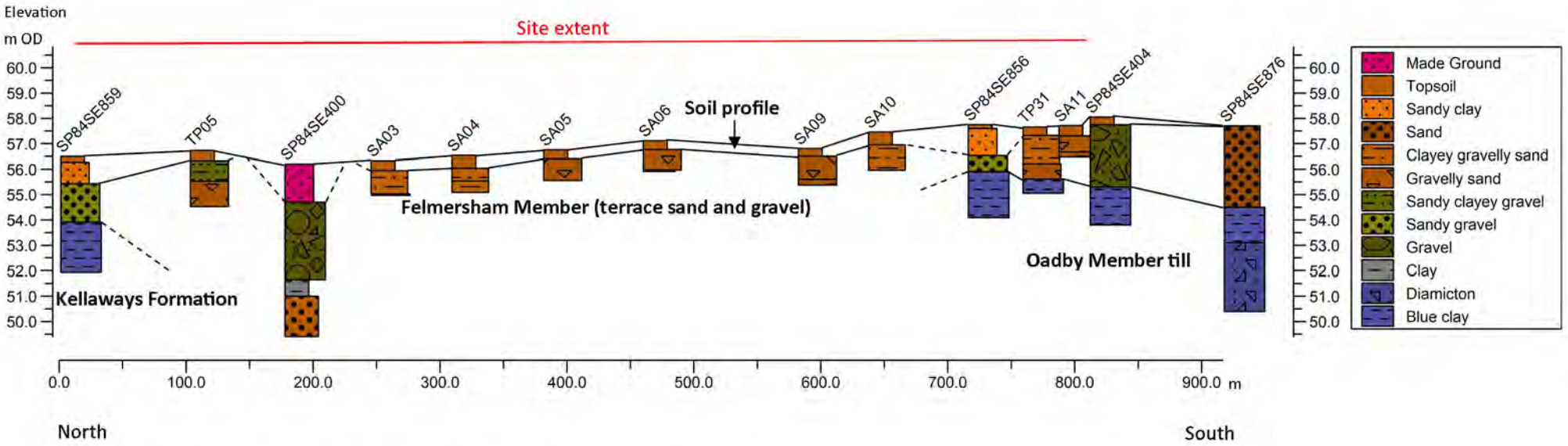


Figure 4. Lithostratigraphic cross section B to B'. Vertical exaggeration x20.

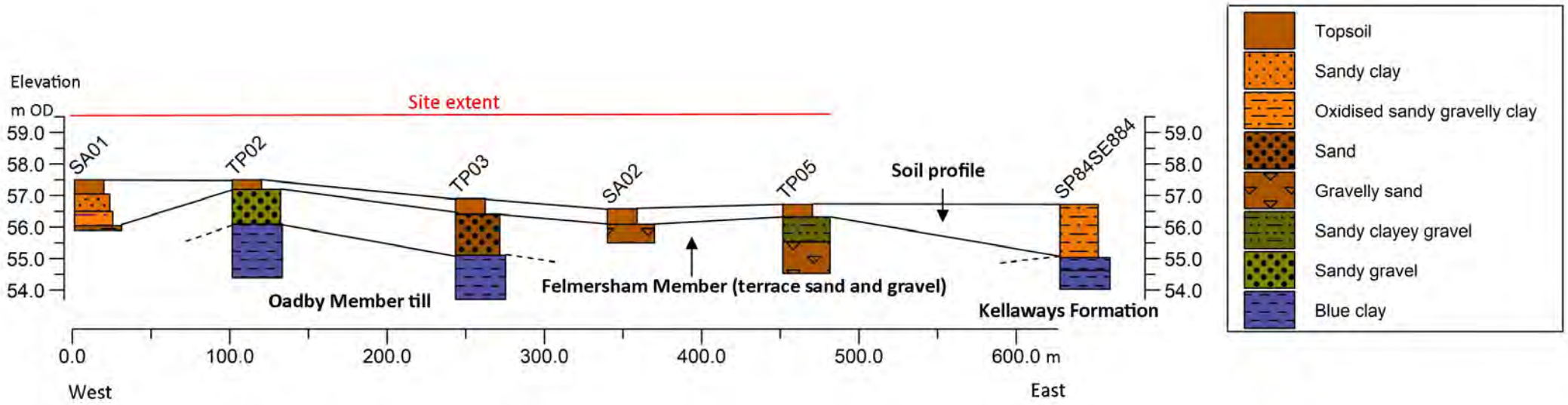


Figure 5. Lithostratigraphic cross section C to C'. Vertical exaggeration x20.

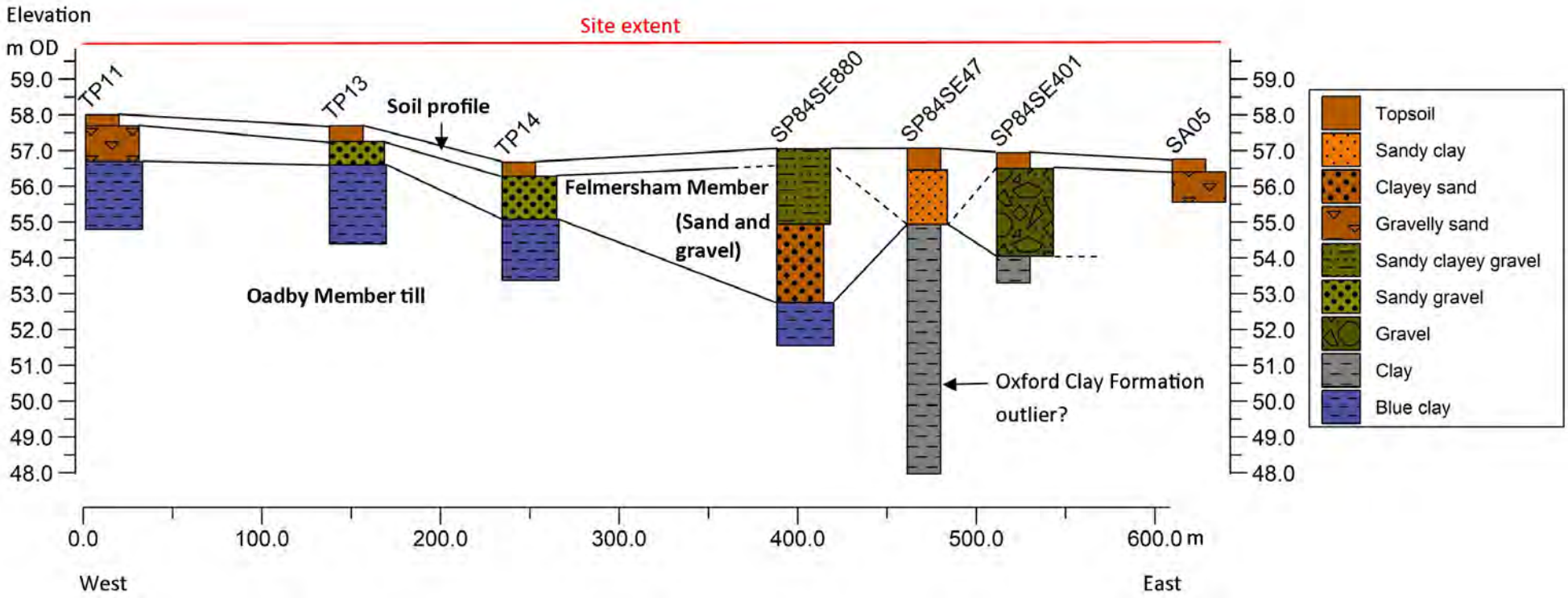


Figure 6. Lithostratigraphic cross section D to D'. Vertical exaggeration x20.

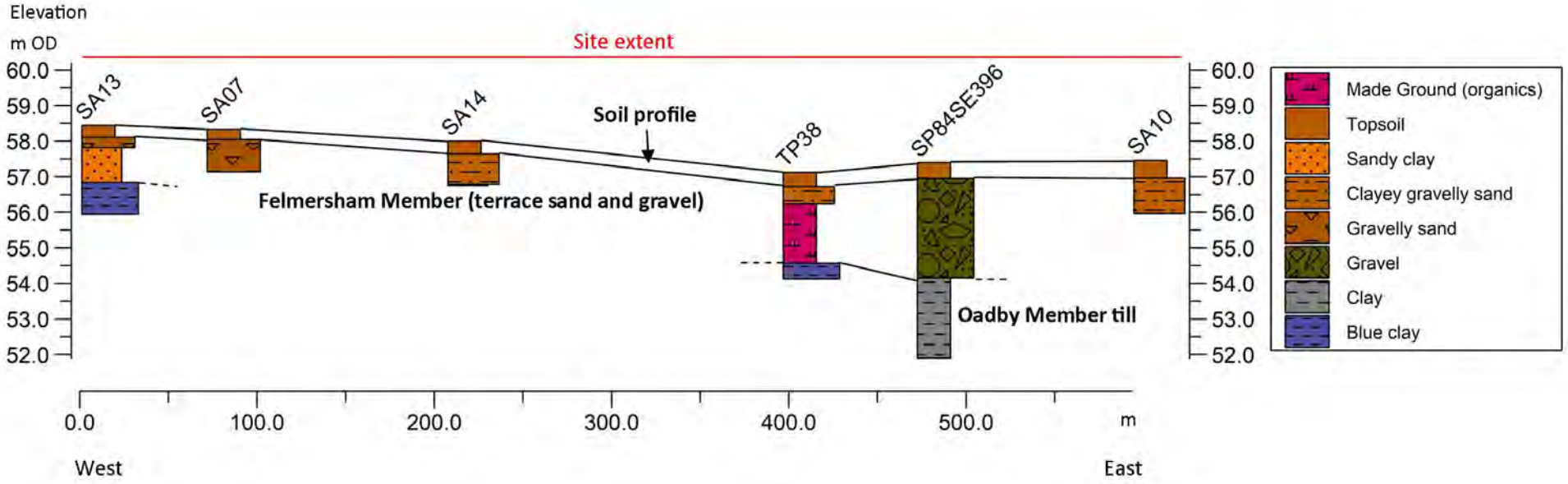


Figure 7. Lithostratigraphic cross section E to E'. Vertical exaggeration x20.

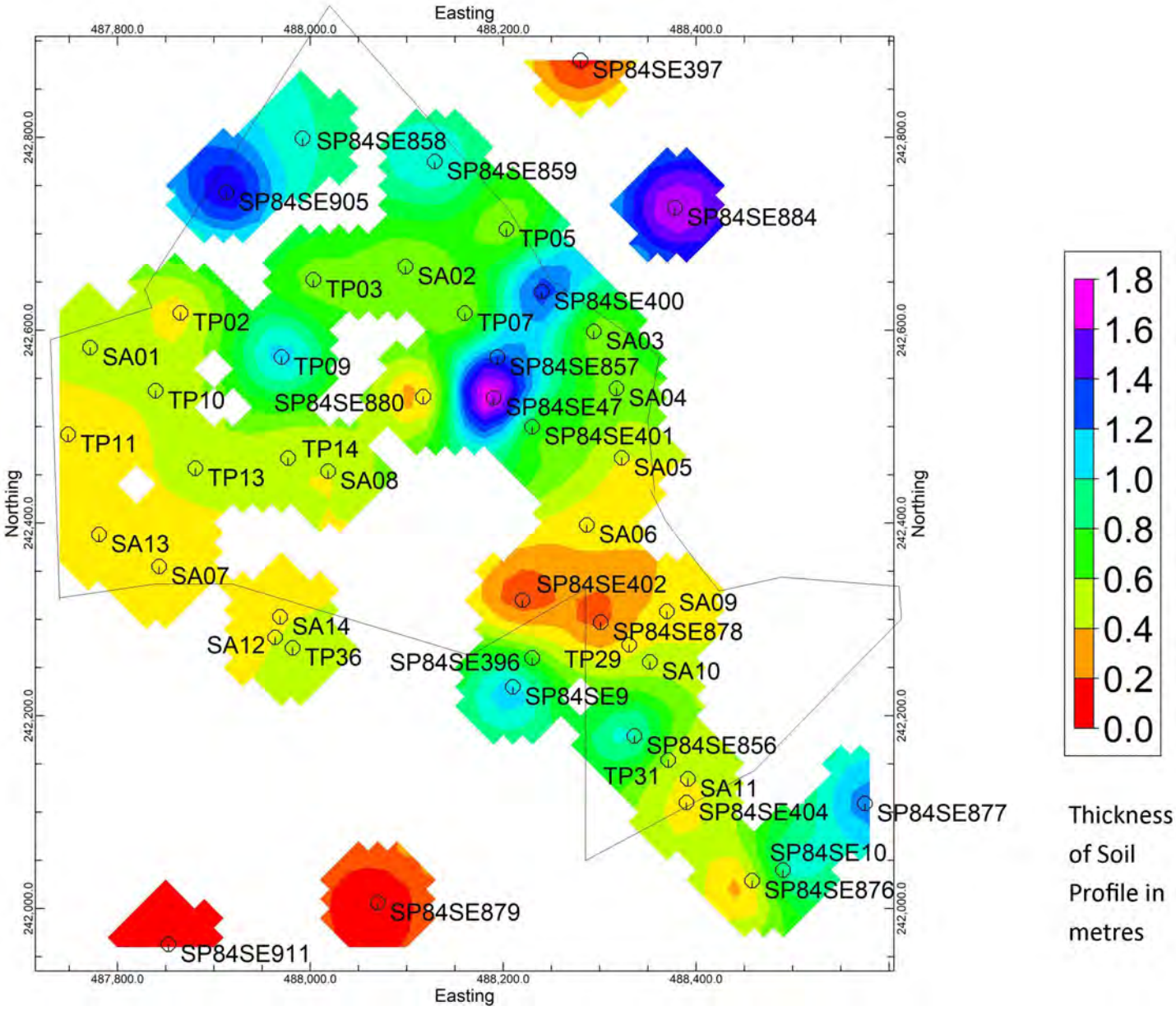


Figure 8. Map of the thickness of the Soil Profile i.e. the depth from the ground surface to the top of the Felmersham Member (note: there is no sand and gravel in SP84SE47, SP84SE905 and SP84SE884 and the so the top of the bedrock is measured). Red colour depicts the outcrop of the sand and gravel. Blue depicts deep deposits of Soil Profile. Test pits recording Made Ground in the quarry are not shown. Approximate site outline in grey line.

APPENDIX 1: BOREHOLE AND TRIAL PIT LOCATIONS

Bore	Easting	Northing	Elevation
SA01	487771.8	242582.0	57.5
SA02	488098.7	242666.0	56.58
SA03	488293.9	242598.8	56.33
SA04	488317.5	242539.7	56.54
SA05	488322.8	242467.6	56.76
SA06	488286.7	242398.0	57.12
SA07	487843.3	242354.9	58.33
SA08	488018.5	242453.8	57.6
SA09	488369.7	242308.3	56.8
SA10	488352.0	242256.0	57.46
SA11	488391.5	242134.5	57.71
SA12	487963.6	242281.4	58
SA13	487781.0	242388.1	58.440
SA14	487968.7	242302.7	58.000
TP02	487865.4	242618.0	57.500
TP03	488003.2	242652.4	56.910
TP05	488203.3	242704.9	56.730
TP07	488160.3	242617.7	56.930
TP09	487970.2	242572.2	56.910
TP10	487839.6	242537.2	57.470
TP11	487748.9	242491.9	58.000
TP13	487880.9	242456.8	57.700
TP14	487976.9	242467.4	56.680
TP29	488330.6	242273.6	57.600
TP31	488371.1	242154.2	57.660
TP36	487981.7	242270.5	58.150
TP38	488155.0	242269.9	57.120
TP42	488003.2	242173.2	58.85
TP43	488095.0	242219.9	59.68
TP44	488278.8	242213.5	57.79
TP56	487931.9	242239.1	58.47
TP57	488003.2	242118.4	58.65
SP84SE858	487992.0	242799.0	62
SP84SE856	488336.0	242179.0	57.75
SP84SE857	488194.0	242572.0	57
SP84SE859	488129.0	242775.0	56.5
SP84SE905	487913.0	242743.0	57
SP84SE397	488280.0	242880.0	57.37
SP84SE884	488378.0	242727.0	56.730
SP84SE400	488240.0	242640.0	56.2
SP84SE880	488117.0	242531.0	57.05
SP84SE47	488190.0	242530.0	57.07

SP84SE401	488230.0	242500.0	56.95
SP84SE402	488220.0	242320.0	57.13
SP84SE878	488301.0	242297.0	57.25
SP84SE396	488230.0	242260.0	57.4
SP84SE9	488210.0	242230.0	57.6
SP84SE404	488390.0	242110.0	58.05
SP84SE877	488575.0	242109.0	57.7
SP84SE10	488490.0	242040.0	57.2
SP84SE876	488458.0	242029.0	57.7
SP84SE879	488070.0	242006.0	61
SP84SE911	487853.0	241963.0	62

APPENDIX 2: BOREHOLE AND TRIAL PIT STRATIGRAPHY

Rolton Group Ltd 2020 and BGS 2021 (comments in italics are the author's)

Bore	Top	Base	Lithology	Comments
Rolton Group Ltd 2020				
SA01	0.00	0.45	Topsoil	TOPSOIL: Brown slightly gravelly very clayey sand. Gravel is medium to coarse subangular to subrounded chalk and flint.
SA01	0.45	1.00	Oxidised sandy clay	Firm to stiff brown sandy CLAY.
SA01	1.00	1.45	Mottled sandy gravelly clay	Firm to stiff grey mottled brown sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded flint.
SA01	1.45	1.60	Gravelly sand	Medium dense brown gravelly SAND. Gravel is fine to coarse subangular to subrounded flint and quartz.
SA02	0.00	0.49	Topsoil	TOPSOIL. Light brown slightly clayey slightly gravelly sand. Gravel is of medium to coarse subrounded flint, quartz and occasional chalk.
SA02	0.49	1.08	Gravelly sand	Medium dense orange brown slightly clayey gravelly medium SAND. Gravel is of medium to coarse subrounded flint, quartz, sandstone and occasional chalk.
SA03	0.00	0.39	Topsoil	TOPSOIL: Brown slightly gravelly very

				clayey sand. Gravel is medium to coarse subangular to subrounded chalk and flint.
SA03	0.39	1.30	Clayey gravelly sand	Medium dense light brown clayey gravelly SAND. Gravel is of medium to coarse subangular to subrounded flint, quartz and sandstone.
SA03	1.30	1.36	Sandy gravel	Medium dense orange brown sandy GRAVEL. Gravel is of medium to coarse subangular to subrounded flint, sandstone and quartz.
SA04	0.00	0.50	Topsoil	TOPSOIL: Brown slightly clayey slightly gravelly sand. Gravel is medium to coarse subangular to subrounded chalk and flint.
SA04	0.50	1.00	Clayey gravelly sand	Medium dense brown clayey gravelly SAND. Gravel is medium to coarse subangular to subrounded chalk and flint
SA04	1.00	1.45	Clayey gravelly sand	Medium dense brown slightly clayey gravelly SAND. Gravel is medium to coarse subangular to subrounded chalk and flint.
SA05	0.00	0.35	Topsoil	TOPSOIL: Brown slightly clayey slightly gravelly sand. Gravel is medium to coarse subangular to subrounded chalk and flint.
SA05	0.35	1.20	Gravelly sand	Medium dense brown gravelly SAND.

				Gravel is fine to coarse subangular to subrounded flint and quartz.
SA06	0.00	0.35	Topsoil	TOPSOIL: Brown slightly clayey slightly gravelly sand. Gravel is medium to coarse subangular to subrounded chalk and flint.
SA06	0.35	1.15	Gravelly sand	Medium dense brown gravelly SAND. Gravel is fine to coarse subangular to subrounded flint and quartz.
SA06	1.15	1.20	Gravelly clay	Firm to stiff grey slightly gravelly CLAY. Gravel is fine subrounded chalk.
SA07	0.00	0.28	Topsoil	TOPSOIL: Brown slightly gravelly very clayey sand. Gravel is medium to coarse subangular to subrounded chalk and flint
SA07	0.28	1.2	Gravelly sand	Medium dense brown gravelly SAND with frequent pockets of clay. Gravel is fine to coarse subangular to subrounded flint and quartz.
SA08	0.00	0.37	Topsoil	TOPSOIL: Brown slightly gravelly very clayey sand. Gravel is medium to coarse subangular to subrounded chalk and flint.
SA08	0.37	0.98	Gravelly sand	Medium dense brown gravelly SAND. Gravel is fine to coarse subangular to subrounded flint and quartz.
SA08	0.98	1.30	Sandy gravelly clay	Firm to stiff grey mottled brown sandy

				gravelly CLAY with frequent pockets of gravel. Gravel is fine to coarse subangular to subrounded flint.
SA09	0.00	0.30	Topsoil	TOPSOIL: Brown slightly clayey slightly gravelly sand. Gravel is medium to coarse subangular to subrounded chalk and flint.
SA09	0.30	1.20	Gravelly sand	Medium dense brown gravelly SAND. Gravel is fine to coarse subangular to subrounded flint and quartz.
SA09	1.20	1.42	Gravelly sand	Medium dense orange gravelly SAND. Gravel is fine to coarse subangular to subrounded flint and quartz.
SA10	0.00	0.50	Topsoil	TOPSOIL: Brown slightly clayey gravelly sand. Gravel is medium to coarse subangular to subrounded chalk and flint.
SA10	0.50	1.50	Clayey gravelly sand	Medium dense yellow brown slightly clayey gravelly SAND. Gravel is fine to coarse subangular to subrounded flint and quartz.
SA11	0.00	0.40	Topsoil	TOPSOIL: Brown slightly clayey gravelly sand. Gravel is medium to coarse subangular to subrounded chalk and flint.
SA11	0.40	1.05	Gravelly sand	Medium dense brown and yellow brown gravelly SAND.

				Gravel is fine to coarse subangular to subrounded flint and quartz.
SA11	1.05	1.24	Gravelly sand	Medium dense light brown gravelly SAND. Gravel is fine to coarse subangular to subrounded flint and quartz.
SA12	0.00	0.33	Topsoil	TOPSOIL: Brown slightly gravelly very clayey sand. Gravel is medium to coarse subangular to subrounded chalk and flint.
SA12	0.33	0.63	Clayey sand	Medium dense brown very clayey SAND with frequent pockets of clay.
SA12	0.63	1.51	Sandy clay	Stiff blue grey slightly gravelly sandy CLAY with occasional pockets of gravelly sand. Gravel is of medium to coarse subangular to subrounded flint, sandstone and chalk.
SA12	1.51	1.68	Blue clay	Stiff blue grey fissured CLAY.
SA13	0.00	0.33	Topsoil	TOPSOIL: Brown slightly gravelly very clayey sand. Gravel is medium to coarse subangular to subrounded chalk and flint.
SA13	0.33	0.62	Gravelly sand	Medium dense brown gravelly SAND with frequent pockets of clay. Gravel is fine to coarse subangular to subrounded flint and quartz.
SA13	0.62	1.60	Sandy clay	Firm light brown mottled light grey sandy CLAY with frequent pockets of

				gravelly sand.
SA13	1.60	2.50	Blue clay	Stiff blue grey fissured CLAY.
SA14	0.00	0.36	Topsoil	TOPSOIL: Brown slightly gravelly very clayey sand. Gravel is medium to coarse subangular to subrounded chalk and flint.
SA14	0.36	1.21	Clayey gravelly sand	Medium dense brown clayey gravelly SAND. Gravel is of medium to coarse sub-angular to sub-rounded flint, quartz and sandstone.
SA14	1.21	1.25	Sandy clay	Stiff blue grey slightly gravelly sandy CLAY with occasional pockets of sand. Gravel is of medium to coarse subangular to subrounded flint, sandstone and chalk.
TP02	0.00	0.30	Topsoil	TOPSOIL: Light brown gravelly slightly clayey sand. Gravel is medium to coarse subangular to subrounded chalk and flint.
TP02	0.30	1.40	Sandy gravel	Medium dense brown slightly clayey SAND & GRAVEL. Gravel is fine to coarse subangular to rounded flint.
TP02	1.40	3.10	Blue clay	Stiff blue grey CLAY with numerous shell fragments
TP03	0.00	0.50	Topsoil	TOPSOIL: Light brown gravelly clayey sand. Gravel is medium to coarse subrounded chalk and flint.
TP03	0.50	1.80	Sand	Medium dense orange brown slightly

				gravelly clayey SAND. Gravel is fine to coarse rounded flint.
TP03	1.80	3.20	Blue clay	Firm to stiff blue grey silty CLAY.
TP05	0.00	0.40	Topsoil	TOPSOIL: Light brown gravelly clayey sand. Gravel is medium to coarse subangular to rounded chalk and flint
TP05	0.40	1.20	Sandy clayey gravel	Medium dense brown sandy clayey GRAVEL of fine to coarse angular to rounded flint.
TP05	1.20	2.20	Gravelly sand	Loose brown fine to coarse gravelly SAND. Gravel is fine to medium angular to subangular flint.
TP07	0.00	0.30	Topsoil	TOPSOIL: Light brown gravelly clayey sand. Gravel is medium to coarse subangular to rounded chalk and flint.
TP07	0.30	1.10	Sandy clayey gravel	Medium dense brown sandy clayey GRAVEL of fine to coarse angular to rounded flint.
TP07	1.10	2.10	Gravelly sand	Loose brown fine to coarse gravelly SAND. Gravel is fine to medium angular to subangular flint.
TP09	0.00	0.40	Topsoil	TOPSOIL: Brown gravelly clayey sand. Gravel is medium to coarse subrounded chalk and flint.
TP09	0.40	1.20	Oxidised sandy gravelly clay	Firm grey brown slightly gravelly sandy CLAY. Gravel is fine to coarse angular to rounded flint.

TP09	1.20	1.90	Sandy gravel	Medium dense yellow brown slightly clayey fine to coarse SAND & GRAVEL. Gravel is fine to coarse angular to subrounded flint.
TP09	1.90	3.20	Blue clay	Firm to stiff blue grey CLAY with occasional shell fragments.
TP10	0.00	0.40	Topsoil	TOPSOIL: Brown gravelly clayey sand. Gravel is medium to coarse subangular to subrounded chalk and flint.
TP10	0.40	2.00	Sandy gravel	Medium dense becoming loose yellow brown slightly clayey fine to coarse SAND & GRAVEL. Gravel is fine to coarse angular to subrounded flint.
TP11	0.00	0.30	Topsoil	TOPSOIL: Light brown slightly gravelly clayey sand. Gravel is medium to coarse subangular chalk and flint.
TP11	0.30	1.30	Gravelly sand	Medium dense orange brown gravelly SAND. Gravel is fine to coarse subrounded to subangular flint and quartz.
TP11	1.30	3.20	Blue clay	Firm to stiff blue grey slightly gravelly CLAY. Gravel is fine to medium subrounded chalk. Rare shell fragments.
TP13	0.00	0.45	Topsoil	TOPSOIL: Light brown slightly gravelly clayey sand. Gravel is medium to coarse subangular chalk and flint.

TP13	0.45	1.10	Sandy gravel	Medium dense orange brown sandy GRAVEL of fine to coarse angular to rounded flint.
TP13	1.10	3.30	Blue clay	Firm to stiff blue grey slightly gravelly CLAY. Gravel is fine to coarse rounded chalk. Rare shell fragments.
TP14	0.00	0.40	Topsoil	TOPSOIL: Brown gravelly clayey sand. Gravel is fine to coarse subangular to subrounded chalk and flint.
TP14	0.40	1.60	Sandy gravel	Medium dense yellow brown slightly clayey fine to coarse SAND & GRAVEL. Gravel is fine to coarse angular to subrounded flint.
TP14	1.60	3.30	Blue clay	Firm to stiff blue grey slightly gravelly CLAY. Gravel is fine to coarse rounded chalk. Rare shell fragment
TP29	0.00	0.34	Topsoil	TOPSOIL: Brown slightly clayey gravelly sand. Gravel is medium to coarse subangular to subrounded chalk and flint.
TP29	0.34	1.10	Gravelly sand	Medium dense yellow brown gravelly SAND. Gravel is fine to coarse subangular to subrounded chalk and flint.
TP29	1.10	2.20	Mottled sandy silt	Firm to stiff light grey mottled yellow very sandy SILT
TP29	2.20	3.00	Blue clay	Firm to stiff grey slightly gravelly

				CLAY. Gravel is fine subrounded chalk.
TP31	0.00	0.34	Topsoil	TOPSOIL. Light brown slightly gravelly clayey sand. Gravel is of medium to coarse sub-angular to subrounded flint, quartz and occasional chalk.
TP31	0.34	1.45	Clayey gravelly sand	Medium dense reddish brown slightly gravelly clayey medium SAND with occasional pockets of silty clay. Gravel is of medium to coarse sub-angular to subrounded flint, sandstone and quartz.
TP31	1.45	2.05	Gravelly sand	Medium dense yellow brown gravelly coarse SAND. Gravel is of medium to coarse sub-angular to subrounded flint, sandstone and quartz.
TP31	2.05	2.60	Blue clay	Firm dark blue grey silty CLAY with occasional pockets of sandy gravel. Gravel is of medium to coarse subangular to sub-rounded flint, sandstone and quartz.
TP36	0.00	0.51	Topsoil	TOPSOIL. Light brown slightly gravelly clayey sand. Gravel is of medium to coarse sub-angular to subrounded flint, quartz and occasional chalk.
TP36	0.51	0.75	Clayey gravelly sand	Medium dense light brown clayey gravelly medium SAND with occasional pockets of clay. Gravel is of medium to

				coarse sub-angular to sub-rounded flint and quartz.
TP36	0.75	2.65	Blue clay	Stiff (becoming firm below 2.3m depth) blue grey slightly gravelly sandy CLAY with occasional pockets of sand. Gravel is of medium to coarse sub-angular to subrounded flint and quartz.
TP36	2.65	3.10	Blue clay	Stiff blue grey silty fissured CLAY with frequent crystals of selenite.
TP38	0.00	0.40	Topsoil	TOPSOIL. Light brown slightly gravelly clayey sand. Gravel is of medium to coarse sub-angular to subrounded flint, quartz and occasional chalk.
TP38	0.40	0.89	Clayey gravelly sand	MADE GROUND. Medium dense light brown clayey gravelly medium sand. Gravel is of medium to coarse sub-angular to sub-rounded flint, sandstone and quartz.
TP38	0.89	2.55	Made Ground (organics)	MADE GROUND. Firm blue grey sandy gravelly clay with occasional pockets of dark grey organic material. Gravel is of medium to coarse sub-angular to subrounded flint, sandstone and quartz, with fragments of brick. Becoming soft to firm below 1.6m depth. Large pocket of sandy gravel observed in trial pit walls from

				1.95m - 2.55m depth. Slight organic odour noted.
TP38	2.55	3.00	Blue clay	Stiff blue grey silty fissured CLAY with frequent crystals of selenite.
TP42	0.00	0.46	Topsoil	TOPSOIL. Light brown slightly gravelly clayey sand occasional pockets of ash. Gravel is of medium to coarse sub-angular to sub-rounded flint, quartz and occasional chalk.
TP42	0.46	1.12	Made Ground	MADE GROUND. Moderately compact grey and orange brown slightly gravelly clayey medium sand with frequent pockets of silty clay. Gravel is of medium to coarse subangular to sub-rounded flint, sandstone, quartz and occasional fragments of brick. Slight organic odour noted.
TP42	1.12	1.75	Made Ground (organics)	MADE GROUND. Stiff dark blue grey sandy gravelly clay with occasional cobbles of sub-angular brick and dark grey pockets of organic material. Gravel is of medium to coarse sub-angular to sub-rounded flint, sandstone and quartz, with fragments of brick and tile. Slight organic odour noted.
TP42	1.75	3.35	Made Ground (organics)	MADE GROUND. Very soft light brown slightly gravelly very sandy clay with

				occasional cobbles of sub-angular brick and pockets of dark grey organic material. Gravel is of medium to coarse sub-angular to sub-rounded flint, sandstone and quartz, with fragments of brick.
TP42	3.35	3.50	Blue clay	Stiff blue grey silty fissured CLAY with frequent crystals of selenite.
TP43	0.00	0.47	Topsoil	TOPSOIL. Light brown slightly gravelly clayey sand. Gravel is of medium to coarse sub-angular to subrounded flint, quartz and occasional chalk.
TP43	0.47	1.45	Made Ground	MADE GROUND. Stiff (becoming firm below 1.2m depth) grey mottled brown slightly gravelly very sandy CLAY with frequent pockets of clayey sand. Gravel is of medium to coarse sub-angular to sub-rounded flint, quartz and sandstone, with fragments of brick.
TP43	1.45	2.35	Made Ground (concrete)	MADE GROUND. Firm to stiff blue grey mottled dark grey sandy gravelly clay with occasional cobbles of subangular brick and pockets of dark grey organic material. Rare boulder of sub-angular concrete observed. Gravel is of medium to coarse sub-angular to sub-rounded flint, sandstone and quartz, with fragments of brick, tile, concrete, wood

				and clinker. Slight organic odour noted.
TP43	2.35	2.85	Made Ground	MADE GROUND. Medium dense dark grey gravelly very clayey sand with occasional cobbles of sub-angular brick. Gravel is of medium to coarse sub-angular to subrounded flint, sandstone and quartz, with fragments of brick and clinker. Slight organic odour noted.
TP43	2.85	3.55	Made Ground	MADE GROUND. Very soft light brown clay
TP43	3.55	3.70	Blue clay	Stiff blue grey silty fissured CLAY with frequent crystals of selenite.
TP44	0.00	0.40	Topsoil	TOPSOIL. Light brown slightly gravelly clayey sand. Gravel is of medium to coarse sub-angular to subrounded flint, quartz and occasional chalk.
TP44	0.40	0.79	Made Ground	MADE GROUND. Medium dense light brown mottled dark grey slightly gravelly very clayey medium sand. Gravel is of medium to coarse sub-angular to subrounded flint, quartz and sandstone, with fragments of brick.
TP44	0.79	1.55	Made Ground	MADE GROUND. Stiff brown mottled grey sandy gravelly clay. Gravel is of medium to coarse sub-angular to sub-

				rounded flint, sandstone and quartz, with fragments of brick.
TP44	1.55	2.25	Made Ground	MADE GROUND. Firm light brown slightly gravelly very sandy clay with frequent pockets of sandy gravel. Gravel is of medium to coarse sub-angular to sub-rounded flint, sandstone and quartz, with fragments of brick.
TP44	2.25	3.00	Blue clay	Stiff blue grey silty fissured CLAY with frequent crystals of selenite
TP56	0.00	0.62	Made Ground	MADE GROUND. Moderately compact light brown slightly gravelly clayey medium sand with frequent pockets of silty clay. Gravel is of medium to coarse subangular to sub-rounded flint, quartz and sandstone, with fragments of brick.
TP56	0.62	2.40	Made Ground (concrete)	MADE GROUND. Stiff dark grey sandy gravelly clay with occasional cobbles of sub-angular brick and dark grey patches of organic material. Gravel is of medium to coarse sub-angular to sub-rounded flint, sandstone and quartz, with fragments of brick, tile, concrete, wood and clinker. Slight organic odour noted.

TP56	2.40	2.80	Blue clay	Stiff blue grey silty fissured CLAY with frequent crystals of selenite.
TP57	0.00	2.01	Made Ground (organics)	MADE GROUND. Firm dark blue grey sandy gravelly clay with occasional cobbles of sub-angular brick and dark grey patches of organic material. Rare boulder of sub-angular sandstone observed at 1.01m depth. Gravel is of medium to coarse sub-angular to sub-rounded sandstone, flint and quartz, with fragments of brick, wood and tile. Slight organic odour noted.
TP57	2.01	2.61	Made Ground	MADE GROUND. Soft dark brown gravelly very sandy clay. Gravel is of medium to coarse sub-angular to subrounded sandstone, flint and quartz, with fragments of brick and tile.
TP57	2.61	3.65	Made Ground	MADE GROUND. Very soft light brown clay.
TP57	3.65	3.80	Blue clay	POSSIBLE NATURAL. Stiff blue grey silty fissured CLAY
BGS 2021				
SP84SE858	0.00	0.15	Topsoil	
SP84SE858	0.15	0.90	Sandy clay	
SP84SE858	0.90	3.66	Sandy gravel	
SP84SE858	3.66	4.66	Blue clay	Hard blue clay and chalk to 6m
SP84SE856	0.00	0.15	Topsoil	

SP84SE856	0.15	1.22	Sandy clay	
SP84SE856	1.22	1.83	Sandy gravel	and clay
SP84SE856	1.83	3.66	Blue clay	Blue clay to 4.57m
SP84SE857	0.00	0.22	Topsoil	
SP84SE857	0.22	1.22	Oxidised sandy clay	Brown sandy clay
SP84SE857	1.22	2.13	Sandy gravel	and clay
SP84SE857	2.13	4.88	Blue clay	Hard blue clay *Kellaways*
SP84SE859	0.00	0.22	Topsoil	
SP84SE859	0.22	1.07	Oxidised sandy clay	
SP84SE859	1.07	2.59	Sandy gravel	
SP84SE859	2.59	4.57	Blue clay	Hard blue clay *Kellaways*
SP84SE905	0.00	1.50	Sandy gravelly clay	Loam and gravel
SP84SE905	1.50	2.10	Blue clay	Blue grey caly Ox.Cl *why: no fossil record*
SP84SE905	2.10	2.70	Blue clay	Blue grey silty clay KI.B
SP84SE397	0.00	2.50	Gravel	
SP84SE397	2.50	3.05	Clay	Soft clay
SP84SE397	3.05	6.50	Sandy clay	Stiff grey fissured silty sandy clay with many partings of fine sand grades into stiff grey fissured clay at 6.5m (lake?). Grey lst 7.3-7.9m, green grey clay to 9.9m
SP84SE884	0.00	1.70	Sandy gravelly clay	loam and gravel
SP84SE884	1.70	2.10	Blue clay	Blue grey clay Ox.Cl *why: no fossil record*
SP84SE884	2.10	2.70	Blue clay	Blue grey silty clay KI.B
SP84SE400	0.00	1.50	Made Ground	Clay sand and gravel
SP84SE400	1.50	4.55	Gravel	

SP84SE400	4.55	5.20	Clay	silty clay *probably Kellaways*
SP84SE400	5.20	6.80	Clayey sand	
SP84SE880	0.00	2.10	Sandy clayey gravel	Brown sandy loam on gravel
SP84SE880	2.10	4.30	Clayey sand	Clayey sand and silt
SP84SE880	4.30	5.50	Blue clay	Blue grey clay KI.B? *more likely till for location*
SP84SE47	0.00	0.61	Topsoil	
SP84SE47	0.61	2.13	Oxidised sandy clay	Firm brown/grey mottled clay with gravel
SP84SE47	2.13	9.10	Clay	Oxford clay. Stiff grey fissured silty clay with some shells and occasional small pockets of sandy silt. Lower middle Grossouvrei at 6.1m
SP84SE401	0.00	0.45	Topsoil	
SP84SE401	0.45	2.90	Gravel	
SP84SE401	2.90	3.65	Clay	Stiff grey laminated clay with shell fragments.
SP84SE402	0.00	1.20	Gravel	
SP84SE402	1.20	3.20	Blue clay	Laminated dark blue grey soft to plastic clay, chalk pebbles absent. Slightly silty in part
SP84SE402	3.20	5.20	Blue clay	Fairly stiff laminated blue/grey clays. Lamination of fine grained sand and silt in lower part, pale grey to creamy grey in colour abundant small rounded grit size fragments of chalk and angular flints
SP84SE402	5.20	9.60	Blue clay	Blue grey clay continues with chalk

				fragments
SP84SE878	0.00	2.40	Gravelly sand	
SP84SE878	2.40	3.70	Clay	Chalky clay
SP84SE396	0.00	0.45	Topsoil	
SP84SE396	0.45	3.25	Gravel	
SP84SE396	3.25	5.50	Clay	Soft clay stiffer below 5.5m lst at 13m
SP84SE9	0.00	0.30	Topsoil	
SP84SE9	0.30	1.35	Oxidised sandy clay	
SP84SE9	1.35	2.58	Gravel	
SP84SE9	2.58	2.74	Clay	Firm brown silty clay with flints.
SP84SE9	2.74	6.09	Clay	Stiff grey brown fissured clay with shell traces Glacial lake clays?
SP84SE404	0.00	0.30	Topsoil	
SP84SE404	0.30	2.75	Gravel	
SP84SE404	2.75	4.25	Blue clay	Stiff laminated clays dark grey blue tinge. Hard rounded pebbles of chalk up to 5mm in size. No other pebbles. Slightly silty. Continues with variation in clast size to 14.8m and noted as probable base of drift
SP84SE877	0.00	1.20	Clay	grey brown clay
SP84SE877	1.20	1.50	Sandy gravel	
SP84SE877	1.50	4.60	Blue clay	Ox Cl *why, no fossil evidence : either till or Kellaways*
SP84SE10	0.00	0.30	Topsoil	
SP84SE10	0.30	1.20	Oxidised sandy clay	
SP84SE10	1.20	1.98	Sandy gravel	
SP84SE10	1.98	2.43	Diamicton	Stiff grey brown silty clay with nodules

				of chalk Boulder clay.
SP84SE10	2.43	5.49	Sandy gravel	Buried channel
SP84SE10	5.49	8.53	Blue clay	Stiff blue grey laminated clays with shells and occasional partings of fine sand. Buried channel.
SP84SE876	0.00	3.20	Sand	Brown loamy sand on fine sand
SP84SE876	3.20	4.60	Blue clay	Blue grey clay
SP84SE876	4.60	7.30	Diamicton	Boulder clay
SP84SE879	0.00	2.30	Gravel	
SP84SE879	2.30	4.60	Blue clay	Grey blue silty clay *probably till or outwash*
SP84SE911	0.00	2.70	Oxidised clayey sand	Brown clayey sand
SP84SE911	2.70	4.00	Clay	Soft grey green clay
SP84SE911	4.00	5.20	Sand	Fine sand
SP84SE911	5.20	6.10	Diamicton	Grey lam. Silty clay. Boulder clay?

APPENDIX 3: STRATIGRAPHY

Bore	**Soil Profile**			**Made Ground**	**Felmersham Member**	**Oadby Member**	**Oxford Clay Formation**	**Kellaways Formation**
	Top soil	Sandy clay/sandy gravelly clay	Clay		Surface m bgl			
SA01	yes				yes 0.45			
SA02	yes				yes 0.49			

SA03	yes				yes 0.39			
SA04	yes				yes 0.50			
SA05	yes				yes 0.35			
SA06	yes				yes 0.35			
SA07	yes				yes 0.28			
SA08	yes				yes 0.37			
SA09	yes				yes 0.30			
SA10	yes				yes 0.50			
SA11	yes				yes 0.40			
SA12	yes				yes 0.33			
SA13	yes				yes 0.33			
SA14	yes				yes 0.36			
TP02	yes				yes 0.30	yes		
TP03	yes				yes 0.50	yes		
TP05	yes				yes 0.40			
TP07	yes				yes 0.30			
TP09	yes	yes			yes 1.20	yes		
TP10	yes				yes 0.40			
TP11	yes				yes 0.30	yes		
TP13	yes				yes 0.45	yes		
TP14	yes				yes 0.40	yes		
TP29	yes				yes 0.34	yes		
TP31	yes				yes 0.34			
TP36	yes				yes 0.51	yes		
TP38	yes			yes		?		
TP42	yes			yes		?		
TP43	yes			yes		?		

TP44	yes			yes		?		
TP56	yes			yes		?		
TP57	yes			yes		?		
SP84SE858	yes	yes			Yes 0.90	yes		
SP84SE856	yes	yes			Yes 1.22	yes		
SP84SE857	yes	yes			Yes 1.22			yes
SP84SE859	yes	yes			Yes 1.07			yes
SP84SE905		yes						yes
SP84SE397					Yes outcrop	yes		
SP84SE884		yes						yes
SP84SE400				yes	Yes truncated at 1.50			yes
SP84SE880					Yes outcrop	yes		
SP84SE47	yes	yes					yes	
SP84SE401	yes				Yes 0.45	yes		
SP84SE402					Yes outcrop	yes		
SP84SE878					Yes outcrop	yes		
SP84SE396	yes				Yes 0.45			?
SP84SE9	yes	yes			Yes 1.35	yes		
SP84SE404	yes				Yes 0.30	yes		
SP84SE877			yes		Yes 1.20	? or		?
SP84SE10	yes	yes			Yes 1.20	yes		
SP84SE876	?				Yes outcrop	yes		
SP84SE879					Yes outcrop	yes		
SP84SE911					Yes outcrop	yes		

dynamic development solutions ™

Appendix 6.3

Earthwork Survey

Cotswold Archaeology

Land East of Willen Road
Newport Pagnell
Milton Keynes

Archaeological Earthwork Survey



for:
Bloor Homes (South Midlands)

CA Project: MK0390
CA Report: MK0390_1
OASIS ID: cotswold2-411865

January 2021

Andover Cirencester Exeter Milton Keynes Suffolk

Land East of Willen Road
Newport Pagnell
Milton Keynes

Archaeological Earthwork Survey

CA Project: MK0390
CA Report: MK0390_1
OASIS ID: cotswold2-411865

Document Control Grid						
Revision	Date	Author	Checked by	Status	Reasons for revision	Approved by
A	22/01/2021	JSJ	RM	Internal review	–	

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CONTENTS

SUMMARY 3

1. INTRODUCTION 4

2. ARCHAEOLOGICAL BACKGROUND 5

3. AIMS AND OBJECTIVES 7

4. METHODOLOGY 8

5. RESULTS 9

6. DISCUSSION 13

7. CA PROJECT TEAM 13

8. REFERENCES 13

APPENDIX E: OASIS REPORT FORM 15

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LIST OF ILLUSTRATIONS

Fig. 1 Site location plan (1:25,000)

Fig. 2 Earthwork Survey and LiDAR transcription results (1:2,500)

Fig. 3 Earthwork Survey and LiDAR transcription interpretation (1:2,500)

Fig. 4 Boundary between Areas 4 and 11 showing the head-dyke, looking south

Fig. 5 Drainage features in Area 6, looking north

Fig. 6 Area 8: Quarry Feature, looking east

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SUMMARY

Project name:	Land East of Willen Road
Location:	Newport Pagnell, Milton Keynes
NGR:	488112 242539
Type:	Earthwork Survey
Date:	13 January 2021
OASIS ID:	cotswold2-411865
Location of Archive:	To be deposited with Milton Keynes Museum and the Archaeology Data Service (ADS)
Site Code:	WNP21

In January 2021, Cotswold Archaeology carried out an Archaeological Earthwork Survey on Land East of Willen Road, Newport Pagnell, Milton Keynes.

The survey covered 25 ha of land between Willen Road and the River Ouzel, comprising ploughed arable fields and areas of pasture. A single area of upstanding ridge and furrow was recorded in the centre of the site with two smaller, less distinct patches to the south and east transcribed from Environment Agency LiDAR data. Areas of flood management earthworks, thought to be contemporary with the medieval field systems, were also recorded between the cultivable ground and the River Ouzel. The alignment of a causewayed track, thought to provide access to a small manorial site at Caldecote, was also recorded.

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1. INTRODUCTION

1.1. In January 2021, Cotswold Archaeology (CA) carried out an archaeological earthwork survey of land east of Willen Road, Newport Pagnell, Milton Keynes (centred at NGR: 488112 242539; Fig. 1). This survey was undertaken for Triskelion Heritage, who were acting on behalf of client, Bloor Homes (South Midlands).

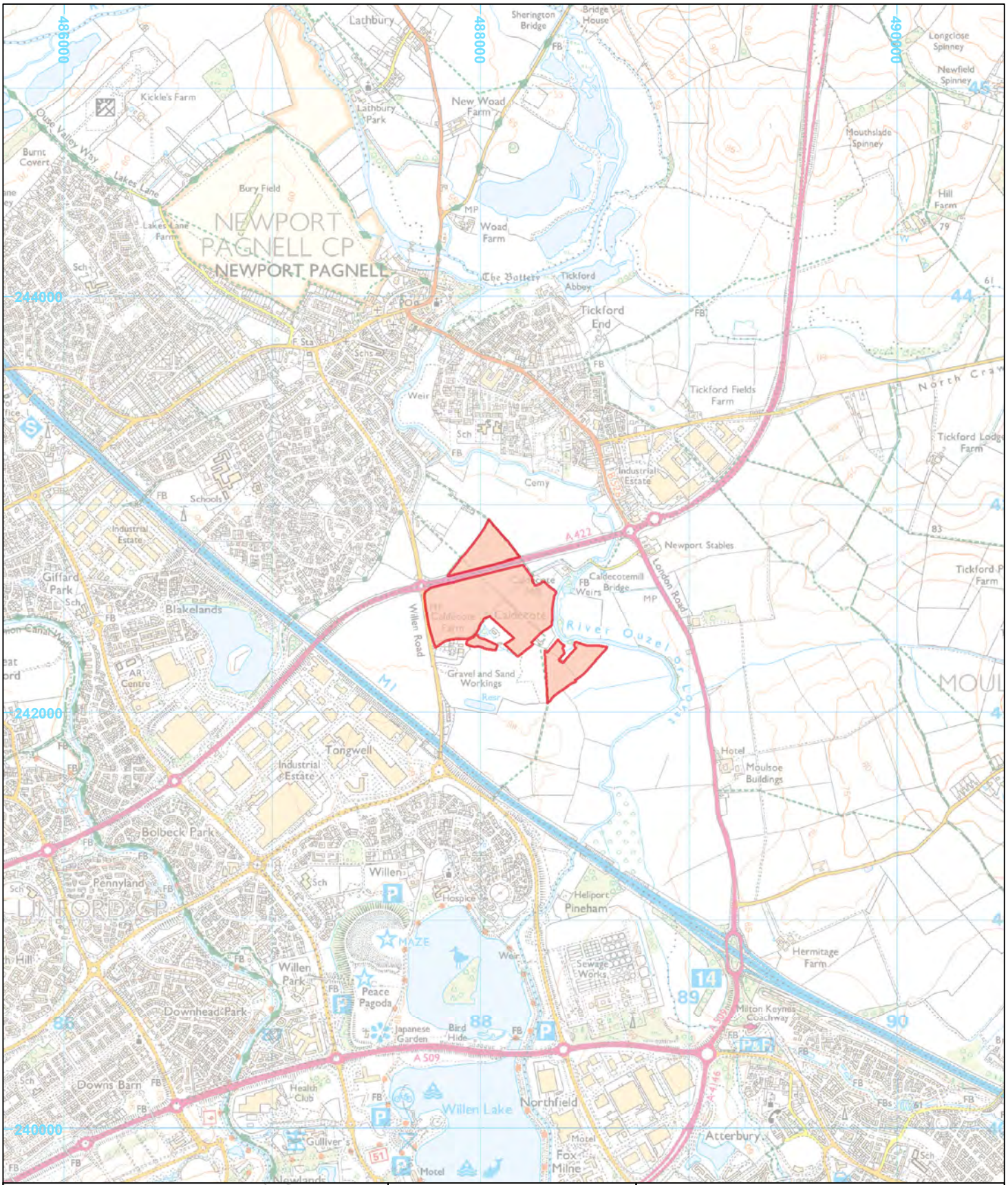
1.2. The earthwork survey and subsequent evaluation results will inform a planning application for residential development of the site, with associated infrastructure and landscaping, which will be made to Milton Keynes Council. The site has since been subject to a full desk-based assessment by Triskelion Heritage and Robinson Wild Consulting (TH, 2020) and a geophysical survey carried out by Magnitude Surveys (MS, 2020).

1.3. The scope of this survey was defined by Nick Crank, Senior Archaeological Officer Milton Keynes Council (SAOMKC), the archaeological advisor to Milton Keynes Council. The survey was carried out in accordance with a Written Scheme of Investigation (WSI) prepared by CA (2021) and approved by Nick Crank.

1.4. The evaluation was also in line with *Standard and guidance for archaeological field evaluation* (CIfA 2014; updated October 2020), *Management of Research Projects in the Historic Environment (MoRPHE) PPN 3: Archaeological Excavation* (Historic England 2015) and *Management of Research Projects in the Historic Environment: The MoRPHE Project Managers' Guide* (Historic England 2015).

The site

1.5. The site is located c.1.3km to the south east of the centre of Newport Pagnell and c.3.7km to the north east of Milton Keynes (Figure 1). The site extends to an area of c. 41 hectares. It consists of two parcels of land intersected by the A422. The larger parcel of land to the south of the A422 is bounded to the north by hedge-line fronting the A422, the River Ouzel and floodplain to the east, fields and the M1 to the south and hedge-line fronting Willen Road to the west. It is characterised by generally level arable fields, some currently under pasture, with an area of former gravel extraction in the south west of the site. There are visible earthworks in the form of ridge and furrow in the fields under pasture. There are also two large residential properties, Caldecote Cottage and Moat Cottage with associated land situated in this section of the site. They do not form part of the proposed residential



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PROJECT TITLE

Willen Road, Newport Pagnell, Buckinghamshire

FIGURE TITLE

Site location plan

DRAWN BY	JSJ	PROJECT NO.	MK0390	FIGURE NO.
CHECKED BY	RM	DATE	26/01/2021	1
APPROVED BY	RM	SCALE @ A4	1:25,000	

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development. The smaller triangular-shaped parcel of land situated to the north of the A422 is an arable field bounded to the north and east by fields, the A422 to the south and hedge- and treeline to Newport Pagnell Town Football and Social Club to the west.

1.6. The British Geological Survey identifies the bedrock underlying the site as Sandstone, Siltstone and Mudstone - Kellaways Formation. This sedimentary bedrock was formed approximately 164 to 166 million years ago in the Jurassic period in an environment previously dominated by shallow seas (BGS, 2020). The superficial deposits are Felmersham Member – Sand and Gravel. These deposits formed up to 3 million years ago in the Quaternary period. They are fluvial in origin and detrital, ranging from coarse- to fine-grained and form beds and lenses of deposits reflecting the channels, floodplains, and levees of a river (ibid).

2. ARCHAEOLOGICAL BACKGROUND

2.1. An archaeological background for the Site and surrounding area has been presented within a Heritage Desk-Based Assessment (Triskelion Heritage and Robinson Wild Consulting 2020) and the following section is summarised from this.

Prehistoric period and Roman periods (up to AD 410)

2.2. There are no known archaeological deposits from the Palaeolithic and Mesolithic Periods within the site. Within the immediate area, to the east of the site next to the River Ouzel, a finished axe-head (Findspot MKHER ID: MMK3636) and an unretouched flake (Findspot MKHER ID: MMK3637) of possible Palaeolithic date were recorded. Also, within the area, to the west of the site, a punch struck blade (Findspot MKHER ID: MMK992) of possible Early Mesolithic to Late Neolithic date has been recorded.

2.3. During systematic fieldwalking in 1976-7, there were multiple finds (MKHER ID: MMK982-90) of artefacts of Early Neolithic to Late Bronze Age Date recorded in the north of the site on the boundary with the A422.

2.4. Cropmark evidence suggests that there are four ring ditches (MKHER ID: MMK502 / MKHER ID: MMK504 / MKHER ID: MMK929 / MKHER ID: MMK930) and one linear feature (MKHER ID: MMK505) to the south of the application site, however no traces of these were found on the ground during trench evaluation prior to quarrying.

2.5. To the west of the site, controlled archaeological investigations (MKHER ID: EMK860; EMK915; EMK761; EMK762; EMK: 535) have revealed the remains of a substantial settlement with a number of features including annular and rectilinear enclosures of Early Iron Age to Roman date (MKHER ID: MMK934).

2.6. There is evidence of activity during the Roman period to the east of the site and focused in the area of the later Caldecote Mill. The location of a Ford is known (MKHER ID: 457) near to which pottery and a quern suggest a potential small riverside dwelling (MKHER ID: 454).

Early Medieval and medieval periods (AD 410 – 1539)

2.7. Evidence for early and mid-Saxon activity in the Milton Keynes area is relatively good. Newport Pagnell was established as a trading settlement at the confluence of the Ouse and Ouzel during the late Saxon period. The gravel terraces along the Ouzel could be considered a favoured location for Early Anglo-Saxon settlement activity.

2.8. Caldecote Mill was mentioned in the Domesday Survey and was an important possession of Tickford Priory. It was destroyed by fire in the 19th Century and not rebuilt. There were two fees in Caldecote at the time of the Survey, both of which afterwards went to form the property known as Caldecote Manor. It is first called a manor in 1426 when the recorded tenant was Thomas Caldecote.

2.9. Aerial photography has identified soil marks which may represent the plough truncated remains of a Medieval hamlet adjacent to the site, however, opinions differ on the exact nature of the deserted settlement at Caldecote. These are variously a deserted Medieval village with 2 moats although there is no evidence of house platforms or streets, or a small manorial complex with associated buildings, the “moats” being the remains of a manorial enclosure (MKHER ID: MMK87 / MMK92). Some research has been undertaken (Giggins, 2008) on the exact nature of the site which summarises hypotheses that there was a triangular village green with buildings either side. The research, based on analysis of map, documentary and archaeological evidence suggests that the previous assumption that there was a large medieval moated site at Caldecote was probably incorrect. The linear water features shown on 19th century maps and as parch marks on aerial photographs next to the River Ouzel, may indicate a planned formal garden for a large house, with a complex of water features. Although the location of the manor house has not

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been formerly identified though map or archaeological evidence, it can be suggested by the location of a straight road leading north-west from the probable garden which cuts across ridge and furrow and formerly terminated at the Newport Pagnell to Fenny Stratford Road.

2.10. Croft and Mynard 1993 (19) note that on the east bank of the Ouzel settlements were regularly spaced at 1.5-2km intervals and located on the lower terraces (but above the flood-plain) and while this was observed in what was then the Milton Keynes area the proposed development site is only just outside that boundary and the observation may be equally applicable. Another feature observed that may relate to the proposed development area is that within Milton Keynes some parishes were poly-focal – Willen (to the south) was one with a subservient focus at Caldecote – which is within the proposed red-line boundaries (Croft and Mynard 1993 21). Willen and Caldecote were one 'vill' in the 14th century but were split and Caldecote merged with Newport Pagnell (Croft and Mynard 1993, 171).

2.11. In 1541 the manor of Caldecote was bought by John White, whose family continued to hold it until the end of the 17th century. In 1750 the owner, William Blackwell, a banker of Pall Mall, acquired Caldecote mill and the land that had been granted by Fulk Paynel to Tickford Priory, and had since descended with Tickford Manor (Page 1927, 415). It was probably shortly after this time that the Manor House was demolished (Giggins 2008). The manor of Caldecote then descended through various owners to the end of the19th century. There are a number of documentary references to the manor and the village Caldecotte Green is mentioned in 1648, Great Green in 1670, and both Great Green and Little Green in 1688 (Giggins 2008). Five cottages are mentioned in a 1713 document (ibid.).

2.12. A watching brief was undertaken at Caldecote Farm Cottage in 2004 (MKHER ID: EMK785) and trial trenching was undertaken to the south of the site in advance of quarrying in 2010 (MKHER ID: EMK1120). No archaeological features or deposits were identified as part of the watching brief. The trial trenching carried out in 2010, however, confirmed that remnants of the Medieval manorial settlement were present to the south of the site including an open field system. Of note, was the evidence for limited Prehistoric activity defined by a relatively substantial pit which contained a small assemblage of flint artefacts of Neolithic/Bronze Age date.

3. AIMS AND OBJECTIVES

3.1. The general objective of the earthwork survey is to provide further information on the likely archaeological resource within the site, including its presence/absence, character, extent, date and state of preservation and to record the earthworks (ridge and furrow) on the site prior to an archaeological evaluation. This information will enable Milton Keynes Council to identify and assess the particular significance of any archaeological heritage assets within the site, consider the impact of the proposed development upon that significance and, if appropriate, develop strategies to avoid or minimise conflict between heritage asset conservation and the development proposals, in line with the *National Planning Policy Framework* (MHCLG 2019).

3.2. The specific objective of the survey was to record any earthworks present prior to evaluation (specifically, but not confined to, the upstanding remains of Medieval ridge and furrow agriculture).

4. METHODOLOGY

4.1. LIDAR tiled DTM and DSM datasets were downloaded from the Environment Agency website at a spatial resolution of 1m. It is considered good practice to process both the DTM and DSM datasets. However, while the DTM is useful in removing vegetation and other non-ground points, the process of classification used to produce DTM data can also remove subtle archaeological features. Therefore, in non-wooded areas a DSM is preferable, since it represents a larger proportion of the original data compared with the DTM (Historic England 2018). The data was then processed through Relief Visualization Toolbox (RVT) to produce several visualisations including Multidirectional Hillshade, Local Relief Model, Sky View Factor and Openness (positive and negative). Resulting visualisations were then used as the basis for a transcribed record of all anthropogenic features on the site.

4.2. The LiDAR transcription was cross-checked in the field and complimented by means of an earthwork survey. This was undertaken using Real Time Kinematic (RTK) Global Navigation Satellite Systems. Breaks of slope were surveyed at the top and base, a photographic record was made of upstanding earthworks, and field notes were taken to compliment the digital data as well as serving to record any apparent stratigraphic relationships which were observed during the survey.

4.3. CA will make arrangements with Milton Keynes Museum for the deposition of the project archive. A digital archive will also be prepared and deposited with the

Archaeology Data Service (ADS). The archives (museum and digital) will be prepared and deposited in accordance with *Standard and guidance for the creation, compilation, transfer and deposition of archaeological archives* (CIfA 2014; updated October 2020).

4.4. A summary of information from this project, as set out in Appendix A, will be entered onto the OASIS online database of archaeological projects in Britain.

5. RESULTS

5.1. This section provides an overview of the survey results. Anomalies and areas have been attributed numbers (1 – 13) and have been phased broadly (from Medieval to Modern) according to morphology, clear stratigraphic relationships observed on the ground and information from the Archaeological Desk Based Assessment (Triskelion, 2020). All features were recorded during the site visit and earthwork survey, unless stated otherwise.

Medieval

5.2. Three isolated portions of ridge and furrow were recorded across the site, comprising Areas 4 and 10.

5.3. Area 4 formed the largest parcel of ridge and furrow within the development boundary. It comprised well-defined furrows, with c. 0.2 – 0.4m difference in height between ridges and furrows, forming reverse 'S' curves oriented south west to north east. They were truncated by a later Post-medieval trackway (Area 1), and by a series of modern service trenches and discrete features which were interpreted as telegraph-pole pits. A large bank and ditch on the eastern edge of Area 4, rising some 0.9m above the surrounding area, was interpreted as a head-dyke, marking the edge of tillable land, with seasonally waterlogged land around River Ouzel immediately to the east.

5.4. Area 10 comprised truncated earthworks of a former ridge and furrow system, surviving to a height of c. 0.1m. This is contiguous to patches of cultivated land depicted on late 18th century maps of the area, reproduced in the ADBA (Triskelion, 2020).

5.5. Areas 6, 8, 9, 11 and 13 were located between the areas of ridge and furrow, and the River Ouzel, on land which is seasonally waterlogged. Area 6 contained a well-



Legend

- Topo bottom of slope
- Topo top of slope
- LiDAR bottom of slope
- LiDAR top of slope

N

0 100m

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PROJECT TITLE

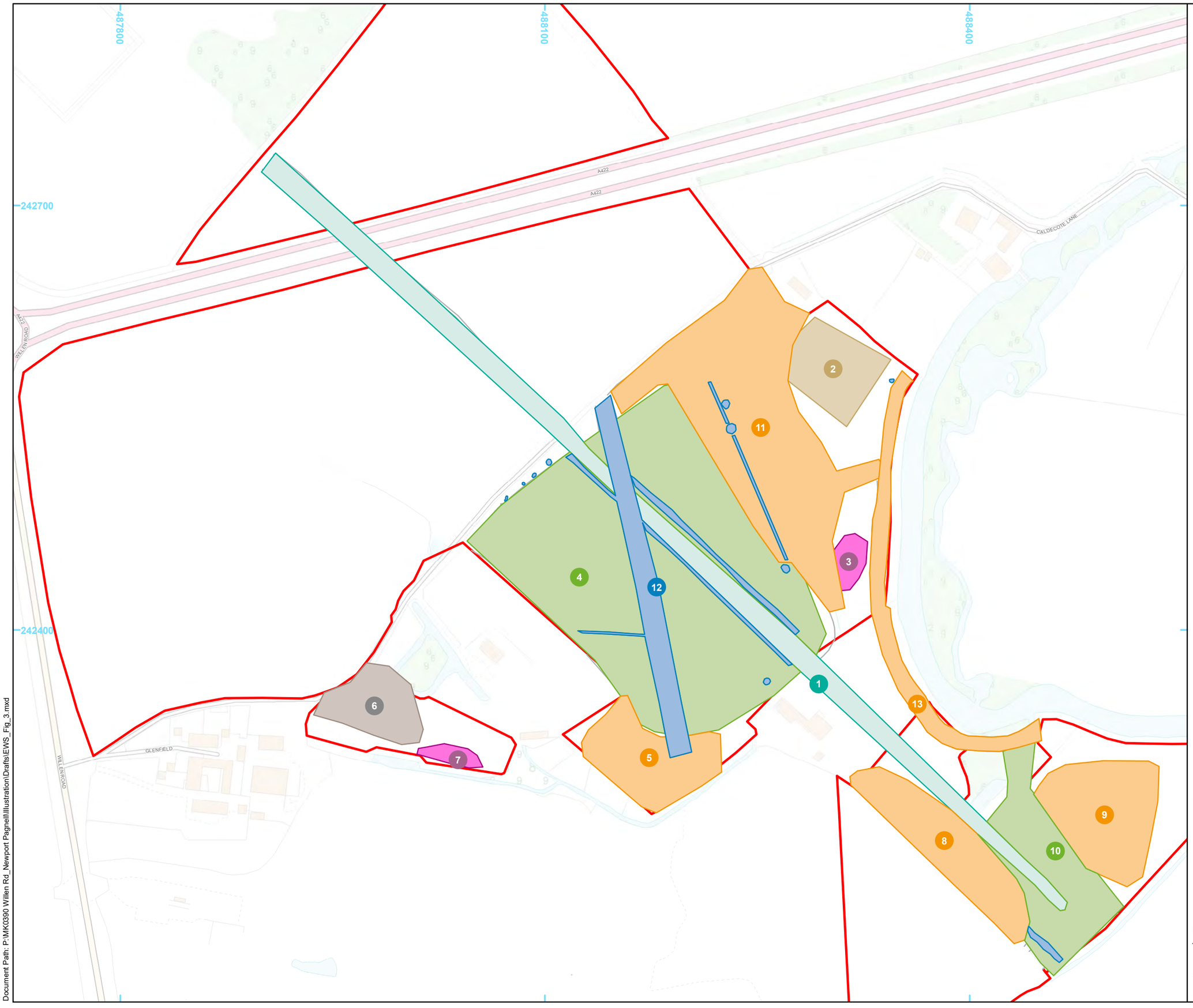
Willen Road, Newport Pagnell, Buckinghamshire

FIGURE TITLE

Earthwork Survey and LiDAR transcription results

DRAWN BY	**JSJ**	*PROJECT NO*	**MK0390**	*FIGURE NO.*
CHECKED BY	**RM**	*DATE*	**26/01/2021**	2
APPROVED BY	**RM**	*SCALE@A3*	**1:2,500**	

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N

Legend

- Modern
- Post Medieval Track
- Ridge and Furrow
- Flood management earthworks
- Quarrying
- Natural
- Watermeadow

0 100m

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PROJECT TITLE

Willen Road, Newport Pagnell, Buckinghamshire

FIGURE TITLE

Earthwork Survey and LiDAR transcription interpretation

DRAWN BY	JSJ	*PROJECT NO*	MK0390	*FIGURE NO.*
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APPROVED BY	RM	*SCALE@A3*	1:2,500	

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Preserved drainage ditch aligned north west to south east, with a counterscarp bank raised-up along its eastern edge. At the eastern edge of the area a large semi-circular pit with a raised central mound may be the remains of a medieval or later quarry-pit. A series of low platforms along the south eastern edge of the area were interpreted as the remains of dredging's or spoil arising out of an adjacent drainage ditch.



Fig.4 Boundary between Areas 4 and 11 showing the head-dyke, looking south

5.6. Area 8 comprised a low bank and ditch aligned northwest to southeast. These mark the edge of a ploughed field immediately to the west. Ground immediately east was waterlogged and under pasture during the site visit.

5.7. Area 9 comprised a series of drainage channels running from the edge of the ridge and furrow (Area 10) towards the River Ouzel. These had been allowed to silt up to the point where they were barely perceptible on site and were transcribed from the LiDAR SLRM.

5.8. Area 11 consisted of a complex series of earthworks, defined by the northern and eastern edges of ridge and furrow (Area 4) and the western bank of the River Ouzel. These earthworks comprised a flat area immediately east of Area 4, which

appeared to have been artificially extended to the east where it was defined by a drainage channel running from south to north.

5.9. Area 13 comprised a wide, low bank raised to a maximum height of 0.7m above the surrounding land, along the western edge of the River Ouzel. The bank had been breached a single point in its central section to allow livestock access to the river. All other drainage channels aligned on the river, including those in Area 8, appear to have been masked by this feature, suggesting it dates to the later medieval or post medieval landscape.



Fig.5 Drainage features in Area 6, looking north

Post Medieval

5.10. Area 1 comprised a low raised bank aligned north west to south east, measuring 10 – 15 metres wide. The north western end had been ploughed-out to the point where it was imperceptible on the ground but was detectable using the SLRM. The central portion remains in use as an access track to late 19th century house and the south eastern terminus is preserved overlying a small patch of ridge and furrow.

5.11. Area 2 was characterised by a series of low ridges and furrows aligned north west to south east, with a perpendicular bank forming the south eastern boundary.

These features had been truncated, with 0.05 – 0.1m difference between ridges and furrows and were barely perceptible on the ground; they were detected using LiDAR data hillshades and the Simple Local Relief Modelling (SLRM). Sitting within the seasonal flood-area of the Ouzel, these features were interpreted as the remains of a small water-meadow.

5.12. Area 8, isolated from the remainder of the survey areas on the western side of the site, included a series of low linear banks and a single discrete hollow, forming an irregular oval in plan, which survived to a depth of c. 0.5m below the surrounding ground level. This was interpreted as another potential quarry pit targeting natural deposits of sand and gravel.



Fig.6 Area 8: Quarry Feature, looking east

Modern

5.13. A series of large linear features were observed cutting across ridge and furrow in Area 4. These related to the alignment of known services and represent 20th century activity. Several discrete features were also recorded across the site. These were almost all aligned with existing overhead services and were interpreted as the remains of former telegraph-pole pits.

Undated

5.14. Two areas, 3 and 7, contained features which were interpreted as being natural in origin. These where characteries by low curving cuts into existing banks or platforms adjacent to watercourses: these were likely formed as the result of flooding.

6. DISCUSSION

6.1. The survey recorded upstanding earthworks dating from the medieval to Modern periods. The earliest features were characterised by pockets of surviving ridge and furrow occupying cultivable land along the edge of the River Ouzel; these were likely associated with the small medieval settlement at Caldecote Mill. Several features were recorded between the ridge and furrow and the riverbank, which appear to form part of a contemporary medieval landscape. These features included drainage ditches and banks. The purpose appears to have been to maximise the area of useable land between the open fields and the river by improving drainage (Area 6 and 11), and by extending the area itself with artificial platforms (Area 11). Post medieval landscape use was characterised by the construction of a low causeway, which may have served to access a manorial site (MKHER ID: MMK87 / MMK92). Later features belonged to the later 20th century when local electrification and sewerage schemes saw the excavation of service trenches and erection of pylons across the site.

7. CA PROJECT TEAM

7.1. Fieldwork was undertaken by Jake Streatfeild-James. This report was written by Jake Streatfeild-James. The report illustrations were prepared by Jake Streatfeild-James. The project archive has been compiled by Matt Lee and prepared for deposition by Hazel O'Neill. The project was managed for CA by Richard Mortimer.

8. REFERENCES

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Ministry of Housing, Communities & Local Government 2019 *National Planning Policy Framework*

Triskelion Heritage and Robinson Wild Consulting 2020, Land East of Willen Road, Newport Pagnell, Buckinghamshire: Historic Environment Desk-Based Assessment. Report

APPENDIX A: OASIS REPORT FORM

PROJECT DETAILS		
Project name	Land East of Willen Road, Earthwork Survey	
Short description	In January 2021, Cotswold Archaeology carried out an Archaeological Earthwork Survey on Land East of Willen Road, Newport Pagnell, Milton Keynes. The survey covered 25 ha of land between Willen Road and the River Ouzel, comprising ploughed arable fields and areas of pasture. A single area of upstanding ridge and furrow was recorded in the centre of the site with two smaller, less distinct patches to the south and east transcribed from Environment Agency LiDAR data. Areas of flood management earthworks, thought to be contemporary with the medieval field systems, were also recorded between the cultivable ground and the River Ouzel. The alignment of a causewayed track, thought to provide access to a small manorial site at Caldecote, was also recorded.	
Project dates	13/01/2021	
Project type	Earthwork Survey	
Previous work		
Future work	Trial Trenching	
PROJECT LOCATION		
Site location	Caldecote Farm, Willen Road, Newport Pagnell	
Study area (m^2/ha)	25Ha	
Site co-ordinates	488112 242539	
PROJECT CREATORS		
Name of organisation	Cotswold Archaeology	
Project brief originator	Senior Archaeological Officer Milton Keynes Council	
Project design (WSI) originator	CA	
Project Manager	Richard Mortimer	
Project Supervisor	Jake Streatfeild-James	
MONUMENT TYPE	Ridge and Furrow	
SIGNIFICANT FINDS	None	
PROJECT ARCHIVES	**Intended final location of archive (museum/Accession no.) Recipient of each type of archive**	**Content (e.g. pottery, animal bone etc) Indicate the contents of each archive box**
Physical	N/A	For example ceramics, animal bone etc
Paper	N/A	Context sheets, matrices etc
Digital	Milton Keynes Museum	Database, digital photos etc
BIBLIOGRAPHY		
Add reference this report only, for example: Cotswold Archaeology 2021 *Land East of Willen Road, Newport Pagnell, Archaeological Earthwork Survey* CA typescript report **MK0390_1**		

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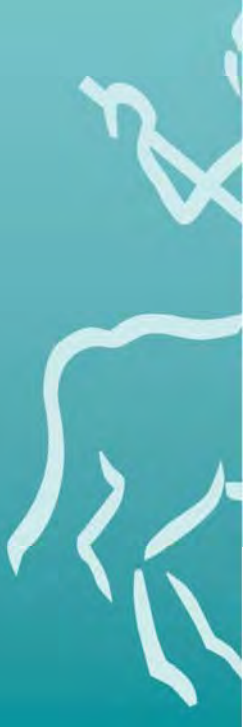
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dynamic development solutions ™

Appendix 6.4

Geophysical Survey

Geophysical Survey Report

of

Willen Road, Newport Pagnell

For

Triskelion Heritage

On Behalf Of

Bloor Homes South Midland Ltd

Magnitude Surveys Ref: MSSP696

HER Event Number: EMK1428

August 2020

Unit 17, Commerce Court

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Bradford

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info@magnitudesurveys.co.uk

Report By:

William Rigby BA MA PCIfA, Sophie Peel BSc (Hons)

Report Approved By:

Dr Paul S. Johnson BA MA PhD

Issue Date:

10 September 2020

Abstract

Magnitude Surveys was commissioned to assess the subsurface archaeological potential of a c. 28.29 ha area of land at Willen Road, Newport Pagnell, Milton Keynes. A fluxgate gradiometer survey was successfully completed across the survey area. The geophysical survey has detected a range of anomalies of archaeological, agricultural, natural and modern origins. Possible enclosures which may represent a former field system have been identified with associated trackways. The intensive agricultural use of the survey area has been detected in the form of ridge and furrow cultivation, former field boundaries and modern ploughing. The ridge and furrow appear to have disturbed the anomalies of possible archaeological origin which have made their identification less certain. Natural variations relating to the deposition of alluvium have been detected in the southeast of the site near a stream. The impact of modern activity on the results includes magnetic disturbance from fencing at field edges and buried services which have been detected across the site. 8.4. A series of features of undetermined origin were also identified. These could relate to archaeological, agricultural, natural or modern processes.

Contents

Abstract 2
List of Figures 4
1. Introduction 5
2. Quality Assurance 5
3. Objectives 5
4. Geographic Background 6
5. Archaeological Background 7
6. Methodology 8
6.1. Data Collection 8
6.2. Data Processing 8
6.3. Data Visualisation and Interpretation 9
7. Results 10
7.1. Qualification 10
7.2. Discussion 10
7.3. Interpretation 11
7.3.1. General Statements 11
7.3.2. Magnetic Results - Specific Anomalies 11
8. Conclusions 13
9. Archiving 14
10. Copyright 14
11. References 14
12. Project Metadata 15
13. Document History 15

List of Figures

Figure 1:	Site Location	1:25,000 @ A4
Figure 2:	Location of Survey Area	1:10,000 @A3
Figure 3:	Magnetic Total Field (Lower Sensor) Overview	1:4,000 @ A3
Figure 4:	Magnetic Gradient Overview	1:4,000 @ A3
Figure 5:	Magnetic Interpretation Overview	1:4,000 @ A3
Figure 6:	Magnetic Interpretation Over Satellite and Historic Mapping	1:4,000 @ A3
Figure 7:	Magnetic Gradient (Areas 2, 5, 6 & 8)	1:1,500 @ A3
Figure 8:	Magnetic Interpretation (Areas 2, 5, 6 & 8)	1:1,500 @ A3
Figure 9:	XY Trace Plot (Areas 2, 5, 6 & 8)	1:1,500 @ A3
Figure 10:	Magnetic Gradient (Areas 1, 2, 3, 6, 8, & 9)	1:1,500 @ A3
Figure 11:	Magnetic Interpretation (Areas 1, 2, 3, 6, 8, & 9)	1:1,500 @ A3
Figure 12:	XY Trace Plot (Areas 1, 2, 3, 6, 8, & 9)	1:1,500 @ A3
Figure 13:	Magnetic Gradient (Areas 2, 3, 6, 8 & 9)	1:1,500 @ A3
Figure 14:	Magnetic Interpretation (Areas 2, 3, 6, 8 & 9)	1:1,500 @ A3
Figure 15:	XY Trace Plot (Areas 2, 3, 6, 8 & 9)	1:1,500 @ A3
Figure 16:	Magnetic Gradient (Areas 3, 4 & 7)	1:1,500 @ A3
Figure 17:	Magnetic Interpretation (Areas 3, 4 & 7)	1:1,500 @ A3
Figure 18:	XY Trace Plot (Areas 3, 4 & 7)	1:1,500 @ A3

1. Introduction

1.1. Magnitude Surveys Ltd (MS) was commissioned by Triskelion Heritage on behalf of Bloor Homes South Midland Ltd to undertake a geophysical survey on a c. 28.29ha area of land at Willen Road, Newport Pagnell, Milton Keynes (SP880425).

1.2. The geophysical survey comprised hand-pulled and quad-towed cart-mounted GNSS-positioned fluxgate gradiometer survey.

1.3. The survey was conducted in line with the current best practice guidelines produced by Historic England (David et al., 2008), the Chartered Institute for Archaeologists (CIfA, 2014) and the European Archaeological Council (Schmidt et al., 2015).

1.4. It was conducted in line with a WSI produced by MS (Magnitude Surveys, 2020).

1.5. The survey commenced on 17th August and took four days to complete.

2. Quality Assurance

2.1. Magnitude Surveys is a Registered Organisation of the Chartered Institute for Archaeologists (CIfA), the chartered UK body for archaeologists, and a corporate member of ISAP (International Society of Archaeological Prospection).

2.2. The directors of MS are involved in the cutting edge of research and the development of guidance/policy. Specifically, Dr. Chrys Harris has a PhD in archaeological geophysics from the University of Bradford, is a Member of CIfA and is the Vice-Chair of the International Society for Archaeological Prospection (ISAP); Finnegan Pope-Carter has an MSc in archaeological geophysics and is a Fellow of the London Geological Society, as well as a member of GeoSIG (CIfA Geophysics Special Interest Group); Dr. Kayt Armstrong has a PhD in archaeological geophysics from Bournemouth University, is a Member of CIfA, the Editor of ISAP News, and is the UK Management Committee representative for the COST Action SAGA; Dr. Paul Johnson has a PhD in archaeology from the University of Southampton, has been a member of the ISAP Management Committee since 2015, and is currently the nominated representative for the EAA Archaeological Prospection Community to the board of the European Archaeological Association.

2.3. All MS managers have relevant degree qualifications to archaeology or geophysics. All MS field and office staff have relevant archaeology or geophysics degrees and/or field experience.

3. Objectives

3.1. The objective of this geophysical survey was to assess the subsurface archaeological potential of the survey area.

4. Geographic Background

4.1. The site is located c. 1.5km southeast from centre of Newport Pagnell (Figure 1). Survey was undertaken across nine fields bound to the north by the A422, to the east by the A509, to the south by the M1 and to the west by Willen Road (Figure 2).

4.2. Survey considerations:

Survey Area	Ground Conditions	Further Notes
1	Flat pasture field with some natural undulation.	Bounded to the north and west by wooden fencing which separated the area from a farm track. Bounded to the south by wooden fencing which separated the area from an aggregates mining area. Bounded to the east by fencing which separated the area from a waste dumping area. A telegraph line ran through the centre of the area in a west-east orientation, with the field containing one pole.
2	Flat pasture field with some natural undulation.	Bounded to the east by electrical fencing which separated the area from a river. Bounded to the north and south by metal fencing which separated the area from farm houses. Bounded to the west by a ditch, with a wooden bridge in the centre of the field boundary. A small linear depression was located running east-west in the centre of the field.
3	Flat pasture field with some natural undulation.	Bounded to the north by a river and electric fence. Bounded to the east and south by metallic fencing. Bounded to the east by wooden fencing.
4	Flat pasture field with some natural undulation.	Bounded to the south, east and west by metallic fencing. Bounded to the north by a river and electric fencing. Drainage ditch ran east to west across the centre of the survey area. Some trees and bushes were located along the western boundary.
5	Flat cultivated arable field with some stubble and ploughing.	Bounded to the north by hedgerow. Bounded to the south by wooden fencing and trees which separated the area from the A422. Telegraph lines ran over the area near the south boundary running east-west. Two poles were located in the area.
6	Flat roughly ploughed arable field.	Bounded to the north by wooden fencing and trees which separated the area from the A422. Bounded to the west by wooden fencing and trees which separated the area from Willen Road. Bounded to the south by wooden fencing. A drainage ditch with surrounding trees was located in the centre

		of the field, running north-west from the central southern boundary.
7	Flat freshly cultivated arable field with some stubble and ploughing.	Bounded to the south by wooden fencing and hedgerow. Bounded to the northeast by wooden fencing with a central metal gate. Unbounded to the west.
8	Undulating pasture field with two orientations of extant ridge and furrow.	Bounded to the north and west by wooden fencing. Bounded to the east by a drainage ditch with a wooden bridge in the centre of the field boundary. Power lines ran across the northern section of the area in an east-west orientation. Two poles were located in the area. A metal trough was located near the northern boundary.

4.1. The underlying geology comprises Kellaways Formation – Sandstone, Siltstone and Mudstone. Superficial deposits in the east of the survey area are Alluvium – Clay and Silt, and to the west Felmersham Member – Sand and Gravel.

4.2. The soils consist of loamy and clayey floodplain soils with naturally high groundwater to the east, and to the west slightly acid loamy and clayey soils with impeded drainage.

5. Archaeological Background

5.1. The following is a summary of a Desk-Based Assessment produced by Robinson Wild Consulting and Triskelion Heritage (Robinson Wild Consulting and Triskelion Heritage, 2020) and provided by Triskelion Heritage.

5.2. Within the north-central part of the survey area, south of the A422, an admittedly thin scatter of Roman ceramics has been noted on the surface (pers. comm., Wait, 2020)

5.3. Early to Late Prehistoric activity has been recorded to the west of the survey area with an Iron Age enclosure and Ring ditch identified 700m and 200m, respectively. Three further Ring ditches are located 400m to the south of the survey area and associated linear feature and 'site'.

5.4. Medieval activity has been recorded within the survey area as multiple features associated with Caldecote Medieval Manorial deserted complex/settlement. The features include moats, ponds and Avenue of trees.

5.5. A Post-medieval manor house and associated buildings were also identified within or in close proximity to the survey area.

5.6. A curilinear enclosure, of unknown date, has also been identified 800m to the east of the survey area.

6. Methodology

6.1. Data Collection

6.1.1. Geophysical prospection comprised the magnetic method as described in the following table.

6.1.2. Table of survey strategies:

Method	Instrument	Traverse Interval	Sample Interval
Magnetic	Bartington Instruments Grad-13 Digital Three-Axis Gradiometer	1m	200Hz reprojected to 0.125m

6.1.3. The magnetic data were collected using MS' bespoke hand-pulled and quad-towed cart system.

6.1.3.1. MS' cart system was comprised of Bartington Instruments Grad 13 Digital Three-Axis Gradiometers. Positional referencing was through a multi-channel, multi-constellation GNSS Smart Antenna RTK GPS outputting in NMEA mode to ensure high positional accuracy of collected measurements. The RTK GPS is accurate to 0.008m + 1ppm in the horizontal and 0.015m + 1ppm in the vertical.

6.1.3.2. Magnetic and GPS data were stored on an SD card within MS' bespoke datalogger. The datalogger was continuously synced, via an in-field Wi-Fi unit, to servers within MS' offices. This allowed for data collection, processing and visualisation to be monitored in real-time as fieldwork was ongoing.

6.1.3.3. A navigation system was integrated with the RTK GPS, which was used to guide the surveyor. Data were collected by traversing the survey area along the longest possible lines, ensuring efficient collection and processing.

6.2. Data Processing

6.2.1. Magnetic data were processed in bespoke in-house software produced by MS. Processing steps conform to Historic England's standards for "raw or minimally processed data" (see sect 4.2 in David et al., 2008: 11).

Sensor Calibration – The sensors were calibrated using a bespoke in-house algorithm, which conforms to Olsen et al. (2003).

Zero Median Traverse – The median of each sensor traverse is calculated within a specified range and subtracted from the collected data. This removes striping effects caused by small variations in sensor electronics.

Projection to a Regular Grid – Data collected using RTK GPS positioning requires a uniform grid projection to visualise data. Data are rotated to best fit an orthogonal grid projection and are resampled onto the grid using an inverse distance-weighting algorithm.

Interpolation to Square Pixels – Data are interpolated using a bicubic algorithm to increase the pixel density between sensor traverses. This produces images with square pixels for ease of visualisation.

6.3.Data Visualisation and Interpretation

6.3.1.This report presents the gradient of the sensors' total field data as greyscale images, as well as the total field data from the lower sensors. The gradient of the sensors minimises external interferences and reduces the blown-out responses from ferrous and other high contrast material. However, the contrast of weak or ephemeral anomalies can be reduced through the process of calculating the gradient. Consequently, some features can be clearer in the respective gradient or total field datasets. Multiple greyscale images at different plotting ranges have been used for data interpretation. Greyscale images should be viewed alongside the XY trace plot (Figures 9, 12, 15, 18). XY trace plots visualise the magnitude and form of the geophysical response, aiding in anomaly interpretation.

6.3.2.Geophysical results have been interpreted using greyscale images and XY traces in a layered environment, overlaid against open street maps, satellite imagery, historic maps, LiDAR data, and soil and geology maps. Google Earth (2020) was consulted as well, to compare the results with recent land usages.

6.3.3.Geodetic position of results - All vector and raster data have been projected into OSGB36 (ESPG27700) and can be provided upon request in ESRI Shapefile (.SHP) and Geotiff (.TIF) respectively. Figures are provided with raster and vector data projected against OS Open Data.

7. Results

7.1. Qualification

7.1.1. Geophysical results are not a map of the ground and are instead a direct measurement of subsurface properties. Detecting and mapping features requires that said features have properties that can be measured by the chosen technique(s) and that these properties have sufficient contrast with the background to be identifiable. The interpretation of any identified anomalies is inherently subjective. While the scrutiny of the results is undertaken by qualified, experienced individuals and rigorously checked for quality and consistency, it is often not possible to classify all anomaly sources. Where possible an anomaly source will be identified along with the certainty of the interpretation. The only way to improve the interpretation of results is through a process of comparing excavated results with the geophysical reports. MS actively seek feedback on their reports as well as reports of further work in order to constantly improve our knowledge and service.

7.2. Discussion

7.2.1. The geophysical results are presented in consideration with satellite imagery and historic maps (Figure 6).

7.2.2. The fluxgate gradiometer survey has responded well to the environment of the survey area. The geophysical survey has detected a range of anomalies including anomalies of a possible archaeological origin. Modern interference has been produced along the boundaries of the survey area, as well as haloes produced by services bisecting the survey areas. Natural variations have been identified in the southeast corner possibly relating to alluvium composed of sand and gravel deposited by the nearby stream.

7.2.3. Anomalies of possible archaeological origin have been identified in the east of the survey area. Two possible partial enclosures which may represent a former field system have been identified as well as three associated trackways; these have been detected along or leading away from the enclosures (Figures 13 and 14). One of the possible trackways matches an extant depression and another one correlates with an edge to the ridge and furrow cultivation visible on satellite imagery (Figure 6) which may suggest a contemporary provenance, or a prolonged use of the trackway. The anomalies appear to be disturbed and dragged out by ridge and furrow which may suggest that they pre-date the ridge and furrow regime. However, because these anomalies are disturbed and are located near a service crossing the area, it has made their identification more ambiguous.

7.2.4. Evidence of agricultural activity has been detected throughout the site (Figure 5). These include ridge and furrow cultivation, modern ploughing trends and a former mapped field boundary.

7.2.5. Anomalies classified as ‘Undetermined’ have been identified, there is no evidence to suggest a modern or historic origin and the lack of context prevents a confident classification. Some of these anomalies detected in the north-central part of Area 6 (Figure 8) may be related to Roman ceramic noted in this area (see section 5). However,

the strength of the anomalies and the significant agricultural activity in the area do not allow for a more confident interpretation as these anomalies could also be of agricultural or natural origin.

7.3. Interpretation

7.3.1. General Statements

7.3.1.1. Geophysical anomalies will be discussed broadly as classification types across the survey area. Only anomalies that are distinctive or unusual will be discussed individually.

7.3.1.2. **Magnetic Disturbance** – The strong anomalies produced by extant metallic structures along the edges of the field have been classified as 'Magnetic Disturbance'. These magnetic 'haloes' will obscure the response of any weaker underlying features, should they be present, often over a greater footprint than the structure they are being caused by.

7.3.1.3. **Ferrous (Spike)** – Discrete ferrous-like, dipolar anomalies are likely to be the result of isolated modern metallic debris on or near the ground surface.

7.3.1.4. **Ferrous/Debris (Spread)** – A ferrous/debris spread refers to a concentrated deposition of discrete, dipolar ferrous anomalies and other highly magnetic material.

7.3.1.5. **Undetermined** – Anomalies are classified as Undetermined when the anomaly origin is ambiguous through the geophysical results and there is no supporting or correlative evidence to warrant a more certain classification. These anomalies are likely to be the result of geological, pedological or agricultural processes, although an archaeological origin cannot be entirely ruled out. Undetermined anomalies are generally not ferrous in nature.

7.3.2. Magnetic Results - Specific Anomalies

7.3.2.1. **Possible Archaeology (Strong and Weak)** – In the east of Area 8, two parallel linear anomalies [**8a**] have been identified that exhibit a weak positive magnetic signal indicative of a cut feature with a magnetically enhanced infill (Figure 13). The anomaly is most explicit in the gradient data (Figure 13), it is recorded running in a northwest-southeast orientation, and possibly relates to a former trackway. [**8a**] extends south to include two further parallel linear anomalies on the same alignment. To the east of the trackway, linear anomalies have been identified [**8b**], that appear to abut the trackway at perpendicular angles, suggesting they form a possible enclosure or relate to a field system. These anomalies exhibit a weak positive magnetic signal and appear more diffuse where ridge and furrow lines have been identified, which could indicate the anomalies were disturbed by the cultivation and therefore suggest that the anomalies pre-date the ridge and furrow. In the southern part of Area 2, positive linear anomalies [**2a & 2b**] have been detected with a similar magnetic signal to [**8a & 8b**], also suggesting cut feature with a magnetically enhanced fill. [**2a**] comprises two parallel linear anomalies, that match an extant depression, and appear to lead away from [**8a**] suggesting a possible relationship. Adjacent to the south of [**2a**] several weakly positive, disjointed linear and curvilinear anomalies [**2b**] (Figure 14) may

represent another possible enclosure, though they are fragmentary and it is therefore difficult to determine what purpose these features may have had.

7.3.2.2. **Possible Archaeology (Weak)** – In the north of Area 2, two sets of negative linear anomalies [**2c**] have been detected (Figure 14). [**2c**] appear to lead away from [**8a & 8b**] suggesting a possible relationship, however their negative magnetic signal is dissimilar to the other archaeology identified, and the extant field boundary separates [**2c**] from [**8a & 8b**] making it difficult to assess the archaeological origin of these anomalies and their relationship to the archaeology identified nearby. The parallel anomalies are spaced c. 6m - c. 7m apart which could indicate ridge and furrow, however their negative magnetic signal and orientation is unlike the ridge and furrow detected throughout the site.

7.3.2.3. **Agricultural (Strong, Weak and Spread)** - Crossing northwest to southeast across Area 6 (Figures 11), a strong positive linear anomaly [**6a**] explicit in Gradient data (Figure 10) has been identified. This anomaly aligns with a former field boundary identified on 2nd edition OS maps (Figure 6). To the south of Area 6, a number of weak amorphous anomalies [**6b],** have been identified on the same alignment as [**6a**] (Figure 10). These anomalies align with another mapped field boundary seen in 2nd edition OS maps (Figure 6), however due to the more diffuse nature of the anomalies [**6b**] their origin is less certain. In the centre of Area 4, two linear anomalies exhibiting a weak positive magnetic signal **[4b]** have been identified that measure c. 54m in length (Figure 17). The signal is typical of an infilled ditch, and their orientation is in line with a drainage ditch identified during survey, which they possibly relate to.

7.3.2.4. **Ridge and Furrow (Trend)** – Regularly spaced, parallel, weak linear anomalies have been detected across the survey area. They run in a general northeast to southwest orientation and are best seen in the total field (Figure 3). The spacing (c. 7m – c. 9m) and magnetic signal are characteristic of ridge and furrow cultivation.

7.3.2.5. **Agricultural (Trends)** – A series of parallel linear anomalies have been detected crossing the survey area mostly in the east-west orientation respecting current field boundaries. These linear trends are characteristic of modern ploughing activity.

7.3.2.6. **Services** - Five linear responses have been detected crossing the survey area on two main orientations: northeast-southwest and northwest-southeast (Figure 5). The responses display dipolar magnetic signals which cast a broad magnetic halo, typical of buried service features.

7.3.2.7. **Natural (Strong and Weak)** – Natural variations have been detected in the southeast of the survey area, where the superficial geology comprises of alluvium (see 4.2), most apparent in the total field data (Figure 3). These anomalies are interpreted as natural deposits of more magnetically enhanced material that have been transported and deposited by the adjacent stream.

7.3.2.8. **Undetermined (Strong and Weak)** – In the north part of Area 6, directly south of the A422, weak linear [**6c**] and discrete [**6d**] anomalies have been detected. Some of the linear anomalies [**6c**] identified present possible returns and have not been recorded

on available historic maps, which could indicate an older origin. However, the magnetic signal is weak and it is difficult to assess whether these are a result of agricultural or earlier anthropogenic activity. The discrete anomalies [**6d**] present a strong positive signal which may be the result of anthropogenic activity. However, a natural origin can also produce these types of anomalies and [**6d**] are located in the blow-out of an adjacent detected service which does not allow for a more precise classification.

7.3.2.9. **Undetermined (Strong, Weak and Spread)** – In the eastern half of Area 5, discrete and linear anomalies [**5a & 5b**] that exhibit a strong and weak magnetic signal have been identified (Figure 7). Similarly, a spread of material in the south of Area 9 displays a strong magnetic signal most explicit in gradient data (Figure 11). These anomalies do not correspond with anything recorded on available historic maps and are not visible on satellite imagery. The lack of context and of define pattern prevent a confident classification and have therefore been classified as 'Undetermined'.

8. Conclusions

8.1. A fluxgate gradiometer survey has successfully been undertaken across the survey area. The geophysical survey has detected a range of anomalies of archaeological, agricultural, natural and modern origins. Natural variations have been detected that likely relate to alluvium deposited by the adjacent stream. Broad ferrous anomalies of modern origin relate to field boundaries and services that have been identified across the survey area.

8.2. Anomalies of possible archaeological origin have been identified in the east of the survey area. A possible enclosure or field system was identified connecting to trackways. One of the trackways correlates to an edge of the area of ridge and furrow visible in satellite imagery and the data, which could indicate a contemporary provenance, or a prolonged use of the trackway. Some of the anomalies of possible archaeological origin appear to be disturbed by ridge and furrow which may suggest they pre-date the ridge and furrow regime. However, because these anomalies are disturbed and are located near a service crossing the area, it has made their identification uncertain.

8.3. Historic agricultural activity is evident throughout the survey area in the form of former mapped field boundaries, ridge and furrow cultivation and modern ploughing trends.

8.4. A series of features of undetermined origin were also identified. These could relate to archaeological, agricultural, natural or modern processes.

9. Archiving

9.1. MS maintains an in-house digital archive, which is based on Schmidt and Ernenwein (2013). This stores the collected measurements, minimally processed data, georeferenced and un-georeferenced images, XY traces and a copy of the final report.

9.2. MS contributes reports to the ADS Grey Literature Library upon permission from the client, subject to the any dictated time embargoes.

10. Copyright

10.1. Copyright and the intellectual property pertaining to all reports, figures, and datasets produced by Magnitude Services Ltd. is retained by MS. The client is given full licence to use such material for their own purposes. Permission must be sought by any third party wishing to use or reproduce any IP owned by MS.

11. References

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12. Project Metadata

MS Job Code	MSSP696
Project Name	Willen Road, Newport Pagnell
Client	Triskelion Heritage
Grid Reference	SP88294234
Survey Techniques	Magnetometry
Survey Size (ha)	c. 28.29ha (Magnetometry)
Survey Dates	2020-08-17 to 2020-08-20
Project Lead	Julia Cantarano Ingénieur PCIfA
Project Officer	William Rigby BA MA PCIfA
HER Event No	EMK1428
OASIS No	TBC
Report Version	0.3

13. Document History

Version	Comments	Author	Checked By	Date
0.1	Initial draft for Project Lead to Review	WR, SP	JC	01 September 2020
0.2	Draft following corrections from Project Lead.	SP	FPC	03 September 2020
0.3	Draft Updated from Client's Comments	JC	PSJ	10 September 2020



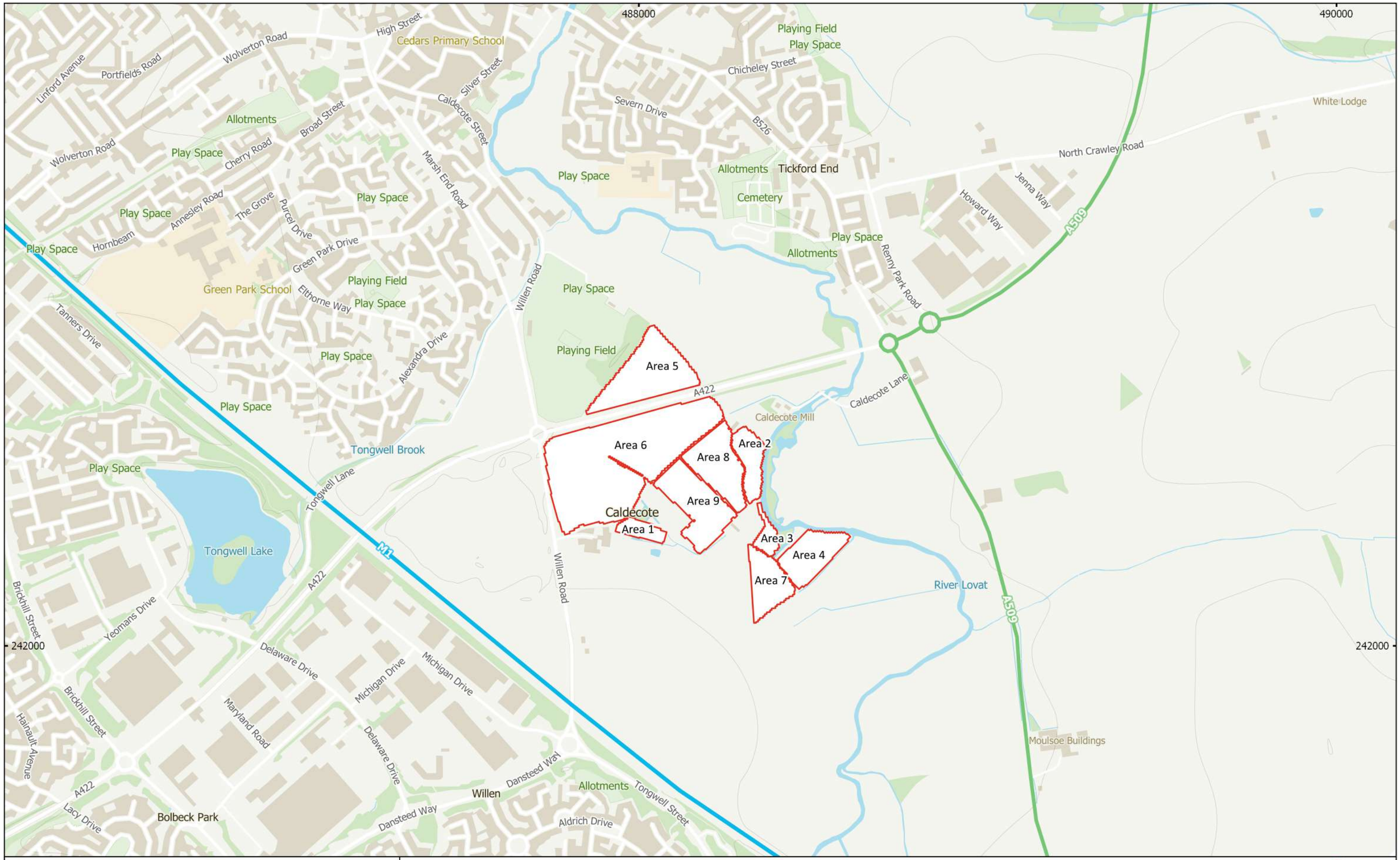
MSSP696 - Willen Road, Newport Pagnell
Figure 1 - Site Location
1:25,000 @ A4
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Site Boundary

N

0 0.5 1 km

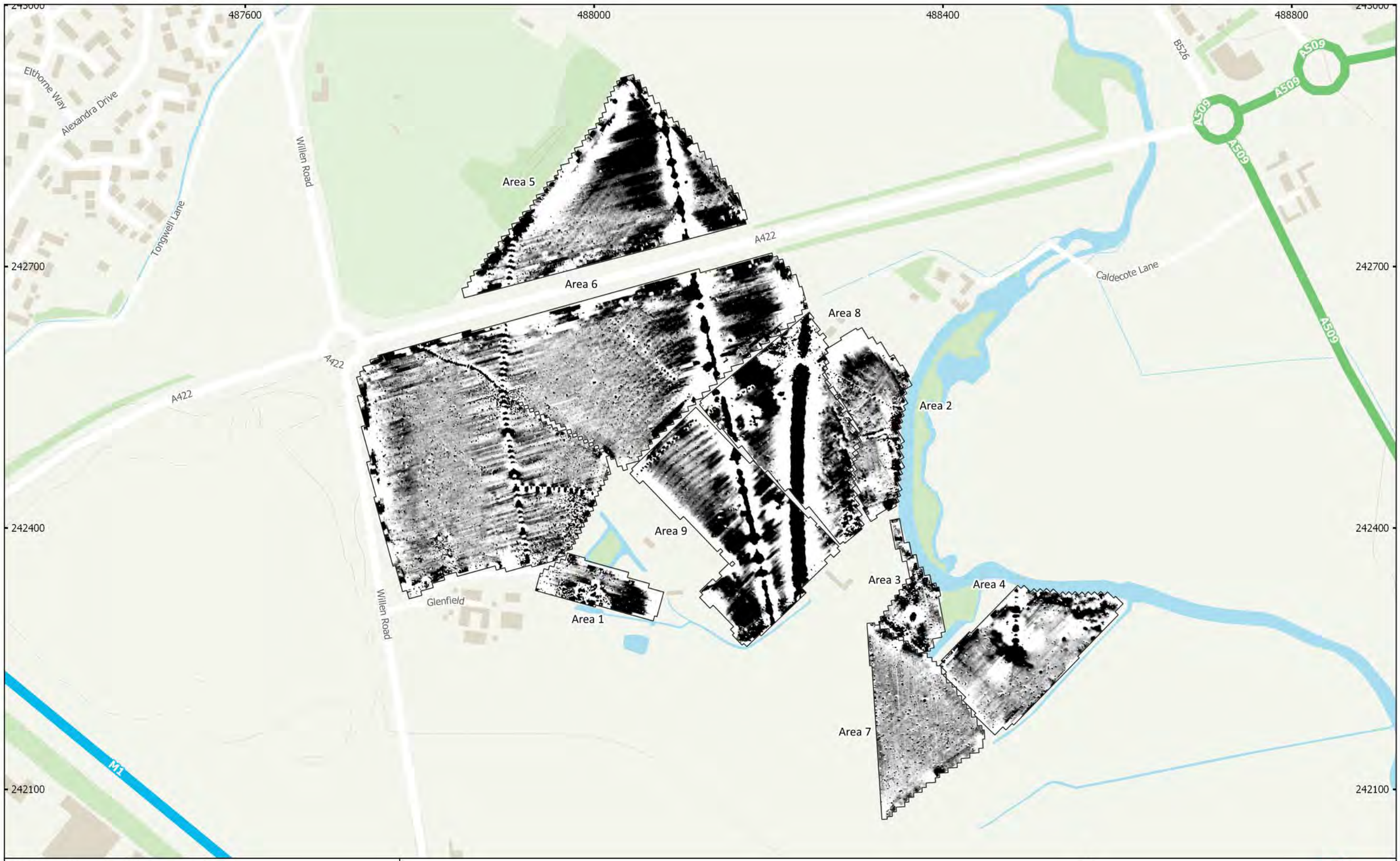
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Figure 2 - Location of Survey Area
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Survey Extent

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Figure 3 - Magnetic Total Field (Lower Sensor) Overview
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48,997 nT 49,005

N

0 100 200 300 m

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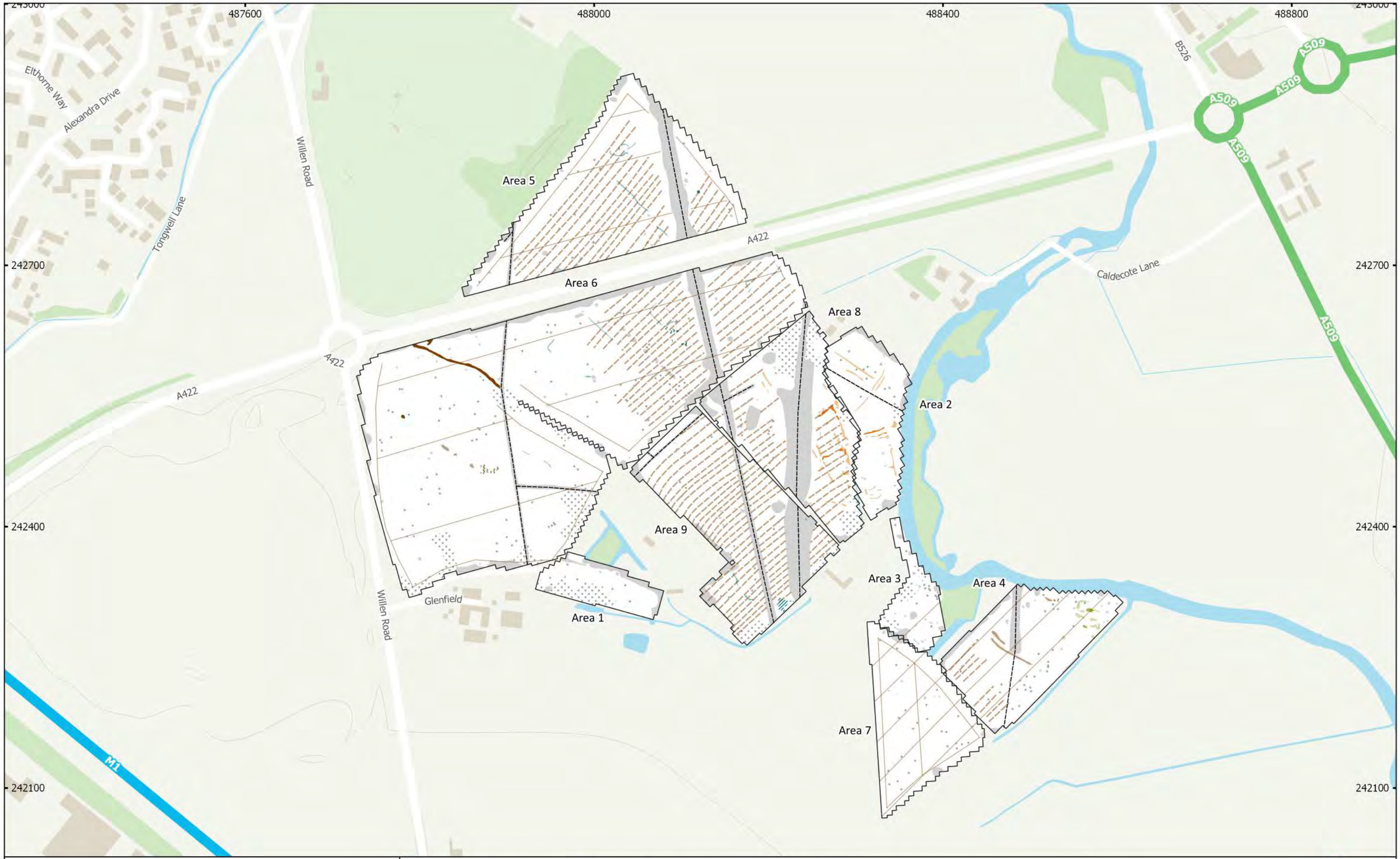
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Figure 4 - Magnetic Gradient Overview
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-1 nT 2

N

0 100 200 300 m

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MSSP696 - Willen Road, Newport Pagnell
Figure 5 - Magnetic Interpretation Overview
1:4,000 @ A3
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- Archaeology Possible (Strong)
- Archaeology Possible (Weak)
- Agricultural (Strong)
- Agricultural (Weak)
- Agricultural (Spread)
- Natural (Strong)
- Natural (Weak)
- Magnetic Disturbance
- Ferrous/Debris (Spread)
- Undetermined (Strong)
- Undetermined (Weak)
- Undetermined (Spread)
- Agricultural (Trend)
- Ridge and Furrow (Trend)
- Service
- Ferrous (Spike)

N

0 100 200 300 m

magnitude surveys

243000 487600 488000 488400 488800 243000

242700 242700

242400 242400

242100 242100

Area 5
Area 6
Area 8
Area 2
Area 9
Area 1
Area 3
Area 4
Area 7

MSSP696 - Willen Road, Newport Pagnell
Figure 6 - Magnetic Interpretation Over Satellite and Histroic Mapping Overview
1:4,000 @ A3
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Contains historic maps: Ordnance Survey, 6" 2nd edition c. 1882-1913 © National Library of Scotland
Contains Satellite Imagery © 2020 Bing Satellite

- Archaeology Possible (Strong)
- Archaeology Possible (Weak)
- Agricultural (Strong)
- Agricultural (Weak)
- Agricultural (Spread)
- Natural (Strong)
- Natural (Weak)
- Magnetic Disturbance
- Ferrous/Debris (Spread)
- Undetermined (Strong)
- Undetermined (Weak)
- Undetermined (Spread)
- Agricultural (Trend)
- Ridge and Furrow (Trend)
- Service
- Ferrous (Spike)

N

0 100 200 300 m

magnitude surveys

487800
488000
488200
242800
242800
Area 5
A422
Area 6
Area 8
A422
242600
242600

MSSP696 - Willen Road, Newport Pagnell
Figure 7 - Magnetic Gradient (Areas 2, 5, 6, & 8)
1:1,500 @ A3
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-1 nT 2

N

0 40 80 120 m

magnitude surveys

487800
488000
488200
242800
242800
Area 5
5b
5a
A422
Area 6
6c
6c
Area 8
6d
6c
A422
242600
242600
6a
2c

MSSP696 - Willen Road, Newport Pagnell
Figure 8 - Magnetic Interpretation (Areas 2, 5, 6, & 8)
1:1,500 @ A3
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- Archaeology Possible (Weak)
- Agricultural (Strong)
- Magnetic Disturbance
- Ferrous/Debris (Spread)
- Undetermined (Strong)
- Undetermined (Weak)
- Agricultural (Trend)
- Ridge and Furrow (Trend)
- Service
- Ferrous (Spike)

N

0 40 80 120 m

magnitude surveys

487800
488000
488200
242800
242800
Area 5
A422
Area 6
Area 8
A422
242600
242600

MSSP696 - Willen Road, Newport Pagnell
Figure 9 - XY Trace Plot (Areas 2, 5, 6, & 8)
30nT/cm at 1:1,500 @ A3
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N

0 40 80 120 m

magnitude surveys



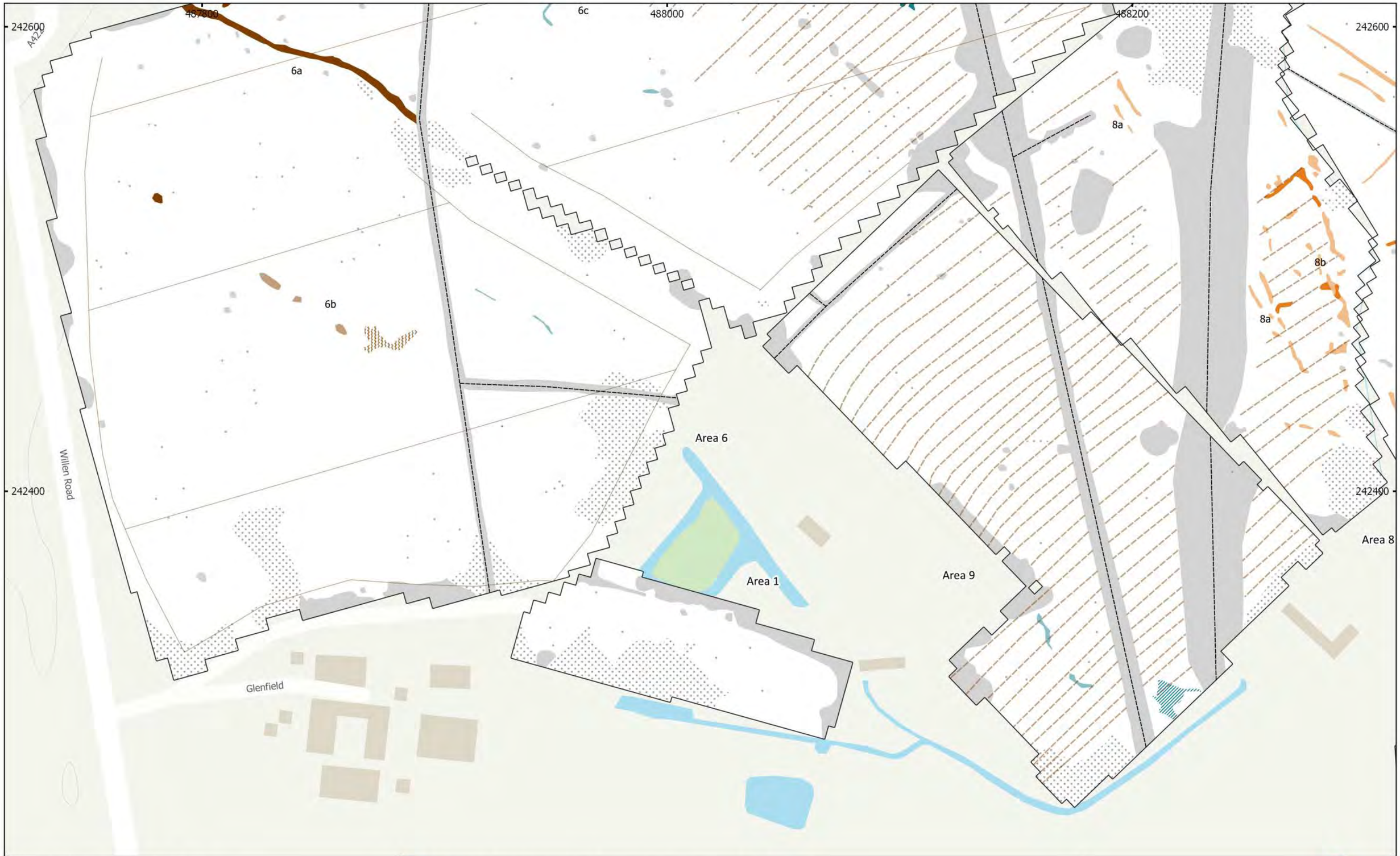
MSSP696 - Willen Road, Newport Pagnell
Figure 10 - Magnetic Gradient (Areas 1, 2, 3, 6, 8 & 9)
1:1,500 @ A3
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-1 nT 2

N

0 40 80 120 m

magnitude surveys



MSSP696 - Willen Road, Newport Pagnell
Figure 11 - Magnetic Interpretation (Areas 1, 2, 3, 6, 8 & 9)
1:1,500 @ A3
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- Archaeology Possible (Strong)
- Archaeology Possible (Weak)
- Agricultural (Strong)
- Agricultural (Weak)
- Agricultural (Spread)
- Magnetic Disturbance
- Ferrous/Debris (Spread)
- Undetermined (Strong)
- Undetermined (Weak)
- Undetermined (Spread)
- Agricultural (Trend)
- Ridge and Furrow (Trend)
- Service
- Ferrous (Spike)

N

0 40 80 120 m

magnitude surveys



MSSP696 - Willen Road, Newport Pagnell
Figure 12 - XY Trace Plot (Areas 1, 2, 3, 6, 8 & 9)
30nT/cm at 1:1,500 @ A3
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magnitude surveys

488000
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488400
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242600
242400
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Area 6
Area 2
Area 1
Area 9
Area 8
Area 3
Area 4

MSSP696 - Willen Road, Newport Pagnell
Figure 13 - Magnetic Gradient (Areas 2, 3, 6, 8 & 9)
1:1,500 @ A3
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magnitude surveys

488000
488200
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8a
2c
Area 2
2a
8b
8a
2b
2b
Area 6
Area 1
Area 9
Area 8
Area 3
Area 4

MSSP696 - Willen Road, Newport Pagnell
Figure 14 - Magnetic Interpretation (Areas 2, 3, 6, 8 & 9)
1:1,500 @ A3
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- Archaeology Possible (Strong)
- Archaeology Possible (Weak)
- Agricultural (Weak)
- Agricultural (Spread)
- Natural (Weak)
- Magnetic Disturbance
- Ferrous/Debris (Spread)
- Undetermined (Strong)
- Undetermined (Weak)
- Undetermined (Spread)
- Agricultural (Trend)
- Ridge and Furrow (Trend)
- Service
- Ferrous (Spike)

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Area 1
Area 9
Area 8
Area 3
Area 4

MSSP696 - Willen Road, Newport Pagnell
Figure 15 - XY Trace Plot (Areas 2, 3, 6, 8 & 9)
30nT/cm at 1:1,500 @ A3
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N

0 40 80 120 m

magnitude surveys

488200
488400
488600
242400
242200
Area 9
Area 8
Area 3
Area 4
Area 7

MSSP696 - Willen Road, Newport Pagnell
Figure 16 - Magnetic Gradient (Areas 3, 4 & 7)
1:1,500 @ A3
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-1 nT 2

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magnitude surveys

488200
488400
488600
242400
242400
242200
242200
Area 9
Area 8
Area 3
Area 4
4a
Area 7

MSSP696 - Willen Road, Newport Pagnell
Figure 17 - Magnetic Interpretation (Areas 3, 4 & 7)
1:1,500 @ A3
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- Agricultural (Weak)
- Agricultural (Spread)
- Natural (Strong)
- Natural (Weak)
- Magnetic Disturbance
- Ferrous/Debris (Spread)
- Undetermined (Weak)
- Undetermined (Spread)
- Agricultural (Trend)
- Ridge and Furrow (Trend)
- Service
- Ferrous (Spike)

N

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magnitude surveys

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Area 3
Area 4
Area 7

MSSP696 - Willen Road, Newport Pagnell
Figure 18 - XY Trace Plot (Areas 3, 4 & 7)
30nT/cm at 1:1,500 @ A3
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dynamic development solutions ™

Appendix 6.5

Archaeological Evaluation

Cotswold Archaeology

Land East of Willen Road
Newport Pagnell
Milton Keynes

Archaeological Evaluation



for:
Bloor Homes (South Midlands)

CA Project: MK0390
CA Report: MK0390_1
OASIS ID: cotswold2-411865
HER Ref: EMK1439

February 2021

Willen Road, Newport Pagnell, Milton Keynes

Archaeological Evaluation

CA Project: MK0390
CA Report: MK0390_1
OASIS ID: cotswold2-411865
HER reference: EMK1439

Document Control Grid						
Revision	Date	Author	Checked by	Status	Reasons for revision	Approved by
A	12/02/21	IW	RM	Internal review	–	R. Mortimer

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CONTENTS

SUMMARY 3

1. INTRODUCTION 5

2. ARCHAEOLOGICAL BACKGROUND 6

3. AIMS AND OBJECTIVES 9

4. METHODOLOGY 9

5. RESULTS 11

6. THE FINDS 19

7. THE BIOLOGICAL EVIDENCE 21

8. DISCUSSION 22

9. CA PROJECT TEAM 25

10. REFERENCES 26

APPENDIX A: CONTEXT DESCRIPTIONS 28

APPENDIX B: THE FINDS 38

APPENDIX C: THE PALAEOENVIRONMENTAL EVIDENCE 39

APPENDIX D: OASIS REPORT FORM 40

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LIST OF ILLUSTRATIONS

Figure 1 Site Location (1;25,000)

Figure 2 Land East of Willen Road, Newport Pagnell, Buckinghamshire: Scheme Overview (1:3000)

Figure 3 Trenches 1 – 10 (1:1000)

Figure 4 Trenches 11 – 21, Trenches 40-41 (1:1000)

Figure 5 Trenches 22 – 36 (1:1000)

Figure 6 Trenches 38, 39 and 42. Medieval and Post-Med features: Trenches 45-49 (1:1000)

Figure 7 Trenches 37, 50 – 57 (1:1000)

Figure 8 Trenches 58-63 (1:1000)

Figure 9 Trench 46: Sections and Photograph (1:10)

Figure 10 Trench 49: Section and Photograph (1:10)

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SUMMARY

Project name: Willen Road

Location: Newport Pagnell, Milton Keynes

NGR: 488112 242539

Type: Evaluation

Date: 18th January to 5th February 2021

Planning reference:

SMC:

OASIS ID: cotswold2-411865

Location of Archive: To be deposited with Milton Keynes Museum and the Archaeology Data Service (ADS)

Accession Number: EMK1439

Site Code: WNP21

In January 2021, Cotswold Archaeology carried out an archaeological evaluation of the land East of Willen Road, Newport Pagnell, Buckinghamshire. A total of 41 trenches out of the proposed 63 trenches were excavated. A very high water table, large areas of standing water and near-constant rainfall prevented the remainder if the trenches from being opened.

Trial trenching revealed a very limited number of archaeological features, finds or deposits across the area; mainly consisting of Medieval to post-Medieval drainage ditches and field boundaries. The results suggest an extended period of use as pastoral land, latterly in association with Caldecote Farm and Mill, with a brief period of arable agriculture in the high Medieval period, evidenced by the standing remains of Ridge and Furrow across the central, southern part of the site.

Very few archaeological artefacts were recovered, making precise dating of features difficult, and further supporting low levels of human activity or input within the area. Small quantities of artefacts were recovered including four flints, four pieces of animal bone, six sherds of Late Iron Age / Roman pottery, nineteen sherds of Medieval pottery – largely dating from between the late 11th-14th centuries - and five post-medieval artefacts. 80% of the finds were

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recovered from the pasture land in the central, eastern part of the site towards the river (Trenches 43-49).

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1. INTRODUCTION

1.1. In January 2021, Cotswold Archaeology (CA) carried out an archaeological evaluation on land east of Willen Road, Newport Pagnell, Buckinghamshire (centred at NGR: 488112 242539; Fig. 1). This survey was undertaken for Triskelion Heritage, who were acting on behalf of their client, Bloor Homes (South Midlands).

1.2. The evaluation results will inform a planning application for residential development of the site, with associated infrastructure and landscaping, which will be made by Milton Keynes Council. The site has been subject to a full desk-based assessment by Triskelion Heritage and Robinson Wild Consulting (TH, 2020) and a geophysical survey was carried out by Magnitude Surveys (MS, 2020).

1.3. The scope of this evaluation was defined by Nick Crank, the Senior Archaeological Officer for the Milton Keynes Council (SAOMKC), the archaeological advisor to Milton Keynes Council. The evaluation was carried out in accordance with a Written Investigation (WSI) prepared by CA (2021) and approved by Mr Crank. A full earthwork survey of the ridge and furrow and other related features was carried out by Cotswold Archaeology immediately prior to the evaluation and is the subject of a separate report (Streatfield-James 2021).

1.4. The evaluation was undertaken in accordance with *Standard and guidance for archaeological field evaluation* (CIfA 2014; updated October 2020), *Management of Research Projects in the Historic Environment (MoRPHE) PPN 3: Archaeological Excavation* (Historic England 2015a) and *Management of Research Projects in the Historic Environment: The MoRPHE Project Managers' Guide* (Historic England 2015b).

The site

1.5. The site is located *c*.1.3km to the southeast of Newport Pagnell and *c*.3.7km to the northeast of Milton Keynes (Figure 1). The site extends to an area of c.41 hectares. It consists of two parcels of land intersected by the A422. The larger parcel of land tis bounded to the north by the hedge-line fronting the A422, the River Ouzel and floodplain to the east, fields and the M1 to the south and a hedge-line fronting Willen Road to the west. It is characterised by generally level arable and pasture fields, with an area of former gravel extraction in the southwest of the site. There are visible earthworks in the form of ridge and furrow in the fields under pasture (See figure 2). There are also two large residential properties, Caldecote Cottage

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and Moat Cottage with associated land situated in this section of the site. They do not form part of the proposed residential development. The smaller triangular-shaped parcel of land situated to the north of the A422 is an arable field bounded to the east by fields, the A422 to the south and hedge- and treeline to Newport Pagnell Town Football and Social Club to the west. The site lies at *c.* 57m - 59m AOD, sloping down to the south and east to the River Ouzel.

1.6. The British Geological survey identifies the underlying bedrock geology of the site as Sandstone, Siltstone and Mudstone - Kellaways Formation. This sedimentary bedrock formed in the Jurassic period approximately 164 to 166 million years ago, indicative of an environment previously dominated by shallow seas (BGS2020). This is overlain by Felmersham Member- Sand and Gravel, which formed in the Quaternary Period approximately 3 million years ago (BGS 2020). They are fluvial in origin and detrital, ranging from course to fine grained and form beds and lenses of deposits reflecting the channels, floodplains and levees of a river (BGS 2020).

2. ARCHAEOLOGICAL BACKGROUND

2.1. An archaeological background for the Site and surrounding area has been presented within a Heritage Desk-Based Assessment (Triskelion Heritage and Robinson Wild Consulting 2020) and the following section is summarised from this.

Prehistoric and Roman periods (up to AD 410)

2.2. There are no known archaeological deposits from the Palaeolithic and Mesolithic Periods within the site. Within the immediate area, to the east of the site next to the River Ouzel, a finished axe-head (Findspot MKHER ID: MMK3636) and an unretouched flake (Findspot MKHER ID: MMK3637) of possible Palaeolithic date were recorded. Also, within the area, to the west of the site, a punch struck blade (Findspot MKHER ID: MMK992) of possible Mesolithic to Neolithic date has been recorded.

2.3. During systematic fieldwalking in 1976-7, there were multiple finds (MKHER ID: MMK982-90) of artefacts of Early Neolithic to Late Bronze Age Date recorded in the north of the site on the boundary with the A422.

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2.4. Cropmark evidence suggests that there are four ring ditches (MKHER ID: MMK502 / MKHER ID: MMK504 / MKHER ID: MMK929 / MKHER ID: MMK930) and one linear feature (MKHER ID: MMK505) to the south of the application site, however no traces of these were found on the ground during trench evaluation prior to quarrying.

2.5. To the west of the site, controlled archaeological investigations (MKHER ID: EMK860; EMK915; EMK761; EMK762; EMK: 535) have revealed the remains of a substantial settlement with a number of features including annular and rectilinear enclosures of Early Iron Age to Roman date (MKHER ID: MMK934). This site occupies a notably higher, drier location above the 60m contour.

2.6. There is evidence of activity during the Roman period to the east of the site and focused in the area of the later Caldecote Mill. The location of a Ford is known (MKHER ID: 457) near to which pottery and a quern suggest a potential small riverside dwelling (MKHER ID: 454).

Early Medieval and medieval periods (AD 410 – 1539)

2.7. Evidence for early and middle Saxon activity in the Milton Keynes area is relatively good. Newport Pagnell was established as a trading settlement at the confluence of the Ouse and Ouzel during the late Saxon period. The higher gravel terraces along the Ouzel could be considered a favoured location for Early Anglo-Saxon settlement activity.

2.8. Caldecote Mill was mentioned in the Domesday Survey and was an important possession of Tickford Priory. It was destroyed by fire in the 19th Century and not rebuilt. There were two fees in Caldecote at the time of the Survey, both of which afterwards went to form the property known as Caldecote Manor. It is first called a manor in 1426 when the recorded tenant was Thomas Caldecote.

2.9. Aerial photography has allowed for the identification of the site of a Medieval hamlet on the site which has been identified through soil marks, however, opinions differ on the exact nature of the deserted settlement at Caldecote. These are variously a deserted Medieval village with 2 moats although there is no evidence of house platforms or streets, or a small manorial complex with associated buildings, the “moats” being the remains of a manorial enclosure (MKHER ID: MMK87 / MMK92). Some research has been undertaken (Giggins, 2008) on the exact nature of the site which summarises hypotheses that there was a triangular village green with

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buildings either side. The research, based on analysis of map, documentary and archaeological evidence suggests that the previous assumption that there was a large medieval moated site at Caldecote was probably incorrect. The linear water features shown on 19th century maps and as parch marks on aerial photographs next to the River Ouzel, may indicate a planned formal garden for a large house, with a complex of water features. Although the location of the manor house has not been formerly identified though map or archaeological evidence, it can be suggested by the location of a straight road leading north-west from the probable garden which cuts across ridge and furrow and formerly terminated at the Newport Pagnell to Fenny Stratford Road.

2.10. Croft and Mynard 1993 (19) note that on the east bank of the Ouzel settlements were regularly spaced at 1.5-2km intervals and located on the lower terraces (but above the flood-plain) and while this was observed in what was then the Milton Keynes area the proposed development site is only just outside that boundary and the observation may be equally applicable. Another feature observed that may relate to the proposed development area is that within Milton Keynes some parishes were poly-focal – Willen (to the south) was one with a subservient focus at Caldecote – which is within the proposed red-line boundaries (Croft and Mynard 1993 21). Willen and Caldecote were one 'vill' in the 14th century but were split and Caldecote merged with Newport Pagnell (Croft and Mynard 1993, 171).

2.11. In 1541 the manor of Caldecote was bought by John White, whose family continued to hold it until the end of the 17th century. In 1750 the owner, William Blackwell, a banker of Pall Mall, acquired Caldecote mill and the land that had been granted by Fulk Paynel to Tickford Priory, and had since descended with Tickford Manor (Page 1927, 415). It was probably shortly after this time that the Manor House was demolished (Giggins 2008). The manor of Caldecote then descended through various owners to the end of the19th century. There are a number of documentary references to the manor and the village Caldecotte Green is mentioned in 1648, Great Green in 1670, and both Great Green and Little Green in 1688 (Giggins 2008). Five cottages are mentioned in a 1713 document (ibid.).

2.12. A watching brief was undertaken at Caldecote Farm Cottage in 2004 (MKHER ID: EMK785) and trial trenching was undertaken to the south of the site in advance of quarrying in 2010 (MKHER ID: EMK1120). No archaeological features or deposits were identified as part of the watching brief. The trial trenching carried out in 2010,

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however, confirmed that remnants of the Medieval manorial settlement were present to the south of the site including an open field system. Of note, was the evidence for limited Prehistoric activity defined by a relatively substantial pit which contained a small assemblage of flint artefacts of Neolithic/Bronze Age date.

3. AIMS AND OBJECTIVES

3.1. The general objective of the evaluation was to provide further information on the likely archaeological resource within the site, including its presence/absence, character, extent, date and state of preservation. In accordance with the *Standard and guidance for archaeological field evaluation* (CIfA 2014, updated 2020), the evaluation was designed to be minimally intrusive and destructive to archaeological remains. This information will enable Milton Keynes Council to identify and assess the particular significance of any archaeological heritage assets within the site, consider the impact of the proposed development upon that significance and, if appropriate, develop strategies to avoid or minimise conflict between heritage asset conservation and the development proposals, in line with the *National Planning Policy Framework* (MHCLG 2019).

3.2. The specific objective of the evaluation was to determine the location and significance of any remains associated with the Medieval sites of Caldecote Farm.

4. METHODOLOGY

4.1. The evaluation fieldwork was designed to comprise the excavation of 63 trenches (Fig. 2):

- 54no 50m x 2m trenches;
- 4no 30m x 2m trenches; and
- 4no 40m x 2m trench.

4.2. The trenches were located to test known earthworks (e.g. Medieval ridge and furrow) and to provide a representative sample of the remainder of the site. Trench 1 was rotated at the southern extent by 30m towards the east and trench 6 was moved at the western extent 5m towards the south, this was to increase their

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distance from flooded ground. Trench 7 was excavated as 43m x 1.8m, due to its proximity to modern services and pathways. Trenches 15-18, 27, 29, 36, 50-52, 59-63 were not excavated due to their proximity to flooded ground, and trenches 37-42 were not excavated due to the presence of livestock. Trench 53 was excavated as 5m x 1.8m and immediately backfilled, due to fast rising ground water. These alterations were undertaken with the approval of SAOMKC.

4.3. Trenches were set out on OS National Grid co-ordinates using Leica GPS. Overburden was stripped from the trenches by a mechanical excavator fitted with a toothless grading bucket. All machining was conducted under archaeological supervision to the top of the natural substrate, which was the level at which archaeological features were first encountered.

4.4. Archaeological features and deposits were investigated, planned and recorded in accordance with *CA Technical Manual 1: Fieldwork Recording Manual*. Each context was recorded on a pro-forma context sheet by written and measured description, Hand-drawn sections of excavated archaeological features were prepared (scale 1:10). The features and deposits were recorded in plan using Leica GPS, in accordance with *CA Technical Manual 4:Survey Manual.* Photographs were taken of archaeological features and excavated trenches where appropriate.

4.5. Deposits were assessed for their palaeoenvironmental potential and samples were taken in accordance with *CA Technical Manual 2: The Taking and Processing of Environmental and Other Samples from Archaeological Sites*.

4.6. Artefacts were processed in accordance with *CA Technical Manual 3: Treatment of Finds Immediately after Excavation*.

4.7. CA will make arrangements with the Milton Keynes Museum for the deposition of the project archive and, subject to agreement with the legal landowner(s), the artefact collection. A digital archive will also be prepared and deposited with the Archaeology Data Service (ADS). The archives (museum and digital) will be prepared and deposited in accordance with *Standard and guidance for the creation, compilation, transfer and deposition of archaeological archives* (CIfA 2014; updated October 2020).

4.8. A summary of information from this project, as set out in Appendix D, will be entered onto the OASIS online database of archaeological projects in Britain.

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5. RESULTS

5.1. This section provides an overview of the evaluation results. Detailed summaries of the recorded contexts are given in Appendix A. Details of the artefactual material recovered from the site are given in Section 6 and Appendix B. Details of the environmental samples (palaeoenvironmental evidence) are given in Section 7 and Appendix C.

5.2. Trenches 15-18, 27, 29, 36, 50-52, 59-63 were not mechanically excavated due to their proximity to flooded ground, and trenches 37-42 were not mechanically excavated due to the presence of livestock.

5.3. Trenches 1-6, 8-9, 11, 21-23, 25, 28, 31-34, 54 and 56-58 contained no archaeological features.

Trenches 1-10 (Fig. 2)

5.4. Trenches 1-10 were located to the north of the A422 on arable land. Natural substrate was encountered at a depth of 0.3-0.7m and consisted of light yellow-brown moderate sandy clay. This was sealed by subsoil consisting of mid yellow-brown sandy-silt 0.08-0.3m thick and topsoil, 0.17-0.36m thick, which contained sub-angular flint. No archaeological features were present in trenches 1-6 or 8-9. Surface finds from around Trench 4 yielded one flint scraper and one flint flake and a small assemblage of Post-Medieval pottery.

Trench 7 (Fig. 2)

5.5. Two parallel ditches (703 and 705) aligned northwest / southeast, were recorded in Trench 7; they were parallel to the footpath to the west which is the remnant of a former trackway shown on the 1937-61 OS map. No finds were recovered from this trench or associated features.

5.6. Ditch 703 was located at the southwestern extent of the trench and was measured as 0.65m wide and cut into the substrate to a depth of 0.24m, with moderate sides and a concave base. Fill 704 was 0.29m thick, dark grey-brown silt sand.

5.7. Ditch 705 was located in the centre of Trench 7, measured 0.76m wide, was unexcavated due to flooding, but appeared to be a single fill feature and was assigned fill 706.

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Trench 10 (Fig. 2)

5.8. Ditch 1003 was aligned northwest / southeast at northeast extent of the trench, adjacent to, and parallel to, the field boundary at the east. Pit 1005 was located close to the southwestern extent of the trench. No finds were recovered from this trench or associated features.

5.9. Ditch 1003 measured 0.92m wide and was cut into the substrate at a depth of 0.29m with gradual sides and concave base. Fill 1004 was 0.29m thick, dark brown-grey sand silt.

5.10. Pit 1005 was cut into substrate to a depth of 0.4m and measured 0.8m wide with moderately steep sides and a slightly concave base. Single fill 1006 was 0.4m thick dark blue grey sandy silt with regular medium gravel and some charcoal.

Trenches 11-36 (Fig. 4 and Fig. 5)

5.11. Trenches 11-36 were located to the south of the A422 and east of Willen Road on arable land. Natural substrate was encountered at a depth of 0.43-0.83m and consisted of light yellow-brown compact silt clay. This was sealed by subsoil consisting of mid yellow-grey silt sand between 0.17-0.39m thick and topsoil, 0.2-0.55m. This area was noticeably lower-lying than the land north of the A422, particularly towards the east and south; large areas of the field were under water for the duration of the evaluation. No archaeological features were present in trenches 11, 21-23, 25, 28, 31-34. Due to flooded ground conditions trenches 15-18, 27, 29 and 36 were not mechanically excavated. Archaeological features in trenches 13-14, 24 and 26 were not excavated, due to fast rising ground water which flooded these trenches.

Trench 12 (Fig. 4)

5.12. Ditch 1203 was aligned southeast / northwest toward the southern end of the trench. It was cut into substrate to a depth of 0.32m and measured 0.62m wide with gradual sides and concave base. Single fill 1204 was 0.32m thick, dark grey-brown silt clay with frequent gravel throughout. No finds were recovered. The ditch was parallel to the field boundary to the east and the former trackway to the west.

Trench 13 (Fig. 4)

5.13. Trench 13 contained two parallel curved ditches, measuring 0.87m wide; the trench flooded almost immediately after it was opened and they remained unexcavated.

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Presumably circular and with a 5m diameter, the ditch/gully may represent the site of a hay stack drainage ditch.

Trench 14 (Fig. 4)

5.14. Trench 14 contained four possible ditches, all measuring 1m wide. The trench flooded shortly after being opened and these remained unexcavated. One ditch/gully at the north-western extent of Trench 14 was aligned west / east. Three to the south were aligned east-northeast / west-southwest, broadly parallel to ridge and furrow visible on the 1945 Google AP. No finds were visible within the trench prior to flooding.

Trench 19 (Fig. 4)

5.15. Two parallel ditches (1903 and 1905) aligned northwest / southeast parallel to the field boundary/stream to the west, were recorded in Trench 19. No finds were recovered in this trench or associated features.

5.16. Ditch 1903 located at northern extent of trench, cut into substrate to a depth of 0.16m and measured 0.46m wide with moderately steep sides and concave base. Fill 1904 was 0.16m thick, mid grey-brown sandy clay with occasional small and fine sub angular stones.

5.17. Ditch 1905 located in the centre of Trench 19, cut into the substrate at a depth of 0.2m and measured 0.6m wide with gentle sides and flat base. Single fill 1906 was 0.2m thick, mid grey-brown sandy clay with occasional small sub-angular stones.

Trench 20 (Fig. 4)

5.18. Two parallel ditches (2003 and 2005) aligned southwest / northeast, perpendicular to those in Trench 19, were recorded in trench 20. One pit 2007 located 0.93m north-west from ditch 2003. No finds were recovered from this trench or associated features, sample 5 taken from pit 2007.

5.19. Ditch 2003 located in the centre of Trench 20, truncated by machine during excavation, was cut into the substrate at 0.11m and measured 0.48m with moderately sloping sides and concave base. Single fill 2004 was 0.11m thick, mid grey-brown sand clay with rare small sub-angular stones.

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5.20. Ditch 2005 located at southeast extent, cut into the substrate to a depth of 0.1m and measured 0.48m wide with gently sloping sides and concave base. Single fill 2006 was 0.1m deep, mid grey-brown sand clay frequent gravel throughout.

5.21. A possible pit, or hollow, 2007 was located at the north-western extent, cut into the substrate to a depth of 0.06m and measured 0.52m wide, with gentle sloping sides and concave base. Fill 2008 was 0.06m thick, dark grey-brown sand silt with frequent small gravel and charcoal. A sample taken due to presence of charcoal in fill but on flotation only a limited quantity of, potentially wind-blown, charcoal was recovered.

Trenches 24 & 26 (Fig. 5)

5.22. Trench 24 contains one ditch; measuring 1m in width, aligned northwest / southeast; the same ditch also appears in the eastern extent of Trench 26 and is on the line of a post-medieval field boundary shown on OS maps up until 1937-61. It remained unexcavated in both trenches due to flooding.

Trench 30 (Fig. 5)

5.22. Ditch 3003 aligned northwest / southeast, located centrally in trench 30. Pit/hollow 3005 was located at the northern extend of Trench 30. No finds were recovered from this trench or associated features.

5.23. Ditch 3003 cut into the substrate at a depth of 0.16m and measured 0.5m wide with, gently sloping sides with concave base. Fill 3004 was 0.16m thick, mid grey-brown silt clay with medium / large sub-angular gravel throughout. The feature may be a continuation of the unexcavated ditch in Trenches 24 & 26 and continues into Trench 35.

5.24. A shallow pit or hollow 3005, cut into substrate at 0.09m deep and measured 0.5m wide, with gently sloping sides and concave base. Single fill 3006 was 0.16m thick, mid grey-brown silt clay with medium to large sub-angular gravel throughout.

Trench 35 (Fig. 5)

5.25. Ditch 3503, modern pits 3505 & 3509 and modern feature 3507 located in trench 35. No finds were recovered from this trench or associated features.

5.26. Ditch 3503 aligned southeast / northwest centrally located in Trench 35, cut into the substrate to a depth of 0.2m and measured 0.65m wide. It had gently sloping sides

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and slightly concave base. Single fill 3504 was 0.2m thick, mid grey-brown sand clay with occasional gravel throughout. The ditch is a continuation of that seen in Trench 30 and possibly of that in Trenches 24 & 26.

5.27. Pit 3505 cut into natural substrate at the south western extent of trench 35, 0.4m wide, 0.95m long and 0.15m deep with gently sloping sides and slightly concave base. Fill 3506 was 0.15m thick mid grey-brown sand silt with rare small gravel throughout. Most likely a modern feature.

5.28. Pit 3509, located at north eastern extent of Trench 35, truncated by feature 3507. Pit 3509 was 0.74m wide and 0.22m deep with gradual sides and concave base. Single fill 3510 was 0.22m thick, mid brown silt clay. Assumed to be pit due to lack of visibility in west facing section of Trench 35. Modern feature due to heavy concentration of modern brick and tile.

5.29. Feature 3507 located at the north-eastern extent of the trench, cut into fill 3510 of pit 3509 at a depth of 0.22m and measured 4.72m wide with gentle sloping sides and concave base. Single fill 3508 was 0.22m thick black silt clay with frequent modern brick and tile.

Trenches 43-49 (Fig 6)

5.30. Trenches 43-49 were located in the eastern part of site toward the river in pasture partly under ridge and furrow. Natural substrate was encountered at a depth of 0.35-0.96m and consisted of light yellow-brown moderate sandy clay. This was sealed by subsoil consisting of mid yellow-brown sandy-silt between 0.21-0.52m thick and topsoil, 0.2-0.71m thick, which contained sub-angular flint. Trenches 47 and 48, closest to the river contained a layer of alluvium between 0.15-0.30m thick, between the natural and the subsoil.

5.31. Trench 43 contained one large, modern feature 4303 at the southern extent of the trench. 4303 cut through topsoil and subsoil to a depth of 0.68m to the natural substrate, and measured 5m wide, with moderately steep sides and an irregular base. Basal fill 4304, 0.34m thick was a dark red brown sandy silt with small sub-angular flint. Fill 4305 was 0.36m thick very dark grey sand silt with frequent modern waste material, such as glass and pottery throughout.

Trench 44 (Fig. 6)

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5.32. Ditches 4403 and 4405 were central to Trench 44. One sherd of Late Iron Age / Early Roman pottery was found in topsoil during trench excavation. No finds were recovered from either feature.

5.33. Ditch 4403 was aligned west / east and cut into natural substrate to a depth of 0.23m; it measured 1m wide with moderate sides and concave base. Fill 4404 was 0.23m thick and mid grey-brown, bioturbated, sandy gravel.

5.34. Ditch 4405 was aligned northwest / southeast and cut into substrate to a depth of 0.15m and measured 0.47m wide with gradual sides and undulating base. Single fill 4406 was 0.15m thick mid grey-brown sandy gravel.

Trench 45 (Fig. 6)

5.35. Shallow trench containing at least six recognisable strip quarries at the eastern end of the trench, one of which was excavated. The central portion of the trench also appeared to have been quarried but the individual strips were less evident. The whole central and eastern part of the trench was noticeably lower than the surrounds, corresponding with a sunken area on the Earthwork Survey.

5.36. Quarry strip 4502, 1m wide and 0.5m deep with steep sides and flat base, cut into natural substrate. Single fill 4503, 0.5m thick mid grey-brown gravelly sand. All pf the recordable unexcavated quarry strips measured 1m in width. No finds were recovered.

Trench 46 (Fig.6 and Fig. 9)

5.37. Deep trench containing two small, shallow ditches, 4603 and 4605. Three sherds of Medieval Courseware were recovered from subsoil (4601), one further sherd from Ditch 4603, and two sherds of St Neots ware from Ditch 4605. It seems likely that these are part of the same feature, aligned southeast / northwest and turning to a butt end at the north. The overall finds assemblage would suggest a date within the late 11th/12th century, or later.

5.38. Ditch 4603 aligned northeast / southwest at southern extent of Trench 46. It was cut into substrate to a depth of 0.28m and measured 0.55m wide sharp almost vertical sides and slightly concave base. Fill 4604 was an 0.28m thick dark brown-grey silty sand with abundant gravel throughout and contained one sherd of Medieval Courseware dating to 12th-14th Century AD.

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5.39. Ditch 4605 aligned east / west located 1.3m to north-east of Ditch 4603. It was cut into substrate to a depth of 0.35m and measured 0.75m wide with sharp almost vertical sides and flat base. Fill 4606 was a 0.35m thick dark brown-grey silt sand with abundant gravel throughout and contained two sherds of St. Neots ware pottery dating to the 9th-11th century.

Trench 47 (Fig. 6)

5.40. Trench 47 contained one ditch aligned northeast / southwest located at the south-eastern extent of trench. The ditch measured 2m wide and remained unexcavated due to flooding; It was parallel to a slight bank to the west and forms part of an earthwork ditch system, possibly a small water meadow.

Trench 48 (Fig. 6 and Fig.10)

5.41. Trench 48 contained eight possible linear ditches or gullies and three possible pits; these remained unexcavated due to fast rising ground water. It is possible that some of the linear features were part of a drainage system in this area of the site. Whether all the potential linear features represent ditches is uncertain, and likewise the possible pit features. Their fills were dark and organic and they may well have been of natural origin.

5.42. Un-stratified finds from top and subsoil in Trench 48 included four sherds of Late Iron Age/Roman pottery, two sherds of Medieval Courseware (12th- 14th century AD), one sherd of Lyveden Stanion ware (13th-14th century AD) and three pieces of Post-Medieval CBM.

Trench 49 (Fig. 6)

5.43. Very deep trench containing two ditches (4903 and 4906) aligned west-southwest / east-northeast parallel to the field boundary to the south and perpendicular to the line of the river to the east. Ditch 4903 was a recutting of Ditch 4906. A possible posthole 4910 cut into the fill of 4906. One flint blade was recovered from the surface of Trench 49.

5.44. Ditch 4903 was cut into fill 4909 of ditch 4906 to the depth of 0.36m and measured 1.04m wide with steep sides and concave base. Primary fill 4904 was 0.68m wide and 0.09m thick was a grey-brown silty clay. No finds were recovered. Secondary fill 4905, 1.04m wide and 0.27m thick dark grey-brown silty clay with gravel throughout, most likely formed by natural silting of the ditch, which yielded eight sherds of St. Neots ware (9th-11th Century AD), two sherds of Medieval Courseware

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(12-14th Century AD) and a small assemblage of animal bone. Sample 1 taken from fill 4905, small quantities of charred cereal waste, rare enough to be wind-blown, were recovered.

5.45. Ditch 4906 was truncated by ditch 4903 and posthole 4910. Ditch 4906 was 0.7m wide and 0.45m deep, with moderate sides. It was not fully excavated due to the flooding of the trench. Primary fill 4907 was 0.42m wide and 0.09m thick, a mid grey-brown sandy silt with frequent gravel throughout. Secondary fill 4908 was 0.64m wide and 0.17m thick, light grey-brown gravel sand, most likely formed through weathering of the ditch sides. Fill 4908 was sealed by fill 4909, 0.7m wide and 0.21m thick dark grey-brown silty sand, no finds were recovered from ditch 4906. Sample 2 was taken from fill 4909, small quantities of charred cereal waste, rare enough to be wind-blown, were recovered.

5.46. Posthole 4910 was cut into ditch 4906 at a depth of 0.2m and measured 0.48m wide with moderate sides and concave base. Fill 4911, 0.2m thick dark brown, sand silt with frequent gravel, most likely formed through natural silting. No finds were recovered.

Trenches 51-57 (Fig. 7)

5.47. Trenches 51-57 were located at the southern end of the site, on arable land between the quarried area and the southern earthworks. Natural substrate was encountered at a depth of 0.5–0.7m and consisted of light yellow-brown compact silt clay with frequent gravel throughout. This was sealed by subsoil consisting of mid brown silt sand between 0.2-0.3m thick and topsoil, 0.25-0.45m.

5.48. No archaeological features were present in Trenches 54, 56 and 57. Due to ground conditions trenches 51 and 52 were not mechanically excavated and 53 was excavated to a length of 5m and immediately backfilled, once photos and survey had occurred, as it filled rapidly with water. No finds were recovered from these trenches or any associated features.

5.49. Trench 53 contained a ditch aligned northwest / southeast, measuring 0.78m wide, which remains unexcavated due to fast rising ground water.

Trench 55 (Fig. 7)

5.50. Shallow trench containing one possible pit 5503 at the northeast extent of trench. Pit 5503 was cut into natural substrate to a depth of 0.34 measuring 2m long and

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1m wide, with steep sides and concave base. Single fill 5504, 0.34m thick dark reddish brown sandy clay with gravel throughout. No finds were recovered from this trench or feature.

Trenches 50, 58-63 (Fig. 7 and Fig 8)

5.51. Trenches 50 and 58-63 were located at the southern limit of the site adjacent to the River Ouzel on an earthwork pasture field. Only Trench 58 was excavated due to ground water and flooding from the river, no archaeological features were present in trench 58. No finds were recovered.

5.52. Natural substrate was encountered at a depth of 0.74m and consisted of light yellow-brown compact silty clay with frequent gravel throughout. This was sealed by subsoil consisting of mid yellow grey sand silt between 0.43m thick and topsoil, 0.31m.

6. THE FINDS

6.1. The artefactual material was recorded from five deposits, consisting of ditch fills and subsoils, and as unstratified material (Appendix B). The material was recovered by hand.

6.2. The pottery from the evaluation has been recorded direct to an Excel spreadsheet from which Appendix B (Table 1) is derived and which forms part of the project archive. The pottery was examined by context, using a x10 binocular microscope and quantified according to sherd count and weight per fabric type. The fabrics are described in Appendix B (Table 2) in accordance with the Historic England guidelines (Barclay et al. 2016).

6.3. The entire assemblage, both stratified and unstratified and across all periods, comprised 39 sherds (1156g) of pottery in total. The assemblage is largely in good condition with fractures and surfaces exhibiting only minor signs of wear. Sherd size is large for a predominantly medieval assemblage with a mean sherd weight of 29.6g.

LIA/Roman Pottery

6.4. Six unstratified sherds (56g) of Late Iron Age or Early Roman pottery were recorded. The sherds are made in grog-tempered (UNS GR), shelly grog-tempered

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(UNS SHGR) and sandy fabrics (UNS Q). The origin of these fabrics is unknown although they have most likely been produced locally. Most sherds are unfeatured, save for a beaded rim (UNS SHGR) recorded unstratified from Trench 48.

Medieval Pottery

6.5. A total of 19 sherds (771g) of pottery can be dated to the medieval period. Ten sherds made in a shell-tempered fabric are most likely St Neots wares (STNE). Two clubbed rims are recorded from ditch fill 4905; the remainder are unfeatured sherds. St Neots wares are known to have been produced between the 9th and 11th centuries (Addyman 1965, 54) but coming here with later material, would more likely be at the end of this date-span. Eight sherds of medieval coarseware (MCW) are recorded. Two flattened rims and an up-curved rim are recorded from ditch fill 4905 and as unstratified material from Trenches 46 and 48 respectively. The medieval coarsewares date to between the 12th and 14th centuries. A handled jug with slashed/stabbed decoration was recorded from Trench 48. The sherd is made in a Lyveden Stanion fabric (LYST) and can be dated to between the 13th and 14th centuries (Webster 1975, 90). Several sherds exhibit signs of sooting residue which may be the result of the manufacturing process or, most likely, from use in food preparation processes.

Post-medieval/Modern Pottery

6.6. One sherd (6g) of Staffordshire-type manganese glazed ware (STMG) dating to the late 17th or 18th centuries and one sherd (4g) of refined white earthenware (REFW) dating to between the late 18th to 20th centuries are recorded as unstratified from Trench 4.

Summary

6.7. The pottery provides limited evidence for activity during the Late Iron Age or Early Roman, medieval and post-medieval/modern periods. Due to the small size of the assemblage and its largely unstratified nature, it is not possible to provide any further meaningful discussion.

Ceramic Building Material (CBM)

6.8. Three fragments of ceramic building material (72g) are recorded as unstratified from trench 48. The fragments are all made in medium sandy fabrics with fine limestone/calcareous inclusions. One peg tile and two unfeatured tile fragments

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were recorded. Based on the forms/thickness, fabrics and characteristics of firing it is most likely that this material dates to the post-medieval or modern period.

Flint

6.9. Five items (31g) of worked flint were recorded as unstratified finds. Trench 49 produced a blade made in yellowish grey flint. It exhibits signs of edge damage and both distal and proximal fractures. A small scraper and flake were recorded from Trench 4. They are made in a dark greyish brown flint and both show minor signs of edge or surface damage. The remaining pieces comprised a small flake made in a yellowish-brown flint with light edge damage and a possible core made in a dark greyish brown flint. The core exhibits multiple flake removal scars and some light edge and surface damage.

7. THE BIOLOGICAL EVIDENCE

7.1. A series of three environmental samples (60 litres of soil) were processed from trench 20 and trench 49. The samples were processed by standard flotation procedures (CA Technical Manual No. 2).

7.2. Preliminary identifications of plant macrofossils are noted in Table 1, following traditional nomenclature of Zohary et al (2012) for cereals.

7.3. Any dates discussed in this report have been obtained through spot dating of the finds (see Banks, this report).

Trench 20 (Fig. 2)

7.4. Undated pit 2007 (sample 5) contained no charred plant remains and only a small number of charcoal fragments. This assemblage is likely to be indicative of wind-blown/dispersed waste material.

Trench 49 (Fig. 6)

7.5. Medieval ditch 4903 (sample 1) cuts undated ditch 4906 (sample 2). Both samples have been taken from the upper fills of their respective ditches. As ditches 4903 cuts 4906, it can be stated that undated ditch 4906 is likely to be of medieval date or earlier.

7.6. Samples 1 and 2 contained small numbers of cereal grains which were heavily abraded and heat effected. Moderately small quantities of charcoal fragments were

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also noted in both assemblages; with the charcoal being silt-encrusted which inhibits further wood species identification. These assemblages are likely to be representative of wind-blown/dispersed waste material.

Summary

7.7. All three assemblages (samples 1, 2 and 5) are indicative of wind-blown/dispersed waste material. Samples 1 and 2 from ditches 4903 and 4906 (respectively) do suggest that they are on the outer edge of settlement activity due to the low presence of charred cereal grain fragments. The environmental evidence from all three assemblages do not provide any insight into the possible use or function of pit 2007, ditch 4903 and ditch 4906, nor do they aid in determining whether there is any association with the medieval sites of Caldecote Farm and Mill. There is also not enough environmental evidence to suggest a likely date for undated pit 2007 and undated ditch 4906 or does the environmental evidence confirm or refute the medieval date for ditch 4903.

8. DISCUSSION

8.1. Trial trenching revealed very few archaeological finds or features across the area; mainly consisting of Medieval drainage systems and field boundaries. The quantities of finds material were correspondingly low, with a few sherds of Romano-British pottery and a small number of Medieval sherds, the majority of which were recovered from the area between Moat House and the River Ouzel (Trenches 44, 46, 48 & 49). The environmental remains recovered were equally poor, with the scattered, windblown remains of charred crops, either representing intentional or unintentional fires or crop processing nearby.

8.2. The chief characteristic of the area is of damp, and sometimes wet, pastureland, with the area perhaps more affected by a frequently high water table, such as occurred during the evaluation, than by flooding - alluvial deposits were only recorded in one location adjacent to the river.

Prehistory

8.3. No prehistoric features were recorded in the trenches, with just four unstratified struck flints recovered from the entire site. The lack of either features or finds suggests that the area may well have been used as summer pasture for much of

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the prehistoric period – no ditches were recorded that might reasonably be interpreted as prehistoric field systems, perhaps corroborating this.

Late Iron Age/ Roman

8.4. With a substantial settlement around 500m to the west of site (MKHER ID: MMK934) and the possible small riverside dwelling to the east (MKHER ID: 454), the lack of a late Iron Age and Roman presence was perhaps unexpected. No dated features and just five unstratified and one residual LIA/Roman pottery sherds were recovered, from the eastern part of site toward the river, again perhaps suggesting that the site may have been under pasture throughout this period.

Medieval

8.5. No early or middle Anglo-Saxon finds were recovered from the site. The earliest stratified material was represented by two small groups of Late Saxon St Neots ware, both found within ditches between Moat House and the river and both in assemblages that included clearly later Medieval material, dating them to perhaps the 12th century. It is suggested that the area did not come under direct occupation until the late 11th or early 12th centuries, allied to the expansion of settlement and farming activity onto previously unused or pasture land at this period.

8.6. The earlier suggestion that there may have been a larger medieval hamlet surrounding Caldecote Farm and Moat House has now been refuted. The last area remaining to prospect for this would be the western pasture field, but this is clearly under Medieval ridge and furrow and therefore highly unlikely to be harbouring Medieval settlement remains – where trenching has taken place within the eastern ridge and furrow field no underlying features were recorded. It is likely that the ridge and furrow fields would have been ploughed at the point of initial settlement at Caldecote Farm, perhaps in the 11th century, and put back to pasture by the end of the 14th century.

8.7. There is however some limited evidence for Medieval activity between the ridge and furrow field and the river, with two (possibly three) ditches – one in trench 49 a re-cut boundary ditch, the other in Trench 46 possibly part of a small enclosure (Fig. 6, Fig. 9 and Fig. 10). Both held small assemblages of Medieval pottery dating them perhaps to around the 12th century. There were two further small, undated ditches in Trench 44 and it is possible that at least some of the features in the flooded, unexcavated Trench 48 represent contemporary drainage ditches.

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8.8. It is likely that the fields with extant ridge and furrow, along with those that have since become ploughed out to the north, would have been taken out of arable production by the late 14th century and put to pasture. These low-lying, damp areas would have been among the first to have been removed from ploughing following the famine and plague of the 14th century, and the consequent reduction in population. These areas had been ploughed initially to feed a growing population, they would now have been more profitably, and far less labour-intensively, used to rear sheep for wool.

8.9. The moated site at Moat House is most likely to have been constructed in the 13th or early 14th century, the floruit of lowland moat building. However, the ridge and furrow to the east respects the moated site, and the small areas to the south are without ridge and furrow, so it is suggested that this area, pre-moat, was part of the original occupation site. To construct a moat around a house in this period often involved moving the main domestic site down the contour into ground where water could be effectively channelled in, not so here.

Post-Medieval

8.10. There is no archaeological evidence for post-medieval occupation outside of the main domestic sites of Caldecote Farm and Moat House. There is a small area of well-structured, but undated, strip-quarrying in Trench 45 along the roadway at the east – potentially taking gravel for the construction of the roadways themselves – and a small number of post-Medieval to modern pits containing buried rubble etc. in Trenches 35 and 43 (Fig. 5 and Fig. 6). The few sherds of pottery recovered from the northern part of the site represent middening within the ploughed fields.

8.11. The eastern and southern parts of the site clearly remained as pasture through to the present day with the northern fields returning to arable only in the post-war period as the ridge and furrow is clearly visible on the 1945 Google aerial photograph. A small number of Enclosure and post-Enclosure field boundaries were recorded, some visible on 19th century maps, some on the 1945 aerial, and some dated by their alignments and associations.

Undated

8.12. A number of excavated and unexcavated features remain undated, either by finds, map evidence or association.

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8.13. The small, circular feature in Trench 13 perhaps most resembles the remnants of a haystack drainage gully, potentially of Roman or Medieval/post-Medieval date (Fig. 4). It would not be a great leap to see these fields as hay meadows at some stage.

8.14. Within Trench 14, three unexcavated narrow, and presumably therefore shallow, ditches were aligned parallel to the ridge and furrow visible on the 1945 Google AP within this field, perhaps representing the bases of deeper furrows.

8.15. A ditch running through Trenches 24 and 26 is visible on the OS maps up until 1937-61 and on the 1945 AP. Excavated ditches in Trenches 30 and 35 to the south run parallel to this ditch (Fig. 5).

8.16. The ditch at the east end of Trench 47 has a corresponding, slight bank parallel to the west and forms a part of a small earthwork ditch-and-bank system of unknown date (Fig. 6). Clearly not ridge and furrow this system has the look of a small water-meadow and would likely be of post-Medieval date.

8.17. Trench 48 contained a number of possible linear and pit-like features, some of which could represent part of a drainage system. Whether all the potential linear features represent ditches is uncertain, and similarly the pit-like features. Their fills were dark and organic-looking and they may well have been of natural origin (Fig. 6).

9. CA PROJECT TEAM

9.1. Fieldwork was undertaken by Isobelle Ward, assisted by Alex Foley, Chloe Groves, Charlotte Nicholson, Greg Bowen, João Heitor, Nasturcja Pachlek and Tommasso Rossi. This report was written by Isobelle Ward. The finds and biological evidence reports were written by Peter Banks and Emma Aitken, respectively. The report illustrations were prepared by Ryan Wilson and Krissy Moore. The project archive has been compiled by Hazel O'Neil, and prepared for deposition by Hazel O'Neil. The project was managed for CA by Richard Mortimer under the direction of the client's consultant Gerry Wait of Triskelion Heritage.

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APPENDIX A: CONTEXT DESCRIPTIONS

Trench	Context No.	Type	Fill of	Interpretation	Description	Length (m)	Width (m)	Depth/ thickness (m)	Spot-date
1	100	Layer		Topsoil	Mid greyish brown, loose sandy silt. Frequent and sub angular stones and flint	50	1.8	0.2	
1	101	Layer		Subsoil	Mid brown, sandy silt, occasional small and fine sub angular stones	50	1.8	0.3	
1	102	layer		Alluvium	Mid blueish grey, sandy clay, moderately compact, rounded and sub angular stones	50	1.8	0.1	
1	103	Layer		Natural	Light yellowish brown, sandy clay moderately compact with frequent gravel	50	1.8		
2	200	Layer		Topsoil	Dark grey-brown, moderate clay, no inclusions	50	1.8	0.37	
2	201	Layer		Natural	Light yellow brown firm silt clay, Frequent large flints, occasional gravel patches	50	1.8	0.02	
2	203	Layer		Subsoil	Mid yellow brown, variable silt and frequent small gravel	50	1.8	0.23	
3	300	Layer		Topsoil	Mid greyish brown clayey sand, friable, with moderate small rounded pebbles and frequent sub angular flint fragments	50	1.8	0.17	
3	301	Layer		Subsoil	Mid Orangey brown clayey sand, loose, frequent with rounded pebbles and sub angular flint	50	1.8	0.08	
3	302	Layer		Natural Geology	Mid brownish yellow clayey sand with frequent patches of gravel, moderately compact	50	1.8	0.04+	
4	400	Layer		Topsoil	Dark grey-brown, firm sandy silt, occasional small gravel	50	1.8	0.32	
4	401	Layer		Subsoil	Mid yellow brown friable silt with medium gravel	50	1.8	0.22	
4	402	Layer		Natural	Mid yellow grey firm silty clay common gravel inclusions	50	1.8	-	
5	500	Layer		Topsoil	Dark grey-brown friable sandy silt with occasional small-medium gravel inclusions	50	1.8	0.25	
5	501	Layer		Subsoil	Mid yellow grey, firm sandy silt with occasional medium/small	50	1.8	0.18	

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					gravel inclusions				
5	502	Layer		Natural	Light yellow-grey, compact silty clay with moderate small/medium gravel inclusions	50	1.8	-	
6	600	Layer		Topsoil	Dark grey-brown friable sandy silt with occasional small/medium gravel inclusions	50	1.8	0.2	
6	601	Layer		Subsoil	Mid yellow brown firm silt with occasional small/medium gravel inclusions	50	1.8	0.14	
6	602	Layer		Natural	Light yellow grey compact silty clay with moderate small/medium gravel inclusions	50	1.8	-	
7	700	Layer		Topsoil	Dark grey-brown friable sandy silt with occasional small/medium gravel inclusions	50	1.8	0.18	
7	701	Layer		Subsoil	Dark yellow brown firm sandy silt with occasional small/medium gravel inclusions	50	1.8	0.15	
7	702	Layer		Natural	Mid grey-brown compact silty clay with common gravel inclusions	50	1.8	-	
7	703	Cut		Linear Ditch	Moderate sides with concave base	-	0.65	0.29	
7	704	Fill		Fill of Cut	Dark grey-brown, silt sand, loose with rare sub-angular stones	-	0.65	0.29	
7	705	Cut		Linear Ditch	unexcavated	-	0.76	-	
7	706	Fill		Fill of Cut	Unexcavated	-	0.76	-	
8	800	Layer		Topsoil	Dark grey-brown, friable with some small gravel inclusions	50	1.8	0.36	
8	801	Layer		Subsoil	Dark yellow grey firm silt with some occasional small/medium gravel inclusions	50	1.8	0.23	
8	802	Layer		Natural	Mid yellow grey firm silty clay with moderate small/medium gravel inclusions	50	1.8	-	
9	900	Layer		Topsoil	Mid greyish brown sandy silt, frequent sub-angular stones and flint	50	1.8	0.2	
9	901	Layer		Subsoil	Mid brown, sandy silt loose, some sub angular stones	50	1.8	0.3	
9	902	Layer		Alluvium	Mid bluey grey, sandy clay, moderately compact, some small sub angular stones	50	1.8	0.2	
9	903	Layer		Natural	Light yellowish brown, sandy clay, moderately compact with patches of gravel	50	1.8	-	
9	904	Cut		Cut of pit	Moderate sides, concave base	-	0.88	0.27	
9	905	Fill		Fill	Mid Greyish brown, sandy	-	0.88	0.27	

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					loose frequent sine and sub angular stones and flint.				
10	1000			Topsoil	Mid greyish brown sandy silt, soft with occasional small, rounded pebbles and bioturbation traces	50	1.8	0.18	
10	1001			Subsoil	Mid Orangey brown sandy silt, Friable with frequent small rounded pebbles. (subsoil only occurs in eastern area of trench)	22	1.8	0.22	
10	1002			Natural	Mid brownish yellow gravelly sand with presence of plough marks	50	1.8	0.15	
10	1003			Cut	Cut of ditch linear in plan, moderately steep and concave sides gradual break of slope, concave base.	1.65	0.92	0.42	
10	1004			Fill	Secondary fill, dark brownish grey sandy silt, soft, with frequent sub-angular flint fragments and rounded small pebbles	1.65	0.92	0.42	
10	1005			Cut	Cut of pit, Sub- circular, moderately steep sides, and concave base.	-	0.3	0.4	
10	1006			fill	Dark blue grey, sandy, gritty silt, fairly compact, with regular medium to large charcoal and gravel.	-	0.3	0.4	
11	1100	Layer		Topsoil	Dark greyish brown, silty sand, frequent flint fragment inclusions	50	2.50	0.20	
11	1101	Layer		Subsoil	Dark reddish brown, silty sand, soft, frequent flint fragment inclusions	50	2.50	0.23	
11	1102	Layer		Natural	Mottled brownish orange, sandy gravel with occasional hematite	50	2.50	-	
12	1200	Layer		Topsoil	Dark greyish brown, silty sand, soft compaction, frequent flint fragments and occasional pebble inclusions	50	2.25	0.30	
12	1201	Layer		Subsoil	Dark reddish brown, silty sand, frequent flint fragment inclusions	50	2.25	0.27	
12	1202	Layer		Natural	Mottled mid brownish orange, sandy gravel	50	2.25	0.03	
12	1203	Cut		Ditch	Linear ditch, gradual sloping	1.80	0.62	0.32	

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					sides, concave base, East / West aligned				
12	1204	Fill		Fill of ditch	Mid-dark greyish brown, silty clay, loose compaction, frequent gravel inclusions	1.80	0.62	0.32	
13	1300	Layer		Topsoil	Dark brown silt sand loose frequent flint	50	2	-	
13	1301	Layer		Subsoil	Mid brown gravel sand moderately compact	50	2	-	
13	1302	Layer		Natural	Yellow brown silt sand with grey-brown gravel sand patches	50	2	-	
14	1400	Layer		Topsoil	Dark brown loose silty sand, frequent flint	50	2	0.25	
14	1401	Layer		Subsoil	Mid brown gravelly sand, moderately compact	50	2	0.35	
14	1402	Layer		Natural	Mid yellowish brown silty with mid greyish brown gravelly sand patches	50	2	-	
19	1900	Layer		Topsoil	Grey-brown moderate silt clay no inclusions	50	1.8	0.55	
19	1901	Layer		Subsoil	Mid yellow brown firm silt clay with rare small stones	50	1.8	0.28	
19	1902	Layer		Natural	Light yellow brown firm silt clay with no inclusions	50	1.8	-	
19	1903	Cut		Cut of Ditch	Linear, moderate sides and concave base	-	0.46	0.16	
19	1904	Fill		Fill of 1903	Mid greyish brown sandy clay, moderately compact occasionally small and fine sub-angular stones	-	0.46	0.16	
19	1905	Cut		Cut of ditch	Linear, shallow concave sides, flat base	-	0.6	0.2	
19	1906	Fill		Fill of 1905	Mid greyish brown sandy clay, moderately compact, occasional small stones.	-	0.6	0.2	
20	2000	Layer		Topsoil	Dark Grey brown, sandy silt friable, rare gravel	50	1.8	0.40	
20	2001	Layer		Subsoil	Mid yellow grey, sandy silt, friable, rare gravel	50	1.8	0.25	
20	2002	Layer		Natural	Light brownish yellow compact silty clay, with big grey clay inclusions, abundant in natural gravel.	50	1.8	-	
20	2003	Cut		Cut of Ditch	Moderate sides, concave base	-	0.48	0.11	
20	2004	Fill		Fill of (2003)	Mid grey-brown moderately compact, rare small sub-angular stones	-	0.48	0.11	
20	2005	Cut		Cut of Ditch	Linear, shallow sides, concave base	-	0.48	0.1	
20	2006	Fill		Fill of 2005	Mid grey-brown, silty clay,	-	0.48	0.1	

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					moderately compact, frequent gravel				
20	2007	Cut		Cut of Pit	Sub-circular, gentle sides, concave base	-	0.52	0.06	
20	2008	Fill		Fill of 2007	Dark grey-brown, compact charcoal and frequent gravel	-	0.52	0.06	
20	2200	Layer		Natural	Mid yellowy grey, sandy silt, compact, gravel inclusions moderately spread through layer	50	1.8	-	
21	2100	Layer		Topsoil	Dark greyish brown, friable sandy silt, rare small pieces of gravel	50	1.8	0.35	
21	2101	Layer		Subsoil	Dark yellow grey – friable sandy silt, looser than topsoil, few pieces of gravel	50	1.8	0.32	
21	2102	Layer		Natural	Mid yellow grey, silty clay, compact, moderate gravel, patches of light yellow-grey	50	1.8	-	
22	2201	Layer		Subsoil	Mid orangey grey, sand, fairly compact, occasional gravel inclusions	50	1.8	0.17	
22	2202	Layer		Topsoil	Dark greyish-brown silt, friable loose compaction	50	1.8	0.28	
23	2300	Layer		Natural	Mid yellow, sandy clay, moderately compact, infrequent gravel inclusions	50	1.8	-	
23	2301	Layer		Subsoil	Light/mid brown, sandy clay, moderately compact, infrequent gravel inclusions	50	1.8	0.22	
23	2302	Layer		Topsoil	Mid brown, sand, loose compaction	50	1.8	0.33	
24	2400	Layer		Natural	Mid yellowish grey, silty, compact clay	50	1.8	-	
24	2401	Layer		Subsoil	Mid orangey grey, sandy, few gravel pieces throughout, friable	50	1.8	0.19	
24	2402	Layer		Topsoil	Mid brown, sand, loose compaction	50	1.8	0.17	
24	2403	Cut		Linear cut	Unexcavated	-	1	-	
24	2404	Fill		Fill of 2403	Unexcavated	-	1	-	
25	2500	Layer		Natural	Mid yellowish grey, clay like silt, compact	50	1.8	-	
25	2501	Layer		Subsoil	Dark yellowish grey, sandy silt, friable compaction	50	1.8	0.39	
25	2502	Layer		Topsoil	Dark greyish brown, silt, friable	50	1.8	0.23	
26	2600	Layer		Natural	Mid yellow grey silty clay, compact	50	1.8		
26	2601	Layer		Subsoil	Mid orangey grey, sandy silt, friable, few pieces of rubble scattered throughout	50	1.8	0.44	
26	2602	Layer		Topsoil	Dark greyish brown, silty and friable	50	1.8	0.22	

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26	2603	Cut		Linear Cut	Unexcavated	-	1	-	
26	2604	Fill		Fill of linear 2604	Unexcavated	-	1	-	
28	2800	Layer		Topsoil	Mid Grey Brown, moderate silt clay with inclusions	50	1.8	0.27	
28	2801	Layer		Subsoil	Mid yellow brown, moderate silt clay no inclusions	50	1.8	0.33	
28	2801	Layer		Natural	Light yellow brown silt clay, firm with no inclusions	50	1.8	-	
30	3000	Layer		Topsoil	Dark Grey brown sandy silt, friable, very moist	50	1.8	0.33	
30	3001	Layer		Subsoil	Mid yellow grey sandy silt, friable, rare medium gravel	50	1.8	0.28	
30	3002	Layer		Natural	Mottled light yellow brown and light grey compact silty clay, often medium gravel	50	1.8	-	
30	3003	Cut		Curved ditch	Gentle slope, concave base	-	0.5	0.16	
30	3004	Fill		Fill of ditch 3003	Mid grey-brown, silty clay, compact, moderate medium to large gravel	-	0.5	0.16	
30	3005	Cut		Pit	Sub circular, gentle slope, concave base	-	0.5	0.09	
30	3006	Fill		Fill of 3005	Mid grey-brown silty clay, compact with moderate to large gravel	-	0.5	0.09	
31	3100	Layer		Natural	Mid yellowish brown, sandy clay, firm, frequent gravel inclusions	50	1.8	-	
31	3101	Layer		Subsoil	Mid yellowish brown, sandy clay, moderate compaction, occasional stone	50	1.8	0.26	
31	3102	Layer		Topsoil	Dark greyish brown, sandy clay, loose compaction, occasional flint inclusions throughout	50	1.8	0.38	
32	3200	Layer		Topsoil	Dark greyish brown, sandy silt, soft compaction, occasional flint fragment inclusions	50	2.50	0.28	
32	3201	Layer		Subsoil	Mid yellowish brown, clayey sand, loose compaction, frequent stone inclusions	50	2.50	0.13	
32	3202	Layer		Natural	Mid brownish yellow, sandy clay, firm compaction, frequent gravel inclusions	50	2.50	-	
33	3300	Layer		Natural	Dark yellowish grey, compact, silty clay, gravel inclusions	50	1.8	-	
33	3301	Layer		Subsoil	Mid yellowish brown, sandy silt, friable compaction, scattered gravel	50	1.8	0.19	

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					inclusions				
33	3302	Layer		Topsoil	Dark yellowish grey, silty sand, friable compaction	50	1.8	0.32	
34	3400	Layer		Natural	Mid yellowish grey, silty clay, compact, densely filled with gravel	50	1.8	-	
34	3401	Layer		Subsoil	Mid yellowish brown, sandy silt, friable compaction, spotted with gravel	50	1.8	0.17	
34	3402	Layer		Topsoil	Dark yellowish grey, sandy silt, friable compaction	50	1.8	0.33	
35	3500	Layer		Topsoil	Dark greyish brown, friable sandy silt, occasional stones	50	1.8	0.3	
35	35001	Layer		Subsoil	Mid greyish brown friable sandy silt, rare small stones	50	1.8	0.2	
35	3502	Layer		Natural	Mid yellow brown compact silty clay with loose sandy gravel	50	1.8	-	
35	3503	Cut		Ditch Cut	Shallow concave sides, concave base	-	0.65	0.2	
35	3504	Fill		Fill of 3503	Mid grey-brown silty clay moderately compact with occasional small stones	-	0.65	0.2	
35	3505	Cut		Pit	Oval, gentle sloping sides and concave base	0.95	0.4	0.15	
35	3506	Fill		Fill of 3505	Mid brownish grey sandy silt, friable, rare small stones	0.95	0.4	0.25	
35	3507	Cut		Modern ditch	Linear, gradual sides, concave base	-	4.72	0.22	
35	3508	Fill		Fill of 3507	Black silty clay, moderate compaction with charcoal and modern tile and brick	-	4.75	0.22	
35	3509	Cut		Modern pit	Unknown shape, gradual sides and concave base	-	0.74	0.22	
35	3510	Fill		Fill of 3509	Mid brown silty clay, moderate compaction, modern brick and tile inclusions	-	0.74	0.22	
43	4300	Layer		Topsoil	Dark greyish brown, silty sand, soft compaction, occasional flint fragment inclusions	30	2.50	0.26	
43	4301	Layer		Subsoil	Dark reddish brown, gravelly sand	30	2.50	0.50	
43	4302	Layer		Natural	Mottled mid brownish orange, sandy gravel	30	2.50	0.30	
43	4303	Cut		Modern feature	Linear Moderately steep sides, uneven undulating base	5	2.50	0.68	
43	4304	Fill	4303	Basal Fill 4303	Dark reddish brown, sandy silt, soft compaction, moderately small flint fragments	5	2.50	0.34	
43	4305	Fill	4303	Upper Fill 4303	Dark grey, sandy silt, soft compaction, occasional flint fragments, CBM,	5	2.50	0.36	

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					charcoal and stone inclusions				
44	4400	Layer		Topsoil	Dark greyish brown loose flint with occasional flint throughout	40	1.8	0.71	
44	4401	Layer		Subsoil	Mid yellowish-brown sand with frequent gravel	40	1.8	0.21	
44	4402	Layer		Natural	Mottled light yellow brown sand gravel	40	1.8	-	
44	4403	Cut		Cut of ditch	Linear, moderate sides and concave base	-	1	0.23	
44	4404	Fill		Fill of 4403	Mid greyish brown, sandy gravel, moderately compact	-	1	0.23	
44	4405	Cut		Cut of Ditch	Linear, Gradual sides, undulating base	-	0.47	0.15	
44	4406	Fill		Fill of 4405	Greyish brown loose sandy gravel	-	0.47	0.15	
45	4500	Layer		Topsoil	Dark brownish, sandy silt, loose compaction	50	2	0.35	
45	4501	Layer		Natural	Mid yellowish brown, gravelly sand, mid brown gravelly patches	50	2	-	
45	4502	Cut		Quarry stripping linear	Linear ditch, steep on NE side, North-West / South-East aligned	-	1	0.50	
45	4503	Fill	4502	Fill of 4502	Mid greyish brown, gravelly sand, loose compaction	-	1	0.50	
46	4600	Layer		Topsoil	Dark brownish, sandy silt, loose compaction, occasional stone inclusions	30	1.8	0.30	
46	4601	Layer		Subsoil	Mid greyish brown, gravelly sand	30	1.8	0.44	
46	4602	Layer		Natural	Dark greyish brown, sandy/gravelly, friable compaction	30	1.8	-	
46	4603	Cut		Ditch	Linear ditch, sharp almost vertical sides, concave base, North-East / South-West aligned	-	0.55	0.28	
46	4604	Fill	4603	Fill of ditch 4603	Dark brownish grey, silty sand, friable compaction, abundant gravel and pebble inclusions	-	0.55	0.28	
46	4605	Cut		Ditch	Linear ditch, sharp almost straight sides, sharp/straight base with a gentle slope towards West, East / West aligned	-	0.75	0.35	
46	4606	Fill	4605	Fill of ditch	Dark brownish grey, silty clay, friable compaction, gravel and pebble inclusions	-	0.75	0.35	
47	4700	Layer		Topsoil	Dark brown, silty sand. No inclusions	50	1.8	0.2	
47	4701	Layer		Subsoil	Mid brown silty sand, no inclusions	50	1.8	0.35	
47	4702	Layer		Alluvium	Mid greyish brown silty clay,	50	1.8	0.15	

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					no inclusions				
47	4703	Layer		Natural	Light yellowish brown silty clay, no inclusions	50	1.8	-	
48	4800	Layer		Topsoil	Dark brown silty sand, no inclusions	50	1.8	0.20	
48	4801	Layer		Subsoil	Mid brown silty sand, no inclusions	50	1.8	0.30	
48	4802	Layer		Alluvium	Mid greyish brown silty clay, no inclusions	50	1.8	0.30	
48	4803	Layer		Natural	Mid yellowish brown silty clay, no inclusions	50	1.8	-	
49	4900	Layer		Topsoil	Dark brown, sandy clay, loose compaction, occasional stones	40	1.8	0.44	
49	4901	Layer		Subsoil	Light brown, sandy clay, frequent stone inclusions	40	1.8	0.52	
49	4902	Layer		Natural	Mottled light brownish yellow, sandy clay, firm compaction, frequent gravel inclusions	40	1.8	-	
49	4903	Cut		Ditch	Linear ditch, steep sides, concave base, North-West / South-East aligned.	-	1.04	0.36	
49	4904	Fill	4903	Fill of ditch 4903	Mid greyish brown, silty clay, loose compaction, occasional fine gravel and stone inclusions	-	0.68	0.09	
49	4905	Fill	4903	Fill of ditch 4903	Dark greyish brown, silty sand, loose compaction, frequent fine stone inclusions	-	1.04	0.27	
49	4906	Cut		Ditch	Linear ditch, moderate sides, North-West / South-East aligned	-	0.70	0.45	
49	4907	Fill	4906	Fill of ditch 4906	Primary fill, Mid greyish brown, sandy silt, loose compaction, frequent fine stone inclusions	-	0.42	0.09	
49	4908	Fill	4906	Fill of ditch 4906	Secondary fill, Light greyish brown, gravelly sand, loose compaction, frequent small flint inclusions	-	0.64	0.17	
49	4909	Fill	4906	Fill of ditch	Tertiary fill, Dark greyish brown, silty sand, loose compaction, frequent fine, small stone inclusions	-	0.70	0.21	
49	4910	Cut		Posthole	Circular posthole, moderately sloped sides, concave base	-	0.48	0.20	
49	4911	Fill	4910	Fill of posthole	Dark brown, sandy silt, loose compaction, frequent stone inclusions	-	0.48	0.20	
54	5400	Layer		Topsoil	Mid brown sandy silt loose with some stones	50	1.8	0.30	
54	5401	Layer		Subsoil	Light reddish brown sandy silt friable	50	1.8	0.30	

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54	5402	Layer		Natural	Light red sandy silt with gravel throughout	50	1.8	-	
54	5403	Cut		Tree Bowl	Oval, steep sides, flat base	-	1.2	0.37	
54	5404	Fill		Fill of 5403	Light brown loose silty clay, loose compaction.	-	1.2	0.37	
55	5500	Layer		Topsoil	Mid greyish brown sandy silt, friable gravel throughout	50	1.8	0.25	
55	5501	Layer		Subsoil	Light mid brown sandy silt friable	50	1.8	0.3	
55	5502	Layer		Natural	Light brown silty clay, filled with gravel	50	1.8	-	
56	5600	Layer		Topsoil	Dark Greyish brown friable silty sand with stones and turf	50	1.8	0.40	
56	5601	Layer		Subsoil	Mid brown friable silty sand with some stones	50	1.8	020	
56	5602	Layer		Natural	Mid yellowish brown compact clayey silt with abundant rounded gravel and pebbles and chalk fragment	50	1.8	0.15	
56	5603	Cut		Cut of Tree bowl	Cut of tree bole, very step sides with slightly convex base	-	0.4	0.2	
56	5604	Fill		Fill of 5603	Dark grey-brown silt clay, friable compaction small infrequent gravel throughout.	-	0.4	0.2	
57	5700	Layer		Topsoil	Dark greyish brown friable silty sand with few stones	50	1.8	0.40-0.45	
57	5700	Layer		Subsoil	Mid brown friable silty sand with rare small stones	50	1.8	0.25	
57	5700	Layer		Natural	Light yellowish brown compact clayey silt, with abundant natural gravel and pebbles and the occasional chalk fragment	50	1.8	-	
58	5800	Layer		Topsoil	Mid greyish brown, sandy silt, friable compaction	50	1.8	0.31	
58	5801	Layer		Subsoil	Mid yellowish grey, sandy silt, friable compaction	50	1.8	0.43	
58	5802	Layer		Natural	Light yellowish grey, silty clay, compact, stone/gravel inclusions	50	1.8	-	

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APPENDIX B: THE FINDS

Table 1: Finds Concordance

Context	Class	Description	Fabric Code	Count	Weight (g)	Spot-date
U/S Tr 4	Post-Medieval/Modern Pottery Post-Medieval Pottery Flint	Refined white earthenware Staffordshire-type manganese glazed ware Scraper x 1, flake x 1	REFW STMG	1 1 2	4 6 10	LC18-C20
2301	LIA /Roman Pottery	Unsourced grog-tempered ware	UNS GR	1	18	LIA/ERB
U/S Tr 44	LIA/Roman Pottery	Unsourced sandy ware	UNS Q	1	15	RB
4601	Medieval Pottery	Medieval coarseware	MCW	3	207	C12-C14
4604	Medieval Pottery	Medieval coarseware	MCW	1	14	C12-C14
4606	Medieval Pottery	St Neots ware	STNE	2	21	C9-C11
U/S Tr 48	LIA/Roman Pottery Medieval Pottery Medieval Pottery CBM	Unsourced shelly grog ware Medieval coarseware Lyveden Stanion ware Tile x 2, Peg Tile x 1	UNS SHGR MCW LYST msli	4 2 1 3	23 30 50 72	C13-C14
U/S Tr 49	Flint	Blade x 1		1	1	
4905	Medieval Pottery Medieval Pottery	St Neots ware Medieval coarseware	STNE MCW	8 2	353 96	C12-C14
U/S	Flint	Core? X 1, flake x 1		2	20	

Table 2: Fabric Descriptions

Period	Fabric Description	Fabric Code	Count	Weight (g)
LIA/Roman Pottery	Unsourced grog-tempered ware Unsourced sandy ware Unsourced shell grog-tempered ware	UNS GR UNS Q UNS SHGR	1 1 4	18 15 23
Medieval Pottery	St Neots ware Lyveden Stanion ware Medieval Coarseware	STNE LYST MCW	10 1 8	374 50 347
Post-medieval/ Medieval Pottery	Staffordshire-type manganese glazed ware Refined white earthenware	STMG REFW	1 1	6 4
Grand Total			**39**	**1156**

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APPENDIX C: THE PALAEOENVIRONMENTAL EVIDENCE

Feature	Context	Sample	Processed vol (L)	Unprocessed vol (L)	Flot size (ml)	Roots %	Grain	Chaff	Cereal Notes	Charred Other	Charcoal > 4/2mm	Other
Trench 20												
Pit 2007	2008	5	20	0	1	50	-	-	-	-	*/**	-
Trench 49												
Ditch 4903	4905	1	20	20	20	80	**	-	indet grain (v. abraded)	-	**/**	-
Ditch 4906	4909	2	20	20	30	80	**	-	indet grain (v. abraded)	-	**/**	-

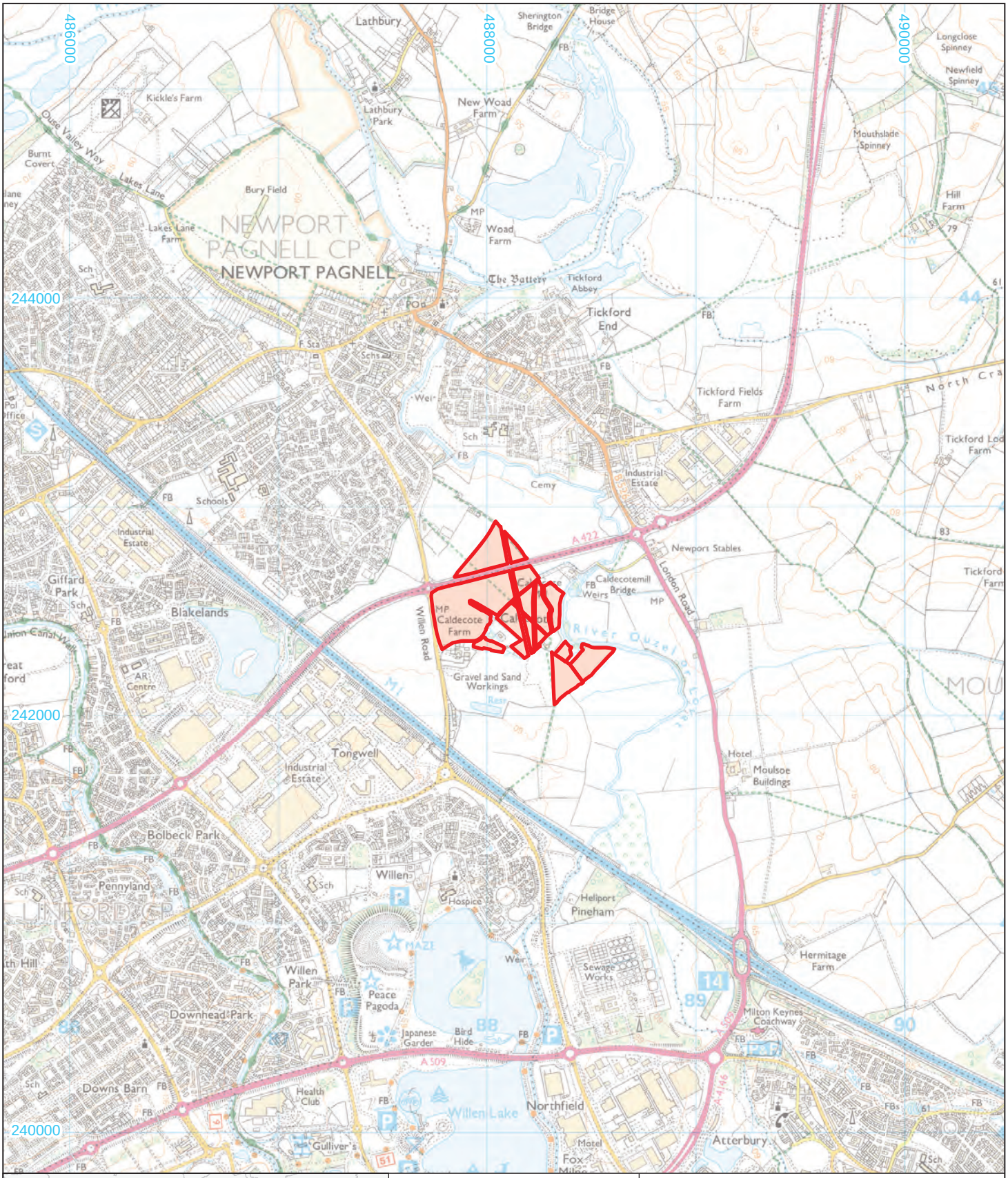
Key: * = 1–4 items; ** = 4–20 items; *** = 21–49 items; **** = 50–99 items; ***** = >100 items

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APPENDIX D: OASIS REPORT FORM

PROJECT DETAILS		
Project name	Land East of Willen Road, Newport Pagnell, Milton Keynes : Archaeological Evaluation	
Short description	In January 2021, Cotswold Archaeology carried out an archaeological evaluation of the land East of Willen Road, Newport Pagnell, Buckinghamshire. A total of 41 trenches out of the proposed 63 trenches were excavated. A very high water table, large areas of standing water and near-constant rainfall prevented the remainder if the trenches from being opened. Trial trenching revealed a very limited number of archaeological features, finds or deposits across the area; mainly consisting of Medieval to post-Medieval drainage ditches and field boundaries. The results suggest an extended period of use as pastoral land, latterly in association with Caldecote Farm and Mill, with a brief period of arable agriculture in the high Medieval period, evidenced by the standing remains of Ridge and Furrow across the central, southern part of the site. Very few archaeological artefacts were recovered, making precise dating of features difficult, and further supporting low levels of human activity or input within the area. Small quantities of artefacts were recovered including four flints, four pieces of animal bone, six sherds of Late Iron Age / Roman pottery, nineteen sherds of Medieval pottery – largely dating from between the late 11th-14th centuries - and five post-medieval artefacts. 80% of the finds were recovered from the pasture land in the central, eastern part of the site towards the river (Trenches 43-49).	
Project dates	18th January to 5th February 2021	
Project type	Field Evaluation	
Previous work	geophysical survey (MS, 2020)	
Future work	Unknown	
PROJECT LOCATION		
Site location	Caldecote Farm, Willen Road, Newport Pagnell	
Study area (m^2/ha)	42 Ha	
Site co-ordinates	488112 242539	
PROJECT CREATORS		
Name of organisation	Cotswold Archaeology	
Project brief originator	Senior Archaeological Officer Milton Keynes Council	
Project design (WSI) originator	Cotswold Archaeology	
Project Manager	Richard Mortimer	
Project Supervisor	Isobelle Ward	
MONUMENT TYPE	None	
SIGNIFICANT FINDS	None	
PROJECT ARCHIVES	**Intended final location of archive (museum/Accession no.)**	**Content (e.g. pottery, animal bone etc)**
Physical	Milton Keynes Museum	ceramics, animal bone
Paper	Milton Keynes Museum	Context sheets, matrices etc
Digital	Milton Keynes Museum	Database, digital photos etc
BIBLIOGRAPHY		
Cotswold Archaeology 2021 Land East of Willen Road, Newport Pagnell, Milton Keynes, *Archaeological* CA typescript report **MK0390_1**		

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PROJECT TITLE

Willen Road, Newport Pagnell, Buckinghamshire

FIGURE TITLE

Site location plan

DRAWN BY	RP	PROJECT NO.	MK0390	FIGURE NO.
CHECKED BY	DJB	DATE	11.02.21	1
APPROVED BY	RM	SCALE@A4	1:25,000	



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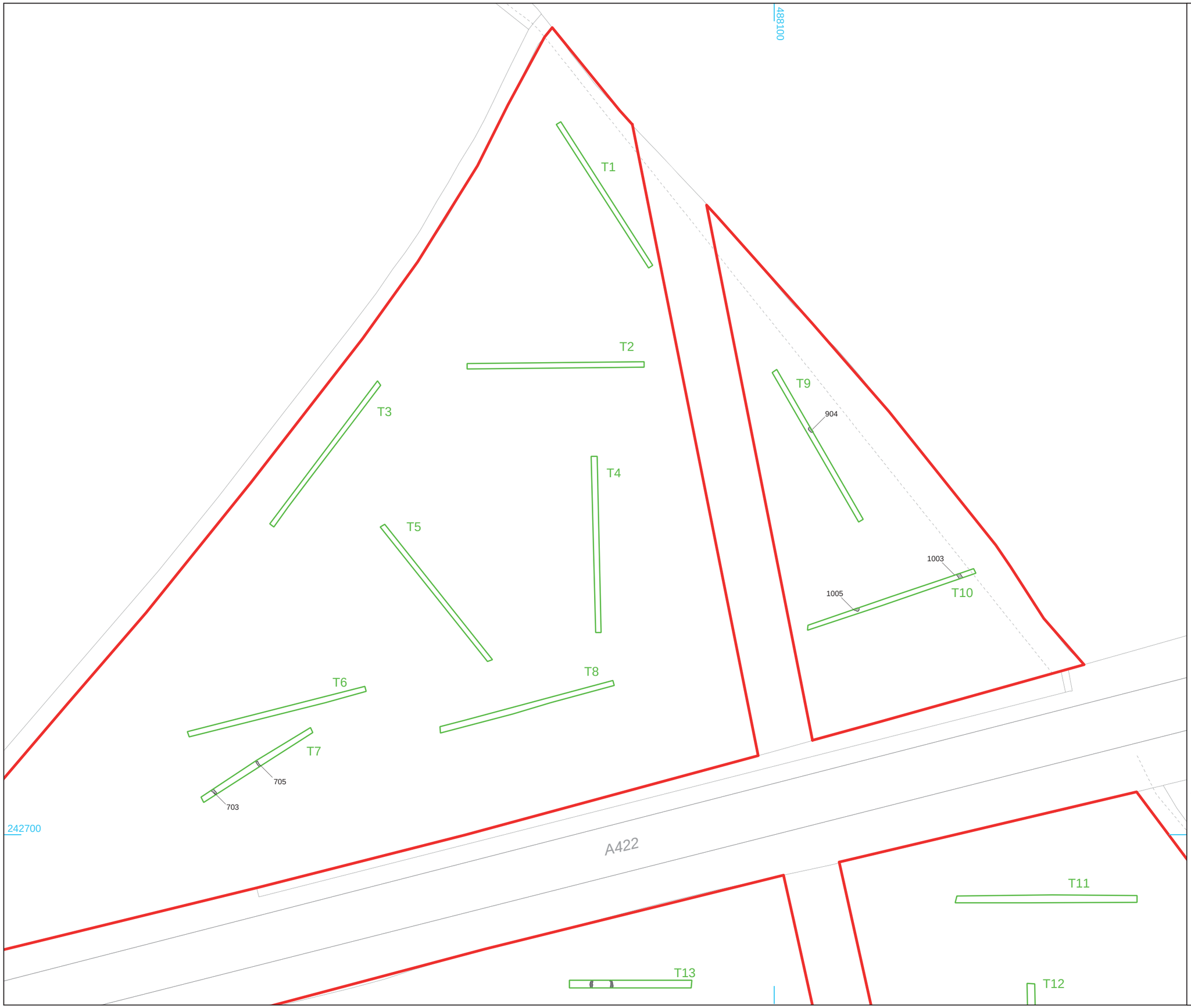
PROJECT TITLE

Willen Road, Newport Pagnell, Buckinghamshire

FIGURE TITLE

Scheme overview

DRAWN BY	KM	PROJECT NO.	MK0390	FIGURE NO.
CHECKED BY	DJB	DATE	25/02/2021	2
APPROVED BY	RM	SCALE@A3	1:3500	



N

Site boundary

Evaluation trench

Unexcavated trench

Archaeological feature (excavated/unexcavated)

0 1:1000 50m

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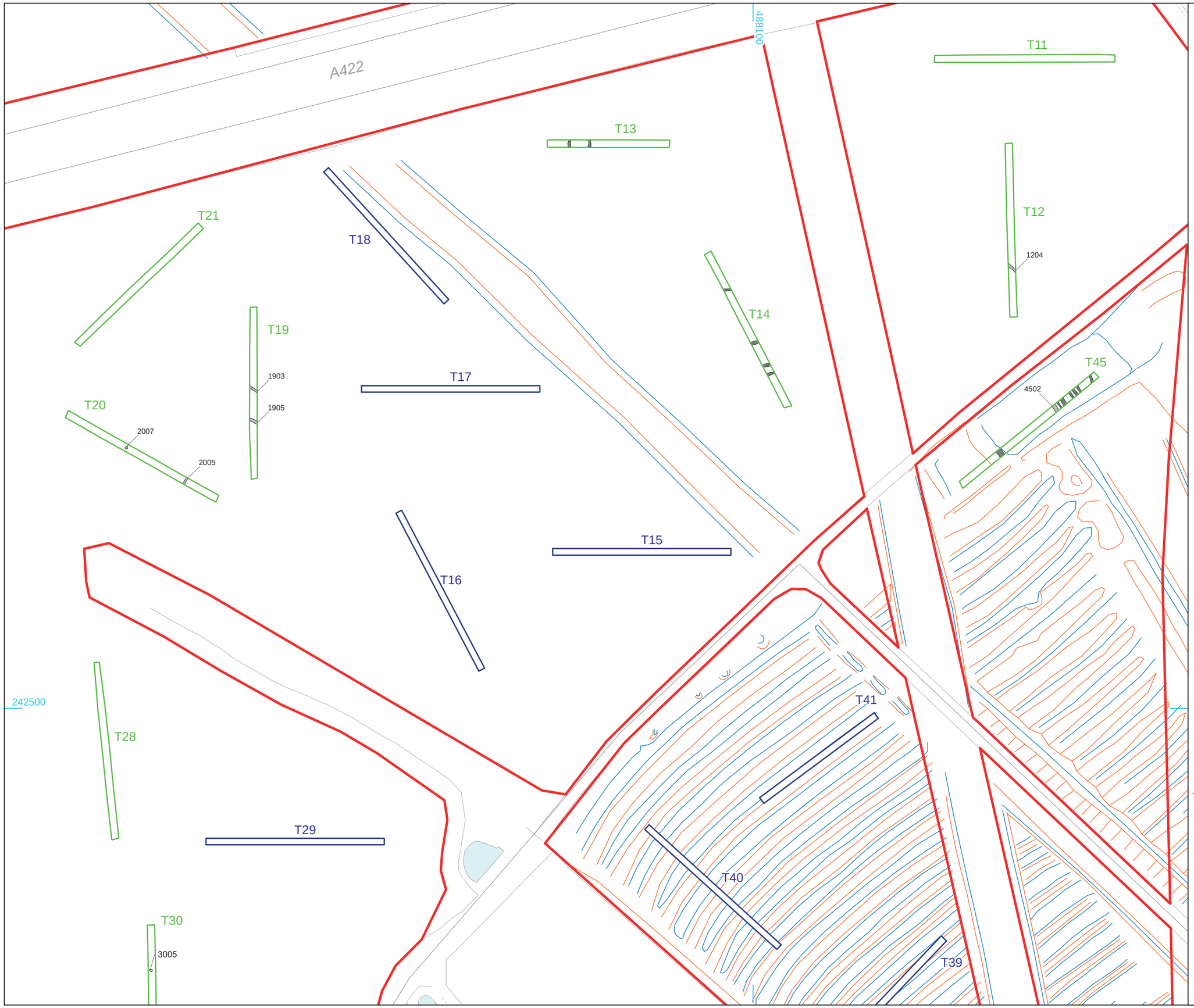
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Willen Road, Newport Pagnell, Buckinghamshire

FIGURE TITLE

Trenches 1- 10

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N

- Site boundary
- Evaluation trench
- Unexcavated trench
- Archaeological feature (excavated/unexcavated)
- Earthwork - top of slope
- Earthwork - bottom of slope

0 1:1000 50m

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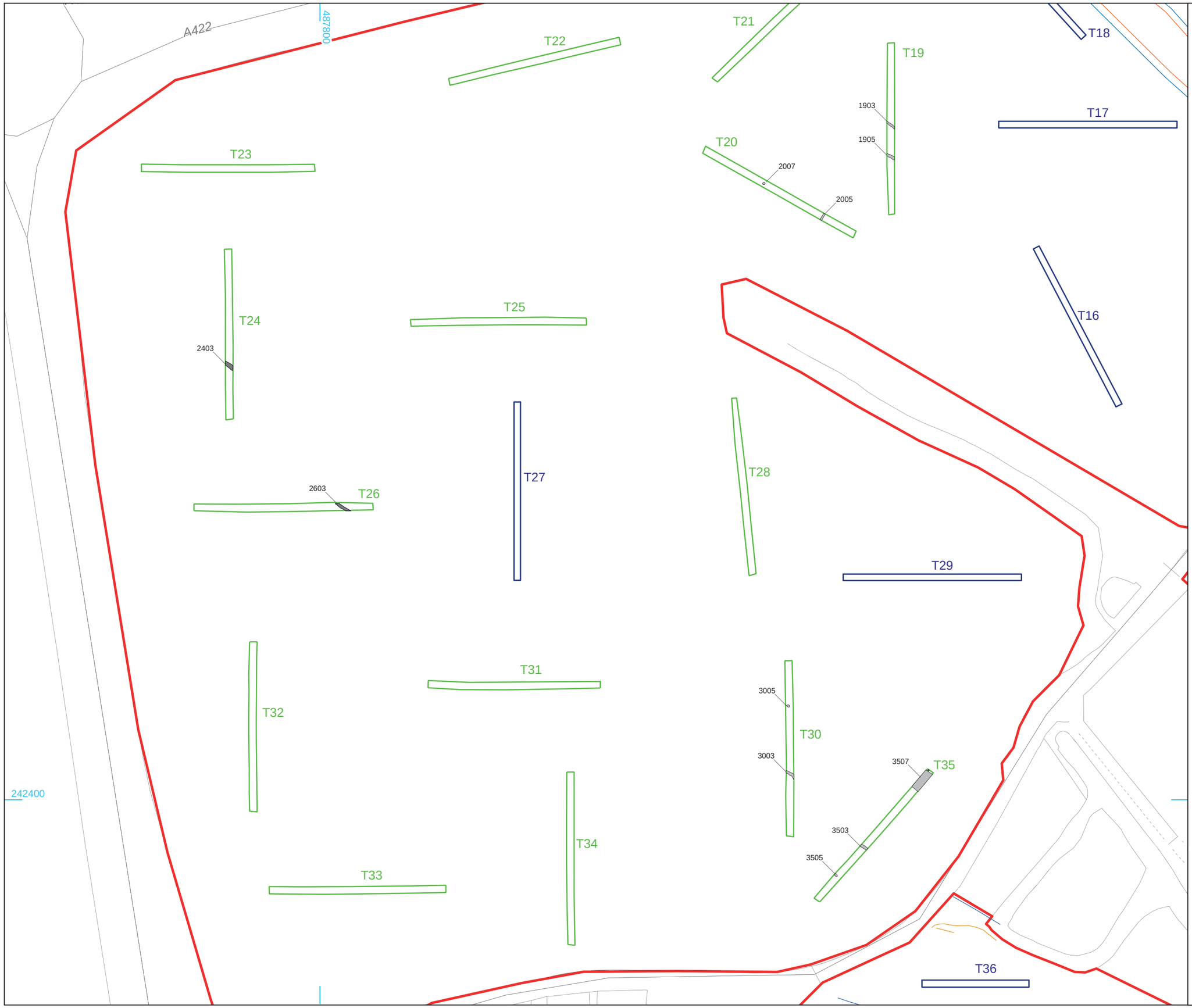
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Trenches 11 - 21, Trenches 40 - 41

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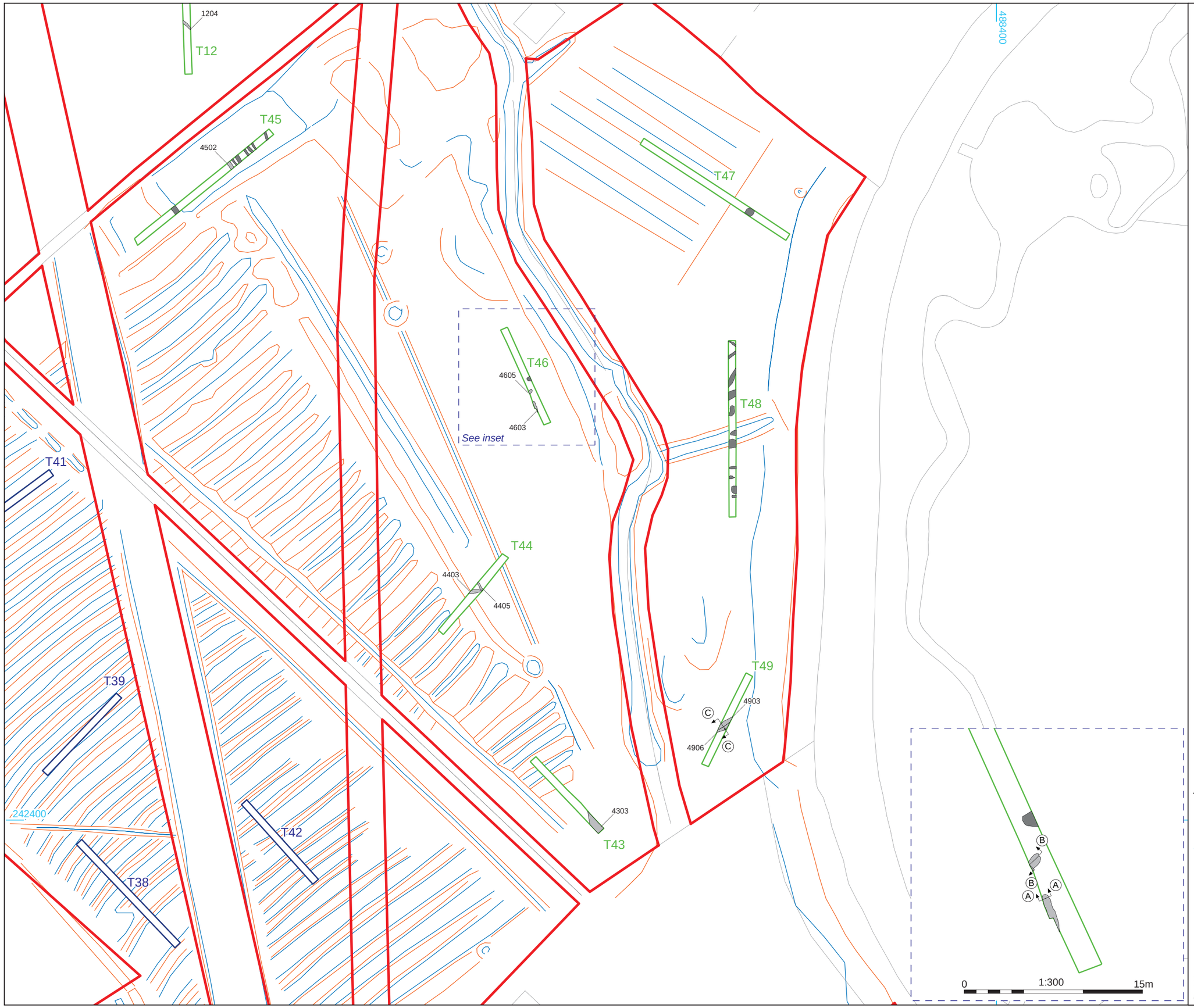
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Willen Road, Newport Pagnell, Milton Keynes

FIGURE TITLE

Trenches 22 - 36

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N

- Site boundary
- Evaluation trench
- Unexcavated trench
- Archaeological feature (excavated/unexcavated)
- Earthwork - top of slope
- Earthwork - bottom of slope

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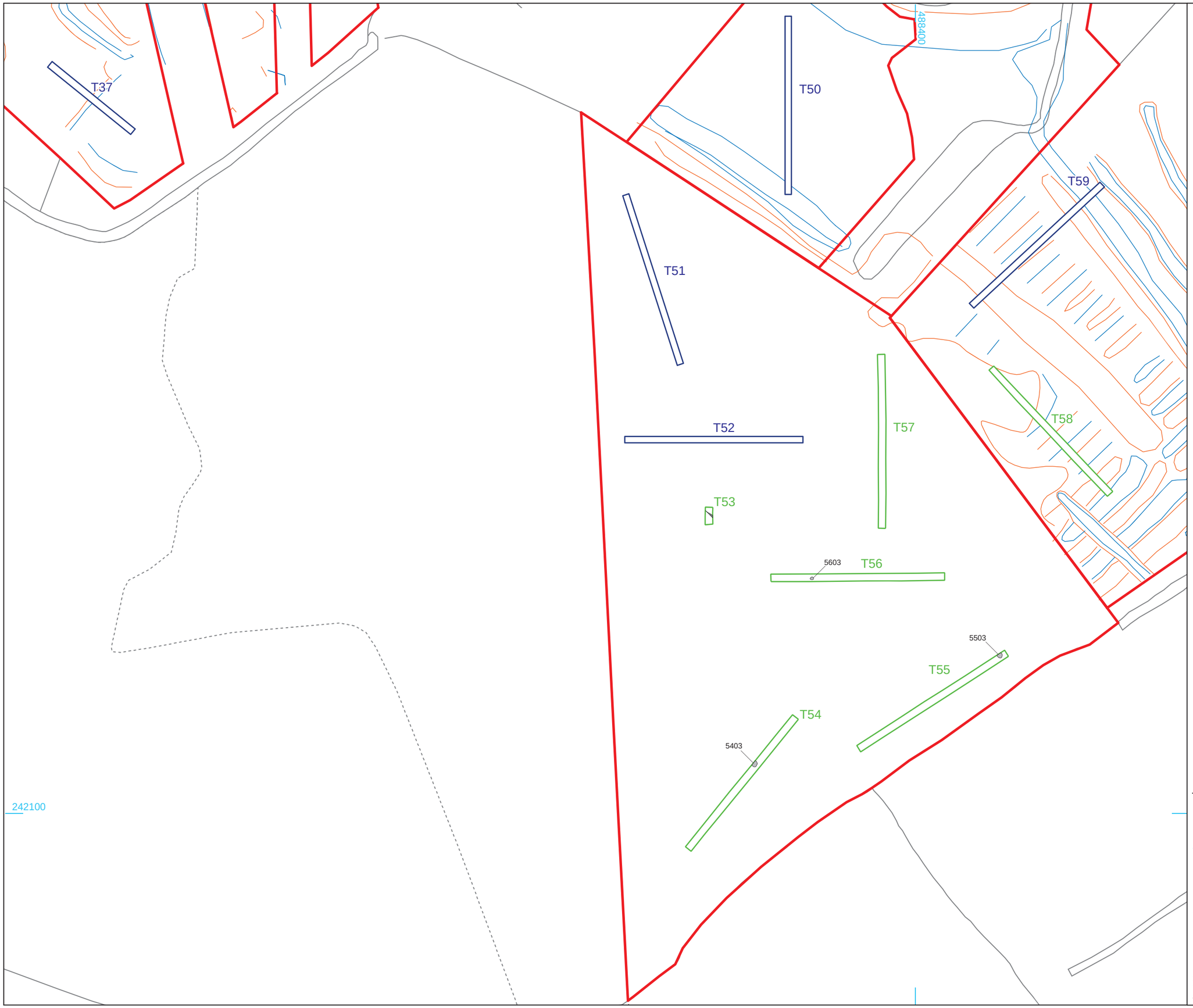
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Willen Road, Newport Pagnell, Buckinghamshire

FIGURE TITLE

Trenches 38, 39 and 42. Medieval and Post-Medieval features: Trenches 45 - 49

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- Earthwork - top of slope
- Earthwork - bottom of slope

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FIGURE TITLE

Trenches 37, 50 - 57

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N

- Site boundary
- Evaluation trench
- Unexcavated trench
- Archaeological feature (excavated/unexcavated)
- Earthwork - top of slope
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0 1:1000 50m

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PROJECT TITLE

Willen Road, Newport Pagnell, Buckinghamshire

FIGURE TITLE

Trenches 58 - 63

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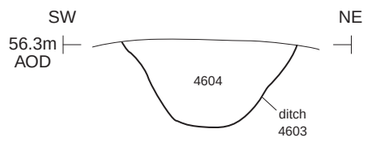


Ditch 4603, looking north-east (0.3m scale)

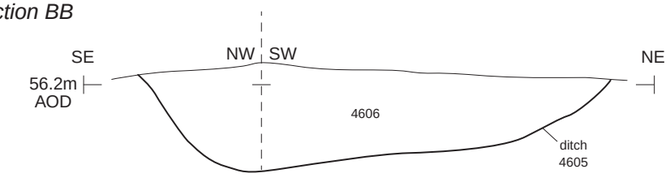


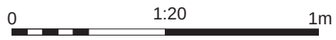
Ditch 4605, looking north (0.3m and 1m scales)

Section AA



Section BB





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FIGURE TITLE

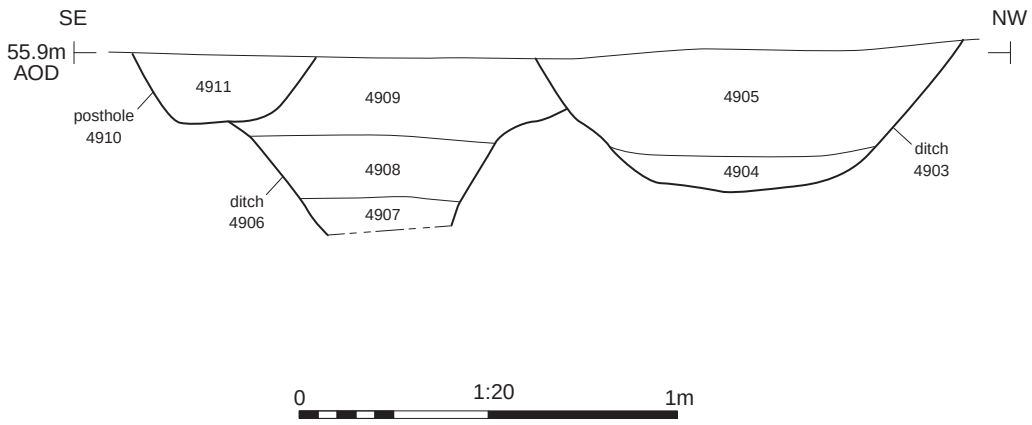
Trench 46: sections and photographs

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Relationship section of Ditch 4903, Ditch 4906, and Posthole 4910, looking south-west (1m scale)

Section CC



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FIGURE TITLE

Trench 49: section and photograph

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Appendix 7.1

Extended Phase 1 Survey Report



Bloor Homes South Midlands

Newport Pagnell

Preliminary Ecological Appraisal Report

858045

DECEMBER 2018

RSK GENERAL NOTES

Project No.: 858045

Title: Newport Pagnell – Preliminary Ecological Appraisal Report

Client: Bloor Homes South Midlands

Date: December 2018

Office: Coventry

Status: Rev00

Author	Shona Redman	**Technical reviewer**	Richard Carter
Signature:	[redacted]	Signature:	[redacted]
Date:	06/11/2018	Date:	26 November 2018
Project manager	Alice Clarke	**Quality reviewer**	Richard Carter
Signature:	[redacted]	Signature:	[redacted]
Date:	7 December 2018	Date:	26 November 2018

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Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

This work has been undertaken in accordance with the quality management system of RSK Environment Ltd.

EXECUTIVE SUMMARY

1. This report presents the findings of a preliminary ecological appraisal (PEA) at three parcels of land off H3 Monks Way, Newport Pagnell, collectively referred to as 'the site'.

2. The survey was carried out to inform a planning application relating to the development of the site for residential use.

3. The majority of the site comprises arable land, but other habitats include semi-improved grassland, improved grassland, scrub, scattered broadleaved trees, hedgerows, standing water and flowing water.

4. There are no statutory designated sites and 7 non-statutory designated sites within 1 km of the site. The proposed development is unlikely to affect any designated sites.

5. The habitats on the site are of low conservation value and only hedgerows classify as a Habitat of Principal Importance. One invasive plant species listed under Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) was identified.

6. The site has habitat suitable for foraging and commuting bats, Badgers, Great Crested Newts, reptiles, Hazel Dormice, Barn Owls, Water Voles, Otters, Kingfishers and other nesting and breeding birds. Further surveys, or precautionary measures for these species, are discussed.

CONTENTS

1 INTRODUCTION 5
1.1 Purpose of this Report 5
1.2 Ecological Context 5
1.3 Further Survey 5
2 METHODS 7
2.1 Background Data Search 7
2.2 Habitat Survey 8
2.2.1 General 8
2.2.2 Phase 1 Habitat Survey 8
2.2.3 Invasive Plant Species 8
2.3 Habitat Assessment for Protected Vertebrates 9
2.3.1 Introduction 9
2.3.2 Bats 9
2.3.3 Nesting Birds 10
2.3.4 Barn Owls 10
2.3.5 Commoner Reptiles 11
2.3.6 Badgers 11
2.3.7 Hazel Dormice 11
2.3.8 Water Voles 11
2.3.9 Otters 12
2.3.10 Great Crested Newts 12
2.3.11 Kingfishers 12
2.3.12 Species of Principal Importance 12
2.4 Survey Constraints 12
3 RESULTS 14
3.1 Background Data Search 14
3.1.1 Biodiversity Action Plans 14
3.1.2 Designated Sites 14
3.1.3 Protected and Noteworthy Species 15
3.2 Phase 1 Habitat Survey 17
3.2.1 Scattered Broadleaved Trees 17
3.2.2 Scrub 17
3.2.3 Arable 18
3.2.4 Improved Grassland 18
3.2.5 Semi-improved Grassland 18
3.2.6 Nettle-beds 18
3.2.7 Standing Water 19
3.2.8 Running Water 19
3.2.9 Hedgerow 19
3.2.10 Dry Ditches 19
3.2.11 Invasive Non-native Species 20
3.3 Protected Species 20
3.3.1 Bats 20
3.3.2 Nesting and Breeding Birds 20

3.3.3 Barn Owls 21
3.3.4 Reptiles 21
3.3.5 Badgers 21
3.3.6 Hazel Dormice 21
3.3.7 Water Voles 21
3.3.8 Otters 21
3.3.9 Kingfishers 22
3.3.10 Great Crested Newts 22
3.3.11 Other Species of Principal Importance 22
4 EVALUATION 23
4.1 Designated Sites 23
4.1.1 Statutory Sites 23
4.1.2 Non-statutory and Other Notable Sites 23
4.2 Habitats 23
4.2.1 Value of Habitats 23
4.2.2 Invasive Plant Species 23
4.3 Protected Animals 23
4.3.1 Bats 23
4.3.2 Nesting and Breeding Birds 24
4.3.3 Barn Owls 25
4.3.4 Reptiles 25
4.3.5 Badgers 25
4.3.6 Hazel Dormice 26
4.3.7 Water Voles 26
4.3.8 Otters 26
4.3.9 Kingfishers 26
4.3.10 Great Crested Newts 26
4.3.11 Other Species of Principal Importance 26
5 REFERENCES 27
6 FIGURES 28
Birds 44
Birds General Protection 44
Birds (Specially Protected Species) 44

FIGURES

Figure 1. Site Location Plan 29
Figure 2. Phase 1 Habitat Survey Map 30

APPENDICES

APPENDIX A – TARGET NOTES 31
APPENDIX B – PLANT SPECIES LIST 33
APPENDIX C – NOTEWORTHY SPECIES RECORDS 36
APPENDIX D – RELEVANT LEGISLATION AND POLICY 41
APPENDIX E – ABBREVIATIONS 45

1 INTRODUCTION

1.1 Purpose of this Report

This report presents the results of a preliminary ecological appraisal (PEA) undertaken at three areas of land off H3 Monk's Way, Newport Pagnell (*Figure 1*), from here on referred to as 'the site' (Ordnance Grid References SP882421, SP874425 and SP881428). The survey aimed to assess the ecological value of the site and its suitability for protected animal species, which will allow ecological constraints on the proposed development to be identified and indicate any requirement for further surveys. This report is required to support a planning application for a residential development.

1.2 Ecological Context

The site is on the southern edge of Newport Pagnell in Buckinghamshire (*Figure 1*). It comprises two fields north of H3 Monk's Way (Areas 1 and 2) and a larger area of land, south of H3 Monk's Way (Area 3). In the centre of Area 3 is a property and associated gardens which are not inside the red line boundary. The site largely comprises arable land, with areas of scrub, scattered broadleaved trees, improved grassland, semi-improved grassland, hedgerows, standing water and dry ditch. There are three farm buildings to the west of Area 3. Habitats adjacent to the site include running water, plantation broadleaved woodland, arable, and agricultural and residential buildings.

The town of Newport Pagnell separates the site extensive agricultural land. To the east the site is bordered by the River Ouzel Wet Corridor, a Milton Keynes Wildlife Corridor (MKWC), which also separates the site from an agricultural landscape. To the west of the site lies Willen Road and the M1 motorway, which separate the site from the Tongell Lake local wildlife site (LWS) 150 m west of the site. To the west and south the landscape is largely urbanised although the Willen Lake LWS lies 840 m to the south.

1.3 Further Survey

This report mentions possible requirements for further surveys (as distinct from 'pre-construction checks'). Current planning guidance and case law is most usually interpreted in such a way that – speaking generally – a planning consent is likely to be obstructed or withheld if at the time of the planning application the results of required ecological surveys are unavailable.

Also - regardless of the planning process, if data on a species might forestall a foreseeable breach of wildlife law, then further surveys might at any time be required for diverse kinds of work not necessarily requiring planning consent (e.g. disturbance of a bat roost by security or repair works to a vacant building that is known to be a possible

bat roost). In this report reference to carrying out surveys before ‘any works’ (or similar wording) refers to this, rather than to the place of the surveys in the planning process.

Given that many surveys can only be carried out at certain times of the year, it may therefore be prudent to do such further surveys as soon as possible (unless it can be foreseen that it would make them out-of-date by the time of the application). Otherwise the applicant should seek advice on ensuring that they are carried out in time to meet the requirements of the planning process for the project in hand (and might seek agreement with the planning authority on what needs doing when). RSK can assist with this, but complex situations may need advice from planning or legal experts.

2 METHODS

2.1 Background Data Search

A search was made in October 2018 for reference materials relating to the ecology of the Newport Pagnell site, and a list of sources is given in *Table 1*.

Table 1: Data sources

Information Obtained	Available From
Protected and Noteworthy species-records	Buckinghamshire and Milton Keynes Environmental Records Centre
Designated site locations and citations	Natural England website
Designated site locations and citations	Joint Nature Conservation Committee (JNCC) website
Designated site locations and citations	Buckinghamshire and Milton Keynes Environmental Records Centre
Milton Keynes Wildlife Corridors	https://data.gov.uk/dataset/8ae27d5a-f185-41a5-8fc5-3056642b9928/wildlife-corridors
Designations and legal protection of noteworthy species	Joint Nature Conservation Committee (JNCC) website
Details of species and habitats listed on the Buckinghamshire LBAP	Local BAP website http://bucksmknep.co.uk/forward-to-2020-biodiversity-action/

A search was made for information on statutory designated sites (often internationally and nationally important sites for ecology) within 2 km of the site boundary and non-statutory designated sites (often important in a local context) within 1 km. A search was also made for records of noteworthy species within 1 km of the site boundary. Species included in the search parameters were:

- European protected species (listed on Schedules 2 and 5 of The Conservation of Habitats and Species Regulations 2017);
- nationally protected species under Schedules 1, 5 and 8 of The Wildlife & Countryside Act 1981 and The Protection of Badgers Act 1992;
- species listed as critically endangered, endangered or vulnerable based on the IUCN Red List Categories and Criteria 2001;
- all species listed on the RSPB *Birds of Conservation Concern 4* as red or amber;
- nationally rare or nationally scarce species;
- notable invertebrates; and

- species of principal importance under The Natural Environment and Rural Communities (NERC) Act (2006) or are priority species under the Local Biodiversity Action Plan.

2.2 Habitat Survey

2.2.1 General

An extended phase 1 habitat survey and assessment for protected species was carried out on 24 October by Alice Clarke (consultant ecologist) and Richard Kelly (consultant ecologist). Alice has over 5 years' consultancy experience and is an associate member of the Chartered Institute of Ecology and Environmental Management (CIEEM). Alice and Richard are both experienced in surveys of this type.

2.2.2 Phase 1 Habitat Survey

The habitat survey centred on the phase 1 habitat survey approach (Joint Nature Conservation Committee, 2010) as extended for use in environmental impact assessment (Institute of Environmental Assessment, 1995). This involves the following elements.

- Habitat mapping using a set of standard colour codes to indicate habitat types on a phase 1 habitat map (these are shown in *Figure 2*).
- Description of features of ecological or nature conservation interest in notes relating to numbered locations on the phase 1 habitat map, called target notes (provided in *Appendix A*).

Basic phase 1 habitat survey methods are described in detail in Joint Nature Conservation Committee's Handbook for phase 1 habitat survey (JNCC, 2010). Limits to the achievable reliability of the method are discussed in Cherrill & McClean (1999). There are no firm guidelines to specify what an extended phase 1 habitat survey involves, but the Institute of Environmental Assessment (1995) suggests that it simply involves more extensive and detailed target notes.

Plant nomenclature in this report follows Stace (2010) for native and naturalised species of vascular plant. Plant names in the text are given with scientific names first, followed by the English name in brackets. Introduced species and garden varieties were identified using the relevant texts.

2.2.3 Invasive Plant Species

Phase 1 habitat survey does not involve exhaustive surveying for any individual plant species, but if invasive plant species listed under Schedule 9 (Part II) of the Wildlife and Countryside Act 1981 (as amended), *e.g. Fallopia japonica* (Japanese Knotweed), *Heracleum mantegazzianum* (Giant Hogweed) or *Impatiens glandulifera* (Indian Balsam), were seen during the normal course of the survey then they were noted.

2.3 Habitat Assessment for Protected Vertebrates

2.3.1 Introduction

The site was assessed for its suitability for the protected animals that are likely to occur in the area. Obvious signs and incidental sightings of protected species would have been noted where present, although this type of survey cannot usually confirm whether species are actually present or absent.

Taking into account the site location and habitats present at the site and in the vicinity, as indicated by the BDS, assessment was carried out for the following species:

- bat species (foraging, commuting and roosting).
- nesting birds.
- Barn Owls (*Tyto alba*).
- commoner reptile species.
- Badgers (*Meles meles*).
- Hazel Dormice (*Muscardinus avellanarius*).
- Water Voles (*Arvicola amphibius*).
- Otters (*Lutra lutra*).
- Great Crested Newts (*Triturus cristatus*).
- Kingfishers (*Alcedo atthis*).
- UK BAP species including Hedgehogs (*Erinaceus europaeus*).
- Other protected or noteworthy species as dictated by the results of the BDS and conditions found during the site visit.

Further details of the assessment methods are given below.

2.3.2 Bats

General

The bat surveys for this assessment were undertaken according to Bat Conservation Trust guidelines (Collins 2016).

Roosting

Potential roosting features in buildings and trees were noted but a full preliminary roost assessment was not undertaken during the PEA.

Foraging and Commuting

Habitats were assessed for their suitability for foraging or commuting bats and categorised in accordance with *Table 2*. Areas of particular interest vary between

species, but generally include sheltered areas and those habitats with good numbers of insects, such as woodland, scrub, hedges, watercourses, ponds, lakes and more species-rich or rough grassland. For commuting, well-connected hedgerows, woodland edge, watercourses and other linear features are generally considered to be of high value.

Table 2. Categorisation of foraging and commuting habitats (adapted from Collins, 2016)

Category	Description
Negligible	Negligible habitat features on the site likely to be used by commuting or foraging bats.
Low	Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or unvegetated stream, but isolated *i.e.* not very well connected to the surrounding landscape by other habitat. Suitable, but isolated habitat that could be used by small numbers of foraging bats such as lone tree (not in a parkland situation) or a patch of scrub.
Moderate	Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.
High	Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be regularly used by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland. Site is close to and connected to known roosts.

2.3.3 Nesting Birds

The site was assessed for its potential for nesting birds. Incidental sightings of birds and old nests were recorded, but observations from an initial non-specific survey are of limited value.

Birds nest in a wide variety of habitats including scrub, woodland, hedges and trees, as well as on open ground and on buildings where appropriate features are present.

2.3.4 Barn Owls

The site was assessed for its potential for Barn Owls. Barn Owls typically roost in mature trees or barns but can also be found in other buildings. Barn Owls usually forage over rough grassland in an agricultural landscape and hedgerows are important

for foraging and commuting. Any incidental signs of Barn Owls including feathers, pellets, white streaking and nests were recorded if observed.

2.3.5 Commoner Reptiles

The site was assessed for commoner reptile species, with particular attention to features providing suitable basking areas (*e.g.* south-facing slopes), potential hibernation or egg-laying habitat (*e.g.* piles of rubble, banks and compost heaps) and opportunities for hunting (*e.g.* rough grassland and scrub). The site was assessed for its suitability for each of the four more widespread reptile species; specific habitat requirements differ between species.

Common Lizards (*Zootoca vivipara*) use a variety of habitats from woodland glades to walls and pastures, although one of their favoured habitats is rough grassland. Slow-worms (*Anguis fragilis*) use similar habitats to Common Lizards, and are often found in rank grassland, gardens and derelict land. Grass Snakes (*Natrix natrix*) have broadly similar requirements to Common Lizards with a greater reliance on ponds and wetlands, where they prey on Common Frogs (*Rana temporaria*). Adders (*Vipera berus*) use a range of fairly open habitats with some cover, but are most often found in dry heath (Beebee & Griffiths, 2000).

2.3.6 Badgers

An initial assessment was carried out to identify areas that might be used by Badgers for commuting, foraging and sett-building within 30 m of all areas potentially affected by the scheme (where access was possible). The area was systematically searched for signs of Badgers including setts, foraging signs, paths (runs) and latrines where possible.

2.3.7 Hazel Dormice

Habitats were assessed for their suitability for Hazel Dormice (*Muscardinus avellanarius)*. This involved consideration of the habitat structure and the presence of plant species favoured by Dormice such as *Corylus avellana* (Hazel) and *Lonicera* species (Honeysuckle). Dormice generally use areas of dense woody vegetation, and are more likely to be found where there is a wide diversity of woody species contributing to three-dimensional habitat complexity, a number of food sources, plants suitable for nest-building material, and good connectivity to other areas of suitable habitat.

2.3.8 Water Voles

The site was assessed to determine whether it is suitable for Water Voles. Suitable habitats include vegetated earth banks, reed beds, flowing water and wet ditches. Incidental signs of Water Vole activity, including burrows, feeding platforms, food remains and latrines, were recorded if they were encountered.

2.3.9 Otters

The site was assessed to determine whether it is suitable for Otters. Suitable habitats include earth banks, reed beds, scrub, overhanging tree roots and flowing water. Incidental signs of Otter activity, including holts, foraging signs, paths (runs), footprints and spraints, were recorded if they were encountered.

2.3.10 Great Crested Newts

Although standing water is essential for their breeding, Great Crested Newts are terrestrial for most of the year and have been recorded up to 500 m from their breeding ponds (Beebee & Griffiths, 2000). Therefore, the application site was assessed for its suitability for both terrestrial and breeding Great Crested Newts. Suitable breeding ponds are typically well-vegetated, relatively clean and unpolluted, have few fish or wildfowl, and are likely to retain water throughout most (but not necessarily all) summers. Highly suitable terrestrial habitats include woodland, scrub and tussocky grassland, although Great Crested Newts can be found in a broad range of sub-optimal habitats as well. Habitat suitability for other amphibians was also assessed.

2.3.11 Kingfishers

The site was assessed for its potential for Kingfishers, which typically nest in the banks of watercourses and forage over slow-moving, shallow rivers or streams. Any incidental sightings of Kingfishers or their nest holes would have been recorded.

2.3.12 Species of Principal Importance

Consideration was also given to the site's potential for other noteworthy species such as those listed under Section 41 of the NERC Act (2006) (formerly UK Biodiversity Action Plan (BAP) species) that are likely to be present in the area *e.g.* European Hedgehog (*Erinaceus europaeus*).

2.4 Survey Constraints

The data from these surveys are generally considered valid for a maximum of two years. Therefore, if more than two years elapse prior to commencement of the development, a repeat phase 1 habitat survey will likely be required to ensure up-to-date information.

Habitat surveys and botanical surveys done in late autumn or winter (October to March) are not generally considered optimal. They can usually describe habitat types adequately, but many plant species (including invasive species) may be unidentifiable or altogether died-away. This is only considered a minor constraint due to the commonness of the habitats present and the low diversity of plant species across substantial areas of arable land.

The preliminary view as to whether protected species might occur on the site is based on the suitability of habitat, the known distribution of relevant species in the local area

(from on-line sources and desk study), and any signs of the relevant species. It does not constitute a full and definitive survey of any protected species group.

3 RESULTS

3.1 Background Data Search

3.1.1 Biodiversity Action Plans

Habitats on the site qualify as the priority habitat types 'Hedgerows' under Section 41 of The Natural Environment and Rural Communities (NERC) Act 2006.

The latest Buckinghamshire and Milton Keynes Local Biodiversity Action Plan (LBAP) sets out targets for creation and restoration of 14 habitats. Habitats that are relevant to the proposed development are;

- Hedgerows (2m wide).
- Ponds.

Buckinghamshire also defines biodiversity opportunity area (BOAs) to deliver BAP targets at a landscape scale. There are currently 23 BOA sites in Buckinghamshire that are the most important areas for biodiversity at the regional level and 11 Local BOAs that are important at the county scale. The site is within the Ouzel Valley Local BOA. Important habitats within the Ouzel Valley Local BOA include eutrophic standing water, fen, hedgerows, lowland meadow, ponds, reedbeds, rivers and streams.

3.1.2 Designated Sites

Statutory Sites

There are no statutory designated sites within 2 km of the site boundary.

SSSI Impact Risk Zones

There are several SSSIs in the wider area, including Mill Crook SSSI, Salcey Forest SSSI and Little Yardley Chase SSSI. The site intersects impact risk zones for these SSSIs but the proposed development does not meet the development-type criteria which trigger a requirement for the planning authority to consult Natural England.

Non-statutory Sites

There are seven non-statutory designated sites within 1 km of the site boundary comprising two local wildlife sites (LWSs), one biological notification site (BNS) and four Milton Keynes wildlife corridor sites (MKWCs). These sites are listed in *Table 3* in order of proximity to the site; short descriptions are given for the sites (when available). No description is provided for the MKWCs; the corridors have been identified along major road, rail, woodland and waterway corridors that run through the Milton Keynes area. MKWCs have status equivalent to LWSs in the Milton Keynes Local Plan.

Table 3: Non-statutory sites within 1 km of the site boundary

Site Name	Designation	Approximate Distance (m)
River Ouzel Wet Corridor	MKWC	0
The River Ouzel Wet Corridor MKWC is within the site boundary. The MKWC extends *c.*45 m in from the site boundary where it borders the River Ouzel.		
M1 Road Corridor	MKWC	40
Tongwell Lake	LWS	150
Tongwell Lake LWS comprises a lake, fringing aquatic vegetation, a wooded island, planted woodland and regularly mown amenity grassland. The LWS supports a wide range of bird species and is particularly important for wintering birds. Species include Bittern, Great Crested Grebe, Kingfisher, Pochard, Redwing, Slavonian Grebe, Shoveler and Tufted Duck. Tongwell Lake LWS is 150 m to the west of the site boundary.		
Broughton Brook Wet Corridor	MKWC	570
Willen Lake	LWS	840
Willen Lake LWS comprises two lakes and adjacent swamp, tall herb fen and lowland meadow habitats. The LWS is important for passage and wintering birds; species of note include Cetti's Warbler, Pintail, Ruff, Teal and Wigeon. Otters have been recorded using the lakes.		
Bridge South of Newport Pagnell	BNS	920
Bridge South of Newport Pagnell BNS covers the area around the Tickford Street road bridge as it crosses the River Ouzel.		
Railway Walk Rail Corridor	MKWC	950

Other Notable Sites

There are no areas of ancient woodland within 1 km of the site boundary.

3.1.3 Protected and Noteworthy Species

At least 146 noteworthy species are recorded from places within 1 km of the site boundary. Of these, 4 are amphibians, 65 are birds, 3 are fish, 62 are invertebrates, 4 are plants, at least 7 are mammals and 1 is a reptile. Species that are protected by law under Schedules 2 and 5 of The Conservation of Habitats and Species (Amendment) Regulations 2012, Schedules 2, 5 and 8 of The Wildlife and Countryside Act 1981 or The Protection of Badgers Act 1992 and have been recorded in the search area are listed in the table below (excluding species protected only against collection for sale); a full species list is given in Appendix C.

Table 4: Protected species records within 1 km of the site boundary

Latin Name	Common Name	Designation	Most Recent	No of Records	Within 100m	Within 1km
Amphibians						
Triturus cristatus	Great Crested Newt	EPS(Sch2), WCA5	2017	10		☒
Birds						
Alcedo atthis	Kingfisher	WCA1.1	2016	10	☒	
Anas acuta	Pintail	WCA1.2	2013	1		☒
Anser anser	Greylag Goose	WCA1.2	2016	10		☒
Aythya marila	Scaup	WCA1.1	2009	3		☒
Botaurus stellaris	Bittern	WCA1.1	2013	6		☒
Bucephala clangula	Goldeneye	WCA1.2	2016	6		☒
Cettia cetti	Cetti's Warbler	WCA1.1	2010	3		☒
Charadrius dubius	Little Ringed Plover	WCA1.1	2014	2		☒
Falco columbarius	Merlin	WCA1.1	2005	1		☒
Falco peregrinus	Peregrine	WCA1.1	2015	2		☒
Falco subbuteo	Hobby	WCA1.1	2015	6		☒
Milvus milvus	Red Kite	WCA1.1	2016	2		☒
Pandion haliaetus	Osprey	WCA1.1	2013	1		☒
Phoenicurus ochruros	Black Redstart	WCA1.1	2005	1		☒
Podiceps auritus	Slavonian Grebe	WCA1.1	2013	2		☒
Tringa ochropus	Green Sandpiper	WCA1.1	2013	3	☒	
Turdus iliacus	Redwing	WCA1.1	2013	7		☒
Turdus pilaris	Fieldfare	WCA1.1	2010	3		☒
Tyto alba	Barn Owl	WCA1.1	2016	3		☒
Mammals						
Lutra lutra	Otter	EPS(Sch2), WCA5	2010	3		☒
Meles meles	Badger	BA	2016	7		☒
Myotis nattereri	Natterer's Bat	EPS(Sch2), WCA5	1990	2		☒
Nyctalus noctula	Noctule Bat	EPS(Sch2), WCA5	2009	1		☒
Pipistrellus pipistrellus	Common Pipistrelle	EPS(Sch2), WCA5	2011	4		☒

Latin Name	Common Name	Designation	Most Recent	No of Records	Within 100m	Within 1km
Pipistrellus sp.	a pipistrelle bat	EPS(Sch2), WCA5	2008	1		☒
Plecotus auritus	Brown Long-eared Bat	EPS(Sch2), WCA5	2008	2		☒
Reptiles						
Natrix natrix	Grass Snake	WCA5	2010	2		☒

Note - **P** relates to records with 4 figure grid references that could potentially be anywhere within a 1 km square.

3.2 Phase 1 Habitat Survey

The habitat types within the survey area (defined as the site boundary on *Figure 1* plus a 30m buffer where accessible) include the following:

- scattered broadleaved trees
- dense scrub
- arable
- improved grassland
- semi-improved grassland
- tall ruderals
- standing water
- running water
- hedgerow
- dry ditch

Target notes and species lists are provided in *Appendix A* and *B*. The habitats are described in more detail below and shown in *Figure 2*.

3.2.1 Scattered Broadleaved Trees

Along the north-eastern boundary of Area 3 there is a line of *Fraxinus excelsior* (Ash), trees, and other broadleaved trees are scattered through the site. Most are in areas of scrub or hedgerows. Broadleaved trees on the site include *Acer campestre* (Field Maple), *Populus alba* (White Poplar) and *Quercus robur* (Pedunculate Oak).

3.2.2 Scrub

Patches of dense scrub across the site are characterised by woody species less than 5 m in height, with *Rubus fruticosus* agg. (Bramble) dominant. Other woody species

include *Crataegus monogyna* (Hawthorn), *Cornus sanguinea* (Dogwood) and *Sambucus nigra* (Elder). The field layer of the scrub is limited, largely comprising *Hedera helix* (Ivy) and *Urtica dioica* (Common Nettle).

3.2.3 Arable

The majority of the site comprises recently ploughed and sown arable land. These areas have species-poor rough grassland on the edges, largely comprising *Anthriscus sylvestris* (Cow Parsley), *Arrhenatherum elatius* (False Oat-grass), *Dactylis glomerata* (Cock's-foot), *Rumex obtusifolius* (Broad-leaved Dock) and *Urtica dioica* (Common Nettle). Less frequent species include *Cirsium vulgare* (Spear Thistle), *Convolvulus arvensis* (Field Bindweed), *Galium aparine* (Cleavers), *Glechoma hederacea* (Ground-ivy) and *Lamium album* (White Dead-nettle).

3.2.4 Improved Grassland

There are areas of sheep-grazed improved grassland in Area 3. The sward contains the grasses: *Lolium perenne* (Perennial Rye-grass), Holcus lanatus (Yorkshire-fog) and *Cynosurus cristatus* (Crested Dog's-tail). Scattered broad-leaved herbs are present which include *Cirsium vulgare* (Spear Thistle), *Helminthotheca echioides* (Bristly Oxtongue), *Plantago lanceolata* (Ribwort Plantain), *Urtica dioica* (Common Nettle).

3.2.5 Semi-improved Grassland

There is one semi-improved grassland field to the east of Area 3 which is split in two by a gappy hedge and dry ditch (*Target Note 16*). Species present include *Elytrigia repens* (Common Couch), *Holcus lanatus* (Yorkshire-fog), *Poa trivialis* (Rough Meadow-grass) with infrequent *Festuca rubra* (Red Fescue) and *Bromus hordeaceus* (Soft-brome). Broadleaved herbs are present in the sward including *Achillea millefolium* (Yarrow), *Alliaria petiolata* (Garlic Mustard), *Epilobium montanum* (Broad-leaved Willowherb), *Leontodon autumnalis* (Autumn Hawkbit), *Potentilla reptans* (Creeping Cinquefoil), *Senecio jacobaea* (Common Ragwort) and *Veronica chamaedrys* (Germander Speedwell). Occasional *Arctium lappa* (Greater Burdock), *Schedonorus arundinaceus* (Tall Fescue), *Papaver rhoeas* (Common Poppy), *Polygonum aviculare* (Knotgrass) and *Senecio vulgaris* (Groundsel) are also present with *Glyceria maxima* (Reed Sweet-grass) growing within the ditch.

3.2.6 Nettle-beds

Along the northern boundary of Area 2 is a patch of tall ruderals, dominated by *Urtica dioica* (Common Nettle). This field boundary separates Area 2 from an area of plantation broadleaved woodland.

3.2.7 Standing Water

There are two wet ditches (*Target Notes 14* and *25*) which have well-vegetated earth banks, a silt substrate and no obvious flow. There is also a pond (*Target Note 11*), connected to another ditch (*Target Note 10*), which was dry during the survey but is probably seasonally wet as *Iris pseudacorus* (Yellow Iris) - a plant characteristic of wet habitats – was present.

There is a large pond in the gardens of the property in the centre of Area 3, outside the red line boundary (*Target Note 24*). It is *c.*40% shaded with well-developed water-margin vegetation containing *Carex riparia* (Greater Pond-sedge), and *Glyceria maxima* (Reed Sweet-grass), although algae covered unshaded sections of the pond at the time of the survey. Within the pond is an island with a duck house and Mallards (*Anas platyrhynchos*) and Moorhens (*Gallinula chloropus*) were observed. Adjacent habitat includes semi-natural broadleaved woodland and amenity grassland.

3.2.8 Running Water

Although there is no running water on the site, the River Ouzel runs adjacent to the eastern boundary of Area 3 (*Target Note 21*). It is *c.*10 m wide with steep earth banks, a slow flow and diverse aquatic vegetation. Water-margin vegetation here includes *Apiurn nodiflorum* (Fool's Watercress), *Carex riparia* (Greater Pond-sedge), *Glyceria maxima* (Reed Sweet-grass), *Juncus effusus* (Soft-rush), *Juncus inflexus* (Hard Rush), *Myosotis scorpioidea* (Water Forget-me-not), *Sparganium erectum* (Branched Bur-reed) and *Veronica beccabunga* (Brooklime).

3.2.9 Hedgerow

Hedgerows with occasional trees form the majority of the site boundaries. Some are intact (*Target Notes 1, 3, 4, 7, 8* and *23*) whereas others are defunct with gaps in places (*Target Notes 6, 10, 16* and *22*). Woody species present include *Acer campestre* (Field Maple), *Cornus sanguinea* (Dogwood), *Corylus avellana* (Hazel), *Crataegus monogyna* (Hawthorn), *Fraxinus excelsior* (Ash), *Ligustrum vulgare* (Wild Privet), *Prunus spinosa* (Blackthorn) *Quercus robur* (Pedunculate Oak), *Rosa arvensis* (Field-rose), *Rubus fruticosus* agg. (Bramble), *Salix fragilis* (Crack Willow) and *Sambucus nigra* (Elder).

Species present in the understory include *Arrhenatherum elatius* (False Oat-grass), *Dactylis glomerata* (Cock's-foot), *Galium aparine* (Cleavers), *Hedera helix* (Ivy), *Hedera hibernica* (Atlantic Ivy), *Silene latifolia* (White Campion) and *Urtica dioica* (Common Nettle).

3.2.10 Dry Ditches

There are three dry ditches on the site, running along the base of hedges (*Target Notes 4, 10 and 16*).

3.2.11 Invasive Non-native Species

Three *Impatiens glandulifera* (Indian Balsam) plants were found growing on the eastern boundary of Area 3, along the banks of the River Ouzel (*Target Note 20*). This species is listed on Schedule 9 of the Wildlife and Countryside Act (1981).

3.3 Protected Species

3.3.1 Bats

BDS Data

There are 10 previous records of at least four bat species within 1 km of the site boundary.

Roosting

To the west of Area 3 there are three farm buildings made of breezeblocks and corrugated metal sheeting (*Target Note 26*). An initial assessment found them to be unsuitable for roosting bats. There are further farm buildings and a residential property in the centre of Area 3, all of which are outside the red line boundary.

Several trees on the site may have potential for roosting bats although they were not inspected closely.

Foraging and Commuting

Linear features such as the hedgerows and lines of trees are suitable for commuting bats, while improved or semi-improved grassland, hedgerows scrub and open water are suitable for foraging. As the site is largely agricultural, lighting is minimal across the site which also favours foraging and commuting bats. Area 3 is particularly suitable for them due to the connectivity of hedgerows and the proximity to the River Ouzel which connect the site ecologically to further suitable habitat.

The site was assessed as having 'moderate' potential for foraging and commuting bats.

3.3.2 Nesting and Breeding Birds

Although no active bird nests were observed during the survey, the scattered trees, scrub and hedgerows provide habitat for nesting birds. Numerous common bird species including Blue Tit (*Cyanistes caeruleus*), Great Tit (*Parus major*), Starling (*Sturnus vulgaris*), Robin (*Erithacus rubecula*), Blackbird (*Turdus merula*), Chaffinch (*Fringilla coelebs*), Buzzard (*Buteo buteo*), Carrion Crow (*Corvus corone*), Long-tailed Tit (*Aegithalos caudatus*), Magpie (*Pica pica*) and Wren (*Troglodytes troglodytes*) were observed during the survey. Starlings are a species of principal importance listed under Section 41 of the NERC Act 2006.

3.3.3 Barn Owls

There are three previous records of Barn Owls from places within 1 km of the site boundary, the most recent in 2016. A dead Barn Owl was recorded on the site (*Target Note 12*) and there is a Barn Owl box on a mature Oak tree (*Target Note 13*).

Semi-improved grassland and hedgerows on the site provide suitable foraging habitat. The barns at *Target Note 26* could provide nesting places (particularly on top of stored bales which could not be inspected during the survey), and so could mature trees.

3.3.4 Reptiles

Most of the site - being arable land – is unsuitable for reptiles. However, areas of scrub, are suitable reptile, and the site is ecologically connected to suitable habitat to the south and east. There are two previous records of Grass Snakes from places within 1 km of the site boundary and it is likely that other common reptile species are also present.

3.3.5 Badgers

There are 7 previous records of Badgers from places within 1 km of the site boundary, the most recent in 2016.

Dense scrub and earth banks provide suitable habitat for Badgers and the agricultural fields could provide foraging. Mammal paths were observed crossing one of the hedges at Area 1 (*Target Note 1*). A potential old Badger sett (*Target Note 5*) and Badger hole (*Target Note 17*) were observed on the site, although it is possible that they are now used by Rabbits (*Oryctolagus cuniculus*).

3.3.6 Hazel Dormice

Hedgerows provide the site with good ecological connectivity internally and to the wider landscape, and they contain *Corylus avellana* (Hazel) and other food plants for Hazel Dormice such as *Rubus fruitcosus* agg. (Bramble). Although there are no records of them from places within 1 km of the site, Hazel Dormice could be present.

3.3.7 Water Voles

Habitat suitable for Water Voles is provided by wet ditches within the site, the brook to the north of Area 1, and the River Ouzel to the east of Area 3, all of which generally have banks that are steep and well-vegetated. Small mammal burrows were observed in the banks of one of the ditches (*Target Note 14*) and potential Water Vole faeces and footprints were observed on the riverbank (*Target Note 19*). Although there are no records of them from places within 1 km, Water Voles could be present on the site.

3.3.8 Otters

Habitat suitable for Otters is provided by wet ditches within the site, the brook to the north of Area 1, and the River Ouzel to the east of Area 3, Scattered mussel shells along the riverbank (*Target Note 21*) could be feeding remains from an Otter. Although

no definite signs of Otters were observed, there are three records of then from places within 1 km of the site boundary and their presence on the site cannot be ruled out.

3.3.9 Kingfishers

There are 10 records of Kingfishers from places within 100 m of the site boundary, the most recent in 2016. There is possible nesting and foraging habitat adjacent to the site, along the brook north of Area 1 and along the River Ouzel on the eastern boundary of Area 3. It is possible that Kingfishers are present on the site or in the immediate vicinity.

3.3.10 Great Crested Newts

Scrub, hedgerows and rough grassland on the site could provide habitat suitable for Great Crested Newts in their terrestrial phase. There is also ecological connectivity to the wider landscape via the hedgerows. One dry pond on the site may be seasonally wet (*Target Note 11*) and a large, well-vegetated pond lies in the gardens of the property in the centre of Area 3 outside the red line boundary (*Target Note* 23). A small copse adjacent to the pond could provide habitat suitable for hibernation. There are 10 records of Great Crested Newts from places within 1 km of the site boundary, the most recent in 2017. Great Crested Newts could therefore be present on the site.

3.3.11 Other Species of Principal Importance

Hedgehog

Hedgehogs occupy a range of lowland habitats with enough cover to allow nesting. They are common in parks in urban and suburban environments, farmland and gardens. Scrub, trees, semi-improved grassland and hedgerows on the site provide suitable foraging habitat for Hedgehogs. The hedgerows also provide connectivity to suitable habitat in the wider landscape, including agricultural fields and residential gardens. There may be opportunities for Hedgehogs to hibernate in the dense scrub and in a spoil heap (*Target note 2)* in Area 1. There are records of Hedgehogs from places within 1 km of the site boundary and it is likely that they are present on the site.

4 EVALUATION

4.1 Designated Sites

4.1.1 Statutory Sites

The development would not affect any statutory designated sites as there are none within 2 km of the site boundary.

The development site falls within several SSSI impact risk zones. However, because of the nature of the planned development, and the distance from the site, there will be no requirement for the planning authority to consult Natural England on the likely risks of the proposed development to any SSSI.

4.1.2 Non-statutory and Other Notable Sites

There are seven non-statutory designated sites within 1 km of the site boundary, comprising two LWSs, one BNS and four MKWCs. It is unlikely that any development on the site would adversely affect these non-statutory designated sites due to their distances from the site and the intervening land uses. There is potential for the final development design to affect the River Ouzel Wet Corridor as this lies within the site boundary. However, currently it is unclear whether the proposals will affect the River Ouzel; consultation with an ecologist is recommended before the development design is finalised.

4.2 Habitats

4.2.1 Value of Habitats

Except for hedgerows, none of the habitats on the site qualify as a HoPI according to the JNCC descriptions and criteria for priority habitats. Hedgerow surveys should be undertaken in summer 2019 to ascertain their importance. Furthermore, a summer species list should be created to gain a better understanding of the botanical character of the site.

4.2.2 Invasive Plant Species

It is an offence under Section 14(2) of the Wildlife and Countryside Act 1981 to 'plant or otherwise cause to grow in the wild' any plant listed in Schedule 9 Part II. Therefore, in removing, or in close working to, *Impatiens glandulifera* (Indian Balsam), the advice of a specialist contractor should be followed (RSK can provide this service).

4.3 Protected Animals

4.3.1 Bats

Roosting

Since the three farm buildings within the red line boundary were found on initial inspection to be unsuitable for roosting bats, no further bat surveys are necessary for these buildings.

Trees on the site were not inspected closely during the survey, but several are likely to be suitable for roosting bats, and further surveys will be required if the development involves tree removal or pruning – initially ground-level tree assessments (GLTAs) to ascertain whether affected trees have potential for roosting bats. Depending on the GLTA findings further surveys may be required, *i.e.* tree climbing surveys or emergence/re-entry surveys. The latter would be carried out during the active months for bats (May to September), and are required if good features for roosting or actual signs of bats or are found during the GLTA or tree climbing surveys.

Foraging and commuting

The site has been assessed as having 'moderate' potential for foraging and commuting bats, and impacts on them are likely if relevant habitat is directly affected by the development. To comply with guidelines Collins (2016), bat-activity surveys would, in that case, be needed first in the form of 'transect surveys' one per month from April to October (*i.e.* using electronic bat-detection equipment while walking along chosen routes through the site around dusk or dawn when bats are flying); and second by deploying two static detectors in suitable habitat for five consecutive nights.

There is also potential – both during the construction and operation phases - for lighting to affect foraging and commuting bats that use the site boundaries. A review of lighting specifications should therefore be undertaken, and an appropriate strategy should be devised using information from the bat activity surveys

4.3.2 Nesting and Breeding Birds

Some nesting habitat on the site may need to be cleared for the development. Given its size and the fact that several bird species were observed during the survey, breeding bird surveys will be required. To comply with best-practice, three survey visits would be needed between early March and the end of June, recording any birds seen or heard and any behaviours that may indicate breeding activity.

Removal of suitable nesting habitat should be conducted over the winter during October to February to avoid the breeding bird season (March to August inclusive). If it is necessary to remove nesting habitat during the breeding bird season this will require a nesting-bird check by an ecologist no more than 24 hours prior to vegetation being cleared. If an active nest is found then works in its vicinity must temporarily cease and an appropriate exclusion zone must be established dependent on the species of bird. The nest, and all vegetation within the exclusion zone, should then be left undisturbed until the young have fledged. All active birds' nests, regardless of species, are protected by law. A nest is deemed to be active even if it is in the process of being built and does not yet contain eggs or young.

4.3.3 Barn Owls

Given the findings in *Section 3.3.3,* a Barn Owl survey is required to assess foraging habitat, inspect the nest box, and assess all trees within and immediately adjacent to the red line boundary. Foraging habitat for Barn Owls also needs to be assessed.

It would be expedient to consult the county recorder for Barn Owls in Buckinghamshire (and owner of the nest box scheme) about the proposed development.

Where known nest sites are to be lost, replacement sites should be incorporated into the mitigation plans for the site. A method statement for relocation of boxes and potentially excluding tree roosts will be required prior to development. The method statement will include a schedule of works to ensure that Barn Owls are not disturbed during the breeding season including any period of courtship and when eggs or juvenile birds are dependent on the nest site. If foraging habitat is present, suitable mitigation will be suggested in the form of habitat manipulation or creation.

4.3.4 Reptiles

Suitable habitat for reptiles is present on the site (including areas of grassland and shrubs); therefore, reptile surveys should be undertaken during the active season (April to May and September).

The standard method for reptile survey involves 'tinning' surveys. Artificial refuges (roofing felt tiles *c.*25 cm^2) are placed in areas suitable for reptiles. They attract sheltering reptiles, allowing surveyors to find reptiles that would otherwise be widely dispersed and well-hidden. The refuges need to be checked on seven occasions during suitable weather conditions, *i.e.* no rain, and air temperatures between 9 and 15ºC plus bright sunshine, or between 9 and 18ºC plus hazy or intermittent sunshine and little wind (HGBI 1998).

4.3.5 Badgers

Badgers regularly move territories, open up old setts or dig new ones. As the majority of the site is suitable for Badgers, a more detailed survey is required.

If an active sett is discovered within 30 m of the working area, works should stop and advice should be obtained from an ecologist. If a sett requires removal, a licence will be required from Natural England to exclude Badgers from it. Such licences may only be obtained from Natural England for works between July and 30 November inclusive.

In order to safeguard any Badgers that may be active in the area during the development phase working at night should be avoided and it is also good practice to cover any excavations over night to prevent Badgers (and other mammals such as Hedgehogs) from becoming trapped in them. If it is not possible to cover excavations an access route should be provided to allow animals to climb out of excavations should they become trapped.

4.3.6 Hazel Dormice

Surveys for Hazel Dormice may be required if the final development design involves hedgerow removal or working close to hedgerows.

4.3.7 Water Voles

Since ditches on the site and the adjacent brook and River Ouzel are suitable for Water Voles (and possible signs of Water Voles were seen) surveys for Water Voles will be required if proposals affect these areas.

4.3.8 Otters

Since ditches on the site and the adjacent brook and River Ouzel are suitable for Otters (and possible signs of Otters were seen) surveys for Otters will be required if proposals affect these areas.

4.3.9 Kingfishers

The high number of previous records of Kingfishers within 100 m of the site boundary suggests that they are nesting along the brook to the north of Area 1 or along the River Ouzel which runs along the eastern boundary of Area 3. An assessment of suitable nesting habitat is needed (it can be combined with any Otter and Water Vole survey). Further surveys of possible nest sites may be required if the final development design suggests there will be an impact on the river banks.

4.3.10 Great Crested Newts

Given the findings in *Section 3.3.10,* and given the size of the development, further surveys for Great Crested Newts are required on all waterbodies within 500 m.

4.3.11 Other Species of Principal Importance

Hedgehog

Hedgehogs are listed as a priority species on the UK Biodiversity Action Plan (BAP). They may be present on the site and therefore precautions should be taken during the planned works to avoid adverse effects. Working at night should be avoided and it is also good practice to cover any excavations over night to prevent Hedgehogs (and other mammals) from becoming trapped in them. If it is not possible to cover excavations an access route should be provided to allow animals to climb out of excavations should they become trapped (i.e. ramps or planks of wood).

Hedgerows should be retained where possible and maintained as dark corridors, to minimise negative impacts on Hedgehogs. Residential gardens created during the development will provide suitable habitat for Hedgehogs if accessible, and where possible, property boundaries should incorporate hedgehog-friendly design.

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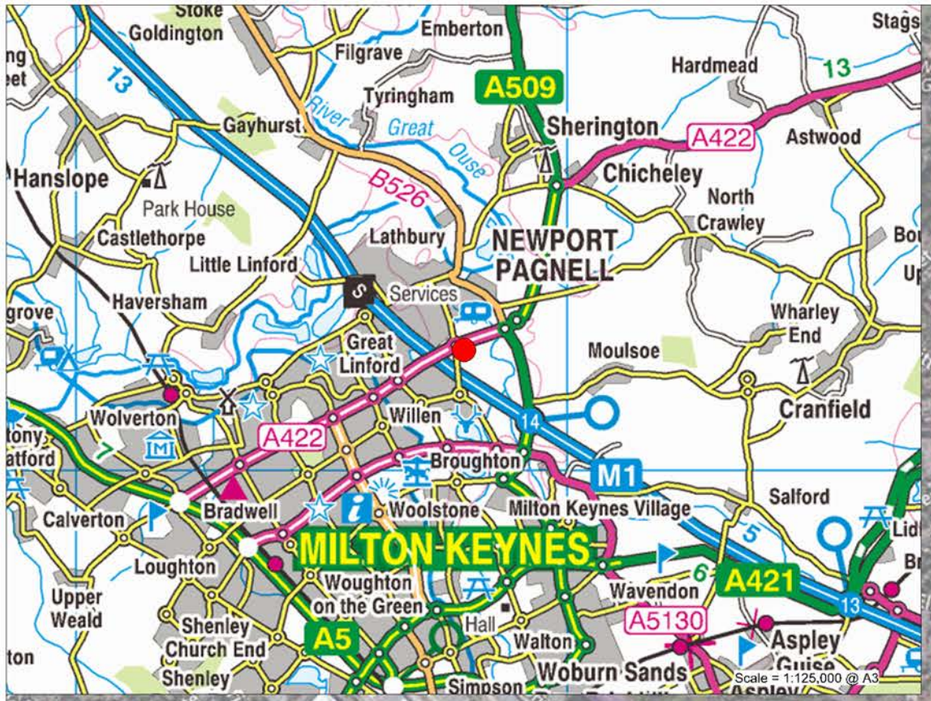
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6 FIGURES

Figure 1 Site Location Plan

Figure 2 Phase 1 Habitat Survey Map

Figure 1. Site Location Plan





Site Boundary



Rev	Date	Description	Drn	Chk	App
00	09.11.18	858045	SP	RG	SR

Newport Pagnell

RSK

Figure 1

Site Location Plan

0 300

Metres

Scale = 1:10,000 @ A3

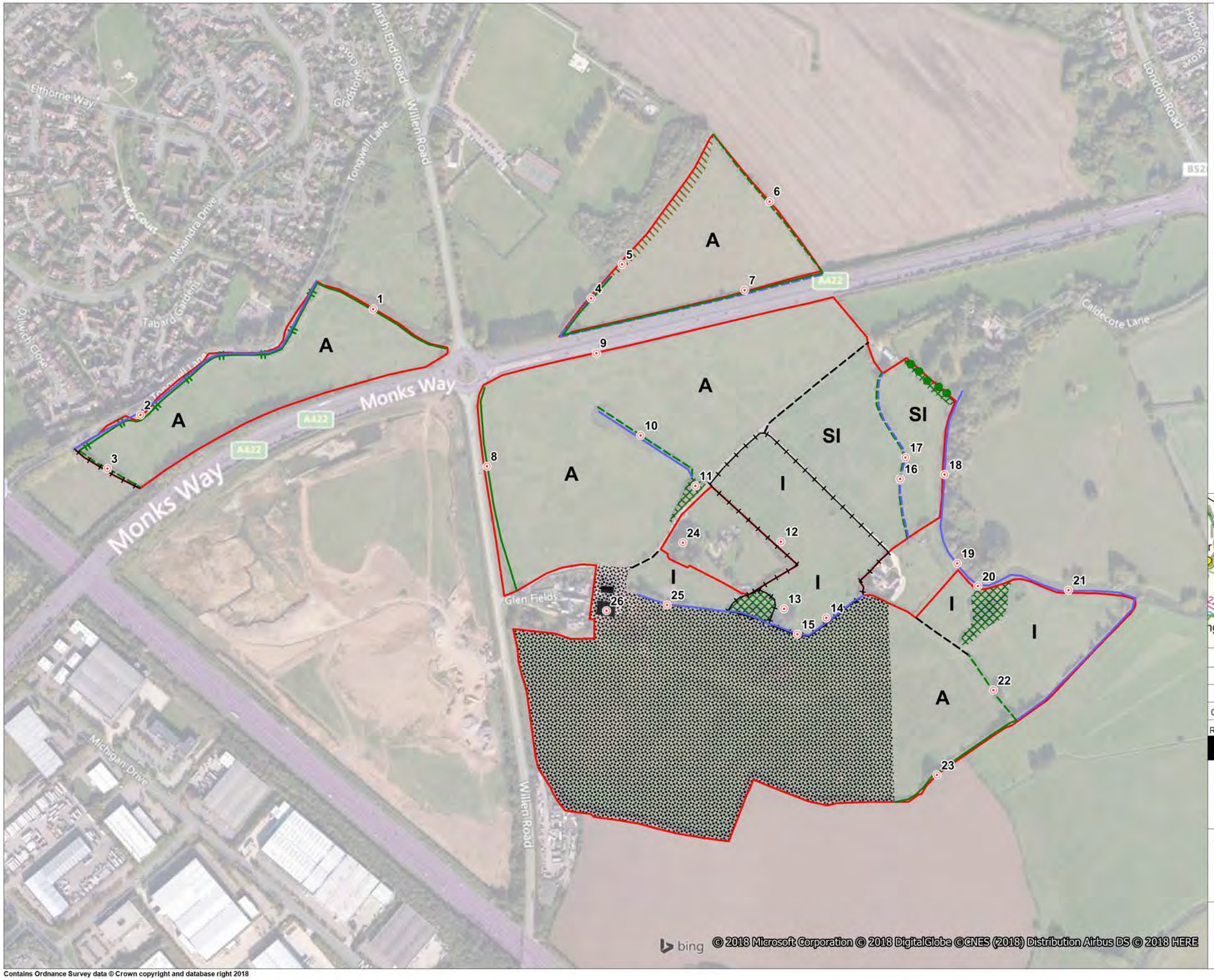
N W E S

REV 00

File Name : U:\Ecology\858000s\858045 - Newport Pagnell PEA\07 - GIS

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Figure 2. Phase 1 Habitat Survey Map



Site boundary
Dense / continuous scrub
Scattered broad-leaved tree
I Improved grassland
SI Semi-improved grassland
Tall ruderal
Running water
Dry ditch
A Arable field
Intact hedge
Gappy hedge
Hedge with trees
Fence
Habitat boundary
Bare ground
Building
Target note



Rev	Date	Description	Drn	Chk	App
00	09.11.18	858045	SP	RG	SR

Newport Pagnell

RSK

Figure 2

Phase 1 Habitat Survey

0 150
metres
Scale = 1:5,000 @ A3

N W E S

REV 00

File Name : U:\Ecology\858000s\858045 - Newport Pagnell PEA\07 - GIS

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APPENDIX A – TARGET NOTES

Target Note 1. A hedge running along east and north site boundary. It is intact and heavily managed, *c.*3 m high and up to 4 m wide. Some mammal paths run through it and there is a dry ditch beneath it. The presence of concealed Badger setts could not be ruled out.

Target Note 2. A spoil pile of vegetation. It could offer hibernation potential for reptiles and Hedgehogs.

Target Note 3. A fence with a species-poor hedge, *c.*1 m wide and 4 m high. A dead tree was lying along the fence.

Target Note 4. An overgrown intact hedge, *c.*4.5 m high and 2 m wide. There is a shallow dry ditch at the base.

Target Note 5. A possible old Badger sett or Rabbit warren with at least six holes.

Target Note 6. A defunct, gappy hedge, *c.*1 m wide and 3 m tall.

Target Note 7. An overgrown, intact hedge along a road, *c.*5 m tall and 2 m wide. A ditch running along the road.

Target Note 8. An intact hedge, *c.*3.5 m high and 2.5 m wide.

Target Note 9. An intact hedge, *c.*3.5 m high and 2.5 m wide.

Target Note 10. A defunct, gappy outgrown hedge with ditch at base. The ditch was dry but may have been wet previously- *Iris pseudacorus* (Yellow Iris) present. Rabbit holes are in the bank.

Target Note 11. A dry pond which may have been wet previously – *Iris pseudacorus* (Yellow Iris) present. Connects to the ditch (*Target Note 16*).

Target Note 12. A deceased Barn Owl.

Target Note 13. A mature Oak tree with a Barn Owl box.

Target Note 14. A damp ditch with a silty bottom and steep earth banks. The banks are well-vegetated with scrub at either end. Small mammal burrows are present.

Target Note 15. A Badger sett on the bank with fresh digging. Two holes on the north bank and one on the south bank. Embankment on south side leads to excavation site. A stock-proof fence around a sheep field was present.

Target Note 16. A dry ditch with a gappy species-poor hedge, *c.*3.5 m high and 2 m wide.

Target Note 17. Possible Badger hole.

Target Note 18. A river, 10 m wide with steep earth banks. It is slow-flowing with diverse aquatic vegetation.

Target Note 19. Possible Water Vole faeces and footprints on the river bank.

Target Note 20. Three *Impatiens glandulifera* (Indian Balsam) plants. A Schedule 9 listed plant on the Wildlife and Countryside Act 1981 (as amended).

Target Note 21. Scattered mussels on the river bank, possibly freshwater pearl.

Target Note 22. A defunct, gappy hedge, recently planted, *c.*2.5 m tall and 2 m wide.

Target Note 23. An intact hedge of varying height, dominated by *Rubus fruticosus* agg. (Bramble).

Target Note 24. A large garden pond with marginal vegetation but algae covering the water surface. Island in the centre with a duck house. Adjacent habitat comprised of woodland and amenity grassland.

Target Note 25. A wet ditch with earth banks and no flow.

Target Note 26. Three farm storage barns made of breezeblocks and corrugated metal sheeting. One contains piles of hay bales.

APPENDIX B – PLANT SPECIES LIST

Table 5. Plant species found at land off H3 Monk's Way, Newport Pagnell on 24 October 2018.

Plant Species
Woody species
Acer campestre (Field Maple)
Betula pendula (Silver Birch)
Cornus australis (Asian dogwood)
Cornus sanguinea (Dogwood)
Corylus avellana (Hazel)
Crataegus monogyna (Hawthorn)
Fraxinus excelsior (Ash)
Hedera helix (Ivy)
Hedera hibernica (Atlantic Ivy)
Iris psuedacorus (Yellow Iris)
Ligustrum vulgare (Wild Privet)
Malus domestica (Domestic Apple)
Populus alba (White Poplar)
Populus tremula (Aspen)
Prunus avium (Wild Cherry)
Prunus cerasifera (Cherry-plum)
Prunus domestica ssp. Insititia (Bullace)
Prunus spinosa (Blackthorn)
Quercus robur (Pedunculate Oak)
Rosa arvensis (Field-rose)
Rosa canina agg. (Dog-rose)
Rubus fruticosus agg. (Bramble)
Salix caprea (Goat Willow)
Salix fragilis (Crack Willow)
Sambucus nigra (Elder)
Solanum dulcamara (Woody Nightshade)
Tilia platyphyllos (Large-leaved Lime)
Ulmus sp. (Elm)
Ulmus glabra (Wych Elm)
Herbaceous species
Achillea millefolium (Yarrow)
Agrostis capillaris (Common Bent)
Alliaria petiolata (Garlic Mustard)
Angelica sylvestris (Wild Angelica)
Anthriscus sylvestris (Cow Parsley)

Plant Species
Apiurn nodiflorum (Fool's Watercress)
Arctium lappa (Greater Burdock)
Arrhenatherum elatius (False Oat-grass)
Bromus hordeaceus (Soft-brome)
Callitriche sp. (Water-starwort)
Calystegia silvatica (Large Bindweed)
Carex hirta (Hairy Sedge)
Carex otrubae (False Fox-sedge)
Carex riparia (Greater Pond-sedge)
Cirsium vulgare (Spear Thistle)
Convolvulus arvensis (Field Bindweed)
Cynosurus cristatus (Crested Dog's-tail)
Dactylis glomerata (Cock's-foot)
Dipsacus fullonum (Teasel)
Fillipendula ulmaria (Meadowsweet)
Elytrigia repens (Common Couch)
Epilobium montanum (Broad-leaved Willowherb)
Festuca gigantea (Giant Fescue)
Festuca rubra (Red Fescue)
Galium aparine (Cleavers)
Galium verum (Lady's Bedstraw)
Geranium dissectum (Cut-leaved Crane's-bill)
Glechoma hederacea (Ground-ivy)
Glyceria maxima (Reed Sweet-grass)
Helminthotheca echioides (Bristly Oxtongue)
Hercaleum sphondylium (Hogweed)
Holcus lanatus (Yorkshire-fog)
Impatiens glandulifera (Indian Balsam)
Iris pseudacorus (Yellow Iris)
Juncus effusus (Soft-rush)
Juncus inflexus (Hard Rush)
Lamium album (White Dead-nettle)
Lemna gibba (Fat Duckweed)
Leontodon autumnalis (Autumn Hawkbit)
Linaria purpurea (Purple Toadflax)
Lolium perenne (Perennial Rye-grass)
Lycopus europeaus (Gipsywort)
Lythrum salicaria (Purple-loosestrife)
Myosotis scorpioides (Water Forget-me-not)
Myosoton aquaticum (Water Chickweed)
Nymphaea sp. (Water-lily)
Papaver rhoeas (Common Poppy)

Plant Species
Persicaria amphibia (Amphibious Bistort)
Plantago lanceolata (Ribwort Plantain)
*Poa annua (*Annual Meadow-grass*)*
Poa trivialis (Rough Meadow-grass)
Polygonum aviculare (Knotgrass)
Potentilla reptans (Creeping Cinquefoil)
Ranunculus repens (Creeping Buttercup)
Ranunculus sceleratus (Celery-leaved Buttercup)
Rumex obtusifolius (Broad-leaved Dock)
Schoenoplectus tabernaemontani (Grey Club-rush)
Scrophularia auriculata (Water Figwort)
Senecio jacobaea (Common Ragwort)
Senecio vulgaris (Groundsel)
Silene latifolia (White Campion)
Sparganium erectum (Branched Bur-reed)
Stachys palustris (Marsh Woundwort)
Stellaria graminea (Lesser Stitchwort)
Tamus communis (Black Bryony)
Trifolium repens (White Clover)
Urtica dioica (Common Nettle)
Veronica beccabunga (Brooklime)
Veronica chamaedrys (Germander Speedwell)

APPENDIX C – NOTEWORTHY SPECIES RECORDS

Table 6 displays noteworthy species records that are located within 1 km of the site boundary. These species records were obtained from Buckinghamshire and Milton Keynes Environmental Records Centre. The Latin and common names for species are given as well as their level of designation. A glossary defining abbreviations used in the table is given in *Table 7, Appendix E*. If a species is not included in the table below it does not necessarily mean the species is absent from the search area, but rather that data-holding organizations do not have records of it in these locations.

Table 6: Noteworthy species records within 1 km of the site boundary

Latin Name	Common Name	Designation
Amphibians		
Bufo bufo	Common Toad	WCA5, S41
Rana temporaria	Common Frog	WCA5
Triturus cristatus	Great Crested Newt	EPS(Sch2), WCA5, S41
Triturus vulgaris	Smooth Newt	WCA5
Birds		
Actitis hypoleucos	Common Sandpiper	Amber
Alauda arvensis	Skylark	S41, Red
Alcedo atthis	Kingfisher	WCA1.1, Amber
Anas acuta	Pintail	WCA1.2, Amber
Anas clypeata	Shoveler	Amber
Anas crecca	Teal	Amber
Anas penelope	Wigeon	Amber
Anas platyrhynchos	Mallard	Amber
Anas strepera	Gadwall	Amber
Anser albifrons	White-fronted Goose	S41, Red
Anser anser	Greylag Goose	WCA1.2, Amber
Anthus pratensis	Meadow Pipit	Amber
Apus apus	Swift	Amber
Asio flammeus	Short-eared Owl	Amber
Aythya ferina	Pochard	Red
Aythya marila	Scaup	WCA1.1, S41, Red
Botaurus stellaris	Bittern	WCA1.1, S41, Amber

Latin Name	Common Name	Designation
Bucephala clangula	Goldeneye	WCA1.2, Amber
Carduelis cabaret	Lesser Redpoll	S41, Red
Carduelis cannabina	Linnet	S41, Red
Carduelis flammea	Mealy Redpoll	Amber
Cettia cetti	Cetti's Warbler	WCA1.1
Charadrius dubius	Little Ringed Plover	WCA1.1
Charadrius hiaticula	Ringed Plover	Red
Chroicocephalus ridibundus	Black-headed Gull	Amber
Cuculus canorus	Cuckoo	S41, Red
Cygnus olor	Mute Swan	Amber
Delichon urbicum	House Martin	Amber
Emberiza calandra	Corn Bunting	S41, Red
Emberiza citrinella	Yellowhammer	S41, Red
Emberiza schoeniclus	Reed Bunting	S41, Amber
Falco columbarius	Merlin	WCA1.1, Red
Falco peregrinus	Peregrine	WCA1.1
Falco subbuteo	Hobby	WCA1.1
Falco tinnunculus	Kestrel	Amber
Gallinago gallinago	Snipe	Amber
Haematopus ostralegus	Oystercatcher	Amber
Larus argentatus	Herring Gull	S41, Red
Larus canus	Common Gull	Amber
Larus fuscus	Lesser Black-backed Gull	Amber
Mergellus albellus	Smew	Amber
Milvus milvus	Red Kite	WCA1.1, Amber
Morus bassanus	Gannet	Amber
Motacilla cinerea	Grey Wagtail	Red
Pandion haliaetus	Osprey	WCA1.1, Amber
Passer domesticus	House Sparrow	S41, Red
Phalacrocorax aristotelis	Shag	Red
Phoenicurus ochruros	Black Redstart	WCA1.1, Red
Phylloscopus trochilus	Willow Warbler	Amber
Podiceps auritus	Slavonian Grebe	WCA1.1, Red
Podiceps grisegena	Red-necked Grebe	Red
Prunella modularis	Dunnock	S41, Amber
Pyrrhula pyrrhula	Bullfinch	S41, Amber
Scolopax rusticola	Woodcock	Red

Latin Name	Common Name	Designation
Sterna hirundo	Common Tern	Amber
Sterna paradisaea	Arctic Tern	Amber
Sturnus vulgaris	Starling	S41, Red
Tringa ochropus	Green Sandpiper	WCA1.1, Amber
Tringa totanus	Redshank	Amber
Turdus iliacus	Redwing	WCA1.1, Red
Turdus philomelos	Song Thrush	S41, Red
Turdus pilaris	Fieldfare	WCA1.1, Red
Turdus viscivorus	Mistle Thrush	Red
Tyto alba	Barn Owl	WCA1.1, Amber
Vanellus vanellus	Lapwing	S41, Red
Fish		
Anguilla anguilla	Eel	S41, OSPAR
Cobitis taenia	Spined Loach	S41
Salmo trutta	Brown Trout	S41
Invertebrates		
Acronicta psi	Grey Dagger	S41
Acronicta rumicis	Knot Grass	S41
Agrochola litura	Brown-spot Pinion	S41
Agrochola lychnidis	Beaded Chestnut	S41
Allophyes oxyacanthae	Green-brindled Crescent	S41
Amphipoea oculea	Ear Moth	S41
Amphipyra tragopoginis	Mouse Moth	S41
Ancylosis oblitella	*Ancylosis oblitella*	Notable
Apamea anceps	Large Nutmeg	S41
Apamea remissa	Dusky Brocade	S41
Aporophyla lutulenta	Deep-brown Dart	S41
Arctia caja	Garden Tiger	S41
Asteroscopus sphinx	Sprawler	S41
Atethmia centrago	Centre-barred Sallow	S41
Auplopus carbonarius	a spider-hunter wasp	Notable:B
Blepharita adusta	Dark Brocade	S41
Brachylomia viminalis	Minor Shoulder-knot	S41
Calamotropha paludella	*Calamotropha paludella*	Notable:B
Caradrina morpheus	Mottled Rustic	S41

Latin Name	Common Name	Designation
Chesias legatella	Streak	S41
Chiasmia clathrata	Latticed Heath	S41
Coenonympha pamphilus	Small Heath	S41
Cymatophorima diluta	Oak Lutestring	S41
Diarsia rubi	Small Square-spot	S41
Diloba caeruleocephala	Figure of Eight	S41
Ecliptopera silaceata	Small Phoenix	S41
Ennomos fuscantaria	Dusky Thorn	S41
Epirrhoe galiata	Galium Carpet	S41
Eulithis mellinata	Spinach	S41
Euxoa nigricans	Garden Dart	S41
Euxoa tritici	White-line Dart	S41
Euzophera cinerosella	*Euzophera cinerosella*	Notable:B
Graphiphora augur	Double Dart	S41
Hemistola chrysoprasaria	Small Emerald	S41
Hepialus humuli	Ghost Moth	S41
Hoplodrina blanda	Rustic	S41
Hydraecia micacea	Rosy Rustic	S41
Lasiommata megera	Wall	S41
Lycia hirtaria	Brindled Beauty	S41
Macaria wauaria	V-Moth	S41
Malacosoma neustria	Lackey	S41
Melanchra persicariae	Dot Moth	S41
Melanchra pisi	Broom Moth	S41
Mythimna comma	Shoulder-striped Wainscot	S41
Orthosia gracilis	Powdered Quaker	S41
Pelurga comitata	Dark Spinach	S41
Perizoma albulata	Grass Rivulet	S41
Pyrochroa coccinea	Black-headed Cardinal Beetle	Notable:B
Rhizedra lutosa	Large Wainscot	S41
Schoenobius gigantella	*Schoenobius gigantella*	Notable:B
Scotopteryx chenopodiata	Shaded Broad-bar	S41
Spilosoma lubricipeda	White Ermine	S41
Spilosoma luteum	Buff Ermine	S41
Tholera decimalis	Feathered Gothic	S41
Timandra comae	Blood-vein	S41

Latin Name	Common Name	Designation
Trichiura crataegi	Pale Eggar	S41
Tyria jacobaeae	Cinnabar	S41
Tyta luctuosa	Four-spotted	S41
Watsonalla binaria	Oak Hook-tip	S41
Xanthia gilvago	Dusky-lemon Sallow	S41
Xanthia icteritia	Sallow	S41
Xanthorhoe ferrugata	Dark-barred Twin- spot Carpet	S41
Mammals		
Erinaceus europaeus	Western Hedgehog	S41
Lutra lutra	Otter	EPS(Sch2), WCA5, S41
Meles meles	Badger	BA
Myotis nattereri	Natterer's Bat	EPS(Sch2), WCA5
Nyctalus noctula	Noctule Bat	EPS(Sch2), WCA5, S41
Pipistrellus pipistrellus	Common Pipistrelle	EPS(Sch2), WCA5
Pipistrellus sp.	Pipistrelle species	EPS(Sch2), WCA5
Plecotus auritus	Brown Long-eared Bat	EPS(Sch2), WCA5, S41
Plants		
Buxus sempervirens	Box	NR
Cuscuta europaea	Greater Dodder	NS
Helleborus foetidus	Stinking Hellebore	NS
Hyacinthoides non-scripta	Bluebell	WCA8
Reptiles		
Natrix natrix	Grass Snake	WCA5, S41

APPENDIX D – RELEVANT LEGISLATION AND POLICY

Badger

Badgers are protected in Britain under the Protection of Badgers Act 1992 and Schedule 6 of the Wildlife and Countryside Act 1981 (as amended).

The legislation affords protection to Badgers and Badger setts, and makes it a criminal offence to:

- wilfully kill, injure, take, possess or cruelly ill-treat a Badger, or to attempt to do so;
- intentionally or recklessly interfere with a sett by damaging or destroying it;
- to obstruct access to, or any entrance of, a Badger sett; or
- to disturb a Badger when it is occupying a sett.

Great Crested Newt

Great Crested Newts are listed on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), and receives full protection under Section 9. Great Crested Newts are also European Protected Species listed on The Conservation of Species and Habitats Regulations 2010 (as amended). This legislation makes it an offence to:

- deliberately capture, injure or kill a Great Crested Newt;
- deliberately disturb a Great Crested Newt (in such a way as to be likely to significantly affect, (i) the ability of a significant group of Great Crested Newt to survive, breed or rear/nurture their young; and (ii) the local distribution or abundance of the species concerned);
- deliberately take or destroys the eggs of such an animal;
- damage or destroy a breeding site or resting place of a Great Crested Newt; and
- possess, control, transport, sell, exchange a Great Crested Newt, or offer a Great Crested Newt for sale or exchange.

All resting and breeding places of Great Crested Newts receive legal protection even when Great Crested Newts are not present.

Hazel Dormouse

The Hazel Dormouse is protected by The Wildlife and Countryside Act 1981 (as amended), extended by the Countryside and Rights of Way Act 2000. This legislation makes it an offence to:

- Intentionally kill, injure or take a dormouse;

- Possess or control any live or dead specimen or anything derived from a dormouse (unless it can be shown to have been legally acquired);
- Intentionally or recklessly damage, destroy or obstruct access to any structure or place used for shelter or protection by a dormouse; or
- Intentionally or recklessly disturb a dormouse while it is occupying a structure or place which it uses for that purpose.

The Dormouse is also European Protected Species listed on The Conservation (Natural Habitats, & c.) Regulations 1994 (as amended). This legislation makes it an offence to:

- Deliberately capture or kill a dormouse;
- Deliberately disturb a dormouse;
- Damage or destroy a breeding site or resting place of a dormouse;
- Keep, transport, sell or exchange, or offer for sale or exchange a live or dead dormouse or any part of a dormouse.

Water Vole

Water Voles are fully protected under Section 9 of Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). Protection was extended by the Countryside and Rights of Way Act 2000.

Under this legislation, it is an offence to:

- intentionally kill, injure or take (capture) a Water Vole;
- possess or control a live or dead Water Vole, or any part of a Water Vole;
- intentionally or recklessly damage, destroy or obstruct access to any structure or place which Water Voles use for shelter or protection, or to intentionally or recklessly disturb Water Voles while they are using such a place; or
- sell, offer for sale or advertise for live or dead Water Voles.

The Water Vole is included as a Priority Species in the UK Biodiversity Action Plan (UKBAP).

Otter

Otters are listed on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), and receives full protection under Section 9. This species is also listed as a European Protected Species on Schedule 2 of The Conservation of Species and Habitats Regulations 2010 (as amended). Protection was extended by the Countryside and Rights of Way Act 2000 (the CRoW Act).

Under the above legislation it is an offence to:

- kill, injure or take an individual of such a species;
- possess any part of such species either alive or dead;

- intentionally or recklessly damage, destroy or obstruct access to any place or structure used by such species for shelter, rest, protection or breeding;
- intentionally or recklessly disturb such a species whilst using any place of shelter or protection; or
- sell or attempt to sell any such species.

The Otter is included as a Priority Species in the UK Biodiversity Action Plan (UKBAP) and also as a species of principal importance for the conservation of biological diversity in England under *Section 74* of the CRoW Act.

The Otter is also protected under Schedule 6 of the Wildlife and Countryside Act 1981 (as amended). This protection relates specifically to trapping and direct pursuit of the species.

The European sub-species is also listed as globally threatened on the IUCN/WCMC RDL.

Other Mammals

All wild mammals are protected by The Wild Mammals (Protection) Act 1996 (as amended). This legislation makes it an offence to mutilate, kick, beat, nail, or otherwise impale, stab, burn, stone, crush, drown, drag or asphyxiate any wild mammal.

Bats

Bats are European Protected Species listed on Schedule 2 of The Conservation of Species and Habitats Regulations 2010 (as amended). This legislation makes it an offence to:

- deliberately capture, injure or kill;
- deliberately disturb, including in particular any disturbance which is likely (a) to impair their ability - (i) to survive, to breed or reproduce, or to rear or nurture their young; or (ii) hibernate or migrate, where relevant; or (b) to affect significantly the local distribution or abundance of the species to which they belong.
- damage or destroy a breeding site or resting place; and
- possess, control, transport, sell, exchange, or offer for sale or exchange.

Commoner Reptiles

Common Lizard, Grass Snake, Slow-worm and Adder are listed under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), in respect of Section 9(5) and part of Section 9(1). Under the above legislation it is an offence to:

- intentionally or deliberately kill or injure any individual of such a species; or

- sell or attempt to sell any part of the species alive or dead.

Birds

Birds General Protection

All species of bird are protected under Section 1 of the Wildlife and Countryside Act 1981 (as amended). The protection was extended by the CRoW Act.

The legislation makes it an offence to intentionally:

- kill, injure or take any wild bird;
- take, damage or destroy the nest of any wild bird while that nest is in use or being built; or
- take or destroy an egg of any wild bird.

Birds (Specially Protected Species)

Certain species of bird e.g. Barn Owl and Kingfisher, are listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) and receive protection under Sections 1(4) and 1(5) of the Act. The protection was extended by the CRoW Act. The legislation confers special penalties where the above mentioned offences are committed for any such bird and also make it an offence to intentionally or recklessly:

- disturb any such bird, whilst building its nest or it is in or near a nest containing dependant young; or
- disturb the dependant young of such a bird.

APPENDIX E – ABBREVIATIONS

Table 7 displays abbreviations of protected species legislation.

Table 7: Glossary of abbreviations used in this report:

Code	Full Title	Explanation
Amber	Amber list	Amber listed species have a population status in the UK of medium conservation concern.
BA	The Protection of Badgers Act 1992	Legislation making it an offence to kill, injure or take a Badger, or to damage or interfere with a sett unless a licence is obtained from a statutory authority.
BAP	Biodiversity Action Plan	A plan that identifies threats to significantly important species and habitats, and sets out targets and actions to enhance or maintain biodiversity.
DA	The Deer Act 1991	All wild deer with the exception of Muntjac (*Muntiacus reevesi*) and Chinese Water deer (*Hydropotes inermis*) are protected by a closed season.
ENG BSBI RDB	A Vascular Plant Red List for England	A list published in 2014 by the Botanical Society of Britain and Ireland of the red list status of plants in England. Measured against standardised IUCN criteria.
ENG BSBI RDB(CR)	Critically Endangered	A BSBI Red List designation for species at an extremely high risk of extinction.
ENG BSBI RDB(EN)	Endangered	A BSBI Red List designation for species at a very high risk of extinction.
ENG BSBI RDB(VU)	Vulnerable	A BSBI Red List designation for species at high risk of extinction.
EPS (Sch 2)	European Protected Species (Schedule 2)	European protected animal species (listed on *Schedules 2* of *The Conservation of Habitats and Species* (Amendment) *Regulations 2012*)
EPS (Sch 5)	European Protected Species (Schedule 5)	European protected plant species (listed on *Schedules 5* of *The Conservation of Habitats and Species* (Amendment) *Regulations 2012*)
GB RDB	Red Data Book Species	Species identified in one of the UK Red Data 2001.

Code	Full Title	Explanation
GB RDB(CR)	Critically Endangered	An IUCN Red List designation for species at an extremely high risk of extinction.
GB RDB(EN)	Endangered	An IUCN Red List designation for species at a very high risk of extinction.
GB RDB(VU)	Vulnerable	An IUCN Red List designation for species at high risk of extinction.
HAP	Habitat Action Plan	A plan that identifies threats to a priority habitat and sets out targets and actions to enhance or maintain that habitat.
IUCN	International Union for Conservation of Nature and Natural Resources (also known as The World Conservation Union)	A worldwide partnership and conservation network to influence, encourage and assist societies throughout the world to conserve the integrity and diversity of nature and to ensure that any use of natural resources is equitable and ecologically sustainable.
LBAP	Local Biodiversity Action Plan	A plan that identifies threats to locally important species and habitats, and sets out targets and actions in Species Action Plans and Habitat Action Plans to enhance or maintain biodiversity at the county or regional level.
LHAP	Local Habitat Action Plan	A plan that identifies threats to a locally important priority habitat and sets out targets and actions to enhance or maintain that habitat.
LSAP	Local Species Action Plan	A plan that identifies threats to locally important species, and sets out targets and actions to prevent losing that species from the local area.
Notable	Scarce and threatened invertebrates	Invertebrate species which are estimated to occur within the range of 16 to 100 10km squares but subdivision into Notable A and Notable B categories is not possible as there is insufficient information available).
Notable:A	Scarce and threatened invertebrates	Taxa which do not fall within Red Data Book categories but which are none-the-less uncommon in Great Britain and thought to occur in 30 or fewer 10km squares of the National Grid or, for less well-recorded groups, within seven or fewer vice-counties.
Notable: B	Scarce and threatened invertebrates	Taxa which do not fall within Red Data Book categories but which are none-the-less uncommon in Great Britain and thought to occur in between 31 and 100 10km squares of the National Grid or, for less-well recorded groups between eight and twenty vice-counties.

Code	Full Title	Explanation
NN	Nationally Notable	Designation for invertebrate taxa that are thought to be notably important in the UK.
NR	Nationally Rare	Species in 15 or fewer hectads in Great Britain.
NS	National Scarce	Species in 16-100 hectads in Great Britain.
OSPAR	OSPAR	Species listed on *The Convention for the Protection of the Marine Environment of the North-East Atlantic*
Red	Red List	Red listed species have a population status in the UK with high conservation concern.
SAP	Species Action Plan	A plan that identifies threats to significantly important species, and sets out targets and actions to prevent losing that species to extinction.
S41	Species of Principal Importance	Species of Principal Importance in England under *The Natural Environment and Rural Communities (NERC) Act (2006)*
UKBAP	UK Biodiversity Action Plan	A plan that identifies threats to locally important species and habitats, and sets out targets and actions in Species Action Plans and Habitat Action Plans to enhance or maintain biodiversity in the UK.
WCA	*The Wildlife and Countryside Act 1981* (as amended)	Containing 4 Parts and 17 Schedules, the Act covers protection of wildlife (birds, and some animals and plants), the countryside, National Parks, and the designation of protected areas, and public rights of way. All wild plants in Britain are protected from intentional uprooting by an unauthorized person, but land owners, land occupiers, persons authorized by either of these or persons authorized in writing by the Local Authority for the area are exempt. Protection for some species may be limited to certain Sections of the Act (*e.g.* S13(2).
WCA1	Schedule 1 of *The Wildlife and Countryside Act 1981* (as amended)	This Schedule lists birds protected by special penalties at all times, but virtually all wild birds have some protection in law. Acts which are prohibited for all wild birds (except derogated 'pest' species) include intentional killing, injuring or taking; taking, damaging or destroying nests in use or being built; taking or destroying eggs; possessing or having control of (with certain exceptions but including live for dead birds, parts or derivative); setting or permitting certain traps, weapons, decoys or

Code	Full Title	Explanation
		poisons. Selling, offering or exposing for sale, possessing or transporting for sale any live wild bird, egg or part of an egg or advertising any of these for sale, or dead wild bird including parts or derivatives are also prohibited. Many birds must be formally registered and ringed if kept in captivity. Schedule I WCA birds are additionally protected from intentional or reckless disturbance while building a nest, or when such a bird is in, on or near a nest containing eggs or young, or intentional or reckless disturbance of dependent young.
WCA5	Schedule 5 of *The Wildlife and Countryside Act 1981* (as amended)	Schedule 5 animals are protected from intentional killing, injuring or taking; possessing (including parts or derivatives); intentional or reckless damage, destruction or obstruction of any structure or place used for shelter or protection; selling, offering or exposing for sale, possessing or transporting for the purpose of sale (alive or dead, including parts or derivatives). Protection of some species is limited to certain Sections of the Act (*e.g.* S9(1), S9(4a), S9(4b), S9(5)).
WCA8	Schedule 8 of *The Wildlife and Countryside Act 1981* (as amended)	Plants and fungi protected from intentional picking, uprooting, destroying, trading (including parts or derivatives), *etc*.

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Appendix 7.2

Phase 2 Ecological Survey Reports



Bloor Homes South Midlands

Newport Pagnell

Badger Survey Report

858045

OCTOBER 2019

RSK GENERAL NOTES

Project No.: 858045

Title: Newport Pagnell – Badger Survey Report

Client: Bloor Homes South Midlands

Date: October 2019

Office: Coventry

Status: Rev00

Author	Shona Redman	**Technical reviewer**	Ruth Morton
Signature:	[redacted]	**Signature:**	[redacted]
Date:	29 August 2019	**Date:**	15 October 2019
Project manager	Patrick Dixon	**Quality reviewer**	Ruth Morton
Signature:	[redacted]	**Signature:**	[redacted]
Date:	14 October 2019	**Date:**	15 October 2019

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Where any data supplied by the client or from other sources have been used, it has been assumed that the information is correct. No responsibility can be accepted by RSK for inaccuracies in the data supplied by any other party. The conclusions and recommendations in this report are based on the assumption that all relevant information has been supplied by those bodies from whom it was requested.

No part of this report may be copied or duplicated without the express permission of RSK and the party for whom it was prepared.

Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

This work has been undertaken in accordance with the quality management system of RSK Environment Ltd.

EXECUTIVE SUMMARY

1. This report presents the results of a Badger (***Meles meles***) survey carried out at four land parcels adjacent to H3 Monk's Way, Newport Pagnell, collectively referred to as 'the site'.

2. The purpose of the survey was to establish the presence or likely absence of Badgers on the site.

3. There are records of Badger within 1 km of the site and the preliminary ecological appraisal identified a possible old Badger sett and a separate old Badger hole.

4. No evidence of Badgers was recorded during the survey; however, some areas of dense scrub were inaccessible.

5. Extensive Rabbit activity and numerous warrens were recorded across the site. Specialist contractors will be required if digging is required above an active warren.

6. A pre-works survey should be undertaken to ensure no new setts have been created and a watching brief should be undertaken for areas not previously accessible.

CONTENTS

1 INTRODUCTION 1
1.1 Purpose of this Report 1
1.2 Ecological Context 1
2 METHODS 2
2.1 Background Data Search 2
2.2 Field Surveys 2
2.2.1 Habitat Assessment 2
2.2.2 Sett Terminology 2
2.2.3 Validity of Data 3
3 RESULTS 4
3.1 Background Data Search 4
3.2 Field Surveys 4
4 EVALUATION AND CONCLUSIONS 5
4.1 Badgers 5
5 REFERENCES 6
6 FIGURES 7
APPENDIX A – LEGISLATION 9

1 INTRODUCTION

1.1 Purpose of this Report

This report presents the results of a Badger ***(Meles meles)*** survey carried out at four areas of land off H3 Monk's Way, Newport Pagnell (***Figure 1***), here collectively referred to as 'the site' (OS grid references SP881428, SP874425, SP882421 and SP880421). The survey was carried out in March 2019.

RSK undertook the survey on behalf of Bloor Homes South Midlands to provide information on any impacts the proposed residential development could have on Badgers. A preliminary ecological appraisal (PEA) undertaken by RSK in October 2018 found a possible old Badger sett and separate old Badger hole on the edge of Area 2 (RSK, 2018).

The current proposals include multiple residential units, a primary school, and open spaces (including an extension to the town council playing fields and retention of ecologically sensitive areas and features).

1.2 Ecological Context

The site is on the southern edge of Newport Pagnell in Buckinghamshire (***Figure 1***). It comprises two fields north of H3 Monk's Way (Areas 1 and 2), a larger area of land south of H3 Monk's Way (Area 3), and a quarry directly east of Willen Road (Area 4). The site comprises arable land, with areas of scrub, scattered broadleaved trees, improved grassland, semi-improved grassland, hedgerows, standing water and dry ditch. There is plantation broad-leaved woodland adjacent to Area 2.

The town of Newport Pagnell separates the site from extensive agricultural land. The east of the site is bordered by the River Ouzel Wet Corridor, part of the Milton Keynes Wildlife Corridor (MKWC), which also separates the site from further agricultural land. Directly west is Willen Road and the M1 motorway, which separates the site from the Tongell Lake Local Wildlife Site (LWS) 150 m west of the site. The agricultural fields on the site may provide foraging opportunities for Badgers, and the areas of dense scrub could provide habitat suitable for sett-building.

2 METHODS

2.1 Background Data Search

A search was made in October 2018 as part of the PEA (RSK, 2018). Badger records were obtained from Buckingham and Milton Keynes Environmental Records Centre (BMKERC).

2.2 Field Surveys

2.2.1 Habitat Assessment

A survey was carried out to identify areas that might be used by Badger for commuting, foraging and sett-building within 30 m of all areas potentially affected by works (where access was possible). The areas were systematically searched for signs of Badgers including setts, foraging signs, paths (runs) and latrines. The survey of Areas 1, 2 and 3 was undertaken on 6 March 2019 by RSK ecologist Shona Redman. Area 4 was surveyed by Jan Skuriat and Patrick Dixon on 18 March 2019 (also RSK ecologists). Shona and Patrick are graduate members of the Chartered Institute of Ecology and Environmental Management (CIEEM) and are experienced in surveys of this kind. Jan is a full member of CIEEM and has several years' experience undertaking these surveys.

2.2.2 Sett Terminology

Individual holes or setts are described using terminology defined by Harris ***et al*** (1989) as set out below.

- ***Well-used Holes*** - These are clear of any debris and vegetation, are obviously in regular use, and may or may not have been excavated recently.
- ***Partially-used Holes*** - These are not in regular use and have debris such as leaves or twigs in the entrance or, have moss or other plants growing in or around the entrance. Partially-used holes could be in regular use after a minimal amount of clearance.
- ***Disused Holes*** - These have not been in use for some time, are partially or completely blocked, and cannot be used without a considerable amount of clearance. If the hole has been disused for some time, all that may be visible is a depression in the ground where the hole used to be, and the remains of a spoil heap, which may be covered in moss or other plants.
- ***Currently-used Setts*** - Any sett entrance that is well-used or partially-used can fall within the category of current use as interpreted by English Nature (1999 & 2002).
- ***Disused Setts*** - If all the entrances of a sett are disused, then even though it was originally dug by a Badger, it is no longer a Badger sett as defined under the Badger Act 1992.
- ***Cohabitation*** - Both Fox (***Vulpes Vulpes***) and Rabbit (***Oryctolagus cuniculus***) are sometimes known to occupy Badger setts at the same time as Badgers are

resident. The presence of Fox hair and Rabbit signs at a sett complex does not necessarily indicate that the sett is being used exclusively by these animals. These findings should be considered in conjunction with other findings or observations in and around the sett.

- ***Main Sett*** - A Badger sett forming the main abode of a group of Badgers. Main setts are occupied continually throughout the year and are generally used by at least one sow to rear young. In a national survey of setts, the average number of holes for a main sett was 12, although there may be any number of holes from one to more than 40.
- ***Annexe Sett*** - Setts situated in the immediate vicinity of a main sett. Although such setts are often occupied throughout the year, they will generally only be used for breeding when the main sett is used by another breeding sow. These setts can have any number of holes although it is usually around eight. The distinguishing feature of these setts is an obvious, well-used path running to the main sett.
- ***Subsidiary Sett*** - Setts situated away from the main sett that may represent an area of particularly good foraging. Such setts are used occasionally throughout the year and occasionally for breeding but are more likely to be used only to exploit a seasonal food source. These setts usually have around four holes.
- ***Outlying Sett -*** These setts are away from the main sett. They have a small number of holes, often only one or two. Such setts are rarely in continuous occupation and are most often used either to exploit a seasonal food source or as a refuge when visiting certain parts of the territory.

2.2.3 Validity of Data

Badgers regularly change location and establish new setts, therefore this data is only valid for a period of six months and the site should be surveyed again no more than three months prior to construction.

3 RESULTS

3.1 Background Data Search

There are seven previous records of Badgers within 1 km of the site (RSK, 2018).

3.2 Field Surveys

There is suitable foraging and sett-building habitat on the site for Badgers including arable fields, dense scrub, steep wooded banks and an area of plantation woodland adjacent to Area 2. No Badger setts or field signs were recorded but there were areas of dense scrub and steep banks across the site that could not be inspected closely during the survey.

Extensive Rabbit activity was noted across the site including paths and numerous warrens, some with recent digging.

4 EVALUATION AND CONCLUSIONS

4.1 Badgers

Badgers are very mobile animals and can readily build new setts in a short period of time. An updated walkover survey for Badgers should be carried out no more than three months prior to any works (including vegetation clearance). Furthermore, an experienced ecologist should be present to perform a watching brief for Badgers during vegetation clearance of scrub in the areas that could not be inspected closely across the site.

4.2 Other Mammals

Digging on the site has the potential to destroy Rabbit warrens, which are numerous across the site. If any of the warrens are active, specialist contractors will be required to advise on preventing an offence under the Wild Mammals (Protection) Act 1996.

5 REFERENCES

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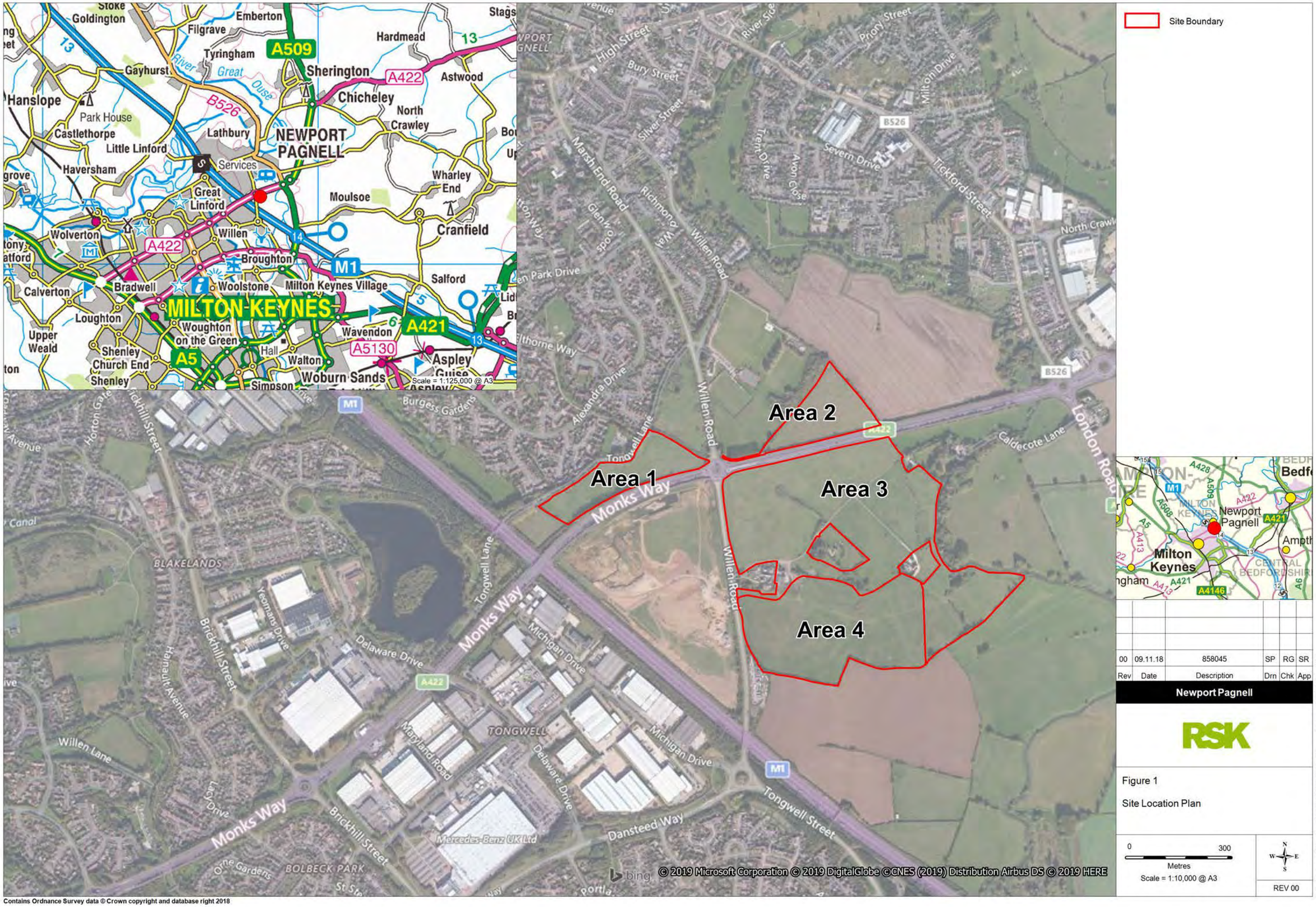
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6 FIGURES

Figure 1 – Site Location Plan

Figure 1 – Site Location Plan



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Rev	Date	Description	Drn	Chk	App
00	09.11.18	858045	SP	RG	SR

Newport Pagnell

RSK

Figure 1

Site Location Plan

0 300

Metres

Scale = 1:10,000 @ A3

N W E S

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APPENDIX A – LEGISLATION

Badger

Badgers are protected in Britain under the Protection of Badgers Act 1992 and Schedule 6 of the Wildlife and Countryside Act 1981 (as amended).

The legislation affords protection to Badgers and Badger setts, and makes it a criminal offence to:

- wilfully kill, injure, take possess or cruelly ill-treat a Badger, or attempt to do so;
- intentionally or recklessly interfere with a sett by damaging or destroying it;
- to obstruct access to, or any entrance of, a Badger sett; or
- to disturb a Badger when it is occupying a sett.

Other Mammals

Rabbits are protected by the Wild Mammals (Protection) Act 1996 (as amended). This legislation makes it an offence to mutilate, kick, beat, nail, or otherwise impale, stab, burn, stone, crush, drown, drag or asphyxiate any wild mammal.



Bloor Homes South Midlands

Newport Pagnell

Barn Owl Survey Report

858045

OCTOBER 2019

RSK GENERAL NOTES

Project No.: 858045

Title: Newport Pagnell – Barn Owl Report

Client: Bloor Homes South Midlands

Date: October 2019

Office: Coventry

Status: Rev00

Author	Shona Redman	**Technical reviewer**	Ruth Morton
Signature:	[redacted]	Signature:	[redacted]
Date:	21 October 2019	Date:	29 October 2019
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Date:	22 October 2019	Date:	29 October 2019

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Where any data supplied by the client or from other sources have been used, it has been assumed that the information is correct. No responsibility can be accepted by RSK for inaccuracies in the data supplied by any other party. The conclusions and recommendations in this report are based on the assumption that all relevant information has been supplied by those bodies from whom it was requested.

No part of this report may be copied or duplicated without the express permission of RSK and the party for whom it was prepared.

Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

This work has been undertaken in accordance with the quality management system of RSK Environment Ltd.

EXECUTIVE SUMMARY

1. This report presents the results of Barn Owl (***Tyto alba***) surveys carried out in 2019 in three parcels of land adjacent to H3 Monk's Way, Newport Pagnell.

2. A preliminary ecological appraisal undertaken by RSK in October 2018 identified a Barn Owl nest box, a dead Barn Owl and suitable foraging habitat for Barn Owls across the site. A background data search found records of Barn Owl within 1 km of the site.

3. Barn Owls were confirmed to be nesting in a nest box in Area 3. Other Barn Owl evidence and activity was also recorded on the site.

4. The nest box should be capped until works are complete and two nest boxes should be installed on adjacent land as mitigation.

5. The development should incorporate suitable foraging habitat and commuting routes for Barn Owls and the habitat surrounding the current nest box should be fenced off to minimise disturbance after works are complete.

CONTENTS

1 INTRODUCTION 1
1.1 Purpose of Report 1
1.2 Ecological Context 1
2 METHODS 2
2.1 Background Data Search 2
2.2 Habitat Assessment 2
2.3 Roost Assessment 2
2.4 Emergence Survey 2
2.5 Survey Constraints 3
3 RESULTS 4
3.1 Background Data Search 4
3.2 Habitat Assessment 4
3.3 Roost Assessment 4
3.4 Emergence Survey 4
4 EVALUATION AND CONCLUSIONS 5
4.1 Barn Owls 5
5 REFERENCES 6
6 FIGURES 7
APPENDIX A – LEGISLATION 10

1 INTRODUCTION

1.1 Purpose of Report

This report presents the results of Barn Owl (***Tyto alba***) surveys carried out in connection with a proposed residential development at four areas of land off H3 Monk's Way, Newport Pagnell (***Figure 1***), here collectively referred to as 'the site' (OS grid references SP881428, SP874425, SP882421 and SP880421).

A preliminary ecological appraisal (PEA) undertaken by RSK in October 2018 identified a Barn Owl nest box, a dead Barn Owl and suitable foraging habitat across the site for Barn Owls (RSK, 2018). RSK undertook the surveys on behalf of Bloor Homes South Midlands to provide information on any affects the proposed residential development could have on Barn Owls.

1.2 Ecological Context

The site is on the southern edge of Newport Pagnell in Buckinghamshire (***Figure 1***). It comprises two fields north of H3 Monk's Way (Areas 1 and 2), a larger area of land south of H3 Monk's Way (Area 3), and a quarry directly east of Willen Road (Area 4). The site comprises arable land, with areas of scrub, scattered broadleaved trees, improved grassland, semi-improved grassland, hedgerows, standing water and dry ditch. There is plantation broad-leaved woodland adjacent to Area 2.

The town of Newport Pagnell separates the site from extensive agricultural land. The east of the site is bordered by the River Ouzel Wet Corridor, part of the Milton Keynes Wildlife Corridor (MKWC), which also separates the site from further agricultural land. Directly west is Willen Road and the M1 motorway, which separates the site from the Tongell Lake Local Wildlife Site (TLLWS), 150 m west of the site.

2 METHODS

2.1 Background Data Search

A background data search was made in October 2018 as part of the PEA (RSK, 2018). Barn Owl records were obtained from Buckingham and Milton Keynes Environmental Records Centre (BMKERC).

2.2 Habitat Assessment

The site was assessed for its potential for Barn Owls during the PEA. Barn Owls typically roost in mature trees or barns but can also be found in other buildings. Barn Owls usually forage over rough grassland in an agricultural landscape, and hedgerows are important for foraging and commuting. Any incidental signs of Barn Owls including feathers, pellets, white streaking and nests were recorded if observed.

2.3 Roost Assessment

All trees within the survey area were searched for signs of Barn Owl occupation during the ground level tree assessment (GLTA) undertaken on 2 and 3 April 2019 as well as during a tree climbing survey for roosting bats on 24 June 2019. These were overseen by Lewis Wright (reference CL29/00209). Any signs of Barn Owls observed during the preliminary roost assessment (PRA) for bats in buildings and barns on 9 July 2019 were also noted.

Ladders, high powered torches and mirrors were used to search for birds, droppings (often comprising white streaks), pellets, feathers, prey remains and nest debris. All evidence of Barn Owls was recorded on maps and combined into a summary map (***Figure 2***).

All surveys were undertaken during suitable weather conditions to avoid flushing Barn Owls out in severe weather conditions.

2.4 Emergence Survey

An emergence survey was undertaken of the nest box on 11 July 2019 by Shona Redman to count the number of individuals seen and record their behaviour. A surveyor was positioned with an infra-red camera facing the nest box, far enough away that they were not considered to be creating a disturbance to any nesting Barn Owls. Surveyor location is shown in ***Figure 2.*** The survey, including the position of the surveyor, was overseen by Tom Coyne who holds a licence for the disturbance of Barn Owls in England (reference CL29/00315).

Incidental sightings of Barn Owls during bat emergence surveys in July and August were also recorded.

2.5 Survey Constraints

Whilst performing the GLTA, a Barn Owl flew out of the nest box as surveyors approached the tree. Surveyors ceased the survey of this tree as they did not want to further disturb nesting Barn Owls.

To prevent disturbance to any nesting Barn Owls during the emergence survey, the surveyor was positioned ***c.***50 m from the tree and the view of the nest box was obscured by the dense tree canopy. However, there are no other suitable roosting features in the tree so any Barn Owls observed emerging from or entering that area can be assumed to be using the nest box.

There was no access to the house on the east of Area 3 so this building could not be inspected for evidence of Barn Owls.

3 RESULTS

3.1 Background Data Search

The background data search returned three records of Barn Owls within 1 km of the site, most recently in 2016 (RSK, 2018).

3.2 Habitat Assessment

Semi-improved grassland and hedgerows throughout the site provide suitable foraging habitat. There are barns and mature trees on site that could provide nesting places. A Barn Owl box was identified on a mature Oak tree to the south of Area 3 and a dead Barn Owl was found in a field ***c.***50 m north of this (***Figure 2***).

3.3 Roost Assessment

While inspecting the tree containing the Barn Owl box, a Barn Owl flew out and pellets were found on the floor underneath the box confirming that the box is in use by Barn Owls. An endoscope survey of the nest box whilst tree climbing for roosting bats revealed a Barn Owl chick in the nest box, confirming that Barn Owls are nesting on the site. Surveyors also noted an increased number of pellets underneath the tree on this occasion.

During the PRA of the barns on the site for bats, a Barn Owl pellet was found at the rear of one of the barns to the west of Area 3. The location of this barn, along with the nest box and dead Barn Owl are shown in ***Figure 2***.

3.4 Emergence Survey

A Barn Owl was seen emerging from the nest box, foraging over an adjoining field and then returning to the nest box. During the bat re-entry survey of the tree on 22 August 2019, two Barn Owls were observed frequently returning to the tree after foraging but were not seen to enter the nest box.

4 EVALUATION AND CONCLUSIONS

4.1 Barn Owls

Barn Owls are known to be breeding on the site. Barn Owls are a Wildlife and Countryside Act 1981 Schedule 1 species, as such, their nesting sites are protected not only from destruction but also from disturbance while adult birds are preparing to nest, actively nesting, or supporting dependent young.

To prevent disturbance to nesting Barn Owls, the current nest box will need to be checked by an ecologist to ensure no Barn Owls are present, and then it must be closed, preferably in late-summer to autumn (outside of the breeding season), but before weather conditions become harsh i.e. heavy rain, frost and low temperatures. The nest box should be re-opened once the development is complete. As mitigation, two nest boxes with the same design as the current one should be mounted on trees in neighbouring land parcels to replicate the current nesting conditions and increase the likelihood that the Barn Owls will take to the new boxes. Possible locations for these boxes include on trees in fields to the east of the river and to the south-east of the development site. The boxes should be either screened from the development or at a sufficient distance that they will not be disturbed during the development. They should be installed at a height of 3 to 4 m to enable future maintenance and monitoring, and there should be a clear flightpath into the entrance. Depending on when works start, the boxes should be installed as soon as possible to enable Barn Owls to find them and start using them before the current box is closed.

The development should also incorporate areas of suitable foraging habitat and commuting routes such as areas of scrub and an undisturbed corridor along the river banks, and areas of unmanaged rough grassland. Furthermore, there should be a fenced off area around the large Oak tree that contains the current nest box so that disturbance to the box is kept to a minimum after works are completed and the box is reopened.

5 REFERENCES

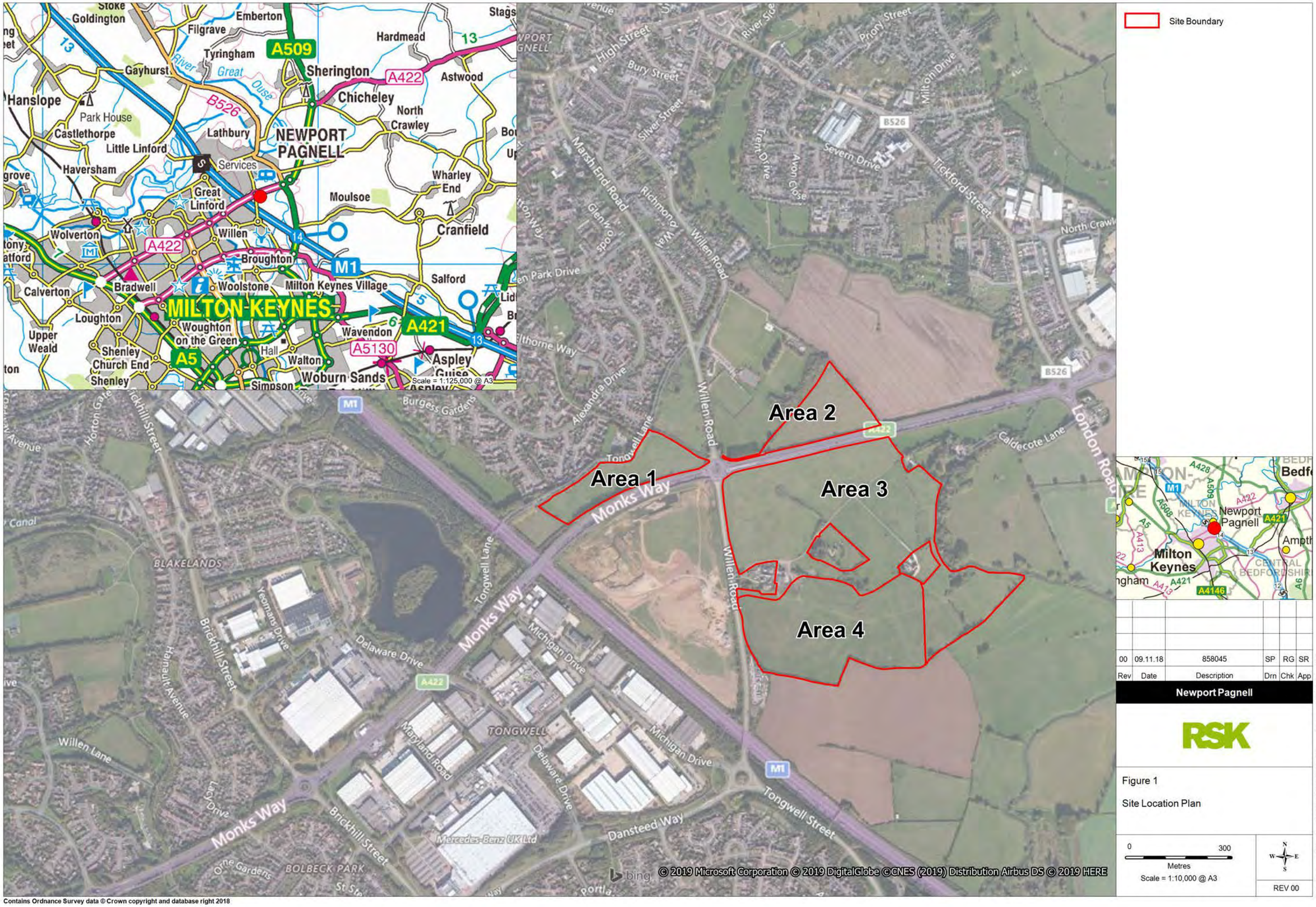
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6 FIGURES

Figure 1 – Site Location Plan

Figure 2 – Barn Owl Survey Results

Figure 1** – **Site Location Plan



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Rev	Date	Description	Drn	Chk	App
00	09.11.18	858045	SP	RG	SR

Newport Pagnell

RSK

Figure 1

Site Location Plan

0 300

Metres

Scale = 1:10,000 @ A3

N W E S

REV 00

File Name : U:\Ecology\858000s\858045 - Newport Pagnell PEAI07 - GIS

Figure 2 – Barn Owl Survey Results



Site boundary

Confirmed Barn Owl nest in box on tree with abundant pellets at base

Surveyor location

Barn Owl pellets found in barn

Dead Barn Owl



Rev	Date	Description	Drn	Chk	App
00	27.08.19	858045	SP	RG	SR

Newport Pagnell

RSK

Figure 2

Barn Own Survey

0 30

metres

Scale = 1:1,000 @ A3

N W E S

REV 00

File Name : U:\Ecology\858000s\858045 - Newport Pagnell PEAI07 - GIS

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APPENDIX A – LEGISLATION

Birds General Protection

All species of bird are protected under Section 1 of the Wildlife and Countryside Act 1981 (as amended). The protection was extended by the CRoW Act.

The legislation makes it an offence to intentionally:

- kill, injure or take any wild bird;
- take, damage or destroy the nest of any wild bird while that nest is in use or being built; or
- take or destroy an egg of any wild bird.

Birds (Specially Protected Species- including Barn Owl)

Certain species of bird are listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) and receive protection under Sections 1(4) and 1(5) of the Act. The protection was extended by the CRoW Act. The legislation confers special penalties where the above mentioned offences are committed for any such bird and also make it an offence to intentionally or recklessly:

- disturb any such bird, whilst building its nest or it is in or near a nest containing dependant young; or
- disturb the dependant young of such a bird.



Bloor Homes South Midlands

Newport Pagnell

Bat Survey Report

858045

JANUARY 2020

RSK GENERAL NOTES

Project No.: 858045

Title: Newport Pagnell – Bat Survey Report

Client: Bloor Homes South Midlands

Date: January 2020

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Date:	23 January 2020	Date:	27 January 2020

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Date:	23 January 2020

RSK Environment Ltd (RSK) has prepared this report for the sole use of the client, showing reasonable skill and care, for the intended purposes as stated in the agreement under which this work was completed. The report may not be relied upon by any other party without the express agreement of the client and RSK. No other warranty, expressed or implied, is made as to the professional advice included in this report.

Where any data supplied by the client or from other sources have been used, it has been assumed that the information is correct. No responsibility can be accepted by RSK for inaccuracies in the data supplied by any other party. The conclusions and recommendations in this report are based on the assumption that all relevant information has been supplied by those bodies from whom it was requested.

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Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

This work has been undertaken in accordance with the quality management system of RSK Environment Ltd.

EXECUTIVE SUMMARY

1. This report presents the results of tree assessments and bat activity monitoring surveys undertaken at two parcels of land off H3 Monk's Way, Newport Pagnell, collectively referred to as 'the site'.

2. The preliminary ecological appraisal undertaken in October 2018 found that the site had moderate potential for foraging and commuting bats.

3. The preliminary roost assessment identified two buildings with moderate potential and one with low potential for roosting bats.

4. The ground level tree assessment and aerial inspection rated four trees as having high potential, 14 with moderate and 24 with low potential for roosting bats.

5. Endoscope surveys and emergence/re-entry surveys of buildings and trees did not identify any bat roosts although common bat species were heard and seen commuting and foraging in nearby areas.

6. At least 10 bat species were recorded on the site during the monthly transect surveys and static detector deployments. This included relatively high numbers of the rare Barbastelle bat during September and October.

7. The site was assessed as having 'regional' significance according to Wray *et al*. Appropriate mitigation is discussed for potential impacts on bats.

CONTENTS

1 INTRODUCTION 1
1.1 Purpose of Report 1
1.2 Ecological Context 1
2 METHODS 2
2.1 General 2
2.2 Personnel 2
2.3 Habitats 2
2.4 Preliminary Roost Assessment of Buildings 2
2.5 Ground Level Tree Assessment (GLTA) 3
2.6 Aerial Surveys 4
2.7 Presence-absence Surveys 4
2.8 Transect Surveys 5
2.9 Automated Monitoring 6
2.10 Sound Analysis 7
2.11 Methods of Evaluation 8
2.12 Considerations 10
2.13 Survey Constraints 10
3 RESULTS 11
3.1 General 11
3.2 Preliminary Roost Assessment of Buildings 11
3.3 GLTA and Aerial Surveys 14
3.4 Presence-absence Surveys 15
3.5 Transect Surveys 15
3.6 Automated Monitoring 17
3.6.1 April 17
3.6.2 May 19
3.6.3 June 20
3.6.4 July 21
3.6.5 August 22
3.6.6 September 24
3.6.7 October 25
4 EVALUATION AND CONCLUSIONS 27
4.1 Roosting Bats 27
4.2 Bat Diversity and Levels of Activity 27
4.3 Habitats and Areas of Activity 28
4.4 Overall Appraisal 28
4.5 Habitats 31
4.6 Lighting 35
5 REFERENCES 36
6 FIGURES 38
APPENDIX A – GLTA AND AERIAL SURVEY RESULTS 52
APPENDIX B - LEGISLATION 58

1 INTRODUCTION

1.1 Purpose of Report

This report presents the results of tree assessments and bat activity monitoring surveys undertaken in connection with a proposed residential development on two parcels of land (Areas 1 and 3) off H3 Monk's Way, Newport Pagnell (*Figure 1*), here collectively referred to as 'the site' (Ordnance Grid references SP882421, SP874425 and SP881428). The surveys were carried out between March and October 2019.

During the preliminary ecological appraisal (PEA) suitable foraging habitat was identified, comprising of hedgerows, lines of trees, woodland areas, rough grassland and open water. A number of trees on the site may have potential for roosting bats (RSK, 2018). RSK was appointed to undertake the surveys on behalf of Bloor Homes South Midlands to provide information on any impacts the proposed residential development could have on bats.

1.2 Ecological Context

The site is on the southern edge of Newport Pagnell in Buckinghamshire (*Figure 1*). It comprises two fields north of H3 Monk's Way (Areas 1 and 2), a larger area of land south of H3 Monk's Way (Area 3), and a quarry directly east of Willen Road (Area 4). The site comprises arable land, with areas of scrub, scattered broadleaved trees, improved grassland, semi-improved grassland, hedgerows, standing water and dry ditch. There is plantation broad-leaved woodland adjacent to Area 2. The 2019 bat surveys included Areas 1 and 3 only as access was not provided to Area 4 and the proposals to extend the council playing fields into Area 2 are not anticipated to have negative impacts on bats as long as hedgerow and tree removal is not required.

The town of Newport Pagnell separates the site from extensive agricultural land. The east of the site is bordered by the River Ouzel Wet Corridor, part of the Milton Keynes Wildlife Corridor (MKWC), which also separates the site from further agricultural land. Directly west is Willen Road and the M1 motorway, which separates the site from the Tongell Lake Local Wildlife Site (LWS), 150 m west of the site.

2 METHODS

2.1 General

The bat surveys, comprising preliminary roost assessments of buildings, ground level tree assessments, aerial surveys, emergence surveys and monthly bat activity surveys, were designed as a means to appraise the level of bat activity across the site within the period bats are most active, and identify the bat fauna where possible. The aim was to be able to place the findings within the context of the development proposals, and assess potential effects on commuting and foraging bats.

It was not intended to undertake an extensive audit of bat activity on the site; instead, the monitoring surveys were designed to sample the site and provide indicative information on the level of bat activity and composition of bat species using it, the relative importance of features and locations, and potentially show how patterns of bat activity may vary on the site in different months.

2.2 Personnel

All surveys were carried out by RSK ecologists, all of whom are members of the Chartered Institute of Ecology and Environmental Management (CIEEM) and are experienced in surveys of this type.

2.3 Habitats

Habitats were assessed for their suitability for foraging and commuting bats during the PEA undertaken by RSK in October 2018 (RSK, 2018). Areas of particular interest vary between bat species, but generally include sheltered areas and dark corridors, including habitats with good numbers of insects, such as woodland edges, hedgerows, watercourses and species-rich or rough grassland.

Habitats of likely interest to foraging and commuting bats that are present on or immediately adjacent to this site are:

- hedgerows;
- small areas of broadleaved woodland, scattered trees and tree lines;
- ponds;
- a watercourse (brook or stream); and,
- areas of unmanaged grassland and scrub.

2.4 Preliminary Roost Assessment of Buildings

The external features of the buildings were surveyed for characteristics that may be used by roosting bats. Potential access points into roof voids were noted as well as any crevices and voids in the external structure which could provide roosting opportunities.

The buildings were assessed according to the following factors that influence the likelihood of bats roosting.

- Surrounding habitat: whether there are potential flight-lines and foraging areas for bats nearby.
- Construction detail: the type and construction of architectural features such as attics, soffit boxes, lead flashing and hanging tiles that could be used by roosting bats.
- Building condition: whether disrepair has opened potential bat-access points (especially around roofs).
- Potential bat-access points: whether there is flight and crawl access.
- Potential roosting locations: description of all bat-accessible voids, cracks and crevices.

The criteria shown in *Table 1* were used to categorise the buildings according to their potential for roosting bats.

Table 1: Categorisation of roosting habitats (adapted from Collins, 2016).

Category	Description
Negligible potential	Negligible habitat features on the site likely to be used by roosting bats.
Low potential	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). A tree of sufficient size and age to contain potential roosting features (PRF) but with none seen from ground level or features seen with only very limited roosting potential.
Moderate potential	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 for 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).
High potential	A structure or tree with one or more potential roost sites that are obviously suitable for larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.
Confirmed roost	Bats or evidence of bats recorded within the building or tree during the initial inspection surveys or during dusk/dawn surveys. A confirmed record (supplied by records centre/local bat group) would also apply.

The preliminary roost assessment of the buildings was carried out on 9 July 2019 by James Hildreth (CL18 (Level 2) 2018-37686-CLS-CLS) and Will Feirn. The weather conditions were mild and overcast.

2.5 Ground Level Tree Assessment (GLTA)

All trees in Areas 1 and 3 were assessed from ground level using binoculars to identify potential roost features (PRFs) on the tree that may support roosting bats. These

features include ivy cover, splits, crevices and cavities, and may be present on the main trunk or the tree limbs. Trees were numbered, their locations were recorded, and target notes were written to describe the PRFs observed in each suitable tree. The trees and features were photographed where possible. Each tree was then graded based on guidance from Bat Surveys for Professional Ecologists, as shown in *Table 1.*

All ground level tree assessments were carried out during suitable weather conditions (mild temperatures and no rain) by Lewis Wright and Adam Penney on 2 April 2019.

2.6 Aerial Surveys

Aerial surveys take the form of an inspection of PRFs identified during the preliminary assessment from a ladder or using rope access methods. All staff used for aerial surveys are trained in City and Guilds NPTC Level 2 Award - Tree Climbing and Rescue and all lead surveyors also possess at least a Natural England Class Level 2 licence allowing the survey for and disturbance of bats.

The PRF's were closely inspected using torches, mirrors and endoscopes to search for evidence of bats including droppings, staining from sebaceous oil and scratch marks. In the case of tree roost's, bats are often present infrequently and roost switching after relatively short periods of time is common amongst those species that use trees. Evidence of bats in the form of droppings are frequently missing due to the actions of weather and invertebrates present within tree cavities.

In some cases, it is not possible to fully inspect a feature using these methods due to factors such as depth of a cavity or due to the tree being using by another sensitive species. Where evidence of bats is found, or a full survey of the tree is not possible then additional dusk emergence or dawn re-entry surveys are required.

A total of 38 trees, highlighted by the GLTA, were inspected by aerial surveys. This was carried out during suitable weather conditions (mild temperatures and no rain) by James Pattenden and an assistant between 24 June 2019 and 3 July 2019.

2.7 Presence-absence Surveys

Dusk emergence and dawn re-entry surveys were carried out on ten trees and two buildings highlighted by the results of the preliminary surveys, where there were suitable roosting features for bats or where a tree could not be fully inspected from the ground. Surveyors were positioned so that all suitable features could be observed. Surveyors observed the features for bats, either emerging during a dusk survey or re-entering during a dawn survey. All surveyors were equipped with a bat detector which records the echolocation of bats. Calls were then analysed using sound analysis software to identify the bat species.

Endoscope inspections of suitable, accessible potential roosting features were carried out by Lewis Wright and Shona Redman on 19-20 August 2019. Lewis has a Class 2 survey licence that allows the use of an endoscope to survey for bats (ref 2016-19937-CLS-CLS). These inspections were carried out on T1, 6, 19, 23, 24, 25, 26, 28 and 32 as one of the required presence-absence surveys in place of a traditional emergence or re-entry survey.

2.8 Transect Surveys

Bat activity transects were undertaken on the site every month between April and October 2019 inclusive. They followed methodology outlined in published guidelines (Collins, 2016) to identify any areas of high commuting and/or foraging activity and also to confirm the species involved (roosts can sometimes also be identified from patterns of activity).

Transects were completed at dusk or dawn and involved two surveyors walking a pre-defined route (continuously recording any signs of bat activity) and stopping for five minutes at 'random' locations before continuing; albeit the stops were 'random', monitoring locations were chosen to sample areas with high quality habitat where bats were likely to be encountered if present on the site, but also to sample all habitat types present. The transect route and stopping points are shown in *Figure 5*.

On each visit, the transect route was walked in weather conducive for bat activity (above 8°C with little or no rain and no strong winds) using an Elekon Batlogger M bat detector. Recordings of bat calls were made automatically by this detector during the survey in full spectrum format, with coordinates assigned to each recording by a GPS unit within the detector. The start and end point of transects and / or the direction they were walked was alternated between each visit to try and take into account changes in bat activity across the site throughout the evening.

Table 2 details the dates, survey times and personnel for each activity survey completed. Weather conditions recorded at the beginning and end of each survey were also recorded. These are provided in *Table 3.*

Table 2: Survey dates, timings and personnel for each transect survey.

Date	Survey Type	Sunset / Sunrise Time	Start Time	End Time	Surveyors
24/04/2019	Dusk	20:14	20:16	23:12	Daniel Fellman and Patrick Dixon
23/05/2019	Dusk	21:02	20:47	23:38	Sam Davis and Sophie Evans
20/06/2019	Dusk	21:27	21:27	00:10	Lewis Wright and Patrick Dixon
11/07/2019 and 12/07/2019	Dusk and Dawn	21:20 04:55	21:20 02:01	00:14 03:41	Tom Coyne and Sophie Evans
13/08/2019	Dawn	05:43	02:43	05:25	Daniel Fellman and Patrick Dixon
24/09/2019	Dusk	18:57	18:57	21:12	Lewis Wright and Nathan Van Cooten
10/10/2019	Dusk	18:19	18:14	20:21	Lewis Wright and Patrick Dixon

Table 3: Weather conditions recorded at the beginning and end of each transect survey. Air temperatures were recorded by the Batlogger M.

Date	Air Temp. Start / Finish (°C)	Cloud Cover (Octas)	Wind Speed (Beaufort)	Precipitation
23/04/2019	14/13	3	1	None
23/05/2019	20/13	3-7	1-2	None
20/06/2019	14/12	3	1	Light rain
11/07/2019 and 12/07/2019	19/17	7	1	Rain from 03:40 on 12/07/2019. Survey finished early.
13/08/2019	12/11	6	2	None
24/09/2019	18/16	6	2	None
10/10/2019	15/16	7	3	None

Levels of bat activity were quantified by the number of bat passes recorded along the route. A single pass by a bat is defined by a gap of one second or more between the end of one recording and beginning of the next bat recording. Species were identified either in the field or through the analysis of recordings using Elekon BatExplorer® and Wildlife Acoustics Kaleidoscope® software programs.

2.9 Automated Monitoring

Two Wildlife Acoustics SongMeter 4 Bat+ (SM4) detectors were installed in the site every month between April-October 2019 inclusive as shown in *Table 4*. The detectors were placed alongside features typically used by foraging or commuting bats, such as hedgerows or tree lines.

As per the Collins (2016) survey guidelines, the SM4s provided data collected over at least five consecutive nights in each month of deployment to augment the data collected during the transect surveys. Survey dates were selected when the weather forecast indicated suitable weather conditions for foraging and commuting bats (*i.e.* air temperature above 8°C, the absence of strong winds and minimal precipitation). The units were set up to continuously record from 30 minutes before sunset until 30 minutes after sunrise. Microphones were mounted on extension cables at least 3 m off the ground.

Table 4: Survey dates for static detector deployment.

Month	Deployment Date	No. of consecutive nights deployed
April 2019	26/04/2019	11
May 2019	23/05/2019	8

Month	Deployment Date	No. of consecutive nights deployed
June 2019	20/06/2019	11
July 2019	23/07/2019	9
August 2019	20/08/2019	15
September 2019	24/09/2019	7
October 2019	01/10/2019	9

All recordings were stored on memory cards and analysed using the Kaleidoscope Pro® software program. This software automatically identifies bat species and 'noise' files but all files were double checked by an experienced ecologist.

The Kaleidoscope Pro® analysis software produces a single file for each recording of ultrasonic activity. Where these ultrasonic recordings include bats, the level of bat activity was quantified by the number of files (for the purposes of this analysed deemed as bat 'passes') for each recorded species for each night and monitoring period. Note that there is no way of extrapolating how many bats were being recorded from this acoustic only data, just the level of activity.

2.10 Sound Analysis

Echolocation calls were identified down to species wherever possible; however, depending on the type of bat encountered and call recorded it is not always possible to reliably identify all bats beyond their genus. In particular, because of the similarities of their frequency modulated calls, *Myotis* bat species cannot reliably be separated. Therefore, in this region of England, a '*Myotis* bat' call is most likely to comprise either: Natterer's Bat (*M. nattereri*), Daubenton's Bat (*M. daubentonii*), Whiskered Bat (*M. mystacinus*) or Brandt's Bat (*M. brandtii*) as these are the most 'common' Myotids.

Note that it can also be difficult to separate some calls of *Plecotus* bats (in Buckinghamshire most likely to be the Brown Long-Eared Bat, *Plecotus auritus*, rather than the Grey Long-Eared Bat, *P. austriacus*), as well as separating some Plecotus calls from Myotis bats. It can also be difficult to distinguish between the two bats in the *Nyctalus* genus, Noctule (*N. noctula*) and Leisler's bat (*N. leisleri*), and occasionally alongside Serotine (*Eptesicus serotinus*). Some calls of Common Pipistrelle (*Pipistrellus pipistrellus*) also overlap with either Nathusius' Pipistrelle (*P. nathusii*) or Soprano Pipistrelle (*P.pygmaeus*). Analysis of cryptic calls can also be more difficult with faint or poor quality recordings.

Lastly, there are a number of variables that affect the 'detect-ability' of a bat, ranging from its biology and ecology, to the environmental conditions and condition of the equipment, and so there are limitations in drawing certain conclusions about bat activity on a site from the use of bat detectors / sound analysis alone.

2.11 Methods of Evaluation

In order to provide a means of evaluating the bat assemblages using the site in 2019, the monitoring results have been evaluated against adapted criteria from Wray *et al*. (2010). This method has also been used in the absence of any other recognised approach.

For this method, where bats (species and likely number of) are found using certain habitats (to roost, commute or forage) their population is assigned a relative ecological value. This value is partly based upon how well used a habitat is and partly upon how rare the bat species is. The number of roosts nearby is also a factor.

In this method of assessment British bat species are subdivided into groups, dependent upon how common they are: common, rarer and rarest. These were further subdivided based upon the location of the site surveyed (i.e. in England), as shown in *Table 5*.

Table 5: Categorising Bats by Distribution and Rarity in England.

Rarity in England	Bat Species
Rarest (population estimated to be under 10,000)	Greater Horseshoe Bat (*Rhinolophus ferrumequinum*) Bechstein's Bat (*Myotis Bechsteinii*) Alcathoe Bat (*Myotis Alcathoe*) Greater Mouse-Eared Bat (*Myotis myotis*) Barbastelle Bat (*Barbastella barbastellus*) Grey Long-Eared Bat (*Plecotus austriacus*)
Rarer (population estimated to be 10,000 to 100,000)	Lesser Horseshoe Bat (*Rhinolophus hipposideros*) Whiskered Bat (*Myotis mystacinus*) Brandt's Bat (*Myotis brandii*) Daubenton's Bat (*Myotis daubentonii*) Natterer's Bat (*Myotis nattereri*) Leisler's Bat (*Nyctalus leisleri*) Noctule (*Nyctalus noctula*) Nathusius' Pipistrelle (*Pipistrellus nathusii*) Serotine (*Eptesicus serotinus*)
Common (population estimated to be over 100,000)	Common Pipistrelle (*Pipistrellus pipistrellus*) Soprano Pipistrelle (*Pipistrellus pygmaeus*) Brown Long-Eared Bat (*Plecotus auritus*)

To calculate the score (shown in brackets in the tables below) for commuting routes or foraging areas according to Wray *et al.,* (2010), the numerical values in *Table 6* (commuting) are added together to give a total for each species recorded on the site, and the same is then also done for *Table 7* (foraging). The highest value obtained for a species across both tables is then used in the assessment. This value is applied to the overall scoring system shown in *Table 8* to give an assessment of the importance of the site to foraging and commuting bats within a geographic frame of reference.

Table 6: Valuing Commuting Routes.

Species	Likely No. of Bats	Roosts / Potential Roosts Nearby	Type and Complexity of Linear Features
Common (2)	Individual bats (5)	None (1)	Absence of (other) linear features (1)
		Small number (3)	Unvegetated fences and large field sizes (2)
Rarer (5)	Small number of bats (10)	Moderate number / Not known (4)	Walls, gappy or flailed hedgerows, isolated well grown hedgerows, and moderate field sizes (3)
		Large number of roosts or close to a SSSI (5)	Well grown and well connected hedgerows, small field sizes (4)
Rarest (20)	Large number of bats (20)	Close to or within a SAC for the species (20)	Complex network of mature well-established hedgerows, small fields and rivers/streams (5)

Table 7: Valuing Foraging Areas.

Species	Likely No. of Bats	Roosts / Potential Roosts Nearby	Foraging Habitat Characteristics
Common (2)	Individual bats (5)	None (1)	Industrial or other site without established vegetation (1)
		Small number (3)	Suburban areas or intensive arable land (2)
Rarer (5)	Small number of bats (10)	Moderate number/Not known (4)	Isolated woodland patches less intensive arable and/or small towns and villages (3)
		Large number of roosts or close to a SSSI (5)	Larger or connected woodland blocks, mixed agriculture and small villages/hamlets (4)
Rarest (20)	Large number of bats (20)	Close to or within a SAC for the species (20)	Mosaic of pasture, woodlands and wetland areas (5)

Table 8: Scoring System for Valuing Sites for Commuting and Foraging Bats.

Geographic Frame of Reference	Score
International	>50
National	41-50
Regional	31-40
County	21-30
District, local or parish	11-20

Geographic Frame of Reference	Score
Not important	1-10

2.12 Considerations

The methodology described for Wray *et al*. (2010) above has been followed as closely as possible to assess the value of the bat habitats at this site. However, as described in previous sections, the term bat 'pass' is loosely defined, and bat activity recorded during surveys is not synonymous with numbers of individual bats. There is also no specific guidance on what constitutes a 'small' or a 'large' number of bats. The 'number of bats' used in this evaluation process is therefore an estimate based on the level of recorded activity for each species and professional experience and judgement. Note that as a background data search for local roost records has not been commissioned within the scope of this monitoring, the 'default' score of 4 equating to a 'moderate number of roosts / potential roosts nearby / not known' has been used for the calculations based on *Tables 7* and *8*.

2.13 Survey Constraints

The aerial inspection of T15 had to be abandoned due to the presence of nesting Barn Owls (*Tyto alba*) and the emergence survey of this tree on 29 July 2019 started late due to the need to relocate surveyors to minimise disturbance to the Barn Owls. The aerial inspection of T28 had to be abandoned due to the presence of a bees nest. T34, 35, 37, 40, 41, 43 were located beyond the boundary fence so there was no access for the aerial inspection and only limited access for the endoscope inspections. Any trees that were accessible during the GLTA and not re-surveyed by climbing or emergence / re-entry surveys were inaccessible (see *Appendix A* for details of individual trees).

Access to Moat House was not provided and as such only a quick look over of the front elevation of the property was possible. No access was provided to the quarry (Area 4) for any of the 2019 surveys; this report does not include the quarry (Area 4).

The dawn transect on 12 July 2019 had to finish early due to rain meaning that Area A was not walked. However, the main site was surveyed, and the dusk transect the night before was completed so this is not considered to be a significant constraint.

3 RESULTS

3.1 General

The following sections provide the findings of the preliminary roost assessments of buildings, ground level tree assessments, aerial surveys, emergence and re-entry surveys and bat activity monitoring surveys completed at the site in 2019.

3.2 Preliminary Roost Assessment of Buildings

There are five buildings on the site, as shown in *Figure 2*. The results of the PRA of these buildings are shown in *Table 9* below.

Table 9: Results of the preliminary roost assessment for buildings.

Building Reference	Description	Potential Bat Access Points	Potential Bat Roosting Features	Suitability for Roosting Bats
B1 - Caldecote Cottage	An early twentieth century farm house which has been modernised and is still used as a residential property. The walls are constructed of bricks with a pitched, tiled roof with underfelt insulation. Breeze blocks have been used in the modern extensions. Immediate habitats are poor for foraging bats. The wider landscape is arable fields with adequate connectivity for commuting bats.	There are gaps between soffits and brick work and gaps between flashing and tiles adjacent to the chimney. There are also slipped tiles on the roof, however the internal loft was well insulated and appeared not to be accessible.	Slipped tiles and gaps in lead flashing provide potential roosting features. However, no evidence of roosting bats was found.	Low potential Further surveys required
B2 - Detached barn	Metal framed barn with half height concrete walls and completed with corrugated metal roof and cladding dating from *c.*1980s. The barn is dry and open completely open at front.	The barn was completely open at front allowing access for bats.	There are no roosting features present and no evidence of bats.	Negligible potential No further surveys required
B3 – Attached barn	Left-hand barn of a pair of detached barns dating from *c.*1960s. Metal framed with half height concrete walls. The barn is cladded in corrugated metal with an asbestos tiled roof. The barn is dry and completely open at front.	The barn is completely open at front allowing access for bats.	There are no roosting features present and no evidence of bats.	Negligible potential No further surveys required
B4 - Attached barn	Right-hand barn of a pair of attached barns dating from *c.*1960s. Metal framed with half height concrete walls. The barn is cladded in corrugated metal with an asbestos tiled roof. The barn is dry and completely open at front.	The barn is completely open at front allowing access for bats.	Boards around the top of the barn walls provides areas for roosting bats. Bat droppings were found on all three walls of the barn.	Moderate potential Further surveys required

B5 - Moat House	Modern 90s brick construction house with a slate tiled roof with lead flashing.	There are areas of slipped tiles, missing mortar and holes within the mortar. However, these could not be identified properly.	Access was not granted so only the front of the building was inspected and no internal features could be identified.	Moderate potential Further surveys required if building will be affected by development and access granted

3.3 GLTA and Aerial Surveys

A total of 56 trees were assessed using the methods from the Bat Survey Guidelines, as shown in *Section 2.4*. The location of each tree, along with its potential for roosting bats following the GLTA and aerial surveys, is shown in *Figures 3* and *4* respectively. Trees assessed as having moderate or high potential were subjected to an aerial climbing survey. The results of the GLTA and aerial surveys are shown in *Appendix A*. After completion of the GLTA and aerial survey, 4 trees were rated as high potential, 14 as moderate potential, 24 as low potential and 14 as negligible.

3.4 Presence-absence Surveys

Dusk emergence and dawn re-entry surveys were undertaken on T1, 6, 15, 19, 23, 24, 25, 26, 28 and 32, as well as Caldecote Cottage and the detached barn. Endoscope inspections were performed on T1, 6, 19, 23, 24, 25, 26, 28 and 32.

During these surveys no bats were observed emerging from or entering the structures. However, Common Pipistrelle, Noctule, Brown Long-eared Bat and a Myotis species were heard and seen foraging and commuting in the areas, particularly around and in the detached barn, and along the boundaries of Caldecote Cottage garden. Frequent Barn Owl activity was observed around tree 15 during a dawn re-entry survey.

The endoscope surveys did not identify any bats, or signs of bats, in any of the accessible features.

3.5 Transect Surveys

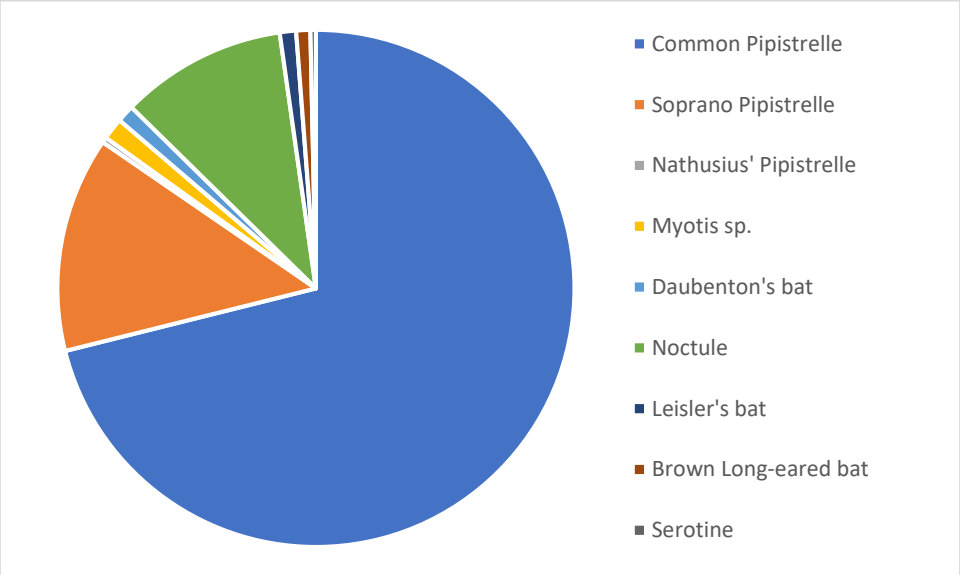
The survey results for each transect are illustrated spatially by *Figures 6 – 12*. *Table 10* shows the total number of bat passes recorded for each transect. At least eight different species of bat were recorded during the transects although it is possible that more than one Myotis bat species has been recorded.

Across the seven surveys, Common Pipistrelle attributed to 71% of all bat activity recorded on the site as shown in *Table 11* and *Chart 1*. The next most commonly recorded bats were Soprano Pipistrelles, which attributed to 13% of the total activity recorded, closely followed by Noctule bat which had a total of 10%. The remaining bat species attributed to no greater than 1% of the total activity recorded.

Table 10: Total number of bat 'passes' recorded during each transect survey (with approximate % of total also shown).

Species	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sept-19	Oct-19	Total
Common Pipistrelle	220 (76%)	108 (66%)	134 (69%)	314 (62%)	111 (87%)	123 (82%)	36 (88%)	**1,046 (71%)**
Soprano Pipistrelle	45 (15%)	30 (18%)	18 (9%)	65 (13%)	11 (9%)	26 (17%)	3 (7%)	**198 (13%)**
Nathusius' Pipistrelle	0	0	0	5 (1%)	0	0	0	**5 (<1%)**
Myotis sp.	4 (1%)	5 (3%)	6 (3%)	4 (<1%)	1 (<1%)	0	0	**20 (1%)**
Daubenton's bat	16 (5%)	0	0	0	0	0	0	**16 (1%)**
Noctule	2 (<1%)	4 (2%)	34 (18%)	111 (22%)	0	2 (1%)	0	**153 (10%)**
Leisler's bat	0	15 (9%)	0	0	0	0	0	**15 (1%)**
Brown Long-eared bat	1 (<1%)	2 (1%)	0	6 (1%)	4 (3%)	0	0	**13 (<1%)**
Serotine	0	0	1 (<1%)	2 (<1%)	0	0	2 (5%)	**5 (<1%)**
TOTAL	**288**	**164**	**193**	**507**	**127**	**151**	**41**	**1,471**

Chart 1: Bat activity recorded on the site for each species across all transect surveys, as an overall % of activity recorded.



The April dusk activity survey and July dusk and dawn activity surveys had the highest levels of total bat activity recorded. The lowest level of bat activity was recorded during the October transect.

3.6 Automated Monitoring

A summary of the results from each static detector deployment is presented in *Tables 11-17, Charts 2-8,* and the accompanying descriptive text. The locations of the detector deployments are shown in *Figure 13*.

As above (*Section 2.9*), the number of bat 'passes' shown in the following tables and charts equates to the number of files recorded by each detector, with intervals of at least one second between recordings, attributed to a species or genus of bat.

Throughout the monitoring, totalling 70 nights, at least ten different bat species were recorded on the site as follows: Common Pipistrelle, Soprano Pipistrelle, Nathusius' Pipistrelle, Daubenton's bat, Natterer's bat, Noctule, Leisler's bat, Brown Long-eared Bat, Serotine and Barbastelle. Calls only identifiable to Myotis species were also recorded and it is likely that other species of Myotis from the 'four' common species have been recorded which would mean that up to 12 species of bat are likely to have been recorded on the site by the automated detectors.

3.6.1 April

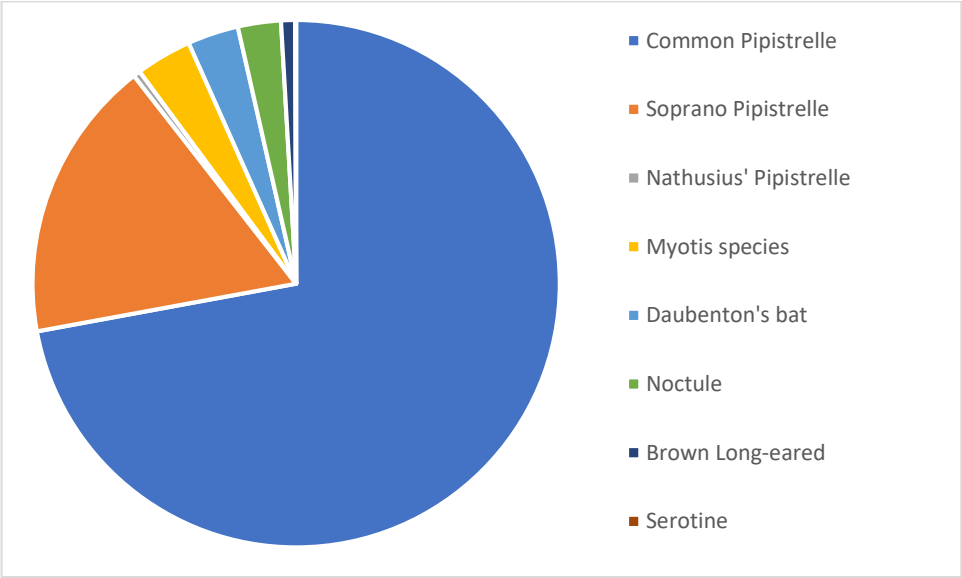
In April, static detector 1 was positioned next to the river in the south-east of Area 3 and static detector 2 was positioned in the northern boundary hedgerow of Area 1 (*Figure 13*). At least seven species were recorded on detector 1 and at least six species on detector 2. Common Pipistrelle was the dominant species recorded by both detectors (83% and 63% respectively). Soprano Pipistrelle was also dominant at detector 2, with nearly 25% of the calls recorded. Other species recorded on the detectors during April

were Daubenton's bat, *Myotis* sp., Noctule, Brown Long-eared Bat, Nathusius Pipistrelle and a single Serotine was recorded on detector 1.

Table 11: Summary of results from static detector survey in April.

Species	Number of 'Passes' on Detector 1	Number of 'Passes' on Detector 2	Total
Common Pipistrelle	619	557	1176
Soprano Pipistrelle	65	218	283
Nathusius' Pipistrelle	1	6	7
Myotis species	2	54	56
Daubenton's bat	51	0	51
Noctule	4	39	43
Brown Long-eared	2	12	14
Serotine	1	0	1
TOTAL	**745**	**886**	**1,631**

Chart 2: Relative levels of bat activity by species for the static detectors in April.



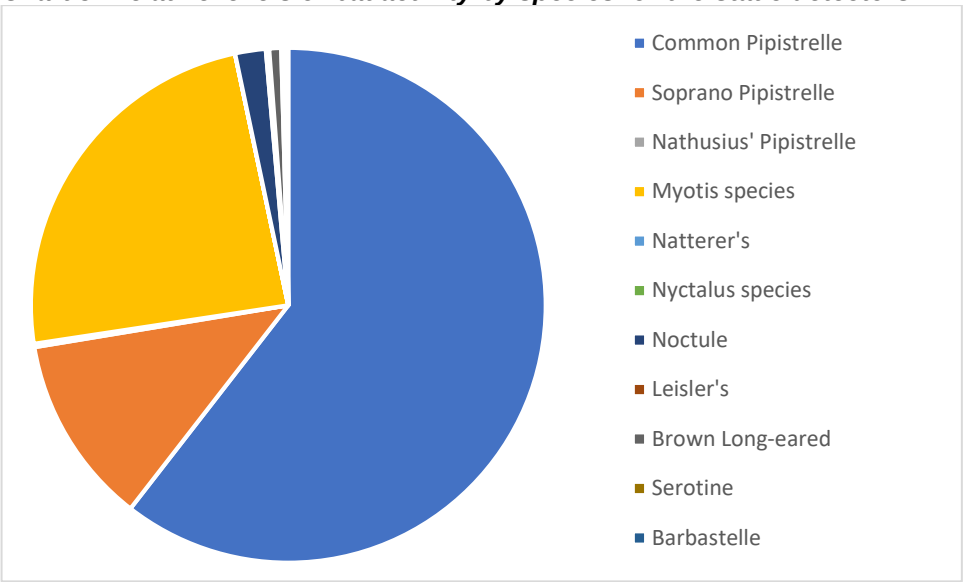
3.6.2 May

In May, detector 1 was deployed next to the river at the most northern accessible point, and detector 2 was deployed at the south-east corner of Caldecote Cottage garden (*Figure 13*). The total number of bat passes recorded on detector 1 was significantly higher than on detector 2. At least nine species were recorded on both detectors. Common Pipistrelle was the dominant species recorded by both detectors (60%), followed by a *Myotis* species (24%), Soprano Pipistrelle (12%) and Noctule (2%). Other species recorded less frequently (<1%) were Brown Long-eared Bat, Serotine, Leisler's bat, Nathusius' Pipistrelle, Barbastelle and single passes by a *Nyctalus* species and a Natterer's bat.

Table 12: Summary of results from May

Species	Number of 'Passes' on Detector 1	Number of 'Passes' on Detector 2	Total
Common Pipistrelle	10133	846	10,979
Soprano Pipistrelle	1976	180	2,156
Nathusius' Pipistrelle	31	8	39
Myotis species	4323	43	4,366
Natterer's	1	0	1
Nyctalus species	1	0	1
Noctule	126	222	348
Leisler's	13	26	39
Brown Long-eared	76	59	135
Serotine	15	27	42
Barbastelle	35	3	38
TOTAL	**16,730**	**1414**	**18,144**

Chart 3: Relative levels of bat activity by species for the static detectors in May.



3.6.3 June

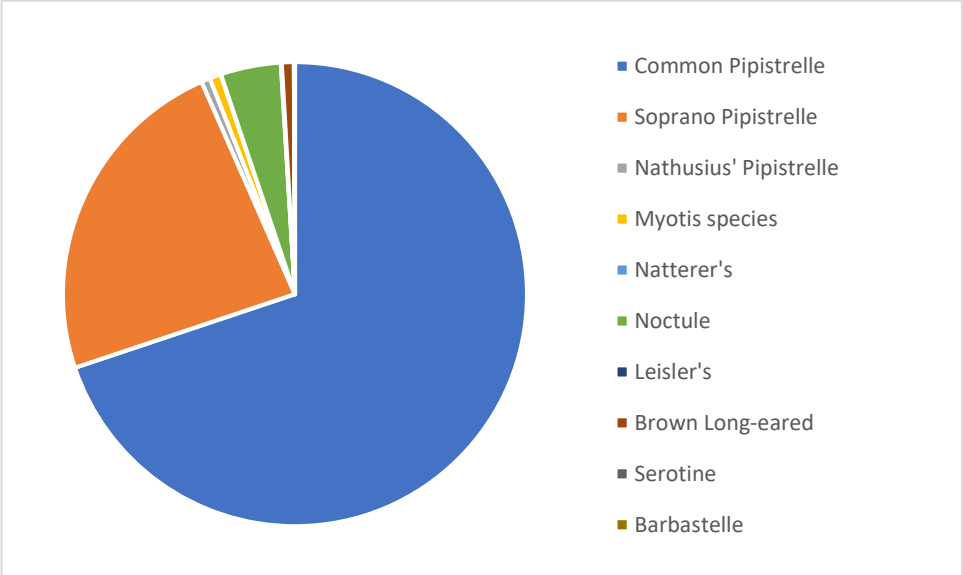
In June, detector 1 was placed at the most northern point of Area A and detector 2 was placed along the eastern boundary of Caldecote Cottage garden (*Figure 13*). At least nine species were recorded on detector 1 and at least eight species on detector 2. Common Pipistrelle was the dominant species recorded by both detectors (70% and 68% respectively). Soprano Pipistrelle was also dominant at detector 1, with 26% of the calls recorded. Other species recorded on the detectors during June were Nathusius' Pipistrelle, *Myotis* sp., Natterer's bat, Noctule, Leisler's bat, Brown Long-eared Bat, Serotine and a single Barbastelle was recorded on detector 1.

Table 13: Summary of results from June.

Species	Number of 'Passes' on Detector 1	Number of 'Passes' on Detector 2	Total
Common Pipistrelle	5767	972	6,739
Soprano Pipistrelle	2157	114	2,271
Nathusius' Pipistrelle	2	57	59
Myotis species	55	22	77
Natterer's	0	1	1
Noctule	172	233	405
Leisler's	2	4	6

Species	Number of 'Passes' on Detector 1	Number of 'Passes' on Detector 2	Total
Brown Long-eared	56	25	81
Serotine	4	2	6
Barbastelle	1	0	1
TOTAL	**8,216**	**1,430**	**9,646**

Chart 4: Relative levels of bat activity by species for the static detectors in June.



3.6.4 July

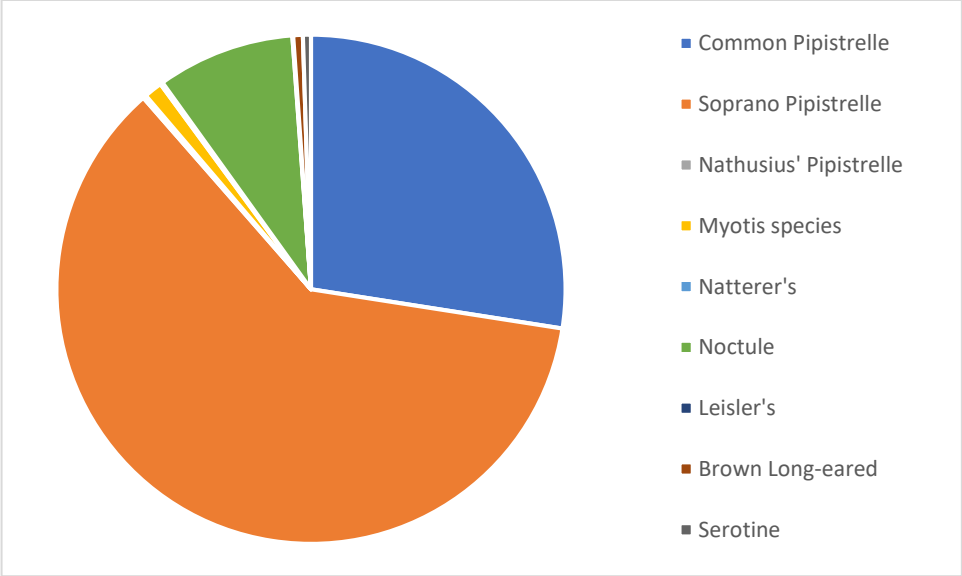
In July, detector 1 was deployed next to the river at the most northern accessible point, and detector 2 was deployed at the edge of a woodland block to the south of Area 3 (*Figure 13*). Only one species (Soprano Pipistrelle) was recorded on detector 1 and it is thought that the detector had a technical problem and did not record properly. At least eight species were recorded on detector 2, of which Common Pipistrelle was the dominant species (58% of all calls). Other species recorded on detector 2 during July were Nathusius' Pipistrelle, Natterer's bat, Noctule, Brown Long-eared Bat, Serotine, unidentified calls of *Myotis* species and a single Leisler's bat was recorded.

Table 14: Summary of results from July.

Species	Number of 'Passes' on Detector 1	Number of 'Passes' on Detector 2	Total
Common Pipistrelle	0	540	540

Species	Number of 'Passes' on Detector 1	Number of 'Passes' on Detector 2	Total
Soprano Pipistrelle	1,036	165	1201
Nathusius' Pipistrelle	0	4	4
Myotis species	0	23	23
Natterer's	0	3	3
Noctule	0	172	172
Leisler's	0	1	1
Brown Long-eared	0	12	12
Serotine	0	10	10
TOTAL	**1,036**	**930**	**1,966**

Chart 5: Relative levels of bat activity by species for the static detectors in July.



3.6.5 August

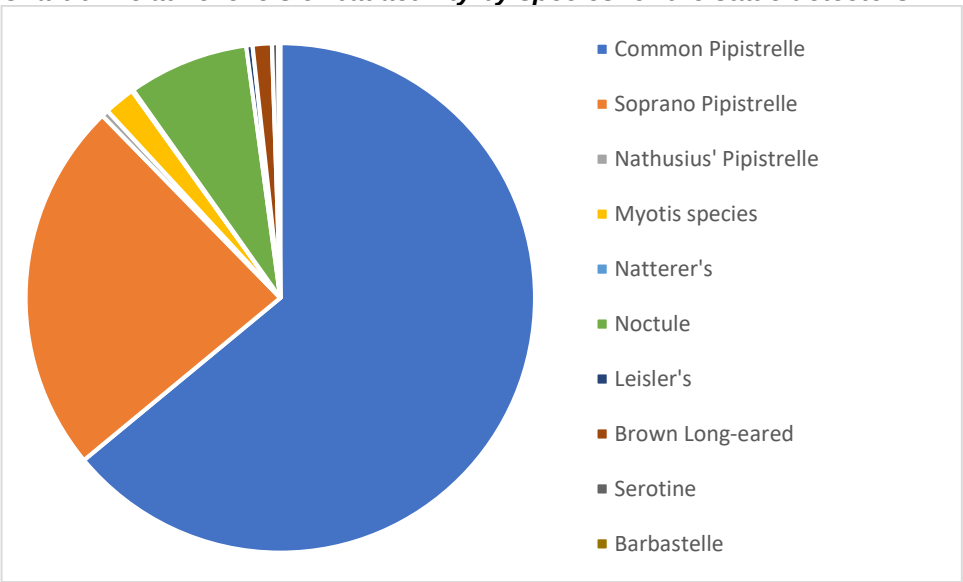
In August, detector 1 was deployed at the most northern point of Area 1 and detector 2 was placed at the south-east corner of Caldecote Cottage garden (*Figure 13*). At least nine species were recorded on both detectors. Common Pipistrelle was the dominant species recorded by both detectors (43% and 70% respectively), although this dominance was not as distinct as it has been previously, with Soprano Pipistrelle (26%) and Noctule (20%) also frequently recorded. Soprano Pipistrelle was also dominant at

detector 2, with 23% of the calls recorded. Other species recorded on the detectors during August were Nathusius' Pipistrelle, *Myotis* sp., Natterer's bat, Leisler's bat, Brown Long-eared bat, Serotine and Barbastelle.

Table 15: Summary of results from August.

Species	Number of 'Passes' on Detector 1	Number of 'Passes' on Detector 2	Total
Common Pipistrelle	1,150	6884	8,034
Soprano Pipistrelle	705	2267	2,972
Nathusius' Pipistrelle	6	49	55
Myotis species	111	137	248
Natterer's	7	5	12
Noctule	540	421	961
Leisler's	35	15	50
Brown Long-eared	107	46	153
Serotine	30	19	49
Barbastelle	9	8	17
TOTAL	**2,700**	**9,851**	**12,551**

Chart 6: Relative levels of bat activity by species for the static detectors in August.



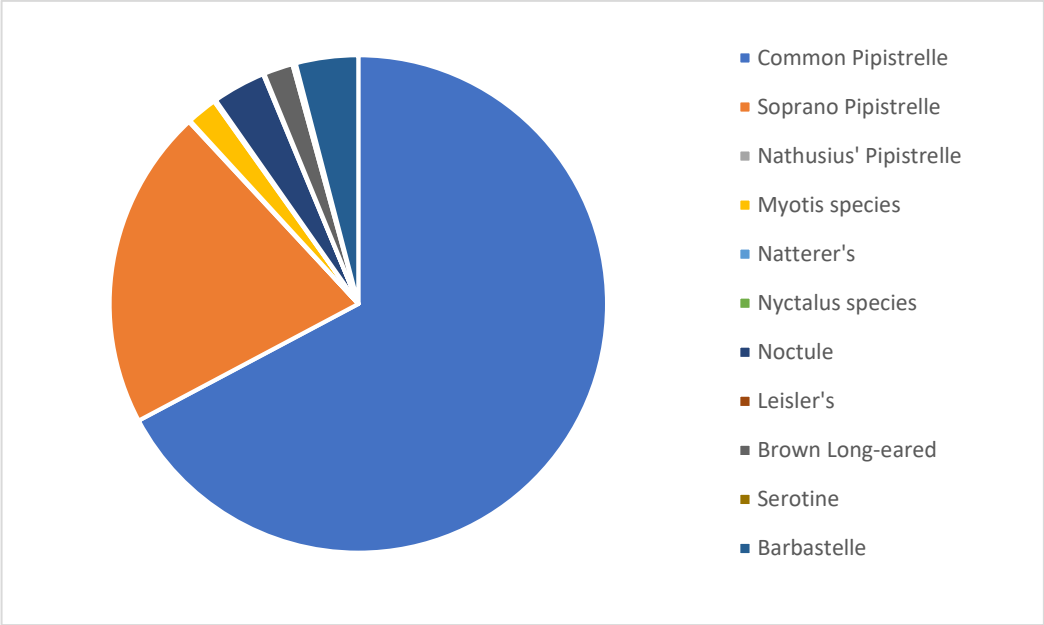
3.6.6 September

In September, detector 1 was placed towards the most southern point of Area 3 and detector 2 was placed along the river, adjacent to Moat House garden (*Figure 13*). At least eight species were recorded on both detectors. Common Pipistrelle was the dominant species recorded by detector 1 (77%) but dominance was shared at detector two by Common Pipistrelle and Soprano Pipistrelle (both accounting for *c.*40% of calls recorded). Other species recorded on the detectors during September were Nathusius' Pipistrelle, Natterer's bat, Noctule, Leisler's bat, Brown Long-eared Bat, Serotine, Barbastelle and unidentified calls from *Myotis* and *Nyctalus* species.

Table 16: Summary of results from September.

Species	Number of 'Passes' on Detector 1	Number of 'Passes' on Detector 2	Total
Common Pipistrelle	5,863	1,137	7,000
Soprano Pipistrelle	1,051	1,120	2,171
Nathusius' Pipistrelle	10	0	10
Myotis species	28	178	206
Natterer's	1	9	10
Nyctalus species	0	3	3
Noctule	173	188	361
Leisler's	5	3	8
Brown Long-eared	115	83	198
Serotine	0	23	23
Barbastelle	373	49	422
TOTAL	**7,619**	**2,793**	**10,412**

Chart 7: Relative levels of bat activity by species for the static detectors in September.



3.6.7 October

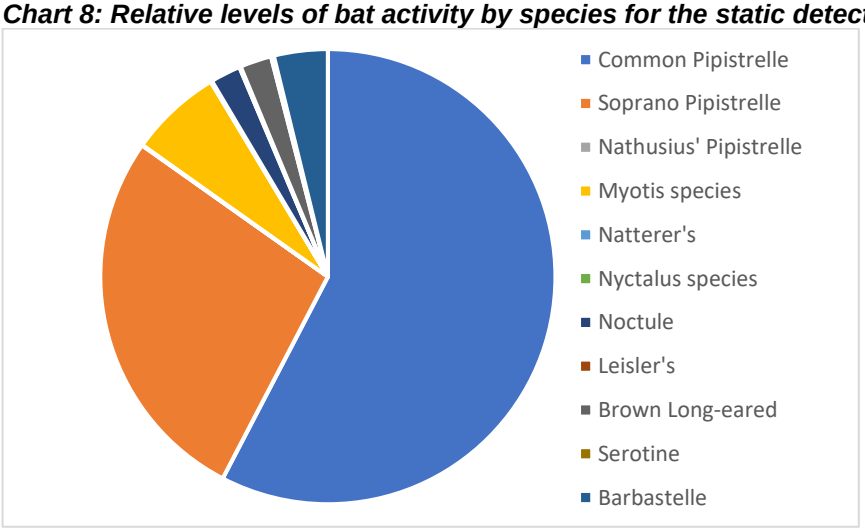
In October, detector 1 was placed towards the most southern point of Area 3 and detector 2 was placed along the river, adjacent to Moat House garden (*Figure 13*). At least nine species were recorded on detector 1 and at least eight species on detector 2. Common Pipistrelle was the dominant species recorded by both detectors (63% and 47% respectively), although this was not as dominant as the species has been in previous months. Soprano Pipistrelle was also dominant at detector 1, with nearly 27% of the calls recorded. Other species recorded on the detectors during October were Nathusius' Pipistrelle, Natterer's bat, Noctule, Leisler's bat, Brown Long-eared Bat, Serotine and Barbastelle with additional passes of unidentified *Myotis* and *Nyctalus* species.

Table 17: Summary of results from October.

Species	Number of 'Passes' on Detector 1	Number of 'Passes' on Detector 2	Total
Common Pipistrelle	3,701	1,359	5,060
Soprano Pipistrelle	1,577	805	2,382
Nathusius' Pipistrelle	3	0	3
Myotis species	38	538	576
Natterer's	3	2	5

Species	Number of 'Passes' on Detector 1	Number of 'Passes' on Detector 2	Total
Nyctalus species	2	1	3
Noctule	111	79	190
Leisler's	2	6	8
Brown Long-eared	152	45	197
Serotine	11	6	17
Barbastelle	283	53	336
TOTAL	**5,883**	**2,894**	**8,777**

Chart 8: Relative levels of bat activity by species for the static detectors in October.



4 EVALUATION AND CONCLUSIONS

4.1 Roosting Bats

No bat roosts were identified on the site. However, pre-fell checks of all trees with roosting potential will be required prior to their felling or pruning due to the frequency with which bats move between roosts in trees. Moat House was identified as having moderate potential for roosting bats but access was not granted to survey the building in full. It is not anticipated that the building will be impacted by the works but if it will be then further surveys will be required.

As enhancement and to provide biodiversity net gain, a number of bat roosting opportunities are described within the following sections.

4.2 Bat Diversity and Levels of Activity

At least eight different species of bat were recorded during the monthly walked transect surveys, with two additional species also confirmed via the automated monitoring by static detectors. Recorded calls from the monitoring could clearly be attributed to the following species: Common Pipistrelle, Soprano Pipistrelle, Nathusius' Pipistrelle, Daubenton's bat, Natterer's bat, Noctule, Leisler's bat, Serotine, Brown Long-eared Bat and Barbastelle. For *Myotis* bats, given the difficulties of attributing their calls to a species, it is difficult to say with surety which species have definitely been recorded but it is quite reasonable to assume that each of the four 'common' Myotids have at least been recorded at some point during the monitoring given the habitats on the site and their generally widespread distribution.

Overall, it is therefore likely that 12 different bat species have commuted across or foraged on the site during the 2019 surveys. Although all bats are legally protected, this includes one species, the Barbastelle, which is afforded additional protection under the 'Habitats Regulations' 2017 (as amended) as an Annex II bat species, which require additional consideration and conservation measures in the context of development. Barbastelle bat activity was recorded by static detectors on the site in May, June, September and October with relatively high numbers of calls recorded in the latter two months for a rarer species (422 calls in September and 336 in October).

Otherwise, Common Pipistrelle activity accounted for a significant proportion of bat activity on the site, upwards of 50% for 10 of the 16 static detector deployments, and for all eight transects. The next most frequently recorded species varied by month and detector but included Soprano Pipistrelle, Noctule, Brown Long-eared Bat, Barbastelle and bats from the *Myotis* genus. All other species were recorded less often and infrequently.

The highest levels of total bat activity recorded by the automated detectors on the site were in May with high levels also recorded in August and September. Increased bat activity is often recorded in May when females are beginning to form maternity colonies. This could imply there is a maternity roost on, or close to, the site. Additionally, increased bat activity is often recorded in August as baby bats are typically born in England between mid-June and mid-July and are first volant and foraging 4-6 weeks

later. Maternity colonies also often disperse around this time and some bat species have begun migrating to mating sites.

The low levels of bat activity recorded by the detectors in April is expected due to lower levels of activity immediately after the hibernation period and whilst temperatures remain relatively low. The low levels recorded in July were unexpected but are partly due to the technical failure of detector 1 coupled with higher than average rainfall for the month. However, the opposite was true of the walked transects which recorded the highest activity in April and July, and the lowest activity in October.

4.3 Habitats and Areas of Activity

Spatially, the highest levels of bat activity on the walked transects were recorded where hedgerows, tree lines and the river form linear features and high levels of activity were noted above Caldecote Cottage garden during an emergence survey of the cottage. However, it should be noted that there is an inherent (albeit acceptable) bias with walked transects as they primarily focus on surveying such features (rather than exposed, open areas), which are typically most used by commuting and foraging bats.

Notwithstanding this, the monthly transect routes have each traversed the entirety of Areas 1 and 3. More bat activity was recorded in the western section of Area 1 and along the western and eastern boundaries of Area 3 including along the river. Therefore, it is a reasonable assumption that these areas are of most value to bats.

4.4 Overall Appraisal

Wray *et al*. (2010) was used to appraise the value of the site for commuting and foraging bats as per section 2.11 above. *Tables 18* and *19* show the scores for the commuting value of the site and the foraging value respectively.

One 'rare' bat species, the Barbastelle bat, was recorded using the site. 814 passes were attributable to this species across a combined total of 70 nights of automated monitoring, and seven transects, and so even accounting for this species' 'quiet' echolocation calls it is a reasonable assumption that the site is used only by small numbers of Barbastelle bats, as opposed to a maternity colony. Otherwise, the monitoring indicated that either small numbers of bats or individuals of each bat species were using the site, except for perhaps 'large' numbers of Common and Soprano Pipistrelles as these species dominated the recorded bat activity. Given the absence of any information on any nearby roosts it was assumed by default that 'a moderate number' of roosts were nearby. In terms of commuting habitat for bats, the site was deemed to support '*well grown and well connected hedgerows, small field sizes*' rather than a '*complex network of mature well-established hedgerows, small fields and rivers/streams*'. For evaluating foraging habitat the site (and surrounding landscape) was assessed as supporting '*Suburban areas or intensive arable land'.*

Table 18: Valuing commuting routes for each of the bat species recorded on the site during the bat activity monitoring.

Species	Rarity	Likely No. of Bats	Roosts / Potential Roosts Nearby	Type and Complexity of Linear Features	Score
Common Pipistrelle	Common (2)	Large number of bats (20)	Moderate number / Not known (4)	Well grown and well connected hedgerows, small field sizes (4)	30
Soprano Pipistrelle		Large number of bats (20)			30
Brown Long-eared bat		Individual bats (5)			15
Daubenton's bat	Rarer (5)	Individual bats (5)	Moderate number / Not known (4)	Well grown and well connected hedgerows, small field sizes (4)	18
Natterer's bat		Individual bats (5)			18
Leisler's bat		Individual bats (5)			18
Noctule		Small number of bats (10)			23
Nathusius' Pipistrelle		Individual bats (5)			18
Serotine		Individual bats (5)			18
Barbastelle bat	Rarest (20)	Small number of bats (10)	Moderate number / Not known (4)	Well grown and well connected hedgerows, small field sizes (4)	38

Table 19: Valuing foraging areas for each of the bat species recorded on the site during the bat activity monitoring surveys.

Species	Rarity	Likely No. of Bats	Roosts / Potential Roosts Nearby	Foraging Habitat Characteristics	Score
Common Pipistrelle	Common (2)	Large number of bats (20)	Moderate number/Not known (4)	Suburban areas or intensive arable land (2)	28
Soprano Pipistrelle		Large number of bats (20)			28
Brown Long-eared bat		Individual bats (5)			13
Daubenton's bat	Rarer (5)	Individual bats (5)	Moderate number/Not known (4)	Suburban areas or intensive arable land (2)	16
Natterer's bat		Individual bats (5)			16
Leisler's bat		Individual bats (5)			16
Noctule		Small number of bats (10)			21
Nathusius' Pipistrelle		Individual bats (5)			16
Serotine		Individual bats (5)			16
Barbastelle bat	Rarest (20)	Small number of bats (10)	Moderate number/Not known (4)	Suburban areas or intensive arable land (2)	36

Overall, the result tables above show a maximum score of 38 for the value of the commuting habitats on the site for bats, and a maximum score of 36 for the value of the foraging habitat. Therefore, based on *Table 8* above (Wray *et. al*, 2010), these values indicate that the site is considered to be of 'Regional' value for commuting and foraging bats.

In terms of species, according to the scores from Wray *et al*. (2010) the site is most important for assemblages of Barbastelle bat, Noctule bat, Soprano Pipistrelle bat and Common Pipistrelle bat. However, it may also be important for Brown Long-Eared Bats as this typically 'quiet' and so often under-recorded species has been recorded at notable levels on some static detector deployments. There could also be relatively regular undetected activity by individual or small numbers of Barbastelle bats, which are also 'quiet' and so often under-recorded.

At least eight different species of bat were recorded during the monthly walked transect surveys, with two additional species also confirmed via the automated monitoring by static detectors. Overall, given it is likely that all four of the more common Myotis bat species have used the site on occasion, it is likely that 12 different bat species have commuted across, or foraged on, the site during the 2019 monitoring. This includes one species, the Barbastelle Bat, which is afforded additional protection as an Annex II species under the 'Habitats Regulations' 2017 (as amended) and so requires additional consideration in the context of development.

Common Pipistrelle was the dominant bat species recorded on the site, with notable activity by Soprano Pipistrelle, *Myotis* bat species, *Nyctalus* bat species and Barbastelle bat. Other species were recorded less frequently.

The above therefore gives rise to the following recommendations for mitigation and compensation measures to help ensure that the effects on local bat assemblages from the development are minimal. The following recommendations are based on the bat activity survey findings and proposed site layout provided within the *Willen Road, Newport Pagnell – Indicative Masterplan 29.11.19 (Draft).*

4.5 Habitats

Due to the large size of the proposed development, the habitat recommendations have been split into the appropriate areas.

Sport Pitches

The existing habitat within this area comprises one large open arable field bordered by mixed hedgerows and lines of trees. The *Willen Road, Newport Pagnell – Indicative Masterplan 29.11.19 (Draft)* indicates the existing hedgerows and lines of trees will be retained and access to the area will be restricted to two existing public footpaths and a new pedestrian link named 'North/South Green Way Link'.

It is recommended that:

- The hedgerows bordering the two existing public footpaths are not widened and the top sections of the hedgerows are retained to allow the hedgerows to form an arch, allowing a continual linear feature with no gaps.
- The bridge allowing 'North/South Green Way' Link between the residential area and sports fields crosses over the top of the hedgerow and doesn't cut through it.
- The sport pitch fencing doesn't encroach any closer than 5 m to the hedgerows to enable bats to continue using these linear features.
- A mixed hedgerow is planted along the eastern field boundary, adjacent to the public footpath.

Pedestrian Cycle Link/North Eastern Field

It is recommended that:

- The proposed pedestrian cycle link within the north eastern field uses the existing gateway off the Willen Road/A422 roundabout.
- Only minor vegetation clearance is undertaken to allow the pedestrian cycle link to cut through the north western hedgerow between the site and the adjacent existing residential estate.

- A suitable bridge is constructed over Tongwell brook to prevent impact of pedestrian use on the watercourse.

Local centre, Primary School, R.14 to R.22 and proposed grid road.

Due to access restrictions the surveyed area doesn't include the following sections labelled on the *Willen Road, Newport Pagnell – Indicative Masterplan 29.11.19 (Draft)*; local centre, primary school, R.14 to R.22 or the proposed grid road. This report is solely focussed on the surveyed areas. If not already done so, it is recommended that appropriate ecological surveys are undertaken within the areas not surveyed by RSK.

Residential Area

The *Willen Road, Newport Pagnell – Indicative Masterplan 29.11.19 (Draft)* shows one vehicle access road off Willen Road. This access road will involve the removal of a section of hedgerow shown to be a key foraging and commuting area for Common Pipistrelle bat, Soprano Pipistrelle bat and Noctule bat. To reduce the impact of the access road it is recommended that:

- The access road is constructed as narrow as possible and the vegetation either side of the road is 'stepped upwards' so the hedgerow is taller either side of the road. This should force any bats using the hedgerow upwards and potentially over the road.
- The tree canopy should be suitably cut on an annual basis to create a 'green arch-way'.

Alternatively, a narrow green bridge could be constructed over the access road. The design of the bridge will have to comply with the Highways Agency standards, however it is recommended the bridge is planted with native climbing flora species, native shrubs and mixed hedgerow species. The bridge should remain unlit and should be for wildlife use only.

The 'stepped up hedge' and bridge should be planted or constructed prior to the removal of the hedgerow, ideally during the winter to enable bats to start using the structure once they become active in spring. It is recommended that the chosen mitigation is monitored through the use of a combination of bat detectors and hand held infra-red cameras to evaluate the level of use during the bat active season.

It is also recommended that:

- The hedgerows bordering the two existing public footpaths are not widened and the top sections of the hedgerows are retained to allow the hedgerows to form an arch, allowing a continual linear feature with no gaps.
- The bridge allowing '*North/South Green Way Link'* between the residential area and sports fields crosses over the top of the hedgerow and doesn't cut through it.
- The creation of the suds corridor adjacent to the site and the A422 and between the surveyed and un-surveyed area doesn't involve the removal of the existing hedgerows.
- Additional native hedgerows and tree planting is incorporated into the layout, on both sides of the proposed suds corridors.

- A mixture of native hedgerow plants and native trees are planted alongside both existing public footpaths and alongside the proposed 'North/South Green Way Link'.
- Native wildflowers are seeded along the 'North/South Green Way Link' to increase insect diversity and in turn improve the sites bat foraging value.
- Scattered native trees are planted alongside the entire length of the primary access/link road.
- Native trees are planted between the site and Caldecote Cottage, Caldecote Farm and Moat Cottage to provide additional bat foraging habitat.
- The layout includes unlit green spaces seeded with areas of wildflowers and planted with native shrubs and trees.
- Additional habitats such as habitat piles and insect hotels are incorporated into the green spaces. Ideally these areas should be linked to suitable bat commuting and foraging areas such as the existing hedgerows or proposed 'North/South Green Way Link'.
- All proposed roadside verges are planted with appropriate wildflower mixes and cut on an annual basis in late summer.
- Residential gardens include native trees and shrubs, and native creepers are planted adjacent to walls, fences and railings. Ideally a mixture of different native plants should be planted within the gardens to increase the species richness.
- Bat bricks are incorporated into the southern elevations of least 5% of the dwellings proposed to be built within the surveyed area. Buyers of the proposed dwellings should be informed regarding the presence of bat bricks and environmental legislation protecting bats. This is to increase the site's bat roosting value.

Attenuation ponds, flood zone and river corridor

The attenuation ponds have the potential to improve the site for bats, as they provide an additional habitat. According to the *Willen Road, Newport Pagnell – Indicative Masterplan 29.11.19 (Draft)* the attenuation ponds will be located relatively close to the river corridor.

It is therefore recommended that:

- The attenuation ponds and area immediately surroundings the ponds remain unlit.
- Native hedgerows and scattered native trees are planted around the ponds and between the attenuation ponds and existing areas used by commuting and foraging bats.
- Native hedgerows and scattered trees are planted between the river corridor and proposed attenuation ponds to allow bats to use both the river corridor and the proposed ponds.
- The existing grassland adjacent to the proposed attenuation ponds, south of Caldecote Cottage and flood zone is managed using the existing sheep grazing or grass cutting regime, or seeded with an appropriate native wildflower mix. If seeded with a wildflower mix the areas should be cut on an annual basis in late summer.

- The attenuation ponds are built as large as possible to benefit the widest range of bat species and multiple water depths are incorporated into the ponds to create shallow and deep-water areas.
- Native aquatic and semi-aquatic plants are planted within and around the pond to potentially increase the diversity of flying insects.
- Bat boxes attached to timber poles are erected around the attenuation ponds to improve the site's bat roosting value. The bat boxes should be faced southwards and erected in suitably sheltered areas such as between the proposed ponds and existing hedgerows or trees. Four bat boxes are to be installed around both of the two largest attenuation ponds.
- Swales or infiltration pits are incorporated into the connecting drainage between the attenuation ponds and River Ouzel. As well as performing an important function in reducing and improving the quality of surface water runoff, swales and infiltration pits also present an opportunity to create linear features ideal for flying insects, therefore providing additional foraging habitat for bats.
- The flood zone is enhanced for wildlife by planting areas of native trees which thrive in wet soil. The newly planted trees should be fenced off to prevent livestock grazing until the trees have become suitably established.

The *Willen Road, Newport Pagnell – Indicative Masterplan 29.11.19 (Draft)* indicates the proposal will include reducing the size of a pocket of woodland, south of the River Ouzel between the flood zone and attenuation pond. It is recommended that the entire existing woodland is incorporated into the development and the woodland belt is extended by planting scattered native trees associated with waterside habitat.

Enhancements for Barbastelle bat

Barbastelle bats were recorded mainly along the river corridor and flood zone but also within the paddock between Caldecote Cottage and Moat Cottage, as well as within the northern field alongside Tongwell Brook.

The Barbastelle bat, which is afforded additional protection as an Annex II species under the 'Habitats Regulations' 2017 (as amended) requires additional consideration in the context of development. The recommendations already stated will improve the proposed site layout for Barbastelle bats, however the following recommendations are specific considerations for Barbastelle bats.

Barbastelle bats are often associated with woodlands for roosting and also foraging, however they often forage above river corridors and floodplains during the summer. The only area containing a significant number of trees on the site is the small woodland copse adjacent to the river corridor, between the flood zone and Moat Cottage. It is recommended that the existing woodland is retained and ideally enhanced by planting native trees within and alongside the existing woodland.

It is also recommended that:

- In areas where it is safe to do so, any dead trees and trees with broken limbs should be retained throughout the site.
- All trees assessed as containing characteristics suitable for roosting bats are retained and protected throughout the development and post-development.

- At least four large crevice bat boxes are erected within the woodland copse between the flood zone and Moat Cottage to increase the number of roosting opportunities for Barbastelle bats within the existing suitable habitat.

4.6 Lighting

All UK and European bat species are nocturnal and adapted to low-light conditions and the artificial lighting of areas in which they are active affects their activities. Artificial lighting can affect the entire composition of local bat communities at the ecosystem level (Rydell, 1992), potentially affecting rare bats recorded on this site such as the Barbastelle bat (Arlettaz *et al*., 2000). Artificial lighting around bat roosts can also delay their nightly emergence time (Downs *et al*., 2003), which can cause bats to miss the peak abundance of their insect prey (Jones & Rydell, 1994), and bright lights shone at roost entrances can 'trap' bats inside and potentially result in their death (Packman *et al*., 2015). In addition, some street or flood lights, particularly those with a high ultraviolet (UV) content, can also result in insect mortality and thereby reduce the overall availability of insect prey for all bats (Frank, 2006; Bruce-White & Shardlow, 2011). Stone (2013) provides a summary of the many studies where lighting has affected bats (p.45, Table 5.1) and the level of impact by species (p.51, Table 5.2).

Although some of the bat species recorded on this site (e.g. Common Pipistrelle, Soprano Pipistrelle, Serotine, and *Nyctalus* bat species) may be more tolerant of artificial light than others (e.g. Eisenbeis, 2006, Stone *et al*., 2012, Lacoeuilhe *et al*., 2014) for some of the slower-flying 'woodland bats' present on the site, namely the Myotis bat species (*Myotis spp*.) and Long-Eared Bats, very low light levels are required for there to be minimal effects on their behaviour (e.g. Furlonger *et al*., 1987; Rydell, 1992; Lacoeuilhe *et al*., 2014). This includes from LED lighting (Stone *et al*., 2012). The potential impacts from artificial lighting on bats are also exacerbated where it illuminates woodland edges and hedgerows (BCT, 2014). As relevant examples here, Stone *et al*., (2012) found that light levels at 3.6 lux caused spatial avoidance of a preferred hedgerow commuting route by *Myotis* bats; species which have been recorded on this site.

Ultimately, there is no "light threshold" where adverse effects on bats from artificial light are negligible (Stone, 2013) and so it is important to achieve the minimal possible illumination levels, particularly when bats are most active from April to October, and particularly where 'light-averse' species are recorded. A full moon under clear, natural conditions is 0.1 to 0.3 lux, and so where complete 'natural' darkness cannot be ensured on a site, illumination levels should aim to fall within this range wherever possible.

To assess the proposed developments lighting impact on the commuting and foraging bats, it is recommended that a lighting impact assessment is undertaken. As bats have been recorded foraging along all linear features across the site the lighting impact assessment should cover all areas of the site, including the areas which are due to be retained such as the river corridor. Appropriate recommendations in relation to lighting impact can be produced once the assessment is undertaken.

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6 FIGURES

Figure 1 – Site location plan

Figure 2 - Building preliminary roost assessment results

Figure 3 – Ground level tree assessment results

Figure 4 – Tree climbing survey results

Figure 5 – Activity transect route

Figure 6 – April 2019 activity transect results

Figure 7 – May 2019 activity transect results

Figure 8 – June 2019 activity transect results

Figure 9 – July 2019 activity transect results

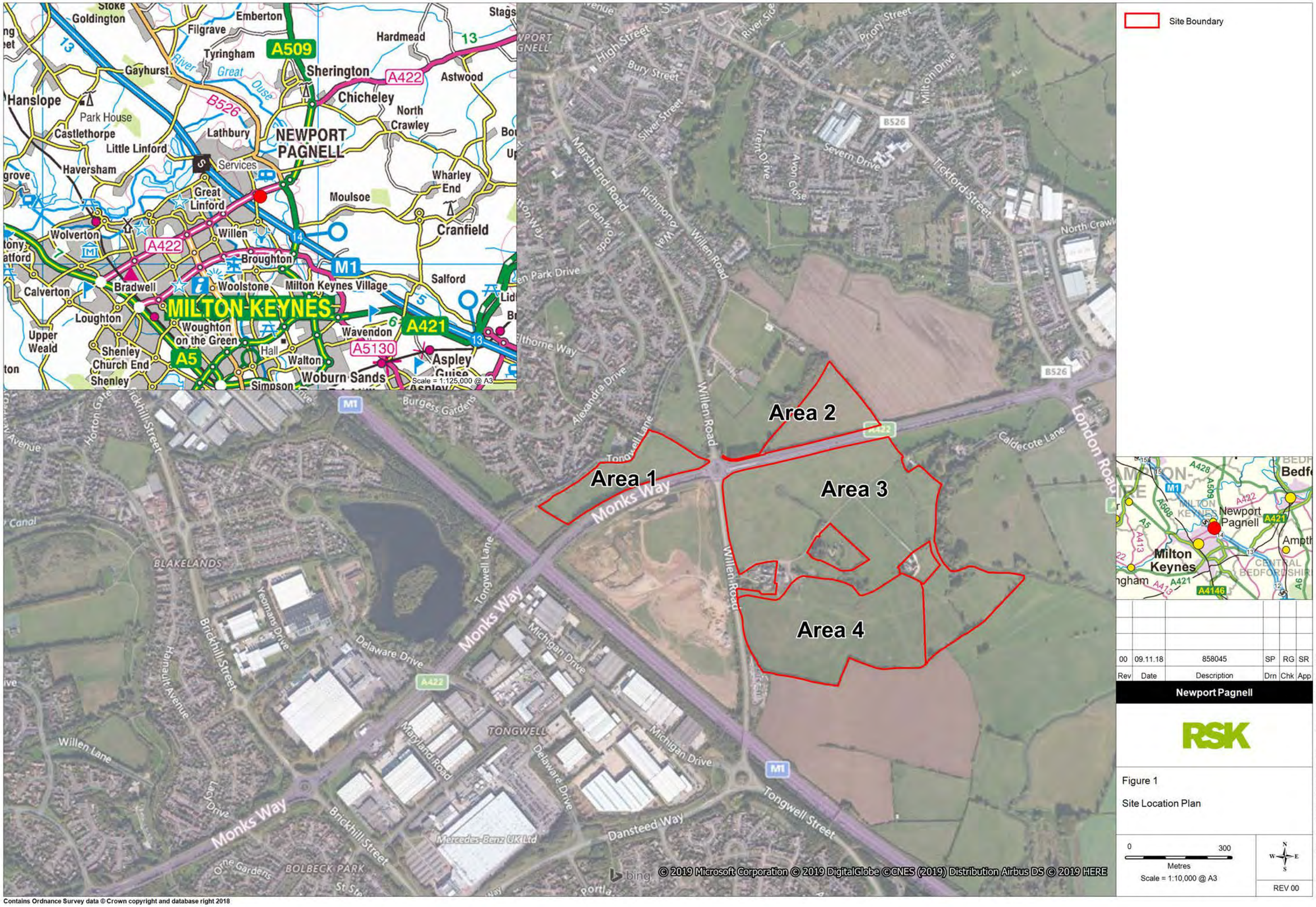
Figure 10 – August 2019 activity transect results

Figure 11 – September 2019 activity transect results

Figure 12 – October 2019 activity transect results

Figure 13 – Static detector locations

Figure 1 – Site location plan



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Figure 1

Site Location Plan

0 300

Metres

Scale = 1:10,000 @ A3

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Figure 2 - Building preliminary roost assessment results

Caldecote Cottage
(B1)

Detached Barn
(B2)

Attached Barns
(B3)

Attached Barns
(B4)

Moat Cottage
(B5)

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Site boundary

Building

Bat Roosting Potential

Moderate

Low

Negligible



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Figure 2

Buildings Preliminary Bat Roost Assessment

0 45
metres
Scale = 1:1,500 @ A3

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Figure 3 – Ground level tree assessment results

Site boundary

Tree

Bat Roosting Potential

High

Moderate

Low

Negligible



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Figure 3

Results of Ground Level Tree Assessment

0 150

metres

Scale = 1:5,000 @ A3

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Figure 4 – Tree climbing survey results

Site boundary

Tree

Bat Roosting Potential

High

Moderate

Low

Negligible



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Figure 4

Results of Tree Climbing Survey

0 150

metres

Scale = 1:5,000 @ A3

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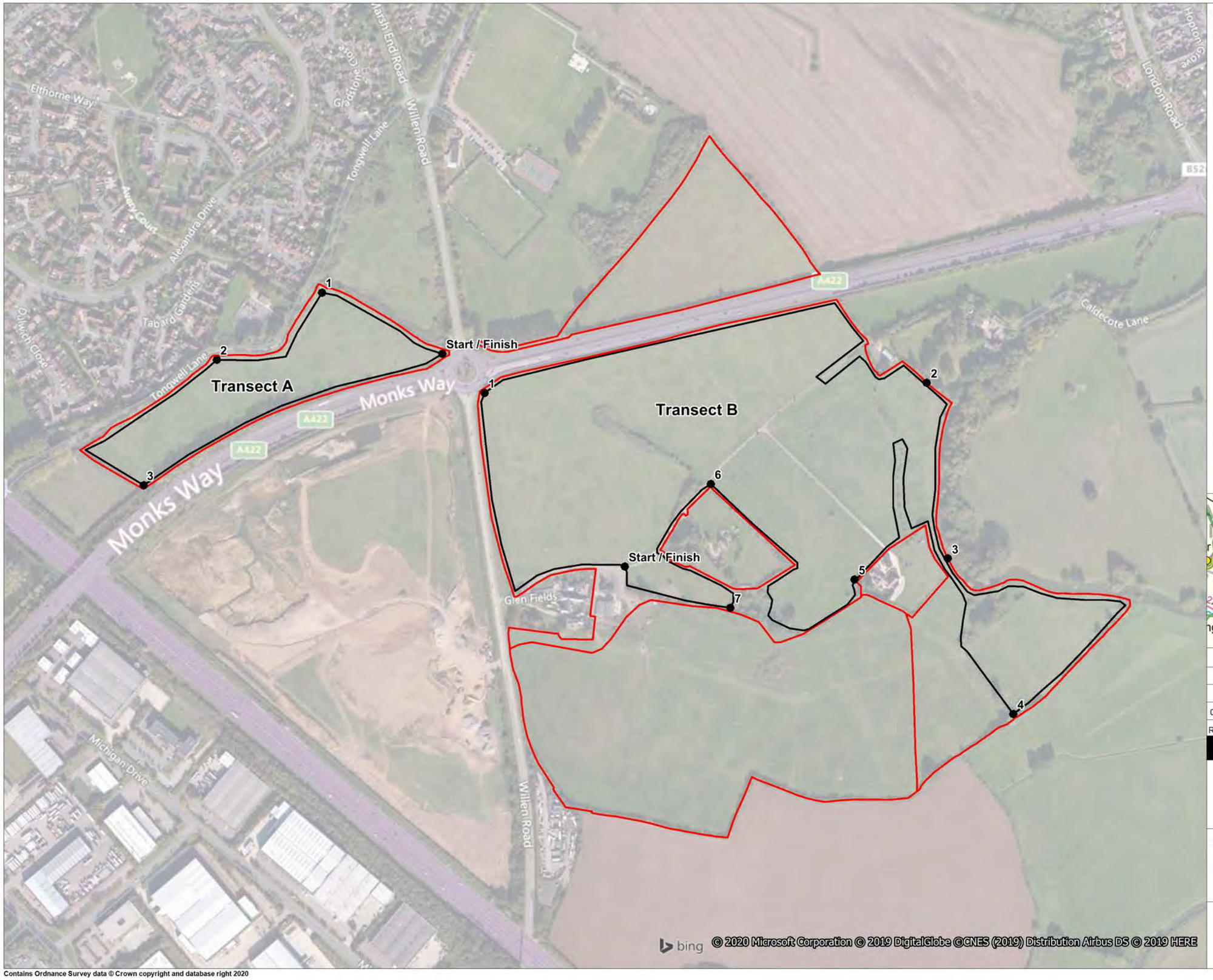
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Figure 5 – Activity transect route



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Figure 5

Location of Bat Activity Survey Transects

0 150
metres
Scale = 1:5,000 @ A3

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Figure 6 – April 2019 activity transect results

Site boundary
Bat survey transect
Stop and listen point

Bat Species

- Serotine bat
- Daubenton's bat
- Myotis bat species
- Leisler's bat
- Noctule bat
- Nathusius's Pipistrelle bat
- Common Pipistrelle bat
- Soprano Pipistrelle bat
- Brown Long-eared bat

Transect A

Transect B

Start / Finish

Start / Finish

Monks Way

Tongwell Lane

Willen Road

Caldecote Lane

London Road

Glen Fields

Michigan Drive

A422

A5

M1

A421

A4146

Milton Keynes

Newport Pagnell



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Figure 6

Transect Survey Results
April 2019

0 150
metres
Scale = 1:5,000 @ A3

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Figure 7 – May 2019 activity transect results

Site boundary
Bat survey transect
Stop and listen point

Bat Species

- Serotine bat
- Daubenton's bat
- Myotis bat species
- Leisler's bat
- Noctule bat
- Nathusius's Pipistrelle bat
- Common Pipistrelle bat
- Soprano Pipistrelle bat
- Brown Long-eared bat

Transect A

Transect B

Start / Finish

Start / Finish

Monks Way

Tongwell Lane

Willen Road

Caldecote Lane

London Road

Glen Fields

Michigan Drive

Elthorne Way

Alexandra Drive

Tabard Gardens

A422

A5

M1

A421

A4146

Milton Keynes

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Figure 7

Transect Survey Results
May 2019

0 150
metres
Scale = 1:5,000 @ A3

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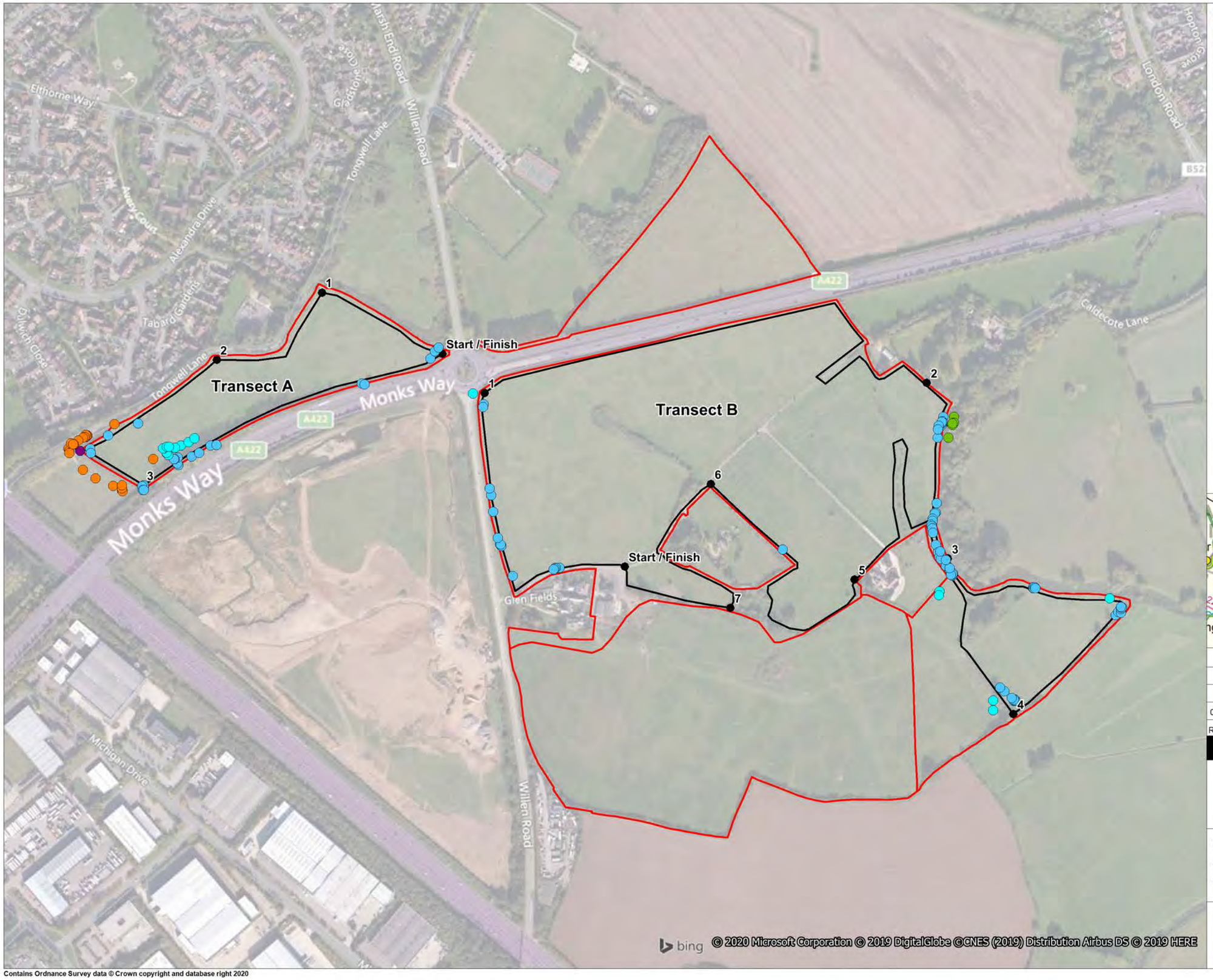
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Figure 8 – June 2019 activity transect results



Site boundary

Bat survey transect

Stop and listen point

Bat Species

- Serotine bat
- Daubenton's bat
- Myotis bat species
- Leisler's bat
- Noctule bat
- Nathusius's Pipistrelle bat
- Common Pipistrelle bat
- Soprano Pipistrelle bat
- Brown Long-eared bat



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Figure 8

Transect Survey Results
June 2019

0 150
metres
Scale = 1:5,000 @ A3

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Figure 9 – July 2019 activity transect results

Site boundary
Bat survey transect
Stop and listen point

Bat Species

- Serotine bat
- Daubenton's bat
- Myotis bat species
- Leisler's bat
- Noctule bat
- Nathusius's Pipistrelle bat
- Common Pipistrelle bat
- Soprano Pipistrelle bat
- Brown Long-eared bat

Transect A

Transect B

Start / Finish

Start / Finish

Monks Way

Tongwell Lane

Willen Road

Caldecote Lane

London Road

Elthorne Way

Tabard Gardens

Alexandra Drive

Michigan Drive

Glen Fields

A422

A421

A4146

M1



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Figure 9

Transect Survey Results
July 2019

0 150
metres
Scale = 1:5,000 @ A3

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Figure 10 – August 2019 activity transect results

Site boundary
Bat survey transect
Stop and listen point

Bat Species

- Serotine bat
- Daubenton's bat
- Myotis bat species
- Leisler's bat
- Noctule bat
- Nathusius's Pipistrelle bat
- Common Pipistrelle bat
- Soprano Pipistrelle bat
- Brown Long-eared bat

Transect A

Transect B

Start / Finish

Start / Finish

Monks Way

Tongwell Lane

Willen Road

Caldecote Lane

London Road

Elthorne Way

Tabard Gardens

Alexandra Drive

Michigan Drive

Glen Fields

A422

A421

A4146

M1

Milton Keynes

Newport Pagnell



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Figure 10

Transect Survey Results
August 2019

0 150
metres
Scale = 1:5,000 @ A3

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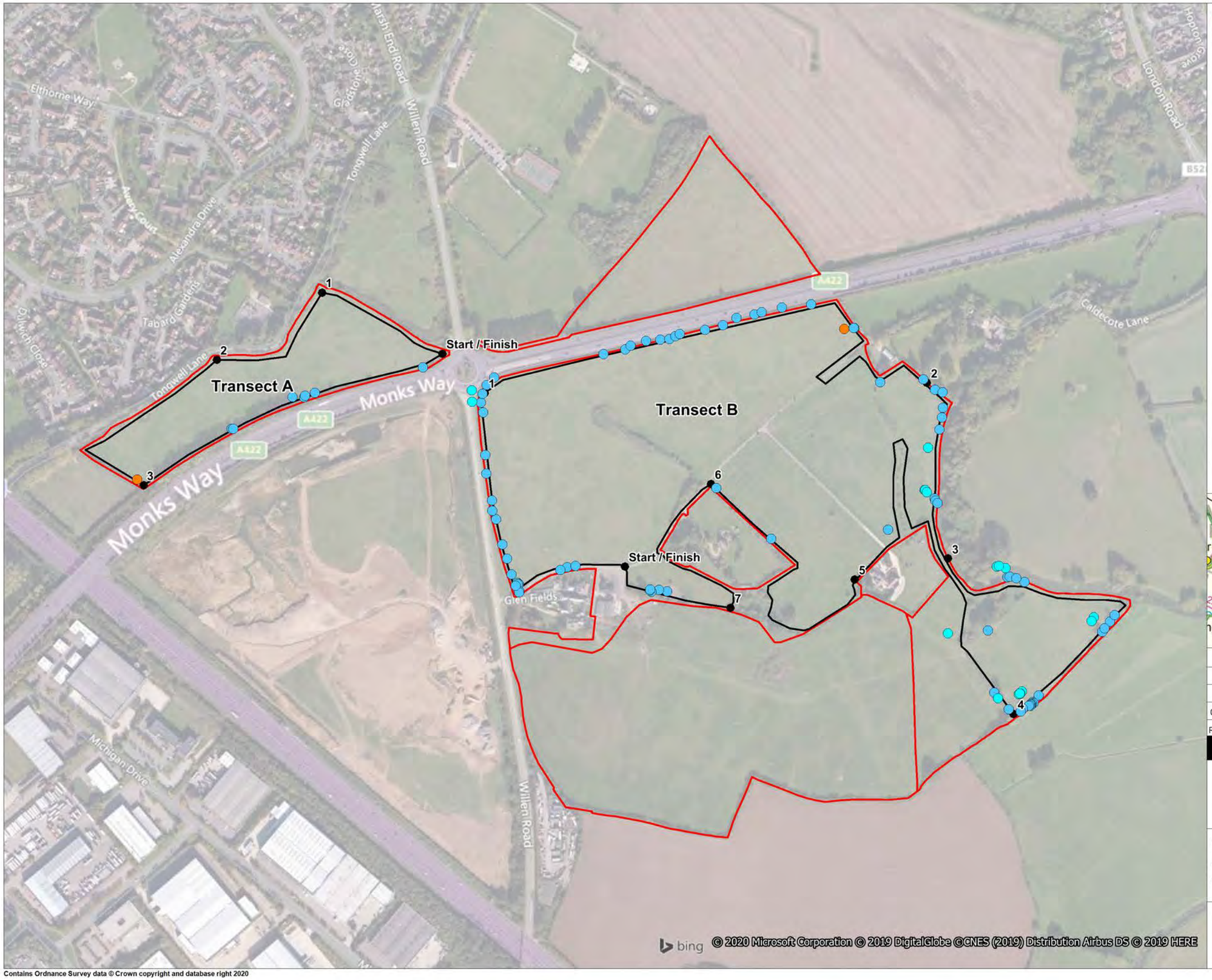
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Figure 11 – September 2019 activity transect results



Site boundary

Bat survey transect

Stop and listen point

Bat Species

- Serotine bat
- Daubenton's bat
- Myotis bat species
- Leisler's bat
- Noctule bat
- Nathusius's Pipistrelle bat
- Common Pipistrelle bat
- Soprano Pipistrelle bat
- Brown Long-eared bat



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Figure 11

Transect Survey Results
September 2019

0 150
metres
Scale = 1:5,000 @ A3

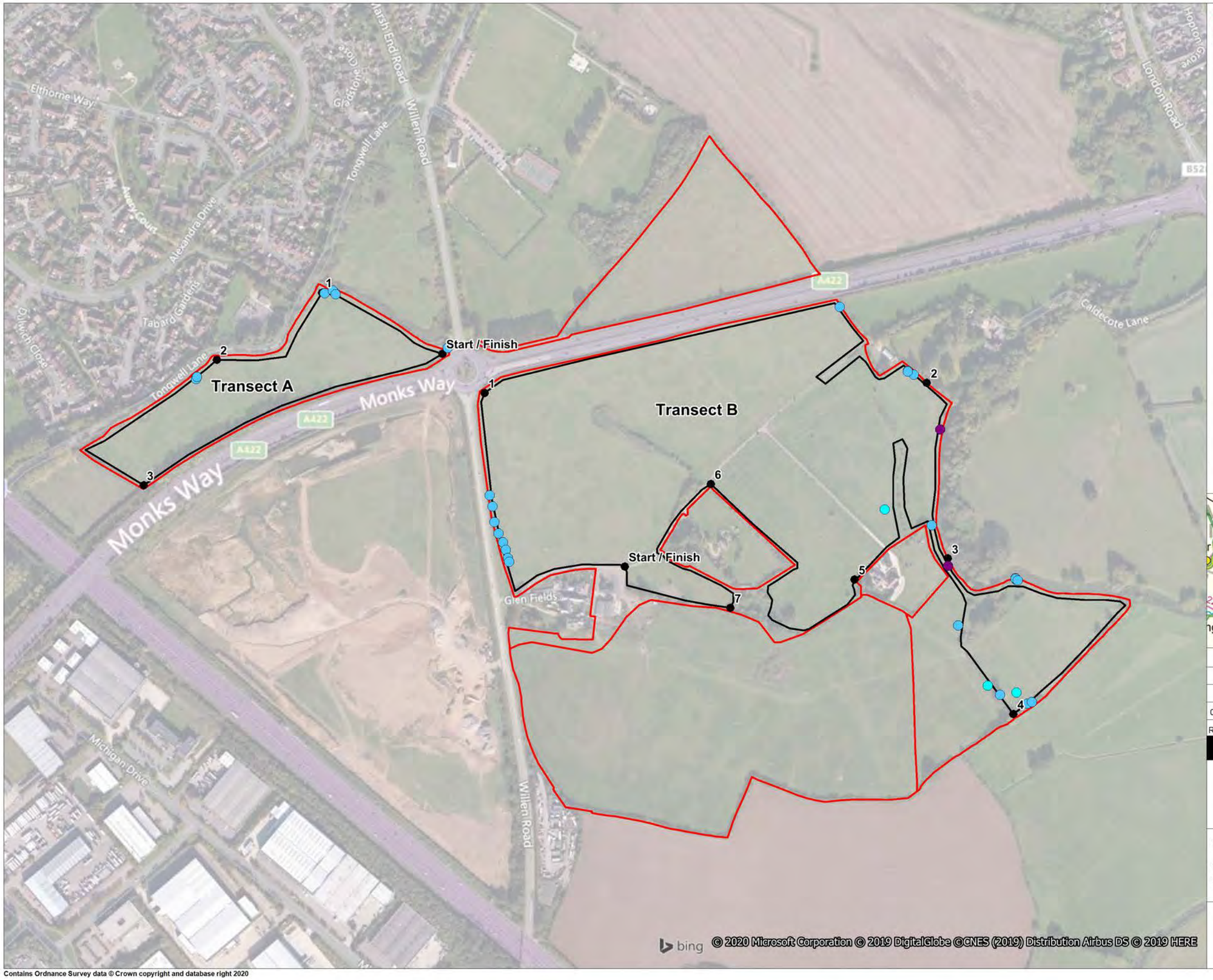
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Figure 12 – October 2019 activity transect results



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Figure 12

Transect Survey Results
October 2019

0 150
metres
Scale = 1:5,000 @ A3

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Figure 13** – **Static detector locations

Site boundary

Static detector location

Month

April

May

June

July

August

September

October



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Figure 13

Static Detector Locations

0 150

metres

Scale = 1:5,000 @ A3

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APPENDIX A – GLTA AND AERIAL SURVEY RESULTS

Tree Target Note	Species	Features	Suitability	Conclusions	Reason further surveys could not be undertaken
T1	***Crataegus monogyna*** (Hawthorn)	Large void within the trunk ***c.***2 m from the ground with multiple splits all leading to the same cavity. Several places that multiple bats could roost.	Moderate	Further surveys required	N/A.
T2	***Crataegus monogyna*** (Hawthorn)	Partly fallen tree with narrow void within trunk.	Low	No further survey required	N/A.
T3	***Crataegus monogyna*** (Hawthorn)	Dense ivy around the trunk.	Low	No further survey required	N/A.
T4	***Salix fragilis*** (Crack Willow)	Partly fallen tree with significant void within the trunk c.1.5m from the ground. Crevices only suitable for single bats.	Low	No further survey required	N/A.
T5	***Crataegus monogyna*** (Hawthorn)	Narrow void in trunk ***c.***1 m from the ground.	Low	No further survey required	N/A.
T6	***Salix fragilis*** (Crack Willow)	Multi-stemmed fallen tree with numerous voids within the trunk and fallen branches. Splits relatively open but suitable for multiple bats.	Moderate	Further surveys required	N/A.
T7	***Crataegus monogyna*** (Hawthorn)	Dense ivy around the trunk suitable for individual bats.	Low	No further survey required	N/A.
T8	***Fraxinus excelsior*** (Ash)	Dense ivy which is think and matted and suitable for individual bats.	Low	No further survey required	N/A.

T9	***Crataegus monogyna*** (Hawthorn)	Narrow void within the trunk – ***c.***1 m from the ground.	Low	No further survey required	N/A.
T10	***Crataegus monogyna*** (Hawthorn)	Dense ivy around the trunk.	Low	No further survey required	N/A.
T11	***Fraxinus excelsior*** (Ash)	Dense ivy around the trunk.	Low	No further survey required	N/A.
T12	***Salix fragilis*** (Crack Willow)	Dense ivy and features likely to be within the higher sections.	Moderate	Further surveys required	Inaccessible (in Area 4).
T13	***Fraxinus excelsior*** (Ash)	Numerous knotholes within the trunk and branches.	Moderate	Further surveys required	Inaccessible (in Area 4).
T14	***Fraxinus excelsior*** (Ash)	Narrow void within the trunk ***c.***1.5 m from the ground. More features likely to be in higher sections.	Moderate	Further surveys required	Inaccessible (in Area 4).
T15	***Quercus robur*** (Pedunculate Oak)	Used Barn Owl box in tree. Numerous large voids within main branches and trunk, knothole, broken branches and flaking bark. Aerial inspection abandoned due to presence of nesting Barn Owls.	High	Further surveys required	N/A.
T16	***Quercus robur*** (Pedunculate Oak)	Multiple splits and cracks but features only suitable for individual bats in the summer months.	Low	No further survey required	N/A.
T17	***Salix fragilis*** (Crack Willow)	Dense ivy around the trunk. Large cavity at base of trunk which extends into smaller crevices. Small split in branch with a cavity at both ends. Features suitable for individual bats only.	Low	No further survey required	N/A.
T18	***Fraxinus excelsior*** (Ash)	No features identified.	Negligible	No further survey required	N/A.
T19	***Salix fragilis*** (Crack Willow)	Partly fallen tree with rot hole in trunk. Cavity extends ***c.***30 cm up and ***c***.20 cm wide and is suitable	Moderate	Further surveys required	N/A.

		for multiple bats. Ivy cover stacked on top of fallen main stem.			
T20	***Salix fragilis*** (Crack Willow)	Splits and cracks in partially fallen mature tree. All of the cracks are too open and exposed. A couple of the splits are suitable for individual bats only.	Low	No further survey required	N/A.
T21	***Fraxinus excelsior*** (Ash)	Split in small overhanging branch but the feature is superficial and there is no cavity present. No features identified.	Negligible	No further survey required	N/A.
T22	***Fraxinus excelsior*** (Ash)	Cavity at end of overhanging split branch but no suitable roosting space present. No features identified.	Negligible	No further survey required	N/A.
T23	***Salix fragilis*** (Crack Willow)	Large cracks and splits in partially fallen mature tree. Numerous cavities present but all are only suitable for individual bats.	Moderate	Further surveys required	N/A.
T24	***Salix fragilis*** (Crack Willow)	Partly fallen tree with numerous large voids within the trunk adjacent to the river.	High	Further surveys required	N/A.
T25	***Salix fragilis*** (Crack Willow)	Partly fallen tree with numerous large voids within the trunk adjacent to the river.	Moderate	Further surveys required	N/A.
T26	***Salix fragilis*** (Crack Willow)	Multi-stem tree with numerous cracks and voids within the main stems.	Moderate	Further surveys required	N/A.
T27	***Populus canescens*** (Grey Poplar)	No features identified.	Negligible	No further survey required	N/A.
T28	***Fraxinus excelsior*** (Ash)	Woodpecker hole within the trunk and multiple cracks within the branches	High	Further surveys required	N/A.
T29	***Fraxinus excelsior*** (Ash)	No features identified.	Negligible	No further survey required	N/A.

T30	***Fraxinus excelsior*** (Ash)	Features only suitable for individual bats in summer months	Low	No further survey required	N/A.
T31	***Salix fragilis*** (Crack Willow)	No features identified.	Negligible	No further survey required	N/A.
T32	***Salix fragilis*** (Crack Willow)	Multiple voids within the main branches and trunk.	Moderate	Further surveys required	N/A.
T33	***Fraxinus excelsior*** (Ash)	Multi-stemmed tree with numerous voids within the trunk	Moderate	Further surveys required	Inaccessible (beyond site boundary).
T34	***Crataegus monogyna*** (Hawthorn)	Features only suitable for individual bats in the summer months	Low	No further survey required	N/A.
T35	***Fraxinus excelsior*** (Ash)	Features only suitable for individual bats in the summer months	Low	No further survey required	N/A.
T36	***Fraxinus excelsior*** (Ash)	No features identified.	Negligible	No further survey required	N/A.
T37	***Salix fragilis*** (Crack Willow)	Split and callus roll on branch near top of tree. Hollow trunk and branches around base of the tree suitable for high numbers of bats.	High	Further surveys required	Inaccessible (beyond site boundary).
T38	***Alnus glutinosa*** (Alder)	Multi-stemmed tree. No features identified.	Negligible	No further survey required	N/A.
T39	***Crataegus monogyna*** (Hawthorn)	Multiple dead steams with narrow voids	Low	No further survey required	N/A.
T40	***Alnus glutinosa*** (Alder)	Small cavity close to top of tree, suitable for individual bats.	Low	No further survey required	N/A.
T41	***Alnus glutinosa*** (Alder)	Numerous knotholes and thick flaking bark	Moderate	Further surveys required	Inaccessible (beyond site boundary).

T42	***Fraxinus excelsior*** (Ash)	No features identified.	Negligible	No further survey required	N/A.
T43	***Fraxinus excelsior*** (Ash)	Suitable void within a broken branch and another small horizontal cavity. Ivy may be obscuring additional features.	Moderate	Further surveys required	Inaccessible (beyond site boundary).
T44	***Fraxinus excelsior*** (Ash) (Dead)	Knothole within dead trunk.	Low	No further survey required	N/A.
T45	***Quercus robur*** (Pedunculate Oak)	Narrow void within trunk and flaking bark.	Low	No further survey required	N/A.
T46	***Fraxinus excelsior*** (Ash)	No features identified.	Negligible	No further survey required	N/A.
T47	***Fraxinus excelsior*** (Ash)	No features identified.	Negligible	No further survey required	N/A.
T48	***Fraxinus excelsior*** (Ash)	Dead section within the trunk containing narrow voids.	Negligible	No further survey required	N/A.
T49	***Populus canescens*** (Grey Poplar)	Numerous knotholes within the trunk and flaking bark but all are superficial with no suitable roosting cavities.	Negligible	No further survey required	N/A.
T50	***Fraxinus excelsior*** (Ash)	Void in flayed branch.	Low	No further survey required	N/A.
T51	***Populus canescens*** (Grey Poplar)	Numerous voids in flayed branch but superficial with no suitable roosting cavities.	Negligible	No further survey required	N/A.
T52	***Fagus sylvatica*** (Beech)	Numerous voids in flayed branch.	Moderate	Further surveys required.	Inaccessible (beyond site boundary).
T53	***Fraxinus excelsior*** (Ash)	Numerous voids in flayed branch but only suitable for individual bats. Tear out close to trunk but wound	Low	No further survey required	N/A.

		is only superficial with no suitable roosting cavity.			
T54	***Fraxinus excelsior*** (Ash)	Dense ivy around the trunk. No further roosting features identified.	Low	No further survey required	N/A.
T55	***Fraxinus excelsior*** (Ash)	Two knot holes in tree base but only suitable for individual bats.	Low	No further survey required	N/A.
T56	***Fraxinus excelsior*** (Ash)	Small crevices and matted ivy suitable for individual bats.	Low	No further survey required	N/A.

APPENDIX B - LEGISLATION

General

This section briefly describes the legal protection afforded to the protected species referred to in this report. It is for information only and is not intended to be comprehensive or to replace specialised legal advice. It is not intended to replace the text of the legislation, but summarises the salient points.

Bats

All species of British bat are protected by The Wildlife and Countryside Act 1981 (as amended***),*** extended by the Countryside and Rights of Way Act 2000. This legislation makes it an offence to:

- intentionally kill, injure or take;
- possess or control;
- intentionally or recklessly damage, destroy or obstruct access to a breeding site or resting place; and
- intentionally or recklessly disturb while the animal occupies a breeding site or resting place.

Bats are also European Protected Species listed on The Conservation (Natural Habitats, & c.) Regulations 2017 (as amended***).*** This legislation makes it an offence to:

- deliberately capture, injure or kill;
- deliberately disturb, including in particular any disturbance which is likely (a) to impair their ability - (i) to survive, to breed or reproduce, or to rear or nurture their young; or (ii) hibernate or migrate, where relevant; or (b) to affect significantly the local distribution or abundance of the species to which they belong;
- damage or destroy a breeding site or resting place; and
- possess, control, transport, sell, exchange, or offer for sale or exchange.



Bloor Homes South Midlands

Newport Pagnell

Breeding Bird Survey Report

858045

JANAURY 2020

RSK GENERAL NOTES

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Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

This work has been undertaken in accordance with the quality management system of RSK Environment Ltd.

EXECUTIVE SUMMARY

1. This report presents the results of breeding bird surveys carried out between April and June 2019 in relation to a housing development adjacent to H3 Monk's Way, Newport Pagnell.

2. A preliminary ecological appraisal undertaken by RSK in October 2018 identified large areas of farmland habitat suitable for breeding birds, including unimproved meadows.

3. The site supports an assemblage of birds typical of the area and habitat. A total of 46 species were recorded during the surveys, including the following red-listed species: Willow Tit, Skylark, Starling, Song Thrush, House Sparrow, Linnet and Yellowhammer.

4. The species recorded on the site were mainly noted in the hedgerows, along the river corridor and in arable fields.

5. Lowland meadow suitable for Skylark should be retained for ornithological and botanical reasons.

6. House Martins are nesting in houses adjacent to the site. A range of bird bricks and boxes, including some suitable for House Martins, should be incorporated into the development to provide net gain for biodiversity.

7. Habitats on the site should be checked for nesting birds before any works between March and August inclusive.

CONTENTS

1 INTRODUCTION 1
1.1 Purpose of Report 1
1.2 Ecological Context 1
2 METHODS 2
2.1 Objectives 2
2.2 Background Data Search 2
2.3 Breeding Bird Survey 2
2.4 Limitations 2
2.5 Criteria for Evaluation 2
2.5.1 Determination of Breeding Status 2
2.5.2 Species Richness 3
2.5.3 Identification of Birds of Conservation Concern 3
2.6 Importance Thresholds 4
2.7 Nomenclature 4
3 RESULTS 5
3.1 Background Data Search 5
3.2 Survey Dates and Weather 5
3.3 Summary of Survey Results 6
3.3.1 Breeding Status 6
3.3.2 Birds of Conservation Concern 6
4 EVALUATION AND CONCLUSIONS 10
4.1 Assemblages 10
4.2 Important Species 10
4.3 Implications for Development 10
5 REFERENCES 12
6 FIGURES 13
APPENDIX A – DETAILED SURVEYS RESULTS 18
APPENDIX B – LEGISLATION 22
APPENDIX C – DEFINITIONS 23

1 INTRODUCTION

1.1 Purpose of Report

This report presents the results of breeding bird surveys carried out in connection with a proposed residential development on three parcels of land off H3 Monk's Way, Newport Pagnell (*Figure 1*), here collectively referred to as 'the site' (OS grid references SP881428, SP874425, SP882421 and SP880421). The surveys were carried out between April and June 2019.

A preliminary ecological appraisal (PEA) undertaken by RSK in October 2018 identified large areas of farmland suitable for breeding birds on the site (RSK 2018). RSK undertook the surveys on behalf of Bloor Homes South Midlands to provide information on any impacts the proposed residential development could have on breeding birds. The results of these surveys will determine the importance of the site for common and listed bird species, whether birds could be affected by the proposed works, and inform a mitigation strategy to reduce impacts to non-significant levels.

1.2 Ecological Context

The site is on the southern edge of Newport Pagnell in Buckinghamshire (*Figure 1*). It comprises two fields north of H3 Monk's Way (Areas 1 and 2), a larger area of land south of H3 Monk's Way (Area 3), and a quarry directly east of Willen Road (Area 4). The site comprises arable land, with areas of scrub, scattered broadleaved trees, improved grassland, semi-improved grassland, hedgerows, standing water and dry ditches. Area 3 contains unimproved grassland as identified by a national vegetation classification (NVC) survey (RSK 2019a). There is plantation broad-leaved woodland adjacent to Area 2.

The town of Newport Pagnell separates the site from extensive agricultural land. The east of the site is bordered by the River Ouzel Wet Corridor, part of the Milton Keynes Wildlife Corridor, which also separates the site from further agricultural land. Directly west is Willen Road and the M1 motorway, which separates the site from the Tongell Lake Local Wildlife Site 150 m to the west.

2 METHODS

2.1 Objectives

The objectives of the breeding bird survey were to:

- identify the distribution of breeding birds across the site;
- locate any birds protected under Schedule 1 of the Wildlife and Countryside Act 1981; and
- identify any species for which special mitigation may be required.

2.2 Background Data Search

A search was made in October 2018 as part of the PEA (RSK, 2018). Bird records were obtained from Buckingham and Milton Keynes Environmental Records Centre.

2.3 Breeding Bird Survey

The survey methodology is based on the Common Bird Census (CBC) methodology (Gilbert *et al*. 1998) devised jointly by the British Trust for Ornithology (BTO), the Royal Society for the Protection of Birds (RSPB) and the Joint Nature Conservancy Council (JNCC). A route was walked incorporating all features that may function as nesting bird habitat within the site. All birds seen or heard were recorded onto base maps along with notes of behaviour that may indicate breeding. All surveys were undertaken early in the morning at or just after sunrise to coincide with the period of peak bird activity. Surveys were undertaken on 30 April, 23 May and 18 June 2019 by Jan Skuriat and Tom Coyne (RSK consultants). Both Jan and Tom are full members of the Chartered Institute of Ecology and Environmental Management (CIEEM) and are experienced ornithologists.

2.4 Limitations

Surveys were undertaken at the ideal time of year and during good weather for breeding bird surveys. A table of weather data for all surveys is shown in *Table 2* in *Section 3.*

Despite the good conditions, it is not realistic to expect to record every bird using site during survey visits. However, the surveys were sufficient to record any important assemblages, and to identify areas of particular interest.

2.5 Criteria for Evaluation

2.5.1 Determination of Breeding Status

The breeding status of each species is classified into three categories: confirmed breeding; probable breeding; and possible breeding. The behaviour, sex, age and location of individual birds allow conclusions to be drawn about breeding status, based on categories devised by the European Ornithology Atlas Committee (EOAC), 1979. Breeding evidence used in this report follows EOAC guidelines (1979), which are given

in *Appendix C*. It is also possible that species are merely present in a habitat and are not actually breeding. Birds not thought to be breeding and birds flying-over are classed as non-breeding.

2.5.2 Species Richness

Fuller (1980) measured the diversity of a breeding assemblage using certain criteria for a simple site assessment, whereby the importance of a site is defined by the number of breeding species present. For the purposes of this assessment, Fuller's (1980) geographical levels have been adapted, so that Fuller's 'local' importance is assumed to correspond to 'district' importance as described in the Institute of Ecology and Environmental Management (2006) guidelines. This gives an assessment of importance according to the following categories - local (<25 species), district (25-49 species), county (50-69 species), regional (70-84 species) and national (85+ species). Since the publication of the criteria in 1980, declines have occurred in many bird populations, and for this reason it is considered appropriate to recalibrate the categories in this way.

2.5.3 Identification of Birds of Conservation Concern

A number of criteria are available to determine the conservation status of those bird species recorded. These criteria aid in evaluating the function of the site for breeding birds and thus the value of the breeding bird assemblage. The most appropriate of these are:

- The Birds Directive. Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (the codified version of Directive 79/409/EEC as amended) is the EU's oldest piece of nature legislation and one of the most important, creating a comprehensive scheme of protection for all wild bird species naturally occurring in the Union. It was adopted unanimously by the Members States in 1979 as a response to increasing concern about the declines in Europe's wild bird populations resulting from pollution, loss of habitats as well as unsustainable use. It also recognised that wild birds, many of which are migratory, are a shared heritage of the Member States and that their effective conservation requires international co-operation. The Birds Directive bans activities that directly threaten birds, such as the deliberate killing or capture of birds, the destruction of their nests and taking of their eggs, and associated activities such as trading in live or dead birds. The directive lists threatened species on various annexes that are reviewed as part of the assessment.
- Wildlife and Countryside Act 1981 Schedule 1 Species. All bird species are protected from intentionally killing and injuring, and from the destruction of nests, eggs and dependent young. Schedule 1 species are also protected from disturbance whilst nesting or attempting to make a nest and the presence of schedule 1 species is noted where recorded
- Birds of Conservation Concern 4 (Eaton et al. 2015). On the basis of population status, this has placed each UK species on one of three lists: red, amber or green. Red list species are of high conservation concern, being either globally threatened, having historical UK population declines between 1800 and 1995 or a rapid population decline or breeding range contraction by 50% or more in the last 25 years. Amber list species are of medium conservation concern due to a number of factors, for example having suffered between 25% and 49% contraction of UK

breeding range or a 25-49% reduction in breeding or non-breeding populations over the last 25 years. Species that have a five year mean of 1-300 breeding pairs (bp) in the UK or an unfavourable European conservation status or for which the breeding population in the UK represents 20% or more of the European breeding populations are also listed on the amber list. Green list species have a favourable conservation status.

- National and Local Biodiversity Action Plans (BAP). The United Kingdom BAP (UK Biodiversity Steering Group 1995, reviewed 2007) lists a number of bird species of conservation concern, for which national targets and priorities have been set in order to address their needs. In June 2007 after a review of the UK BAP an additional 22 priority bird species were added to the list of species for which species action plans (SAPs) will be prepared. The local BAP lists species for which conservation targets exist within the local area. An action plan for each of these species has been developed to set specific, measurable, achievable, realistic and time bounded targets for the conservation of these species.

2.6 Importance Thresholds

When assessing the importance of sites used by birds a system was developed and thresholds set where if 1% of a species (or subspecies) population is represented at a site then the site is important for this species for the size of the population (Fuller, 1980). For example, where a site supports 1% of the international population the site is important at international level, where a site supports 1% of the national population the site is important at the national level etc.

We have adopted these thresholds of importance in assessing the importance of some breeding species identified during these surveys. For example, if 1% of a species breeding population is identified at any population size then it is important at that level.

2.7 Nomenclature

The nomenclature for common and scientific names and the taxonomic ordering of species accounts follows that contained in The British List: A checklist of Birds of Britain (9th edition), British Ornithological Union (2017).

3 RESULTS

3.1 Background Data Search

Table 1 displays the protected bird species records located within 1 km of the site boundary that were returned in the background data search. The Latin and common names for bird species are given as well as their level of designation. A full list of noteworthy bird species records, including Red and Amber listed species, is available in the PEA report (RSK, 2018).

Table 1: Protected bird species records within 1 km of the site boundary.

Latin Name	Common Name	Designation	Most Recent	No of Records	Within 100m	Within 1km
Birds						
Alcedo atthis	Kingfisher	WCA1.1	2016	10	☒	
Anas acuta	Pintail	WCA1.2	2013	1		☒
Anser anser	Greylag Goose	WCA1.2	2016	10		☒
Aythya marila	Scaup	WCA1.1	2009	3		☒
Botaurus stellaris	Bittern	WCA1.1	2013	6		☒
Bucephala clangula	Goldeneye	WCA1.2	2016	6		☒
Cettia cetti	Cetti's Warbler	WCA1.1	2010	3		☒
Charadrius dubius	Little Ringed Plover	WCA1.1	2014	2		☒
Falco columbarius	Merlin	WCA1.1	2005	1		☒
Falco peregrinus	Peregrine	WCA1.1	2015	2		☒
Falco subbuteo	Hobby	WCA1.1	2015	6		☒
Milvus milvus	Red Kite	WCA1.1	2016	2		☒
Pandion haliaetus	Osprey	WCA1.1	2013	1		☒
Phoenicurus ochruros	Black Redstart	WCA1.1	2005	1		☒
Podiceps auritus	Slavonian Grebe	WCA1.1	2013	2		☒
Tringa ochropus	Green Sandpiper	WCA1.1	2013	3	☒	
Turdus iliacus	Redwing	WCA1.1	2013	7		☒
Turdus pilaris	Fieldfare	WCA1.1	2010	3		☒
Tyto alba	Barn Owl	WCA1.1	2016	3		☒

3.2 Survey Dates and Weather

The dates of the surveys and general weather conditions are shown below in *Table 2*.

Table 2: Dates and weather conditions of the breeding bird surveys.

Survey Visit	Date	Weather Conditions
1	30 April 2019	Light mist, no rain. Wind 1, Cloud 8.
2	23 May 2019	Sunny, thin high cloud. Wind 0, Cloud 6.
3	18 June 2019	Cloudy, no rain. Wind 1, Cloud 8.

3.3 Summary of Survey Results

Summary maps of the results from the breeding bird surveys are presented in *Figures 2-4*.

46 species were recorded – of these 32 species were confirmed breeding, probable breeding or possible breeding. A complete species list summarising the breeding status, based on the EOAC criteria is presented in *Appendix A*.

3.3.1 Breeding Status

Interpreting the data using the EOAC criteria, 5 species (11 %) are confirmed as breeding, 15 (33 %) as probable breeding species, and 12 (26 %) as possible breeding. In addition, 14 species (30 %) are categorised as either non-breeding species or were simply recorded flying over the site.

3.3.2 Birds of Conservation Concern

Of all the bird species recorded, 18 are designated as Annex 1 on the EU Birds Directive, Schedule 1 on The Wildlife and Countryside Act 1981 or are species of conservation concern (BOCC). Their associated conservation and breeding status are presented in *Table 3*. A summary of the number of designated bird species recorded and their associated EOAC breeding status is given in *Table 4*. Key points from the data are summarised below.

Barn Owl (Tyto alba), a species listed under Schedule 1 of the Wildlife and Countryside Act 1981, was confirmed breeding in a nest box on the site. The results and mitigation measures required for this species are covered in a separate report (RSK 2019b).

Seven red-listed bird species were recorded on the site. These are Willow Tit (*Poecile montanus*), Skylark (*Alauda arvensis*), Starling (*Sturnus vulgaris*), Song Thrush (*Turdus philomelos*), House Sparrow (*Passer domesticus*), Linnet (*Linaria cannabina)* and Yellowhammer (*Emberiza citronella).* Skylark, House Sparrow, Linnet and Yellowhammer were recorded as probable breeders on the site. Starling and Song Thrush were recorded as possible breeders while Willow Tit was thought not to be breeding on the site (a single bird being observed away from suitable nesting habitat).

Ten amber-listed species have been recorded on the site. These are Greylag Goose (*Anser anser*), Mute Swan (*Cygnus olor*), Mallard (*Anas platyrhynchos*), Oystercatcher (*Haematopus ostralegus*), Stock Dove (*Columba oenas*), Swift (*Apus apus*), House Martin (*Delichon urbicum*), Dunnock (*Pruenella modularis*), Bullfinch (*Pyrrhula pyrrhula*)

and Reed Bunting (*Emberiza schoeniclus*). Mute Swan has been confirmed as breeding on the site. Mallard, Dunnock, Bullfinch and Greylag Goose were recorded as probable breeders although the Greylag Geese are feral, not being native to England. Reed Bunting was recorded as a possible breeder. Oystercatcher, Stock Dove, Swift and House Martin were recorded as not breeding on the site although a colony of House Martins is nesting in houses encapsulated by, but not within, the boundary of Area 3.

Table 3: Bird Species Recorded during the breeding bird surveys of conservation concern, their conservation status and their breeding status

English name	Scientific name	EU Birds Directive Annex 1	WCA 1981 Sch 1	BoCC Red / Amber	UK or Local BAP	Species Summary	Breeding Status
Greylag Goose	*Anser anser*		Yes	Amber		Group of up to 20 observed in field but species not native in England	Probable but are feral
Mute Swan	*Cygnus olor*			Amber		Pair observed on nest along western bank of River Ouzel	Confirmed
Mallard	*Anas platyrhynchos*			Amber		Two pairs observed on garden pond and on river	Probable
Oystercatcher	*Haematopus ostralegus*			Amber		Single bird observed flying over on single occasion	Non-breeding
Stock Dove	*Columba oenas*			Amber		Only observed flying over	Non-breeding
Barn Owl	*Tyto alba*		Yes			Breeding in nest box confirmed during specialist surveys	Confirmed
Swift	*Apus apus*			Amber		Pair seen flying over	Non-breeding
Willow Tit	*Poecile montanus*			Red	UK BAP	Only one bird observed, away from suitable nesting habitat	Non-breeding
Skylark	*Alauda arvensis*			Red	UK BAP	Birds observed in arable fields, singing in same locations on multiple occasions	Probable
House Martin	*Delichon urbicum*			Amber		Group nesting in houses outside of site boundary but not on the site itself	Non-breeding
Starling	*Sturnus vulgaris*			Red	UK BAP	Juvenile observed in northern hedgerow of Area 1 but cannot confirm that it fledged from the site. Individual birds observed in different places each time	Possible
Song Thrush	*Turdus philomelos*			Red	UK BAP	Observed in suitable nesting habitat during surveys	Possible
House Sparrow	*Passer domesticus*			Red	UK BAP	Birds in same location in hedgerow surrounding property on two occasions	Probable
Dunnock	*Prunella modularis*			Amber	UK BAP	Bird singing in same location in hedgerow along south of Area 1 on two occasions	Probable

English name	Scientific name	EU Birds Directive Annex 1	WCA 1981 Sch 1	BoCC Red / Amber	UK or Local BAP	Species Summary	Breeding Status
Bullfinch	*Pyrrhula pyrrhula*			Amber	UK BAP	Pair observed in suitable nesting habitat along river	Probable
Linnet	*Linaria cannabina*			Red	UK BAP	Pair observed in suitable nesting habitat	Probable
Yellowhammer	*Emberiza citrinella*			Red	UK BAP	Birds singing in same place on multiple occasions	Probable
Reed Bunting	*Emberiza schoeniclus*			Amber	UK BAP	Individuals observed in suitable nesting habitat but never in the same place twice	Possible

Table 4: A summary of the number of all the designated bird species recorded and their associated EOAC breeding status

Designation	Confirmed Breeding	Probable Breeding	Possible Breeding	Non Breeding	Total
EU Birds Directive Annex 1	0	0	0	0	0
WCA 1981 Schedule 1	1	1	0	0	2
BoCC Red List	0	4	2	1	7
BoCC Amber List	1	4	1	4	10
UK BAP	0	6	3	1	9
No Designation	3	7	9	9	28

4 EVALUATION AND CONCLUSIONS

4.1 Assemblages

46 species were recorded of which 32 species were confirmed as breeding, probable breeding or possible breeding species.

Using the criteria adapted from Fuller (1980) the site has a breeding bird assemblage that is of importance at a District level (25-49 species).

The variety of the habitats on the site make it suitable for a wide range of species and this means that WCA, BoCC and BAP species nest here.

4.2 Important Species

Barns Owls are confirmed as breeding on the site. They are protected under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). The implications of this are set out in a separate report (RSK 2019b).

Twelve species on the red or amber list were recorded as confirmed, probable or possible breeding on the site. These birds are experiencing a national decline, with a major factor being loss of breeding habitat. Therefore, removal of large areas of breeding habitat could be detrimental, particularly the removal of the lowland meadows which are important for Skylark.

Nine UK BAP species were recorded as probable or possible breeding on the site. There is a duty under national planning policy framework (NPPF) to promote the protection and recovery of priority species.

Although none of the species recorded had populations over site-level importance, it should be considered that these are nationally declining species. Where possible mitigation should be put in place to maintain or improve their habitat.

4.3 Implications for Development

Based on the results of the survey it is clear that species are likely to be breeding in the hedgerows, in the arable fields, and along the river. The site contains lowland meadow habitats (RSK 2019a) which are particularly important for ground-nesting farmland birds such as Skylark which were recorded as probable breeders on the site and are a red-listed and UK BAP species due to rapid national population declines largely caused by habitat loss. These areas of habitat should be maintained from both ornithological and botanical perspectives (see RSK 2019a for botanical details).

The majority of breeding activity is focused on the hedgerows and the river corridor. The river corridor will not be affected by the development and only small sections of hedgerow are to be removed as part of the development. There should be a minimum 5 m buffer between the retained hedgerows and the development to maintain these as wildlife corridors for birds and other species such as bats and hedgerows. Supplementary planting of hedgerows is described in a separate report (RSK 2019c).

A colony of House Martins were recorded nesting in houses to the west of Area 3. These are adjacent to the development footprint but included in it. This population will not be lost but it is likely to be affected by the development. Measures should be taken to ensure possible flight paths to their nests are not obstructed.

To provide biodiversity net gain, a mixture of bird boxes and bricks should be incorporated into the development, including 9A Schwegler House Martin nests, Swift nest boxes and callers, and bricks/boxes suitable for House Sparrow and Starling. Further details can be provided in a mitigation and enhancement report which would also cover other taxa.

It is an offence to disturb breeding birds and a check for their presence should be carried out prior to any works taking place between March and August inclusive.

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6 FIGURES

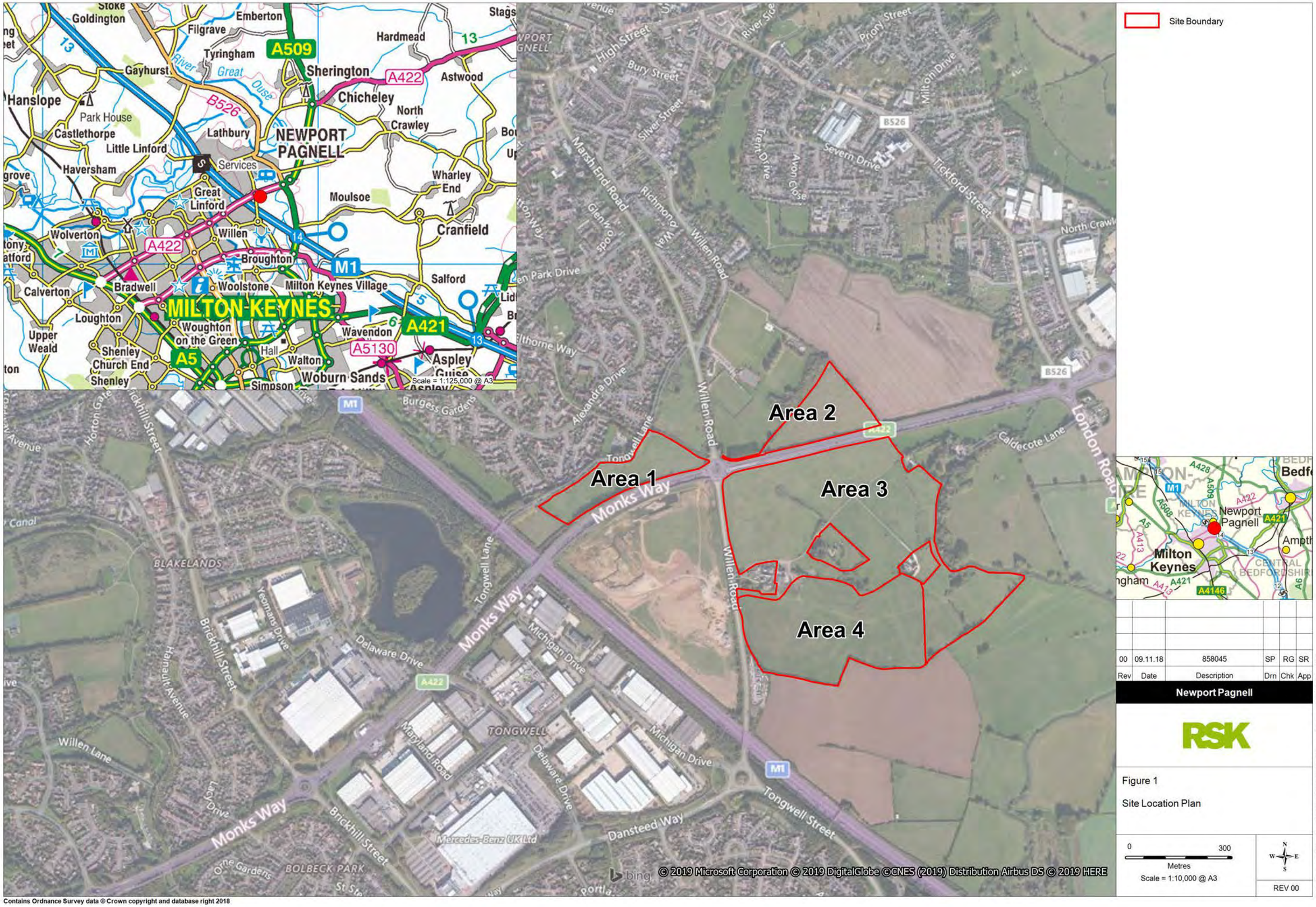
Figure 1 – Site Location Plan

Figure 2 – Breeding Bird Survey Results – April 2019

Figure 3 – Breeding Bird Survey Results – May 2019

Figure 4 – Breeding Bird Survey Results – June 2019

Figure 1 – Site Location Plan



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Newport Pagnell

RSK

Figure 1

Site Location Plan

0 300

Metres

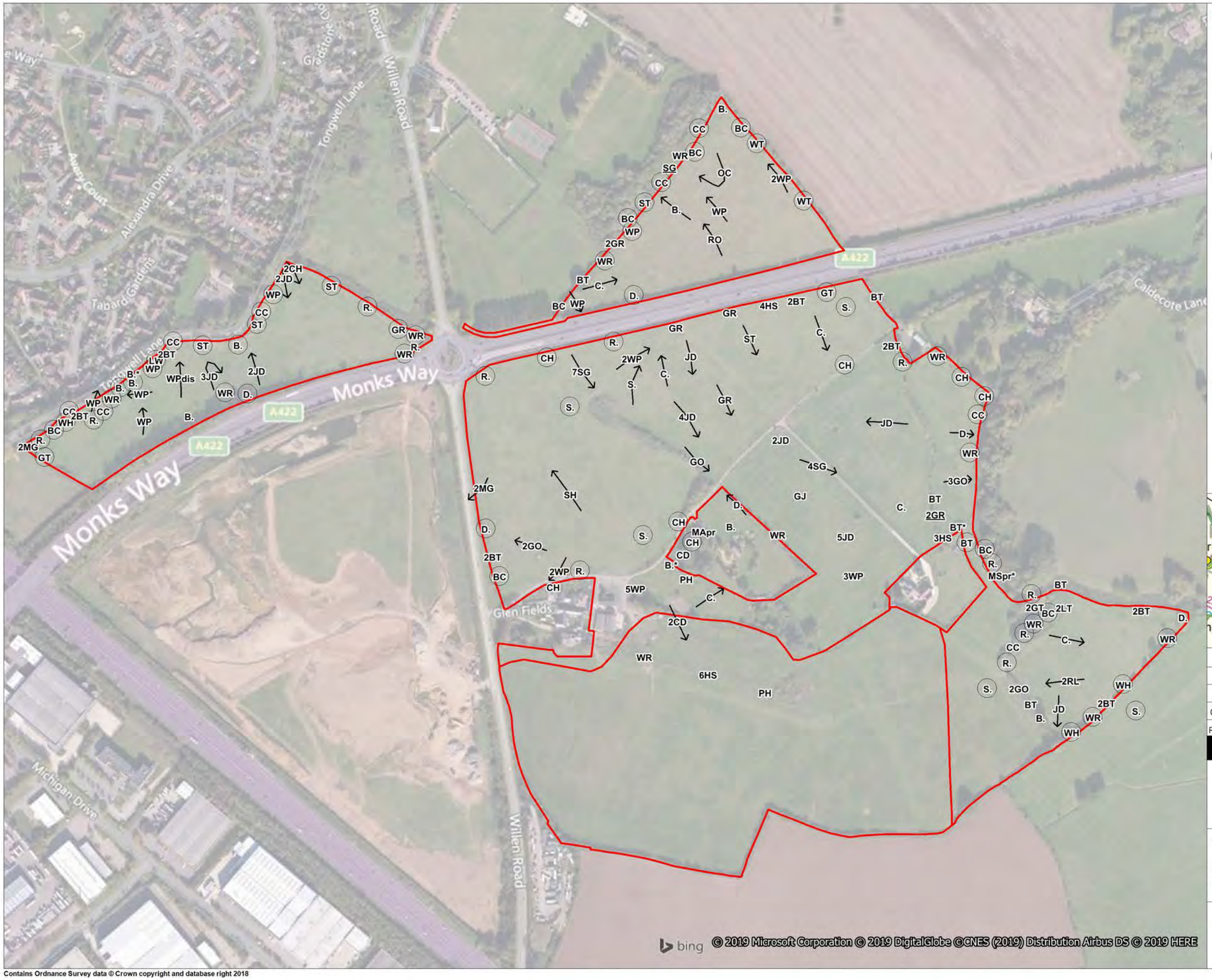
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Figure 2 – Breeding Bird Survey Results – April 2019



Site boundary

Bird Activity Codes

2B.	Number of birds	B.pr	Pair of birds
B.m	Male bird	B.fm	Female bird
B.fam	Family of birds	B.juv	Juvenile bird
B.mat	Bird carrying nesting material	B.*	Bird nest
B.food	Bird carrying food	B.dis	Bird displaying
(B.)	Bird singing	B.	Bird calling
B.	Bird alarm calling	(B.)	Aggressive bird
—B.→	Bird in flight		

Bird Species Codes

B.	Blackbird	ST	Song Thrush
BC	Blackcap	WH	Whitethroat
BT	Blue Tit	WP	Woodpigeon
C.	Carrion Crow	WR	Wren
CC	Chiffchaff	WT	Willow Tit
CD	Collared Dove		
CH	Chaffinch		
D.	Dunnock		
GJ	Greylag Goose		
GO	Goldfinch		
GR	Greenfinch		
GT	Great Tit		
HS	House Sparrow		
JD	Jackdaw		
LT	Long-tailed Tit		
LW	Lesser Whitethroat		
MA	Mallard		
MG	Magpie		
MS	Mute Swan		
OC	Oystercatcher		
PH	Pheasant		
R.	Robin		
RL	Red-legged Partridge		
RO	Rook		
S.	Skylark		
SG	Starling		
SH	Sparrowhawk		



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Newport Pagnell

RSK

Figure 2

Breeding Birds Survey
April 2019

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metres
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Figure 3 – Breeding Bird Survey Results – May 2019

Site boundary

Bird Activity Codes

2B.	Number of birds	B.pr	Pair of birds
B.m	Male bird	B.fm	Female bird
B.fam	Family of birds	B.juv	Juvenile bird
B.mat	Bird carrying nesting material	B.*	Bird nest
B.food	Bird carrying food	B.dis	Bird displaying
(B.)	Bird singing	B.	Bird calling
B.	Bird alarm calling	B.	Aggressive bird
—B.→	Bird in flight		

Bird Species Codes

B.	Blackbird	SL	Swallow
BC	Blackcap	SI	Swift
BF	Bullfinch	ST	Song Thrush
BT	Blue Tit	WH	Whitethroat
CC	Chiffchaff	WP	Woodpigeon
CH	Chaffinch	WR	Wren
D.	Dunnock	Y.	Yellowhammer
FP	Feral Pigeon		
G.	Green Woodpecker		
GC	Goldcrest		
GJ	Greylag Goose		
GO	Goldfinch		
GR	Greenfinch		
GT	Great Tit		
HM	House Martin		
HS	House Sparrow		
JD	Jackdaw		
LI	Linnet		
MA	Mallard		
MG	Magpie		
MS	Mute Swan		
PW	Pied Wagtail		
R.	Robin		
RB	Reed Bunting		
S.	Skylark		
SD	Stock Dove		
SG	Starling		



Rev	Date	Description	Drn	Chk	App
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Newport Pagnell

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Figure 3

Breeding Birds Survey
May 2019

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Figure 4 – Breeding Bird Survey Results – June 2019

Site boundary

Bird Activity Codes

2B.	Number of birds	B.pr	Pair of birds
B.m	Male bird	B.fm	Female bird
B.fam	Family of birds	B.juv	Juvenile bird
B.mat	Bird carrying nesting material	B.*	Bird nest
B.food	Bird carrying food	B.dis	Bird displaying
(B.)	Bird singing	B.	Bird calling
B.	Bird alarm calling	B.	Aggressive bird
—B.→	Bird in flight		

Bird Species Codes

B.	Blackbird
BC	Blackcap
BT	Blue Tit
C.	Carrion Crow
CC	Chiffchaff
CH	Chaffinch
D.	Dunnock
GO	Goldfinch
GR	Greenfinch
GS	Great Spotted Woodpecker
GT	Great Tit
HM	House Martin
R.	Robin
RB	Reed Bunting
S.	Skylark
SD	Stock Dove
SL	Swallow
ST	Song Thrush
WH	Whitethroat
WP	Woodpigeon
WR	Wren
Y.	Yellowhammer



Rev	Date	Description	Drn	Chk	App
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Newport Pagnell

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Figure 4

Breeding Birds Survey
June 2019

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metres
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APPENDIX A – DETAILED SURVEYS RESULTS

Table 5 below gives the detailed results of the bird species recorded during the surveys, their breeding status and their protection and red list status.

Table 5: All Bird Species Recorded during the Breeding Bird Surveys and their Breeding Status.

English name	Scientific name	EU Birds Directive Annex 1	WCA 1981 Sch 1	BoCC Red / Amber	UK or Local BAP	Species Summary	Breeding Status
Greylag Goose	***Anser anser***		Yes	Amber		Group of up to 20 observed in field but species not native in England	Probable but are feral
Mute Swan	***Cygnus olor***			Amber		Pair observed on nest along western bank of River Ouzel	Confirmed
Mallard	***Anas platyrhynchos***			Amber		Two pairs observed on garden pond and on river	Probable
Red-legged Partridge	***Alectoris rufa***					Only observed flying over	Non-breeding
Pheasant	***Phasianus colchicus***					Two individuals seen on one occasion but species not native	Possible but are feral
Eurasian Sparrowhawk	***Accipiter nisus***					Only observed flying over	Non-breeding
Oystercatcher	***Haematopus ostralegus***			Amber		Single bird observed flying over on single occasion	Non-breeding
Feral Pigeon	***Columba livia***					One observed flying over	Non-breeding
Stock Dove	***Columba oenas***			Amber		Only observed flying over	Non-breeding
Woodpigeon	***Columba palumbus***					Nest observed in scrub in centre of Area 3. Another pair and a displaying bird observed in Area 1.	Confirmed
Collared Dove	***Streptopelia decaocto***					Observed flying over and another seen in a tree but only on one occasion	Non-breeding
Barn Owl	***Tyto alba***		Yes			Breeding in nest box confirmed during specialist surveys	Confirmed
Swift	***Apus apus***			Amber		Pair seen flying over	Non-breeding
Great Spotted Woodpecker	***Dendrocopos major***					Observed in nesting habitat but only on single occasion	Possible
Green Woodpecker	***Picus viridis***					Only one bird observed, away from suitable nesting habitat	Non-breeding
Magpie	***Pica pica***					Birds observed in suitable nesting habitat	Possible

English name	Scientific name	EU Birds Directive Annex 1	WCA 1981 Sch 1	BoCC Red / Amber	UK or Local BAP	Species Summary	Breeding Status
Jackdaw	***Corvus monedula***					Only observed flying over	Non-breeding
Rook	Corvus frugilegus					Only observed flying over	Non-breeding
Carrion Crow	***Corvus corone***					All bar one sightings were of birds flying over. One sighted in the middle of a field but this does not constitute nesting habitat	Non-breeding
Willow Tit	***Poecile montanus***			Red	UK BAP	Only one bird observed, away from suitable nesting habitat	Non-breeding
Blue Tit	***Cyanistes caeruleus***					One occupied nest observed. Pairs of adult birds and a juvenile also seen.	Confirmed
Great Tit	***Parus major***					Birds observed in suitable nesting habitat	Possible
Skylark	***Alauda arvensis***			Red	UK BAP	Birds observed in arable fields, singing in same locations on multiple occasions	Probable
Swallow	***Hirundo rustica***					Single bird singing near farm complex and houses	Possible
House Martin	***Delichon urbicum***			Amber		Group nesting in houses outside of site boundary but not on the site itself	Non-breeding
Long-tailed Tit	***Aegithalos caudatus***					Birds observed in suitable nesting habitat	Possible
Chiffchaff	***Phylloscopus collybita***					Birds observed singing in same locations on two separate occasions	Probable
Blackcap	***Sylvia atricapilla***					Birds observed singing in same location on all three surveys, including in hedgerow along north of Area 2 and along the river	Probable
Lesser Whitethroat	***Sylvia curruca***					Observed singing once in northern hedge of Area 1.	Possible
Whitethroat	***Sylvia communis***					Observed singing in same location on two occasions (south-east corner of Caldecote Cottage garden)	Probable
Goldcrest	***Regulus regulus***					Individual observed singing in conifers on one occasion	Possible
Wren	***Troglodytes troglodytes***					Birds observed singing in multiple locations, each on more than one occasion	Probable

English name	Scientific name	EU Birds Directive Annex 1	WCA 1981 Sch 1	BoCC Red / Amber	UK or Local BAP	Species Summary	Breeding Status
Starling	***Sturnus vulgaris***			Red	UK BAP	Juvenile observed in northern hedgerow of Area 1 but cannot confirm that it fledged from the site. Individual birds observed in different places each time	Possible
Blackbird	***Turdus merula***					Two occupied nests observed	Confirmed
Song Thrush	***Turdus philomelos***			Red	UK BAP	Observed in suitable nesting habitat during surveys	Possible
Robin	***Erithacus rubecula***					Observed in multiple locations, some on more than one occasion	Probable
House Sparrow	***Passer domesticus***			Red	UK BAP	Birds in same location in hedgerow surrounding property on two occasions	Probable
Dunnock	***Prunella modularis***			Amber	UK BAP	Bird singing in same location in hedgerow along south of Area 1 on two occasions	Probable
Pied Wagtail	***Motacilla alba***					Only one bird seen on a single occasion, away from nesting habitat	Non-breeding
Chaffinch	***Fringilla coelebs***					Birds singing in two locations along river, both on two occasions	Probable
Bullfinch	***Pyrrhula pyrrhula***			Amber	UK BAP	Pair observed in suitable nesting habitat along river	Probable
Greenfinch	***Chloris chloris***					Bird calling/singing in same location on two occasions	Probable
Linnet	***Linaria cannabina***			Red	UK BAP	Pair observed in suitable nesting habitat	Probable
Goldfinch	***Carduelis carduelis***					Individuals observed in suitable nesting habitat	Possible
Yellowhammer	***Emberiza citrinella***			Red	UK BAP	Birds singing in same place on multiple occasions	Probable
Reed Bunting	***Emberiza schoeniclus***			Amber	UK BAP	Individuals observed in suitable nesting habitat but never in the same place twice	Possible

APPENDIX B – LEGISLATION

Nesting Birds

Birds general protection

All species of bird are protected under Section 1 of the Wildlife and Countryside Act 1981 (as amended). The protection was extended by the CRoW Act.

The legislation makes it an offence to intentionally:

- kill, injure or take any wild bird;
- take, damage or destroy the nest of any wild bird while that nest is in use or being built; or
- take or destroy an egg of any wild bird.

Birds (specially protected species)

Certain species of bird are listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) and receive protection under Sections 1(4) and 1(5) of the Act. The protection was extended by the CRoW Act. The legislation confers special penalties where the above mentioned offences are committed for any such bird and also make it an offence to intentionally or recklessly:

- disturb any such bird, whilst building its nest or it is in or near a nest containing dependant young; or
- disturb the dependant young of such a bird.

APPENDIX C – DEFINITIONS

The following evidence is used to define breeding categories during breeding bird surveys.

Possible Breeding

- Species observed in breeding season in possible nesting habitat.
- Singing male(s) present (or breeding calls heard) in breeding season

Probable Breeding

- Pair observed in suitable nesting habitat in breeding season
- Permanent territory presumed through registration of territorial behaviour (song, etc.) on at least two different days a week or more apart at the same place
- Courtship and display
- Visiting a probable nest site
- Agitated behaviour or anxiety calls from adults
- Brood patch on adult examined in the hand
- Nest building or excavating nest-hole

Confirmed Breeding

- Distraction-display or injury feigning
- Used nest or eggshells found (occupied or laid within period of survey)
- Recently fledged young (nidicolous species) or downy young (nidifugous species)
- Adults entering or leaving nest-site in circumstances indicating occupied nest (including high nest or nest-holes, the contents of which cannot be seen) or adult seen incubating
- Adult carrying faecal sac or food for young
- Nest containing eggs
- Nest with young seen or heard



Bloor Homes South Midlands

Newport Pagnell

Hazel Dormouse Survey Report

858045

OCTOBER 2019

RSK GENERAL NOTES

Project No.: 858045

Title: Newport Pagnell – Hazel Dormouse Survey Report

Client: Bloor Homes South Midlands

Date: October 2019

Office: Coventry

Status: Rev00

Author	Shona Redman	**Technical reviewer**	Ruth Morton
Signature	[redacted]	Signature	[redacted]
Date:	15 October 2019	Date:	21 October 2019
Project Manager	Patrick Dixon	**Quality reviewer**	Ruth Morton
Signature	[redacted]	Signature	[redacted]
Date:	16 October 2019	Date:	21 October 2019

RSK Environment Ltd (RSK) has prepared this report for the sole use of the client, showing reasonable skill and care, for the intended purposes as stated in the agreement under which this work was completed. The report may not be relied upon by any other party without the express agreement of the client and RSK. No other warranty, expressed or implied, is made as to the professional advice included in this report.

Where any data supplied by the client or from other sources have been used, it has been assumed that the information is correct. No responsibility can be accepted by RSK for inaccuracies in the data supplied by any other party. The conclusions and recommendations in this report are based on the assumption that all relevant information has been supplied by those bodies from whom it was requested.

No part of this report may be copied or duplicated without the express permission of RSK and the party for whom it was prepared.

Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

This work has been undertaken in accordance with the quality management system of RSK Environment Ltd.

EXECUTIVE SUMMARY

1. This report presents the results of Hazel Dormouse (***Muscardinus avellanarius***) surveys carried out in 2019 at three parcels of land off H3 Monk's Way, Newport Pagnell, collectively referred to as 'the site'.

2. A preliminary ecological appraisal undertaken by RSK in October 2018 identified areas of habitat suitable for Dormice across the site.

3. A total of 129 artificial nest-tubes were placed in suitable areas of habitat in March and checked monthly from May until October 2019.

4. No evidence of Hazel Dormouse was found. Under current proposals, there is minimal hedgerow removal; therefore, the risk to Dormice is minimal and no further consideration is required for this species. However, it would be prudent to complete a final check for Dormouse nests in conjunction with a nesting bird check prior to hedgerow removal.

CONTENTS

1 INTRODUCTION 1
1.1 Purpose of Report 1
1.2 Ecological Context 1
2 METHODS 2
2.1 General 2
2.2 Background Data Search 2
2.3 Habitat Assessment 2
2.4 Nut Search 3
2.5 Nest-tube Survey 3
2.6 Survey Limitations 4
3 RESULTS 5
3.1 Background Data Search 5
3.2 Habitat Assessment 5
3.3 Nest-tube Survey 5
4 EVALUATION AND CONCLUSIONS 6
4.1 Hazel Dormouse 6
5 REFERENCES 7
6 FIGURES 8
APPENDIX A – LEGISLATION 11

1 INTRODUCTION

1.1 Purpose of Report

This report presents the results of Hazel Dormouse (***Muscardinus avellanarius***) surveys carried out in connection with a proposed residential development on four areas of land off H3 Monk's Way, Newport Pagnell (***Figure 1***), here collectively referred to as 'the site' (OS grid references SP881428, SP874425, SP882421 and SP880421). The surveys were carried out between March and October 2019.

A preliminary ecological appraisal (PEA) undertaken by RSK in October 2018 identified suitable habitat for Hazel Dormice on the site (RSK, 2018). RSK was appointed to undertake the surveys on behalf of Bloor Homes South Midlands to provide information on any impacts the proposed residential development could have on Hazel Dormice.

The current proposals include multiple residential units, a primary school, and open spaces (including an extension to the town council playing fields and retention of ecologically sensitive areas and features).

1.2 Ecological Context

The site is on the southern edge of Newport Pagnell in Buckinghamshire (***Figure 1***). It comprises two fields north of H3 Monk's Way (Areas 1 and 2), a larger area of land south of H3 Monk's Way (Area 3), and a quarry directly east of Willen Road (Area 4). The site comprises arable land, with areas of scrub, scattered broadleaved trees, improved grassland, semi-improved grassland, hedgerows, standing water and dry ditch. There is plantation broad-leaved woodland adjacent to Area 2.

The town of Newport Pagnell separates the site from extensive agricultural land. The east of the site is bordered by the River Ouzel Wet Corridor, part of the Milton Keynes Wildlife Corridor (MKWC), which also separates the site from further agricultural land. Directly west is Willen Road and the M1 motorway, which separates the site from the Tongell Lake Local Wildlife Site (LWS), 150 m west of the site.

2 METHODS

2.1 General

The dates of each survey are presented in ***Table 1*** along with the personnel who undertook the survey. Jan Skuriat (2016-22205-CLS-CLS CL10B) and Lewis Wright (2017-32926_CLS-CLS) are both holders of a Natural England Hazel Dormouse licence. Jan is a full member of the Chartered Institute of Ecology and Environmental Management (CIEEM), and Lewis is an associate member. All surveyors are experienced in surveys of this type.

Table 1. Survey dates and personnel.

Date	Survey	Surveyors
18.03.2019	Putting out nest-tubes	Jan Skuriat and Patrick Dixon
24.05.2019	First nest-tube check	Patrick Dixon, Sophie Evans and Oliver Bulpitt
17.06.2019	Second nest-tube check	Lewis Wright and Shona Redman
23.07.2019	Third nest-tube check	Lewis Wright and Shona Redman
20.08.2019	Fourth nest-tube check	Lewis Wright and Shona Redman
10.10.2019	Final nest-tube check including collection and nut search	Lewis Wright and Patrick Dixon

2.2 Background Data Search

A search was made in October 2018 as part of the PEA (RSK, 2018). Records were obtained from Buckingham and Milton Keynes Environmental Records Centre (BMKERC).

2.3 Habitat Assessment

Habitats were assessed for their general suitability for Hazel Dormice during the PEA (RSK, 2018). Dormice generally use areas of dense woody vegetation cover and are more likely to be found where there is a wide diversity of woody species contributing to three-dimensional habitat complexity, a number of food sources, plants suitable for nest-building material, and good connectivity to other areas of suitable habitat.

2.4 Nut Search

Dormice open hazelnuts in a distinctive manner, and this survey technique centres on identifying the characteristically-opened shells. However, this method is only appropriate in areas where there is fruiting ***Corylus avellana*** (Hazel) and can only prove presence of the species. It cannot be used to prove absence or give an indication of population. Where there is no ***Corylus avellana*** (Hazel), or where population estimates are required (e.g. for European protected species licensing purposes) nest-tube survey is used.

Although ***Corylus avellana*** (Hazel) trees were present on the site, they were concentrated in the woodland adjacent to Area 2 (which was mainly off-site). This area and the area immediately adjacent to this woodland was searched for nuts.

2.5 Nest-tube Survey

According to the guidance outlined in Natural England's Hazel Dormouse Conservation Handbook (Bright ***et al***. 2006), artificial nest-tubes were placed in suitable areas of habitat along the site and checked on six occasions (***Table 1***). 129 nest tubes were placed on the site. The locations of these nest-tubes are shown in ***Figure 2.***

As detailed in ***Table 2***, monthly scores for the period over which the tubes are in place are added together and a minimum score of 20 must be reached in order to determine presence/likely absence. The monthly scores are based on 50 nest-tubes being placed on the site. As 129 were placed here, the survey effort was considerably higher than that needed to reach the required 20 points.

Table 2. Index of probability for Hazel Dormouse surveys.

Month	Index of probability
April	1
May	4
June	2
July	2
August	5
September	7
Total	**21**

Each survey visit involved checking the nest-tubes for the presence of Hazel Dormice nests and also a search for any signs of Hazel Dormice ***i.e.*** feeding remains, evidence of bark stripping for nest building or sightings. Where Dormice populations are

identified, the nest-tubes are checked by an appropriately licensed individual. This methodology can give information on population size and extent, which is necessary to inform the European protected species (EPS) licensing process and to devise mitigation measures.

2.6 Survey Limitations

There was 2 m tall ***Conium maculatum*** (Hemlock) growing along sections of transects B and D which prevented some of the tubes being checked. Hedge vegetation had also grown considerably since the tubes were placed meaning that a few tubes were missed during the surveys. However, the majority of the tubes could be checked and as such these are not seen as significant constraints.

Access was not provided to Area 4 so nest tubes could not be placed in the hedgerows bordering this area.

These survey results are valid for a maximum of 18 months. Therefore, if hedgerows will be removed after April 2021 then an updated survey will be required in summer 2021.

3 RESULTS

3.1 Background Data Search

There are no previous records of Hazel Dormice within 1 km of the site however there is a known monitoring programme in the nearby Little Linford Woods (***c***.4 km away).

3.2 Habitat Assessment

Suitable habitat for Hazel Dormice was identified in the hedgerows forming the site boundaries and running through the site. These hedges contain species that provide food for Dormice including ***Corylus avellana*** (Hazel), ***Prunus spinosa*** (Blackthorn) and ***Rubus fruticosus*** agg. (Bramble). The hedgerows provide connectivity internally and to the wider hedgerow network surrounding the site. Patches of dense scrub on the site and areas of semi-natural broadleaved woodland adjacent to the site also provide suitable habitat for Hazel Dormice.

3.3 Nest-tube Survey

No evidence of Hazel Dormice was found during the surveys and no hazelnuts opened by Hazel Dormice were identified during the nut search. ***Table 3*** shows the results of the nest-tube surveys.

Table 3. Results of Hazel Dormouse nest-tube surveys.

Visit 1	Visit 2	Visit 3	Visit 4	Visit 5
No signs of Hazel Dormice.	Wood Mouse (***Apodemus sylvaticus***) and two Wood Mouse nests observed in tubes.	Two Wood Mice and four Wood Mouse nests observed in tubes.	Eleven Wood Mice, six Wood Mouse nests and a Field Vole (***Microtus agrestis***) observed in tubes.	20 Wood Mice and eight Wood Mouse nests observed in tubes.

4 EVALUATION AND CONCLUSIONS

4.1 Hazel Dormouse

The site has been subject to an appropriate level of survey effort, and no evidence of Hazel Dormice was found. It can therefore be concluded that Hazel Dormice are likely to be absent from the site.

Only a minimal amount of hedgerow removal is proposed under the current plans and this can proceed without further consideration for Dormice. It should be noted that habitats suitable for Dormice are also generally suitable for nesting birds, which is applicable to this site. If works proceed during the nesting bird season (March to August inclusive) then a final check of hedgerows for Dormouse and bird nests should be undertaken to ensure no nests are disturbed.

In the unlikely event that a Dormouse or nest is found, then works would have to stop and specific advice and an EPS licence sought from Natural England (for which there are time and cost implications).

5 REFERENCES

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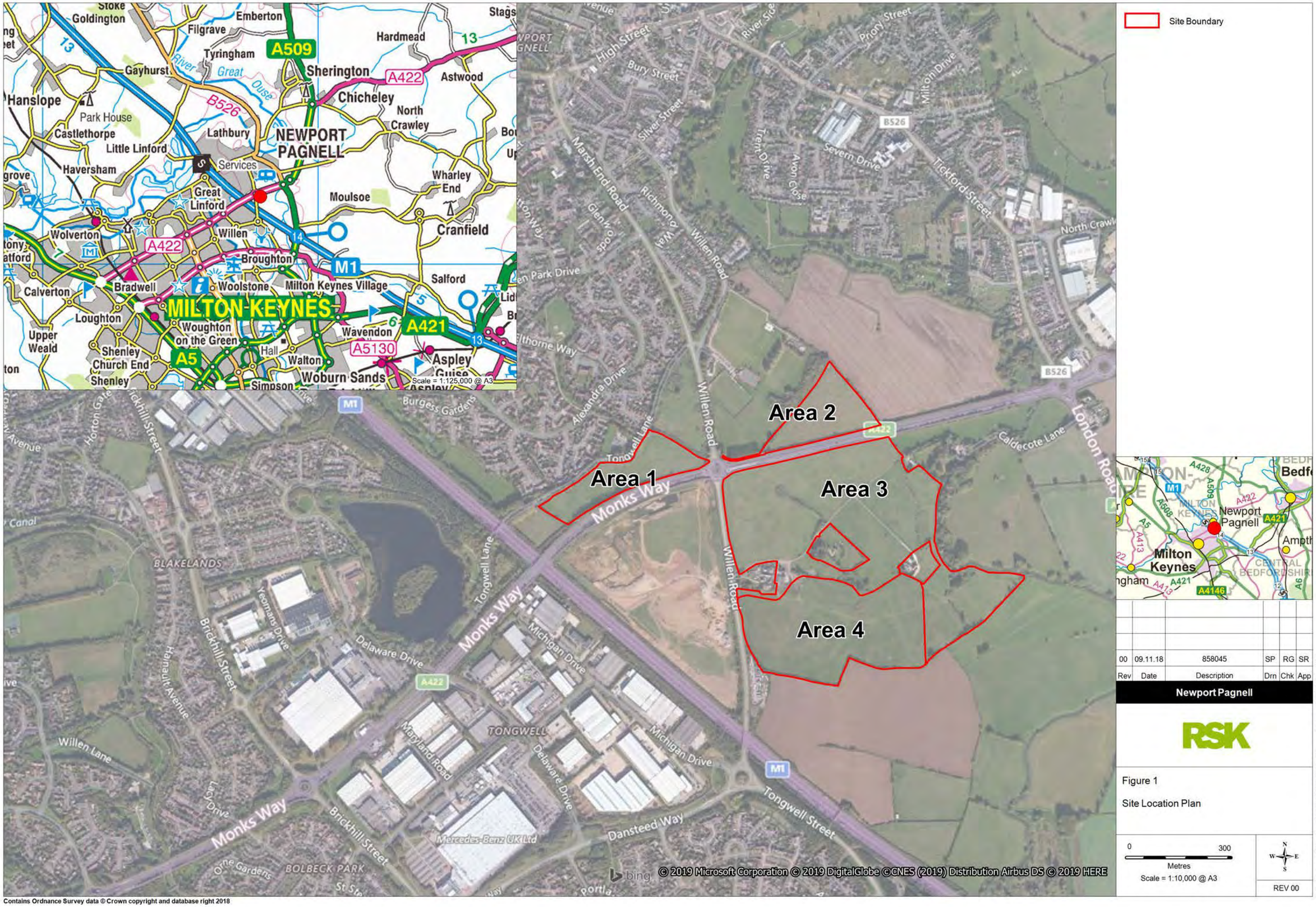
RSK. (2018) ***858045 Newport Pagnell. Preliminary Ecological Appraisal Report.*** Unpublished report.

6 FIGURES

Figure 1 – Site Location Plan

Figure 2 – Location of Dormouse Nest Tubes

Figure 1 – Site Location Plan



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Rev	Date	Description	Drn	Chk	App
00	09.11.18	858045	SP	RG	SR

Newport Pagnell

RSK

Figure 1

Site Location Plan

0 300

Metres

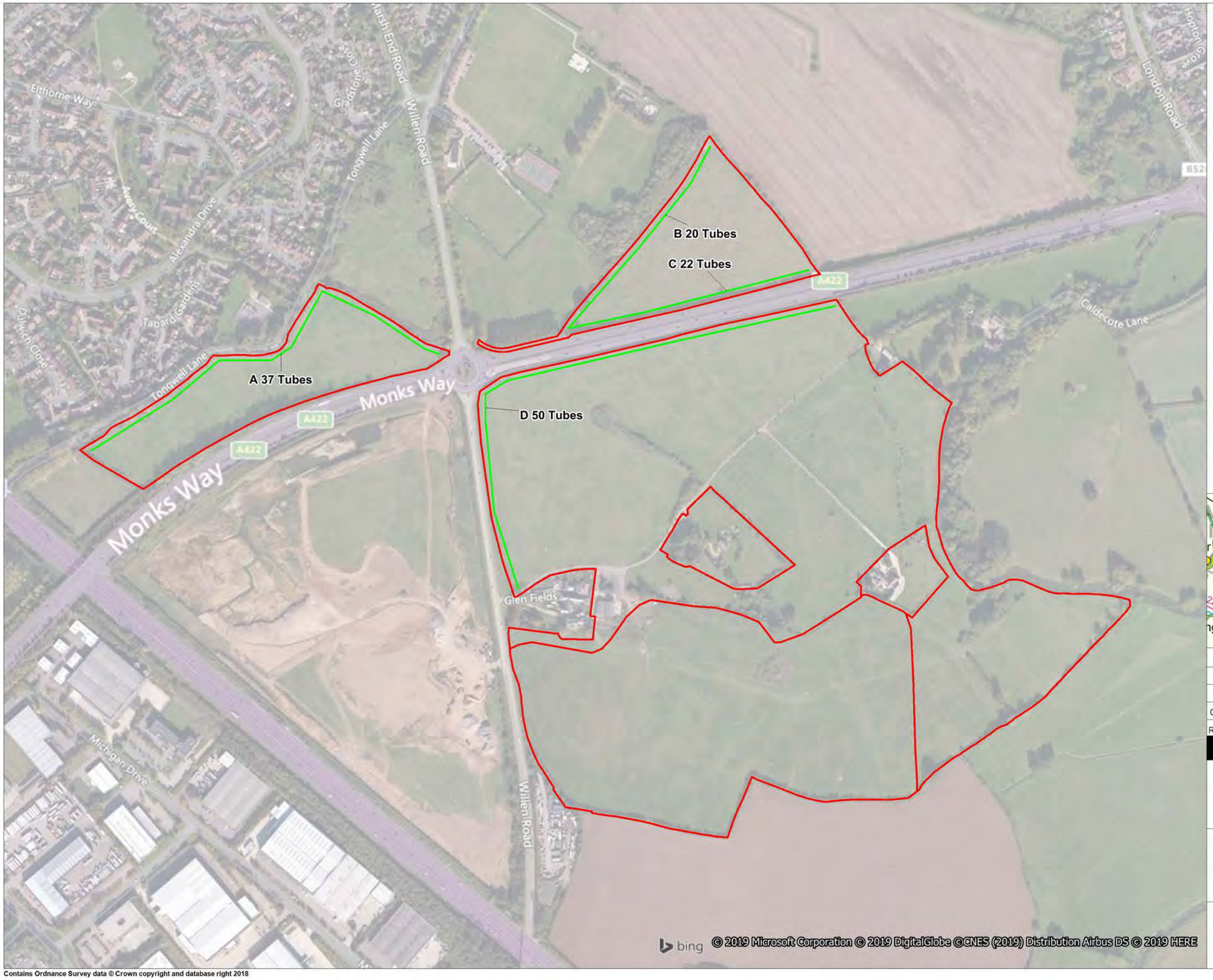
Scale = 1:10,000 @ A3

N W E S

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Figure 2 – Location of Dormouse Nest-tubes



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Rev	Date	Description	Drn	Chk	App
00	05.04.19	858045	SP	RG	SR

Newport Pagnell

RSK

Figure 2

Location of Dormouse Transects

0 150

metres

Scale = 1:5,000 @ A3

N W E S

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APPENDIX A – LEGISLATION

Hazel Dormice

Hazel Dormice are protected by the Wildlife and Countryside Act 1981 (as amended), extended by the Countryside and Rights of Way Act 2000. This legislation makes it an offence to:

- Intentionally kill, injure or take a Dormouse;
- Possess or control any live or dead specimen or anything derived from a Dormouse (unless it can be shown to have been legally acquired);
- Intentionally or recklessly damage, destroy or obstruct access to any structure or place used for shelter or protection by a Dormouse; or
- Intentionally or recklessly disturb a Dormouse while it is occupying a structure or place which it uses for that purpose.

Hazel Dormice are also European Protected Species listed on the Conservation of Habitats and Species Regulations 2017. This legislation makes it an offence to:

- Deliberately capture or kill a Dormouse;
- Deliberately disturb a Dormouse;
- Damage or destroy a breeding site or resting place of a Dormouse;

  Keep, transport, sell or exchange, or offer for sale or exchange a live or dead Dormouse or any part of a Dormouse.



Bloor Homes South Midlands

Newport Pagnell

Hedgerow Survey Report

858045

NOVEMBER 2019

RSK GENERAL NOTES

Project No.: 858045

Title: Newport Pagnell - Hedgerow Survey Report

Client: Bloor Homes South Midlands

Date: November 2019

Office: Coventry

Status: Rev00

Author	Shona Redman	**Technical reviewer**	Richard Carter
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Date:	15 August 2019	Date:	11 November 2019
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Date:	22 August 2019	Date:	11 November 2019

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Where any data supplied by the client or from other sources have been used, it has been assumed that the information is correct. No responsibility can be accepted by RSK Environment Limited for inaccuracies in the data supplied by any other party. The conclusions and recommendations in this report are based on the assumption that all relevant information has been supplied by those bodies from whom it was requested.

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Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

This work has been undertaken in accordance with the quality management system of RSK Environment Limited.

CONTENTS

EXECUTIVE SUMMARY **3**
1 INTRODUCTION **4**
1.1 Overview 4
2 METHODS **6**
2.1 Field Survey 6
2.2 Taxonomic Considerations 7
2.3 Survey Constraints 8
3 RESULTS **9**
4 EVALUATION AND CONCLUSIONS **24**
4.1 Status of Hedgerows 24
4.2 Effects of Proposed Development 24
5 REFERENCES **26**
6 FIGURES **27**

EXECUTIVE SUMMARY

1. This report presents the results of hedgerow surveys carried out in June 2019 in three parcels of land adjacent to H3 Monk's Way, Newport Pagnell.
2. A preliminary ecological appraisal undertaken by RSK in October 2018 identified hedgerows forming all site boundaries. A hedgerow survey was required to ascertain their importance.
3. A survey of 15 boundary hedgerows was carried out in June 2019 using methods adequate for evaluation of each hedge against criteria used for identifying 'important hedgerows' in the Hedgerows Regulations 1997.
4. After dismissing hedges that do not qualify for consideration under the regulations, ***e.g.*** garden hedges, the remainder were mostly found to be relatively species-poor hedges dominated by ***Crataegus monogyna*** (Hawthorn), ***Prunus spinosa*** (Blackthorn) and ***Rosa canina*** (Dog-rose).
5. Two hedgerows were found to qualify as 'important hedges' under the regulations. Current proposals do not include any removal of these hedges.
6. Once work on the hedgerows is complete, supplementary planting of native woody species in hedgerows with significant gaps would benefit connectivity and biodiversity.

1 INTRODUCTION

1.1 Overview

This report presents the results of a hedgerow survey carried out in connection with a proposed residential development on four parcels of land off H3 Monk's Way, Newport Pagnell (***Figure 1***), here collectively referred to as 'the site' (Ordnance grid references SP881428, SP874425, SP882421 and SP880421). The survey was carried out in June 2019 to assess the effects of the proposed residential development and ascertain the importance of the hedgerows.

Though documents such as the Hedgerows Regulations 1997 (here referred to as "the regulations") fail to define what a hedge is, most definitions agree that a hedge is a line of woody plants managed – currently or historically – to form a stock-proof barrier. Defunct hedges are generally accepted to be those with significant gaps, so that they are no longer stock-proof, though they are still recognisable as hedges. Inevitably, there comes a point where a hedge deteriorates into a few bushes remaining in a strip of grassland or brambles, or into a line of well-spaced mature trees, so that it no longer amounts to a hedge under any sensible definition.

A preliminary ecological appraisal (PEA) undertaken by RSK in October 2018 identified boundaries on the site that were, or might be, hedges (RSK 2018). They were subsequently surveyed in June 2019, even though some turned out not to be hedges qualifying for consideration under the regulations. These are shown in ***Figure 2***.

The hedges were surveyed using methods adequate to allow subsequent evaluation of each hedge individually under the criteria of the regulations, which identify 'important hedges' according to their historical importance and biodiversity. These are not unrelated aspects of a hedge, because it is old hedges that are diverse in their assemblage of woody species and woodland herbs, and these in turn support enhanced assemblages of invertebrates, birds and mammals.

Whether a hedge qualifies as an 'important hedge' is not pertinent to development so far as the provisions of the regulations go. They protect only agricultural hedges against agricultural removal, and planning consent is over-riding. But whether or not a hedge qualifies as an 'important hedge' is nevertheless - for the reasons set out in the preceding paragraph – a good measure of its nature conservation importance. In environmental impact assessment (EIA) it is a better measure than some other hedgerow evaluation systems such as the Hedgerow Evaluation and Grading System (HEGS) (Clements & Tofts 1992), because it focuses on the relatively permanent qualities of a hedge – its species composition, hedge-bank, and connections to other hedges, woods and ponds – rather than features which can change in a day under ordinary agricultural management, such as the manner of trimming and the frequency of small trees (<15 cm DBH), which are stressed in HEGS (because that system was designed to assess hedges pursuant to improving their management for nature conservation).

The field survey data therefore allowed each of the 15 boundaries to be assigned to one of the following categories:

- ‘Important hedges’ under the regulations.
- Borderline hedges, which might be upgradable to Important with abnormal survey effort (different things may for example be spotted in repeat surveys at different times of year). We have assigned to this category hedges where finding two more woody species in the recorded stretches or accepting one more qualifying feature would suffice.
- Hedges that are not important under the regulations;
- Hedges that do not qualify for consideration under the regulations – or fragments too small to assess.
- Boundaries carrying woody vegetation that cannot reasonably be regarded as a hedge – tree lines, scrub-edges, extremely defunct hedges etc.

2 METHODS

2.1 Field Survey

Hedgerow surveys should ideally be undertaken in the spring or summer; in this case it was carried out on 19 June 2019 by Jan Skuriat and Shona Redman, both of RSK Environment Ltd. Jan is a principal consultant with over 15 years experience of botanical surveys. He is a full member of the Chartered Institute of Ecology and Environmental Management (CIEEM). Shona is a graduate consultant with botanical skills rated at a Field Identification Skills Certificate (FISC) level 3. She is a graduate member of CIEEM. All hedges were assigned a number and surveyed using methods designed to meet the following objectives.

Hedges were surveyed in detail using methods adequate to identify hedges that are 'important hedges' under the ecological criteria used in the Hedgerow Regulations 1997 (but not other criteria e.g. historical, which have not been considered in this report), and second to provide information for nature conservation evaluation. Under the regulations, a hedgerow ends where it meets 'whether by intersection or junction' another hedgerow or feature such as a wood. A package of information was collected for each hedge (so defined) as follows:

- ***A count of woody species in an average 30 m stretch of hedge***. Woody species were listed in 30 m sample stretches of a hedgerow – 1 stretch in hedges under 100 m, 2 in hedges between 100 m and 200 m, and 3 in hedges over 200 m. Sample stretch locations were chosen according to rules in the regulations. Species listed under Schedule 3 of the regulations were used for computing the average number of species in a 30 m stretch, though other woody species were noted for nature conservation evaluation, ***e.g. Acer pseudoplatanus*** (Sycamore).
- ***Hedge-features***. Hedge features in the regulations were recorded as follows:
    - a bank or wall along 50% of the length of the hedge;
    - a ditch along 50% of the length;
    - gaps totalling less than 10% of the length;
    - one or more standard trees per 50 m of hedge;
    - a parallel hedge within 15 m;
    - three or more Schedule 2 woodland herbs in the whole hedge; or
    - four or more connections (as defined in the regulations) with other hedges, woods or ponds.
- ***Special circumstances***. Some special features modify scores used for deciding whether a hedge is an 'important hedge', ***e.g.*** location in listed northern counties, presence of one of four special woody species, location adjacent to a footpath (among others).

Interpretation of hedgerow data can be subject to ambiguities in the Hedgerow Regulations 1997 that have not been tested in legal cases. A guidance note (Department of the Environment 1997) helps in some cases. In conformance with the guidance note, only one species of ***Rosa***, ***Salix*** or ***Ulmus has*** been counted in woody species totals (thus for example ***Rosa arvensis*** and ***Rosa canina*** count as one).

Under the regulations a hedgerow is an 'important hedge' if it complies with any of the following ecological criteria:

- it contains any species listed in Part 1 of Schedule 1, Schedule 5 or Schedule 8 of the Wildlife and Countryside Act 1981 or categorised as 'endangered', 'extinct', 'rare' or 'vulnerable' in any of the British Red Data Books;
- it contains any of the following;
    - seven or more Schedule 3 woody species in an average 30 m stretch;
    - six Schedule 3 woody species in an average 30 m stretch in conjunction with three or more hedgerow-features;
    - five Schedule 3 woody species in an average 30 m stretch in conjunction with four or more hedgerow-features;
    - six or more Schedule 3 woody species in an average 30 m stretch in conjunction with any one of four significant woody species as listed in the regulations; or
- it is adjacent to a footpath, bridleway or byway, contains at least four woody species in an average 30 m stretch, and has two or more hedgerow features.

Hedges may also qualify on ecological grounds if they contain any birds categorised as a declining breeder (category 3) in 'Red Data Birds in Britain' 1990, but this cannot be determined from a single survey, and would usually apply where the fact is known from existing information sources. These criteria are applied in the hedgerow tables.

Hedges may qualify as 'important hedges' on historical grounds as well as ecological grounds. Historical matters are not addressed here, and hedge appraisals in this report relate only to whether the hedges qualify as Important on ecological grounds.

The regulations apply to agricultural hedges, but not to hedges in gardens or the grounds of premises, nor to such hedges even if they border agricultural land. The regulations are intended for the control of hedgerow removals in connection with agriculture or other land management that bears no requirement for planning consent. They do not apply to hedgerow removals where planning permission has been granted. They have been used here primarily to identify hedges having high nature conservation value.

2.2 Taxonomic Considerations

Recently planted hedges (post-1980) designed to look like old species-rich hedges (and hedges enhanced for nature conservation by additional planting) often contain ***Cornus australis*** (Asian Dogwood) supplied by nurseries in place of the native species ***Cornus sanguinea*** (Dogwood). Though they are superficially very similar, the two can easily be distinguished (at least while in leaf), and they have been distinguished in the surveys reported here. As some authoritative British Floras differ in whether they recognise

Cornus australis at species level or sub-species level, and as Schedule 3 of the regulations does not name species to sub-species level, there is an ambiguity as to whether or not ***Cornus australis*** counts as a Schedule 3 species (yes if named at sub-species level, and no if named at species level), but as it is clearly non-native it is arguably contrary to the intention of the regulations to count it as a Schedule 3 taxon. Similar problems with non-native look-alike species apply to some other Schedule 3 species. They apply to ***Acer campestre*** (Field Maple), where, however, the non-native taxa are only ever recognised at sub-species or variety level and not accepted by all authorities, making exclusion of the non-native taxa harder to justify. And they apply to ***Viburnum opulus*** (Guelder-rose) and ***Viburnum lantana*** (Wayfaring-tree), where the non-native taxa are accepted at species level by all authorities, making their exclusion essential if the look-alikes can be reliably identified (which is unfortunately not always possible at all times of the year – fruits are needed).

2.3 Survey Constraints

There was no access to the hedgerows around the edge of the quarry (Area 4) so these could not be surveyed. However, current proposals do not include any removal of these hedgerows.

3 RESULTS

The data are presented in hedgerow tables below.

Hedge 1 – 197 m – Borderline

***(a) WOODY SPECIES* - Schedule 3 species**

Whole hedge	Stretch 1	Stretch 2	Stretch 3
Corylus avellana	-	✓	-
Crataegus monogyna	✓	✓	-
Fraxinus excelsior	✓	-	-
Prunus spinosa	✓	✓	-
Rosa canina agg.	✓	✓	-
Salix fragilis	-	✓	-
Sambucus nigra	-	✓	-

Species not on schedule 3

None

Total – all species	7	4	6	-
Total – qualifying species	7	4	6	-

Average number of qualifying species per 30m stretch = 5

(b) FEATURES* - Schedule 2 woodland indicator species (> or =3) – *Geranium robertianum (1) - **No**

Number of connection points – 2 (hedges) Connects to hedges 2 and 3

Standard trees (>1 per 50m) – Yes (***Salix*** sp. and ***Fraxinus excelsior***)

Others – ditch for >50% of length

Total number of qualifying features = 2

(c) NOTES* - Field layer type.** 80% OV24a ***Urtica dioica*-*Galium aparine community, 20% MG1 ***Arrhenatherum elatius*** grassland, ***Festuca rubra*** sub-community

Bank. No bank

Ditch. Side A. Over 1 m wide at base, wet.

Verge. Side A under 1 m uncut

Fence. Wire strand, over 1.2 m

Integrity. Significant gaps

Management. Recently flailed

Cross section. Mechanically cut and leggy

***(d) MODIFYING FACTORS* -** None

Hedge 2 – 98 m – Not Important

***(a) WOODY SPECIES* - Schedule 3 species**

Whole hedge	Stretch 1	Stretch 2	Stretch 3
Crataegus monogyna	✓	-	-
Fraxinus excelsior	✓	-	-
Rosa canina agg.	✓	-	-
Sambucus nigra	✓	-	-

Species not on schedule 3

None

Total – all species	4	4	-	-
Total – qualifying species	4	4	-	-

Average number of qualifying species per 30m stretch = 4

(b) FEATURES* - Schedule 2 woodland indicator species (> or =3) – *Geranium robertianum (1) - **No**.

Number of connection points – 2 (hedges) Connects to hedges 1 and 3

Standard trees (>1 per 50m) – No

Others – Less than 10% gaps

Total number of qualifying features = 1

(c) NOTES* - Field layer type.** OV24a ***Urtica dioica*-*Galium aparine community

Bank. No bank

Ditch. No ditch

Verge. Side A under 1 m uncut. Side B under 1 m, uncut

Fence. Wire strand 0.6-1.2 m

Integrity. Stock proof

Management. Recently flailed

Cross section. Clipped and dense

***(d) MODIFYING FACTORS* -** None

Hedge 3 – 84 m – IMPORTANT

***(a) WOODY SPECIES* - Schedule 3 species**

Whole hedge	Stretch 1	Stretch 2	Stretch 3
Acer campestre	✓	-	-
Crataegus monogyna	✓	-	-
Populus tremula	✓	-	-
Prunus spinosa	✓	-	-
Quercus robur	✓	-	-
Rosa canina agg.	✓	-	-
Sambucus nigra	✓	-	-

Species not on schedule 3

None

Total – all species	7	7	-	-
Total – qualifying species	7	7	-	-

Average number of qualifying species per 30m stretch = 7

***(b) FEATURES* - Schedule 2 woodland indicator species (> or =3) – None**

Number of connection points – 2 (hedges) Connects to hedges 1 and 2

Standard trees (>1 per 50m) – Yes (***Acer campestre, Populus tremula, Quercus robur, Salix fragilis***)

Others – Ditch for >50% of length

Total number of qualifying features = 2

(c) NOTES* - Field layer type.** OV24a ***Urtica dioica*-*Galium aparine community

Bank. No bank

Ditch. Side A internal >1 m wide at base, wet

Verge. Side A 1-2 m uncut

Fence. Wire strand 0.6-1.2 m

Integrity. Minor gaps

Management. Recently flailed

Cross section. Mechanically cut and leggy

***(d) MODIFYING FACTORS* -** None

Hedge 4 – 99 m – Not Important

***(a) WOODY SPECIES* - Schedule 3 species**

Whole hedge		Stretch 1	Stretch 2	Stretch 3
Crataegus monogyna		✓	-	-
Prunus spinosa		✓	-	-
Rosa canina agg.		✓	-	-
Species not on schedule 3				
Prunus domestica		✓	-	-
Total – all species	4	4	-	-
Total – qualifying species	3	3	-	-

Average number of qualifying species per 30m stretch = 3

***(b) FEATURES* - Schedule 2 woodland indicator species (> or =3) – None**

Number of connection points – 0 or 2 Connects to 2 non-qualifying garden hedges [Note 1]

Standard trees (>1 per 50m) – No

Others – Ditch for >50% of length

Total number of qualifying features = 1

(c) NOTES* - Field layer type.** 50% OV24a ***Urtica dioica*-*Galium aparine community, 50% MG1 ***Arrhenatherum elatius*** grassland, ***Festuca rubra*** sub-community

Bank. No bank

Ditch. Side A 0.5-1 m wide at base, wet

Verge. No verge

Fence. Wire strand 0.6-1.2 m

Integrity. Minor gaps and minor leggy. Not stockproof

Management. Previously flailed (2-10 years)

Cross section. Unclipped and overgrown with outgrowth

***(d) MODIFYING FACTORS* –** None

Note 1 – The Regulations specify that one connection should be counted for each intersection with another hedgerow and do not explicitly state that these should be qualifying hedgerows under the Regulations, though it seems likely that the intended meaning is that. Neither do the Regulations state how the word 'hedgerow' should be understood in general (and the word is used in referring to non-qualifying hedgerows. We have therefore given both possible figures for the number of connections where garden hedges are involved.

Hedge 5 – 63 m – Not Important

***(a) WOODY SPECIES* - Schedule 3 species**

Whole hedge		Stretch 1	Stretch 2	Stretch 3
Crataegus monogyna		✓	-	-
Sambucus nigra		✓	-	-
Species not on schedule 3				
None				
Total – all species	2	2	-	-
Total – qualifying species	2	2	-	-

Average number of qualifying species per 30m stretch = 2

***(b) FEATURES* - Schedule 2 woodland indicator species (> or =3) – None**

Number of connection points – 3 or 4 Connects to hedge 8. Other connections are to 2 hedges outside of the survey boundary and to a non-qualifying garden hedge.

Standard trees (>1 per 50m) – No

Others – Less than 10% gaps

Total number of qualifying features = 1

(c) NOTES* - Field layer type.** OV24a ***Urtica dioica-Galium aparine community

Bank. No bank

Ditch. No ditch

Verge. Under 1 m uncut

Fence. Wire strand >1.2 m

Integrity. Stockproof

Management. Recently flailed

Cross section. Mechanically cut

***(d) MODIFYING FACTORS* –** None

Hedge 6 – 133 m – Not Important

***(a) WOODY SPECIES* - Schedule 3 species**

Whole hedge		**Stretch 1**	**Stretch 2**	**Stretch 3**
Crataegus monogyna		✓	✓	-
Salix cinerea		✓	✓	-
Species not on schedule 3				
None				
Total – all species	2	2	-	-
Total – qualifying species	2	2	-	-

Average number of qualifying species per 30m stretch = 2

(b) FEATURES* - Schedule 2 woodland indicator species (> or =3) – *Geranium robertianum*, *Geum urbanum (2) - **No**

Number of connection points – 0

Standard trees (>1 per 50m) – No

Others – Ditch for >50% of length

Total number of qualifying features = 1

(c) NOTES* - Field layer type.** 80% OV24a ***Urtica dioica*-*Galium aparine community, 20% OV24a ***Urtica dioica*-*Galium aparine*** community, with ***Conium maculatum***

Bank. No bank

Ditch. Side A <0.5 m wide at base, wet

Verge. Side B 1-2 m uncut

Fence. No fence

Integrity. Significant gaps and significantly leggy

Management. Previously flailed (2-10 years)

Cross section. Mechanically cut

***(d) MODIFYING FACTORS* –** None

Hedge 7 – 90 m – Not Important

***(a) WOODY SPECIES* - Schedule 3 species**

Whole hedge	Stretch 1	Stretch 2	Stretch 3
Crataegus monogyna	✓	-	-
Fraxinus excelsior	✓	-	-
Sambucus nigra	✓	-	-

Species not on schedule 3

None

Total – all species	3	3	-	-
Total – qualifying species	3	3	-	-

Average number of qualifying species per 30m stretch = 3

***(b) FEATURES* - Schedule 2 woodland indicator species ((> or =3) –** None

Number of connection points – None

Standard trees (>1 per 50m) – Yes (2 ***Fraxinus excelsior***)

Others – Ditch for >50% of length, <10% gaps

Total number of qualifying features = 3

(c) NOTES* - Field layer type.** OV24a ***Urtica dioica*-*Galium aparine community

Bank. No bank

Ditch. Side A >1 m wide at base, wet

Verge. Side B <1 m uncut

Fence. Side B wire strand >1.2 m

Integrity. Minor gaps. Stockproof

Management. Recently flailed

Cross section. Mechanically cut but with outgrowth

***(d) MODIFYING FACTORS* –** None

Hedge 8 – 749 m – Not Important

***(a) WOODY SPECIES* - Schedule 3 species**

Whole hedge		Stretch 1	Stretch 2	Stretch 3
Acer campestre		-	-	-
Cornus sanguinea		-	-	-
Crataegus monogyna		✓	✓	✓
Fraxinus excelsior		✓	✓	-
Ligustrum vulgare		-	✓	-
Prunus spinosa		-	-	-
Rosa rubiginosa agg.		✓	-	-
Salix caprea		-	-	-
Sambucus nigra		✓	-	-
Ulmus minor		-	-	-
Species not on schedule 3				
Malus domestica		✓	-	-
Cornus australis		✓	-	-
Total – all species	12	6	3	1
Total – qualifying species	10	4	3	1

Average number of qualifying species per 30m stretch = 2.67

***(b) FEATURES* - Schedule 2 woodland indicator species ((> or =3) – None**

Number of connection points – 1 (hedge) Connects to hedge 5

Standard trees (>1 per 50m) – No

Others – Ditch for >50% of length, <10% gaps

Total number of qualifying features = 2

(c) NOTES* - Field layer type.** 60% MG1 ***Arrhenatherum elatius grassland, Festuca rubra sub-community, 20% OV24a ***Urtica dioica*-*Galium aparine*** community, with ***Conium maculatum***, 20% MG1 ***Arrhenatherum elatius*** grassland, ***Urtica dioica*** sub-community

Bank. No bank

Ditch. Side A 0.5-1 m wide at base, dry

Verge. Side A 1-2 m uncut

Fence. Side B post and rail >1.2 m

Integrity. Stockproof

Management. Recently flailed

Cross section. Clipped and dense

***(d) MODIFYING FACTORS* –** None

Hedge 9 – 79 m – Not Important

***(a) WOODY SPECIES* - Schedule 3 species**

Whole hedge	Stretch 1	Stretch 2	Stretch 3
Crataegus monogyna	✓	-	-
Populus x canadensis	✓	-	-
Sambucus nigra	✓	-	-
Ulmus minor	✓	-	-

Species not on schedule 3

None

Total – all species	4	4
Total – qualifying species	4	4

Average number of qualifying species per 30m stretch = 4

***(b) FEATURES* - Schedule 2 woodland indicator species ((> or =3) – None**

Number of connection points – 3 (hedges) Connects to hedges 10 and 11 and a further hedge outside of the survey boundary

Standard trees (>1 per 50m) – Yes (***Populus x canadensis***)

Others – Less than 10% gaps

Total number of qualifying features = 2

(c) NOTES* - Field layer type.** 50% OV24a ***Urtica dioica*-*Galium aparine community, typical sub-community, 50% MG1 ***Arrhenatherum elatius*** grassland, ***Urtica dioica*** sub-community

Bank. No bank

Ditch. No ditch

Verge. Side A >2 m uncut, Side B >2 m uncut

Fence. Side A netting >1.2 m

Integrity. Minor leggy. Not stockproof

Management. Recently flailed

Cross section. Mechanically cut on side A, overgrown and leggy on side B

***(d) MODIFYING FACTORS* –** None

Hedge 10 – 84 m – Borderline

***(a) WOODY SPECIES* - Schedule 3 species**

Whole hedge	Stretch 1	Stretch 2	Stretch 3
Cornus sanguineus	✓	-	-
Crataegus monogyna	✓	-	-
Prunus spinosa	✓	-	-
Quercus robur	-	-	-
Ulmus minor	✓	-	-

Species not on schedule 3

None

Total – all species	5	4
Total – qualifying species	5	4

Average number of qualifying species per 30m stretch = 4

***(b) FEATURES* - Schedule 2 woodland indicator species ((> or =3) – None**

Number of connection points – 4 (hedges and wood) Connects to hedges 9 and 11, and woodland to the north

Standard trees (>1 per 50m) – Yes (***Quercus robur***)

Others – Ditch for >50% of length, <10% gaps

Total number of qualifying features = 4

(c) NOTES* - Field layer type.** OV24a ***Urtica dioica*-*Galium aparine community

Bank. No bank

Ditch. Side A 0.5-1 m wide at base, dry

Verge. Side A >2 m uncut

Fence. Side A wire strand 0.6-1.2 m

Integrity. Minor leggy and minor gaps. Not stockproof

Management. Previously flailed (2-10 years)

Cross section. Overgrown and leggy

***(d) MODIFYING FACTORS* –** None

Hedge 11 – 335 m – Not Important

***(a) WOODY SPECIES* - Schedule 3 species**

Whole hedge	Stretch 1	Stretch 2	Stretch 3
Corylus avellana	-	-	-
Crataegus monogyna	✓	✓	✓
Fraxinus excelsior	-	-	-
Ligustrum vulgare	✓	✓	✓
Prunus spinosa	-	-	-
Quercus robur	✓	✓	✓
Rosa sp***. (canina*** and ***rubiginosa*** agg***.)***	✓	✓	✓
Salix alba	-	-	-

Species not on schedule 3

None

Total – all species	8	4	4	4
Total – qualifying species	8	4	4	4

Average number of qualifying species per 30m stretch = 4

***(b) FEATURES* - Schedule 2 woodland indicator species (> or =3) – None**

Number of connection points – 2 (hedges) Connects to hedges 9 and 10

Standard trees (>1 per 50m) – No

Others – Ditch for >50% of length, <10% gaps

Total number of qualifying features = 2

(c) NOTES* - Field layer type.** 50% MG1 ***Arrhenatherum elatius grassland, ***Festuca rubra*** sub-community, 50% MG1 ***Arrhenatherum elatius*** grassland, ***Urtica dioica*** sub-community

Bank. No bank

Ditch. Side A 0.5-1 m wide at base, dry

Verge. Side A >2 m uncut, Side B <1 m uncut

Fence. Side A post and rail >1.2 m

Integrity. Stockproof

Management. Recently flailed

Cross section. Clipped and dense

***(d) MODIFYING FACTORS* –** None

Hedge 12 – 165 m – Not Important

***(a) WOODY SPECIES* - Schedule 3 species**

Whole hedge	Stretch 1	Stretch 2	Stretch 3
Crataegus monogyna	✓	✓	-
Prunus spinosa	✓	✓	-
Salix cinerea	-	-	-
Ulmus minor	✓	-	-

Species not on schedule 3

None

Total – all species	4	3	2
Total – qualifying species	4	3	2

Average number of qualifying species per 30m stretch = 2.5

***(b) FEATURES* - Schedule 2 woodland indicator species ((> or =3) – None**

Number of connection points – 3 (hedges) Connects to hedge 13 and 2 hedges outside of survey boundary

Standard trees (>1 per 50m) – No

Others – None

Total number of qualifying features = 0

(c) NOTES* - Field layer type.** OV24a ***Urtica dioica-Galium aparine community, typical sub-community

Bank. No bank

Ditch. No ditch

Verge. Side A <1 m grazed, Side B <1 m uncut

Fence. Side A wire strand 0.6-1.2 m

Integrity. Significant gaps. Not stockproof

Management. Recently flailed

Cross section. Mechanically cut, **c**lipped and dense

***(d) MODIFYING FACTORS* – None**

Hedge 13 – 408 m – IMPORTANT

***(a) WOODY SPECIES* - Schedule 3 species**

Whole hedge	Stretch 1	Stretch 2	Stretch 3
Crataegus monogyna	✓	✓	-
Fraxinus exclesior	✓	✓	-
Populus x canadensis	✓	-	-
Prunus spinosa	✓	✓	✓
Quercus robur	-	-	-
Rosa sp***. (arvensis*** and ***canina)***	✓	✓	-
Salix alba	✓	-	-
Sambucus nigra	-	✓	✓
Ulmus minor	✓	✓	✓

Species not on schedule 3

None

Total – all species	9	7	6	3
Total – qualifying species	9	7	6	3

Average number of qualifying species per 30m stretch = 5.33

***(b) FEATURES* - Schedule 2 woodland indicator species (> or =3) – None**

Number of connection points – 4 (hedges) Connects to hedges 12 and 14, and 2 hedges outside of the survey boundary

Standard trees (>1 per 50m) – Yes (***Fraxinus excelsior, Populus x canadensis, Quercus robur***)

Others – Parallel hedge within 15 m, <10% gaps

Total number of qualifying features = 4

(c) NOTES* - Field layer type.** OV24a ***Urtica dioica-Galium aparine community, typical sub-community

Bank. No bank

Ditch. No ditch

Verge. Side A <1 m uncut, Side B >2 m uncut

Fence. Side A wire strand >1.2 m

Integrity. Stockproof

Management. Recently flailed

Cross section. Mechanically cut, **c**lipped and dense

***(d) MODIFYING FACTORS* – None**

Hedge 14 – 93 m – Not Important

***(a) WOODY SPECIES* - Schedule 3 species**

Whole hedge	Stretch 1	Stretch 2	Stretch 3
Crataegus monogyna	✓	-	-
Sambucus nigra	✓	-	-
Ulmus minor	✓	-	-

Species not on schedule 3

None

Total – all species	3	3
Total – qualifying species	3	3

Average number of qualifying species per 30m stretch = 3

***(b) FEATURES* - Schedule 2 woodland indicator species ((> or =3) – None**

Number of connection points – 2 (hedges) Connects to hedge 13 and a hedge outside of the survey boundary

Standard trees (>1 per 50m) – No

Others – Ditch for >50% of length, <10% gaps

Total number of qualifying features = 2

(c) NOTES* - Field layer type.** OV24a ***Urtica dioica-Galium aparine community, typical sub-community

Bank. No bank

Ditch. Side B <0.5 m wide at base, dry

Verge. Side A <1 m uncut, Side B <1 m uncut

Fence. Side A wire strand >1.2 m

Integrity. Minor leggy and minor gaps. Not stockproof

Management. Recently flailed

Cross section. Mechanically cut, overgrown and leggy

***(d) MODIFYING FACTORS* – None**

Hedge 15 – 56 m – Not Important

***(a) WOODY SPECIES* - Schedule 3 species**

Whole hedge	Stretch 1	Stretch 2	Stretch 3
Crataegus monogyna	✓	-	-
Fraxinus excelsior	✓	-	-
Sambucus nigra	✓	-	-

Species not on schedule 3

None

Total – all species	3	3
Total – qualifying species	3	3

Average number of qualifying species per 30m stretch = 3

***(b) FEATURES* - Schedule 2 woodland indicator species (> or =3) – None**

Number of connection points – 0

Standard trees (>1 per 50m) – Yes (***Fraxinus excelsior***)

Others – Ditch for >50% of length, <10% gaps

Total number of qualifying features = 3

(c) NOTES* - Field layer type.** OV24a ***Urtica dioica-Galium aparine community, typical sub-community

Bank. No bank

Ditch. Side A 0.5-1 m wide at base, dry

Verge. Side A 1-2 m cut, Side B 1-2 m uncut

Fence. Side A post and rail 0.6-1.2 m

Integrity. Minor leggy. Stockproof

Management. Recently flailed

Cross section. Mechanically cut on Side A, overgrown on side B

***(d) MODIFYING FACTORS* – None**

4 EVALUATION AND CONCLUSIONS

4.1 Status of Hedgerows

Most of the hedges on site are species-poor, being dominated by ***Crataegus monogyna*** (Hawthorn), ***Prunus spinosa*** (Blackthorn) and ***Rosa canina*** agg. (Dog-rose). Also frequent along many of the hedges are ***Fraxinus excelsior*** (Ash), ***Sambucus nigra*** (Elder) and ***Ulmus minor*** (Small-leaved Elm). Species occasionally present along the hedges include ***Acer campestre*** (Field Maple), ***Corylus avellana*** (Hazel), ***Cornus sanguinea*** (Dogwood), ***Ligustrum vulgare*** (Wild privet), ***Populus x canadensis*** (Hybrid Black-poplar) and ***Quercus robur*** (Pedunculate Oak).

The understoreys are largely dominated by OV24a ***Urtica-dioica*-*Galium aparine*** community and MG1 ***Arrhenatherum elatius*** grassland with ***Rubus fruticosus*** agg. (Bramble) present in all hedges. Herbaceous woodland indicator species are few and limited to occasional ***Geranium robertianum*** (Herb-robert) and ***Geum urbanum*** (Wood Avens). However, due to summer growth of the hedgerows, large areas of the ground flora were obscured at the time of the survey, and other species may have been missed. In those cases where this could make the difference between a hedge being classed as 'important' or 'not important', the hedges have been classified as 'borderline' as a survey earlier in the year may reveal a more diverse ground flora. This applies to ***Hedgerows 1***, and ***10***. Only ***Hedgerows 3*** and ***13*** are classed as 'important' under the regulations.

All of the hedges have been flailed either recently or within the last 10 years, although in some cases this only applies to one side of the hedge and the other is left unmanaged. They are all planted on land that is generally flat although the majority have a ditch running along the base.

Seven of the hedges have standard trees in great enough numbers (***i.e.*** on average more than one per 50 m) to count as a feature defined by the regulations. Species present included ***Acer campestre*** (Field Maple), ***Fraxinus excelsior*** (Ash), ***Populus*** x ***canadensis*** (Hybrid Black-poplar), ***Quercus robur*** (Pedunculate Oak), ***Salix*** sp. (Willow species).

4.2 Effects of Proposed Development

Under current proposals, ***Hedgerows 8*** and ***12*** will have ***c***.20 m and ***c.***10 m sections removed respectively, to allow construction of new access roads. Both of these class as hedgerows under the regulations but are not classed as 'important'. If removal of the hedgerow sections will be covered under a planning consent, then this overrides the regulations and sections can be removed without further action[1].

However, if hedgerow removal will not be covered by a planning consent then the local planning authority (LPA) must be informed of the intention to remove sections of these hedgerows (or any other hedgerow qualifying under the regulations) by means of a

[1] NB: Hedges provide habitat suitable for nesting birds therefore hedges should be removed outside of the nesting season (March to August inclusive) or checked by an ecologist prior to removal.

hedgerow removal notice. The LPA then has 42 days to issue either a hedgerow retention notice or a written notice giving permission to remove the hedgerow sections in the proposed way (within 2 years of the notice). If the LPA do not respond in 42 days, then hedgerow removal can proceed.

As sections of ***Hedgerows 8*** and ***12*** will need to be removed for the works, compensation should include planting in gaps in other hedgerows to increase connectivity and species diversity in the hedgerow network. This planting should focus on those hedges identified as having significant gaps and must include a range of native species ***e.g. Acer campestre*** (Field Maple), ***Corylus avellana*** (Hazel), and ***Sambucus nigra*** (Elder).

Other effects are anticipated on the hedgerows ***e.g.*** increased lighting, but these, and the associated mitigation, are covered in separate protected species reports.

5 REFERENCES

Clements, D.K. & Tofts, R.J. (1992). ***Hedgerow Evaluation and Grading System (HEGS).*** Countryside Planning and Management.

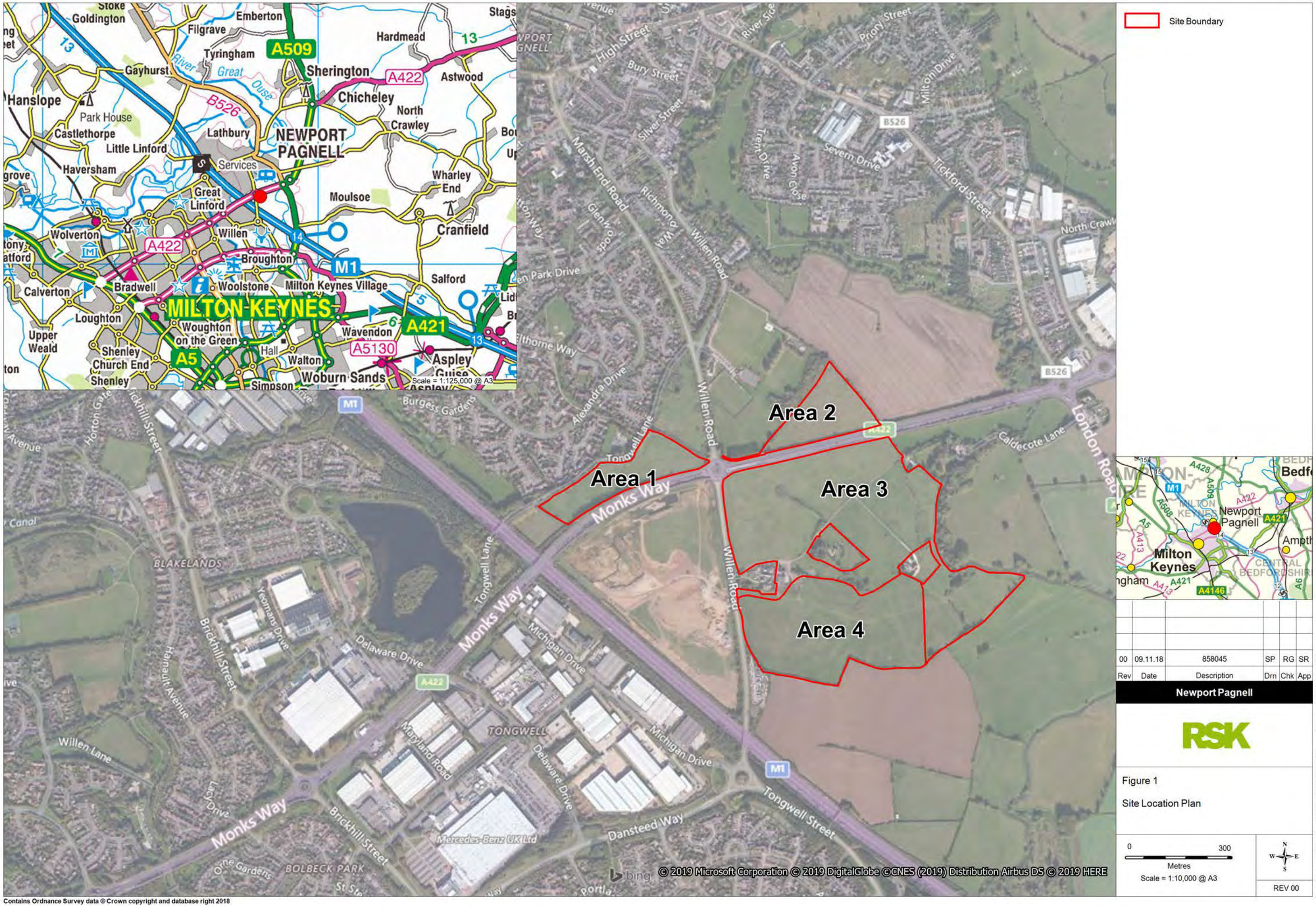
RSK (2018). ***Newport Pagnell*** – ***Preliminary Ecological Appraisal***. Unpublished report.

6 FIGURES

Figure 1 – Site Location Plan

Figure 2 – Hedgerow Survey Results

Figure 1 – Site Location Plan



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Rev	Date	Description	Drn	Chk	App
00	09.11.18	858045	SP	RG	SR

Newport Pagnell

RSK

Figure 1

Site Location Plan

0 300

Metres

Scale = 1:10,000 @ A3

N W E S

REV 00

File Name : U:\Ecology\858000s\858045 - Newport Pagnell PEAI07 - GIS

Figure 2 – Hedgerow Survey Results

Site boundary
Important hedgerow
Borderline important hedgerow
Unimportant hedgerow
Garden hedgerow
Hedgerow outside survey boundary



Rev	Date	Description	Drn	Chk	App
00	06.09.19	858045	SP	RG	SR

Newport Pagnell

RSK

Figure 2

Hedgerow Survey

0 150
metres
Scale = 1:5,000 @ A3

N W E S

REV 00

File Name : U:\Ecology\858000s\858045 - Newport Pagnell PEA\07 - GIS

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Bloor Homes South Midlands

Newport Pagnell

NVC Survey Report

858045

JANUARY 2020

RSK GENERAL NOTES

Project No.: 858045

Title: Newport Pagnell – NVC Survey Report

Client: Bloor Homes South Midlands

Date: January 2020

Office: Coventry

Status: Rev00

Author	Shona Redman	**Technical reviewer**	Richard Carter
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Date:	21 January 2020	Date:	24 January 2020
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Date:	21 January 2020	Date:	24 January 2020

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This work has been undertaken in accordance with the quality management system of RSK Environment Ltd.

EXECUTIVE SUMMARY

1. This report presents the results of a National Vegetation Classification (NVC) survey carried out in June 2019 in a parcel of land adjacent to H3 Monk's Way, Newport Pagnell.

2. A preliminary ecological appraisal was undertaken at the site by RSK in October 2018. An updated inspection of the habitats on site in May 2019 identified two herb-rich traditional ridge-and-furrow fields which required further botanical assessment in the form of an NVC survey.

3. Quadrat sampling was used to show that the grassland in the survey area shows affinities to MG5b *Cynosurus cristatus* - *Centaurea nigra* grassland, *Galium verum* sub-community.

4. This grassland qualifies as the priority habitat 'lowland meadow' and should be retained with a suitable buffer, without further agricultural improvement and with a suitable management regime to maintain the floristic diversity.

CONTENTS

1 INTRODUCTION 1
1.1 Purpose of Report 1
1.2 Ecological Context 1
2 METHODS 2
2.1 General 2
2.2 Survey Methodology 2
2.3 Nomenclature 3
2.4 Constraints 3
3 RESULTS 4
3.1 NVC 4
4 EVALUATION AND CONCLUSIONS 7
4.1 NVC 7
5 REFERENCES 8
6 FIGURES 9

APPENDIX A – RELEVANT POLICY 12

1 INTRODUCTION

1.1 Purpose of Report

This report presents the results of a national vegetation classification (NVC) survey carried out in connection with a proposed residential development on four parcels of land off H3 Monk's Way, Newport Pagnell (*Figure 1*), here collectively referred to as 'the site' (OS grid references SP881428, SP874425, SP882421 and SP880421). The survey was carried out in June 2019.

RSK undertook a preliminary ecological appraisal (PEA) at the site in October 2018 (RSK 2018). An updated inspection of the habitats by an experienced botanist in May 2019 identified two traditional ridge-and-furrow fields which were suspected to be unimproved grassland due to the presence of herb-rich areas (*Figure 2*). Unimproved grasslands have protection under the planning system as priority habitats and as such both fields required further botanical assessment in the form of an NVC survey. RSK undertook the survey on behalf of Bloor Homes South Midlands to provide information on the botanical significance of the fields, and any impacts the proposed residential development could have on them.

1.2 Ecological Context

The site is on the southern edge of Newport Pagnell in Buckinghamshire (*Figure 1*). It comprises two fields north of H3 Monk's Way (Areas 1 and 2), a larger area of land south of H3 Monk's Way (Area 3), and a quarry directly east of Willen Road (Area 4). The site comprises arable land, with areas of scrub, scattered broadleaved trees, improved grassland, semi-improved grassland, hedgerows, standing water and dry ditch. There is plantation broad-leaved woodland adjacent to Area 2. The fields that required the NVC survey are in Area 3, and they are here referred to as *Fields 1* and *2* with *Field 1* being the more western of the two (*Figure 2*).

The town of Newport Pagnell separates the site from extensive agricultural land. The east of the site is bordered by the River Ouzel Wet Corridor (ROWC), part of the Milton Keynes Wildlife Corridor (MKWC), which also separates the site from further agricultural land. Directly west is Willen Road and the M1 motorway, which separates the site from the Tongell Lake Local Wildlife Site (TLLWS) 150 m west of the site.

2 METHODS

2.1 General

The two ridge-and-furrow fields were subjected to a further botanical survey in the form of an NVC. The NVC survey was carried out on 18 June 2019 by Jan Skuriat and Shona Redman (RSK consultants). Jan, the lead surveyor, is a principal consultant with over 20 years of experience and a full member of the Chartered Institute of Ecology and Environmental Management (CIEEM). He is experienced in carrying out NVC Surveys.

2.2 Survey Methodology

Plant assemblages were described using the methods of the NVC. NVC types were largely identified in the field from simple observation and experience, but quadrat sampling was carried out to confirm identification of the main NVC type in the NVC Survey.

Quadrat data were collected from homogeneous stands of vegetation following the standard methods for identifying NVC types (Rodwell 2006). The cover of each species was estimated in 2 m^2 squares (quadrats) and was recorded on the Domin Scale (10 - over 90% cover, 9 - 76-90%, 8 - 51-75%, 7 - 34-50%, 6 - 26-33%, 5 - 11-25%, 4 - 5-10%, 3 - under 5% yet frequent, 2 - under 5% and occasional, 1 - under 5% and rare). Five quadrats were recorded for each stand providing the cover for each sample but also frequency estimates for each species.

The data are presented as a floristic table in the style of the definitive NVC tables given in *British Plant Communities* (Rodwell 1992). Species are ordered by their relative abundance, first by frequency class (class I – 0-20%, II – 21-40%, III -41-60%, IV – 61-80%, V – 81-100%), and then by maximum cover value on the Domin Scale; any remaining species ties are then ordered alphabetically.

Stands of vegetation were identified from quadrat data with the assistance of the computer-program MATCH (Malloch 1999), which computes similarity-coefficients between quadrat data and the published NVC tables in *British Plant Communities* (because these define the NVC communities and sub-communities). This gives only an initial indication of which NVC types the data are most likely to have been drawn from – the highest coefficient does not necessarily indicate a correct NVC diagnosis. It is always necessary to identify the NVC type through careful consideration of the NVC descriptions in *British Plant Communities* (Rodwell 1992). In the floristic tables, matching coefficients in bold represent acceptable NVC diagnoses, and those in italics represent informative but individually unacceptable diagnoses, e.g. cases where a stand of vegetation is transitional to the indicated coefficient.

An eight figure Ordnance Survey grid reference was recorded for each of the quadrats surveyed allowing the exact location of the field surveys to be mapped (*Figure 2*).

2.3 Nomenclature

Plant nomenclature in this report follows Stace (2019) for native and naturalised species of vascular plant. Plant names in the text are given with scientific names first, followed by the English name in brackets. Introduced species and garden varieties were identified using the relevant texts.

2.4 Constraints

June is the ideal time of year for NVC Survey. The lists of species in the floristic table therefore adequately describes the flora of the field with the proviso that a list from a single site-visit can never be completely exhaustive.

Both fields had been topped and grazed prior to the survey. Patches still remained in *Field 2* where species could be identified but the topping of *Field 1* was more severe and the NVC could not be performed in this field due to the difficulties of accurately identifying and estimating the abundance of the species present. Therefore, only *Field 2* could be classified using the NVC.

3 RESULTS

3.1 NVC

Both fields contain evidence of ridge-and-furrow, which was produced by prolonged ploughing, causing soil to build up in regularly spaced ridges. The fields show hints of the aratral curve, caused by turning the oxen at the end of each plough run. This was a method of cultivation typical of the medieval period and later. More recently, these fields appear to be rotationally grazed by sheep.

Field 1 could not be assessed during the NVC survey because it had been recently topped but earlier in the season appeared to be similar in composition or even more flower rich (*Plate 1* below) to *Field 2* and also exhibits ridge-and-furrow. *Field 2* was assessed and quadrat locations are provided in *Figure 2,* along with those areas identified as botanically interesting during the updated inspection. The field is largely unimproved mesotrophic grassland that is transitional between **MG5b *Cynosurus cristatus* - *Centaurea nigra* grassland, *Galium verum* sub-community** and **MG6c *Lolium perenne – Cynosurus cristatus* grassland, *Trisetum flavescens* sub-community** but with greater affinities to **MG5b *Cynosurus cristatus* - *Centaurea nigra* grassland, *Galium verum* sub-community.**

The floristic table is given below in *Table 1*.

Table 1: Floristic table for five 2×2m quadrats in unimproved mesotrophic grassland.

Species	Q1	Q2	Q3	Q4	Q5	Freq	Cover
Agrostis capillaris	5	7	7	5	7	V	5-7
Festuca rubra	7	5	5	4	4	V	4-7
Conopodium majus	3	4	4	3	6	V	3-6
Galium verum	3	4	5	3	4	V	3-5
Holcus lanatus	5	3	3	3	3	V	3-5
Lolium perenne	5	3	3	3	3	V	3-5
Achillea millefolium	3	3	3	4	3	V	3-4
Dactylis glomerata	3	3	4	3	4	V	3-4
Ranunculus bulbosus	4	3	3	3	3	V	3-4
Geranium dissectum	2	2	3	2	2	V	2-3
Poa pratensis	1	2	2	3	3	V	1-3
Trifolium repens	2	1	3	2	1	V	1-3
Veronica chamaedrys	3	3	3	1	2	V	1-3
Phleum bertolonii	1	1	2	1	1	V	1-2
Cynosurus cristatus	5	7	-	7	3	IV	3-7
Geranium molle	3	2	2	2	-	IV	2-3
Crepis capillaris	-	2	1	2	1	IV	1-2
Rumex acetosa	2	-	1	1	2	IV	1-2
Taraxacum agg.	2	1	2	2	-	IV	1-2
Poa trivialis	2	2	-	-	4	III	2-4

Alopecurus pratensis	4	-	1	1	-	III	1-4
Carex hirta	2	3	2	-	-	III	2-3
Luzula campestris	3	3	2	-	-	III	2-3
Lotus corniculatus	3	-	1	2	-	III	1-3
Plantago lanceolata	1	-	-	2	1	III	1-2
Trifolium dubium	-	2	1	2	-	III	1-2
Cerastium glomeratum	2	-	-	-	3	II	2-3
Trisetum flavescens	-	3	2	-	-	II	2-3
Cerastium fontanum	3	-	-	1	-	II	1-3
Hypochaeris radicata	-	-	-	2	2	II	2
Scorzoneroides autumnalis	1	2	-	-	-	II	1-2
Medicago arabica	-	2	-	-	-	I	2
Bromus hordeaceus	-	1	-	-	-	I	1
Carex flacca	1	-	-	-	-	I	1
Convolvulus arvensis	1	-	-	-	-	I	1
Jacobaea vulgaris	-	1	-	-	-	I	1

Sub-community matching coefficients: 1: MG5 57.72; 2: MG6c 57.65; 3: MG5b 57.08; 4: MG6b 56.55; 5: MG5a 55.92; 6: MG6 54.86; 7: MG6a 52.21; 8: MG3 51.32; 9: MG5c 49.93.

Diagnosis: **MG5b *Cynosurus cristatus – Centaurea nigra* grassland, *Galium verum* sub-community.** The field has some affinities with **MG6 *Lolium perenne – Cynosurus cristatus* grassland** though it is more herb-rich and lacks the improvement sometimes associated with this grassland type.

The herb-rich communities in *Field 2* are restricted to mounds and ridge-and-furrow. The preservation of these historic features in the landscape suggests long established grassland and this is supported by the species present including an abundance of *Conopodium majus* (Pignut), a species that is slow to establish itself (usually over 100 years). The fields have a high proportion of herbs rather than grasses and generally lack coarse grasses and semi-ruderal weedy species. Grasses include abundant *Agrostis capillaris* (Common Bent), *Cynosurus cristatus* (Crested Dog's-tail) and *Festuca rubra* (Red Fescue). Other grasses and graminoids at lower levels of abundance include *Alopecurus pratensis* (Meadow Foxtail), *Bromus hordeaceus* (Soft Brome), *Carex flacca* (Glaucous Sege), *Carex hirta* (Hairy Sedge), *Dactylis glomerata* (Cock's-foot), *Holcus lanatus* (Yorkshire-fog), *Lolium perenne* (Perennial Rye-grass), *Luzula campestris* (Field Wood-rush), *Phleum bertolonii* (Smaller Cat's-tail), *Poa pratensis* (Smooth Meadow-grass), *Poa trivialis* (Rough Meadow-grass) and *Trisetum flavescens* (Yellow Oat-grass). The grassland is forb-rich with species present in high abundance including *Achillea millefolium* (Yarrow), *Conopodium majus* (Pignut), *Galium verum* (Lady's Bedstraw) and *Ranunculus bulbosus* (Bulbous Buttercup). Other forbs present at a lower abundance include *Cerastium fontanum* (Common Mouse-ear), *Cerastium glomeratum* (Sticky Mouse-ear Chickweed), *Convolvulus arvensis* (Field Bindweed), *Crepis capillaris* (Smooth Hawk's-beard), *Geranium dissectum* (Cut-leaved Crane's-bill), *Geranium molle* (Dove's-foot Crane's-bill), *Hypochaeris radicata* (Cat's-

ear), *Jacobaea vulgaris* (Common Ragwort), *Lotus corniculatus* (Bird's-foot-trefoil), *Medicago arabica* (Spotted Medick), *Plantago lanceolata* (Ribwort Plantain), *Rumex acetosa* (Common Sorrel), *Scorzoneroides autumnalis* (Autumn Hawkbit), *Trifolium*



repens (White Clover), *Taraxacum* agg. (Dandelion), *Trifolium dubium* (Lesser Trefoil) and *Veronica chamaedrys* (Germander Speedwell).

Plate 1. Field 1 during the updated inspection in May 2019. Species present include Conopodium majus (Pignut), Luzula campestris (Field Wood-rush), Ranunculus bulbosus (Bulbous Buttercup) and Veronica chamaedrys (Germander Speedwell).

Although the grassland is transitional between MG5 *Cynosurus cristatus* - *Centaurea nigra* grassland and MG6 *Lolium perenne – Cynosurus cristatus* grassland, it has greater affinities to MG5 *Cynosurus cristatus* - *Centaurea nigra* grassland, specifically the *Galium verum* sub-community due to the herb-rich nature of the grassland including abundant *Conopodium majus* (Pignut) and *Galium verum* (Lady's Bedstraw). The most frequent grasses are the fined-leaved *Agrostis capillaris* (Common Bent), *Cynosurus cristatus* (Crested Dog's-tail) and *Festuca rubra* (Red Fescue), again typical of MG5 grassland. MG5 grassland is the typical grassland of ridge-and-furrow which fits with the history of the field and the majority of the field does not show the improvement occasionally associated with MG6 *Lolium perenne – Cynosurus cristatus* grassland.

Although *Field 1* could not be analysed during the NVC survey it appeared similar in composition to *Field 2* (as exhibited in *Plate 1*) during the updated inspection in May 2019 and seems to be largely unimproved MG5 *Cynosurus cristatus* - *Centaurea nigra* grassland. This grassland classifies as the priority habitat 'lowland meadow' under Section 41 of the NERC Act 2006.

4 EVALUATION AND CONCLUSIONS

4.1 NVC

Field 2 most closely matches MG5b *Cynosurus cristatus* - *Centaurea nigra* grassland, *Galium verum* sub-community which is typical of ridge-and-furrow and classifies as the priority habitat 'lowland meadow'. *Field 1* is assumed to have a similar composition. This grassland is typical of unimproved hay meadows, which are long established. It would therefore be nearly impossible to recreate this grassland as it would need to be managed for over 100 years again to create the same composition. MG5 grasslands have been some of the fastest declining habitats of the last century and '*since the late 1960's it has sustained large losses due to drainage, ploughing and re-seeding and from the use of high rates of fertilisers. There is now less than 6,000 ha remaining in England*'.(Natural England 2013). The grassland is likely to be of at least parish significance, possibly even local significance due to the improvement of most other grasslands and the limited distribution of traditional ridge-and-furrow. Furthermore, lowland meadows are important for farmland birds including Skylark (*Alauda arvensis*) which were recorded in both *Fields 1* and *2* during breeding birds surveys at the site (RSK 2019).

The National Planning Policy Framework (NPPF) states that "*plans should promote the conservation, restoration and enhancement of priority habitats*" and "*development resulting in the loss or deterioration of irreplaceable habitats should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists*". Therefore, these grasslands, or at least the most botanically interesting areas should be retained within the scheme with a suitable buffer, without any further agricultural improvement and also be maintained under a suitable management regime so that their floristic diversity does not diminish as a result of the development. If it is not possible to maintain these areas, lowland meadow habitats should be recreated in other areas of the site.

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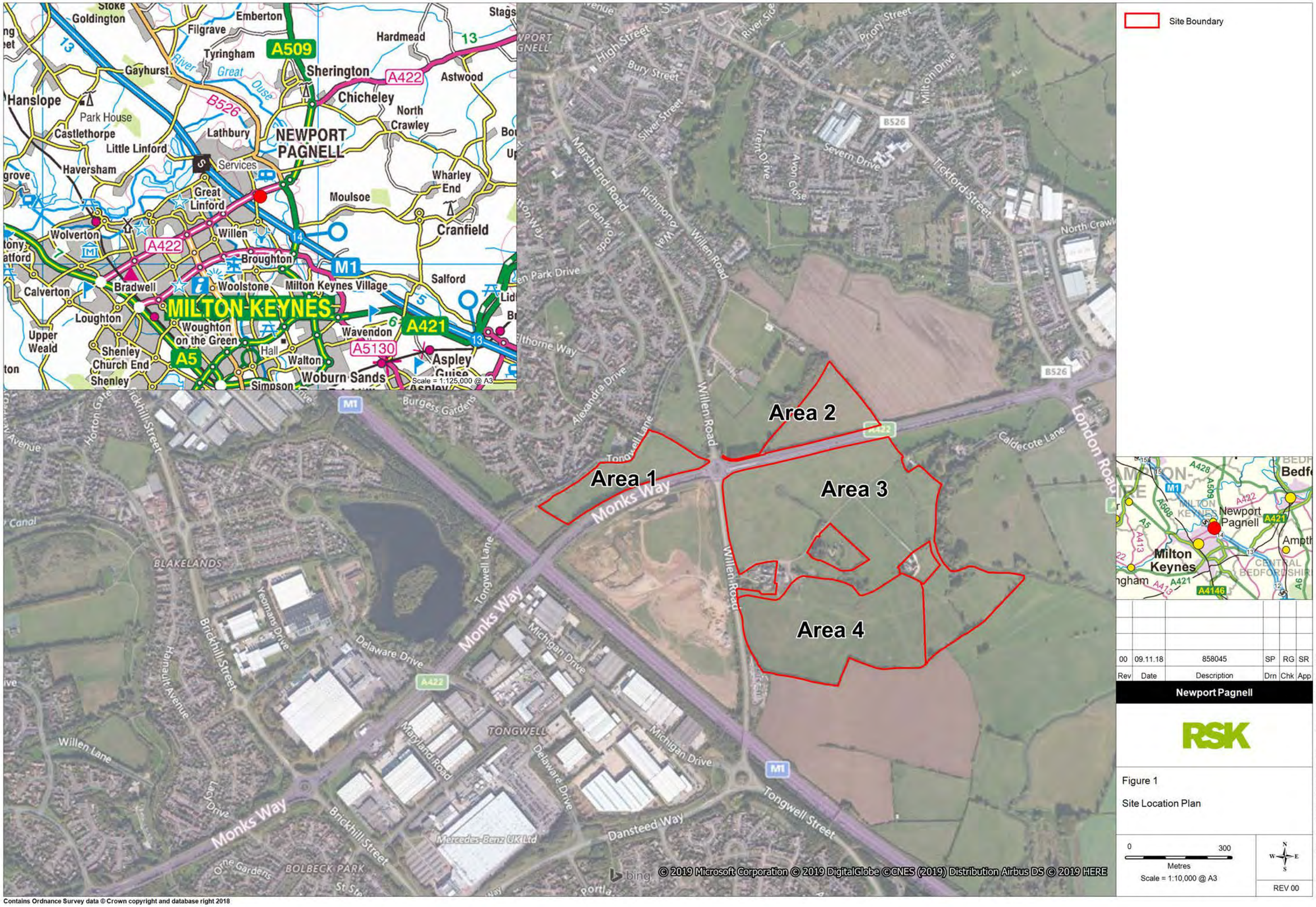
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6 FIGURES

Figure 1 – Site Location Plan

Figure 2 – NVC Quadrat Locations

Figure 1. Site Location Plan.



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00	09.11.18	858045	SP	RG	SR

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Figure 1

Site Location Plan

0 300

Metres

Scale = 1:10,000 @ A3

N W E S

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Figure 2. NVC Quadrat Locations



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Rev	Date	Description	Drn	Chk	App
00	13.01.20	858045	SP	RG	PD

Newport Pagnell

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Figure 2

NVC Quadrat Locations

0 150

metres

Scale = 1:5,000 @ A3

N W E S

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APPENDIX A – RELEVANT POLICY

Natural Environment and Rural Communities (NERC) Act 2006

Lowland meadows are listed as a priority habitat under Section 41 the NERC Act 2006 (as amended). The act requires that:

- the Secretary of State must take steps as appear to be reasonably practicable to further the conservation of the types of habitat included in any list published under this section, or;
- promote the taking by others of such steps.

National Planning Policy Framework (NPPF)

NPPF requires that planning policies and decisions should contribute and enhance the natural and local environment by:

- protecting and enhancing valued landscapes and sites of biodiversity, and;
- minimising impacts on and providing net gains for biodiversity

The framework also requires that plans should:

- identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks, and;
- promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity

Under this framework, development resulting in the loss or deterioration of irreplaceable habitats should be refused unless there are wholly exceptional reasons and a suitable compensation strategy exists.



Bloor Homes South Midlands

Newport Pagnell

Reptile Survey Report

858045

JUNE 2019

RSK GENERAL NOTES

Project No.: 858045

Title: Newport Pagnell - Reptile Survey Report

Client: Bloor Homes South Midlands

Date: June 2019

Office: Coventry

Status: Final

Author	Oli Bulpitt	**Technical reviewer**	Tom Coyne
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Date:	11 June 2019	Date:	11 June 2019
Project manager	Patrick Dixon	**Quality reviewer**	Ruth Morton
Signature:	[redacted]	Signature:	[redacted]
Date:	12 June 2019	Date:	17 June 2019

RSK Environment Ltd (RSK) has prepared this report for the sole use of the client, showing reasonable skill and care, for the intended purposes as stated in the agreement under which this work was completed. The report may not be relied upon by any other party without the express agreement of the client and RSK. No other warranty, expressed or implied, is made as to the professional advice included in this report.

Where any data supplied by the client or from other sources have been used, it has been assumed that the information is correct. No responsibility can be accepted by RSK for inaccuracies in the data supplied by any other party. The conclusions and recommendations in this report are based on the assumption that all relevant information has been supplied by those bodies from whom it was requested.

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Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

This work has been undertaken in accordance with the quality management system of RSK Environment Ltd.

EXECUTIVE SUMMARY

1. This report presents the results of reptile surveys carried out between April and May 2019 in three parcels of land adjacent to H3 Monk's Way, Newport Pagnell.

2. A preliminary ecological appraisal undertaken by RSK in October 2018 identified areas of habitat suitable for reptiles across the site. A background data search found that Grass Snakes (*Natrix natrix)* had been recorded within 1 km of the site.

3. One Grass Snake was recorded in Area 1 and another was recorded in Area 3.

4. An ecological methods statement should be produced to facilitate vegetation clearance in all areas containing suitable habitat. It will include provision of reptile dissuasion using a two-stage vegetation cut.

CONTENTS

1 INTRODUCTION 1
1.1 Purpose of report 1
1.2 Ecological Context 1
2 METHODS 2
2.1 Background Data Search 2
2.2 Habitat Assessment 2
2.3 Transect Survey 2
2.4 Artificial Refuge Survey 2
2.5 Assumptions and Limitations 3
2.6 Population Estimates 4
3 RESULTS 5
3.1 Background Data Search 5
3.2 Habitat Assessment 5
3.3 Presence – Absence Survey 5
3.4 Population Estimate 5
4 EVALUATION AND CONCLUSIONS 6
4.1 Potential Effects 6
4.2 Mitigation 6
4.2.1 Ecological Clerks of Works 6
4.2.2 Enhancement for Reptiles 6
4.2.3 Roles and Responsibilities 6
5 REFERENCES 8
6 FIGURES 9

APPENDICES
APPENDIX A: SURVEY RESULTS 13
APPENDIX B: LEGISLATION 17

1 INTRODUCTION

1.1 Purpose of Report

This report presents the results of reptile surveys carried out in connection with a proposed residential development on three parcels of land off H3 Monk's Way, Newport Pagnell (*Figure 1*), here collectively referred to as 'the site' (Ordnance Grid references SP882421, SP874425 and SP881428). The surveys were carried out during April and May 2019.

A preliminary ecological appraisal (PEA) undertaken by RSK in October 2018 identified suitable habitat for common reptile species on the site (RSK, 2018). RSK undertook the surveys on behalf of Bloor Homes South Midlands to provide information on any impacts the proposed residential development could have on reptiles.

1.2 Ecological Context

The site is on the southern edge of Newport Pagnell in Buckinghamshire (*Figure 1*). It comprises two fields north of H3 Monk's Way (Areas 1 and 2), a larger area of land south of H3 Monk's Way (Area 3), and a quarry directly east of Willen Road (Area 4). The site comprises arable land, with areas of scrub, scattered broadleaved trees, improved grassland, semi-improved grassland, hedgerows, standing water and dry ditch. There is plantation broad-leaved woodland adjacent to Area 2.

The town of Newport Pagnell separates the site from extensive agricultural land. The east of the site is bordered by the River Ouzel Wet Corridor, part of the Milton Keynes Wildlife Corridor (MKWC), which also separates the site from further agricultural land. Directly west is Willen Road and the M1 motorway, which separates the site from the Tongell Lake Local Wildlife Site (TLLWS) 150 m west of the site.

2 METHODS

2.1 Background Data Search

A search was made in October 2018 as part of the PEA (RSK 2018). Reptile records were obtained from Buckingham and Milton Keynes Environmental Records Centre (BMKERC).

2.2 Habitat Assessment

The site was assessed for reptiles, with particular attention to those features that provide suitable basking areas (*e.g.* south-facing slopes), hibernation sites (*e.g.* banks, walls, piles of rotting vegetation) and opportunities for foraging (*e.g.* rough grassland and scrub).

The site was assessed for its suitability for four reptile species. Specific habitat requirements differ between species. Common lizards (*Zootoca vivipara*) use a variety of habitats from woodland glades to walls and pastures, although one of their favoured habitats is rough grassland. Slow-worms (*Anguis fragilis*) use similar habitats to Common Lizards, and are often found in rank grassland, gardens and derelict land. Grass Snakes (*Natrix natrix*) have broadly similar requirements to common lizards with a greater reliance on ponds and wetlands, where they prey on Common Frogs (*Rana temporaria*). Adders (*Vipera berus*) use a range of fairly open habitats with some cover, but are most often found in dry heath (Beebee & Griffiths 2000).

Two other species of reptile occur naturally in the UK, namely Sand Lizard (*Lacerta agilis*) and Smooth Snake (*Coronella austriaca*). However, these two species have a very discrete distribution linked to their more specific habitat requirements. Consequently, it was considered unlikely that these species would be found at this site.

2.3 Transect Survey

Natural England's standing advice for reptile survey now includes a transect survey designed to incorporate the areas of habitat most suitable for reptiles (Natural England, 2015). Surveyors search for basking animals on areas such as banks, hedgerow understory and scrub edges. A combination of this and artificial refuge surveys was used, as explained below.

2.4 Artificial Refuge Survey

The standard method for establishing reptile presence or likely absence is to use reptile 'tinning' surveys. Artificial refuges (roofing felt tiles *c.*0.5 m^2 called 'felts' and corrugated metal sheets *c.*0.5 m^2 called 'tins') were placed in the areas that had been identified as suitable for reptiles during the habitat assessment (identified as areas A-L in *Figure 2*). The refuges attract reptiles, which use them for shelter and to aid temperature regulation; this allows surveyors to find reptiles that would otherwise be widely dispersed and well-hidden. So far as possible they were placed on slightly uneven

ground so as not to lie completely flat (which makes it difficult for reptiles to get underneath) two weeks before the first survey.

Surveys covered areas of field boundaries, rough grassland and scrub on the site and involved 101 felts and 85 tins, which were checked between April and May 2019.

All suitable areas had a higher number of artificial refuges per hectare than the minimum recommended level of 10 per hectare (Froglife 1999). The refuges were checked for reptiles on seven occasions during suitable weather conditions as detailed in *Table 1* below. When checking tins, a general watch was kept for other signs of reptiles, *e.g.* Grass Snake eggs, excrement or sloughed skins (often found beneath refuges).

Days with air temperatures between 9ºC and 15ºC and with bright sunshine are generally accepted as suitable for reptile surveys, or if there is hazy or intermittent sunshine and little wind (less than Beaufort Scale Force 3) then between 9ºC and 18ºC (HGBI, 1998). Days with rain are generally unsuitable, though sunny periods after rain may be ideal because reptiles emerge from cover to bask.

Checks took place on seven suitable days between 18 April 2019 and 28 May 2019.

Table 1: Weather conditions on survey dates.

Date	Time of check	Temperature (ºC)	Wind speed (Beaufort 1-12)	Cloud cover (Octas 1-8)	General weather
18.04.19	09:45-12:30	13-15	4	2	Warm and sunny.
26.04.19	09:30-12:00	12-14	5	2-4	Sunny, had rained previous night.
07.05.19	10:00-13:00	11-13	2	6-7	Overcast and occasional drizzle.
14.05.19	09:30-12:00	14-16	3-5	1-2	Sunny and warm with a light breeze.
21.05.19	10:50-13:15	16-18	4-6	2	Sunny and warm with a light breeze.
24.05.19	10:30-13:10	16-18	3	6-8	Humid and hazy.
28.05.19	10:10-13:55	14-15	4	4	Slightly unsettled weather- very occasional shower and sunny spells.

2.5 Assumptions and Limitations

Refuges were not placed in areas where the habitat was unsuitable for reptiles or where placement would endanger reptiles from farm vehicles or cows. Owing to the survey effort and number of refuges used it is still considered that the surveys were appropriate and that the data collected is representative of the reptile population in the area.

2.6 Population Estimates

Due to the complexity of reptile biology and ecology, reptile population sizes are notoriously difficult to estimate accurately. However, to ascertain the extent to which reptiles are present on a site, population scores following Froglife (1999) are widely used (*Table 2*). In addition, these population scores are the criteria for assessing sites that qualify for the Key Reptile Site Register (Froglife 1999) and provide a basic evaluation of the ecological value of the site for reptiles. The scores are estimated by taking the maximum number of adults seen by one person in a day (by direct observation or under refuges) given refuges present at a density of 10 per hectare.

Table 2: Reptile populations, following Froglife Advice Sheet 10.

Species	'Low' Population	'Good' Population	'Exceptional' Population
Adder	<5	5-10	>10
Grass Snake	<5	5-10	>10
Common Lizard	<5	5-20	>20
Slow-worm	<5	5-20	>20

3 RESULTS

3.1 Background Data Search

The background data search returned four records of Grass Snakes within 1 km of the site, most recently in 2018 (RSK 2018).

3.2 Habitat Assessment

Areas of scrub and field margins are suitable for reptiles and there are several brash piles, creating suitable hibernacula. There are also areas of standing water suitable for Grass Snakes. The site is ecologically-connected to suitable habitat to the south and east.

3.3 Presence – Absence Survey

One sub-adult Grass Snake was found in Area 1 (Transect A) on the second survey. A full list of survey results can be found in *Appendix A*. There was an incidental sighting of a single adult Grass Snake in Area 3 on 24 June 2019.

3.4 Population Estimate

Two sub-adult Grass Snakes were found, suggesting there is a 'low' population of Grass Snakes using the site.

4 EVALUATION AND CONCLUSIONS

4.1 Potential Effects

Under current plans, Areas 1, 3 and 4 are going to be cleared as part of the development. Suitable reptile habitat is likely to be cleared, which could have the following detrimental effects:

- injury to or killing of reptiles;
- removal of reptile habitat; and
- disturbance of habitat used by reptiles.

4.2 Mitigation

4.2.1 Ecological Clerks of Works

All areas of the site subject to development will be hand searched by an ecologist immediately prior to vegetation clearance, as part of an ecological methods statement.

A precautionary displacement approach will be used to deter reptiles from the suitable habitats. This involves a two-stage cut of the vegetation. The first cut will trim the vegetation to 300 mm, making the habitat less suitable and dissuading reptiles away from the area. Loose vegetation will be removed from the working area to avoid creation of suitable refuges. The second cut will take place no more than 48 hours after the first, and the vegetation will be trimmed to the ground.

Prior to construction, a final walkover should be conducted to ensure all reptiles have been dissuaded.

Any reptiles found will be moved to a suitable mitigation area which must be identified before clearance of the suitable habitats. An ecological clerk of works (ECoW) will be appointed to supervise the vegetation clearance. This will ensure that any reptiles found during the works are safely translocated to the mitigation area.

4.2.2 Enhancement for Reptiles

Habitat compensation for reptile habitat lost should be considered to ensure that the impacts on the wider reptile population are minimal. This will be provided through the retention and enhancement of existing habitat on the site, such as the hedgerow field margins.

An ecologist will be consulted during the detailed design stage in order to ensure that the layout of the development (particularly any associated landscaping) is compliant with the requirements for these species.

4.2.3 Roles and Responsibilities

Prior to starting works, the contractors will be briefed by an ecologist on their duties and responsibilities regarding the methods statement. Contractors will be provided with reptile identification cards and information about what to do if a reptile is found during works.

Reptiles will only be handled by the ecologist and released into the agreed receptor area. Contractors should not attempt to handle reptiles and any seen should be left alone to disperse safely.

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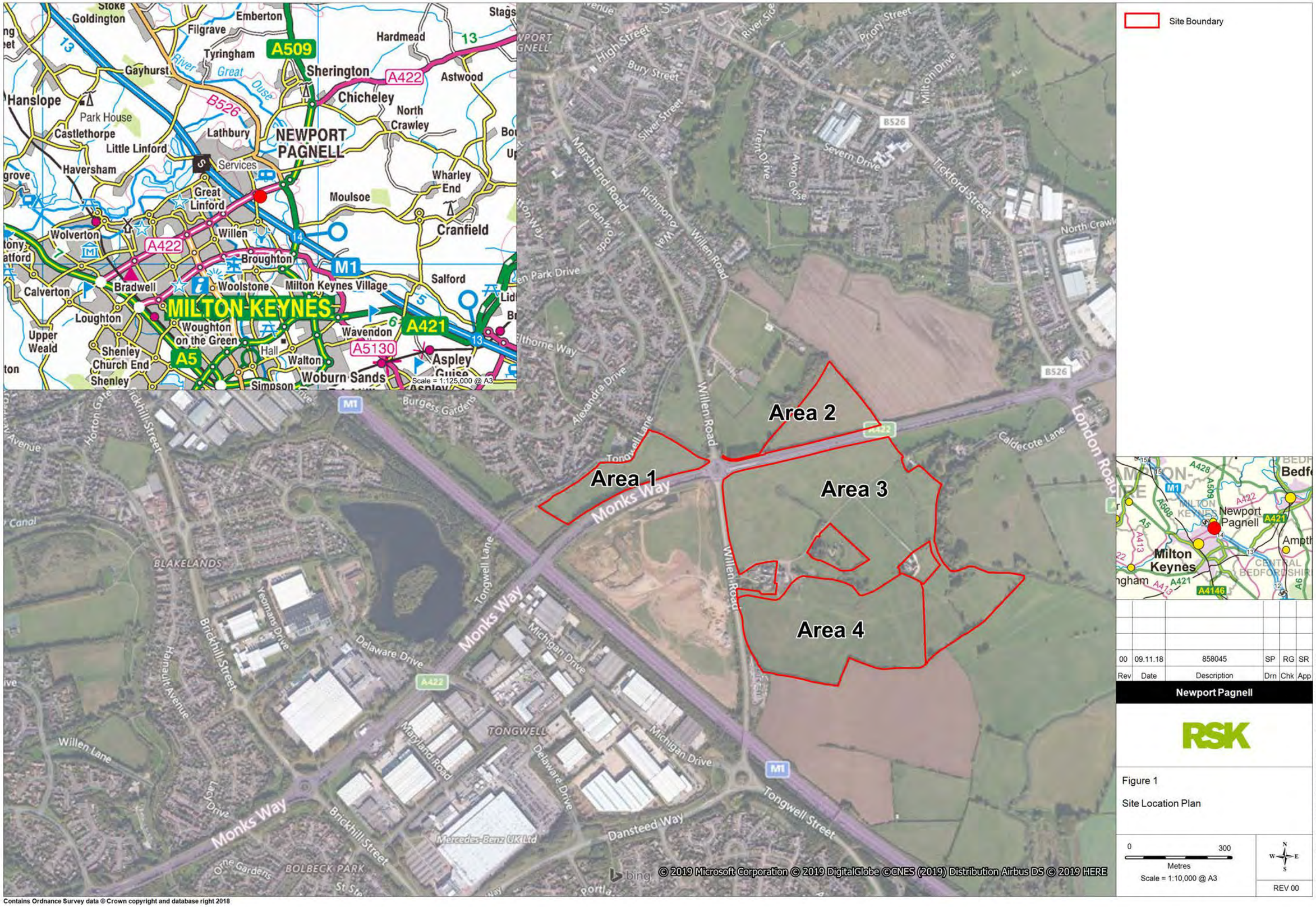
6 FIGURES

Figure 1 – Site Location Plan

Figure 2 – Reptile Survey Areas

Figure 3 – Reptile Sighting Locations

Figure 1. Site Location Plan.



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Rev	Date	Description	Drn	Chk	App
00	09.11.18	858045	SP	RG	SR

Newport Pagnell

RSK

Figure 1

Site Location Plan

0 300

Metres

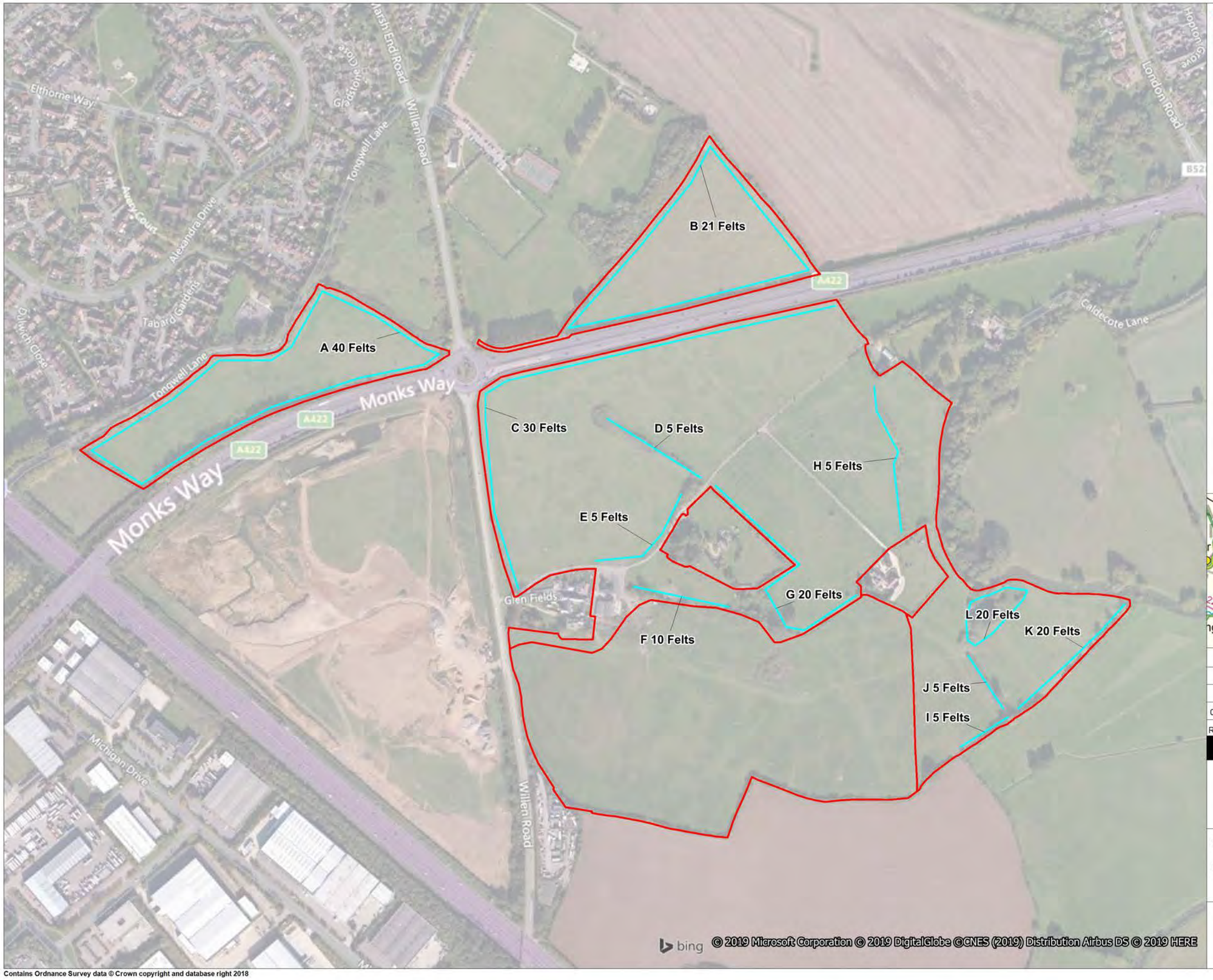
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Figure 2. Reptile Survey Areas.



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Rev	Date	Description	Drn	Chk	App
00	05.04.19	858045	SP	RG	SR

Newport Pagnell

RSK

Figure 2

Location of Reptile Transects

0 150

metres

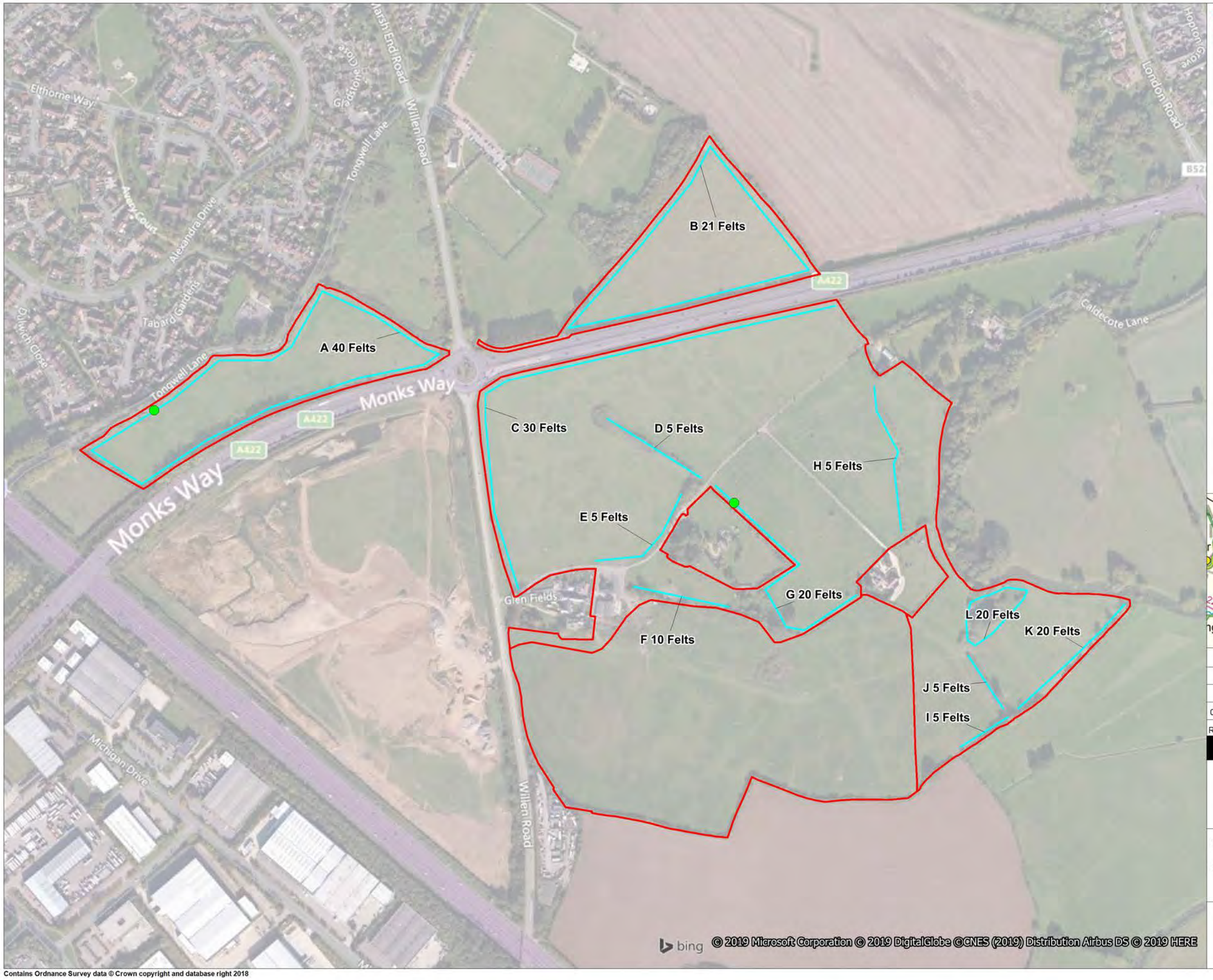
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N W E S

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Figure 3. Reptile Sighting Locations.



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Rev	Date	Description	Drn	Chk	App
00	25.06.19	858045	SP	RG	SR

Newport Pagnell

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Figure 3

Reptile Survey Results

0 150

metres

Scale = 1:5,000 @ A3

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APPENDIX A: SURVEY RESULTS

The results from the surveys are presented in ***Table A1*** below***.***

Table A1: Survey results.

Survey Visit	Survey Location	Reptiles (A – Adult; SA – Sub Adult; J – Juv; E – Eggs)					Suitable Conditions (Y, N, Fair, Unknown)
		Common Lizard	Slow Worm	Grass Snake	Adder	Other	
1	A	0	0	0	0	0	Y
	B	0	0	0	0	0	Y
	C	0	0	0	0	0	Y
	D	0	0	0	0	0	Y
	E	0	0	0	0	0	Y
	F	0	0	0	0	0	Y
	G	0	0	0	0	0	Y
	H	0	0	0	0	0	Y
	I	0	0	0	0	0	Y
	J	0	0	0	0	0	Y
	K	0	0	0	0	0	Y
	L	0	0	0	0	0	Y
2	A	0	0	1A	0	0	Y
	B	0	0	0	0	0	Y
	C	0	0	0	0	0	Y
	D	0	0	0	0	0	Y
	E	0	0	0	0	0	Y
	F	0	0	0	0	0	Y
	G	0	0	0	0	0	Y

Survey Visit	Survey Location	Reptiles (A – Adult; SA – Sub Adult; J – Juv; E – Eggs)					Suitable Conditions (Y, N, Fair, Unknown)
		Common Lizard	Slow Worm	Grass Snake	Adder	Other	
	H	0	0	0	0	0	Y
	I	0	0	0	0	0	Y
	J	0	0	0	0	0	Y
	K	0	0	0	0	0	Y
	L	0	0	0	0	0	Y
3	A	0	0	0	0	0	F
	B	0	0	0	0	0	F
	C	0	0	0	0	0	F
	D	0	0	0	0	0	F
	E	0	0	0	0	0	F
	F	0	0	0	0	0	F
	G	0	0	0	0	0	F
	H	0	0	0	0	0	F
	I	0	0	0	0	0	F
	J	0	0	0	0	0	F
	K	0	0	0	0	0	F
	L	0	0	0	0	0	F
4	A	0	0	0	0	0	Y
	B	0	0	0	0	0	Y
	C	0	0	0	0	0	Y
	D	0	0	0	0	0	Y
	E	0	0	0	0	0	Y

Survey Visit	Survey Location	Reptiles (A – Adult; SA – Sub Adult; J – Juv; E – Eggs)					Suitable Conditions (Y, N, Fair, Unknown)
		Common Lizard	Slow Worm	Grass Snake	Adder	Other	
	F	0	0	0	0	0	Y
	G	0	0	0	0	0	Y
	H	0	0	0	0	0	Y
	I	0	0	0	0	0	Y
	J	0	0	0	0	0	Y
	K	0	0	0	0	0	Y
	L	0	0	0	0	0	Y
5	A	0	0	0	0	0	Y
	B	0	0	0	0	0	Y
	C	0	0	0	0	0	Y
	D	0	0	0	0	0	Y
	E	0	0	0	0	0	Y
	F	0	0	0	0	0	Y
	G	0	0	0	0	0	Y
	H	0	0	0	0	0	Y
	I	0	0	0	0	0	Y
	J	0	0	0	0	0	Y
	K	0	0	0	0	0	Y
	L	0	0	0	0	0	Y
6	A	0	0	0	0	0	Y
	B	0	0	0	0	0	Y
	C	0	0	0	0	0	Y

Survey Visit	Survey Location	Reptiles (A – Adult; SA – Sub Adult; J – Juv; E – Eggs)					Suitable Conditions (Y, N, Fair, Unknown)
		Common Lizard	Slow Worm	Grass Snake	Adder	Other	
	D	0	0	0	0	0	Y
	E	0	0	0	0	0	Y
	F	0	0	0	0	0	Y
	G	0	0	0	0	0	Y
	H	0	0	0	0	0	Y
	I	0	0	0	0	0	Y
	J	0	0	0	0	0	Y
	K	0	0	0	0	0	Y
	L	0	0	0	0	0	Y
7	A	0	0	0	0	0	Y
	B	0	0	0	0	0	Y
	C	0	0	0	0	0	Y
	D	0	0	0	0	0	Y
	E	0	0	0	0	0	Y
	F	0	0	0	0	0	Y
	G	0	0	0	0	0	Y
	H	0	0	0	0	0	F
	I	0	0	0	0	0	F
	J	0	0	0	0	0	F
	K	0	0	0	0	0	F
	L	0	0	0	0	0	F

APPENDIX B: LEGISLATION

Common Reptiles

Common Lizard (***Lacerta vivipara***), Grass Snake (***Natrix natrix***), Slow-worm (***Anguis fragilis***), and Adder (***Vipera berus)*** are listed under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), in respect of Section 9(5) and part of Section 9(1). This protection was extended by the Countryside and Rights of Way Act 2000 (the CRoW Act).

Under the above legislation it is an offence to:

- intentionally or deliberately kill or injure any individual of such a species; or
- sell or attempt to sell any part of the species alive or dead.



Bloor Homes South Midlands

Newport Pagnell

Water Vole, Otter and Kingfisher Report

858045

NOVEMBER 2019

RSK GENERAL NOTES

Project No.: 858045

Title: Newport Pagnell - Water Vole, Otter and Kingfisher Survey Report

Client: Bloor Homes South Midlands

Date: November 2019

Office: Coventry

Status: Rev00

Author	Patrick Dixon	**Technical reviewer**	Richard Carter
Signature	[redacted]	Signature	[redacted]
Date:	16 October 2019	Date:	27 November 2019
Project manager	Patrick Dixon	**Quality reviewer**	Richard Carter
Signature	[redacted]	Signature	[redacted]
Date:	16 October 2019	Date:	27 November 2019

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Where any data supplied by the client or from other sources have been used, it has been assumed that the information is correct. No responsibility can be accepted by RSK for inaccuracies in the data supplied by any other party. The conclusions and recommendations in this report are based on the assumption that all relevant information has been supplied by those bodies from whom it was requested.

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Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

This work has been undertaken in accordance with the quality management system of RSK Environment Ltd.

EXECUTIVE SUMMARY

1. This report presents the results of Water Vole, Otter and Kingfishers surveys carried out in June and September 2019 along the River Ouzel, near H3 Monk's Way, Newport Pagnell.

2. A preliminary ecological appraisal undertaken by RSK in October 2018 identified the River Ouzel as suitable habitat for all three species. A background data search found that Otters and Kingfishers had been recorded within 1 km of the site.

3. There was suitable habitat for all three species along the river. Otter feeding signs and spraint were identified during both surveys, but no evidence of Water Voles or Kingfishers was found.

4. As Otters are likely to be using the site for commuting, a buffer zone of 50 m from the river should be maintained where no works take place. Further mitigation regarding working times and lighting are discussed.

CONTENTS

1 INTRODUCTION 1
1.1 Purpose of this Report 1
1.2 Ecological Context 1
2 METHODS 2
2.1 Background Data Search 2
2.2 General 2
2.3 Otters 2
2.3.1 Habitat Assessment 2
2.3.2 Presence-Absence Survey 2
2.4 Water Voles 3
2.4.1 Habitat Assessment 3
2.4.2 Evidence of Water Voles 3
2.4.3 Presence-Absence Survey 4
2.5 Kingfishers 4
2.5.1 Habitat Assessment 4
2.6 Survey Constraints 4
3 RESULTS 5
3.1 Background Data Search 5
3.2 Otter 5
3.2.1 Habitat Assessment 5
3.2.2 Presence-Absence Survey 5
3.3 Water Vole 5
3.3.1 Habitat Assessment 5
3.3.2 Presence-Absence Survey 5
3.4 Kingfisher 5
3.4.1 Habitat Assessment 5
4 DISCUSSION 6
4.1 Otter 6
4.2 Water Vole 6
4.3 Kingfisher 6
5 REFERENCES 7
6 FIGURES 8
APPENDIX A – RELEVANT LEGISLATION 11

1 INTRODUCTION

1.1 Purpose of this Report

This report presents the results of surveys for Water Voles (***Arvicola terrestris***), Otters (***Lutra lutra***) and Kingfishers (***Alcedo atthis***) surveys along the River Ouzel near H3 Monk's Way, Newport Pagnell (***Figure 1***), here referred to as 'the site' (OS grid reference SP883423). A preliminary ecological appraisal (PEA) by RSK in October 2018 found that the River Ouzel and adjacent areas provide commuting, foraging and resting habitat for these species (RSK, 2018).

RSK undertook the surveys on behalf of Bloor Homes South Midlands to provide information on any impacts the proposed residential development could have. The current proposals include multiple residential units, a primary school, and open spaces (including an extension to the town council playing fields and retention of ecologically sensitive areas and features).

1.2 Ecological Context

The site is on the southern edge of Newport Pagnell in Buckinghamshire (***Figure 1***). It comprises two fields north of H3 Monk's Way (Areas 1 and 2), a larger area of land south of H3 Monk's Way (Area 3), and a quarry directly east of Willen Road (Area 4). It comprises arable land, with areas of scrub, scattered broadleaved trees, improved grassland, semi-improved grassland, hedgerows, standing water and a dry ditch. There is plantation broad-leaved woodland adjacent to Area 2.

The town of Newport Pagnell separates the site from extensive agricultural land. The east of the site is bordered by the River Ouzel Wet Corridor, which is part of the Milton Keynes Wildlife Corridor (MKWC) and separates the site from further agricultural land. Directly west is Willen Road and the M1 motorway, which separates the site from the Tongell Lake local wildlife site (LWS) 150 m west of the site.

2 METHODS

2.1 Background Data Search

A background data search was made in October 2018 as part of the PEA (RSK, 2018). Water Vole, Otter and Kingfisher records were obtained from Buckingham and Milton Keynes Environmental Records Centre (BMKERC).

2.2 General

The habitat assessment and first presence-absence survey for each species was undertaken on 20 June 2019 by Lewis Wright and Patrick Dixon.

The second presence-absence survey for Otters and Water Voles was undertaken on 4 September 2019 by Patrick Dixon and Shona Redman.

All staff are employees of RSK, members of the Chartered Institute of Ecology and Environmental Management (CIEEM) and experienced in surveys of this type.

2.3 Otters

2.3.1 Habitat Assessment

Habitat was assessed for Otters according to the criteria below, which were then used to categorise areas according to thsuitability. The following habitat factors were taken into consideration:

- water quality;
- water-level regime;
- channel dimensions;
- bank type and material;
- vegetation for cover and food sources;
- shading;
- predation and competition; and
- habitat management.

2.3.2 Presence-Absence Survey

Habitats with potential for Otters on the site boundary and within 100 m of the site boundary (where possible) were surveyed for evidence of Otter activity following standard methods adapted from Chanin (1993). All suitable bank-side and water-edge habitats were systematically and thoroughly searched for field signs of the species including:

- spraint (droppings);
- footprints,
- slides;
- paths;
- feeding evidence:

- holts (underground resting places); and
- couches (temporary resting places).

2.4 Water Voles

2.4.1 Habitat Assessment

Habitat was assessed for Water Voles according to subjective criteria, which were then used to categorize habitat according to suitability for the species. The following habitat factors were taken into consideration:

- water quality;
- water-level regime;
- channel dimensions;
- bank type and material;
- vegetation for cover and food sources;
- shading;
- predation and competition; and
- habitat management.

Classification of habitat suitability was made as follows:

- ***Excellent*** – ideal or optimal habitat with good cover, food sources and other elements that would allow a population of Water Voles to thrive throughout the year.
- ***Suitable*** – habitat that has all the elements required for Water Voles certainly in the summer, and probably through most winters.
- ***Marginal*** – habitat that has some of the habitat features that are suitable for Water Vole, but with some constraints so that suitability throughout the year is not certain.
- ***Unsuitable*** – habitat lacking one or more crucial element for use by Water Voles. This category does not necessarily preclude the habitat being used by commuting Water Voles, but it would not be able to support a resident population.

2.4.2 Evidence of Water Voles

Survey for evidence of Water Vole activity followed standard methods adapted from Strachan (1998). All of the suitable habitat, in this case the stretch of the River Ouzel along the eastern border of the site, was thoroughly searched for signs of the species including:

- burrows;
- feeding platforms and evidence of feeding;
- food remains;
- latrines; and
- footprints.

2.4.3 Presence-Absence Survey

A search for field signs indicating Water Vole presence - especially droppings (also feeding remains, burrows, footprints etc) - was completed during the breeding season when they are more evident (Dean ***et al.,*** 2016). The breeding season for most of the UK is considered to be between mid-April to the end of September (though the season can vary depending on latitude and altitude).

The apparent size and distribution of Water Vole populations can be affected by changes in habitat suitability during the breeding season, especially if different parts of the site are therefore used during different periods of the breeding season. Two surveys were therefore completed in line with Dean ***et al*** (2016), one between mid-April and the end of June and one between July and September (to satisfy the need for them to be at least two months apart).

Where Water Vole presence is confirmed, estimates of latrine density can be used to indicate the relative size of the population and highlight the areas of most value to the species (***Table 1***). Subdivision of the survey area into 'low', 'medium' or 'high' relative population densities could assist with interpretation of the site (Dean ***et al.,*** 2016).

Table 1: Approximate latrine numbers and relative population density.

Relative Population Density	Approximate number of latrines per 100 m of bank-side habitat	
	Mid-April to end of June	**July to September (inclusive)**
High	10 or more	20 or more
Medium	3 – 9	6 – 19
Low	≤ 2 (or none, but with confirmatory signs)	≤ 5 (or none, but with confirmatory signs)

2.5 Kingfishers

2.5.1 Habitat Assessment

The habitat was assessed for its suitability for foraging, nesting and roosting Kingfishers. Any nest holes indicative of nesting activity in previous years were noted and mapped.

Kingfishers tend to be found close to still or gently-flowing lowland freshwater, including rivers, streams, lakes and canals. They require feeding perches from which to dive, and steep-sided, soft earth banks into which to excavate a nesting burrow.

2.6 Survey Constraints

The eastern river bank edge was not accessible and therefore could not be inspected fully for field signs.

3 RESULTS

3.1 Background Data Search

The background data search returned three records of Otters from within 1 km of the site and 10 records of Kingfishers from within 1 km of the site, most recently in 2016 (RSK, 2018). No records of Water Voles were found from within 1 km of the site.

3.2 Otter

3.2.1 Habitat Assessment

The river was found to provide habitat for Otters, with high levels of bank-side and marginal vegetation as well as tree roots and other sheltered areas which may provide resting places. The water quality is generally good, but there are patches of dense algae and duckweed in places.

3.2.2 Presence-Absence Survey

A single Otter spraint and scattered feeding remains were found along the riverbank on both surveys. The spraint found on the second survey was fresh and probably less than a day old.

Since no holts or couches were observed, it is likely that Otters use this section of the river for only foraging and commuting.

3.3 Water Vole

3.3.1 Habitat Assessment

Large areas of the river bank are suitable for Water Vole burrowing, being steep sided and well-vegetated. There is also water-margin vegetation present along much of the river stretch.

3.3.2 Presence-Absence Survey

No evidence of Water Voles was identified during either survey.

3.4 Kingfisher

3.4.1 Habitat Assessment

While habitat was suitable, no nests or evidence of foraging was found on the site during the surveys. No individuals were observed using the river corridor.

4 DISCUSSION

4.1 Otter

As Otters are using the river for commuting and foraging, the riverbank must not be obstructed, no works should take place within 50 m of it, and there should be no night working or artificial illumination of the river. Additionally, any open excavations or pipes should be covered at night to prevent Otters using them and then being disturbed or injured, e.g. when the pipes are turned back on. If any holts or couches are found during works, they must stop and an ecologist should be consulted.

Good construction practices should be followed to avoid any pollution run-off into the river.

4.2 Water Vole

Although no signs of Water Voles were observed during the surveys, only one side of the river bank could be assessed, and they may be using the site to forage. The measures outlined above regarding foraging and commuting Otters will also safeguard any Water Voles feeding in the area. If any Water Vole burrows are found during the works, they must stop and an ecologist should be consulted.

4.3 Kingfisher

Under current plans, the riverbank is not going to be affected by the development; therefore, no further mitigation is required for Kingfishers. If plans change then a reassessment of impacts on Kingfishers should be undertaken.

5 REFERENCES

Chanin, P. (1993). ***Otters***. Whittet Books, London.

Dean, M., Strachan, R., Gow, D. & Andrews, R.M. (2016), ***The Water Vole Mitigation Handbook***. In Matthews, F. & Chanin, P. (eds.), ***The Mammal Society Mitigation Guidance Series.*** The Mammal Society, London.

RSK (2018). ***858045 Newport Pagnell. Preliminary Ecological Appraisal Report.*** Unpublished report.

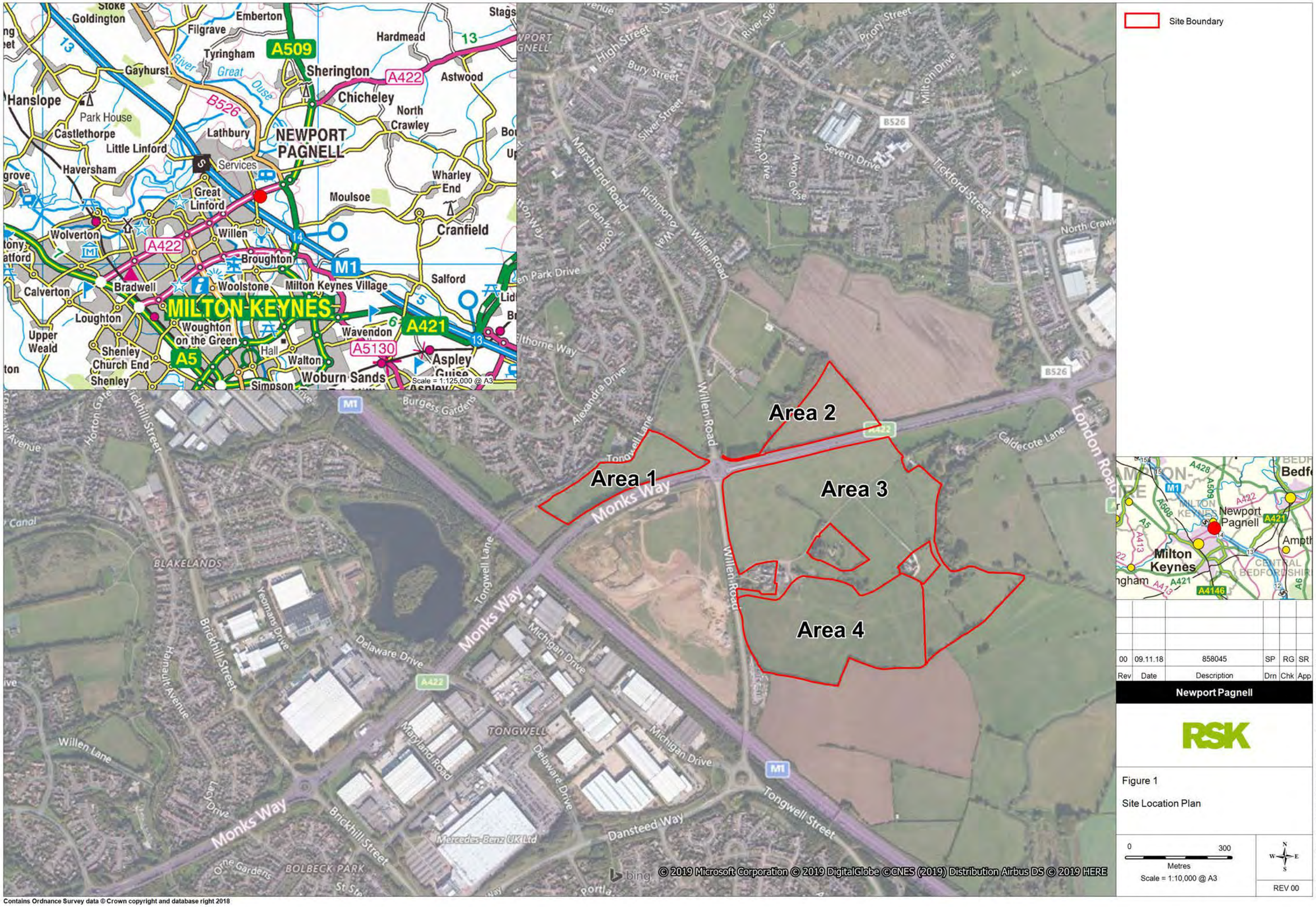
Strachan, R. (1998). ***Water Vole Conservation Handbook***. Wildlife Conservation Research Unit, Oxford.

6 FIGURES

Figure 1 – Site Location Plan

Figure 2 – Otter and Water Vole Field Signs

Figure 1 – Site Location Plan



Contains Ordnance Survey data © Crown copyright and database right 2018

Rev	Date	Description	Drn	Chk	App
00	09.11.18	858045	SP	RG	SR

Newport Pagnell

RSK

Figure 1

Site Location Plan

0 300

Metres

Scale = 1:10,000 @ A3

N W E S

REV 00

File Name : U:\Ecology\858000s\858045 - Newport Pagnell PEA\07 - GIS

Figure 2 – Otter and Water Vole Field Signs

Thick bramble on steep bank with mammal tracks

Otter feeding signs

Small mammal hole, most likely too small for Water Vole

Otter feeding signs

Fresh Otter spraint

Otter feeding signs

Otter feeding signs

bing © 2019 Microsoft Corporation © 2019 DigitalGlobe ©CNES (2019) Distribution Airbus DS © 2019 HERE

Contains Ordnance Survey data © Crown copyright and database right 2019

Site boundary

Otter and/or Water Vole signs



Rev	Date	Description	Drn	Chk	App
00	15.10.19	858045	SP	RG	SR

Newport Pagnell

RSK

Figure 2

Otter and Water Vole Survey Results

0 30

metres

Scale = 1:1,000 @ A3

N W E S

REV 00

File Name : U:\Ecology\858000s\858045 - Newport Pagnell PEAI07 - GIS

APPENDIX A – RELEVANT LEGISLATION

Birds General Protection

All species of bird are protected under Section 1 of the Wildlife and Countryside Act 1981 (as amended). The protection was extended by the CRoW Act.

The legislation makes it an offence to intentionally:

- kill, injure or take any wild bird;
- take, damage or destroy the nest of any wild bird while that nest is in use or being built; or
- take or destroy an egg of any wild bird.

Birds (Specially Protected Species)

Certain species of bird are listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) and receive protection under Sections 1(4) and 1(5) of the Act. The protection was extended by the CRoW Act. The legislation confers special penalties where the above mentioned offences are committed for any such bird and also make it an offence to intentionally or recklessly:

- disturb any such bird, whilst building its nest or it is in or near a nest containing dependant young; or
- disturb the dependant young of such a bird.

Otter

Lutra lutra (Otter) is listed on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), and receives full protection under Section 9. This species is also listed as a European Protected Species on Schedule 2 of the Conservation (Natural Habitats, etc.) Regulations 1994 which gives it full protection under Regulation 39. Protection was extended by the Countryside and Rights of Way Act 2000 (the CRoW Act).

Under the above legislation it is an offence to:

- kill, injure or take an individual of such a species;
- possess any part of such species either alive or dead;
- intentionally or recklessly damage, destroy or obstruct access to any place or structure used by such species for shelter, rest, protection or breeding;
- intentionally or recklessly disturb such a species whilst using any place of shelter or protection; or
- sell or attempt to sell any such species.

The Otter is included as a Priority Species in the UK Biodiversity Action Plan (UKBAP) and also as a species of principal importance for the conservation of biological diversity in England under Section 74 of the CRoW Act.

The Otter is also protected under Schedule 6 of the Wildlife and Countryside Act 1981 (as amended). This protection relates specifically to trapping and direct pursuit of the species.

The European sub-species is also listed as globally threatened on the IUCN/WCMC RDL.

Water Vole

Arvicola amphibius (Water Vole) is fully protected under Section 9 of Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). Protection was extended by the Countryside and Rights of Way Act 2000.

Under this legislation, it is an offence to:

- intentionally kill, injure or take (capture) a Water Vole;
- possess or control a live or dead Water Vole, or any part of a Water Vole;
- intentionally or recklessly damage, destroy or obstruct access to any structure or place which Water Voles use for shelter or protection, or to intentionally or recklessly disturb Water Voles while they are using such a place; or
- sell, offer for sale or advertise for live or dead Water Voles.

The Water Vole is included as a Priority Species in the UK Biodiversity Action Plan (UKBAP).

dynamic development solutions ™

Appendix 7.3

Biodiversity Net Gain Calculation - using the DEFRA metric

NATURAL ENGLAND

The Biodiversity Metric 3.0

auditing and accounting for biodiversity

Calculation Tool

Open Tool

ISBN: 978-1-78354-781-4



The Biodiversity Metric 3.0 - Calculation Tool
Main menu

Urban tree helper		
Tree size	Tree number	Area
Small		0.0000
Medium		0.0000
Large		0.0000
Total	0.00	0.0000

Start page | Instructions | Technical data | Results

Start here

1 → 2 → 3 → 4

On-site baseline

- A-1 On-site habitat baseline
- B-1 On-site hedge baseline
- C-1 On-site river baseline

On-site post development

- A-2 Habitat creation
- A-3 Habitat enhancement
- B-2 Hedgerow creation
- B-3 Hedgerow enhancement
- C-2 River creation
- C-3 River enhancement

Off-site baseline

- D-1 Off-site habitat baseline
- E-1 Off-site hedge baseline
- F-1 Off-site river baseline

Off-site post development

- D-2 Off-site habitat creation
- D-3 Off-site habitat enhancement
- E-2 Off-site hedge creation
- E-3 Off-site hedge enhancement
- F-2 Off-site river creation
- F-3 Off-site river enhancement

The Biodiversity Metric 3.0 - Calculation Tool
Start page

Project details	
Planning authority:	Milton Keynes
Project name:	Willen Road Newport Pagnell (RSK Project 2480325)
Applicant:	
Application type:	
Planning application reference:	
Assessor:	Mark Lang MCIEEM, CEcol, CEnv - RSK
Reviewer:	
Metric version:	version 3
Assessment date:	27/07/2021
Planning authority reviewer:	

Instructions

Main menu

Results

Cell style conventions	
	Enter data
	Automatic lookup
	Result

View all

Reset view

On-site baseline map — Insert

On-site post intervention map — Insert

Off-site baseline map — Insert

Off-site post intervention map — Insert

Natural England Joint Publication JP029

The Biodiversity Metric 3.0

Auditing and accounting for biodiversity

Calculation Tool: Short Guide

First published July 2021

www.gov.uk/natural-england

NATURAL ENGLAND

Further information

Natural England evidence can be downloaded from our **Access to Evidence Catalogue**. For more information about Natural England and our work see **Gov.UK**. For any queries contact the Natural England Enquiry Service on 0300 060 3900 or e-mail **enquiries@naturalengland.org.uk** .

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The Biodiversity Metric 3.0 – Calculation Tool Guidance

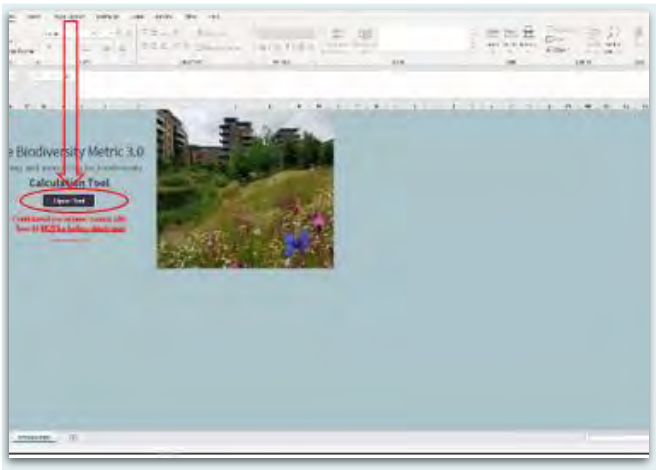
This guide shows you how to use the biodiversity metric 3.0 calculation tool in six quick steps.
If you are an off-site habitat provider start at Step 3.
Before starting you will need to know the following about your project:

- The types of habitat involved (on-site and off-site)
- The size of each habitat parcel (in hectares or, if linear, kilometres)
- If there will be any delays in creating/enhancing habitat
- If any of the habitat has been created/enhanced in advance
- The condition of each habitat parcel
- Whether the site(s) are in locations identified as local nature priorities

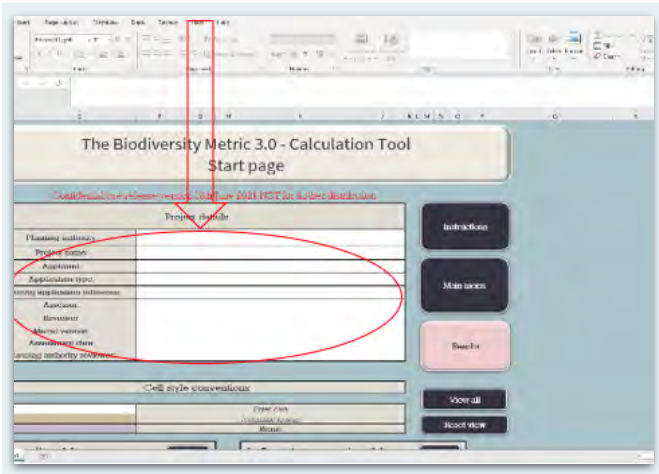
Contents

Start
STEP 1: Entering Baseline Data
STEP 2: Entering On- Site Post-Development Data
STEP 3: Entering Off-Site Data (NOTE: only needed when creating or enhancing habitat outside the project 'red line' boundary)
STEP 4: Hedgerows, Lines of Trees, Rivers and Streams
STEP 5: The Results
STEP 6: Saving and Submitting Your Assessment
Additional Functions

START

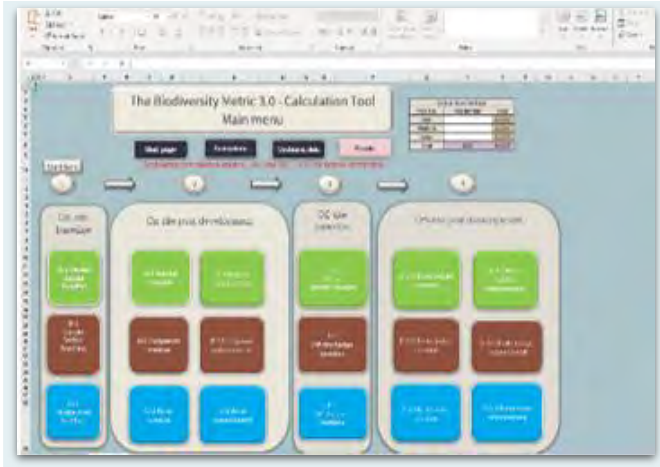


Open tool on any laptop with spreadsheet software installed. Press “Open Tool”.



This is the start page. Input details of your project into “Project Details”.

Remember to periodically save your work.



Click the “Main Menu” button. The Worksheet Menu will then open like this.

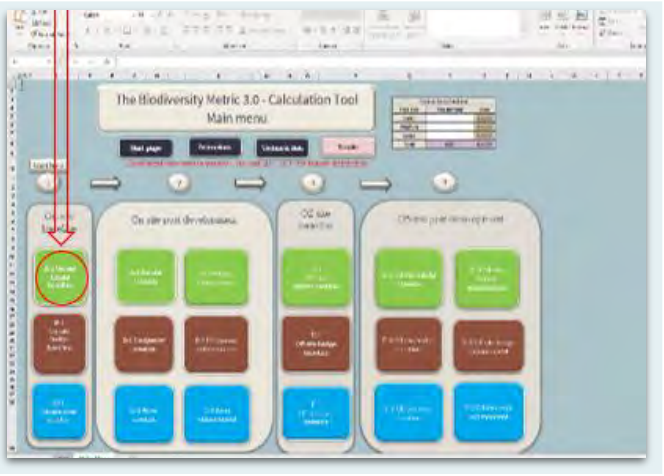
The next steps explain how to enter the key data for your project.

Top Tip

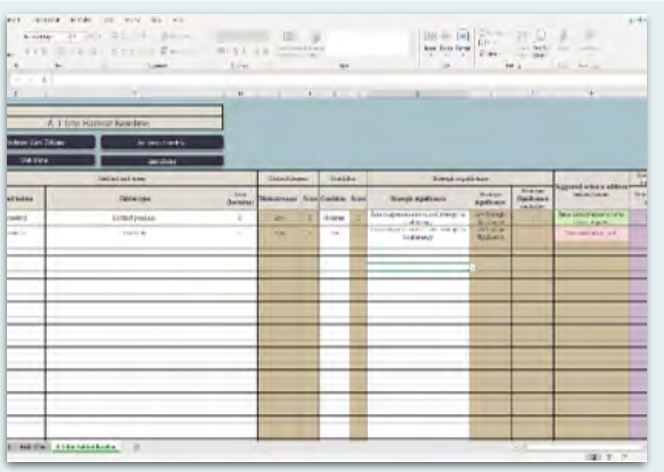
- Prepare your data before completing the Metric. Think about how the individual parcels within the site will change post development/intervention. Consider which habitats will be lost, retained and/or enhanced.

Back to Top

Step 1: Entering Baseline Data



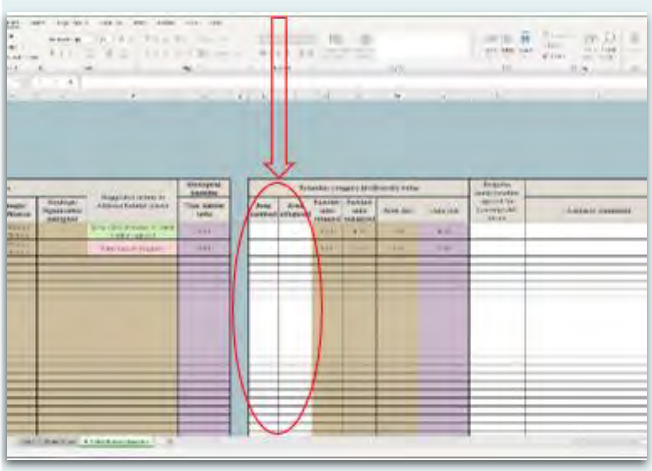
Click the green "A-1 On-site habitat baseline" button at the left-hand side of the page:



Fill in all of the white columns. Some allow you to select from drop-down lists, others (such as Area) require you to input data. The data in the light brown cells is auto populated based on the data entered in the white cells.

Top Tip

- The individual habitat dropdown list will be blank unless a broad habitat is entered, and you will not be able to select a habitat if a broad habitat is not selected first.

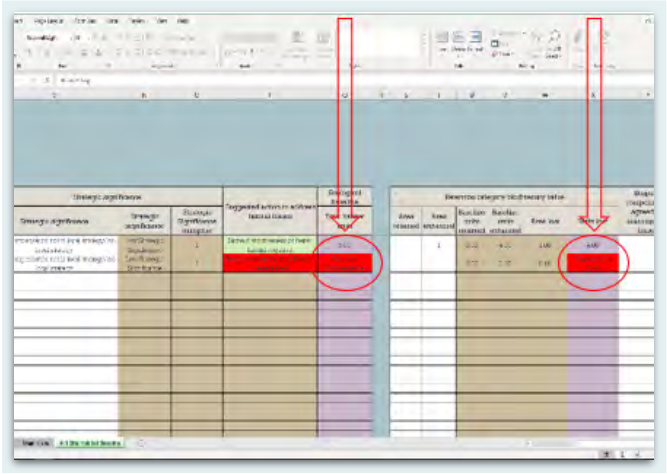


Scroll right and enter the area of any habitat that you plan to enhance or retain in the white cells at the right-hand side. Complete a new row for every habitat parcel found on site.

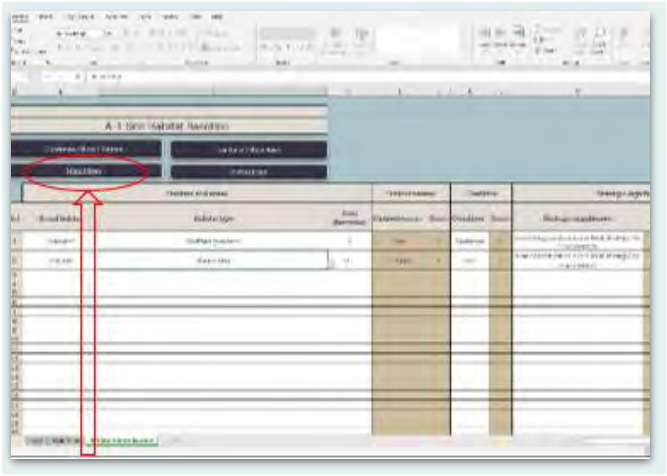
Back to Top

Top Tips

- If any of the habitat entered in the on-site or off-site baseline tabs is proposed for enhancement, ensure the full detailed view is used in the enhancement tab until all the baseline data is entered.
- An error will be generated if data is entered into both the advance creation and the delayed creation cells for the same habitat parcel.



An error flag will be generated if a Very High Distinctiveness habitat is entered into the metric unless it is retained, enhanced or it is confirmed that bespoke compensation has been agreed.



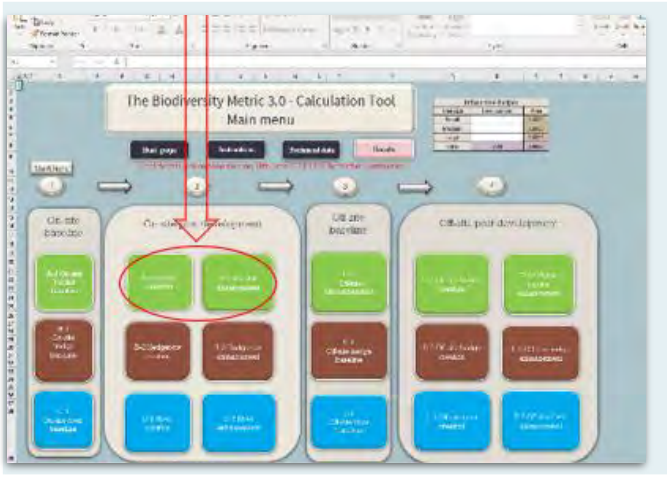
When you have finished entering all the site baseline data scroll left and click the “Main menu” button.

Top Tips

- Consider ‘Strategic significance’ separately for each individual habitat entry in the metric and not in a blanket fashion on a site wide basis.
- Use the comments section to record any additional justifications for the assessment of habitat type, condition or location if needed.

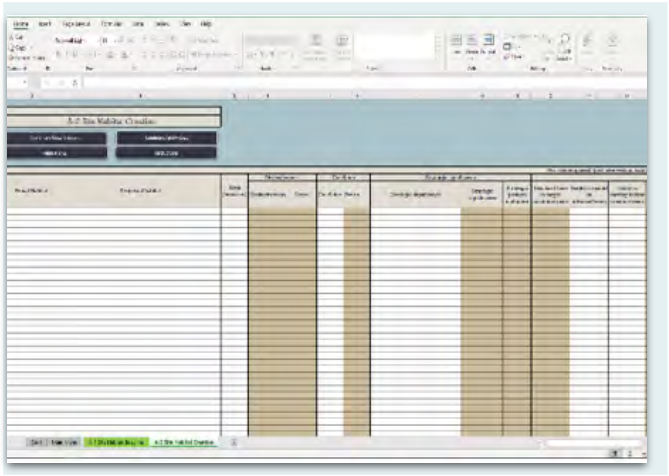
Back to Top

Step 2: Entering On-Site Post-Development Data



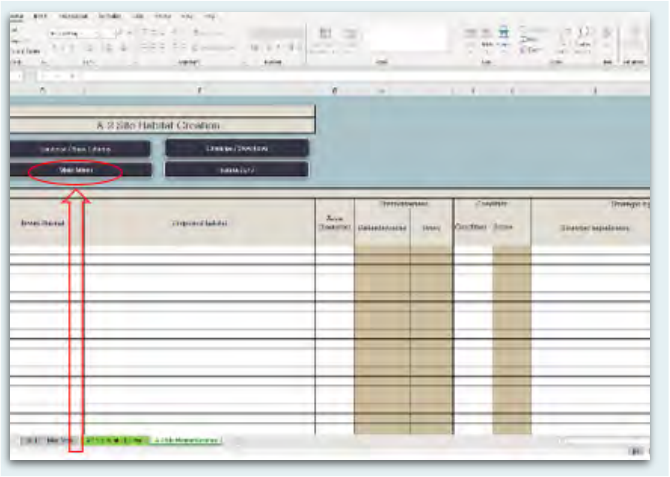
In the Main Menu there are two buttons to enter data relating to habitat present on-site post development: “A-2 Habitat Creation” and “A-3 Habitat Enhancement”.

Data can be entered into each as appropriate by clicking the relevant green button.



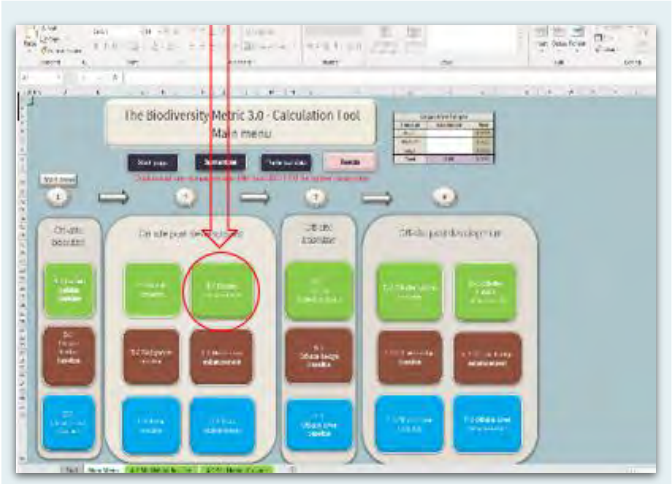
Click on the “A-2 Habitat Creation” button and a new sheet will open.

Input data into each of the white columns as appropriate, in the same way as was done for the baseline habitat. You will need to complete a new row for each habitat parcel on-site.



When you have finished entering the habitat creation data click the “Main menu” button in the top left of the screen to return to the worksheet menu.

Back to Top



If required, click the “A-3 Habitat Enhancement” button and enter data for any habitats enhanced by filling in the white columns.

You will notice that the current habitat data is prepopulated from the baseline data entered earlier.

When finished return to the “Main menu”.

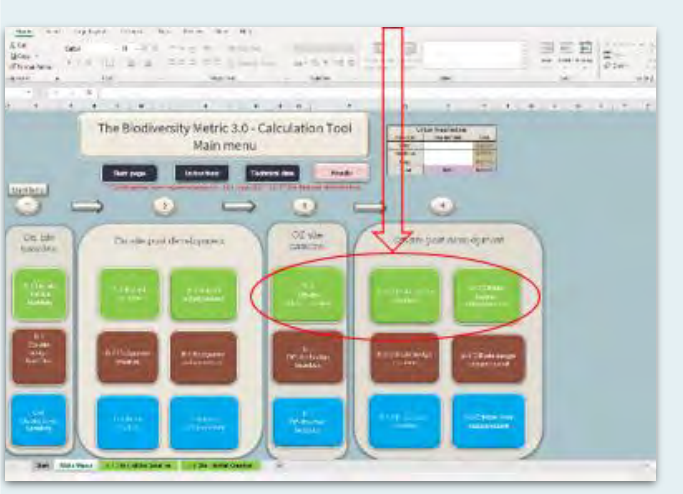
Top Tips

- If an error flag is triggered there is a discrepancy bigger than 0.01 ha between the baseline and post development site areas that needs to be addressed.
- If a trading error occurs in either the distinctiveness or condition movement cells in the enhancement tab the tool will not calculate a value. To resolve the error, change the proposed habitat or proposed condition.

If you are seeking to achieve a biodiversity net gain outcome on-site no further data input is needed. You can now skip to “Step 4” to check the results and see whether an on-site biodiversity net gain has been achieved.

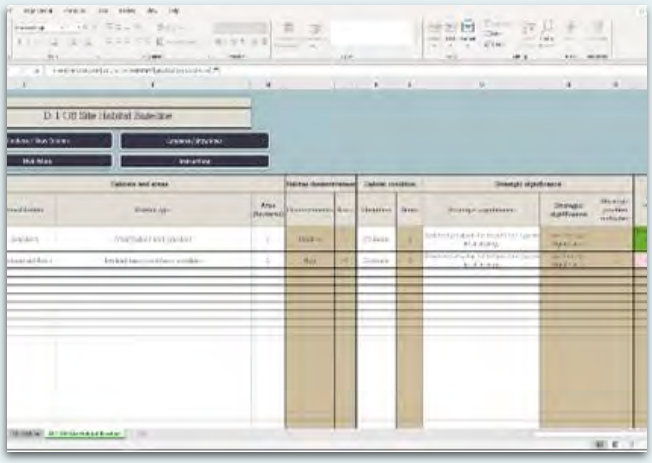
Back to Top

Step 3: Entering Off-Site Data (NOTE: only needed when creating or enhancing habitat outside the project 'red line' boundary)



Projects creating or enhancing any habitats outside a development site will need to enter data in the off-site baseline habitat, off-site habitat enhancement and/or creation sheets.

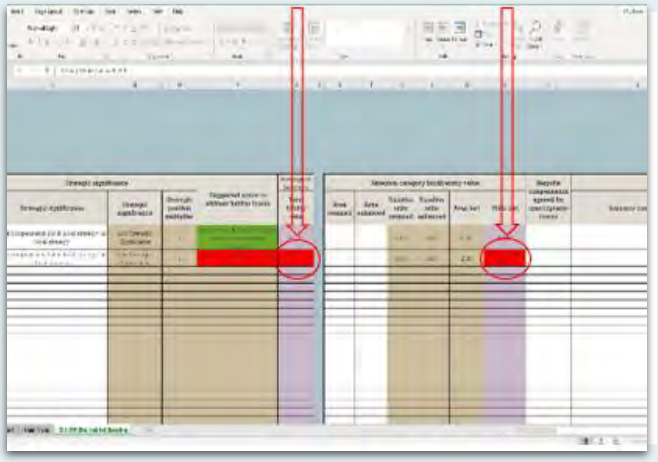
These are accessed using the green buttons highlighted under points 3 and 4 to the right-hand side on the main menu.



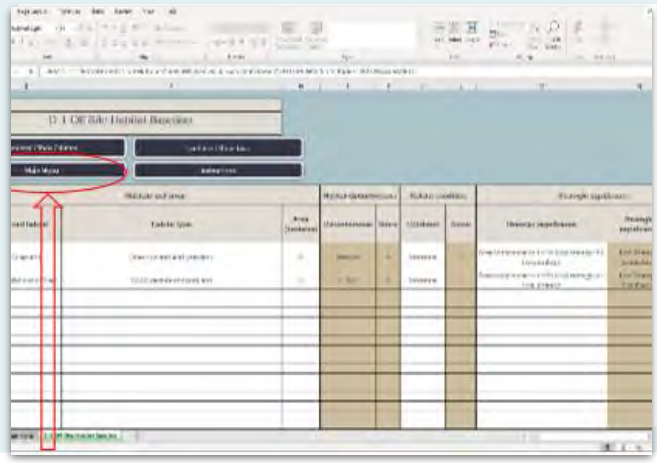
Off-site data should be entered into the white columns on each of the off-site sheets, starting with the D-1 off-site habitat baseline sheet. In the same way as the previous sheets, the light brown cells auto populate based on the data input into the white cells.

When entering baseline data scroll right on the screen to ensure that all white data entry fields are completed, including any areas in the off-site baseline that will be retained or enhanced. Complete a new row for each habitat parcel.

Back to Top



An error flag will be generated if a Very High Distinctiveness habitat is entered into the metric, unless it is retained, enhanced or it is confirmed that bespoke compensation has been agreed.

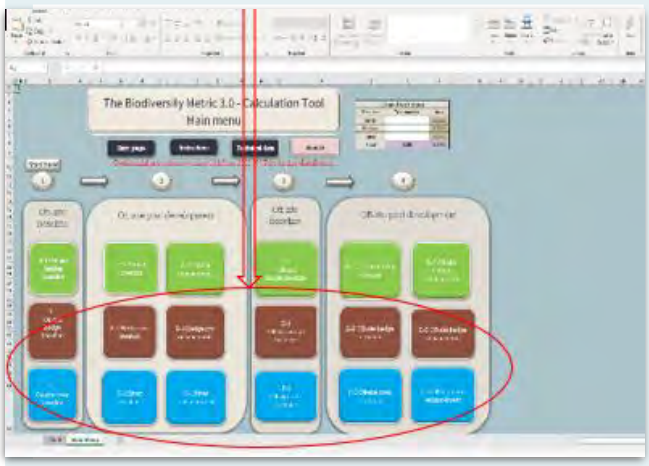


When all “off-site” baseline data has been entered click on the ‘main menu’ button.

Then click on the “D-2 Off-site habitat creation” and / or “D-3 Off-site habitat enhancement” buttons as appropriate for your project and enter data into each of the white columns.

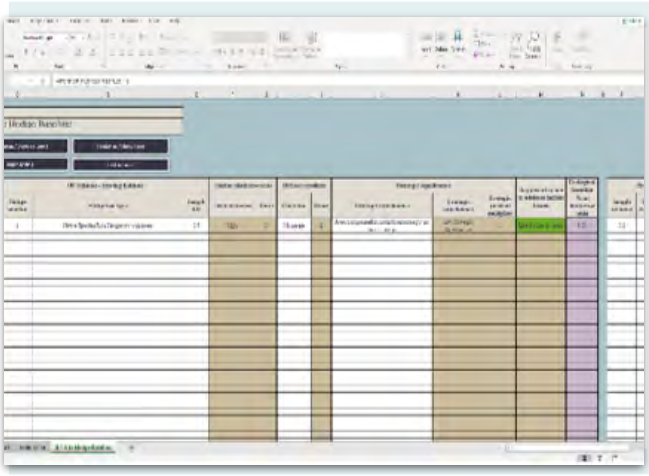
You will need to complete a new row for each habitat parcel on-site.

Step 4: Hedgerows, Lines of Trees, Rivers and Streams



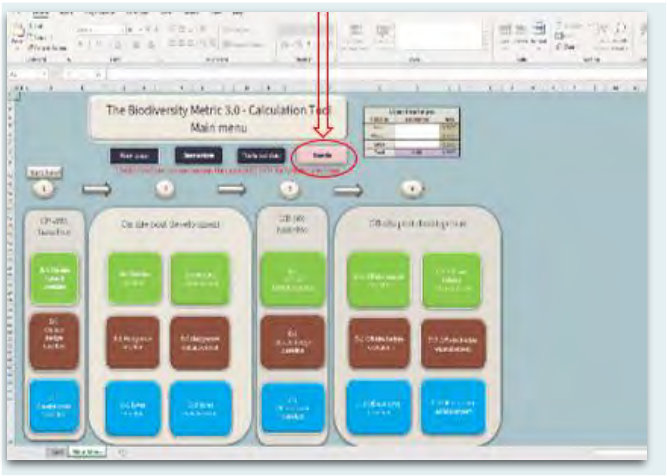
If your project contains hedgerows, lines of trees or rivers, or streams or watercourses then you will need to fill in the additional metric modules for these habitats.

Back to Top

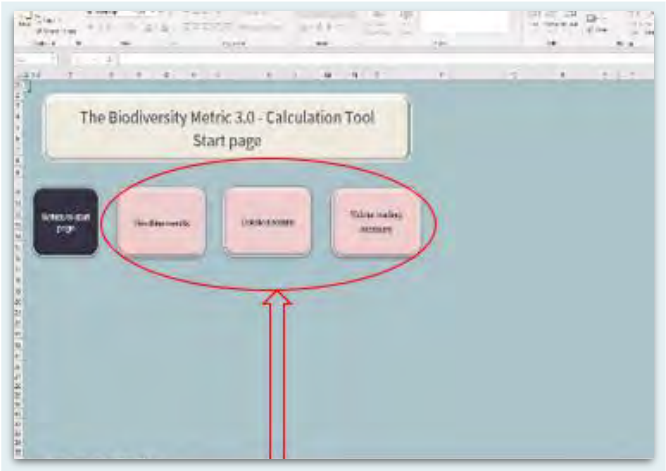


On-site and off-site project data for these habitats should be entered in the same way as for area habitats by inputting data into the white columns.

Step 5: The Results

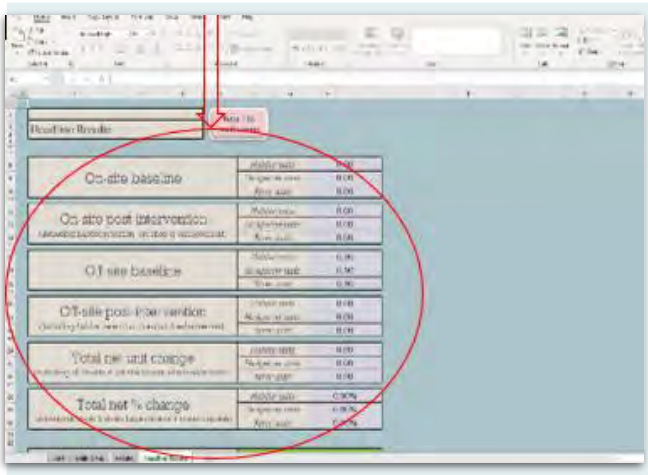


Click on the “Results” to see whether or not your project has achieved a forecast net biodiversity gain.



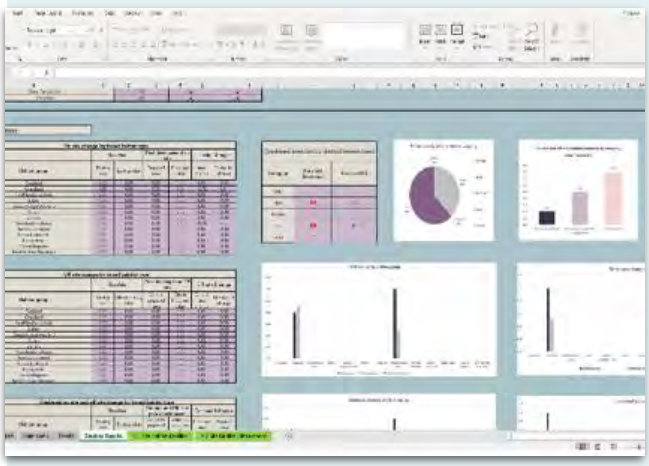
On this screen you can click to see the “Headline results”, “Detailed results” or the ”Habitat trading summary”.

Back to Top

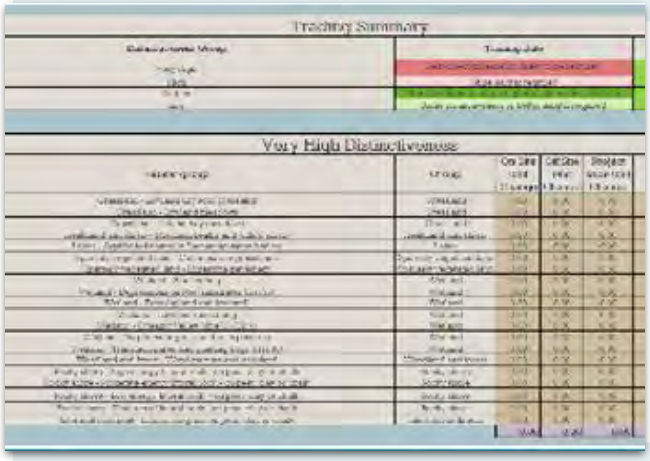


The “headline results” page provides a breakdown of the biodiversity units lost and gained and the percentage loss or gain achieved in biodiversity units.

It will also show if the proposal satisfies the metric trading rules.



For more detailed results, including changes at the broad habitat level, click on the “Detailed results” button.



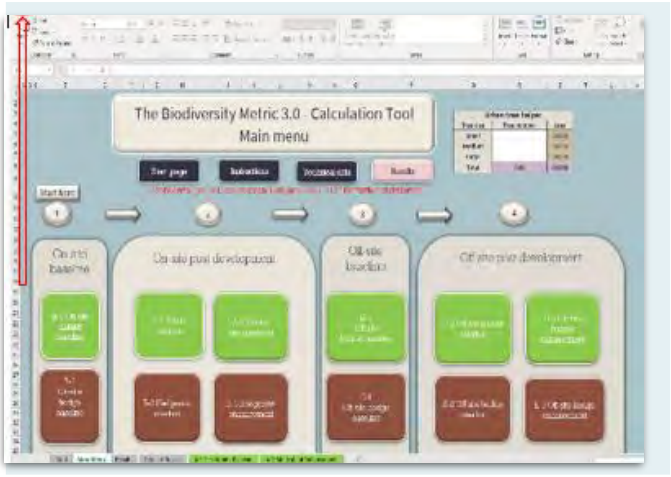
The ‘Habitat trading summary’ provides details of losses and gains for each habitat and indicates if the proposal satisfies the trading rules.

Top Tips

- Results for habitats based on an area measure are not comparable with those based on a linear measure and therefore need to be accounted for separately.
- If habitat enhancement units are not included in the Headline results check all the data in the enhancement tab has been entered correctly.

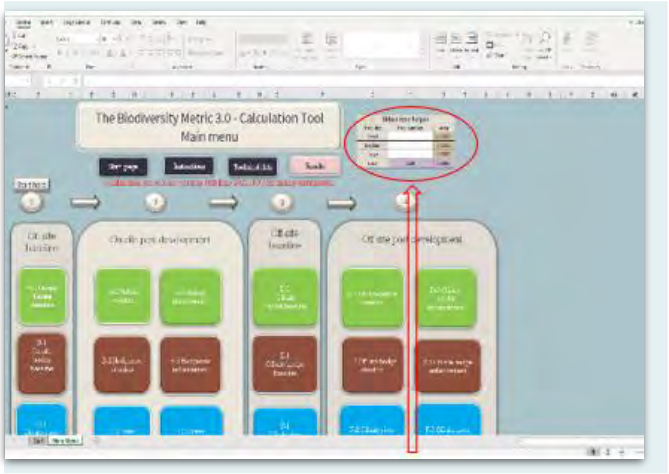
Back to Top

Step 6: Saving and Submitting Your Assessment



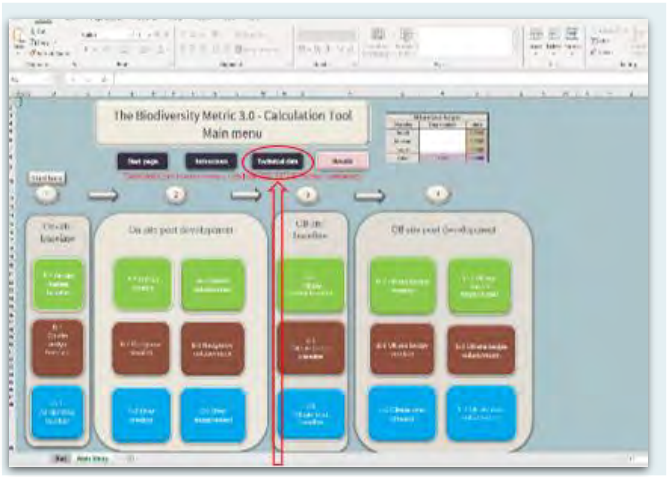
Go to file, save as and save the document as the same name as the user has put in the project title.

Additional Functions



Urban Tree Helper

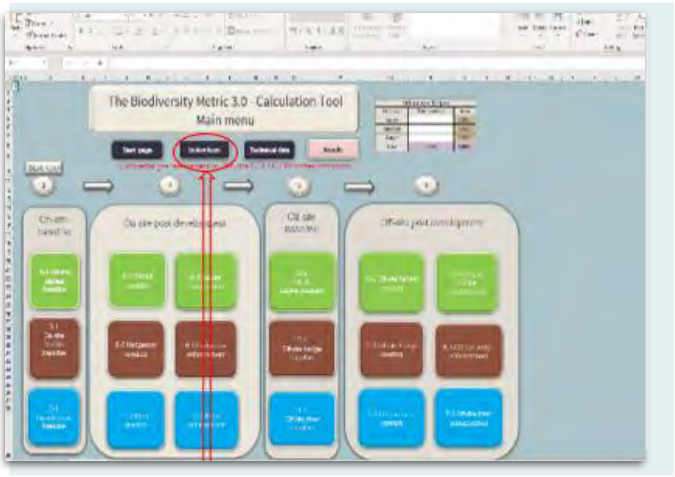
The calculation tool also comes with an urban tree helper to quickly convert your urban tree measurements into an area calculation to use when calculating baseline and post-intervention values for urban trees. Enter the number of trees of each size type and the tool will convert this into hectares.



Technical Data

Information about all of the technical data that underpins the calculation tool can be found by clicking the "Technical data" button on the main menu.

Back to Top



Instructions

A copy of these instructions can be accessed at any point in the tool by pressing the instructions button.

Additional help and detailed instructions describing all of the functions of the calculation tool can be found in Chapter 4 of *The Biodiversity Metric 3.0 – User Guide*

Back to Top

Willen Road Newport Pagnell (RSK Project 2480325)

Headline Results

Return to results menu

On-site baseline	*Habitat units*	50.72
	Hedgerow units	32.48
	River units	8.44
On-site post-intervention (Including habitat retention, creation & enhancement)	*Habitat units*	81.37
	Hedgerow units	33.36
	River units	14.10
On-site net % change (Including habitat retention, creation & enhancement)	*Habitat units*	60.44%
	Hedgerow units	2.71%
	River units	67.02%
Off-site baseline	*Habitat units*	0.00
	Hedgerow units	0.00
	River units	0.00
Off-site post-intervention (Including habitat retention, creation & enhancement)	*Habitat units*	0.00
	Hedgerow units	0.00
	River units	0.00
Total net unit change (including all on-site & off-site habitat retention, creation & enhancement)	*Habitat units*	30.65
	Hedgerow units	0.88
	River units	5.66
Total on-site net % change plus off-site surplus (including all on-site & off-site habitat retention, creation & enhancement)	*Habitat units*	60.44%
	Hedgerow units	2.71%
	River units	67.02%
Trading rules Satisfied?		Yes

Willen Road Newport Pagnell (RSK Project 2480325)

Detailed Results

Return to results menu

Summary Figures

Net project biodiversity units (including all on-site & off-site habitat retention/creation)		
	Habitat units	30.65
	Hedgerow units	0.88
	River units	5.66

Total project biodiversity % change (including all On-site & Off-site Habitat Creation + Retained Habitats)		
	Habitat units	60.44%
	Hedgerow units	2.71%
	River units	67.02%

Combined habitat retention and enhancement

	Habitats	Hedgerows	Rivers
Total area / length	40.79	3.78	1.40
Total units	50.72	32.48	8.44
Area / length retained	0.61	2.91	1.19
Units Retained	4.88	26.77	7.00
Area / length proposed for enhancement	0.00	0.28	0.00
Baseline units proposed for enhancement	0.00	1.29	0.00
Area / length lost	40.18	0.59	0.21
Units lost	45.84	4.42	1.44

Area Habitats

Area habitats

On site change by broad habitat type

Habitat group	Baseline		Post development on site		Onsite Change	
	Existing area	Existing value	Proposed area	Proposed value	Area change	Onsite Unit change
Cropland	16.25	32.50	0.00	0.00	-16.25	-32.50
Grassland	6.46	12.92	11.35	39.37	4.89	26.45
Heathland and shrub	0.61	4.88	4.05	27.91	3.44	23.03
Lakes	0.00	0.00	1.18	9.76	1.18	9.76
Sparsely vegetated land	0.21	0.42	0.00	0.00	-0.21	-0.42
Urban	17.26	0.00	24.21	8.61	6.95	8.61
Wetland	0.00	0.00	0.00	0.00	0.00	0.00
Woodland and forest	0.00	0.00	0.00	0.00	0.00	0.00
Intertidal sediment	0.00	0.00	0.00	0.00	0.00	0.00
Coastal saltmarsh	0.00	0.00	0.00	0.00	0.00	0.00
Rocky shore	0.00	0.00	0.00	0.00	0.00	0.00
Coastal lagoons	0.00	0.00	0.00	0.00	0.00	0.00
Intertidal Hard Structures	0.00	0.00	0.00	0.00	0.00	0.00

Off site change by broad habitat type

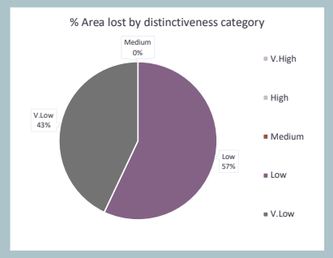
Habitat group	Baseline		Post development Off-site		Off-site Change	
	Existing area	Off-site Existing value	Off-site proposed area	Off site Proposed value	Off-site area change	Off-site unit change
Cropland	0.00	0.00	0.00	0.00	0.00	0.00
Grassland	0.00	0.00	0.00	0.00	0.00	0.00
Heathland and shrub	0.00	0.00	0.00	0.00	0.00	0.00
Lakes	0.00	0.00	0.00	0.00	0.00	0.00
Sparsely vegetated land	0.00	0.00	0.00	0.00	0.00	0.00
Urban	0.00	0.00	0.00	0.00	0.00	0.00
Wetland	0.00	0.00	0.00	0.00	0.00	0.00
Woodland and forest	0.00	0.00	0.00	0.00	0.00	0.00
Intertidal sediment	0.00	0.00	0.00	0.00	0.00	0.00
Coastal saltmarsh	0.00	0.00	0.00	0.00	0.00	0.00
Rocky shore	0.00	0.00	0.00	0.00	0.00	0.00
Coastal lagoons	0.00	0.00	0.00	0.00	0.00	0.00
Intertidal Hard Structures	0.00	0.00	0.00	0.00	0.00	0.00

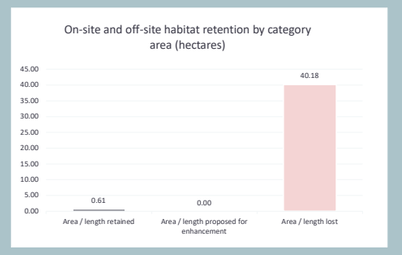
Combined on site and off site change by broad habitat type

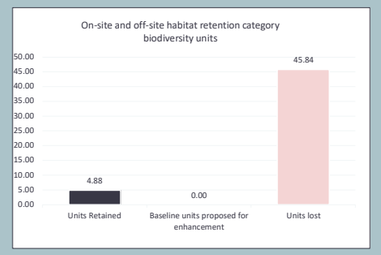
Habitat group	Baseline		On-site and Off-site post development		Combined change	
	Existing area	Existing value	Combined proposed area	Combined proposed value	Proposed area	Proposed value
Cropland	16.25	32.50	0.00	0.00	-16.25	-32.50
Grassland	6.46	12.92	11.35	39.37	4.89	26.45
Heathland and shrub	0.61	4.88	4.05	27.91	3.44	23.03
Lakes	0.00	0.00	1.18	9.76	1.18	9.76
Sparsely vegetated land	0.21	0.42	0.00	0.00	-0.21	-0.42
Urban	17.26	0.00	24.21	8.61	6.95	8.61
Wetland	0.00	0.00	0.00	0.00	0.00	0.00
Woodland and forest	0.00	0.00	0.00	0.00	0.00	0.00
Intertidal sediment	0.00	0.00	0.00	0.00	0.00	0.00
Coastal saltmarsh	0.00	0.00	0.00	0.00	0.00	0.00
Rocky shore	0.00	0.00	0.00	0.00	0.00	0.00
Coastal lagoons	0.00	0.00	0.00	0.00	0.00	0.00
Intertidal Hard Structures	0.00	0.00	0.00	0.00	0.00	0.00

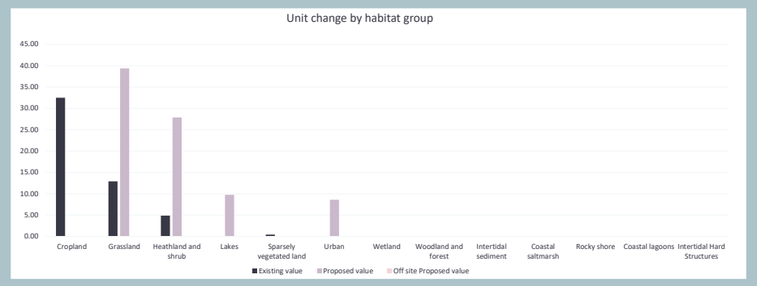
Combined area lost by distinctiveness band

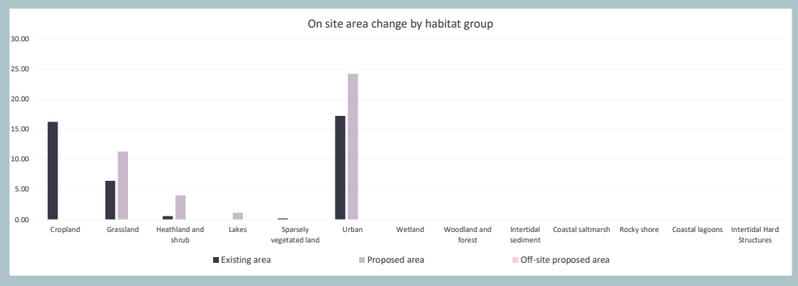
Category	Area lost (hectares)	Area lost (%)
V.High	0	
High	0	
Medium	0	
Low	22.92	57
V.Low	17.26	43

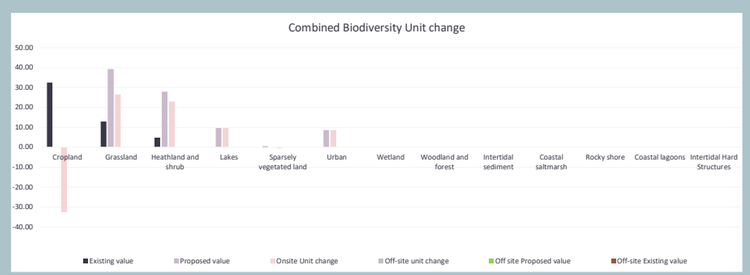


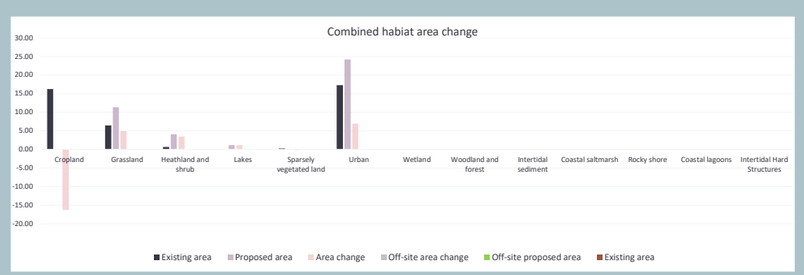












Hedgerows and lines of trees

On site change by hedgerow type

Hedgerow type	Baseline		Post development on site		Onsite Change	
	Existing length on-site	Existing value	Proposed length on-site	Proposed value on-site	On-site length change	On-site Unit change
Native Species Rich Hedgerow with trees - Associated with bank or ditch	0.00	0.00	0.00	0.00	0.00	0.00
Native Species Rich Hedgerow with trees	0.00	0.00	0.00	0.00	0.00	0.00
Native Species Rich Hedgerow - Associated with bank or ditch	0.00	0.00	0.00	0.00	0.00	0.00
Native Hedgerow with trees - Associated with bank or ditch	0.00	0.00	0.00	0.00	0.00	0.00
Native Species Rich Hedgerow	3.78	32.48	3.65	33.36	-0.13	0.88
Native Hedgerow - Associated with bank or ditch	0.00	0.00	0.00	0.00	0.00	0.00
Native Hedgerow with trees	0.00	0.00	0.00	0.00	0.00	0.00
Line of Trees (Ecologically Valuable)	0.00	0.00	0.00	0.00	0.00	0.00
Line of Trees (Ecologically Valuable) - with Bank or Ditch	0.00	0.00	0.00	0.00	0.00	0.00
Native Hedgerow	0.00	0.00	0.00	0.00	0.00	0.00
Line of Trees	0.00	0.00	0.00	0.00	0.00	0.00
Line of Trees - Associated with bank or ditch	0.00	0.00	0.00	0.00	0.00	0.00
Hedge Ornamental Non Native	0.00	0.00	0.00	0.00	0.00	0.00

Off site change by hedgerow type

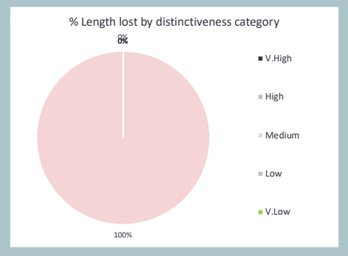
Hedgerow type	Off site baseline		Post development off site		Off site Change	
	Existing length off-site	Existing value off-site	Proposed length off-site	Proposed value off-site	Off-site length change	Off site Unit change
Native Species Rich Hedgerow with trees - Associated with bank or ditch	0.00	0.00	0.00	0.00	0.00	0.00
Native Species Rich Hedgerow with trees	0.00	0.00	0.00	0.00	0.00	0.00
Native Species Rich Hedgerow - Associated with bank or ditch	0.00	0.00	0.00	0.00	0.00	0.00
Native Hedgerow with trees - Associated with bank or ditch	0.00	0.00	0.00	0.00	0.00	0.00
Native Species Rich Hedgerow	0.00	0.00	0.00	0.00	0.00	0.00
Native Hedgerow - Associated with bank or ditch	0.00	0.00	0.00	0.00	0.00	0.00
Native Hedgerow with trees	0.00	0.00	0.00	0.00	0.00	0.00
Line of Trees (Ecologically Valuable)	0.00	0.00	0.00	0.00	0.00	0.00
Line of Trees (Ecologically Valuable) - with Bank or Ditch	0.00	0.00	0.00	0.00	0.00	0.00
Native Hedgerow	0.00	0.00	0.00	0.00	0.00	0.00
Line of Trees	0.00	0.00	0.00	0.00	0.00	0.00
Line of Trees - Associated with bank or ditch	0.00	0.00	0.00	0.00	0.00	0.00
Hedge Ornamental Non Native	0.00	0.00	0.00	0.00	0.00	0.00

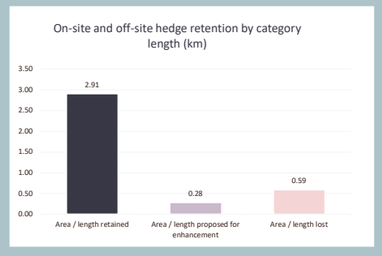
Combined on and off site change by hedgerow type

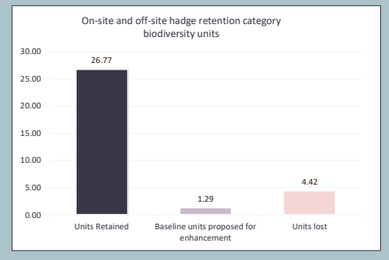
Hedgerow type	Baseline		Post development on site		Onsite Change	
	Existing length	Existing value	Proposed length	Proposed value	length change	Onsite Unit change
Native Species Rich Hedgerow with trees - Associated with bank or ditch	0.00	0.00	0.00	0.00	0.00	0.00
Native Species Rich Hedgerow with trees	0.00	0.00	0.00	0.00	0.00	0.00
Native Species Rich Hedgerow - Associated with bank or ditch	0.00	0.00	0.00	0.00	0.00	0.00
Native Hedgerow with trees - Associated with bank or ditch	0.00	0.00	0.00	0.00	0.00	0.00
Native Species Rich Hedgerow	3.78	32.48	3.65	33.36	-0.13	0.88
Native Hedgerow - Associated with bank or ditch	0.00	0.00	0.00	0.00	0.00	0.00
Native Hedgerow with trees	0.00	0.00	0.00	0.00	0.00	0.00
Line of Trees (Ecologically Valuable)	0.00	0.00	0.00	0.00	0.00	0.00
Line of Trees (Ecologically Valuable) - with Bank or Ditch	0.00	0.00	0.00	0.00	0.00	0.00
Native Hedgerow	0.00	0.00	0.00	0.00	0.00	0.00
Line of Trees	0.00	0.00	0.00	0.00	0.00	0.00
Line of Trees - Associated with bank or ditch	0.00	0.00	0.00	0.00	0.00	0.00
Hedge Ornamental Non Native	0.00	0.00	0.00	0.00	0.00	0.00

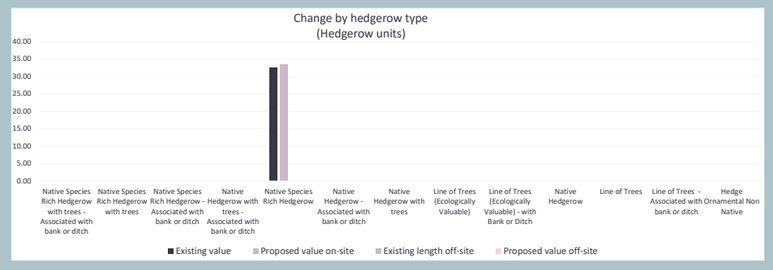
Combined length lost by distinctiveness band

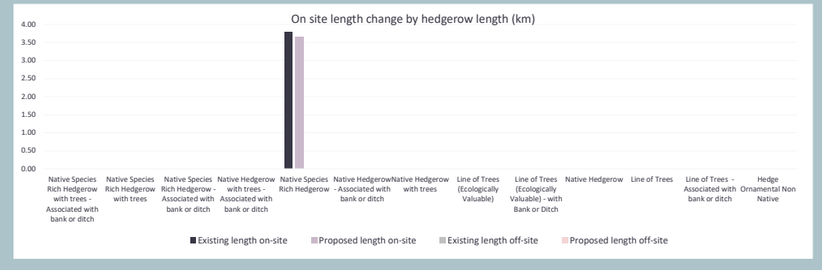
Category	Length lost (KM)	Length lost (%)
V.High	0	
High	0	
Medium	0.59	100
Low	0	
V.Low	0	

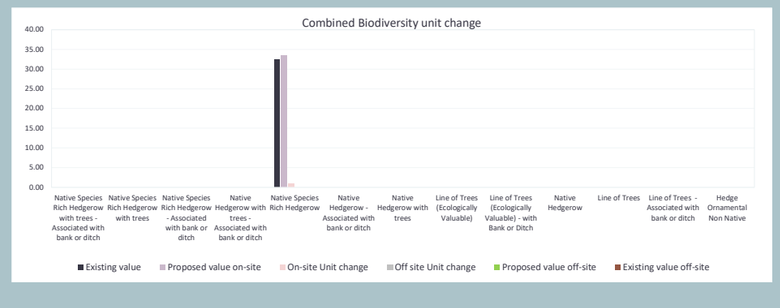


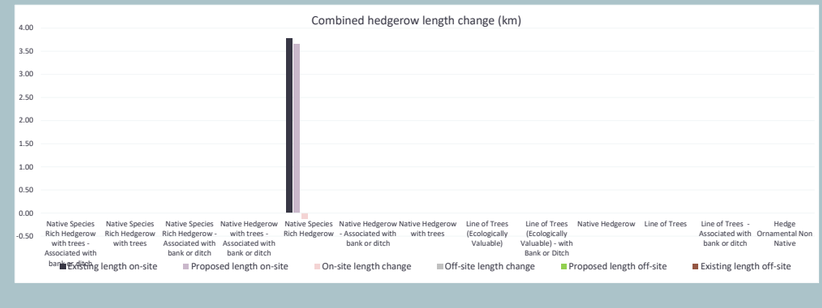












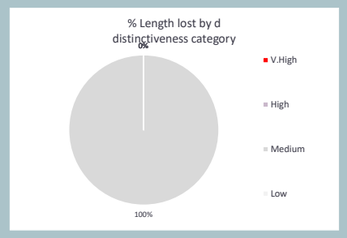
Rivers and Streams

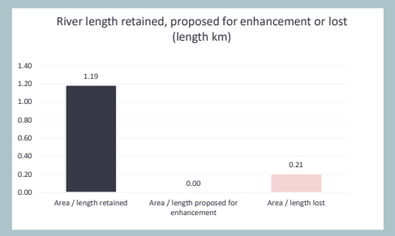
On site change by river type

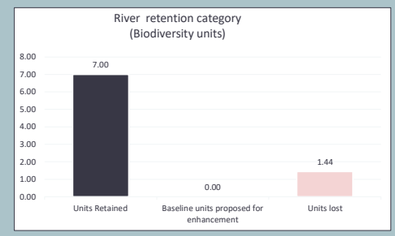
River type	Baseline		Post development on site		Onsite Change	
	Existing length	Existing value	Proposed length	Proposed value	length change	Onsite Unit change
Priority Habitat	0.0	0.0	0.0	0.0	0.0	0.0
Other Rivers and Streams	0.0	0.0	0.0	0.0	0.0	0.0
Ditches	1.4	8.4	2.3	14.1	0.9	5.7
Canals	0.0	0.0	0.0	0.0	0.0	0.0
Culvert	0.0	0.0	0.0	0.0	0.0	0.0

Combined length lost by distinctiveness band

Category	Length lost (KM)	Length lost (%)
V.High	0	
High	0	
Medium	0.21	36
Low	0	

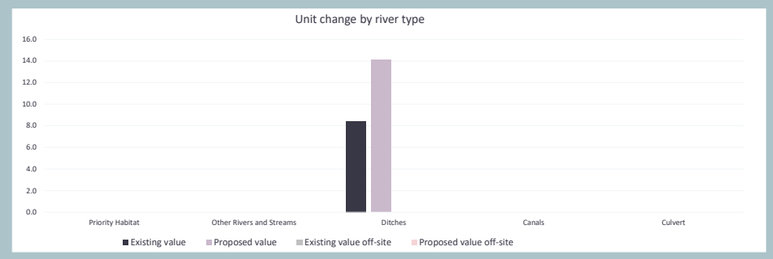


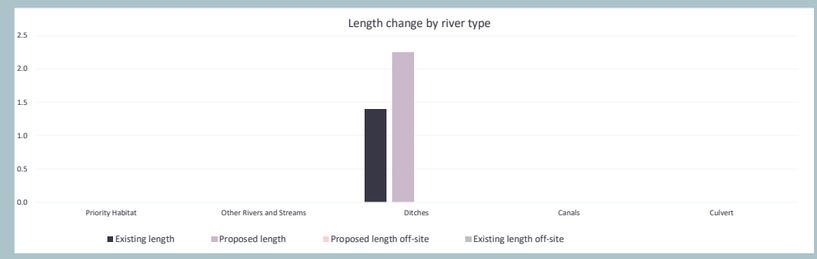


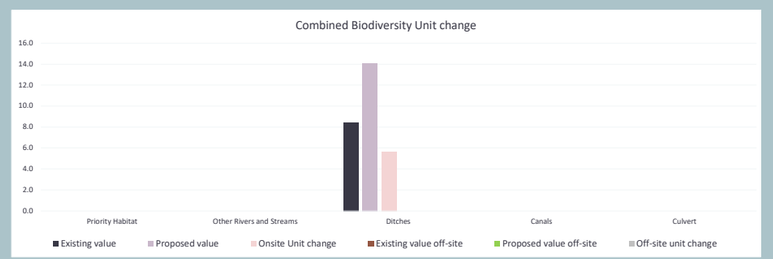


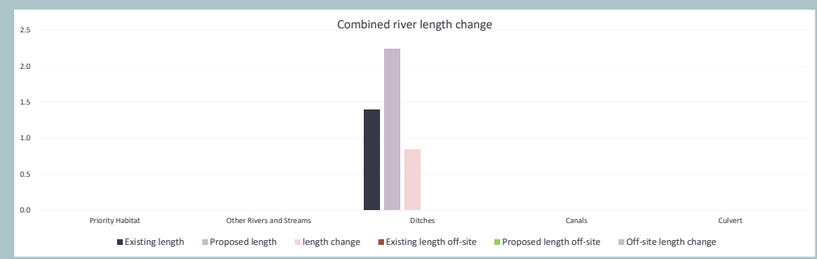
Off site change by river type

River type	Baseline		Post development off-site		Off-site Change	
	Existing length off-site	Existing value off-site	Proposed length off-site	Proposed value off-site	Off-site length change	Off-site unit change
Priority Habitat	0.0	0.0	0.0	0.0	0.0	0.0
Other Rivers and Streams	0.0	0.0	0.0	0.0	0.0	0.0
Ditches	0.0	0.0	0.0	0.0	0.0	0.0
Canals	0.0	0.0	0.0	0.0	0.0	0.0
Culvert	0.0	0.0	0.0	0.0	0.0	0.0









Combined on and off site change by river type

River type	Baseline		Post development on site		Onsite Change	
	Existing length	Existing value	Proposed length	Proposed value	length change	Onsite Unit change
Priority Habitat	0.0	0.0	0.0	0.0	0.0	0.0
Other Rivers and Streams	0.0	0.0	0.0	0.0	0.0	0.0
Ditches	1.4	8.4	2.3	14.1	0.9	5.7
Canals	0.0	0.0	0.0	0.0	0.0	0.0
Culvert	0.0	0.0	0.0	0.0	0.0	0.0

Return to results menu

Trading Summary

Distinctiveness Group	Trading Rule	Trading Satisfied?
Very High	Bespoke compensation likely to be required	Yes
High	Same habitat required	Yes
Medium	Same broad habitat or a higher distinctiveness habitat required	Yes
Low	Same distinctiveness or better habitat required	Yes

Very High Distinctiveness

Habitat group	Group	On Site Unit Change	Off Site Unit Change	Project wide Unit Change	Unit Losses
Grassland - Lowland dry acid grassland	Grassland	0.00	0.00	0.00	
Grassland - Lowland meadows	Grassland	0.00	0.00	0.00	
Grassland - Upland hay meadows	Grassland	0.00	0.00	0.00	
Heathland and shrub - Mountain heaths and willow scrub	Heathland and shrub	0.00	0.00	0.00	
Lakes - Aquifer fed naturally fluctuating water bodies	Lakes	0.00	0.00	0.00	
Sparsely vegetated land - Calaminarian grasslands	Sparsely vegetated land	0.00	0.00	0.00	
Sparsely vegetated land - Limestone pavement	Sparsely vegetated land	0.00	0.00	0.00	
Wetland - Blanket bog	Wetland	0.00	0.00	0.00	
Wetland - Depressions on Peat substrates (H7150)	Wetland	0.00	0.00	0.00	
Wetland - Fens (upland and lowland)	Wetland	0.00	0.00	0.00	
Wetland - Lowland raised bog	Wetland	0.00	0.00	0.00	
Wetland - Oceanic Valley Mire[1] (D2.1)	Wetland	0.00	0.00	0.00	
Wetland - Purple moor grass and rush pastures	Wetland	0.00	0.00	0.00	
Wetland - Transition mires and quaking bogs (H7140)	Wetland	0.00	0.00	0.00	
Woodland and forest - Wood-pasture and parkland	Woodland and forest	0.00	0.00	0.00	
Rocky shore - High energy littoral rock - on peat, clay or chalk	Rocky shore	0.00	0.00	0.00	
Rocky shore - Moderate energy littoral rock - on peat, clay or chalk	Rocky shore	0.00	0.00	0.00	
Rocky shore - Low energy littoral rock - on peat, clay or chalk	Rocky shore	0.00	0.00	0.00	
Rocky shore - Features of littoral rock - on peat, clay or chalk	Rocky shore	0.00	0.00	0.00	
Intertidal sediment - Littoral seagrass on peat, clay or chalk	Intertidal sediment	0.00	0.00	0.00	
		0.00	0.00	0.00	0.00

Very High Distinctiveness Summary

Very High Distinctiveness Units available to offset lower distinctiveness defecit	0.00

High Distinctiveness

Habitat group	Group	On Site Unit Change	Off Site Unit Change	Project wide Unit Change	Losses not yet accounted for
Grassland - Traditional orchards	Grassland	0.00	0.00	0.00	
Grassland - Floodplain Wetland Mosaic (CFGM)	Grassland	0.00	0.00	0.00	
Grassland - Lowland calcareous grassland	Grassland	0.00	0.00	0.00	
Grassland - Tall herb communities	Grassland	0.00	0.00	0.00	
Grassland - Upland calcareous grassland	Grassland	0.00	0.00	0.00	
Heathland and shrub - Lowland Heathland	Grassland	0.00	0.00	0.00	
Heathland and shrub - Sea buckthorn scrub (Annex 1)	Heathland and shrub	0.00	0.00	0.00	
Heathland and shrub - Upland Heathland	Heathland and shrub	0.00	0.00	0.00	
Lakes - High alkalinity lakes	Lakes	0.00	0.00	0.00	
Lakes - Low alkalinity lakes	Lakes	0.00	0.00	0.00	
Lakes - Marl Lakes	Lakes	0.00	0.00	0.00	
Lakes - Moderate alkalinity lakes	Lakes	0.00	0.00	0.00	
Lakes - Peat Lakes	Lakes	0.00	0.00	0.00	
Lakes - Ponds (Priority Habitat)	Lakes	0.00	0.00	0.00	
Lakes - Temporary lakes, ponds and pools	Lakes	0.00	0.00	0.00	
Sparsely vegetated land - Coastal sand dunes	Sparsely vegetated land	0.00	0.00	0.00	
Sparsely vegetated land - Coastal vegetated shingle	Sparsely vegetated land	0.00	0.00	0.00	
Sparsely vegetated land - Inland rock outcrop and scree habitats	Sparsely vegetated land	0.00	0.00	0.00	
Sparsely vegetated land - Maritime cliff and slopes	Sparsely vegetated land	0.00	0.00	0.00	
Urban - Open Mosaic Habitats on Previously Developed Land	Urban	0.00	0.00	0.00	
Wetland - Reedbeds	Wetland	0.00	0.00	0.00	
Woodland and forest - Felled	Woodland and forest	0.00	0.00	0.00	
Woodland and forest - Lowland beech and yew woodland	Woodland and forest	0.00	0.00	0.00	
Woodland and forest - Lowland mixed deciduous woodland	Woodland and forest	0.00	0.00	0.00	
Woodland and forest - Native pine woodlands	Woodland and forest	0.00	0.00	0.00	
Woodland and forest - Upland birchwoods	Woodland and forest	0.00	0.00	0.00	
Woodland and forest - Upland mixed ashwoods	Woodland and forest	0.00	0.00	0.00	
Woodland and forest - Upland oakwood	Woodland and forest	0.00	0.00	0.00	
Woodland and forest - Wet woodland	Woodland and forest	0.00	0.00	0.00	
Coastal lagoons - Coastal lagoons	Coastal lagoons	0.00	0.00	0.00	
Rocky shore - High energy littoral rock	Rocky shore	0.00	0.00	0.00	
Rocky shore - Moderate energy littoral rock	Rocky shore	0.00	0.00	0.00	
Rocky shore - Low energy littoral rock	Rocky shore	0.00	0.00	0.00	
Rocky shore - Features of littoral rock	Rocky shore	0.00	0.00	0.00	
Intertidal sediment - Littoral mud	Intertidal sediment	0.00	0.00	0.00	
Intertidal sediment - Littoral mixed sediments	Intertidal sediment	0.00	0.00	0.00	
Coastal saltmarsh - Saltmarshes and saline reedbeds	Coastal Saltmarsh	0.00	0.00	0.00	
Intertidal sediment - Littoral biogenic reefs - Mussels	Intertidal sediment	0.00	0.00	0.00	
Intertidal sediment - Littoral biogenic reefs - Sabellaria	Intertidal sediment	0.00	0.00	0.00	
Intertidal sediment - Features of littoral sediment	Intertidal sediment	0.00	0.00	0.00	
Intertidal sediment - Littoral muddy sand	Intertidal sediment	0.00	0.00	0.00	
		0.00	0.00	0.00	0.00

High Distinctiveness Summary

High Distinctiveness Units available to offset lower distinctiveness defecit	0.00
Unit Defecit; Like for like not satisfied	0.00

Medium Distinctiveness

Habitat Group	Group	On site unit change	Off Site Unit Change	Project wide unit change	Cumulative Broad Habitat Change
Cropland - Arable field margins cultivated annually	Cropland	0.00	0.00	0.00	0.00
Cropland - Arable field margins game bird mix	Cropland	0.00	0.00	0.00	
Cropland - Arable field margins pollen & nectar	Cropland	0.00	0.00	0.00	
Cropland - Arable field margins tussocky	Cropland	0.00	0.00	0.00	
Cropland - Cereal crops winter stubble	Cropland	0.00	0.00	0.00	
Grassland - Other lowland acid grassland	Grassland	0.00	0.00	0.00	0.00
Grassland - Other neutral grassland	Grassland	0.00	0.00	0.00	
Grassland - Upland acid grassland	Grassland	0.00	0.00	0.00	
Heathland and shrub - Blackthorn scrub	Heathland and shrub	0.00	0.00	0.00	23.03
Heathland and shrub - Bramble scrub	Heathland and shrub	0.00	0.00	0.00	
Heathland and shrub - Gorse scrub	Heathland and shrub	0.00	0.00	0.00	
Heathland and shrub - Hawthorn scrub	Heathland and shrub	0.00	0.00	0.00	
Heathland and shrub - Hazel scrub	Heathland and shrub	0.00	0.00	0.00	
Heathland and shrub - Mixed scrub	Heathland and shrub	23.03	0.00	23.03	
Lakes - Ponds (Non- Priority Habitat)	Lakes	9.76	0.00	9.76	9.76
Lakes - Reservoirs	Lakes	0.00	0.00	0.00	
Sparsely vegetated land - Other inland rock and scree	Sparsely vegetated land	0.00	0.00	0.00	0.00
Urban - Brown roof	Urban	0.00	0.00	0.00	0.00
Urban - Cemeteries and churchyards	Urban	0.00	0.00	0.00	
Urban - Intensive green roof	Urban	0.00	0.00	0.00	
Woodland and forest - Other Scot's Pine woodland	Woodland and forest	0.00	0.00	0.00	0.00
Woodland and forest - Other woodland; broadleaved	Woodland and forest	0.00	0.00	0.00	
Woodland and forest - Other woodland; mixed	Woodland and forest	0.00	0.00	0.00	
Intertidal sediment - Littoral coarse sediment	Intertidal sediment	0.00	0.00	0.00	0.00
Intertidal sediment - Littoral sand	Intertidal sediment	0.00	0.00	0.00	
Intertidal Hard Structures - Artificial hard structures with Integrated Greening of Grey Infrastructure (IGGI)	Intertidal	0.00	0.00	0.00	
		32.79	0.00	32.79	

Medium Distinctiveness Summary

Medium Distinctiveness Units available to offset lower distinctiveness defecit	32.79
Medium Distinctiveness Broad Habitat Deficit to be offset by trading up	0.00
Higher distinctiveness surplus units miunus Medium Distinctivenss Broad Habitat Defecit	0.00
Cumulative surplus of units	32.79

Low Distinctiveness

Habitat group	Group	On site unit change	Off Site Unit Change	Project wide unit change
Cropland - Cereal crops	Cropland	-32.50	0.00	-32.50
Cropland - Cereal crops other	Cropland	0.00	0.00	0.00
Cropland - Horticulture	Cropland	0.00	0.00	0.00
Cropland - Intensive orchards	Cropland	0.00	0.00	0.00
Cropland - Non-cereal crops	Cropland	0.00	0.00	0.00
Cropland - Temporary grass and clover leys	Cropland	0.00	0.00	0.00
Grassland - Modified grassland	Grassland	26.45	0.00	26.45
Grassland - Bracken	Grassland	0.00	0.00	0.00
Heathland and shrub - Rhododendron scrub	Heathland and shrub	0.00	0.00	0.00
Lakes - Ornamental lake or pond	Lakes	0.00	0.00	0.00
Sparsely vegetated land - Ruderal/Ephemeral	Sparsely vegetated land	-0.42	0.00	-0.42
Urban - Bioswale	Sparsely vegetated land	0.00	0.00	0.00
Urban - Allotments	Urban	0.00	0.00	0.00
Urban - Facade-bound green wall	Urban	0.00	0.00	0.00
Urban - Ground based green wall	Urban	0.00	0.00	0.00
Urban - Ground level planters	Urban	0.00	0.00	0.00
Urban - Extensive green roof	Urban	0.00	0.00	0.00
Urban - Introduced shrub	Urban	0.00	0.00	0.00
Urban - Rain garden	Urban	0.00	0.00	0.00
Urban - Sand pit quarry or open cast mine	Urban	0.00	0.00	0.00
Urban - Urban Tree	Urban	0.00	0.00	0.00
Urban - Sustainable urban drainage feature	Urban	0.00	0.00	0.00
Urban - Vacant/derelict land/ bareground	Urban	0.00	0.00	0.00
Urban - Vegetated garden	Urban	8.61	0.00	8.61
Woodland and forest - Other coniferous woodland	Woodland and forest	0.00	0.00	0.00
Coastal saltmarsh - Artificial saltmarshes and saline reedbeds	Coastal saltmarsh	0.00	0.00	0.00
Intertidal sediment - Artificial littoral coarse sediment	Intertidal sediment	0.00	0.00	0.00
Intertidal sediment - Artificial littoral mud	Intertidal sediment	0.00	0.00	0.00
Intertidal sediment - Artificial littoral sand	Intertidal sediment	0.00	0.00	0.00
Intertidal sediment - Artificial littoral muddy sand	Intertidal sediment	0.00	0.00	0.00
Intertidal sediment - Artificial littoral mixed sediments	Intertidal sediment	0.00	0.00	0.00
Intertidal sediment - Artificial littoral seagrass	Intertidal sediment	0.00	0.00	0.00
Intertidal sediment - Artificial littoral biogenic reefs	Intertidal sediment	0.00	0.00	0.00
Intertidal Hard Structures - Artificial hard structures	Intertidal	0.00	0.00	0.00
Intertidal Hard Structures - Artificial features of hard structures	Intertidal	0.00	0.00	0.00
Heathland and shrub - Sea buckthorn scrub (other)	Heathland and shrub	0.00	0.00	0.00
		2.14		2.14

Low Distinctiveness Summary

Low Distinctiveness Net Change in Units	2.14
Cumulative surplus of units	34.92

Willen Road Newport Pagnell (RSK Project 2480325)

A-1 Site Habitat Baseline

Condense / Show Columns | Condense / Show Rows

Main Menu | Instructions

	Habitats and areas				Distinctiveness		Condition		Strategic significance			Suggested action to address habitat losses	Ecological baseline
Ref	Broad habitat	Habitat type	Habitat type	Area (hectares)	Distinctiveness	Score	Condition	Score	Strategic significance	Strategic significance	Strategic Significance multiplier		Total habitat units
1	Cropland	Cereal crops	Cropland - Cereal crops	16.25	Low	2	N/A -Agricultural	1	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Same distinctiveness or better habitat required	32.50
2	Grassland	Modified grassland	Grassland - Modified grassland	6.46	Low	2	Poor	1	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Same distinctiveness or better habitat required	12.92
3	Heathland and shrub	Mixed scrub	Heathland and shrub - Mixed scrub	0.61	Medium	4	Moderate	2	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Same broad habitat or a higher distinctiveness habitat required	4.88
4	Sparsely vegetated land	Ruderal/Ephemeral	Sparsely vegetated land - Ruderal/Ephemeral	0.21	Low	2	Poor	1	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Same distinctiveness or better habitat required	0.42
5	Urban	Artificial unvegetated, unsealed surface	Urban - Artificial unvegetated, unsealed surface	0.43	V.Low	0	N/A - Other	0	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Compensation Not Required	0.00
6	Urban	Developed land; sealed surface	Urban - Developed land; sealed surface	0.06	V.Low	0	N/A - Other	0	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Compensation Not Required	0.00
7	Urban	Developed land; sealed surface	Urban - Developed land; sealed surface	12.89	V.Low	0	N/A - Other	0	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Compensation Not Required	0.00
8	Urban	Developed land; sealed surface	Urban - Developed land; sealed surface	3.88	V.Low	0	N/A - Other	0	Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1	Compensation Not Required	0.00
				40.79									50.72

Willen Road Newport Pagnell (RSK Project 2480325)

A-1 Site Habitat Baseline

Retention category biodiversity value						Bespoke compensation agreed for unacceptable losses	Comments	
Area retained	Area enhanced	Baseline units retained	Baseline units enhanced	Area lost	Units lost		Assessor comments	Reviewer comments
		0.00	0.00	16.25	32.50			
		0.00	0.00	6.46	12.92			
0.61		4.88	0.00	0.00	0.00			
		0.00	0.00	0.21	0.42			
		0.00	0.00	0.43	0.00		Track	
		0.00	0.00	0.06	0.00		Building	
		0.00	0.00	12.89	0.00		Hardstanding	
		0.00	0.00	3.88	0.00		This area is lowland meadow and will be lost. On and off-site bespoke mitigation is proposed to mitigate it's loss. The mitigation for the loss of this very high distinctiveness habitat is considered seperately. Sealed surface has been entered so that areas match up.	
0.61	0.00	4.88	0.00	40.18	45.84			

Willen Road Newport Pagnell (RSK Project 2480325)

A-2 Site Habitat Creation

Condense / Show Columns | Condense / Show Rows

Main Menu | Instructions

Post development/ post intervention habitats											
			Distinctiveness	Condition	Strategic significance	Temporal multiplier		Difficulty		Comments	
Broad Habitat	Proposed habitat	Area (hectares)	Distinctiveness	Condition	Strategic significance	Standard or adjusted time to target condition	Final time to target condition/years	Final difficulty of creation	Habitat units delivered	Assessor comments	Reviewer comments
Grassland	Modified grassland	11.35	Low	Moderate	Area/compensation not in local strategy/ no local strategy	Standard time to target condition applied	4	Low	39.37		
Urban	Developed land; sealed surface	1.96	V.Low	N/A - Other	Area/compensation not in local strategy/ no local strategy	Standard time to target condition applied	0	Medium	0.00	This area is lowland meadow creation and part of the bespoke mitigation. The mitigation for the loss of the existing lowland meadow is considered seperately. Sealed surface has been entered so that the areas match up.	
Heathland and shrub	Mixed scrub	3.44	Medium	Moderate	Area/compensation not in local strategy/ no local strategy	Standard time to target condition applied	5	Low	23.03		
Lakes	Ponds (Non- Priority Habitat)	1.18	Medium	Moderate	Within area formally identified in local strategy	Standard time to target condition applied	3	Low	9.76		
Urban	Developed land; sealed surface	17.79	V.Low	N/A - Other	Area/compensation not in local strategy/ no local strategy	Standard time to target condition applied	0	Medium	0.00		
Urban	Vegetated garden	4.46	Low	Poor	Area/compensation not in local strategy/ no local strategy	Standard time to target condition applied	1	Low	8.61		
	Total area	40.18							80.76		

Wilton Road Newport Pagnell (BSK Project 2403302)

A-3 Site Habitat Enhancement

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	Baseline habitats										Post development/ post intervention habitats																														Habitat units delivered	Comments	
											Proposed Habitat (Pre-Populated but can be overridden)		Change in distinctiveness and condition		Area (hectares)	Distinctiveness	Score	Condition	Score	Strategic significance			Temporal risk multiplier					Difficulty risk multipliers																
Baseline ref	Baseline habitat	Total habitat area	Baseline distinctiveness band	Baseline distinctiveness score	Baseline condition category	Baseline condition score	Baseline strategic significance category	Baseline strategic significance score	Baseline habitat units	Suggested action to address habitat losses	Proposed Broad Habitat	Proposed habitat	Distinctiveness change	Condition change						Strategic significance	Strategic significance	Strategic position multiplier	Standard time to target condition/years	Habitat enhanced in advance/years	Delay in starting habitat enhancement/years	Standard or adjusted time to target condition	Final time to target condition/years	Final time to target multiplier	Standard difficulty of enhancement	Applied difficulty multiplier	Final difficulty of enhancement	Difficulty multiplier applied																		

B-1 Site Hedge Baseline

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	UK Habitats - existing habitats			Habitat distinctiveness		Habitat condition		Strategic significance			Suggested action to address habitat losses	Ecological baseline	Retention category biodiversity value						Comments	
Baseline ref	Hedge number	Hedgerow type	Length KM	Distinctiveness	Score	Condition	Score	Strategic significance	Strategic significance	Strategic position multiplier		Total hedgerow units	Length retained	Length enhanced	Units retained	Units enhanced	Length lost	Units lost	Assessor comments	Reviewer comments
1		Native Species Rich Hedgerow	0.5	Medium	4	Poor	1	Within area formally identified in local strategy	High strategic significance	1.15	Like for like or better	2.30		0.28	0.00	1.29	0.22	1.01		
2		Native Species Rich Hedgerow	3.28	Medium	4	Moderate	2	Within area formally identified in local strategy	High strategic significance	1.15	Like for like or better	30.18	2.91		26.77	0.00	0.37	3.40		
3																				
4																				
5																				
6																				
7																				
			3.78									32.48	2.91	0.28	26.77	1.29	0.59	4.42		

B-2 Site Hedge Creation

Condense / Show Columns | Condense / Show Rows | Main Menu | Instructions

		Proposed habitats		Habitat distinctiveness	Habitat condition	Strategic significance	Temporal multiplier		Difficulty risk multipliers	Hedge units delivered	Comments	
Baseline ref	New hedge number	Habitat type	Length km	Distinctiveness	Condition	Strategic significance	Standard or adjusted time to target condition	Final time to target condition/years	Final difficulty of creation		Assessor comments	Reviewer comments
1		Native Species Rich Hedgerow	0.46	Medium	Good	Within area formally identified in local strategy	Standard time to target condition applied	12	Low	4.14		
2												
3												
4												
5												
6												
			0.46							4.14		

Willen Road Newport Pagnell (RSK Project 2480325)

B-3 Site Hedge Enhancement

Condense / Show Columns | Condense / Show Rows | Main Menu | Instructions

Post development/ post intervention habitats																	
Baseline Habitats		Proposed (Pre-Populated but can be overridden)	Change in distinctiveness and condition		Length KM	Distinctiveness	Condition	Strategic significance	Temporal multiplier		Difficulty risk multipliers	Hedge units delivered	Comments	
Baseline ref	Baseline habitat		Distinctiveness movement	Condition movement		Distinctiveness	Condition	Strategic significance	Standard or adjusted time to target condition	Final time to target condition/years	Final difficulty of enhancement		Assessor comments	Reviewer comments
1	Native Species Rich Hedgerow	Native Species Rich Hedgerow	Medium - Medium	Poor - Moderate	0.28	Medium	Moderate	Within area formally identified in local strategy	Standard time to target condition applied	3	Low	2.45		
					0.28							2.45		

C-1 Site River Baseline

Condense / Show Columns | Condense / Show Rows | Main Menu | Instructions

Existing river type			Habitat distinctiveness	Habitat condition	Strategic significance	Watercourse encroachment	Riparian encroachment	Suggested action	Ecological baseline	Retention category biodiversity value						Comments	
Baseline ref	River type	Length KM	Distinctiveness	Condition	Strategic significance	Extent of encroachment	Extent of encroachment		Total river units	Length retained	Length enhanced	Units retained	Units enhanced	Length Lost	Units Lost	Assessor Comments	Reviewer comments
1	Ditches	0.69	Medium	Poor	Low potential/action not identified in any plan	No Encroachment	No Encroachment	Restore	2.76	0.63		2.52	0.00	0.06	0.24		
2	Ditches	0.71	Medium	Moderate	Low potential/action not identified in any plan	No Encroachment	No Encroachment	Restore	5.68	0.56		4.48	0.00	0.15	1.20		
3																	
4																	
5																	
6																	
7																	
		1.40							8.44	1.19	0.00	7.00	0.00	0.21	1.44		

C-2 Site River Creation

Condense / Show Columns | Condense / Show Rows | Main Menu | Instructions

	Proposed habitats		Habitat distinctiveness	Habitat condition	Strategic significance	Temporal multiplier		Difficulty multipliers	Watercourse encroachment	Riparian encroachment	River units delivered	Comments	
Baseline ref	River type	Length km	Distinctiveness	Condition	Strategic significance	Standard or adjusted time to target condition	Final time to target condition/years	Final difficulty of creation	Extent of encroachment	Extent of encroachment		Assessor comments	Reviewer comments
1	Ditches	1.06	Medium	Moderate	Low potential/action not identified in any plan	Standard time to target condition applied	5	Low	No Encroachment	No Encroachment	7.10	Linear SUDS network	
2													
3													
4													
5													
6													
		1.06									7.10		

Return to start

All Habitats Based on UKHab

Labeling Column	Definitive UKHAB / EUNIS/NE Code	Level 1	Level 2 code	Level 2 Label	Level 3 code	Level 3 Label	Level 4 code	Level 4 Label (Priority Habitats in Bold)	Distinctivness Category	Distinctivness Score	trading notes	Technical Difficulty Creation	Multiplier	Technical Difficulty Enhancement	Multiplier	Basic Description	Condition Assessment Notes
Cropland - Arable field margins cultivated annually	c1a7	Terrestrial		Cropland		Arable and horticulture		Arable field margins	Medium	4	Same broad habitat or a higher distinctiveness habitat required	Low	1	Low	1		
Cropland - Arable field margins game bird mix	c1a8	Terrestrial		Cropland		Arable and horticulture		Arable field margins	Medium	4	Same broad habitat or a higher distinctiveness habitat required	Low	1	Low	1		
Cropland - Arable field margins pollen & nectar	c1a6	Terrestrial		Cropland		Arable and horticulture		Arable field margins	Medium	4	Same broad habitat or a higher distinctiveness habitat required	Low	1	Low	1		
Cropland - Arable field margins tussocky	c1a	Terrestrial	c	Cropland	c1	Arable and horticulture	c1a	Arable field margins	Medium	4	Same broad habitat or a higher distinctiveness habitat required	Low	1	Low	1		
Cropland - Cereal crops	c1c	Terrestrial		Cropland		Arable and horticulture	c1c	Cereal crops	Low	2	Same distinctiveness or better habitat required	Low	1	Low	1		
Cropland - Cereal crops other	c1c7	Terrestrial		Cropland		Arable and horticulture		Cereal crops	Low	2	Same distinctiveness or better habitat required	Low	1	Low	1		
Cropland - Cereal crops winter stubble	c1c5	Terrestrial		Cropland		Arable and horticulture		Cereal crops	Medium	4	Same broad habitat or a higher distinctiveness habitat required	Low	1	Low	1		
Cropland - Horticulture	c1f	Terrestrial		Cropland		Arable and horticulture	c1f	Horticulture	Low	2	Same distinctiveness or better habitat required	Low	1	Low	1		
Cropland - Intensive orchards	c1e	Terrestrial		Cropland		Arable and horticulture	c1e	Intensive orchards	Low	2	Same distinctiveness or better habitat required	Low	1	Low	1		
Cropland - Non-cereal crops	c1d	Terrestrial		Cropland		Arable and horticulture	c1d	Non-cereal crops	Low	2	Same distinctiveness or better habitat required	Low	1	Low	1		
Cropland - Temporary grass and clover leys	c1b	Terrestrial		Cropland		Arable and horticulture	c1b	Temporary grass and clover leys	Low	2	Same distinctiveness or better habitat required	Low	1	Low	1		
Grassland - Traditional orchards	21	Terrestrial		Grassland		Traditional orchards		Traditional orchards	High	6	Same habitat required	Low	1	Medium	0.67		
Grassland - Bracken	g1c	Terrestrial		Grassland		Acid grassland	g1c	Bracken	Low	2	Same distinctiveness or better habitat required	Low	1	Low	1		
Grassland - Floodplain Wetland Mosaic (CFGM)	25	Terrestrial		Grassland		Floodplain Wetland Mosaic		Floodplain Wetland Mosaic	High	6	Same habitat required	High	0.33	Medium	0.67		
Grassland - Lowland calcareous grassland	g2a	Terrestrial		Grassland	g2	Calcareous grassland	g2a	**Lowland calcareous grassland**	High	6	Same habitat required	High	0.33	High	0.33		
Grassland - Lowland dry acid grassland	g1a	Terrestrial	g	Grassland	g1	Acid grassland	g1a	**Lowland dry acid grassland**	V.High	8	Bespoke compensation likely to be required	High	0.33	High	0.33		
Grassland - Lowland meadows	g3a	Terrestrial		Grassland	g3	Neutral grassland	g3a	**Lowland meadows**	V.High	8	Bespoke compensation likely to be required	High	0.33	Medium	0.67		
Grassland - Modified grassland	g4	Terrestrial		Grassland	g4	Modified grassland	Carried forward	Modified grassland	Low	2	Same distinctiveness or better habitat required	Low	1	Low	1		
Grassland - Other lowland acid grassland	g1d	Terrestrial		Grassland		Acid grassland	g1d	Other lowland acid grassland	Medium	4	Same broad habitat or a higher distinctiveness habitat required	Low	1	Low	1		
Grassland - Other neutral grassland	g3c	Terrestrial		Grassland		Neutral grassland	g3c	Other neutral grassland	Medium	4	Same broad habitat or a higher distinctiveness habitat required	Low	1	Low	1		
Grassland - Tall herb communities	g5	Terrestrial		Grassland	g5	Other grassland		Tall herb communities	High	6	Same habitat required	High	0.33	High	0.33		
Grassland - Upland acid grassland	g1b	Terrestrial		Grassland		Acid grassland	g1b	**Upland acid grassland**	Medium	4	Same broad habitat or a higher distinctiveness habitat required	Low	1	Low	1		
Grassland - Upland calcareous grassland	g2b	Terrestrial		Grassland		Calcareous grassland	g2b	**Upland calcareous grassland**	High	6	Same habitat required	High	0.33	High	0.33		
Grassland - Upland hay meadows	g3b	Terrestrial		Grassland		Neutral grassland	g3b	**Upland hay meadows**	V.High	8	Bespoke compensation likely to be required	High	0.33	Medium	0.67		
Heathland and shrub - Blackthorn scrub	h3a	Terrestrial		Heathland and shrub	h3	Dense scrub	h3a	Blackthorn scrub	Medium	4	Same broad habitat or a higher distinctiveness habitat required	Low	1	Low	1		
Heathland and shrub - Bramble scrub	h3d	Terrestrial		Heathland and shrub		Dense scrub	h3d	Bramble scrub	Medium	4	Same broad habitat or a higher distinctiveness habitat required	Low	1	Low	1		
Heathland and shrub - Gorse scrub	h3e	Terrestrial		Heathland and shrub		Dense scrub	h3e	Gorse scrub	Medium	4	Same broad habitat or a higher distinctiveness habitat required	Low	1	Low	1		
Heathland and shrub - Hawthorn scrub	h3f	Terrestrial		Heathland and shrub		Dense scrub	h3f	Hawthorn scrub	Medium	4	Same broad habitat or a higher distinctiveness habitat required	Low	1	Low	1		
Heathland and shrub - Hazel scrub	h3b	Terrestrial		Heathland and shrub		Dense scrub	h3b	Hazel scrub	Medium	4	Same broad habitat or a higher distinctiveness habitat required	Low	1	Low	1		
Heathland and shrub - Lowland Heathland	h1a	Terrestrial	h	Heathland and shrub	h1	Dwarf shrub heath	h1a	**Lowland Heathland**	High	6	Same habitat required	High	0.33	Medium	0.67		
Heathland and shrub - Mixed scrub	h3h	Terrestrial		Heathland and shrub		Dense scrub	h3h	Mixed scrub	Medium	4	Same broad habitat or a higher distinctiveness habitat required	Low	1	Low	1	to include scattered mixed scrub over grassland	
Heathland and shrub - Mountain heaths and willow scrub	h1c	Terrestrial		Heathland and shrub		Dwarf shrub heath	h1c	**Mountain heaths and willow scrub**	V.High	8	Bespoke compensation likely to be required	High	0.33	High	0.33		
Heathland and shrub - Rhododendron scrub	h3g	Terrestrial		Heathland and shrub		Dense scrub	h3g	Rhododendron scrub	Low	2	Same distinctiveness or better habitat required	Low	1	Low	1		
Heathland and shrub - Sea buckthorn scrub (Annex 1)	h3c	Terrestrial		Heathland and shrub		Dense scrub	h3c	Sea buckthorn scrub	High	6	Same habitat required	Medium	0.67	Low	1		
Heathland and shrub - Sea buckthorn scrub (other)	h3c	Terrestrial		Heathland and shrub		Dense scrub	h3c	Other Sea buckthorn scrub	Low	2	Same distinctiveness or better habitat required	Low	1	Low	1		
Heathland and shrub - Upland Heathland	h1b	Terrestrial		Heathland and shrub		Dwarf shrub heath	h1b	**Upland Heathland**	High	6	Same habitat required	Medium	0.67	Medium	0.67		
Lakes - Aquifer fed naturally fluctuating water bodies	r1d	Freshwater		Lakes		Standing open water and canals	r1d	**Aquifer fed naturally fluctuating water bodies**	V.High	8	Bespoke compensation likely to be required	Very High	0.1	High	0.33		
Lakes - Ornamental lake or pond	382	Terrestrial		Urban		Built-up areas and gardens		Ornamental lake or pond	Low	2	Same distinctiveness or better habitat required	Low	1	High	0.33		
Lakes - High alkalinity lakes	NE0001	Freshwater		Lakes		Standing open water and canals			High	6	Same habitat required	High	0.33	High	0.33		
Lakes - Low alkalinity lakes	NE0002	Freshwater		Lakes		Standing open water and canals			High	6	Same habitat required	High	0.33	Medium	0.67		
Lakes - Marl Lakes	NE0003	Freshwater		Lakes		Standing open water and canals			High	6	Same habitat required	High	0.33	High	0.33		
Lakes - Moderate alkalinity lakes	NE0004	Freshwater		Lakes		Standing open water and canals			High	6	Same habitat required	High	0.33	High	0.33		
Lakes - Peat Lakes	NE0005	Freshwater		Lakes		Standing open water and canals			High	6	Same habitat required	High	0.33	High	0.33		
Lakes - Ponds (Priority Habitat)	NE0006	Freshwater		Lakes		Standing open water and canals			High	6	Same habitat required	Medium	0.67	Medium	0.67		
Lakes - Ponds (Non- Priority Habitat)	r1b	Freshwater		Lakes		Standing open water and canals	r1b		Medium	4	Same broad habitat or a higher distinctiveness habitat required	Low	1	Medium	0.67		
Lakes - Reservoirs	108	Freshwater		Lakes		Standing open water and canals			Medium	4	Same broad habitat or a higher distinctiveness habitat required	Medium	0.67	Medium	0.67		
Lakes - Temporary lakes, ponds and pools	r1c	Freshwater		Lakes		Standing open water and canals	r1c		High	6	Same habitat required	Medium	0.67	Medium	0.67		
Sparsely vegetated land - Calaminarian grasslands	a1c	Freshwater		Sparsely vegetated land		Inland rock		**Calaminarian grasslands**	V.High	8	Bespoke compensation likely to be required	Very High	0.1	Medium	0.67		
Sparsely vegetated land - Coastal sand dunes	a3a	Freshwater		Sparsely vegetated land		Supralittoral Sediment			High	6	Same habitat required	Very High	0.1	Medium	0.67		
Sparsely vegetated land - Coastal vegetated shingle	a3b	Terrestrial		Sparsely vegetated land		Supralittoral Sediment	a1c		High	6	Same habitat required	Very High	0.1	Medium	0.67		
Sparsely vegetated land - Ruderal/Ephemeral	17	Terrestrial		Sparsely vegetated land				Ephemeral	Low	2	Same distinctiveness or better habitat required	Low	1	Medium	0.67	including low value tall herb	
Sparsely vegetated land - Inland rock outcrop and scree habitats	a1a	Terrestrial	a	Sparsely vegetated land	a1	Inland rock	a1a	**Inland rock outcrop and scree habitats**	High	6	Same habitat required	High	0.33	Low	1		
Sparsely vegetated land - Limestone pavement	a1b	Terrestrial		Sparsely vegetated land		Inland rock	a1b	**Limestone pavement**	V.High	8	Bespoke compensation likely to be required	Very High	0.1	Medium	0.67		
Sparsely vegetated land - Maritime cliff and slopes	a2a	Terrestrial		Sparsely vegetated land	a2	Supralittoral Rock	a2a	**Maritime cliff and slopes**	High	6	Same habitat required	High	0.33	Medium	0.67		
Sparsely vegetated land - Other inland rock and scree	a1d	Terrestrial		Sparsely vegetated land		Inland rock	a1d	Other inland rock and scree	Medium	4	Same broad habitat or a higher distinctiveness habitat required	Medium	0.67	Medium	0.67		
Urban - Allotments	910	Terrestrial		Urban		Built-up areas and gardens		Allotments	Low	2	Same distinctiveness or better habitat required	Low	1	Low	1		
Urban - Artificial unvegetated, unsealed surface	u1c	Terrestrial		Urban		Built-up areas and gardens	u1c	Artificial unvegetated, unsealed surface	V.Low	0	Compensation Not Required	Low	1	Low	1		
Urban - Bioswale	1191	Terrestrial		Urban		Built-up areas and gardens		Bioswale	Low	2	Same distinctiveness or better habitat required	Medium	0.67	Low	1		
Urban - Brown roof	1113	Terrestrial		Urban		Built-up areas and gardens		Brown roof	Medium	4	Same broad habitat or a higher distinctiveness habitat required	Medium	0.67	Low	1		
Urban - Built linear features	u1e	Terrestrial		Urban		Built-up areas and gardens	u1e	Built linear features	V.Low	0	Compensation Not Required	Low	1	Low	1		
Urban - Cemeteries and churchyards	800	Terrestrial		Urban		Built-up areas and gardens		Cemeteries and churchyards	Medium	4	Same broad habitat or a higher distinctiveness habitat required	Medium	0.67	Low	1		
Urban - Developed land; sealed surface	u1b	Terrestrial		Urban		Built-up areas and gardens	u1b	Developed land; sealed surface	V.Low	0	Compensation Not Required	Low	1	Medium	0.67		
Urban - Extensive green roof	1111	Terrestrial		Urban		Built-up areas and gardens		Extensive green roof	Low	2	Same distinctiveness or better habitat required	Low	1	Low	1		
Urban - Façade-bound green wall	1122	Terrestrial		Urban		Built-up areas and gardens		Façade-bound green wall	Low	2	Same distinctiveness or better habitat required	Medium	0.67	Medium	0.67		
Urban - Ground based green wall	1121	Terrestrial		Urban		Built-up areas and gardens		Ground based green wall	Low	2	Same distinctiveness or better habitat required	Medium	0.67	Medium	0.67		
Urban - Ground level planters	1140	Terrestrial		Urban		Built-up areas and gardens		Ground level planters	Low	2	Same distinctiveness or better habitat required	Low	1	Low	1		
Urban - Intensive green roof	1112	Terrestrial		Urban		Built-up areas and gardens		Intensive green roof	Medium	4	Same broad habitat or a higher distinctiveness habitat required	Medium	0.67	Medium	0.67		
Urban - Introduced shrub	1160	Terrestrial		Urban		Built-up areas and gardens		Introduced shrub	Low	2	Same distinctiveness or better habitat required	Low	1	Low	1		
Urban - Open Mosaic Habitats on Previously Developed Land	u1a	Terrestrial	u	Urban	u1	Built-up areas and gardens	u1a	**Open Mosaic Habitats on Previously Developed Land**	High	6	Same habitat required	Medium	0.67	Medium	0.67		
Urban - Rain garden	1192	Terrestrial		Urban		Built-up areas and gardens		Rain garden	Low	2	Same distinctiveness or better habitat required	Low	1	Low	1		
Urban - Sand pit quarry or open cast mine	1020	Terrestrial		Urban		Built-up areas and gardens		Sand pit quarry or open cast mine	Low	2	Same distinctiveness or better habitat required	Medium	0.67	Medium	0.67		
Urban - Urban Tree	1170	Terrestrial		Urban		Built-up areas and gardens		Street Tree	Medium	4	Same broad habitat or a higher distinctiveness habitat required	Low	1	Low	1		
Urban - Sustainable urban drainage feature	1119	Terrestrial		Urban		Built-up areas and gardens		Sustainable urban drainage feature	Low	2	Same distinctiveness or better habitat required	Medium	0.67	Medium	0.67		
Urban - Un-vegetated garden	232	Terrestrial		Urban		Built-up areas and gardens		Un-vegetated garden	V.Low	0	Compensation Not Required	Low	1	Low	1		
Urban - Vacant/derelict land/ bareground	350	Terrestrial		Urban		Built-up areas and gardens		Vacant/derelict land/ bareground	Low	2	Same distinctiveness or better habitat required	Low	1	Low	1	justify why not omh	
Urban - Vegetated garden	231	Terrestrial		Urban		Built-up areas and gardens		Vegetated garden	Low	2	Same distinctiveness or better habitat required	Low	1	Low	1		
Wetland - Blanket bog	f1a	Terrestrial		Wetland		Bog	f1a	**Blanket bog**	V.High	8	Bespoke compensation likely to be required	Very High	0.1	High	0.33		
Wetland - Depressions on Peat substrates (H7150)	24	Terrestrial	f	Wetland	f1	Bog		**Depressions on Peat substrates (H7150)**	V.High	8	Bespoke compensation likely to be required	Very High	0.1	High	0.33		
Wetland - Fens (upland and lowland)	f2a	Terrestrial		Wetland	f2	Fen marsh and swamp	f2a	**Lowland fens**	V.High	8	Bespoke compensation likely to be required	High	0.33	High	0.33		
Wetland - Lowland raised bog	f1b	Terrestrial		Wetland		Bog	f1b	**Lowland raised bog**	V.High	8	Bespoke compensation likely to be required	Very High	0.1	High	0.33		
Wetland - Oceanic Valley Mire[1] (D2.1)	f2f	Terrestrial		Wetland		Fen marsh and swamp	f2f	Oceanic Valley Mire[1] (D2.1)	V.High	8	Bespoke compensation likely to be required	Very High	0.1	High	0.33		
Wetland - Purple moor grass and rush pastures	f2b	Terrestrial		Wetland		Fen marsh and swamp	f2b	**Purple moor grass and rush pastures**	V.High	8	Bespoke compensation likely to be required	High	0.33	High	0.33		
Wetland - Reedbeds	f2e	Terrestrial		Wetland		Fen marsh and swamp	f2e	**Reedbeds**	High	6	Same habitat required	Medium	0.67	Medium	0.67		
Wetland - Transition mires and quaking bogs (H7140)	f2a8	Terrestrial		Wetland		Fen marsh and swamp		Wetland - Transition mires and quaking bogs (H7140)	V.High	8	Bespoke compensation likely to be required	Very High	0.1	High	0.33		
Woodland and forest - Felled	53	Terrestrial		Woodland and forest		Other woodland		Felled	High	6	Same habitat required	Low	1	Low	1		
Woodland and forest - Lowland beech and yew woodland	w1c	Terrestrial		Woodland and forest		Broadleaved mixed and yew woodland	w1c	**Lowland beech and yew woodland**	High	6	Same habitat required	High	0.33	High	0.33		
Woodland and forest - Lowland mixed deciduous woodland	w1f	Terrestrial		Woodland and forest		Broadleaved mixed and yew woodland	w1f	**Lowland mixed deciduous woodland**	High	6	Same habitat required	High	0.33	High	0.33		
Woodland and forest - Native pine woodlands	w2a	Terrestrial		Woodland and forest	w2	Coniferous woodland	w2a	**Native pine woodlands**	High	6	Same habitat required	High	0.33	High	0.33		
Woodland and forest - Other coniferous woodland	w2c	Terrestrial		Woodland and forest		Coniferous woodland	w2c	Other coniferous woodland	Low	2	Same distinctiveness or better habitat required	Low	1	Low	1		
Woodland and forest - Other Scot's Pine woodland	w2b	Terrestrial		Woodland and forest		Coniferous woodland	w2b	Other Scot's Pine woodland	Medium	4	Same broad habitat or a higher distinctiveness habitat required	Medium	0.67	Medium	0.67		
Woodland and forest - Other woodland; broadleaved	w1g	Terrestrial		Woodland and forest		Broadleaved mixed and yew woodland	w1g	Other woodland; broadleaved	Medium	4	Same broad habitat or a higher distinctiveness habitat required	Low	1	Low	1		
Woodland and forest - Other woodland; mixed	w1h	Terrestrial		Woodland and forest		Broadleaved mixed and yew woodland	w1h	Other woodland; mixed	Medium	4	Same broad habitat or a higher distinctiveness habitat required	Low	1	Low	1		
Woodland and forest - Upland birchwoods	w1e	Terrestrial		Woodland and forest		Broadleaved mixed and yew woodland	w1e	**Upland birchwoods**	High	6	Same habitat required	Medium	0.67	Medium	0.67		
Woodland and forest - Upland mixed ashwoods	w1b	Terrestrial		Woodland and forest		Broadleaved mixed and yew woodland	w1b	**Upland mixed ashwoods**	High	6	Same habitat required	High	0.33	High	0.33		
Woodland and forest - Upland oakwood	w1a	Terrestrial	w	Woodland and forest	w1	Broadleaved mixed and yew woodland	w1a	**Upland oakwood**	High	6	Same habitat required	High	0.33	High	0.33		
Woodland and forest - Wet woodland	w1d	Terrestrial		Woodland and forest		Broadleaved mixed and yew woodland	w1d	**Wet woodland**	High	6	Same habitat required	Medium	0.67	Medium	0.67		
Woodland and forest - Wood-pasture and parkland	20	Terrestrial		Woodland and forest		Other woodland		Wood-pasture and parkland	V.High	8	Bespoke compensation likely to be required	Very High	0.1	High	0.33		
Coastal lagoons - Coastal lagoons	x02	Intertidal	X02/03	Coastal lagoons		Coastal lagoons			High	6	Same habitat required	Medium	0.67	Medium	0.67		
Rocky shore - High energy littoral rock	a1.1	Intertidal	A1	Rocky shore		High energy littoral rock			High	6	Same habitat required	High	0.33	Medium	0.67		
Rocky shore - High energy littoral rock - on peat, clay or chalk	A1.1	Intertidal	A1	Rocky shore		**High energy littoral rock - on bedrock including chalk, peat or clay**			V.High	8	Bespoke compensation likely to be required	Very High	0.1	Medium	0.67		
Rocky shore - Moderate energy littoral rock	A1.2	Intertidal	A1	Rocky shore		Moderate energy littoral rock			High	6	Same habitat required	High	0.33	Medium	0.67		
Rocky shore - Moderate energy littoral rock - on peat, clay or chalk	A1.2.PCC	Intertidal	A1	Rocky shore		**Moderate energy littoral rock - on bedrock including chalk, peat or clay**			V.High	8	Bespoke compensation likely to be required	Very High	0.1	Medium	0.67		
Rocky shore - Low energy littoral rock	A1.3	Intertidal	A1	Rocky shore		Low energy littoral rock			High	6	Same habitat required	High	0.33	Medium	0.67		
Rocky shore - Low energy littoral rock - on peat, clay or chalk	A1.3.PCC	Intertidal	A1	Rocky shore		**Low energy littoral rock - on bedrock including chalk, peat or clay**			V.High	8	Bespoke compensation likely to be required	Very High	0.1	Medium	0.67		
Rocky shore - Features of littoral rock	A1.4	Intertidal	A1	Rocky shore		Features of littoral rock			High	6	Same habitat required	High	0.33	Medium	0.67		
Rocky shore - Features of littoral rock - on peat, clay or chalk	A1.PCC	Intertidal	A1	Rocky shore		**Features of littoral rock - on bedrock including chalk, peat or clay**			V.High	8	Bespoke compensation likely to be required	Very High	0.1	Medium	0.67		
Coastal saltmarsh - Saltmarshes and saline reedbeds	A2.5	Intertidal	A2	Coastal saltmarsh		Coastal saltmarshes and saline reedbeds			High	6	Same habitat required	High	0.33	Medium	0.67		
Coastal saltmarsh - Artificial saltmarshes and saline reedbeds	ART_A2.5	Intertidal		Coastal saltmarsh		Artificial saltmarshes and saline reedbeds			Low	2	Same distinctiveness or better habitat required	High	0.33	Medium	0.67		
Intertidal sediment - Littoral coarse sediment	A2.1	Intertidal	A2	Intertidal sediment		Littoral coarse sediment			Medium	4	Same broad habitat or a higher distinctiveness habitat required	Medium	0.67	Medium	0.67		
Intertidal sediment - Littoral mud	A2.3	Intertidal	A2	Intertidal sediment		Littoral mud			High	6	Same habitat required	High	0.33	Medium	0.67		
Intertidal sediment - Littoral mixed sediments	A2.4	Intertidal	A2	Intertidal sediment		Littoral mixed sediments			High	6	Same habitat required	High	0.33	Medium	0.67		
Intertidal sediment - Littoral seagrass	A2.6	Intertidal	A2	Intertidal sediment		Littoral sediments dominated by aquatic angiosperms			High	6	Same habitat required	High	0.33	High	0.33		
Intertidal sediment - Littoral seagrass on peat, clay or chalk	A2.6.PCC	Intertidal	A2	Intertidal sediment		**Littoral seagrass - on peat, clay or chalk**			V.High	8	Bespoke compensation likely to be required	Very High	0.1	High	0.33		
Intertidal sediment - Littoral biogenic reefs - Mussels	A2.7.M			Intertidal sediment		Littoral biogenic reefs - Mussels			High	6	Same habitat required	High	0.33	Medium	0.67		
Intertidal sediment - Littoral biogenic reefs - Sabellaria	A2.7.S	Intertidal	A2	Intertidal sediment		Littoral biogenic reefs - Sabellaria			High	6	Same habitat required	High	0.33	Medium	0.67		
Intertidal sediment - Features of littoral sediment	A2.8	Intertidal	A2	Intertidal sediment		Features of littoral sediment			High	6	Same habitat required	High	0.33	Medium	0.67		
Intertidal sediment - Artificial littoral coarse sediment	ART_A2.1	Intertidal	A2	Intertidal sediment		Artificial littoral coarse sediment			Low	2	Same distinctiveness or better habitat required	Medium	0.67	Medium	0.67		
Intertidal sediment - Artificial littoral mud	ART_A2.3			Intertidal sediment		Artificial littoral mud			Low	2	Same distinctiveness or better habitat required	High	0.33	Medium	0.67		
Intertidal sediment - Artificial littoral sand	ART_A2.2/A2.22/A2.23			Intertidal sediment		Artificial littoral sand			Low	2	Same distinctiveness or better habitat required	Medium	0.67	Medium	0.67		
Intertidal sediment - Artificial littoral muddy sand	ART_A2.24	Intertidal	A2	Intertidal sediment		Artificial littoral mud			Low	2	Same distinctiveness or better habitat required	High	0.33	Medium	0.67		
Intertidal sediment - Artificial littoral mixed sediments	ART_A2.4	Intertidal	A2	Intertidal sediment		Artificial littoral mixed sediments			Low	2	Same distinctiveness or better habitat required	High	0.33	Medium	0.67		
Intertidal sediment - Artificial littoral seagrass	ART_A2.6	Intertidal	A2	Intertidal sediment		Artificial littoral seagrass			Low	2	Same distinctiveness or better habitat required	High	0.33	High	0.33		
Intertidal sediment - Artificial littoral biogenic reefs	ART_A2.7	Intertidal	A2	Intertidal sediment		Artificial littoral biogenic reefs			Low	2	Same distinctiveness or better habitat required	High	0.33	Medium	0.67		
Intertidal sediment - Littoral sand	A2.21/A2.22/A2.23	Intertidal		Intertidal sediment		Littoral sand			Medium	4	Same broad habitat or a higher distinctiveness habitat required	Medium	0.67	Medium	0.67		
Intertidal sediment - Littoral muddy sand	A2.24	Intertidal		Intertidal sediment		Littoral muddy sand			High	6	Same habitat required	High	0.33	Medium	0.67		
Intertidal Hard Structures - Artificial hard structures	ART_A1	Intertidal		Intertidal Hard Structures		Artificial hard structures			Low	2	Same distinctiveness or better habitat required	Medium	0.67	Medium	0.67		
Intertidal Hard Structures - Artificial features of hard structures	ART_A1.4	Intertidal		Intertidal Hard Structures		Artificial features of hard structures			Low	2	Same distinctiveness or better habitat required	Medium	0.67	Medium	0.67		
Intertidal Hard Structures - Artificial hard structures with Integrated Greening of Grey Infrastructure (IGGI)	ART_A1_IGGI	Intertidal		Intertidal Hard Structures		Artificial hard structures with Integrated Greening of Grey Infrastructure (IGGI)			Medium	4	Same broad habitat or a higher distinctiveness habitat required	Medium	0.67	Medium	0.67		

Return To Start

All Habitats

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Habitat Description	Group	Distinctiveness	Trading Notes	Existing area baseline on site	Existing units baseline on site	Existing area retained on site	Existing units retained on site	Existing area Lost on site	Existing units lost baseline on site	Proposed area creation on site post development	Proposed units creation onsite post development	Proposed area enhancement on site post development	Proposed units enhancement onsite post development	Total proposed area on site post development	Total proposed units onsite post development	Net area change	Net unit change	Existing area off site	Existing units offsite	Retained area offsite	Retained units offsite	Proposed area creation off site	Proposed units creation off site	Proposed area enhancement off site	Proposed units enhancement offsite	Total proposed area off site	Total proposed units offsite	Off Site net area change	Off Site net unit change	Overall area change	Overall unit change
Cropland - Arable field margins cultivated annually	Cropland	Medium	Same broad habitat or a higher distinctiveness habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cropland - Arable field margins game bird mix	Cropland	Medium	Same broad habitat or a higher distinctiveness habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cropland - Arable field margins pollen & nectar	Cropland	Medium	Same broad habitat or a higher distinctiveness habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cropland - Arable field margins tussocky	Cropland	Medium	Same broad habitat or a higher distinctiveness habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cropland - Cereal crops	Cropland	Low	Same distinctiveness or better habitat required	16.28	32.56	0.00	0.00	16.28	32.56	0.00	0.00	0.00	0.00	0.00	0.00	-16.28	-32.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-16.28	-32.56
Cropland - Cereal crops other	Cropland	Low	Same distinctiveness or better habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cropland - Cereal crops winter stubble	Cropland	Medium	Same broad habitat or a higher distinctiveness habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cropland - Horticulture	Cropland	Low	Same distinctiveness or better habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cropland - Intensive orchards	Cropland	Low	Same distinctiveness or better habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cropland - Non-cereal crops	Cropland	Low	Same distinctiveness or better habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cropland - Temporary grass and clover leys	Cropland	Low	Same distinctiveness or better habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grassland - Traditional orchards	Grassland	High	Same habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grassland - Bracken	Grassland	Low	Same distinctiveness or better habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grassland - Floodplain Wetland Mosaic (CFGM)	Grassland	High	Same habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grassland - Lowland calcareous grassland	Grassland	High	Same habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grassland - Lowland dry acid grassland	Grassland	V.High	Bespoke compensation likely to be required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grassland - Lowland meadows	Grassland	V.High	Bespoke compensation likely to be required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grassland - Modified grassland	Grassland	Low	Same distinctiveness or better habitat required	6.48	12.95	0.00	0.00	6.46	12.92	11.35	39.37	0.00	0.00	11.35	39.37	4.89	26.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.89	26.45
Grassland - Other lowland acid grassland	Grassland	Medium	Same broad habitat or a higher distinctiveness habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grassland - Other neutral grassland	Grassland	Medium	Same broad habitat or a higher distinctiveness habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grassland - Tall herb communities	Grassland	High	Same habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grassland - Upland acid grassland	Grassland	Medium	Same broad habitat or a higher distinctiveness habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grassland - Upland calcareous grassland	Grassland	High	Same habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grassland - Upland hay meadows	Grassland	V.High	Bespoke compensation likely to be required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heathland and shrub - Blackthorn scrub	Heathland and shrub	Medium	Same broad habitat or a higher distinctiveness habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heathland and shrub - Bramble scrub	Heathland and shrub	Medium	Same broad habitat or a higher distinctiveness habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heathland and shrub - Gorse scrub	Heathland and shrub	Medium	Same broad habitat or a higher distinctiveness habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heathland and shrub - Hawthorn scrub	Heathland and shrub	Medium	Same broad habitat or a higher distinctiveness habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heathland and shrub - Hazel scrub	Heathland and shrub	Medium	Same broad habitat or a higher distinctiveness habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heathland and shrub - Lowland Heathland	Heathland and shrub	High	Same habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heathland and shrub - Mixed scrub	Heathland and shrub	Medium	Same broad habitat or a higher distinctiveness habitat required	0.61	1.22	0.00	0.00	4.88	3.44	23.03	4.05	0.00	0.00	27.91	3.44	23.03	4.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	23.03	4.05
Heathland and shrub - Mountain heaths and willow scrub	Heathland and shrub	V.High	Bespoke compensation likely to be required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heathland and shrub - Rhododendron scrub	Heathland and shrub	Low	Same distinctiveness or better habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heathland and shrub - Sea buckthorn scrub (Annex 1)	Heathland and shrub	High	Same habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heathland and shrub - Sea buckthorn scrub (other)	Heathland and shrub	Low	Same distinctiveness or better habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heathland and shrub - Upland Heathland	Heathland and shrub	High	Same habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lakes - Aquifer fed naturally fluctuating water bodies	Lakes	V.High	Bespoke compensation likely to be required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lakes - Ornamental lake or pond	Urban	Low	Same distinctiveness or better habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lakes - High alkalinity lakes	Lakes	High	Same habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lakes - Low alkalinity lakes	Lakes	High	Same habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lakes - Marl Lakes	Lakes	High	Same habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lakes - Moderate alkalinity lakes	Lakes	High	Same habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lakes - Peat Lakes	Lakes	High	Same habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lakes - Ponds (Priority Habitat)	Lakes	High	Same habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lakes - Ponds (Non- Priority Habitat)	Lakes	Medium	Same broad habitat or a higher distinctiveness habitat required	0.00	0.00	0.00	0.00	0.00	0.00	1.18	9.76	0.00	0.00	1.18	9.76	1.18	9.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.18	9.76
Lakes - Reservoirs	Lakes	Medium	Same broad habitat or a higher distinctiveness habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lakes - Temporary lakes, ponds and pools	Lakes	High	Same habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sparsely vegetated land - Calaminarian grasslands	Sparsely vegetated land	V.High	Bespoke compensation likely to be required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sparsely vegetated land - Coastal sand dunes	Sparsely vegetated land	High	Same habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sparsely vegetated land - Coastal vegetated shingle	Sparsely vegetated land	High	Same habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sparsely vegetated land - Ruderal/Ephemeral	Sparsely vegetated land	Low	Same distinctiveness or better habitat required	0.21	0.42	0.00	0.00	0.21	0.42	0.00	0.00	0.00	0.00	0.00	0.00	-0.21	-0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.21	-0.42
Sparsely vegetated land - Inland rock outcrop and scree habitats	Sparsely vegetated land	High	Same habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sparsely vegetated land - Limestone pavement	Sparsely vegetated land	V.High	Bespoke compensation likely to be required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sparsely vegetated land - Maritime cliff and slopes	Sparsely vegetated land	High	Same habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sparsely vegetated land - Other inland rock and scree	Sparsely vegetated land	Medium	Same broad habitat or a higher distinctiveness habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Urban - Allotments	Urban	Low	Same distinctiveness or better habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Urban - Artificial unvegetated, unsealed surface	Urban	V.Low	Compensation Not Required	0.43	0.00	0.00	0.00	0.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.43	0.00
Urban - Bioswale	Urban	Low	Same distinctiveness or better habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Urban - Brown roof	Urban	Medium	Same broad habitat or a higher distinctiveness habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Urban - Built linear features	Urban	V.Low	Compensation Not Required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Urban - Cemeteries and churchyards	Urban	Medium	Same broad habitat or a higher distinctiveness habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Urban - Developed land; sealed surface	Urban	V.Low	Compensation Not Required	16.83	0.00	0.00	0.00	16.83	0.00	19.75	0.00	0.00	0.00	19.75	0.00	2.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.92	0.00
Urban - Extensive green roof	Urban	Low	Same distinctiveness or better habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Urban - Facade-bound green wall	Urban	Low	Same distinctiveness or better habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Urban - Ground based green wall	Urban	Low	Same distinctiveness or better habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Urban - Ground level planters	Urban	Low	Same distinctiveness or better habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Urban - Intensive green roof	Urban	Medium	Same broad habitat or a higher distinctiveness habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Urban - Introduced shrub	Urban	Low	Same distinctiveness or better habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Urban - Open Mosaic Habitats on Previously Developed Land	Urban	High	Same habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Urban - Rain garden	Urban	Low	Same distinctiveness or better habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Urban - Sand pit quarry or open cast mine	Urban	Low	Same distinctiveness or better habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Urban - Urban Tree	Urban	Medium	Same broad habitat or a higher distinctiveness habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Urban - Sustainable urban drainage feature	Urban	Low	Same distinctiveness or better habitat required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Urban - Un-vegetated garden	Urban	V.Low	Compensation Not Required	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0

Hedgerows and lines of trees

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Hedgerow type	**Group**	**Distinctivness**	**Trading Notes**	**Existing length baseline on site**	**Existing units baseline on site**	**Existing length retained on site**	**Existing Units retained on site**	**Existing length lost on site**	**Existing units lost baseline on site**	**Proposed length creation on site post development**	**Proposed units creation onsite post development**	**Proposed length enhancement on site post development**	**Proposed units enhancement onsite post development**	**Total proposed length on site post development**	**Total proposed units onsite post development**	**Net length change**	**Net unit change**	**Existing length off site**	**Existing units offsite**	**Retained length offsite**	**Retained units offsite**	**Proposed length creation off site**	**Proposed units creation off site**	**Proposed length enhancement off site**	**Proposed units Enhancement offsite**	**Total proposed length off site**	**Total proposed units offsite**	**Off Site net length change**	**Off Site net unit change**	**Overall length change**	**Overall unit change**
Native Species Rich Hedgerow with trees - Associated with bank or ditch	Hedgerow	V.High	Like for like	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Native Species Rich Hedgerow with trees	Hedgerow	High	Like for like or better	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Native Species Rich Hedgerow - Associated with bank or ditch	Hedgerow	High	Like for like or better	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Native Hedgerow with trees - Associated with bank or ditch	Hedgerow	High	Like for like or better	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Native Species Rich Hedgerow	Hedgerow	Medium	Like for like or better	3.78	32.48	2.91	26.77	0.59	0.00	0.46	4.14	0.28	2.45	3.85	33.39	-0.13	0.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.13	0.88
Native Hedgerow - Associated with bank or ditch	Hedgerow	Medium	Like for like or better	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Native Hedgerow with trees	Hedgerow	Medium	Like for like or better	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Line of Trees (Ecologically Valuable)	Hedgerow	Medium	Like for like or better	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Line of Trees (Ecologically Valuable) - with Bank or Ditch	Hedgerow	Medium	Like for like or better	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Native Hedgerow	Hedgerow	Low	Same distinctiveness band or better	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Line of Trees	Hedgerow	Low	Same distinctiveness band or better	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Line of Trees - Associated with bank or ditch	Hedgerow	Low	Same distinctiveness band or better	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hedge Ornamental Non Native	Hedgerow	V.Low	Same distinctiveness band or better	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Rivers and Streams

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
River type	**Group**	**Distinctivness**	**Trading Notes**	**Existing length baseline on site**	**Existing units baseline on site**	**Existing length retained on site**	**Existing Units retained on site**	**Existing length lost on site**	**Existing units lost baseline on site**	**Proposed length creation on site post development**	**Proposed units creation onsite post development**	**Proposed length enhancement on site post development**	**Proposed units enhancement onsite post development**	**Total proposed length on site post development**	**Total proposed units onsite post development**	**Net length change**	**Net unit change**	**Existing length off site**	**Existing units offsite**	**Retained length offsite**	**Retained units offsite**	**Proposed length creation off site**	**Proposed units creation off site**	**Proposed length enhancement off site**	**Proposed units Enhancement offsite**	**Total proposed length off site**	**Total proposed units offsite**	**Off Site net length change**	**Off Site net unit change**	**Overall length change**	**Overall unit change**
Priority Habitat	Rivers & streams	V.High	Loss Unacceptable	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Rivers and Streams	Rivers & streams	High	Avoid	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ditches	Rivers & streams	Medium	Avoid, Mitigate or Compensate	1.40	8.44	1.19	7.00	0.21	1.44	1.06	7.10	0.00	0.00	2.25	14.10	0.85	5.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	5.66
Canals	Rivers & streams	Medium	Avoid, Mitigate or Compensate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Culvert	Rivers & streams	Low	Mitigate or Compensate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Return to start

Risk

Habitat Description	Technical Difficulty Creation	Multiplier	Technical Difficulty Enhancement	Multiplier
Coastal lagoons - Coastal lagoons	Medium	0.67	Medium	0.67
Coastal saltmarsh - Saltmarshes and saline reedbeds	High	0.33	Medium	0.67
Cropland - Arable field margins cultivated annually	Low	1	Low	1
Cropland - Arable field margins game bird mix	Low	1	Low	1
Cropland - Arable field margins pollen & nectar	Low	1	Low	1
Cropland - Arable field margins tussocky	Low	1	Low	1
Cropland - Cereal crops	Low	1	Low	1
Cropland - Cereal crops other	Low	1	Low	1
Cropland - Cereal crops winter stubble	Low	1	Low	1
Cropland - Horticulture	Low	1	Low	1
Cropland - Intensive orchards	Low	1	Low	1
Cropland - Non-cereal crops	Low	1	Low	1
Cropland - Temporary grass and clover leys	Low	1	Low	1
Grassland - Traditional orchards	Low	1	Medium	0.67
Grassland - Bracken	Low	1	Low	1
Grassland - Floodplain Wetland Mosaic (CFGM)	High	0.33	Medium	0.67
Grassland - Lowland calcareous grassland	High	0.33	High	0.33
Grassland - Lowland dry acid grassland	High	0.33	High	0.33
Grassland - Lowland meadows	High	0.33	Medium	0.67
Grassland - Modified grassland	Low	1	Low	1
Grassland - Other lowland acid grassland	Low	1	Low	1
Grassland - Other neutral grassland	Low	1	Low	1
Grassland - Tall herb communities	High	0.33	High	0.33
Grassland - Upland acid grassland	Low	1	Low	1
Grassland - Upland calcareous grassland	High	0.33	High	0.33
Grassland - Upland hay meadows	High	0.33	Medium	0.67
Heathland and shrub - Blackthorn scrub	Low	1	Low	1
Heathland and shrub - Bramble scrub	Low	1	Low	1
Heathland and shrub - Gorse scrub	Low	1	Low	1
Heathland and shrub - Hawthorn scrub	Low	1	Low	1
Heathland and shrub - Hazel scrub	Medium	1	Medium	1
Heathland and shrub - Lowland Heathland	High	0.33	Medium	0.67
Heathland and shrub - Mixed scrub	Low	1	Low	1
Heathland and shrub - Mountain heaths and willow scrub	High	0.33	High	0.33
Heathland and shrub - Rhododendron scrub	Low	1	Low	1
Heathland and shrub - Sea buckthorn scrub (Annex 1)	Medium	0.67	Low	1
Heathland and shrub - Sea buckthorn scrub (other)	Low	1	Low	1
Heathland and shrub - Upland Heathland	Medium	0.67	Medium	0.67
Intertidal sediment - Artificial littoral biogenic reefs	High	0.33	Medium	0.67
Intertidal sediment - Artificial littoral coarse sediment	Medium	0.67	Medium	0.67
Intertidal sediment - Artificial littoral mixed sediments	High	0.33	Medium	0.67
Intertidal sediment - Artificial littoral muddy sand	High	0.33	Medium	0.67
Intertidal sediment - Artificial littoral seagrass	High	0.33	High	0.33
Intertidal sediment - Features of littoral sediment	High	0.33	Medium	0.67
Intertidal sediment - Littoral biogenic reefs - Sabellaria	High	0.33	Medium	0.67
Intertidal sediment - Littoral coarse sediment	Medium	0.67	Medium	0.67
Intertidal sediment - Littoral mixed sediments	High	0.33	Medium	0.67
Intertidal sediment - Littoral mud	High	0.33	Medium	0.67
Intertidal sediment - Littoral seagrass	High	0.33	High	0.33
Intertidal sediment - Littoral seagrass on peat, clay or chalk	Very High	0.1	High	0.33
Lakes - Aquifer fed naturally fluctuating water bodies	Very High	0.1	High	0.33
Lakes - Ornamental lake or pond	Low	1	High	0.33
Lakes - High alkalinity lakes	High	0.33	High	0.33
Lakes - Low alkalinity lakes	High	0.33	Medium	0.67
Lakes - Marl Lakes	High	0.33	High	0.33
Lakes - Moderate alkalinity lakes	High	0.33	High	0.33
Lakes - Peat Lakes	High	0.33	High	0.33
Lakes - Ponds (Non- Priority Habitat)	Low	1	Medium	0.67
Lakes - Ponds (Priority Habitat)	Medium	0.67	Medium	0.67
Lakes - Reservoirs	Medium	0.67	Medium	0.67
Lakes - Temporary lakes, ponds and pools	Medium	0.67	Medium	0.67
Rocky shore - Features of littoral rock	High	0.33	Medium	0.67
Rocky shore - Features of littoral rock - on peat, clay or chalk	Very High	0.1	Medium	0.67
Rocky shore - High energy littoral rock	High	0.33	Medium	0.67
Rocky shore - High energy littoral rock - on peat, clay or chalk	Very High	0.1	Medium	0.67
Rocky shore - Low energy littoral rock	High	0.33	Medium	0.67
Rocky shore - Low energy littoral rock - on peat, clay or chalk	Very High	0.1	Medium	0.67
Rocky shore - Moderate energy littoral rock	High	0.33	Medium	0.67
Rocky shore - Moderate energy littoral rock - on peat, clay or chalk	Very High	0.1	Medium	0.67
Sparsely vegetated land - Calaminarian grasslands	Very High	0.1	Medium	0.67
Sparsely vegetated land - Coastal sand dunes	Very High	0.1	Medium	0.67
Sparsely vegetated land - Coastal vegetated shingle	Very High	0.1	Medium	0.67
Sparsely vegetated land - Inland rock outcrop and scree habitats	High	0.33	Low	1
Sparsely vegetated land - Limestone pavement	Very High	0.1	Medium	0.67
Sparsely vegetated land - Maritime cliff and slopes	High	0.33	Medium	0.67
Sparsely vegetated land - Other inland rock and scree	Medium	0.67	Medium	0.67
Sparsely vegetated land - Ruderal/Ephemeral	Low	1	Medium	0.67
Urban - Vacant/derelict land/ bareground	Low	1	Low	1
Urban - Allotments	Low	1	Low	1
Urban - Artificial unvegetated, unsealed surface	Low	1	Low	1
Urban - Bioswale	Medium	0.67	Low	1
Urban - Brown roof	Medium	0.67	Low	1
Urban - Built linear features	Low	1	Low	1
Urban - Cemeteries and churchyards	Medium	0.67	Low	1
Urban - Developed land; sealed surface	Low	1	Medium	0.67
Urban - Extensive green roof	Low	1	Low	1
Urban - Facade-bound green wall	Medium	0.67	Medium	0.67
Urban - Ground based green wall	Medium	0.67	Medium	0.67
Urban - Ground level planters	Low	1	Low	1
Urban - Intensive green roof	Medium	0.67	Medium	0.67
Urban - Introduced shrub	Low	1	Low	1
Urban - Open Mosaic Habitats on Previously Developed Land	Medium	0.67	Medium	0.67
Urban - Rain garden	Low	1	Low	1
Urban - Sand pit quarry or open cast mine	Medium	0.67	Medium	0.67
Urban - Urban Tree	Low	1	Low	1
Urban - Sustainable urban drainage feature	Medium	0.67	Medium	0.67
Urban - Un-vegetated garden	Low	1	Low	1
Urban - Vegetated garden	Low	1	Low	1
Wetland - Blanket bog	Very High	0.1	High	0.33
Wetland - Depressions on Peat substrates (H7150)	Very High	0.1	High	0.33
Wetland - Fens (upland and lowland)	High	0.33	High	0.33
Wetland - Lowland raised bog	Very High	0.1	High	0.33
Wetland - Oceanic Valley Mire[1] (D2.1)	Very High	0.1	High	0.33
Wetland - Purple moor grass and rush pastures	High	0.33	High	0.33
Wetland - Reedbeds	Medium	0.67	Medium	0.67
Wetland - Transition mires and quaking bogs (H7140)	Very High	0.1	High	0.33
Woodland and forest - Felled	Low	1	Low	1
Woodland and forest - Lowland beech and yew woodland	High	0.33	High	0.33
Woodland and forest - Lowland mixed deciduous woodland	High	0.33	High	0.33
Woodland and forest - Native pine woodlands	High	0.33	High	0.33
Woodland and forest - Other coniferous woodland	Low	1	Low	1
Woodland and forest - Other Scot's Pine woodland	Medium	0.67	Medium	0.67
Woodland and forest - Other woodland; broadleaved	Low	1	Low	1
Woodland and forest - Other woodland; mixed	Low	1	Low	1
Woodland and forest - Upland birchwoods	Medium	0.67	Medium	0.67
Woodland and forest - Upland mixed ashwoods	High	0.33	High	0.33
Woodland and forest - Upland oakwood	High	0.33	High	0.33
Woodland and forest - Wet woodland	Medium	0.67	Medium	0.67
Woodland and forest - Wood-pasture and parkland	Very High	0.1	High	0.33
Intertidal sediment - Littoral sand	Medium	0.67	Medium	0.67
Intertidal sediment - Littoral muddy sand	High	0.33	Medium	0.67
Intertidal Hard Structures - Artificial hard structures	Medium	0.67	Medium	0.67
Intertidal Hard Structures - Artificial features of hard structures	Medium	0.67	Medium	0.67
Intertidal Hard Structures - Artificial hard structures with Integrated Greening of Grey Infra	Medium	0.67	Medium	0.67
Coastal saltmarsh - Artificial saltmarshes and saline reedbeds	High	0.33	Medium	0.67
Intertidal sediment - Littoral biogenic reefs - Mussels	High	0.33	Medium	0.67
Intertidal sediment - Artificial littoral mud	High	0.33	Medium	0.67
Intertidal sediment - Artificial littoral sand	Medium	0.67	Medium	0.67

Spatial multipliers

Strategic Significance

Description	strategic significance	Multiplier
Within area formally identified in local strategy	High strategic significance	1.15
Location ecologically desirable but not in local strategy	Medium strategic significance	1.1
Area/compensation not in local strategy/ no local strategy	Low Strategic Significance	1

Compensation outside LPA or NCA of impact site and beyond neighbouring LPA or NCA

Difficulty

category	value
Low	1
Medium	0.67
High	0.33
Very High	0.1

Spatial risk

Category	Multiplier
Compensation inside LPA or NCA, or deemed to be sufficiently local, to site of biodiversity loss	1
Compensation outside LPA or NCA of impact site but in neighbouring LPA or NCA	0.75
Compensation outside LPA or NCA of impact site and beyond neighbouring LPA or NCA	0.5
Intertidal habitats - Compensation inside same Marine Plan Area, or deemed to be sufficiently local, to site of biodiversity loss	1
Intertidal habitats - Compensation outside same Marine Plan Area but in neighbouring Marine Plan Area	0.75
Intertidal habitats - Compensation outside Marine Plan Area of impact site and beyond neighbouring Marine Plan Area	0.5

Street trees

Tree size	Diameter M	RPA Radius M	RPA ha
Small	0.1	1.2	0.0005
Medium	0.3	3.6	0.0041
Large	0.5	6	0.0113

Return to start

Creation

Habitat Description	Good	Fairly Good	Moderate	Fairly Poor	Poor	N/A -Agricultural	N/A - Other
Cropland - Arable field margins cultivated annually	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	1	Not Possible
Cropland - Arable field margins game bird mix	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	1	Not Possible
Cropland - Arable field margins pollen & nectar	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	1	Not Possible
Cropland - Arable field margins tussocky	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	1	Not Possible
Cropland - Cereal crops	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	1	Not Possible
Cropland - Cereal crops other	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	1	Not Possible
Cropland - Cereal crops winter stubble	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	1	Not Possible
Cropland - Horticulture	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	1	Not Possible
Cropland - Intensive orchards	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	1	Not Possible
Cropland - Non-cereal crops	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	1	Not Possible
Cropland - Temporary grass and clover leys	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	1	Not Possible
Grassland - Traditional orchards	30	25	20	10	5	Not Possible	Not Possible
Grassland - Bracken	Not Possible	Not Possible	Not Possible	Not Possible	1	Not Possible	Not Possible
Grassland - Floodplain Wetland Mosaic (CFGM)	20	15	10	8	5	Not Possible	Not Possible
Grassland - Lowland calcareous grassland	20	15	10	8	5	Not Possible	Not Possible
Grassland - Lowland dry acid grassland	30+	25	20	15	10	Not Possible	Not Possible
Grassland - Lowland meadows	15	12	10	8	5	Not Possible	Not Possible
Grassland - Modified grassland	7	5	4	2	1	1	Not Possible
Grassland - Other lowland acid grassland	15	12	10	5	1	Not Possible	Not Possible
Grassland - Other neutral grassland	10	7	5	3	2	Not Possible	Not Possible
Grassland - Tall herb communities	30	25	20	15	10	Not Possible	Not Possible
Grassland - Upland acid grassland	15	12	10	5	1	Not Possible	Not Possible
Grassland - Upland calcareous grassland	25	20	15	12	10	Not Possible	Not Possible
Grassland - Upland hay meadows	20	18	15	12	10	Not Possible	Not Possible
Heathland and shrub - Blackthorn scrub	10	7	5	3	1	Not Possible	Not Possible
Heathland and shrub - Bramble scrub	Not Possible	Not Possible	Not Possible	Not Possible	1	Not Possible	Not Possible
Heathland and shrub - Gorse scrub	10	7	5	3	1	Not Possible	Not Possible
Heathland and shrub - Hawthorn scrub	10	7	5	3	1	Not Possible	Not Possible
Heathland and shrub - Hazel scrub	15	12	10	7	5	Not Possible	Not Possible
Heathland and shrub - Lowland Heathland	30+	25	20	15	10	Not Possible	Not Possible
Heathland and shrub - Mixed scrub	10	7	5	3	1	Not Possible	Not Possible
Heathland and shrub - Mountain heaths and willow scrub	30+	30+	25	23	15	Not Possible	Not Possible
Heathland and shrub - Rhododendron scrub	Not Possible	Not Possible	Not Possible	Not Possible	1	Not Possible	Not Possible
Heathland and shrub - Sea buckthorn scrub (Annex 1)	10	7	5	3	1	Not Possible	Not Possible
Heathland and shrub - Sea buckthorn scrub (other)	Not Possible	Not Possible	Not Possible	Not Possible	1	Not Possible	Not Possible
Heathland and shrub - Upland Heathland	30	25	20	15	10	Not Possible	Not Possible
Lakes - Aquifer fed naturally fluctuating water bodies	30	20	15	10	1	Not Possible	Not Possible
Lakes - High alkalinity lakes	30	20	10	7	5	Not Possible	Not Possible
Lakes - Low alkalinity lakes	30	20	10	7	5	Not Possible	Not Possible
Lakes - Marl Lakes	30	20	10	7	5	Not Possible	Not Possible
Lakes - Moderate alkalinity lakes	30	20	10	7	5	Not Possible	Not Possible
Lakes - Peat Lakes	30	20	10	7	5	Not Possible	Not Possible
Lakes - Ponds (Priority Habitat)	5	4	3	2	1	Not Possible	Not Possible
Lakes - Ponds (Non- Priority Habitat)	5	4	3	2	1	Not Possible	Not Possible
Lakes - Reservoirs	10	7	5	3	1	Not Possible	Not Possible
Lakes - Temporary lakes, ponds and pools	5	4	3	2	1	Not Possible	Not Possible
Sparsely vegetated land - Calaminarian grasslands	10	7	5	3	2	Not Possible	Not Possible
Sparsely vegetated land - Coastal sand dunes	20	15	10	7	5	Not Possible	Not Possible
Sparsely vegetated land - Coastal vegetated shingle	20	15	10	7	5	Not Possible	Not Possible
Sparsely vegetated land - Ruderal/Ephemeral	5	4	3	2	1	Not Possible	Not Possible
Sparsely vegetated land - Inland rock outcrop and scree habitats	30+	25	20	15	10	Not Possible	Not Possible
Sparsely vegetated land - Limestone pavement	30+	30+	30+	30+	30+	Not Possible	Not Possible
Sparsely vegetated land - Maritime cliff and slopes	20	15	10	7	5	Not Possible	Not Possible
Sparsely vegetated land - Other inland rock and scree	20	15	10	7	5	Not Possible	Not Possible
Urban - Allotments	1	1	1	1	1	Not Possible	Not Possible
Lakes - Ornamental lake or pond	5	4	3	2	1	Not Possible	Not Possible
Urban - Artificial unvegetated, unsealed surface	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	0
Urban - Bioswale	3	2	1	1	1	Not Possible	Not Possible
Urban - Brown roof	10	7	5	3	1	Not Possible	Not Possible
Urban - Built linear features	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	0
Urban - Cemeteries and churchyards	20	17	15	12	10	Not Possible	Not Possible
Urban - Developed land; sealed surface	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	0
Urban - Extensive green roof	5	4	3	2	1	Not Possible	Not Possible
Urban - Facade-bound green wall	5	4	3	2	1	Not Possible	Not Possible
Urban - Ground based green wall	5	4	3	2	1	Not Possible	Not Possible
Urban - Ground level planters	Not Possible	Not Possible	Not Possible	Not Possible	1	Not Possible	Not Possible
Urban - Intensive green roof	10	8	5	3	1	Not Possible	Not Possible
Urban - Introduced shrub	Not Possible	Not Possible	Not Possible	Not Possible	1	Not Possible	Not Possible
Urban - Open Mosaic Habitats on Previously Developed Land	10	7	4	2	0	Not Possible	Not Possible
Urban - Rain garden	5	4	3	2	1	Not Possible	Not Possible
Urban - Sand pit quarry or open cast mine	Not Possible	Not Possible	Not Possible	Not Possible	1	Not Possible	Not Possible
Urban - Urban Tree	30+	30+	27	15	10	Not Possible	Not Possible
Urban - Sustainable urban drainage feature	5	4	3	2	1	Not Possible	Not Possible
Urban - Un-vegetated garden	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	0
Urban - Vacant/derelict land/ bareground	5	4	3	2	1	Not Possible	Not Possible
Urban - Vegetated garden	Not Possible	Not Possible	Not Possible	Not Possible	1	Not Possible	Not Possible
Wetland - Blanket bog	30+	30+	30+	30+	30+	Not Possible	Not Possible
Wetland - Depressions on Peat substrates (H7150)	30+	30+	30	25	15	Not Possible	Not Possible
Wetland - Fens (upland and lowland)	30	25	20	15	10	Not Possible	Not Possible
Wetland - Lowland raised bog	30+	30+	30	20	15	Not Possible	Not Possible
Wetland - Oceanic Valley Mire[1] (D2.1)	30+	30+	30	20	15	Not Possible	Not Possible
Wetland - Purple moor grass and rush pastures	30	25	20	15	10	Not Possible	Not Possible
Wetland - Reedbeds	12	10	7	5	3	Not Possible	Not Possible
Wetland - Transition mires and quaking bogs (H7140)	30+	30+	30	25	15	Not Possible	Not Possible
Woodland and forest - Felled	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible
Woodland and forest - Lowland beech and yew woodland	30+	30+	30+	25	10	Not Possible	Not Possible
Woodland and forest - Lowland mixed deciduous woodland	30+	30+	30+	25	10	Not Possible	Not Possible
Woodland and forest - Native pine woodlands	30+	30+	30+	25	10	Not Possible	Not Possible
Woodland and forest - Other coniferous woodland	30+	30+	30	10	5	Not Possible	Not Possible
Woodland and forest - Other Scot's Pine woodland	30+	30+	30+	25	10	Not Possible	Not Possible
Woodland and forest - Other woodland; broadleaved	30+	20	15	7	5	Not Possible	Not Possible
Woodland and forest - Other woodland; mixed	30+	30+	30	10	5	Not Possible	Not Possible
Woodland and forest - Upland birchwoods	30+	30	25	20	10	Not Possible	Not Possible
Woodland and forest - Upland mixed ashwoods	30+	30+	30+	25	10	Not Possible	Not Possible
Woodland and forest - Upland oakwood	30+	30+	30+	25	10	Not Possible	Not Possible
Woodland and forest - Wet woodland	30+	30	15	10	5	Not Possible	Not Possible
Woodland and forest - Wood-pasture and parkland	30+	30+	30+	25	10	Not Possible	Not Possible
Coastal lagoons - Coastal lagoons	10	8	5	3	1	Not Possible	Not Possible
Rocky shore - High energy littoral rock	10	7	4	2	1	Not Possible	Not Possible
Rocky shore - High energy littoral rock - on peat, clay or chalk	30+	30+	30+	30+	30+	Not Possible	Not Possible
Rocky shore - Moderate energy littoral rock	13	8	4	2	1	Not Possible	Not Possible
Rocky shore - Moderate energy littoral rock - on peat, clay or chalk	30+	30+	30+	30+	30+	Not Possible	Not Possible
Rocky shore - Low energy littoral rock	15	10	5	1	1	Not Possible	Not Possible
Rocky shore - Low energy littoral rock - on peat, clay or chalk	30+	30+	30+	30+	30+	Not Possible	Not Possible
Rocky shore - Features of littoral rock	13	8	4	2	1	Not Possible	Not Possible
Rocky shore - Features of littoral rock - on peat, clay or chalk	30+	30+	30+	30+	30+	Not Possible	Not Possible
Intertidal sediment - Littoral coarse sediment	3	2	1	1	1	Not Possible	Not Possible
Intertidal sediment - Littoral mud	6	4	3	2	1	Not Possible	Not Possible
Intertidal sediment - Littoral mixed sediments	5	4	3	2	1	Not Possible	Not Possible
Coastal saltmarsh - Saltmarshes and saline reedbeds	15	10	7	3	1	Not Possible	Not Possible
Coastal saltmarsh - Artificial saltmarshes and saline reedbeds	15	10	7	3	1	Not Possible	Not Possible
Intertidal sediment - Littoral seagrass	20	15	10	5	2	Not Possible	Not Possible
Intertidal sediment - Littoral seagrass on peat, clay or chalk	30+	30+	30+	30+	30+	Not Possible	Not Possible

Intertidal sediment - Littoral biogenic reefs - Mussels	15	10	5	3	3	Not Possible	Not Possible
Intertidal sediment - Littoral biogenic reefs - Sabellaria	15	10	5	3	3	Not Possible	Not Possible
Intertidal sediment - Features of littoral sediment	10	7	5	3	3	Not Possible	Not Possible
Intertidal sediment - Artificial littoral coarse sediment	3	2	1	1	1	Not Possible	Not Possible
Intertidal sediment - Artificial littoral mud	6	4	3	2	1	Not Possible	Not Possible
Intertidal sediment - Artificial littoral sand	4	2	1	1	1	Not Possible	Not Possible
Intertidal sediment - Artificial littoral muddy sand	5	4	3	2	1	Not Possible	Not Possible
Intertidal sediment - Artificial littoral mixed sediments	5	4	3	2	1	Not Possible	Not Possible
Intertidal sediment - Artificial littoral seagrass	20	15	10	5	2	Not Possible	Not Possible
Intertidal sediment - Artificial littoral biogenic reefs	15	10	5	3	3	Not Possible	Not Possible
Intertidal sediment - Littoral sand	4	2	1	1	1	Not Possible	Not Possible
Intertidal sediment - Littoral muddy sand	5	4	3	2	1	Not Possible	Not Possible
Intertidal Hard Structures - Artificial hard structures	15	10	5	2	1	Not Possible	Not Possible
Intertidal Hard Structures - Artificial features of hard structures	13	8	4	2	1	Not Possible	Not Possible
Intertidal Hard Structures - Artificial hard structures with Integrated Greening of Grey Infrastructure (IGG	13	8	4	2	1	Not Possible	Not Possible

Return to start

Start cond	Lower Distinctiveness Habitat	Lower Distinctiveness Habitat	Lower Distinctiveness Habitat	Lower Distinctiveness Habitat	Lower Distinctiveness Habitat	Lower Distinctiveness Habitat	Lower Distinctiveness Habitat	Poor	Poor	Poor	Poor	Fairly Poor	Fairly Poor	Fairly Poor	Moderate	Moderate	Fairly Good	Good
Target cond	N/A - Other	N/A -Agricultural	Poor	Fairly Poor	Moderate	Fairly Good	Good	Fairly Poor	Moderate	Fairly Good	Good	Moderate	Fairly Good	Good	Fairly Good	Good	Good	Good
Habitat	**Lower Distinctiveness Habitat - N/A - Other**	**Lower Distinctiveness Habitat - N/A - Agricultural**	**Lower Distinctiveness Habitat - Poor**	**Lower Distinctiveness Habitat - Fairly Poor**	**Lower Distinctiveness Habitat - Moderate**	**Lower Distinctiveness Habitat - Fairly Good**	**Lower Distinctiveness Habitat - Good**	**Poor - Fairly Poor**	**Poor - Moderate**	**Poor - Fairly Good**	**Poor - Good**	**Fairly Poor - Moderate**	**Fairly Poor - Fairly Good**	**Fairly Poor - Good**	**Moderate - Fairly Good**	**Moderate - Good**	**Fairly Good - Good**	**Good - Good**
Cropland - Arable field margins cultivated annually	Not Possible	1	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible
Cropland - Arable field margins game bird mix	Not Possible	1	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible
Cropland - Arable field margins pollen & nectar	Not Possible	1	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible
Cropland - Arable field margins tussocky	Not Possible	1	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible
Cropland - Cereal crops	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible
Cropland - Cereal crops other	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible
Cropland - Cereal crops winter stubble	Not Possible	1	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible
Cropland - Horticulture	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible
Cropland - Intensive orchards	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible
Cropland - Non-cereal crops	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible
Cropland - Temporary grass and clover leys	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible
Grassland - Traditional orchards	Not Possible	Not Possible	5	10	20	25	30	5	15	20	25	10	15	20	5	10	5	Not Possible
Grassland - Bracken	Not Possible	Not Possible	1	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible
Grassland - Floodplain Wetland Mosaic (CFGM)	Not Possible	Not Possible	5	8	10	12	15	8	10	12	15	2	4	7	2	4	3	Not Possible
Grassland - Lowland calcareous grassland	Not Possible	Not Possible	10	15	20	25	30	5	10	15	20	5	10	15	5	10	5	Not Possible
Grassland - Lowland dry acid grassland	Not Possible	Not Possible	10	15	20	25	30+	5	15	20	30+	8	15	25	10	20	10	Not Possible
Grassland - Lowland meadows	Not Possible	Not Possible	5	8	10	12	15	4	8	11	15	4	8	11	4	8	4	Not Possible
Grassland - Modified grassland	Not Possible	1	1	5	10	12	15	5	10	12	15	8	10	12	8	10	8	Not Possible
Grassland - Other lowland acid grassland	Not Possible	Not Possible	1	5	10	12	15	5	10	12	15	8	10	12	8	10	8	Not Possible
Grassland - Other neutral grassland	Not Possible	Not Possible	1	5	10	12	15	5	10	12	15	8	10	12	8	10	8	Not Possible
Grassland - Tall herb communities	Not Possible	Not Possible	10	15	20	25	30	10	20	25	30	10	10	15	5	10	5	Not Possible
Grassland - Upland acid grassland	Not Possible	Not Possible	1	5	10	12	15	5	10	12	15	8	10	12	8	10	8	Not Possible
Grassland - Upland calcareous grassland	Not Possible	Not Possible	10	12	15	20	25	10	15	18	20	10	15	18	10	10	10	Not Possible
Grassland - Upland hay meadows	Not Possible	Not Possible	10	12	15	18	20	10	15	18	20	10	15	18	10	15	10	Not Possible
Heathland and shrub - Blackthorn scrub	Not Possible	Not Possible	1	3	5	7	10	1	5	7	10	3	5	3	2	3	2	Not Possible
Heathland and shrub - Bramble scrub	Not Possible	Not Possible	1	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible
Heathland and shrub - Gorse scrub	Not Possible	Not Possible	1	3	5	7	10	1	5	7	10	3	5	7	2	3	2	Not Possible
Heathland and shrub - Hawthorn scrub	Not Possible	Not Possible	1	3	5	7	10	1	5	7	10	3	5	7	2	3	2	Not Possible
Heathland and shrub - Hazel scrub	Not Possible	Not Possible	5	7	10	12	15	5	7	12	15	5	8	12	5	7	5	Not Possible
Heathland and shrub - Lowland Heathland	Not Possible	Not Possible	10	15	20	25	30+	5	10	15	25	5	10	20	5	15	10	Not Possible
Heathland and shrub - Mixed scrub	Not Possible	Not Possible	1	3	5	7	10	1	5	7	10	3	5	7	2	3	2	Not Possible
Heathland and shrub - Mountain heaths and willow scrub	Not Possible	Not Possible	15	23	25	30+	30+	20	30+	30+	30+	20	30+	30+	20	30+	20	Not Possible
Heathland and shrub - Rhododendron scrub	Not Possible	Not Possible	1	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible
Heathland and shrub - Sea buckthorn scrub (Annex 1)	Not Possible	Not Possible	5	7	10	12	15	5	7	10	12	5	7	10	5	7	5	Not Possible
Heathland and shrub - Sea buckthorn scrub (other)	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible
Heathland and shrub - Upland Heathland	Not Possible	Not Possible	10	15	20	25	30	10	20	30	30+	10	20	30	10	20	10	Not Possible
Lakes - Aquifer fed naturally fluctuating water bodies	Not Possible	Not Possible	1	10	15	20	30	5	10	15	30	5	15	25	5	20	5	Not Possible
Lakes - High alkalinity lakes	Not Possible	Not Possible	2	3	5	7	10	5	10	15	30	5	15	25	10	20	10	Not Possible
Lakes - Low alkalinity lakes	Not Possible	Not Possible	5	10	15	20	30	5	10	15	20	5	10	15	5	10	5	Not Possible
Lakes - Marl Lakes	Not Possible	Not Possible	5	7	10	15	20	5	10	15	30	5	15	25	10	20	10	Not Possible
Lakes - Moderate alkalinity lakes	Not Possible	Not Possible	5	7	10	15	20	5	10	15	30	5	15	25	10	20	10	Not Possible
Lakes - Peat Lakes	Not Possible	Not Possible	5	10	15	20	30	5	10	15	30	5	15	25	10	20	10	Not Possible
Lakes - Ponds (Priority Habitat)	Not Possible	Not Possible	2	3	5	7	10	2	4	6	8	2	4	6	2	4	2	Not Possible
Lakes - Ponds (Non- Priority Habitat)	Not Possible	Not Possible	1	2	3	4	5	2	4	6	8	2	4	6	2	4	2	Not Possible
Lakes - Reservoirs	Not Possible	Not Possible	1	3	5	7	10	5	10	15	30	5	15	25	10	20	10	Not Possible
Lakes - Temporary lakes, ponds and pools	Not Possible	Not Possible	2	3	5	7	10	2	4	6	8	2	4	6	2	4	2	Not Possible
Sparsely vegetated land - Calaminarian grasslands	Not Possible	Not Possible	2	3	5	7	10	1	3	5	8	1	4	7	2	5	3	Not Possible
Sparsely vegetated land - Coastal sand dunes	Not Possible	Not Possible	5	7	10	15	20	5	8	15	20	5	10	18	7	12	8	Not Possible
Sparsely vegetated land - Coastal vegetated shingle	Not Possible	Not Possible	5	7	10	15	20	5	8	15	20	5	10	18	7	12	8	Not Possible
Sparsely vegetated land - Ruderal/Ephemeral	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	1	2	3	5	1	2	3	1	2	1	Not Possible
Sparsely vegetated land - Inland rock outcrop and scree habitats	Not Possible	Not Possible	10	15	20	25	30+	10	15	25	30+	20	25	27	15	20	15	Not Possible
Sparsely vegetated land - Limestone pavement	Not Possible	Not Possible	30+	30+	30+	30+	30+	5	10	15	20	5	10	15	5	10	5	Not Possible
Sparsely vegetated land - Maritime cliff and slopes	Not Possible	Not Possible	10	15	20	25	30+	5	8	15	20	5	10	18	7	12	8	Not Possible
Sparsely vegetated land - Other inland rock and scree	Not Possible	Not Possible	3	5	10	15	20	5	10	15	20	5	10	15	5	10	5	Not Possible
Urban - Allotments	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	Not Possible
Lakes - Ornamental lake or pond	Not Possible	Not Possible	1	2	3	4	5	2	4	6	8	2	4	6	2	4	2	Not Possible
Urban - Artificial unvegetated, unsealed surface	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible
Urban - Bioswale	Not Possible	Not Possible	1	1	1	2	3	1	2	2	3	1	3	3	2	2	2	Not Possible
Urban - Brown roof	Not Possible	Not Possible	1	3	5	7	10	1	5	7	10	5	8	10	5	5	3	Not Possible
Urban - Built linear features	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible
Urban - Cemeteries and churchyards	Not Possible	Not Possible	10	12	15	17	20	5	10	15	20	10	15	20	10	15	5	Not Possible
Urban - Developed land; sealed surface	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible
Urban - Extensive green roof	Not Possible	Not Possible	1	2	3	4	5	1	2	3	5	1	2	3	1	2	1	Not Possible
Urban - Facade-bound green wall	Not Possible	Not Possible	1	2	3	4	5	1	2	3	5	1	2	3	1	2	1	Not Possible
Urban - Ground based green wall	Not Possible	Not Possible	1	2	3	4	5	1	2	3	5	1	2	3	1	2	1	Not Possible
Urban - Ground level planters	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible
Urban - Intensive green roof	Not Possible	Not Possible	1	3	5	8	10	3	5	8	10	3	8	8	3	5	2	Not Possible
Urban - Introduced shrub	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible
Urban - Open Mosaic Habitats on Previously Developed Land	Not Possible	Not Possible	0	2	4	7	10	2	4	7	10	2	5	8	3	4	3	Not Possible
Urban - Rain garden	Not Possible	Not Possible	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	Not Possible
Urban - Sand pit quarry or open cast mine	Not Possible	Not Possible	1	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible
Urban - Urban Tree	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	8	16	24	30+	8	16	24	8	16	8	Not Possible
Urban - Sustainable urban drainage feature	Not Possible	Not Possible	1	2	3	4	5	1	2	3	5	1	2	3	1	2	1	Not Possible
Urban - Un-vegetated garden	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible
Urban - Vacant/derelict land/ bareground	Not Possible	Not Possible	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	Not Possible
Urban - Vegetated garden	Not Possible	Not Possible	1	2	3	4	5	1	2	3	5	1	2	3	1	2	1	Not Possible
Wetland - Blanket bog	Not Possible	Not Possible	15	25	30	30+	30+	10	20	30+	30	10	30+	30+	30	30+	30	Not Possible
Wetland - Depressions on Peat substrates (H7150)	Not Possible	Not Possible	15	25	30	30+	30+	10	20	25	30	10	20	25	10	20	10	Not Possible
Wetland - Fens (upland and lowland)	Not Possible	Not Possible	10	12	15	25	30	10	12	15	18	10	12	15	10	12	10	Not Possible
Wetland - Lowland raised bog	Not Possible	Not Possible	15	20	30	30+	30+	10	20	25	30	10	20	20	10	15	10	Not Possible
Wetland - Oceanic Valley Mire[1] (D2.1)	Not Possible	Not Possible	15	20	30	30+	30+	10	20	25	30	10	20	20	10	15	10	Not Possible
Wetland - Purple moor grass and rush pastures	Not Possible	Not Possible	10	12	15	17	20	10	10	15	20	10	15	20	10	15	10	Not Possible
Wetland - Reedbeds	Not Possible	Not Possible	5	7	10	12	15	5	7	10	12	5	7	10	5	7	5	Not Possible
Wetland - Transition mires and quaking bogs (H7140)	Not Possible	Not Possible	15	25	30	30+	30+	10	20	25	30	10	20	20	10	15	10	Not Possible
Woodland and forest - Felled	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible
Woodland and forest - Lowland beech and yew woodland	Not Possible	Not Possible	10	25	30+	30+	30+	25	30+	30+	30+	30+	30+	30+	30+	30+	30+	Not Possible
Woodland and forest - Lowland mixed deciduous woodland	Not Possible	Not Possible	10	25	30+	30+	30+	10	20	25	30+	10	20	25	10	20	10	Not Possible
Woodland and forest - Native pine woodlands	Not Possible	Not Possible	25	30	30+	30+	30+	10	15	20	30+	15	20	25	10	15	10	Not Possible
Woodland and forest - Other coniferous woodland	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	5	25	30+	30+	20	15	25	5	7	10	Not Possible
Woodland and forest - Other Scot's Pine woodland	Not Possible	Not Possible	20	25	30+	30+	30+	10	15	20	30+	15	20	25	10	15	10	Not Possible
Woodland and forest - Other woodland; broadleaved	Not Possible	Not Possible	5	10	15	20	25	5	10	15	20	5	10	15	5	10	5	Not Possible
Woodland and forest - Other woodland; mixed	Not Possible	Not Possible	5	10	15	20	25	5	10	15	20	5	10	15	5	10	5	Not Possible
Woodland and forest - Upland birchwoods	Not Possible	Not Possible	10	20	25	30	30+	10	15	20	30+	15	20	25	10	15	10	Not Possible
Woodland and forest - Upland mixed ashwoods	Not Possible	Not Possible	10	25	30+	30+	30+	10	15	20	30+	15	20	25	10	15	10	Not Possible
Woodland and forest - Upland oakwood	Not Possible	Not Possible	10	25	30+	30+	30+	25	30+	30+	30+	30+	30+	30+	30+	30+	30+	Not Possible
Woodland and forest - Wet woodland	Not Possible	Not Possible	10	20	25	30	30+	10	10	15	30+	15	20	25	10	15	10	Not Possible
Woodland and forest - Wood-pasture and parkland	Not Possible	Not Possible	10	25	30+	30+	30+	25	30+	30+	30+	30+	30+	30+	30+	30+	30+	Not Possible
Coastal lagoons - Coastal lagoons	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	1	4	8	12	3	7	11	4	8	4	Not Possible
Rocky shore - High energy littoral rock	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	2	4	6	10	2	4	8	2	6	4	Not Possible
Rocky shore - High energy littoral rock - on peat, clay or chalk	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	2	4	6	10	2	4	8	2	6	4	Not Possible
Rocky shore - Moderate energy littoral rock	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	2	4	6	11	2	4	9	2	7	5	Not Possible
Rocky shore - Moderate energy littoral rock - on peat, clay or chalk	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	2	4	6	11	2	4	9	2	7	5	Not Possible
Rocky shore - Low energy littoral rock	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	2	4	6	12	2	4	10	2	8	6	Not Possible
Rocky shore - Low energy littoral rock - on peat, clay or chalk	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	2	4	6	12	2	4	10	2	8	6	Not Possible
Rocky shore - Features of littoral rock	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	2	4	6	11	2	4	9	2	7	5	Not Possible
Rocky shore - Features of littoral rock - on peat, clay or chalk	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	2	4	6	11	2	4	9	2	7	5	Not Possible
Intertidal sediment - Littoral coarse sediment	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	1	2	3	4	1	2	3	1	2	1	Not Possible
Intertidal sediment - Littoral mud	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	2	4	6	8	2	4	6	2	4	2	Not Possible
Intertidal sediment - Littoral mixed sediments	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	1	2	3	4	1	2	3	1	2	1	Not Possible
Coastal saltmarsh - Saltmarshes and saline reedbeds	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	2	6	10	20	4	8	18	4	14	10	Not Possible
Coastal saltmarsh - Artificial saltmarshes and saline reedbeds	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	2	6	10	20	4	8	18	4	14	10	Not Possible
Intertidal sediment - Littoral seagrass	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	3	13	23	0	10	20	30	10	20	10	Not Possible
Intertidal sediment - Littoral seagrass on peat, clay or chalk	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	2	4	7	0	2	3	8	3	6	3	Not Possible
Intertidal sediment - Littoral biogenic reefs - Mussels	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	2	4	7	10	2	3	8	3	6	3	Not Possible
Intertidal sediment - Littoral biogenic reefs - Sabellaria	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	2	4	7	10	2	3	8	3	6	3	Not Possible
Intertidal sediment - Features of littoral sediment	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	1	2	3	5	1	2	4	1	3	2	Not Possible
Intertidal sediment - Artificial littoral coarse sediment	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	1	2	3	4	1	2	3	1	2	1	Not Possible
Intertidal sediment - Artificial littoral mud	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	2	4	6	8	2	4	6	2	4	2	Not Possible
Intertidal sediment - Artificial littoral sand	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	2	3	4	6	1	2	4	1	3	2	Not Possible
Intertidal sediment - Artificial littoral muddy sand	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	2	4	6	8	2	4	6	2	4	2	Not Possible
Intertidal sediment - Artificial littoral mixed sediments	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	1	2	3	4	1	2	3	1	2	1	Not Possible
Intertidal sediment - Artificial littoral seagrass	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	3	13	23	30+	10	20	30	10	20	10	Not Possible
Intertidal sediment - Artificial littoral biogenic reefs	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	2	4	7	10	2	3	8	3	6	3	Not Possible
Intertidal sediment - Littoral sand	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	2	3	4	6	1	2	4	1	3	2	Not Possible
Intertidal sediment - Littoral muddy sand	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	2	4	6	8	2	4	6	2	4	2	Not Possible
Intertidal Hard Structures - Artificial hard structures	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	6	4	10	2	2	8	6	2	12	4	Not Possible
Intertidal Hard Structures - Artificial features of hard structures	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	5	4	9	2	2	7	6	2	11	4	Not Possible
Intertidal Hard Structures - Artificial hard structures with Integrated Greening of Grey Infrastructure (IG	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	5	4	9	2	2	7	6	2	11	4	Not Possible

Return to start

Habitat Description	Distinctivness		Creation - Years to Target Condition			Enhancement Through Condition - Years to Target Condition			Enhancement Through Distinctiveness - Years to Target Condition														Difficulty		Suggested Action
	Distinctivness Category	Distinctivness Score	Poor	Moderate	Good	Poor - Moderate	Poor - Good	Moderate - Good	Native Species Rich Hedgerow with trees - Associated with bank or ditch	Native Species Rich Hedgerow with trees	Native Species Rich Hedgerow - associated with bank or ditch	Native Hedgerow with trees - associated with bank or ditch	Native Species Rich Hedgerow	Native Hedgerow - associated with bank or ditch	Native Hedgerow with trees	Line of Trees (ecologically valuable)	Line of Trees (ecologically valuable) - with bank or ditch	Native Hedgerow	Line of Trees	Line of Trees - associated with bank or ditch	Hedge Ornamental Non Native	Technical Difficulty Creation	Technical Difficulty Enhancement	
Native Species Rich Hedgerow with trees - Associated with bank or ditch	V.High	8	1	10	20	6	10	4	Error	Error	Error	Error	Error	Error	Error	Error	Error	Error	Error	Error	Error	Low	Low	Like for like
Native Species Rich Hedgerow with trees	High	6	1	10	20	6	10	4	5	Error	Error	Error	Error	Error	Error	Error	Error	Error	Error	Error	Error	Low	Low	Like for like or better
Native Species Rich Hedgerow - Associated with bank or ditch	High	6	1	5	12	3	5	2	10	Error	Error	Error	Error	Error	Error	Error	Error	Error	Error	Error	Error	Low	Low	Like for like or better
Native Hedgerow with trees - Associated with bank or ditch	High	6	1	10	20	6	10	4	5	Error	Error	Error	Error	Error	Error	Error	Error	Error	Error	Error	Error	Low	Low	Like for like or better
Native Species Rich Hedgerow	Medium	4	1	5	12	3	5	2	10	10	5	10	Error	Error	Error	Error	Error	Error	Error	Error	Error	Low	Low	Like for like or better
Native Hedgerow - Associated with bank or ditch	Medium	4	1	5	12	3	5	2	10	10	5	10	Error	Error	Error	Error	Error	Error	Error	Error	Error	Low	Low	Like for like or better
Native Hedgerow with trees	Medium	4	1	10	20	6	10	4	5	5	5	5	Error	Error	Error	Error	Error	Error	Error	Error	Error	Low	Low	Like for like or better
Line of Trees (Ecologically Valuable)	Medium	4	5	20	30+	20	30	10	12	12	Error	12	Error	Error	Error	Error	Error	Error	Error	Error	Error	Low	Low	Like for like or better
Line of Trees (Ecologically Valuable) - with Bank or Ditch	Medium	4	5	20	30+	20	30	10	12	12	Error	12	Error	Error	Error	Error	Error	Error	Error	Error	Error	Low	Low	Like for like or better
Native Hedgerow	Low	2	1	5	12	3	5	2	10	10	5	10	5	6	10	Error	Error	Error	Error	Error	Error	Low	Low	Same distinctiveness band or better
Line of Trees	Low	2	5	20	30+	20	30	10	12	12	Error	12	Error	Error	12	Error	Error	Error	Error	Error	Error	Low	Low	Same distinctiveness band or better
Line of Trees - Associated with bank or ditch	Low	2	5	20	30+	20	30	10	12	12	Error	12	Error	Error	12	Error	Error	Error	Error	Error	Error	Low	Low	Same distinctiveness band or better
Hedge Ornamental Non Native	V.Low	1	1	N/A	N/A	N/A	N/A	N/A	Error	Error	Error	Error	Error	Error	Error	Error	Error	Error	Error	Error	Error	Low	Low	Same distinctiveness band or better

Condition	
Condition Category	Condition Score
Good	3
Moderate	2
Poor	1

Enhancement through Distinctiveness	Post Development Hedge Type												
Baseline Hedge Type	Native Species Rich Hedgerow with trees - Associated with bank or ditch	Native Species Rich Hedgerow with trees	Native Species Rich Hedgerow - Associated with bank or ditch	Native Hedgerow with trees - associated with bank or ditch	Native Species Rich Hedgerow	Native Hedgerow - associated with bank or ditch	Native Hedgerow with trees	Line of Trees (ecologically valuable)	Line of Trees (ecologically valuable) - with bank or ditch	Native Hedgerow	Line of Trees	Line of Trees - Associated with bank or ditch	Hedge Ornamental Non Native
Native Species Rich Hedgerow with trees - Associated with bank or ditch	V.High - V.High	Error Trading Down	Error Trading Down	Error Trading Down	Error Trading Down	Error Trading Down	Error Trading Down	Error Trading Down	Error Trading Down	Error Trading Down	Error Trading Down	Error Trading Down	Error Trading Down
Native Species Rich Hedgerow with trees	High - V.High	High - High	High - High	High - High	Error Trading Down	Error Trading Down	Error Trading Down	Error Trading Down	Error Trading Down	Error Trading Down	Error Trading Down	Error Trading Down	Error Trading Down
Native Species Rich Hedgerow - Associated with bank or ditch	High - V.High	High - High	High - High	High - High	Error Trading Down	Error Trading Down	Error Trading Down	Error Trading Down	Error Trading Down	Error Trading Down	Error Trading Down	Error Trading Down	Error Trading Down
Native Hedgerow with trees - Associated with bank or ditch	High - V.High	High - High	High - High	High - High	Error Trading Down	Error Trading Down	Error Trading Down	Error Trading Down	Error Trading Down	Error Trading Down	Error Trading Down	Error Trading Down	Error Trading Down
Native Species Rich Hedgerow	Medium - V.High	Medium - High	Medium - High	Medium - High	Medium - Medium	Medium - Medium	Medium - Medium	Error - Enhancement not possible	Error - Enhancement not possible	Error Trading Down	Error Trading Down	Error Trading Down	Error Trading Down
Native Hedgerow - Associated with bank or ditch	Medium - V.High	Medium - High	Medium - High	Medium - High	Medium - Medium	Medium - Medium	Medium - Medium	Error - Enhancement not possible	Error - Enhancement not possible	Error Trading Down	Error Trading Down	Error Trading Down	Error Trading Down
Native Hedgerow with trees	Medium - V.High	Medium - High	Medium - High	Medium - High	Medium - Medium	Medium - Medium	Medium - Medium	Medium - Medium	Medium - Medium	Error Trading Down	Error Trading Down	Error Trading Down	Error Trading Down
Line of Trees (ecologically valuable)	Medium - V.High	Medium - High	Error - Enhancement not possible	Medium - High	Error - Enhancement not possible	Error - Enhancement not possible	Medium - Medium	Medium - Medium	Medium - Medium	Error Trading Down	Error Trading Down	Error Trading Down	Error Trading Down
Line of Trees (ecologically valuable) - with bank or ditch	Medium - V.High	Medium - High	Error - Enhancement not possible	Medium - High	Error - Enhancement not possible	Error - Enhancement not possible	Medium - Medium	Medium - Medium	Medium - Medium	Error Trading Down	Error Trading Down	Error Trading Down	Error Trading Down
Native Hedgerow	Low - V.High	Low - High	Low - High	Low - High	Low - Medium	Low - Medium	Low - Medium	Error - Enhancement not possible	Error - Enhancement not possible	Low - Low	Error - Enhancement not possible	Error - Enhancement not possible	Error Trading Down
Line of Trees	Low - V.High	Low - High	Error - Enhancement not possible	Low - High	Error - Enhancement not possible	Error - Enhancement not possible	Low - Medium	Error - Enhancement not possible	Error - Enhancement not possible	Error - Enhancement not possible	Low - Low	Low - Low	Error Trading Down
Line of Trees - Associated with bank or ditch	Low - V.High	Low - High	Error - Enhancement not possible	Low - High	Error - Enhancement not possible	Error - Enhancement not possible	Low - Medium	Error - Enhancement not possible	Error - Enhancement not possible	Error - Enhancement not possible	Low - Low	Low - Low	Error Trading Down
Hedge Ornamental Non Native	Error - Enhancement not possible	Error - Enhancement not possible	Error - Enhancement not possible	Error - Enhancement not possible	Error - Enhancement not possible	Error - Enhancement not possible	Error - Enhancement not possible	Error - Enhancement not possible	Error - Enhancement not possible	Error - Enhancement not possible	Error - Enhancement not possible	Error - Enhancement not possible	V.Low - V.Low

Return to start

Habitat Description	Distinctivness		Difficulty			Condition				
	Distinctivness Category	Distinctivness Score	Technical Difficulty Creation	Technical Difficulty Enhancement	Suggested Action	Good	Fairly Good	Moderate	Fairly Poor	Poor
Priority Habitat	V.High	8	High	Medium	Restore	3	2.5	2	1.5	1
Other Rivers and Streams	High	6	High	Medium	Restore	3	2.5	2	1.5	1
Ditches	Medium	4	Low	Medium	Restore	3	2.5	2	1.5	1
Canals	Medium	4	Low	Medium	Restore	3	2.5	2	1.5	1
Culvert	Low	2	Low	Medium	Restore	Not Possible	Not Possible	Not Possible	Not Possible	1

Target Condition for All Habitats	
Good	10
Fairly Good	8
Moderate	5
Fairly Poor	2
Poor	1

Enhancement - Years to Target Condition for All Habitats	
Enhancement through Distinctiveness	10

Enhancement - Years to Target Condition					
	Proposed Condition				
Baseline Condition	Poor	Fairly Poor	Moderate	Fairly Good	Good
Poor	1	2	4	6	8
Fairly Poor	N/A	1	2	4	6
Moderate	N/A	N/A	1	2	4
Fairly Good	N/A	N/A	N/A	1	2
Good	N/A	N/A	N/A	N/A	1

Encroachment	
Encroachment into Watercourse	multiplier
No Encroachment	1
Minor	0.8
Major	0.5
N/A - Culvert	1

Encroachment	
Encroachment into riparian zone	multiplier
No Encroachment	1
Minor	0.95
Moderate	0.85
Major	0.75

Spatial		
Description of multiplier	Category	Strategic multiplier
Low potential/action not identified in any plan	Low Strategic Significance	1
Delivery within Local Plans	High strategic significance	1.15
Delivery within River Basin Management Plan	High strategic significance	1.15
Delivery within Catchment Plans	High strategic significance	1.15
Delivery within Catchment Planning System	High strategic significance	1.15
Delivery within Priority Habitats for Restoration	High strategic significance	1.15

Spatial		
Description of multiplier	Category	Strategic multiplier
Low potential/action not identified in any plan	Low Strategic Significance	1
Within Local Plans	High strategic significance	1.15
Within River Basin Management Plan	High strategic significance	1.15
Within Catchment Plans	High strategic significance	1.15
Within Catchment Planning System	High strategic significance	1.15
Within Priority Habitats for Restoration	High strategic significance	1.15

Spatial	
Description of multiplier	Strategic multiplier
Outside Waterbody	0.25
Outside Catchment	0.5
Within Waterbody	1

Distinctivness categories		
Distinctiveness Category	Distinctivness Score	Sugested Action
V.High	8	Loss Unacceptable
High	6	Avoid
Medium	4	Avoid, Mitigate or Compensate
Low	2	Mitigate or Compensate

Return to start

Habitat Description	Condition						
	Good	Fairly Good	Moderate	Fairly Poor	Poor	N/A -Agricultural	N/A - Other
Cropland - Arable field margins cultivated annually	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	1	Not Possible
Cropland - Arable field margins game bird mix	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	1	Not Possible
Cropland - Arable field margins pollen & nectar	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	1	Not Possible
Cropland - Arable field margins tussocky	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	1	Not Possible
Cropland - Cereal crops	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	1	Not Possible
Cropland - Cereal crops other	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	1	Not Possible
Cropland - Cereal crops winter stubble	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	1	Not Possible
Cropland - Horticulture	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	1	Not Possible
Cropland - Intensive orchards	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	1	Not Possible
Cropland - Non-cereal crops	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	1	Not Possible
Cropland - Temporary grass and clover leys	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	1	Not Possible
Grassland - Traditional orchards	3	2.5	2	1.5	1	Not Possible	Not Possible
Grassland - Bracken	Not Possible	Not Possible	Not Possible	Not Possible	1	Not Possible	Not Possible
Grassland - Floodplain Wetland Mosaic (CFGM)	3	2.5	2	1.5	1	Not Possible	Not Possible
Grassland - Lowland calcareous grassland	3	2.5	2	1.5	1	Not Possible	Not Possible
Grassland - Lowland dry acid grassland	3	2.5	2	1.5	1	Not Possible	Not Possible
Grassland - Lowland meadows	3	2.5	2	1.5	1	Not Possible	Not Possible
Grassland - Modified grassland	3	2.5	2	1.5	1	Not Possible	Not Possible
Grassland - Other lowland acid grassland	3	2.5	2	1.5	1	Not Possible	Not Possible
Grassland - Other neutral grassland	3	2.5	2	1.5	1	Not Possible	Not Possible
Grassland - Tall herb communities	3	2.5	2	1.5	1	Not Possible	Not Possible
Grassland - Upland acid grassland	3	2.5	2	1.5	1	Not Possible	Not Possible
Grassland - Upland calcareous grassland	3	2.5	2	1.5	1	Not Possible	Not Possible
Grassland - Upland hay meadows	3	2.5	2	1.5	1	Not Possible	Not Possible
Heathland and shrub - Blackthorn scrub	3	2.5	2	1.5	1	Not Possible	Not Possible
Heathland and shrub - Bramble scrub	Not Possible	Not Possible	Not Possible	Not Possible	1	Not Possible	Not Possible
Heathland and shrub - Gorse scrub	3	2.5	2	1.5	1	Not Possible	Not Possible
Heathland and shrub - Hawthorn scrub	3	2.5	2	1.5	1	Not Possible	Not Possible
Heathland and shrub - Hazel scrub	3	2.5	2	1.5	1	Not Possible	Not Possible
Heathland and shrub - Lowland Heathland	3	2.5	2	1.5	1	Not Possible	Not Possible
Heathland and shrub - Mixed scrub	3	2.5	2	1.5	1	Not Possible	Not Possible
Heathland and shrub - Mountain heaths and willow scrub	3	2.5	2	1.5	1	Not Possible	Not Possible
Heathland and shrub - Rhododendron scrub	Not Possible	Not Possible	Not Possible	Not Possible	1	Not Possible	Not Possible
Heathland and shrub - Sea buckthorn scrub (Annex 1)	3	2.5	2	1.5	1	Not Possible	Not Possible
Heathland and shrub - Sea buckthorn scrub (other)	Not Possible	Not Possible	Not Possible	Not Possible	1	Not Possible	Not Possible
Heathland and shrub - Upland Heathland	3	2.5	2	1.5	1	Not Possible	Not Possible
Lakes - Aquifer fed naturally fluctuating water bodies	3	2.5	2	1.5	1	Not Possible	Not Possible
Lakes - High alkalinity lakes	3	2.5	2	1.5	1	Not Possible	Not Possible
Lakes - Low alkalinity lakes	3	2.5	2	1.5	1	Not Possible	Not Possible
Lakes - Marl Lakes	3	2.5	2	1.5	1	Not Possible	Not Possible
Lakes - Moderate alkalinity lakes	3	2.5	2	1.5	1	Not Possible	Not Possible
Lakes - Peat Lakes	3	2.5	2	1.5	1	Not Possible	Not Possible
Lakes - Ponds (Priority Habitat)	3	2.5	2	1.5	1	Not Possible	Not Possible
Lakes - Ponds (Non- Priority Habitat)	3	2.5	2	1.5	1	Not Possible	Not Possible
Lakes - Reservoirs	3	2.5	2	1.5	1	Not Possible	Not Possible
Lakes - Temporary lakes, ponds and pools	3	2.5	2	1.5	1	Not Possible	Not Possible
Sparsely vegetated land - Calaminarian grasslands	3	2.5	2	1.5	1	Not Possible	Not Possible
Sparsely vegetated land - Coastal sand dunes	3	2.5	2	1.5	1	Not Possible	Not Possible
Sparsely vegetated land - Coastal vegetated shingle	3	2.5	2	1.5	1	Not Possible	Not Possible
Sparsely vegetated land - Ruderal/Ephemeral	3	2.5	2	1.5	1	Not Possible	Not Possible
Sparsely vegetated land - Inland rock outcrop and scree habitats	3	2.5	2	1.5	1	Not Possible	Not Possible
Sparsely vegetated land - Limestone pavement	3	2.5	2	1.5	1	Not Possible	Not Possible
Sparsely vegetated land - Maritime cliff and slopes	3	2.5	2	1.5	1	Not Possible	Not Possible
Sparsely vegetated land - Other inland rock and scree	3	2.5	2	1.5	1	Not Possible	Not Possible
Urban - Allotments	3	2.5	2	1.5	1	Not Possible	Not Possible
Lakes - Ornamental lake or pond	3	2.5	2	1.5	1	Not Possible	Not Possible
Urban - Artificial unvegetated, unsealed surface	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	0
Urban - Bioswale	3	2.5	2	1.5	1	Not Possible	Not Possible
Urban - Brown roof	3	2.5	2	1.5	1	Not Possible	Not Possible
Urban - Built linear features	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	0
Urban - Cemeteries and churchyards	3	2.5	2	1.5	1	Not Possible	Not Possible
Urban - Developed land; sealed surface	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	0
Urban - Extensive green roof	3	2.5	2	1.5	1	Not Possible	Not Possible
Urban - Facade-bound green wall	3	2.5	2	1.5	1	Not Possible	Not Possible
Urban - Ground based green wall	3	2.5	2	1.5	1	Not Possible	Not Possible
Urban - Ground level planters	Not Possible	Not Possible	Not Possible	Not Possible	1	Not Possible	Not Possible
Urban - Intensive green roof	3	2.5	2	1.5	1	Not Possible	Not Possible
Urban - Introduced shrub	Not Possible	Not Possible	Not Possible	Not Possible	1	Not Possible	Not Possible
Urban - Open Mosaic Habitats on Previously Developed Land	3	2.5	2	1.5	1	Not Possible	Not Possible
Urban - Rain garden	3	2.5	2	1.5	1	Not Possible	Not Possible
Urban - Sand pit quarry or open cast mine	Not Possible	Not Possible	Not Possible	Not Possible	1	Not Possible	Not Possible
Urban - Urban Tree	3	2.5	2	1.5	1	Not Possible	Not Possible
Urban - Sustainable urban drainage feature	3	2.5	2	1.5	1	Not Possible	Not Possible
Urban - Un-vegetated garden	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	0
Urban - Vacant/derelict land/ bareground	3	2.5	2	1.5	1	Not Possible	Not Possible
Urban - Vegetated garden	Not Possible	Not Possible	Not Possible	Not Possible	1	Not Possible	Not Possible
Wetland - Blanket bog	3	2.5	2	1.5	1	Not Possible	Not Possible
Wetland - Depressions on Peat substrates (H7150)	3	2.5	2	1.5	1	Not Possible	Not Possible
Wetland - Fens (upland and lowland)	3	2.5	2	1.5	1	Not Possible	Not Possible
Wetland - Lowland raised bog	3	2.5	2	1.5	1	Not Possible	Not Possible
Wetland - Oceanic Valley Mire[1] (D2.1)	3	2.5	2	1.5	1	Not Possible	Not Possible
Wetland - Purple moor grass and rush pastures	3	2.5	2	1.5	1	Not Possible	Not Possible
Wetland - Reedbeds	3	2.5	2	1.5	1	Not Possible	Not Possible
Wetland - Transition mires and quaking bogs (H7140)	3	2.5	2	1.5	1	Not Possible	Not Possible
Woodland and forest - Felled	3	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible	Not Possible
Woodland and forest - Lowland beech and yew woodland	3	2.5	2	1.5	1	Not Possible	Not Possible
Woodland and forest - Lowland mixed deciduous woodland	3	2.5	2	1.5	1	Not Possible	Not Possible
Woodland and forest - Native pine woodlands	3	2.5	2	1.5	1	Not Possible	Not Possible
Woodland and forest - Other coniferous woodland	3	2.5	2	1.5	1	Not Possible	Not Possible
Woodland and forest - Other Scot's Pine woodland	3	2.5	2	1.5	1	Not Possible	Not Possible
Woodland and forest - Other woodland; broadleaved	3	2.5	2	1.5	1	Not Possible	Not Possible
Woodland and forest - Other woodland; mixed	3	2.5	2	1.5	1	Not Possible	Not Possible
Woodland and forest - Upland birchwoods	3	2.5	2	1.5	1	Not Possible	Not Possible
Woodland and forest - Upland mixed ashwoods	3	2.5	2	1.5	1	Not Possible	Not Possible
Woodland and forest - Upland oakwood	3	2.5	2	1.5	1	Not Possible	Not Possible
Woodland and forest - Wet woodland	3	2.5	2	1.5	1	Not Possible	Not Possible
Woodland and forest - Wood-pasture and parkland	3	2.5	2	1.5	1	Not Possible	Not Possible
Coastal lagoons - Coastal lagoons	3	2.5	2	1.5	1	Not Possible	Not Possible
Rocky shore - High energy littoral rock	3	2.5	2	1.5	1	Not Possible	Not Possible
Rocky shore - High energy littoral rock - on peat, clay or chalk	3	2.5	2	1.5	1	Not Possible	Not Possible
Rocky shore - Moderate energy littoral rock	3	2.5	2	1.5	1	Not Possible	Not Possible
Rocky shore - Moderate energy littoral rock - on peat, clay or chalk	3	2.5	2	1.5	1	Not Possible	Not Possible
Rocky shore - Low energy littoral rock	3	2.5	2	1.5	1	Not Possible	Not Possible
Rocky shore - Low energy littoral rock - on peat, clay or chalk	3	2.5	2	1.5	1	Not Possible	Not Possible
Rocky shore - Features of littoral rock	3	2.5	2	1.5	1	Not Possible	Not Possible
Rocky shore - Features of littoral rock - on peat, clay or chalk	3	2.5	2	1.5	1	Not Possible	Not Possible
Intertidal sediment - Littoral coarse sediment	3	2.5	2	1.5	1	Not Possible	Not Possible
Intertidal sediment - Littoral mud	3	2.5	2	1.5	1	Not Possible	Not Possible
Intertidal sediment - Littoral mixed sediments	3	2.5	2	1.5	1	Not Possible	Not Possible
Coastal saltmarsh - Saltmarshes and saline reedbeds	3	2.5	2	1.5	1	Not Possible	Not Possible
Coastal saltmarsh - Artificial saltmarshes and saline reedbeds	3	2.5	2	1.5	1	Not Possible	Not Possible
Intertidal sediment - Littoral seagrass	3	2.5	2	1.5	1	Not Possible	Not Possible
Intertidal sediment - Littoral seagrass on peat, clay or chalk	3	2.5	2	1.5	1	Not Possible	Not Possible
Intertidal sediment - Littoral biogenic reefs - Mussels	3	2.5	2	1.5	1	Not Possible	Not Possible
Intertidal sediment - Littoral biogenic reefs - Sabellaria	3	2.5	2	1.5	1	Not Possible	Not Possible
Intertidal sediment - Features of littoral sediment	3	2.5	2	1.5	1	Not Possible	Not Possible
Intertidal sediment - Artificial littoral coarse sediment	3	2.5	2	1.5	1	Not Possible	Not Possible
Intertidal sediment - Artificial littoral mud	3	2.5	2	1.5	1	Not Possible	Not Possible
Intertidal sediment - Artificial littoral sand	3	2.5	2	1.5	1	Not Possible	Not Possible
Intertidal sediment - Artificial littoral muddy sand	3	2.5	2	1.5	1	Not Possible	Not Possible
Intertidal sediment - Artificial littoral mixed sediments	3	2.5	2	1.5	1	Not Possible	Not Possible
Intertidal sediment - Artificial littoral seagrass	3	2.5	2	1.5	1	Not Possible	Not Possible
Intertidal sediment - Artificial littoral biogenic reefs	3	2.5	2	1.5	1	Not Possible	Not Possible
Intertidal sediment - Littoral sand	3	2.5	2	1.5	1	Not Possible	Not Possible
Intertidal sediment - Littoral muddy sand	3	2.5	2	1.5	1	Not Possible	Not Possible
Intertidal Hard Structures - Artificial hard structures	3	2.5	2	1.5	1	Not Possible	Not Possible
Intertidal Hard Structures - Artificial features of hard structures	3	2.5	2	1.5	1	Not Possible	Not Possible
Intertidal Hard Structures - Artificial hard structures with Integrated Greening of Grey Infrastructure (IG	3	2.5	2	1.5	1	Not Possible	Not Possible

Return to start

Phase 1 Habitat	UK Hab habitat	Distinctiveness band
Woodland	Woodland and forest - Other woodland; mixed	Medium
Broadleaved woodland	Woodland and forest - Other woodland; broadleaved	Medium
Semi-natural broadleaved woodland	Woodland and forest - Lowland mixed deciduous woodland	High
Plantation broadleaved woodland	Woodland and forest - Other woodland; broadleaved	Medium
Coniferous woodland	Woodland and forest - Other coniferous woodland	Low
Semi-natural coniferous woodland	Woodland and forest - Native pine woodlands	High
Plantation coniferous woodland	Woodland and forest - Other coniferous woodland	Low
Mixed woodland	Woodland and forest - Other woodland; mixed	Medium
Semi-natural mixed woodland	Woodland and forest - Lowland mixed deciduous woodland	High
Plantation mixed woodland	Woodland and forest - Other woodland; mixed	Medium
Scrub	Heathland and shrub - Mixed scrub	Medium
Dense / continuous scrub	Heathland and shrub - Mixed scrub	Medium
Scattered scrub	Heathland and shrub - Mixed scrub	Medium
Parkland / scattered trees	Woodland and forest - Wood-pasture and parkland	High
Broadleaved parkland / scattered trees	Woodland and forest - Wood-pasture and parkland	High
Coniferous parkland / scattered trees	Woodland and forest - Other coniferous woodland	Medium
Mixed parkland / scattered trees	Woodland and forest - Wood-pasture and parkland	High
Recently-felled woodland	Woodland and forest - Felled	Medium
Broadleaved recently felled woodland	Woodland and forest - Felled	Medium
Coniferous recently felled woodland	Woodland and forest - Felled	Medium
Mixed recently felled woodland	Woodland and forest - Felled	Medium
Acid grassland	Grassland - Other lowland acid grassland	Medium
Acid grassland	Grassland - Upland acid grassland	Medium
Unimproved acid grassland	Grassland - Lowland dry acid grassland	V.High
Unimproved acid grassland	Grassland - Upland hay meadows	V.High
Semi-improved acid grassland (Good quality)	Grassland - Upland acid grassland	Medium
Semi-improved acid grassland (Good quality)	Grassland - Other lowland acid grassland	Medium
Semi-improved acid grassland (Poor quality)	Grassland - Modified grassland	Low
Neutral grassland	Grassland - Other neutral grassland	Medium
Unimproved neutral grassland	Grassland - Lowland meadows	V.High
Semi-improved neutral grassland (Good quality)	Grassland - Other neutral grassland	Medium
Semi-improved neutral grassland (Poor quality)	Grassland - Modified grassland	Low
Calcareous grassland	Grassland - Upland calcareous grassland	High
Calcareous grassland	Grassland - Lowland calcareous grassland	High
Unimproved calcareous grassland	Grassland - Lowland calcareous grassland	High
Unimproved calcareous grassland	Grassland - Upland calcareous grassland	High
Semi-improved calcareous grassland (Good quality)	Grassland - Upland calcareous grassland	High
Semi-improved calcareous grassland (Good quality)	Grassland - Lowland calcareous grassland	High
Semi-improved calcareous grassland (Poor quality)	Grassland - Modified grassland	Low
Improved grassland	Grassland - Modified grassland	Low
Marsh/marshy grassland	Wetland - Purple moor grass and rush pastures	V.High
Marsh/marshy grassland	Grassland - Other neutral grassland	Medium
Marsh/marshy grassland	Grassland - Modified grassland	Low
Poor semi-improved grassland	Grassland - Modified grassland	Low
Strandline vegetation coastland	Sparsely vegetated land - Coastal vegetated shingle	High
Sand dune	Sparsely vegetated land - Coastal sand dunes	High
Dune slack sand dune coastland	Sparsely vegetated land - Coastal sand dunes	High
Dune grassland sand dune coastland	Sparsely vegetated land - Coastal sand dunes	High
Dune heath sand dune coastland	Sparsely vegetated land - Coastal sand dunes	High
Dune scrub sand dune coastland	Sparsely vegetated land - Coastal sand dunes	High
Open dune sand dune coastland	Sparsely vegetated land - Coastal sand dunes	High
Maritime cliff coastland	Sparsely vegetated land - Maritime cliff and slopes	High
Hard maritime cliff coastland	Sparsely vegetated land - Maritime cliff and slopes	High
Soft maritime cliff	Sparsely vegetated land - Maritime cliff and slopes	High
Crevice/ledge vegetation	Sparsely vegetated land - Maritime cliff and slopes	High
Crevice/ledge vegetation	Grassland - Tall herb communities	High
Coastal grassland	Sparsely vegetated land - Maritime cliff and slopes	High
Coastal grassland	Grassland - Lowland meadows	V.High
Coastal grassland	Grassland - Lowland dry acid grassland	V.High
Coastal grassland	Grassland - Other lowland acid grassland	Medium
Coastal heathland	Sparsely vegetated land - Maritime cliff and slopes	High
Coastal heathland	Heathland and shrub - Lowland Heathland	High
Standing open water	lakes - Aquifer fed naturally fluctuating water bodies	V.High
Standing open water	Lakes - Ditches	Medium
Standing open water	Lakes - High alkalinity lakes	High
Standing open water	Lakes - Low alkalinity lakes	High
Standing open water	Lakes - Marl Lakes	High
Standing open water	Lakes - Moderate alkalinity lakes	High
Standing open water	Lakes - Peat Lakes	High
Standing open water	Lakes - Ponds (Priority Habitat)	High
Standing open water	Lakes - Ponds (Non- Priority Habitat)	Medium
Standing open water	Lakes - Reservoirs	Medium
Standing open water	Lakes - Temporary lakes, ponds and pools	High
Dry dwarf shrub heath	Heathland and shrub - Lowland Heathland	High
Dry dwarf shrub heath	Heathland and shrub - Upland Heathland	High
Acidic dry dwarf shrub heath	Heathland and shrub - Lowland Heathland	High
Acidic dry dwarf shrub heath	Heathland and shrub - Upland Heathland	High
Basic dry dwarf shrub heath	Heathland and shrub - Lowland Heathland	High
Basic dry dwarf shrub heath	Heathland and shrub - Upland Heathland	High
Wet dwarf shrub heath	Heathland and shrub - Lowland Heathland	High
Wet dwarf shrub heath	Heathland and shrub - Upland Heathland	High
Lichen / bryophyte heath	Heathland and shrub - Lowland Heathland	High
Lichen / bryophyte heath	Heathland and shrub - Upland Heathland	High
Montane heath / dwarf herb	Heathland and shrub - Mountain heaths and willow scrub	V.High
Dry heath / acidic grass mosaic	Heathland and shrub - Lowland Heathland	High
Wet heath / acidic grass mosaic	Heathland and shrub - Lowland Heathland	High
Dry heath / acidic grass mosaic	Heathland and shrub - Upland Heathland	High
Wet heath / acidic grass mosaic	Heathland and shrub - Upland Heathland	High
Bracken	Grassland - Bracken	Medium
Continuous bracken	Grassland - Bracken	Medium
Scattered bracken	Grassland - Bracken	Medium
Other tall herb or fern (Good quality)	Sparsely vegetated land - Inland rock outcrop and scree habitats	High
Other tall herb or fern	Grassland - Bracken	Medium
Tall ruderal	Sparsely vegetated land - Ruderal/Ephemeral	Low
Non-ruderal	Sparsely vegetated land - Ruderal/Ephemeral	Low
Bog	Wetland - Lowland raised bog	V.High
Sphagnum bog	Wetland - Lowland raised bog	V.High
Blanket bog	Wetland - Blanket bog	V.High
Raised bog	Wetland - Lowland raised bog	V.High
Wet modified bog	Wetland - Transition mires and quaking bogs (H7140)	V.High
Dry modified bog	Wetland - Blanket bog	V.High
Dry modified bog	Wetland - Lowland raised bog	V.High
Flush and spring	Wetland - Fens (upland and lowland)	V.High
Acid/neutral flush	Wetland - Fens (upland and lowland)	V.High
Basic flush	Wetland - Fens (upland and lowland)	V.High
Bryophyte-dominated spring	Wetland - Fens (upland and lowland)	V.High
Fen	Wetland - Fens (upland and lowland)	V.High
Valley mire	Wetland – Oceanic Valley Mire[1] (D2.1)	V.High
Basin mire	Wetland – Oceanic Valley Mire[1] (D2.1)	V.High
Floodplain mire	Wetland – Oceanic Valley Mire[1] (D2.1)	V.High
Bare peat	Wetland - Depressions on Peat substrates (H7150)	V.High
Swamp	Wetland - Fens (upland and lowland)	V.High
Marginal and inundation	Wetland - Fens (upland and lowland)	V.High
Marginal and inundation	Wetland - Reedbeds	High
Marginal vegetation	Use the Feature that it is within, i.e. River, Lake type etc.	
Inundation vegetation	Wetland - Reedbeds	High
Natural rock exposures and caves (Good quality)	Sparsely vegetated land - Inland rock outcrop and scree habitats	High
Natural rock exposures and caves	Sparsely vegetated land - Other inland rock and scree	Medium
Inland cliff (High quality)	Sparsely vegetated land - Inland rock outcrop and scree habitats	High
Inland cliff	Sparsely vegetated land - Other inland rock and scree	Medium
Acidic inland cliff	Sparsely vegetated land - Inland rock outcrop and scree habitats	High
Basic inland cliff	Sparsely vegetated land - Inland rock outcrop and scree habitats	High
Scree	Sparsely vegetated land - Inland rock outcrop and scree habitats	High
Acidic scree	Sparsely vegetated land - Inland rock outcrop and scree habitats	High
Basic scree	Sparsely vegetated land - Inland rock outcrop and scree habitats	High
Limestone pavement	Sparsely vegetated land - Limestone pavement	V.High
Other natural rock exposure	Sparsely vegetated land - Other inland rock and scree	Medium
Other acidic natural rock exposure	Sparsely vegetated land - Other inland rock and scree	Medium
Other basic rock exposure	Sparsely vegetated land - Other inland rock and scree	Medium
Artificial rock exposures	Sparsely vegetated land - Other inland rock and scree	Medium
Artificial rock exposures	Sparsely vegetated land - Other inland rock and scree	Medium
Artificial rock exposures	Sparsely vegetated land - Other inland rock and scree	Medium
Artificial rock exposures	Sparsely vegetated land - Other inland rock and scree	Medium
Artificial rock exposures	Sparsely vegetated land - Other inland rock and scree	Medium
Artificial rock exposures	Sparsely vegetated land - Other inland rock and scree	Medium
Quarry	Urban - Sand pit quarry or open cast mine	Low
Spoil heap	Urban - Sand pit quarry or open cast mine	Low
Mine	Urban - Sand pit quarry or open cast mine	Low
Refuse tip	Urban - Artificial unvegetated, unsealed surface	V.Low
Cultivated/disturbed ground	Cropland - Cereal crops other	Low
Arable	Cropland - Cereal crops	Low
Amenity grassland	Grassland - Modified grassland	Low
Ephemeral / short perennial	Sparsely vegetated land - Ruderal/Ephemeral	Low
Introduced shrub	Urban - Introduced shrub	Low
Fence	Urban - Built linear features	V.Low
Wall	Urban - Built linear features	V.Low
Built-up areas	Urban - Developed land; sealed surface	V.Low
Caravans	Urban - Developed land; sealed surface	V.Low
Sea wall (artificial materials)	Urban - Developed land; sealed surface	V.Low
Buildings	Urban - Developed land; sealed surface	V.Low
Bare ground	Urban - Vacant/derelict land/ bareground	Low

The Biodiversity Metric 3.0 - Calculation Tool Technical Data

Return to start page

All area habitats

Area habitat groups

Multipliers

Temporal multipliers

Enhancement temporal multipliers

Hedgerow data

River data

Condition data

UKHab/Phase 1 translation

Local Authority List	Application type
Adur and Worthing Borough Council	Householder planning consent
Adur District Council	Full planning consent;
Allerdale Borough Council	Hybrid planning consent
Amber Valley Borough Council	Outline planning consent
Arun District Council	Reserved Matters
Ashfield District Council	Listed building consent
Ashford Borough Council	Advertisement consent
Aylesbury Vale District Council	Lawful Development Certificate (LDC)
Babergh District Council	Prior notification
Barnsley Metropolitan Borough Council	Removal/variation of conditions
Barrow-in-Furness Borough Council	Approval of conditions
Basildon Borough Council	Consent under Tree Preservation Orders
Basingstoke and Deane Borough Council	Notification of proposed works to trees in conservation areas
Bassetlaw District Council	Application for non-material amendments
Bath and North East Somerset Council	Nationaly Significant Infrastructure Habitats (NSIP'S)
Bedford Borough Council	
Birmingham City Council	
Blaby District Council	
Blackburn with Darwen Borough Council	
Blackpool Borough Council	
Blaenau Gwent County Borough Council	
Bolsover District Council	
Bolton Metropolitan Borough Council	
Borough of Broxbourne	
Borough of Poole	
Boston Borough Council	
Bournemouth Borough Council	
Bracknell Forest Council	
Bradford Metropolitan District Council	
Braintree District Council	
Breckland District Council	
Brentwood Borough Council	
Bridgend County Borough Council	
Brighton and Hove City Council	
Bristol City Council	
Broadland District Council	
Bromsgrove District Council	
Broxtowe Borough Council	
Buckinghamshire County Council	
Burnley Borough Council	
Bury Metropolitan Borough Council	
Caerphilly County Borough Council	
Calderdale Metropolitan Borough Council	
Cambridge City Council	
Cambridgeshire County Council	
Cannock Chase District Council	
Canterbury City Council	
Cardiff Council	
Carlisle City Council	
Carmarthenshire County Council	
Castle Point Borough Council	
Central Bedfordshire Council	
Ceredigion County Council	
Charnwood Borough Council	
Chelmsford City Council	
Cheltenham Borough Council	
Cherwell District Council	
Cheshire East Council (Unitary)	
Cheshire West and Chester Council	
Chesterfield Borough Council	
Chichester District Council	
Chiltern District Council	
Chorley Council	
Christchurch Borough Council	
City of Lincoln Council	
City of London	
City of York Council	
Colchester Borough Council	
Conwy County Borough Council	
Copeland Borough Council	
Corby Borough Council	
Cornwall Council (Unitary)	
Cotswold District Council	
Coventry City Council	
Craven District Council	
Crawley Borough Council	
Cumbria County Council	
Dacorum Council	
Darlington Borough Council	
Dartford Borough Council	
Daventry District Council	
Denbighshire County Council	
Derby City Council	
Derbyshire County Council	
Derbyshire Dales District Council	
Devon County Council	
Doncaster Metropolitan Borough Council	
Dorset County Council	
Dover District Council	
Dudley Metropolitan Borough Council	
Durham County Council	
East Cambridgeshire District Council	
East Devon District Council	
East Dorset District Council	

Habitat list
Cropland - Arable field margins cultivated annually
Cropland - Arable field margins game bird mix
Cropland - Arable field margins pollen & nectar
Cropland - Arable field margins tussocky
Cropland - Cereal crops
Cropland - Cereal crops other
Cropland - Cereal crops winter stubble
Cropland - Horticulture
Cropland - Intensive orchards
Cropland - Non-cereal crops
Cropland - Temporary grass and clover leys
Grassland - Traditional orchards
Grassland - Bracken
Grassland - Floodplain Wetland Mosaic (CFGM)
Grassland - Lowland calcareous grassland
Grassland - Lowland dry acid grassland
Grassland - Lowland meadows
Grassland - Modified grassland
Grassland - Other lowland acid grassland
Grassland - Other neutral grassland
Grassland - Tall herb communities
Grassland - Upland acid grassland
Grassland - Upland calcareous grassland
Grassland - Upland hay meadows
Heathland and shrub - Blackthorn scrub
Heathland and shrub - Bramble scrub
Heathland and shrub - Gorse scrub
Heathland and shrub - Hawthorn scrub
Heathland and shrub - Hazel scrub
Heathland and shrub - Lowland Heathland
Heathland and shrub - Mixed scrub
Heathland and shrub - Mountain heaths and willow scrub
Heathland and shrub - Rhododendron scrub
Heathland and shrub - Sea buckthorn scrub (Annex 1)
Heathland and shrub - Sea buckthorn scrub (other)
Heathland and shrub - Upland Heathland
Lakes - Aquifer fed naturally fluctuating water bodies
#REF!
Lakes - High alkalinity lakes
Lakes - Low alkalinity lakes
Lakes - Marl Lakes
Lakes - Moderate alkalinity lakes
Lakes - Peat Lakes
Lakes - Ponds (Priority Habitat)
Lakes - Ponds (Non- Priority Habitat)
Lakes - Reservoirs
Lakes - Temporary lakes, ponds and pools
Sparsely vegetated land - Calaminarian grasslands
Sparsely vegetated land - Coastal sand dunes
Sparsely vegetated land - Coastal vegetated shingle
Sparsely vegetated land - Ruderal/Ephemeral
Sparsely vegetated land - Inland rock outcrop and scree habitats
Sparsely vegetated land - Limestone pavement
Sparsely vegetated land - Maritime cliff and slopes
Sparsely vegetated land - Other inland rock and scree
Urban - Allotments
Lakes - Ornamental lake or pond
Urban - Artificial unvegetated, unsealed surface
Urban - Bioswale
Urban - Brown roof
Urban - Built linear features
Urban - Cemeteries and churchyards
Urban - Developed land; sealed surface
Urban - Extensive green roof
Urban - Facade-bound green wall
Urban - Ground based green wall
Urban - Ground level planters
Urban - Intensive green roof
Urban - Introduced shrub
#REF!
Urban - Open Mosaic Habitats on Previously Developed Land
#REF!
Urban - Rain garden
Urban - Sand pit quarry or open cast mine
Urban - Urban Tree
#REF!
Urban - Sustainable urban drainage feature
Urban - Un-vegetated garden
Urban - Vacant/derelict land/ bareground
Urban - Vegetated garden
#REF!
Wetland - Blanket bog
Wetland - Depressions on Peat substrates (H7150)
Wetland - Fens (upland and lowland)
Wetland - Lowland raised bog
Wetland - Oceanic Valley Mire[1] (D2.1)
Wetland - Purple moor grass and rush pastures
Wetland - Reedbeds
Wetland - Transition mires and quaking bogs (H7140)
Woodland and forest - Felled
Woodland and forest - Lowland beech and yew woodland
Woodland and forest - Lowland mixed deciduous woodland
Woodland and forest - Native pine woodlands
Woodland and forest - Other coniferous woodland

East Hampshire District Council	Woodland and forest - Other Scot's Pine woodland
East Hertfordshire District Council	Woodland and forest - Other woodland; broadleaved
East Lindsey District Council	Woodland and forest - Other woodland; mixed
East Northamptonshire Council	#REF!
East Riding of Yorkshire Council	Woodland and forest - Upland birchwoods
East Staffordshire Borough Council	Woodland and forest - Upland mixed ashwoods
East Sussex County Council	Woodland and forest - Upland oakwood
Eastbourne Borough Council	Woodland and forest - Wet woodland
Eastleigh Borough Council	Woodland and forest - Wood-pasture and parkland
Eden District Council	Coastal lagoons - Coastal lagoons
Elmbridge Borough Council	Rocky shore - High energy littoral rock
Epping Forest District Council	Rocky shore - High energy littoral rock - on peat, clay or chalk
Epsom and Ewell Borough Council	Rocky shore - Moderate energy littoral rock
Erewash Borough Council	Rocky shore - Moderate energy littoral rock - on peat, clay or chalk
Essex County Council	Rocky shore - Low energy littoral rock
Exeter City Council	Rocky shore - Low energy littoral rock - on peat, clay or chalk
Fareham Borough Council	Rocky shore - Features of littoral rock
Fenland District Council	Rocky shore - Features of littoral rock - on peat, clay or chalk
Flintshire County Council	#REF!
Forest Heath District Council	#REF!
Forest of Dean District Council	#REF!
Fylde Borough Council	#REF!
Gateshead Metropolitan Borough Council	Intertidal sediment - Littoral coarse sediment
Gedling Borough Council	#REF!
Gloucester City Council	Intertidal sediment - Littoral mud
Gloucestershire County Council	Intertidal sediment - Littoral mixed sediments
Gosport Borough Council	Coastal saltmarsh - Saltmarshes and saline reedbeds
Gravesham Borough Council	Intertidal sediment - Littoral seagrass
Great Yarmouth Borough Council	Intertidal sediment - Littoral seagrass on peat, clay or chalk
Guildford Borough Council	Intertidal sediment - Littoral biogenic reefs - Sabellaria
Gwynedd County Council	#REF!
Halton Borough Council	Intertidal sediment - Features of littoral sediment
Hambleton District Council	Intertidal sediment - Artificial littoral coarse sediment
Hampshire County Council	#REF!
Harborough District Council	Intertidal sediment - Artificial littoral muddy sand
Harlow Council	Intertidal sediment - Artificial littoral mixed sediments
Harrogate Borough Council	Intertidal sediment - Artificial littoral seagrass
Hart District Council	Intertidal sediment - Artificial littoral biogenic reefs
Hartlepool Borough Council	#REF!
Hastings Borough Council	#REF!
Havant Borough Council	0
Herefordshire Council	0
Hertfordshire County Council	0
Hertsmere Borough Council	0
High Peak Borough Council	0
Hinckley and Bosworth Borough Council	0
Horsham District Council	0
Huntingdonshire District Council	0
Hyndburn Borough Council	0
Ipswich Borough Council	0
Isle of Anglesey County Council	0
Isle of Wight Council	0
Isles of Scilly	0
Kent County Council	0
Kettering Borough Council	0
King's Lynn and West Norfolk Borough Council	0
Kingston-upon-Hull City Council	0
Kirklees Council	0
Knowsley Metropolitan Borough Council	0
Lancashire County Council	0
Lancaster City Council	0
Leeds City Council	
Leicester City Council	
Leicestershire County Council	
Lewes District Council	
Lichfield District Council	
Lincolnshire County Council	
Liverpool City Council	
London Borough of Barking and Dagenham	
London Borough of Barnet	
London Borough of Bexley	
London Borough of Brent	
London Borough of Bromley	
London Borough of Camden	
London Borough of Croydon	
London Borough of Ealing	
London Borough of Enfield	
London Borough of Hackney	
London Borough of Hammersmith & Fulham	
London Borough of Haringey	
London Borough of Harrow	
London Borough of Havering	
London Borough of Hillingdon	
London Borough of Hounslow	
London Borough of Islington	
London Borough of Lambeth	
London Borough of Lewisham	
London Borough of Merton	
London Borough of Newham	
London Borough of Redbridge	
London Borough of Richmond upon Thames	
London Borough of Southwark	
London Borough of Sutton	
London Borough of Tower Hamlets	
London Borough of Waltham Forest	

London Borough of Wandsworth
Luton Borough Council
Maidstone Borough Council
Maldon District Council
Malvern Hills District Council
Manchester City Council
Mansfield District Council
Medway Council
Melton Borough Council
Mendip District Council
Merthyr Tydfil County Borough Council
Mid Devon District Council
Mid Suffolk District Council
Mid Sussex District Council
Middlesbrough Borough Council
Milton Keynes
Mole Valley District Council
Monmouthshire County Council
Neath Port Talbot County Borough Council
New Forest District Council
Newark and Sherwood District Council
Newcastle-Under-Lyme District Council
Newport City Council
Newcastle-upon-Tyne City Council
Norfolk County Council
North Devon Council
North Dorset District Council
North East Derbyshire District Council
North East Lincolnshire Council
North Hertfordshire District Council
North Kesteven District Council
North Lincolnshire Council
North Norfolk District Council
North Somerset Council
North Tyneside Metropolitan Borough Council
North Warwickshire Borough Council
North West Leicestershire District Council
North Yorkshire County Council
Northampton Borough Council
Northamptonshire County Council
Northumberland Council
Norwich City Council
Nottingham City Council
Nottinghamshire County Council
Nuneaton and Bedworth Borough Council
Oadby and Wigston District Council
Oldham Metropolitan Borough Council
Oxford City Council
Oxfordshire County Council
Pembrokeshire County Council
Pendle Borough Council
Perth and Kinross Council
Peterborough City Council
Plymouth City Council
Portsmouth City Council
Powys County Council
Preston City Council
Purbeck District Council
Reading Borough Council
Redcar and Cleveland Council
Redditch Borough Council
Reigate & Banstead Borough Council
Rhondda Cynon Taf County Borough Council
Ribble Valley Borough Council
Richmondshire District Council
Rochdale Metropolitan Borough Council
Rochford District Council
Rossendale Borough Council
Rother District Council
Rotherham Metropolitan Borough Council
Royal Borough of Greenwich
Royal Borough of Kensington and Chelsea
Royal Borough of Kingston upon Thames
Royal Borough of Windsor and Maidenhead
Rugby Borough Council
Runnymede Borough Council
Rushcliffe Borough Council
Rushmoor Borough Council
Rutland County Council
Ryedale District Council
Salford City Council
Sandwell Metropolitan Borough Council
Scarborough Borough Council
Sedgemoor District Council
Sefton Metropolitan Borough Council
Selby District Council
Sevenoaks District Council
Sheffield City Council
Shepway District Council
Shropshire Council - Unitary
Slough Borough Council
Solihull Metropolitan Borough Council
Somerset County Council
South Buckinghamshire District Council
South Cambridgeshire District Council

South Derbyshire District Council
South Gloucestershire Council
South Hams District Council
South Holland District Council
South Kesteven District Council
South Lakeland District Council
South Norfolk District Council
South Northamptonshire Council
South Oxfordshire District Council
South Ribble Borough Council
South Somerset District Council
South Staffordshire Council
South Tyneside Council
Southampton City Council
Southend-on-Sea Borough Council
Spelthorne Borough Council
St Albans City and District Council
St Edmundsbury Borough Council
St Helens Metropolitan Borough Council
Stafford Borough Council
Staffordshire County Council
Staffordshire Moorlands District Council
Stevenage Borough Council
Stockport Metropolitan Borough Council
Stockton-on-Tees Borough Council
Stoke-on-Trent City Council
Strabane District Council
Stratford-on-Avon District Council
Stroud District Council
Suffolk Coastal District Council
Suffolk County Council
Sunderland City Council
Surrey County Council
Surrey Heath Borough Council
Swale Borough Council
Swansea City and Borough Council
Swindon Borough Council
Tameside Metropolitan Borough Council
Tamworth Borough Council
Tandridge District Council
Taunton Deane Borough Council
Teignbridge District Council
Telford & Wrekin Council
Tendring District Council
Test Valley Borough Council
Tewkesbury Borough Council
Thanet District Council
Three Rivers District Council
Thurrock Council
Tonbridge and Malling Borough Council
Torbay Council
Torfaen County Borough Council
Torridge District Council
Trafford Metropolitan Borough Council
Tunbridge Wells Borough Council
Uttlesford District Council
Vale of Glamorgan Council
Vale of White Horse District Council
Wakefield Metropolitan District Council
Walsall Metropolitan Borough Council
Warrington Borough Council
Warwick District Council
Warwickshire County Council
Watford Borough Council
Waveney District Council
Waverley Borough Council
Wealden District Council
Wellingborough Borough Council
Welwyn Hatfield Council
West Berkshire Council
West Devon Borough Council
West Dorset District Council
West Lancashire Borough Council
West Lindsey District Council
West Oxfordshire District Council
West Somerset District Council
West Sussex County Council
Westminster City Council
Weymouth and Portland Borough Council
Wigan Metropolitan Borough Council
Wiltshire Council
Winchester City Council
Wirral Council
Woking Borough Council
Wokingham Borough Council
Wolverhampton City Council
Worcester City Council
Worcestershire County Council
Wrexham County Borough Council
Wychavon District Council
Wycombe District Council
Wyre Council
Wyre Forest District Council

dynamic development solutions ™

Appendix 8.1

LVIA Methodology

8.1 METHODOLOGY

Guidance

8.1 The assessment has been undertaken regarding best practice, as outlined within published guidance:

- Landscape Institute, Institute of Environmental Management and Assessment, (2013), *Guidance for Landscape and Visual Impact Assessment,* Routledge (3rd Edition)
- Christine Tudor, Natural England, (October 2014), *An Approach to Landscape Character Assessment,* Natural England (1st Edition)
- Landscape Institute, (2011), *Photography and Photomontage in Landscape and Visual Assessment*, *Advice Note 01/11*, Landscape Institute

8.2 GLVIA3 states within paragraph 1.1 that "Landscape and Visual Impact Assessment (LVIA) is a tool used to identify and assess the significance of and the effects of change resulting from development on both the landscape as an environmental resource in its own right and on people's views and visual amenity."[1]

8.3 GLVIA3 also states within paragraph 1.17 that when identifying landscape and visual effects there is a "need for an approach that is in proportion to the scale of the project that is being assessed and the nature of the likely effects. Judgement needs to be exercised at all stages in terms of the scale of investigation that is appropriate and proportional**.**"[2]

8.4 GLVIA3 recognises within paragraph 2.23 that "professional judgement is a very important part of LVIA. While there is some scope for quantitative measurement of some relatively objective matters much of the assessment must rely on qualitative judgements"[3] undertaken by a landscape consultant or a Chartered Member of the Landscape Institute (CMLI).

8.5 The effects on cultural heritage and ecology are not considered within this assessment.

Study Area

8.6 The extent of the study area was established by initial desk-based research and field work up to 2km from the site. Initial fieldwork was undertaken to define an appropriate study area and was made based on views from eye level of a person standing on the ground. The visibility of the site is strongly influenced by the landform and by extent and type of land use. The study area ranges from up to 1km to the south and up to 0.5km to the east, north and west. Field work was undertaken from publicly accessible viewpoints within the immediate settlement and wider countryside. The representative viewpoints recorded (Viewpoints 1-10) form the basis of the visual assessment.

Assessment of Effects

8.7 Landscape and visual effects are assessed through professional judgements on the sensitivity of landscape elements, landscape character, visual receptors and representative viewpoints

[1] Para 1.1, Page 4, GLVIA, 3rd Edition

[2] Para 1.17, Page 9, GLVIA, 3rd Edition

[3] Para 2.23, Page 21, GLVIA, 3rd Edition

combined with the predicted magnitude of change arising from the proposals. The landscape and visual effects have been assessed in the following sections:

- Effects on landscape character
- Effects on landscape elements; and
- Effects on visual amenity.

Receptor Sensitivity

8.8 Sensitivity is defined in GLVIA3 as "a term applied to specific receptors, combining judgments of susceptibility of the receptor to a specific type of change or development proposed and the value related to that receptor."[4]

8.9 Various factors in relation to the value and susceptibility of landscape character, landscape elements, visual receptors or representative viewpoints are combined to determine the overall sensitivity as shown in Table 1 below. Both value and susceptibility are assessed on a scale of high, medium or low.

Table 1: Landscape and Visual Receptor Sensitivity

	VALUE			
SUSCEPTIBILITY		**High**	**Medium**	**Low**
	High	High	High	Medium
	Medium	High	Medium	Medium
	Low	Medium	Medium	Low

Assessment of Landscape Effects

Sensitivity of Landscape Character and Features

8.10 The effects on landscape elements are limited to within the site and includes the direct physical change to the fabric of the land, such as the removal of woodland, hedgerows or grassland to allow for the proposals.

8.11 Sensitivity is determined by a combination of the value that is attached to a landscape element and character and the susceptibility of the landscape element to changes that would arise as a result of the proposals.

8.12 The criteria for assessing the value of landscape character and features is shown in Table 2 below.

Table 2: Value of Landscape Character and Features

[4] Glossary, Page 158, GLVIA, 3rd Edition

High	Designated landscape including but not limited to World Heritage Sites, National Parks, Areas of Outstanding Natural Beauty considered to be an important component of the country's character experienced by a high number of people. Landscape condition is good and components are generally maintained to a high standard. In terms of seclusion, enclosure by land use, traffic and movement, light pollution and presence/absence of major infrastructure, the landscape has an elevated level of tranquillity. Rare or distinctive landscape elements and features are key components that contribute to the landscape character of the area.
Medium	Undesignated landscape including urban fringe and rural countryside considered to be a distinctive component of the national or local landscape character. Landscape condition is fair and components are generally well maintained. In terms of seclusion, enclosure by land use, traffic and movement, light pollution and presence/absence of major infrastructure, the landscape has a moderate level of tranquillity. Rare or distinctive landscape elements and features are notable components that contribute to the character of the area.
Low	Undesignated landscape including urban fringe and rural countryside considered to be of unremarkable character. Landscape condition may be poor and components poorly maintained or damaged. In terms of seclusion, enclosure by land use, traffic and movement, light pollution and presence/absence of major infrastructure, the landscape has limited levels of tranquillity. Rare or distinctive elements and features are not notable components that contribute to the landscape character of the area.

Magnitude of Change – Landscape Character and Features

8.13 Landscape character is defined as the "distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse."[5] The assessment of effects on landscape character considers how the introduction of new landscape elements physically alters the landform, landcover, landscape pattern and perceptual attributes of the site or how visibility of the proposals changes the way in which the landscape character is perceived.

8.14 Professional judgement has been used to determine the magnitude of change on landscape character as shown in Table 3 below.

Table 3: Magnitude of Change – Landscape Character and Features

High	Introduction of major new elements into the landscape or some major change to the scale, landform, landcover or pattern of the landscape.
Medium	Introduction of some notable new elements into the landscape or some notable change to the scale, landform, landcover or pattern of the landscape.
Low	Introduction of minor new elements into the landscape or some minor change to the scale, landform, landcover or pattern of the landscape.
Negligible	No notable or appreciable introduction of new elements into the landscape or change to the scale, landform, landcover or pattern of the landscape.

Assessment of Visual Effects

8.15 The effects on visual amenity considers the changes in views arising from the proposals in relation to visual receptors including settlements, residential properties, transport routes, recreational facilities and attractions; and representative viewpoints or specific locations within the study area as agreed with the Local Planning Authority.

Sensitivity of Visual Receptors

8.16 Sensitivity is determined by a combination of the value that is attached to a view and the susceptibility of the visual receptor to changes in that view that would arise as a result of the proposals. Both value and susceptibility are assessed on a scale of high, medium or low.

8.17 The criteria for assessing the value of views is shown in Table 4 below.

Table 4: Value of View

[5] Glossary, Page 157, GLVIA, 3rd Edition

High	Views with high scenic value within designated landscapes including but not limited to World Heritage Sites, National Parks, Areas of Outstanding Natural Beauty, etc. Likely to include key viewpoints on OS maps or reference within guidebooks, provision of facilities, presence of interpretation boards, etc.
Medium	Views with moderate scenic value within undesignated landscape including urban fringe and rural countryside.
Low	Views with unremarkable scenic value within undesignated landscape with partly degraded visual quality and detractors.

8.18 The criteria for assessing the susceptibility of the visual receptor to the proposed development is shown in Table 5 below.

Table 5: Visual Receptor Susceptibility

High	Includes occupiers of residential properties and people engaged in recreational activities in the countryside using public rights of way (PROW).
Medium	Includes people engaged in outdoor sporting activities and people travelling through the landscape on minor roads and trains.
Low	Includes people at places of work e.g. industrial and commercial premises and people travelling through the landscape on major roads and motorways.

Magnitude of Change on Visual Receptors

8.19 Professional judgement has been used to determine the magnitude change on visual receptors as shown in Table 6 below.

Table 6: Magnitude of Change on Visual Receptors

High	Major change in the view that has a defining influence on the overall view with many visual receptors affected.
Medium	Some change in the view that is clearly visible and forms an important but not defining element in the view.

Low	Some change in the view that is appreciable with few visual receptors affected.
Negligible	No notable change in the view.

8.20 The effects on landscape elements are limited to within the site and includes the direct physical change to the fabric of the land, such as the removal of woodland, hedgerows or grassland to allow for the proposals.

Significance of Landscape and Visual Effects

8.21 The likely significance of effects is dependent on all of the factors considered in the sensitivity and the magnitude of change upon the relevant landscape and visual receptors. These factors are assimilated to assess whether or not the proposed development will have a likely significant or not significant effect. The variables considered in the evaluation of the sensitivity and the magnitude of change is reviewed holistically to inform the professional judgement of significance.

8.22 In the assessment, in accordance with GLVIA 3, a distinction is drawn between what are considered to be the significant and non-significant effects. A likely **significant** effect will occur where the combination of the variables results in the proposed development having a definitive effect on the view. A **not significant** effect will occur where the appearance of the proposed development is not definitive, and the effect continues to be defined principally by its baseline condition.

8.23 Within Table 7 below, the major effects highlighted in dark grey are considered to be significant in terms of the EIA Regulations. The moderate effects highlighted in light grey are potentially significant, and a summary justification is provided as to whether the effect in question is significant or not significant. It should be noted that whilst an individual effect may be significant, it does not necessarily follow that the proposed development would be unacceptable in the planning balance. The cross referencing of the sensitivity and magnitude of change on the landscape and visual receptor determines the significance of effect as shown in Table 7 below.

Table 7: Significance of landscape and Visual Effects

		SENSITIVITY		
		High	**Medium**	**Low**
MAGNITUDE OF CHANGE	**High**	Major	Major	Moderate
	Medium	Major	Moderate	Minor to Moderate
	Low	Moderate	Minor to Moderate	Minor
	Negligible	Negligible	Negligible	Negligible

Nature of Effects

8.24 GLVIA3 includes an entry that states "effects can be described as positive or negative (or in some cases neutral) in their consequences for views and visual amenity."[6] GLVIA3 does not, however, state how negative or positive effects should be assessed and this therefore becomes a matter of subjective judgement rather than reasoned criteria. Due to inconsistencies with the assessment of negative or positive effects a precautionary approach is applied to this LVIA that assumes all landscape and visual effects are considered to be negative or adverse unless otherwise stated.

[6] Para 6.29, Page 113, GLVIA, 3rd Edition

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Appendix 8.2

Landscape Effects Summary Table

Appendix 8.2: Landscape Effects Summary Table

Receptor	Sensitivity	Development Phase	Magnitude of Effect	Significance of Effect	Comments
Local Landscape Character Area					
LCT 2 Urban River Valley • Slow flowing meandering river in sinuous valley floor. • Areas of pasture close to the river. • Open field patterns. • Weirs and historic mills. • River inconspicuous within the landscape. • Tranquil character. LCA 2d Ouzel North Urban River Valley • Major roads including the M1, the A422 dual carriageway and the A509. • Fragmented access despite its proximity to urban areas. • Distinctive features include Caldecote Mill and the deserted medieval village and moated site at Caldecote Farm. • The area between Willen Road and the M1 is	Medium	**Construction (temporary)**	Medium	Moderate (not significant)	The nature of the construction works would introduce temporary structures, facilities, and a change of land use. The changes within the LCA occupied by the proposed built elements of the Proposed Development would be phased which would help to stagger and minimize the effects to the overall character. PRoW connections throughout the Proposed Development will be retained or temporarily diverted during construction. Hedgerows, trees, and riverside vegetation across the Site are to be retained (where feasible) and enhanced planting proposed with native species. Areas of agricultural land will be lost to allow for built development and access. However, improved grassland will be provided throughout the Proposed Development as part of the open space strategy. The Proposed Development will follow the existing contours and will sit largely within the existing field pattern. There would be a loss of agricultural land however there will be an increase in diversity of habitat types throughout with the creation of areas of open space, green corridors across the Site and enhancement of riverside grassland, shrub and tree planting. There would be an increase accessibility to these areas providing recreational value. Planting and enhancement of existing vegetation will be provided throughout to mitigate any potential loss of vegetation where tree removal is essential to the implementation of the proposals.
		Operation Year 1	Medium	Moderate (not significant)	
		Operation Year 15	Low	Minor (not significant)	
		Cumulative Effect	Medium	Moderate (not significant)	

currently in use as a sand and gravel extraction site.					The establishment of open space throughout the Development will contribute considerably to the local character across the LCA particularly along the River Ouzel. Planting throughout the built elements of the proposals will provide screening and help to soften the appearance of the buildings. This character area will be largely urbanised in character following the development of the cumulative and the Proposed Sites. Areas of open space along the River Ouzel will be retained and enhanced providing amenity, ecological, visual, and enhancing the character of this primary landscape characteristic of the LCA.
LCT 4 Clay Lowland Farmland • Low lying and generally flat landscape. • Mixed arable, pasture and recreational land uses. • Limited woodland cover. • Few field trees. • Dominated by major transport routes. • Large scale arable fields with overgrown hedges. • Extensive and open views to the clay plateau and towards Milton Keynes. LCA 4a Broughton to Tickford Clay and Lowland Farmland	Medium	**Construction (temporary)**	Low	Minor (not significant)	The nature of the construction works would introduce temporary structures, facilities, and a change of land use into the adjacent 'Ouzel North Urban River Valley' LCA. The changes would be phased, happening in different areas across the Site over the duration of the construction period. Temporary Construction works would cause a physical change in character to the adjacent LCA only. Any effects would be the change to the perception the 'Ouzel North Urban River Valley' LCA which is largely of the urban edge offset by the 'Ouzel North Urban River Valley' LCA. The open views referred to within the characteristics of the 'Clay Lowland Farmland' LCT are of the clay plateau predominantly to the east. Proposed Development within the adjacent LCA would be west of the River Ouzel against the existing urban edge. Any effects would be the change to the perception the 'Ouzel North Urban River Valley' LCA which is largely of the urban edge offset by the 'Ouzel North Urban River Valley' LCA. The open views referred to within eh
		Operation Year 1	Low	Minor (not significant)	
		Operation Year 15	Negligible	Negligible (not significant)	

• Contains large arable fields and small isolated woodland copses. • M1 corridor runs along its southern boundary beyond which is the on-going development within the Eastern Expansion Area of Milton Keynes. • Extensive views to the clay plateau to the east. • Settlement is limited to isolated farms.		**Cumulative Effect**	Low	Minor (not significant)	characteristics of the 'Clay Lowland Farmland' LCT are of the clay plateau predominantly to the east. Planting and enhancement of existing vegetation along the River Ouzel corridor will be provided to strengthen the adjacent LCA over time. This LCA will be permanently changed by the extensive urban expansion within this LCA. The combined effect of the Proposed and cumulative Sites will not be significant due to the minor indirect change the Proposed Development causes to the 'Broughton to Tickford Clay and Lowland Farmland' LCA.
Landscape Elements and Features within the Site					
Topography	Medium	**Construction (temporary)**	Medium	Moderate (not significant)	The proposals have sought to minimise the requirements for any ground engineering to accommodate the residential dwellings, gardens, driveways, and access roads, etc. A degree of ground engineering would be required due to the prevailing flat landform with localized variations caused by sand and gravel extraction. The construction phase may cause changes to the topography of the Site for example areas of hard standing and creation of attenuation. During the years 1 and 15 the topography would remain unchanged. The cumulative effect of minor changes to topography throughout the cumulative and Proposed Development Sites would not be significant.
		Operation Year 1	Low	Minor (not significant)	
		Operation Year 15	Low	Minor (not significant)	
		Cumulative Effect	Low	Minor (not significant)	
Land Use/Landcover	Low	**Construction (temporary)**	Medium	Minor (not significant)	The construction phase would cause an adverse effect, where the open fields are replaced with the Proposed Development. However, areas of open space and green

		Operation Year 1	Low	Minor (not significant)	SUDs corridors are proposed throughout the Development, improving the quality of the existing agricultural landcover. At year 1 the changes to the land use would be new and mitigation yet to establish however, measures such as areas of grassland under a less intensive management regime would provide some positive change to land use/landcover which will increase by year 15 as mitigation planting matures. The proposals would inevitably result in the removal of the grassland area; however grassed areas will be provided, including the public open space and SUDs corridor within the site. The cumulative effects on the surrounding landcover however this would not change the effect on the landcover of the Site itself.
		Operation Year 15	Low	Minor (not significant)	
		Cumulative Effect	Low	Minor (not significant)	
Trees and Hedgerows	Medium	**Construction (temporary)**	Medium	Moderate (not significant)	The Proposed Development would not require the loss of significant trees, tree groups or hedgerow. Hedgerow loss is limited as outlined within the Arboricultural Impact Assessment (Aspect, 2021) The proposals would introduce a number of medium sized trees on key architectural frontages to articulate the street scene. Native ornamental shrubs will be provided at the curtilages. At year 1 new and infill planting mitigation will be yet to establish however, measures such as hedgerow planting and existing hedgerows under a less intensive management regime would be beneficial. By year 15 these measures would help to soften the appearance of built form across the Site.
		Operation Year 1	Low	Minor (not significant)	
		Operation Year 15	Low	Minor (not significant)	
		Cumulative Effect	Low	Minor (not significant)	
River Ouzel corridor (watercourse and vegetation)	Medium	**Construction (temporary)**	Medium	Moderate (not significant)	The built elements of the Proposed Development have been offset from the River Ouzel corridor to retain the riverine character and to minimise potential disturbance.

		Operation Year 1	Medium	Moderate (not significant)	At year 1 proposed enhancement of the open grassland and vegetated areas will be new and mitigation yet to establish. Measures such as areas of grassland under a less intensive management regime would provide some positive change to land use/landcover which will increase by year 15 as mitigation planting matures. The predicted magnitude of effect of the cumulative Proposals on the River Ouzel corridor would not change.
		Operation Year 15	Low	Minor (not significant)	
		Cumulative Effect	Medium	Moderate (not significant)	

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Appendix 8.3

Visual Effects Summary Table

Appendix 8.3: Visual Effects Summary Table

Receptor	View	Sensitivity	Development	Magnitude of change	Significance of Effect	Comments
Residents/community						
Edge of Tickford End	6	High	**Construction (temporary)**	Low	Moderate (not significant)	There may be glimpsed, partial views of construction work associated with the Proposed Development within the northern part of the Site. This would not significantly change the character of the view. Proposed planting along the A422 would help to reduce the effects of development over time. There may be sequential and combined views of the wider MKE scheme in combination with glimpsed views of the Proposed Development. This would be significantly reduced in summer months and once vegetation within the Proposed Development has matured.
			Operation Year 1	Low	Moderate (not significant)	
			Operation Year 15	Negligible	Negligible (not significant)	
			Cumulative	Low	Moderate (not significant)	
Users of the recreation area	4	Medium	**Construction (temporary)**	Low	Minor (not significant)	There would be glimpsed views of construction works associated with the northeast corner of the Proposed development. The retained hedgerow along the A422 would partially obscure views, particularly during summer months when vegetation is in full leaf. There would be some change in the view. Over time the proposed Development would be assimilated into the surrounding landscape by maturing existing hedgerows and proposed vegetation at the northern edge of the Site. There may be a glimpsed view of the northern part of the employment area.
			Operation Year 1	Low	Minor (not significant)	
			Operation Year 15	Negligible	Negligible	
			Cumulative	Low	Minor (not significant)	

Receptor	View	Sensitivity	Development Phase	Magnitude of change	Significance of Effect	Comments
PRoW Users						
PRoW footpath Moulsoe FP014	1	High	**Construction (temporary)**	High	Major (significant)	There would be a clear view of construction works associated with the Proposed Development due to the proximity of the view to the Site. Construction of units within the southern part of the Development would be visible. There would be a major change in the view in the short term. Proposed residential development would be visible in the mid ground of the view. This would be set back from the boundary of the Site by existing and proposed intervening vegetation around the boundary of the Proposed Development and proposed pocket park. The existing route of the PRoW would be retained, and cycle route added with tree planting along it, forming part of the north/south greenway link. There would be a partially obscured view of completed Development by year 15 once proposed planting has matured. Over time proposed vegetation would mature providing screening and softening the built form. It is expected that there would be a level of street tree planting and along the PRoW directly in the view which would help to soften the built edge, reducing the overall visual effect. The viewpoint is located within the wider MKE scheme elements of which may be visible within the view to the west and east where the proposed Grid Road would also be visible to the south. There would be a combined sequential view of the cumulative and Development Site from this point.
			Operation Year 1	Medium	Major (significant)	
			Operation Year 15	Low	Moderate (not significant)	
			Cumulative	High	Major (significant)	

PRoW Footpath Newport Pagnell FP007	4	High	**Construction (temporary)**	Low	Moderate (not significant)	There would be glimpsed views of construction works associated with the northeast corner of the Proposed development. The retained hedgerow along the A422 would partially obscure views, particularly during summer months when vegetation is in full leaf. There would be some change in the view. Over time the proposed Development would be assimilated into the surrounding landscape by maturing existing hedgerows and proposed vegetation at the northern edge of the Site. There may be a glimpsed view of the northern part of the employment area.
			Operation Year 1	Low	Moderate (not significant)	
			Operation Year 15	Negligible	Negligible (not significant)	
			Cumulative	Low	Moderate (not significant)	
PRoW Footpath Newport Pagnell FP008	5	High	**Construction (temporary)**	High	Major (significant)	There would be a clear view of construction works associated with the Proposed Development within the northern and northwestern parts of the Site due to the proximity of the view to the Site. There would be a major change in the view in the short term. Proposed residential development would be visible in the mid ground of the view. This would be set back from the boundary of the Site by existing and proposed intervening vegetation around the boundary of the Proposed Development and along the SUDs corridor. The existing route of the PRoW would be retained. There would be a partially obscured view of completed Development by year 15 once proposed planting has matured. Over time proposed vegetation would mature providing screening and softening the built form. The viewpoint is located at the edge of the wider MKE scheme elements of which may be visible within the view to the east. There may be a glimpsed combined view of the cumulative and Development Site from this point.
			OperationYear 1	Medium	Major (significant)	
			OperationYear 15	Low	Moderate (not significant)	
			Cumulative	Low	Moderate (not significant)	

PRoW footpath Moulsoe FP018	9	High	**Construction (temporary)**	Low	Moderate (not significant)	There would be glimpsed partial views of construction activity viewed at a distance and for a short period of time. Proposed residential development would be visible in the mid-distance of the view. Existing intervening vegetation would partially obscure the built form. The view would not be greatly changed by the additional rooftops in the context of the existing large white buildings of the Interchange Industrial Estate. By year 15 proposed vegetation would mature providing additional screening and further softening the built form. The viewpoint is located at the edge of the wider MKE scheme elements of which would be visible within the vie, including the proposed road and residential development. It is very unlikely that there would be any combined view of the cumulative and Development Site from this point.
			Operation Year 1	Low	Moderate (not significant)	
			Operation Year 15	Negligible	Negligible (not significant)	
			Cumulative	Negligible	Negligible (not significant)	
PRoW footpath Moulsoe FP004	10	High	**Construction (temporary)**	Negligible	Negligible (not significant)	It is unlikely the construction phase would be visible in the view. Taller elements such as cranes may be perceptible but at a distance this would cause a negligible effect on the view. There would be no change to the view at year 1 and 15. The cumulative Site would occupy the raised area of the view, there would be no combined cumulative effect.
			Operation Year 1	Negligible	Negligible (not significant)	
			Operation Year 15	Negligible	Negligible (not significant)	
			Cumulative	Negligible	Negligible (not significant)	

Receptor	View	Sensitivity	Development Phase	Magnitude of change	Significance of Effect	Comments
Road Users						
Willen Road, bridge over the M1	2	Low	**Construction (temporary)**	Medium	Minor(not significant)	There would be a partially obscured view of construction works visible between intervening vegetation. The movement and disturbance would be temporary. The operational Development would be more settled in nature. Proposed enhanced planting at the edges of the Proposed Development would help to soften the appearance of the built elements of the proposals. There would be a combined view of the cumulative and Development Site from this point, including proposed housing south of the Site and the employment elements of MKE in the foreground of the view.
			Operation Year 1	Low	Minor(not significant)	
			Operation Year 15	Low	Minor(not significant)	
			Cumulative	Medium	Minor(not significant)	
Willen Road	3	Low	**Construction (temporary)**	Medium	Minor (not significant)	During construction there would be a view of construction traffic along Willen Road and at the proposed access points into the Site. Generally, construction across the wider Site will not be visible. The fencing and mounds would no longer be part of the view. A road would occupy the foreground of the view. Proposed open space, SUDs corridor and enhanced tree planting would improve the current view. There would be a combined sequential view of the cumulative and Development Site from this point to the employment area to east.
			Operation Year 1	Low	Minor (not significant)	
			Operation Year 15	Low	Minor (not significant)	
			Cumulative	Medium	Minor (not significant)	

A422	5	Low	**Construction (temporary)**	High	Moderate (not significant)	There would be a clear view of construction works associated with the Proposed Development within the northern and northwestern parts of the Site due to the proximity of the view to the Site. There would be a major change in the view in the short term. Proposed residential development would be visible in the mid ground of the view. This would be set back from the boundary of the Site by existing and proposed intervening vegetation around the boundary of the Proposed Development and along the SUDs corridor. The existing route of the PRoW would be retained. There would be a partially obscured view of completed Development by year 15 once proposed planting has matured. Over time proposed vegetation would mature providing screening and softening the built form. The viewpoint is located at the edge of the wider MKE schemeelements of which may be visible within the view to the east. There may be a combined sequential view of elements of the cumulative and Development Site from this point.
			Operation Year 1	Medium	Moderate (not significant)	
			Operation Year 15	Low	Minor (not significant)	
			Cumulative	Low	Minor (not significant)	
Caldecote Lane	7	Low	**Construction (temporary)**	Low	Minor(not significant)	There may be a glimpsed partial view of construction works, looking southwest across the flood zone towards the southeast corner of the Proposed Development. The built elements of the Proposed Development have been offset from the river corridor and would be largely screened within the view. Cumulative effects would be limited by existing surrounding vegetation. There may be a view of proposed residential areas west of London Road.
			OperationYear 1	Low	Minor(not significant)	
			OperationYear 15	Negligible	Negligible (not significant)	
			Cumulative	Low	Minor(not significant)	

London Road	8	Low	**Construction (temporary)**	Medium	Minor (not significant)	There would be a glimpsed partial view of construction works associated with development towards the eastern part of the Site. There may be a glimpsed partial view of the Proposed Development, looking west across the flood zone towards the Proposed Development. The built elements of the Proposed Development have been offset from the river corridor and would be largely screened within the view and The viewpoint is located within the wider MKE scheme, elements of which would be visible within the immediate view. There would be a combined sequential view of the cumulative and Development Site from this point.
			Operation Year 1	Medium	Minor (not significant)	
			Operation Year 15	Low	Minor (not significant)	
			Cumulative	Medium	Minor (not significant)	

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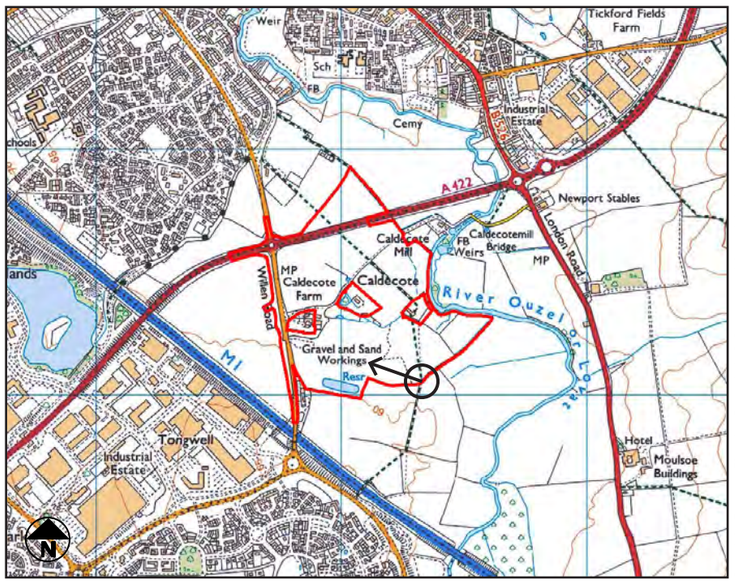
Appendix 8.4

Viewpoints 1-10

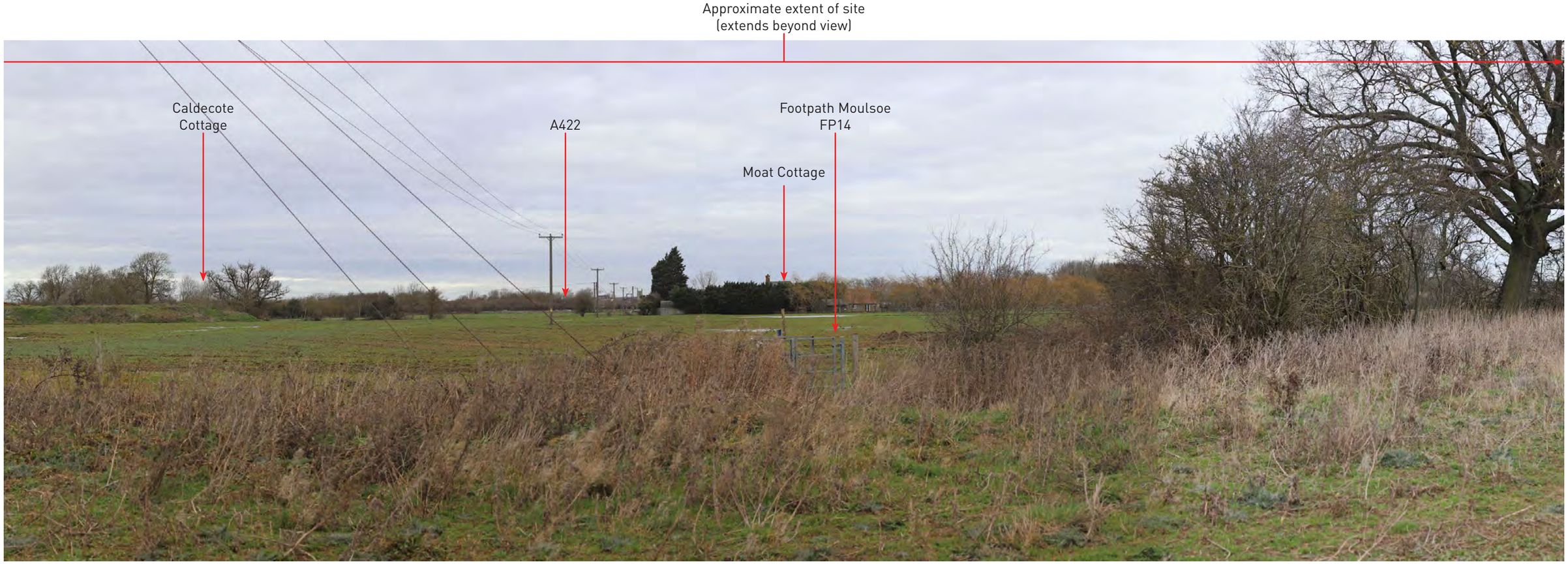


CONTEXT BASELINE VIEWPOINT 1A

From PRoW footpath Moulsoe FP014, looking north

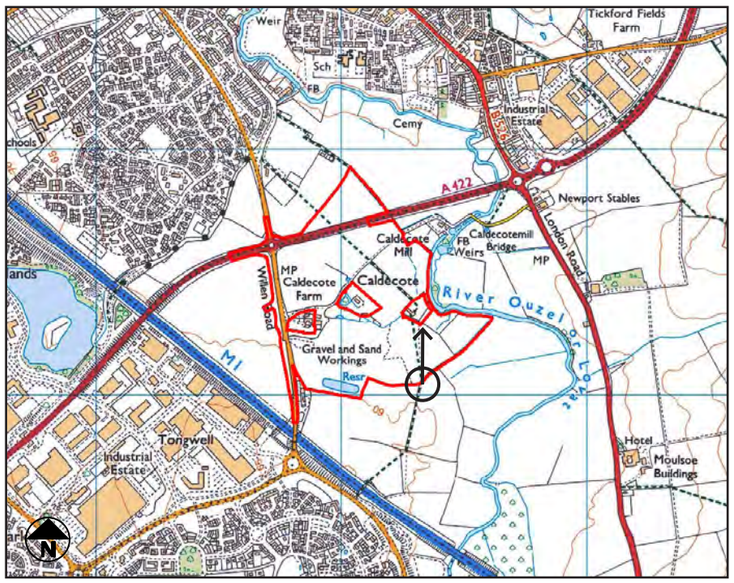


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CONTEXT BASELINE VIEWPOINT 1B

From PRoW footpath Moulsoe FP014, looking north



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Camera make & model	- Canon EOS 5D, FFS	**Viewpoint height (AOD)**	- 58.6m	**Visualisation Type**	- Type 1
Lens make & focal length	- Canon EF 50mm, f/1.4 USM	**Distance from site**	- 573.9m	**Horizontal Field of View**	- 39.6°
Date & time of photograph	- 23/02/2021 @ 15:20	**Projection**	- Planar	**Height of camera AGL**	- 1.5m
OS grid reference	- 488324, 242056	**Enlargement / Sheet Size**	- 100% @ A3	**Page size / Image size (mm)**	- 420 x 297 / 390 x 260

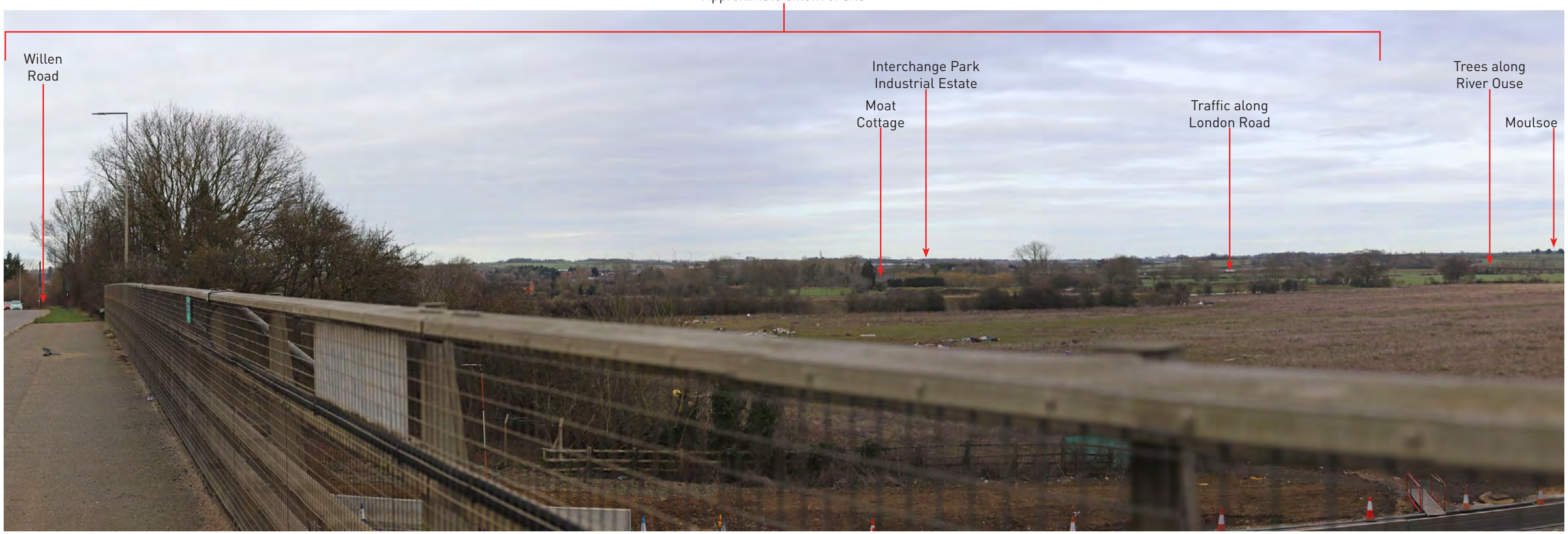
VIEWPOINT 1

From PRoW footpath Moulsoe FP014, looking north

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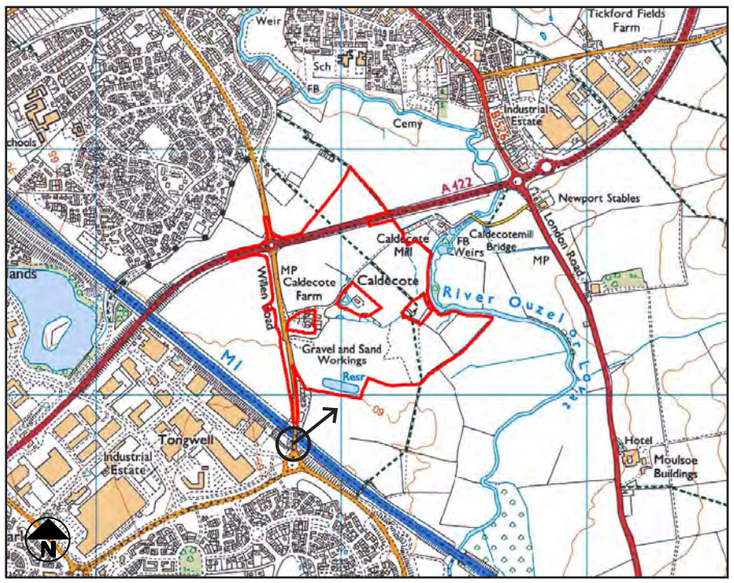
DESIGN | ENVIRONMENT | PLANNING | ECONOMICS | HERITAGE

TO BE VIEWED AT A COMFORTABLE ARM'S LENGTH



CONTEXT BASELINE VIEWPOINT 2

From Willen Road, bridge over the M1, looking north east



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Camera make & model	- Canon EOS 5D, FFS
Lens make & focal length	- Canon EF 50mm, f/1.4 USM
Date & time of photograph	- 23/02/2021 @ 16:02
OS grid reference	- 487810, 241801

Viewpoint height (AOD)	- 69.0m
Distance from site	- 418.1m
Projection	- Planar
Enlargement / Sheet Size	- 100% @ A3

Visualisation Type	- Type 1
Horizontal Field of View	- 39.6°
Height of camera AGL	- 1.5m
Page size / Image size (mm)	- 420 x 297 / 390 x 260

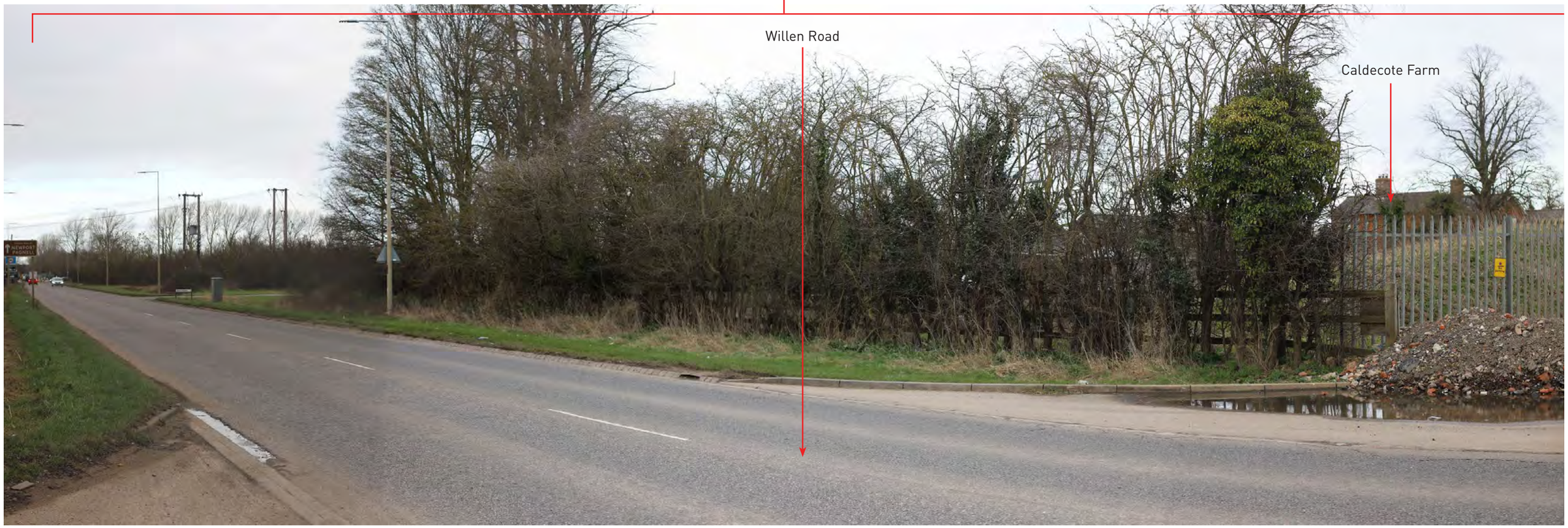
VIEWPOINT 2

From Willen Road, bridge over the M1, looking north east

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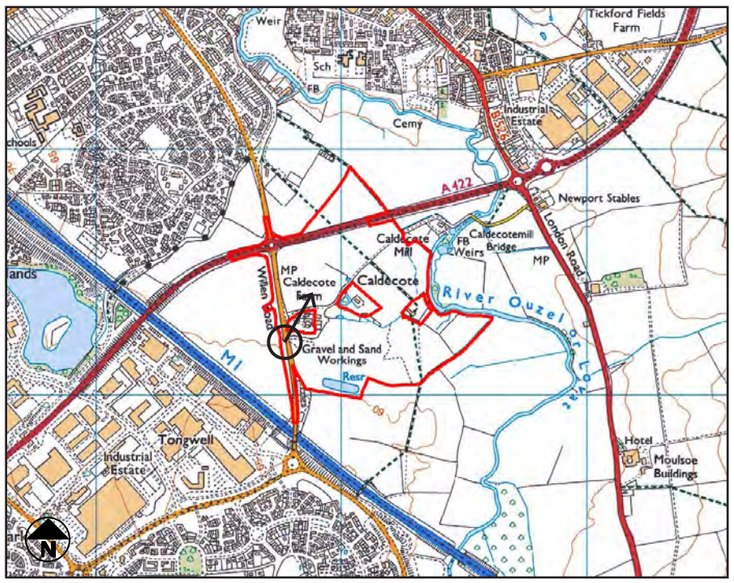
DESIGN | ENVIRONMENT | PLANNING | ECONOMICS | HERITAGE

TO BE VIEWED AT A COMFORTABLE ARM'S LENGTH



CONTEXT BASELINE VIEWPOINT 3A

From Willen Road, looking east

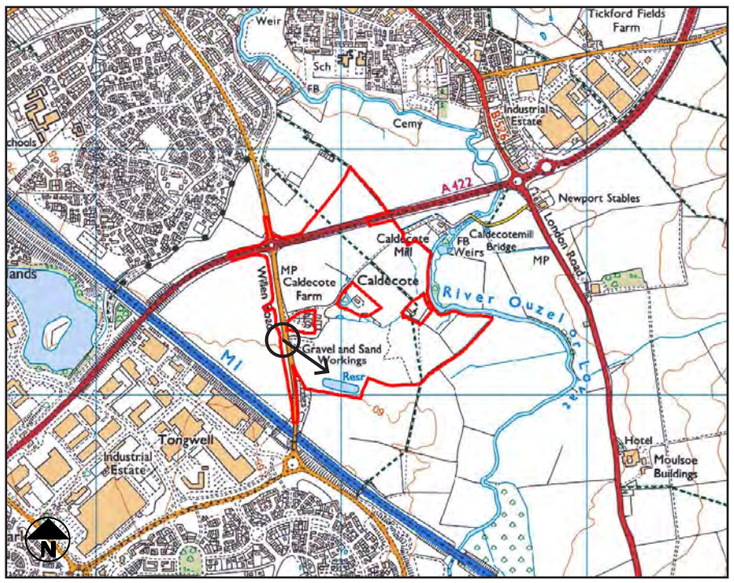


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CONTEXT BASELINE VIEWPOINT 3B

From Willen Road, looking east



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Pegasus Environment

Camera make & model	- Canon EOS 5D, FFS
Lens make & focal length	- Canon EF 50mm, f/1.4 USM
Date & time of photograph	- 23/02/2021 @ 16:10
OS grid reference	- 487768, 242217

Viewpoint height (AOD)	- 59.1m
Distance from site	- 418.1m
Projection	- Planar
Enlargement / Sheet Size	- 100% @ A3

Visualisation Type	- Type 1
Horizontal Field of View	- 39.6°
Height of camera AGL	- 1.5m
Page size / Image size (mm)	- 420 x 297 / 390 x 260

VIEWPOINT 3

From Willen Road, looking east

DESIGN | ENVIRONMENT | PLANNING | ECONOMICS | HERITAGE

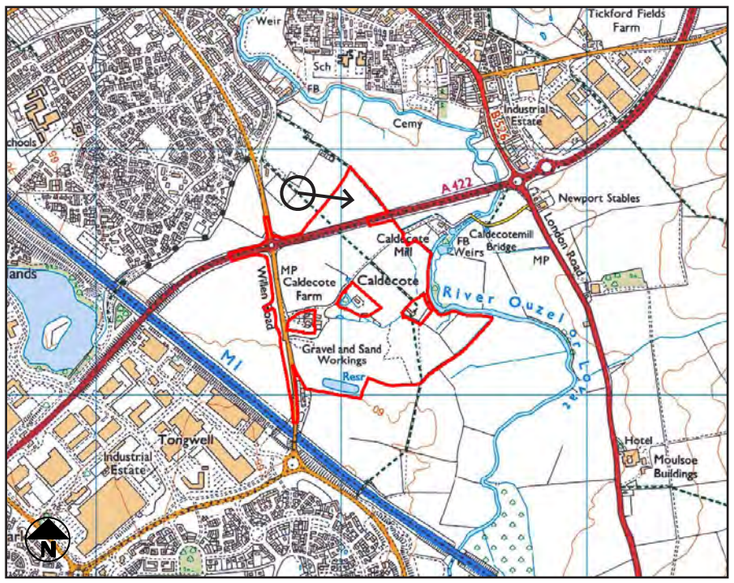
TO BE VIEWED AT A COMFORTABLE ARM'S LENGTH

P19-2619_10A | WILLEN ROAD, NEWPORT PAGNELL | BLOOR HOMES



CONTEXT BASELINE VIEWPOINT 4A

From PRoW Footpath Newport Pagnell FP007, looking south east

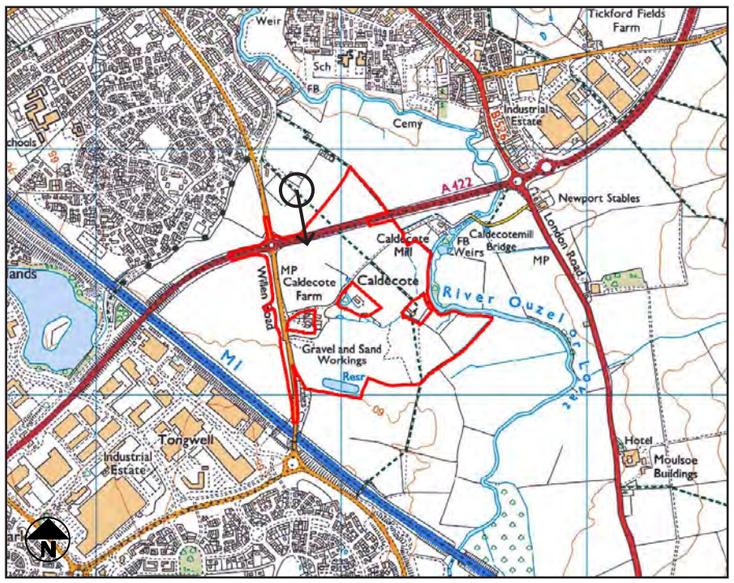


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CONTEXT BASELINE VIEWPOINT 4B

From PRoW Footpath Newport Pagnell FP007, looking south east



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Camera make & model	- Canon EOS 5D, FFS
Lens make & focal length	- Canon EF 50mm, f/1.4 USM
Date & time of photograph	- 23/02/2021 @ 15:44
OS grid reference	- 487823, 242820

Viewpoint height (AOD)	- 57.4m
Distance from site	- 368.1m
Projection	- Planar
Enlargement / Sheet Size	- 100% @ A3

Visualisation Type	- Type 1
Horizontal Field of View	- 39.6°
Height of camera AGL	- 1.5m
Page size / Image size (mm)	- 420 x 297 / 390 x 260

DESIGN | ENVIRONMENT | PLANNING | ECONOMICS | HERITAGE

TO BE VIEWED AT A COMFORTABLE ARM'S LENGTH

VIEWPOINT 4

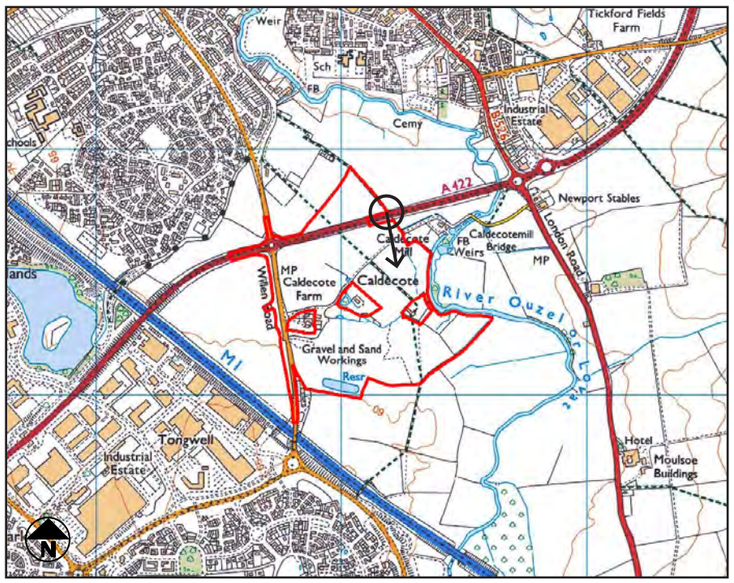
From PRoW Footpath Newport Pagnell FP007, looking south east

P19-2619_10A | WILLEN ROAD, NEWPORT PAGNELL | BLOOR HOMES



CONTEXT BASELINE VIEWPOINT 5A

From PRoW Footpath Newport Pagnell FP008, looking south west

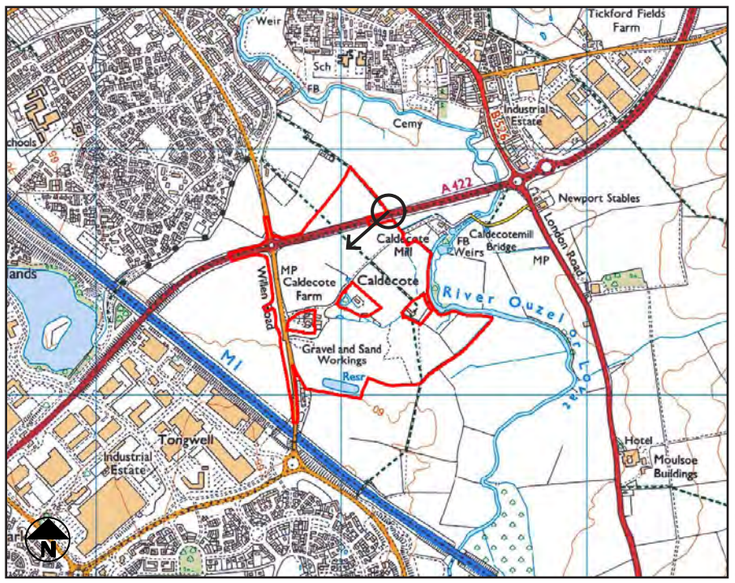


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CONTEXT BASELINE VIEWPOINT 5B

From PRoW Footpath Newport Pagnell FP008, looking south west



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Camera make & model	- Canon EOS 5D, FFS
Lens make & focal length	- Canon EF 50mm, f/1.4 USM
Date & time of photograph	- 23/02/2021 @ 14:49
OS grid reference	- 488183, 242741

Viewpoint height (AOD)	- 56.4m
Distance from site	- 368.1m
Projection	- Planar
Enlargement / Sheet Size	- 100% @ A3

Visualisation Type	- Type 1
Horizontal Field of View	- 39.6°
Height of camera AGL	- 1.5m
Page size / Image size (mm)	- 420 x 297 / 390 x 260

Pegasus Environment

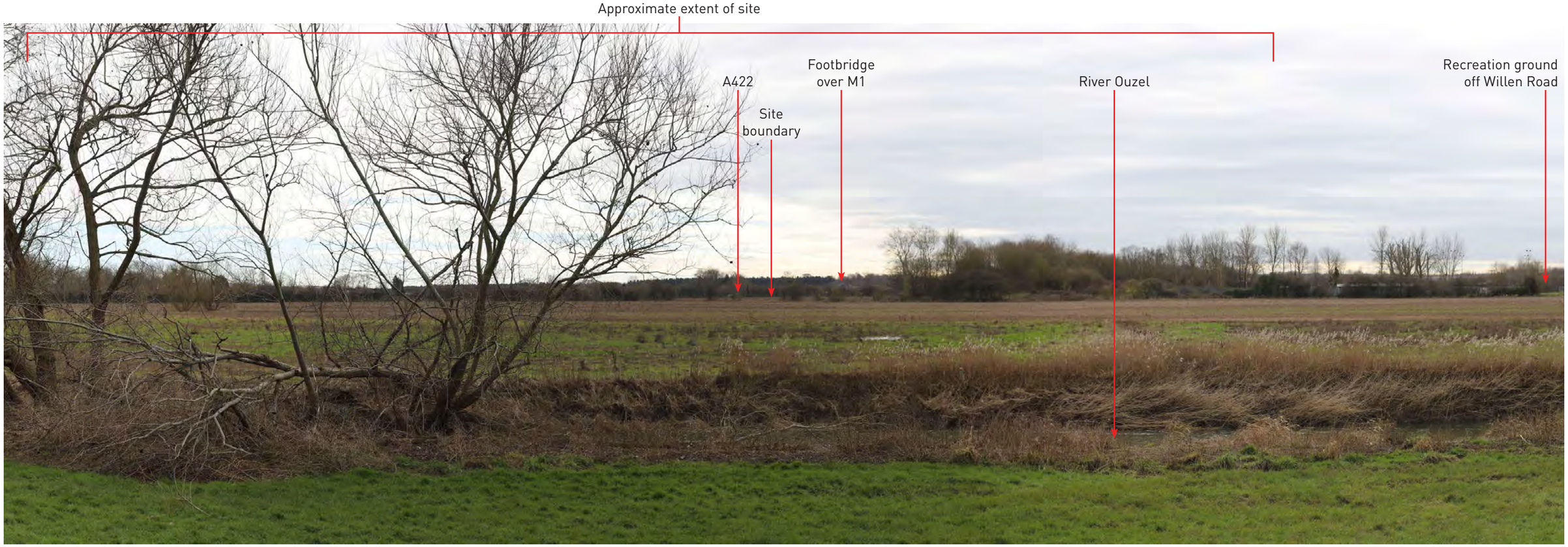
DESIGN | ENVIRONMENT | PLANNING | ECONOMICS | HERITAGE

TO BE VIEWED AT A COMFORTABLE ARM'S LENGTH

VIEWPOINT 5

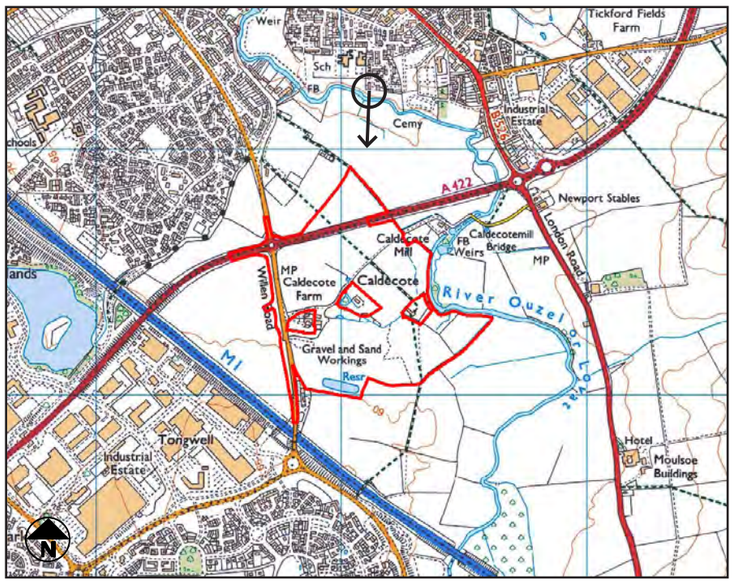
From PRoW Footpath Newport Pagnell FP008, looking south west

P19-2619_10A | WILLEN ROAD, NEWPORT PAGNELL | BLOOR HOMES



CONTEXT BASELINE VIEWPOINT 6

From the edge of Tickford End, looking south



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Camera make & model	- Canon EOS 5D, FFS
Lens make & focal length	- Canon EF 50mm, f/1.4 USM
Date & time of photograph	- 23/02/2021 @ 14:23
OS grid reference	- 488108, 243230

Viewpoint height (AOD)	- 55.9m
Distance from site	- 494.6m
Projection	- Planar
Enlargement / Sheet Size	- 100% @ A3

Visualisation Type	- Type 1
Horizontal Field of View	- 39.6°
Height of camera AGL	- 1.5m
Page size / Image size (mm)	- 420 x 297 / 390 x 260

VIEWPOINT 6

From the edge of Tickford End, looking south

Pegasus Environment

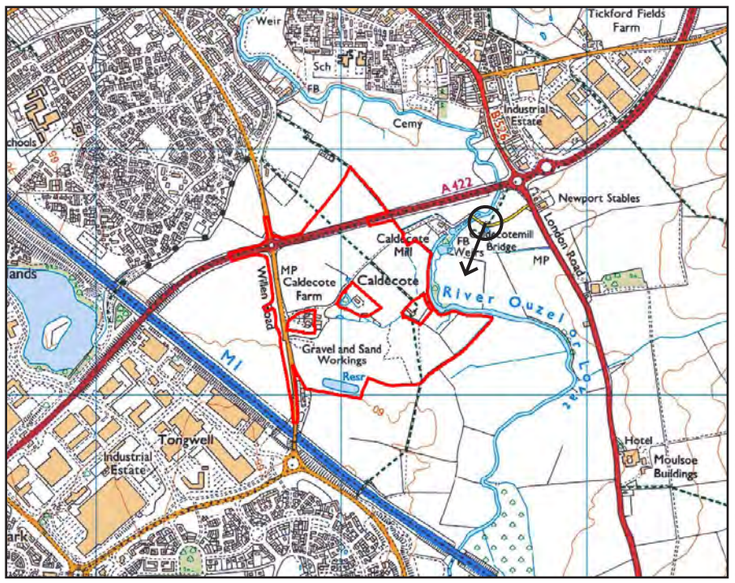
DESIGN | ENVIRONMENT | PLANNING | ECONOMICS | HERITAGE

TO BE VIEWED AT A COMFORTABLE ARM'S LENGTH



CONTEXT BASELINE VIEWPOINT 7A

From Caldecote Lane, looking south west

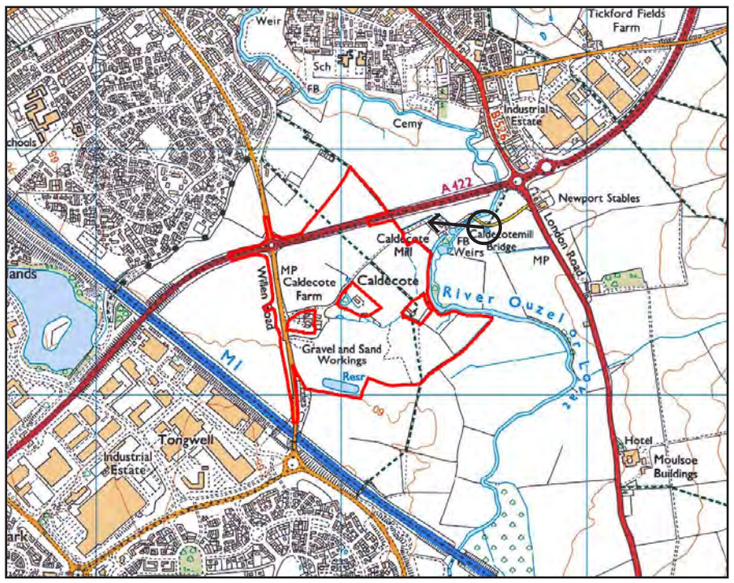


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CONTEXT BASELINE VIEWPOINT 7B

From Caldecote Lane, looking south west

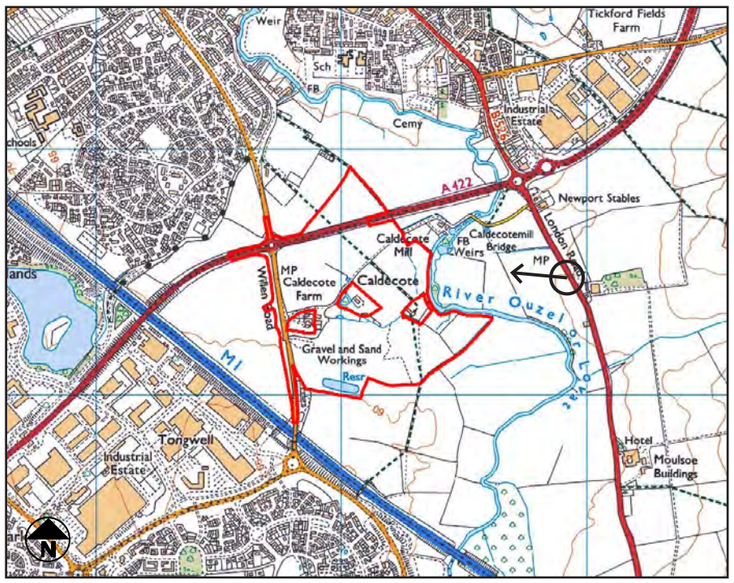


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CONTEXT BASELINE VIEWPOINT 8

From London Road, looking west



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Camera make & model	- Canon EOS 5D, FFS
Lens make & focal length	- Canon EF 50mm, f/1.4 USM
Date & time of photograph	- 23/02/2021 @ 12:50
OS grid reference	- 488916, 242481

Viewpoint height (AOD)	- 60.1m
Distance from site	- 398.2m
Projection	- Planar
Enlargement / Sheet Size	- 100% @ A3

Visualisation Type	- Type 1
Horizontal Field of View	- 39.6°
Height of camera AGL	- 1.5m
Page size / Image size (mm)	- 420 x 297 / 390 x 260

VIEWPOINT 8

From London Road, looking west

Pegasus Environment

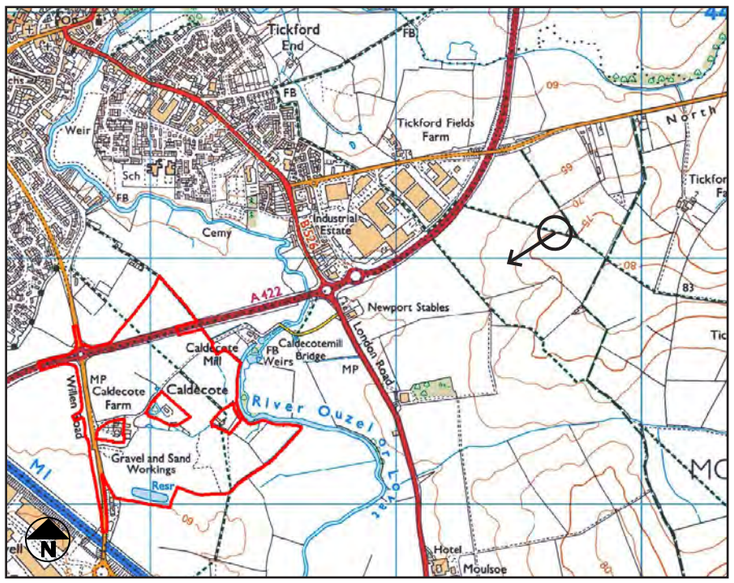
DESIGN | ENVIRONMENT | PLANNING | ECONOMICS | HERITAGE

TO BE VIEWED AT A COMFORTABLE ARM'S LENGTH



CONTEXT BASELINE VIEWPOINT 9

From PRoW footpath Moulsoe FP018, looking south west



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Camera make & model	- Canon EOS 5D, FFS
Lens make & focal length	- Canon EF 50mm, f/1.4 USM
Date & time of photograph	- 23/02/2021 @ 11:46
OS grid reference	- 489636, 243104

Viewpoint height (AOD)	- 74.5m
Distance from site	- 952.3m
Projection	- Planar
Enlargement / Sheet Size	- 100% @ A3

Visualisation Type	- Type 1
Horizontal Field of View	- 39.6°
Height of camera AGL	- 1.5m
Page size / Image size (mm)	- 420 x 297 / 390 x 260

VIEWPOINT 9

From PRoW footpath Moulsoe FP018, looking south west

Pegasus Environment

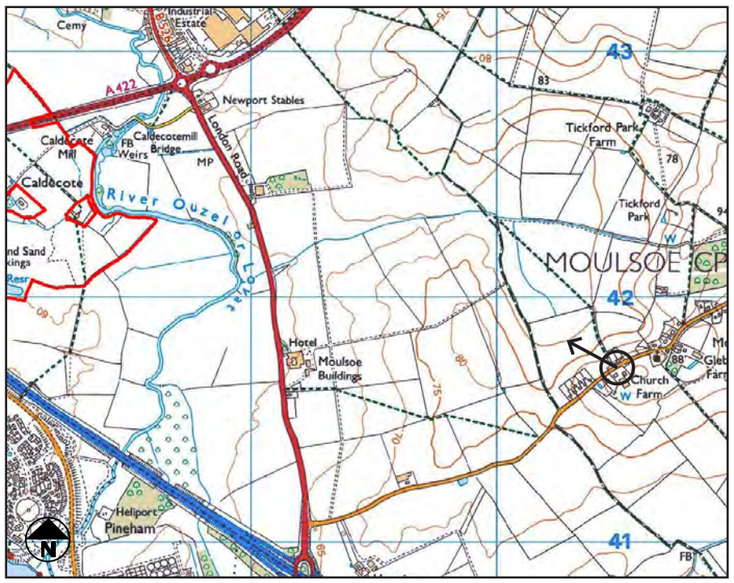
DESIGN | ENVIRONMENT | PLANNING | ECONOMICS | HERITAGE

TO BE VIEWED AT A COMFORTABLE ARM'S LENGTH



CONTEXT BASELINE VIEWPOINT 10

From PRoW footpath Moulsoe FP004, looking north west



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Camera make & model	- Canon EOS 5D, FFS
Lens make & focal length	- Canon EF 50mm, f/1.4 USM
Date & time of photograph	- 23/02/2021 @ 13:21
OS grid reference	- 490474, 241719

Viewpoint height (AOD)	- 86.5m
Distance from site	- 1618.9m
Projection	- Planar
Enlargement / Sheet Size	- 100% @ A3

Visualisation Type	- Type 1
Horizontal Field of View	- 39.6°
Height of camera AGL	- 1.5m
Page size / Image size (mm)	- 420 x 297 / 390 x 260

VIEWPOINT 10

From PRoW footpath Moulsoe FP004, looking north west

Pegasus Environment

DESIGN | ENVIRONMENT | PLANNING | ECONOMICS | HERITAGE

TO BE VIEWED AT A COMFORTABLE ARM'S LENGTH

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Appendix 8.5

Photomontage Wirelines

To Follow

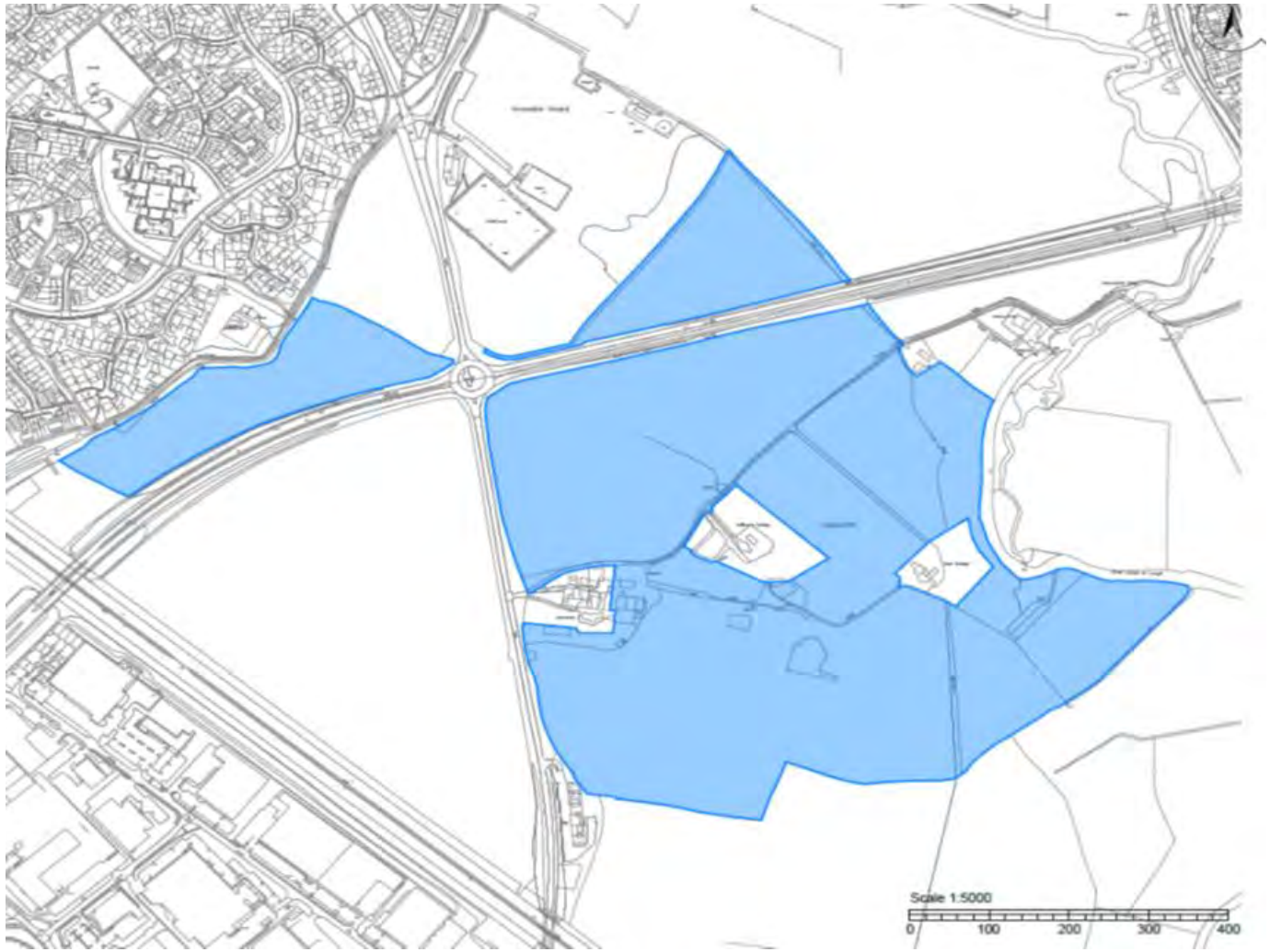
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Appendix 9.1

Boundary Plans (Land Controlled by Bloor Homes and Development Site)

Appendix 9.1

Plan detailing Bloor Homes Controlled Land



Plan Showing Ownership of Wider SD12 Allocation
(Extract MKE SPD, MKC)



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Appendix 9.2

Cycle Maps

MK Cycling Map

A map of the **Redways** and other **cycle** routes in **Milton Keynes**

www.getcyclingmk.org

get cycling

get smarter travel in Milton Keynes

milton keynes council

Index of areas in Milton Keynes

Ashland C4
Atterbury D3
Bancroft B2
Bancroft Park B2
Beanhill C4
Blakelands D2
Bleak Hall C3
Bletchley B5
Blue Bridge B1
Bolbeck Park D2
Bradville C2
Bradwell B2
Bradwell Abbey B2
Bradwell Common C2
Brinklow D4
Brook Furlong D3
Brooklands E3
Broughton D3
Broughton Gate D3
Browns Wood D4
Caldecotte C4
Campbell Park C2
Central Bletchley B5
Central Milton Keynes C3
Coffee Hall C3
Conniburrow C2
Crownhill A2
Denbigh East C4
Denbigh North C4
Denbigh West C4
Downhead Park D2
Downs Barn C2
Eaglestone C3
Eaglestone West C3
Elfield Park B3
Emerson Valley B4
Far Bletchley B4
Fenny Lock C4
Fenny Stratford C5
Fishermead C3
Fox Milne D3
Fullers Slade A1
Furzton B3
Giffard Park D2
Granby D3
Grange Farm A3
Great Holm B2
Great Linford C2
Greenleys C1
Hazeley A3
Heelands D1
Hodge Lea B2
Kents Hill D4
Kents Hill Park D4
Kiln Farm A2
Kingsmead A3
Kingston E4
Knowlhill B3
Leadenhall C3
Linford Wood C2
Loughton B3
Loughton Lodge B2
Magna Park E4
Medbourne A3
Middleton D3
Milton Keynes Village D3
Monkston D3
Monkston Park D3
Mount Farm C4
Neath Hill C2
Netherfield C4
New Bradwell C1
Newlands D3
Newport Pagnell D1
Newton Leys B5
Northfield D3
Oakgrove C2
Oakhill A3
Old Bletchley B4
Old Farm Park A4
Old Wolverton B1
Oldbrook C3
Oxley Park A4
Peartree Bridge C3
Pennyland D2
Pineham D3
Redhouse Park D1
Redmoor C4
Rooksley B2
Shenley Brook End B3
Shenley Church End B3
Shenley Lodge B3
Shenley Wood A3
Simpson C4
Snelshall East A4
Snelshall West A4
Springfield C3
Stacey Bushes B2
Stantonbury C2
Stonebridge B1
Stony Stratford A1
Tattenhoe A4
Tattenhoe Park A4
The Open University D4
Tickford End E2
Tilbrook D4
Tinkers Bridge C4
Tongwell D2
Towergate D4
Two Mile Ash B2
Walnut Tree D4
Walton D4
Walton Hall D4
Water Eaton B5
Wavendon Gate D4
Wavendon Tower D4
West Ashland C4
West Bletchley B4
Westcroft A3
Whitehouse A2
Willen D2
Willen Park D2
Winterhill B3
Wolverton B1
Wolverton Mill A1
Wolverton Mill East A1
Wolverton Mill South A1
Woodhill A3
Woolstone D3
Woughton on the Green C3
Woughton Park C4
Wymbush B2

The Redway Code – Respect, Protect, Enjoy.

The Redways are an important part of Milton Keynes. They are shared-use routes for people on foot or on cycles. The traffic-free network is popular for leisure, for commuting and for staying active. Redways may be used by anyone cycling and walking including people with pushchairs or prams and those in wheelchairs (including powered wheelchairs / mobility scooters). To enjoy them, please follow these common sense guidelines.

Respect other people

- Be polite and courteous. Consider the needs of others.
- Cycle on the left, walk on the right. Don't change direction suddenly and signal clearly while cycling.
- Take care when passing other people, allow plenty of room and use a polite audible method to signal your approach.
- Slow down at bends and all junctions and be prepared to stop when necessary.
- Only cycle or walk two abreast. Don't obstruct the Redway or stand in groups; allow others to pass quickly and easily.
- Don't use your mobile phone. It's safer to be aware of your surroundings especially of people approaching from behind.
- If you need to cross a Redway in a vehicle e.g. to reach a private driveway, drivers should give way to pedestrians and cyclists.

Protect the environment

- Take your litter home.
- Keep dogs under strict control, preferably on a short lead.
- Always clean up after your dog and get rid of mess responsibly.
- Report problems on the Redways including glass, potholes, lighting and vegetation to MK Highways via our website www.getcyclingmk.org

Enjoy the outdoors

- Follow these guidelines and the Highway Code.
- Be responsible for your own safety and others in your care.
- Plan your route in advance.
- Horse-riding is permitted on Redways which are part of the bridleway network.

Helpful advice: Young people and others may want to consider wearing a helmet while cycling. At night, wearing reflective, hi-viz or light coloured clothing will help you be seen.

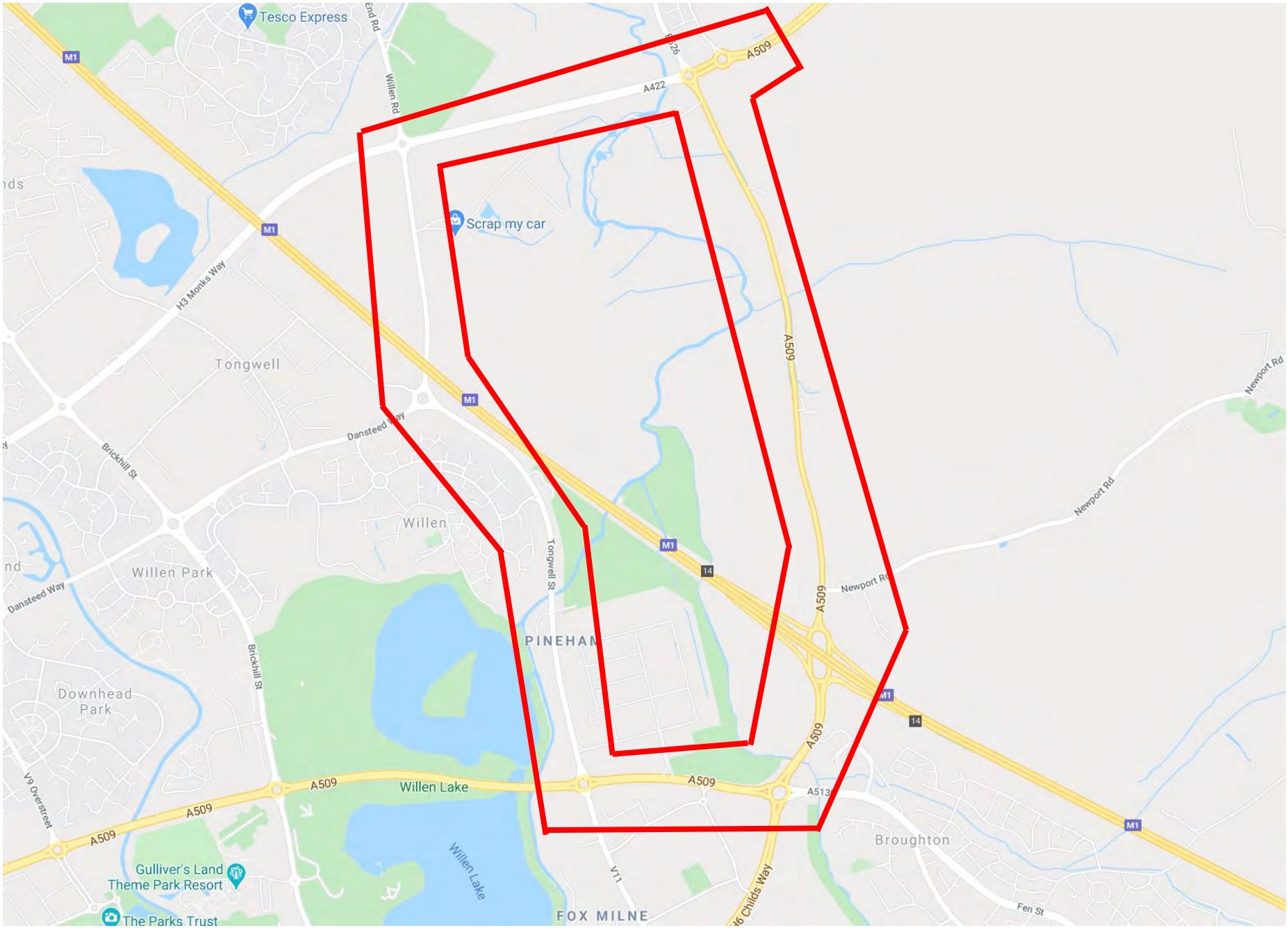
Redways and the law

- Electric cycles which meet the EAPC Regulations are permitted to use Redways.
- As Public Highway, all legal requirements and the Highway Code are applicable to the Redways: cycles should be road worthy and able to stop in an emergency; cycle lights are required at night.
- All motor-powered vehicles including mopeds, mini-motos and motorcycles are prohibited from using Redways with the exception of authorised vehicles e.g. emergency vehicles and maintenance vehicles.
- Away from the Redways, pavements and footways are for pedestrians only. **Cycling on the pavement is an offence which carries a fine of £500.**

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Appendix 9.3

PIA Data


Tesco Express
M1
A509
A422
Willen Rd
Scrap my car
H3 Monks Way
Tongwell
Dansteed Way
Brickhill St
Willen
Willen Park
Tongwell St
PINEHAM
Newport Rd
14
Downhead Park
Willen Lake
A513
Broughton
Gulliver's Land Theme Park Resort
The Parks Trust
FOX MILNE
Fen St

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Friday 24/04/2015 Time 2125 Slight at A509, APPRX 150 METRES N/EAST OF RENNY LODGE RBT, NEWPORT PAGNELL, MK
E: 489010 N: 242987 Junction Detail: 0 Control
Fine without high winds Road surface Dry Darkness: no street lighting
GV1 TRAV S/WEST IN LN 1, C2 TRAV IN LN 2 & PASSING GV1, GV1 CHANGED LANES & HIT N/SIDE C2 CAUSING C2 TO LEAVE C/WAY ONTO CENT RES. GV1 STOPPED BUT THEN DROVE OFF.
Road Type Dual carriageway Vehicles 2 Casualties 1 Police Ref. S0980415 Speed limit 70
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1938 Road Section: 162 Accident Type(s) MD

Causation

	Factor:	Participant:	Confidence:
1st:	Poor turn or manoevre	Vehicle 1	Very Likely
2nd:	Failed to look properly	Vehicle 1	Very Likely
3rd:			
4th:			
5th:			
6th:			

Vehicle Reference 1 Goods vehicle - unknown weight Moving from NE to S Changing lane to right Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Offside Parts damaged: 0 0 0 Age of Driver Sex of Driver Not traced Breath test Driver not contacted

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Car Moving from NE to S Going ahead other Left hand drive: No

On main carriageway
First point of impact Nearside Parts damaged: 0 0 0 Age of Driver 25 Sex of Driver Female No skidding, jack-knifing or overturning Breath test Negative

Casualty Reference: 1 Age: 25 Female Driver/rider Severity: Slight Injured by vehicle: 2

Seatbelt: Unknown Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Tuesday 23/06/2015 Time 1002 Slight at A422 JNC WILLEN ROAD, MARSH END ROUNDABOUT, NEWPORT PAGNELL, MK
E: 487702 N: 242576 Junction Detail: 1 Control 4
Fine without high winds Road surface Dry Daylight
C1 TRAV W ON A422 AT EXCESS SPEED, DRVR LOST CONTRL ON RBT, C1 HIT CENT ISLAND & LEFT C/WAY AHEAD INTO DITCH. DRVR C1 POS B. TEST.
Road Type Dual carriageway Vehicles 1 Casualties 1 Police Ref. S1070615 Speed limit 70
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1938 Road Section: 208 Accident Type(s) SG

Causation

	Factor:	Participant:	Confidence:
1st:	Impaired by alcohol	Vehicle 1	Very Likely
2nd:	Loss of control	Vehicle 1	Very Likely
3rd:	Exceeding speed limit	Vehicle 1	
4th:			
5th:			
6th:			

Vehicle Reference 1 Car Moving from E to W Going ahead other Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Front Parts damaged: 0 0 0 Age of Driver 41 Sex of Driver Male Breath test Not provided (medical reasons)

Casualty Reference: 1 Age: 41 Male Driver/rider Severity: Slight Injured by vehicle: 1

Seatbelt: Unknown Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Wednesday 19/08/2015 Time 0645 Slight at A422, 400METRES WEST OF JNC LONDON ROAD, NEWPORT PAGNELL, MK
E: 488286 N: 242760 Junction Detail: 0 Control
Fine without high winds Road surface Dry Daylight
C1 & PC2 TRAV E, C1 HIT REAR PC2.
Road Type Dual carriageway Vehicles 2 Casualties 1 Police Ref. S0840815 Speed limit 70
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1938 Road Section: 206 Accident Type(s) NB

Causation

	Factor:	Participant:	Confidence:
1st:	Failed to look properly	Vehicle 1	Possible
2nd:			
3rd:			
4th:			
5th:			
6th:			

Vehicle Reference 1 Car Moving from W to E Going ahead other Left hand drive: No

On main carriageway
First point of impact Front Parts damaged: 0 0 0 Age of Driver Sex of Driver Male
No skidding, jack-knifing or overturning
Breath test Driver not contacted

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Pedal Cycle Moving from W to E Going ahead other Left hand drive: No

On main carriageway
First point of impact Back Parts damaged: 0 0 0 Age of Driver 31 Sex of Driver Male No skidding, jack-knifing or overturning Breath test Driver not contacted

Casualty Reference: 1 Age: 31 Male Driver/rider Severity: Slight Injured by vehicle: 2

Seatbelt: Not Applicable Cycle helmet Yes
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Thursday 03/09/2015 Time 0611 Slight at A422 JNC WILLEN ROAD, MARSH END ROUNDABOUT, NEWPORT PAGNELL, MK
E: 487737 N: 242603 Junction Detail: 1 Control 4
Fine without high winds Road surface Dry Darkness: street lights present and lit
PC2 TRAV S NEG RBT, C1 TRAV W ON A422 ENTERD RBT INTO PATH PC2, C1 COLL WITH PC2.
Road Type Dual carriageway Vehicles 2 Casualties 1 Police Ref. S0140915 Speed limit 70
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1938 Road Section: 208 Accident Type(s) CM

Causation

	Factor:	Participant:	Confidence:
1st:	Failed to look properly	Vehicle 1	Very Likely
2nd:	Careless/Reckless/In a hurry	Vehicle 1	Very Likely
3rd:			
4th:			
5th:			
6th:			

Vehicle Reference 1 Car Moving from E to W Going ahead other Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Front Parts damaged: 0 0 0 Age of Driver 42 Sex of Driver Male Breath test Negative

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Pedal Cycle Moving from N to S Going ahead other Left hand drive: No

On main carriageway
First point of impact Back Parts damaged: 0 0 0 Age of Driver 58 Sex of Driver Male No skidding, jack-knifing or overturning Breath test Not requested

Casualty Reference: 1 Age: 58 Male Driver/rider Severity: Slight Injured by vehicle: 2

Seatbelt: Not Applicable Cycle helmet Yes
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Saturday 10/10/2015 Time 0844 Slight at A422, EXACT LOCATION NOT KNOWN, NEWPORT PAGNELL, MK
E: 488351 N: 242776 Junction Detail: 0 Control
Fine without high winds Road surface Dry Daylight
C2 & C1 TRAV EAST, C1 SWERVED TO AVOID PED IN C/WAY (PED MASKED BY C2) & COLL WITH REAR C2. C1 LEFT C/WAY TO N/SIDE DOWN EMBANKMNT.
Road Type Dual carriageway Vehicles 2 Casualties 1 Police Ref. S0571015 Speed limit 70
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1938 Road Section: Accident Type(s) NB

Causation

	Factor:	Participant:	Confidence:
1st:	Failed to judge other persons path or speed	Vehicle 1	Possible
2nd:	Loss of control	Vehicle 1	Very Likely
3rd:			
4th:			
5th:			
6th:			

Vehicle Reference 1 Car Moving from W to E Going ahead other Left hand drive: No

On main carriageway Skidded and overturned
First point of impact Front Parts damaged: 0 0 0 Age of Driver 38 Sex of Driver Male Breath test Negative

Casualty Reference: 1 Age: 38 Male Driver/rider Severity: Slight Injured by vehicle: 1

Seatbelt: Unknown Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Car Moving from W to E Going ahead other Left hand drive: No

On main carriageway
First point of impact Back Parts damaged: 0 0 0 Age of Driver 60 Sex of Driver Female No skidding, jack-knifing or overturning Breath test Negative

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Friday 06/11/2015 Time 1355 Slight at A509 JNC RENNY PARK RD, RENNY LODGE ROUNDABOUT, NEWPORT PAGNELL, MK
E: 488826 N: 242956 Junction Detail: 1 Control 4
Raining without high winds Road surface Wet/Damp Daylight
C2 TRAV N/EAST ON A509 NEG RBT, C1 TRAV S ON RENNY PK RD ENTERD RBT INTO PATH C2, C2 COLL WITH O/SIDE C1.
Road Type Dual carriageway Vehicles 2 Casualties 3 Police Ref. S0151115 Speed limit 70
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1938 Road Section: 162 Accident Type(s) CM

Causation

	Factor:	Participant:	Confidence:
1st:	Failed to judge other persons path or speed	Vehicle 1	Very Likely
2nd:	Poor turn or manoevre	Vehicle 1	Very Likely
3rd:	Careless/Reckless/In a hurry	Vehicle 1	
4th:			
5th:			
6th:			

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 1 Car Moving from N to S Turning right Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Offside Parts damaged: 0 0 0 Age of Driver 33 Sex of Driver Male Breath test Negative

Casualty Reference: 1 Age: 33 Male Driver/rider Severity: Slight Injured by vehicle: 1
Seatbelt: Worn but not independently confirmed Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Casualty Reference: 3 Age: 29 Male Passenger Severity: Slight Injured by vehicle: 1
Seatbelt: Worn but not independently confirmed Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Vehicle Reference 2 Car Moving from S to NE Going ahead other Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Front Parts damaged: 0 0 0 Age of Driver 40 Sex of Driver Male Breath test Negative

Casualty Reference: 2 Age: 40 Male Driver/rider Severity: Slight Injured by vehicle: 2
Seatbelt: Worn but not independently confirmed Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Wednesday 23/03/2016 Time 1726 Slight at LONDON ROAD, JUST SOUTH OF TICKFORD ROUNDABOUT, NEWPORT PAGNELL, MK
E: 488748 N: 242826 Junction Detail: 8 Control 4
Fine without high winds Road surface Dry Daylight

GV3 (VAN) BROKEN DOWN & PUSHED ONTO DRIVEWAY SOUTH OF RBT, C4 PARKED & DRVR ASSISTING, C2 TRAV S EXITED RBT & SLOWING TO TURN LEFT INTO DRIVEWAY, C1 EXITED RBT & COLL WITH REAR C2, C1 THEN HIT GV3 & C4.

Road Type Single carriageway Vehicles 4 Casualties 1 Police Ref. S1230316 Speed limit 60
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1938 Road Section: 201 Accident Type(s) NB

Causation

	Factor:	Participant:	Confidence:
1st:	Careless/Reckless/In a hurry	Vehicle 1	Very Likely
2nd:	Failed to judge other persons path or speed	Vehicle 1	Very Likely
3rd:	Loss of control	Vehicle 1	
4th:			
5th:			
6th:			

Vehicle Reference 1 Car Moving from N to S Going ahead other Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Front Parts damaged: 0 0 0 Age of Driver 25 Sex of Driver Male Breath test Negative

Vehicle Reference 2 Car Moving from N to E Turning left Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Front Parts damaged: 0 0 0 Age of Driver 32 Sex of Driver Male Breath test Negative

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 3 Van or Goods 3.5 tonnes mgw and under Moving from to Parked Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Front Parts damaged: 0 0 0 Age of Driver 30 Sex of Driver Male Breath test Not requested

Casualty Reference: 1 Age: 30 Male Driver/rider Severity: Slight Injured by vehicle: 3

Seatbelt: Unknown Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Vehicle Reference 4 Car Moving from to Parked Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Offside Parts damaged: 0 0 0 Age of Driver 60 Sex of Driver Male Breath test Not requested

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Saturday 26/03/2016 Time 1732 Serious at LONDON ROAD, 650METRES NORTH OF HOLIDAY INN HOTEL, NEWPORT PAGNELL, MK
E: 488996 N: 242343 Junction Detail: 0 Control
Raining without high winds Road surface Wet/Damp Daylight
C2 TRAV SOUTH ON A509, C1 TRAV OPP DIR, C1 CROSSED INTO OPP LANE & COLL WITH FRONT C2 CAUSING C2 TO SPIN.
Road Type Single carriageway Vehicles 2 Casualties 4 Police Ref. S1160316 Speed limit 60
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1190 Road Section: 203 Accident Type(s) NN

Causation

	Factor:	Participant:	Confidence:
1st:	Fatigue	Vehicle 1	Very Likely
2nd:	Illness or disability, mental or physical	Vehicle 1	Very Likely
3rd:	Distraction in vehicle	Vehicle 1	Possible
4th:	Impaired by drugs (illicit or medicinal)	Vehicle 1	Possible
5th:	Failed to look properly	Vehicle 1	Very Likely
6th:	Careless/Reckless/In a hurry	Vehicle 1	Possible

Vehicle Reference 1 Car Moving from S to N Going ahead other Left hand drive: No

On main carriageway Skidded
First point of impact Front Parts damaged: 0 0 0 Age of Driver 63 Sex of Driver Male Breath test Not provided (medical reasons)

Casualty Reference: 1 Age: 63 Male Driver/rider Severity: Slight Injured by vehicle: 1
Seatbelt: Worn but not independently confirmed Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Car Moving from N to S Going ahead other Left hand drive: No

On main carriageway Skidded
First point of impact Front Parts damaged: 0 0 0 Age of Driver 23 Sex of Driver Male Breath test Not provided (medical reasons)

Casualty Reference: 2 Age: 23 Male Driver/rider Severity: Serious Injured by vehicle: 2
Seatbelt: Worn but not independently confirmed Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Casualty Reference: 3 Age: 23 Male Passenger Severity: Slight Injured by vehicle: 2
Seatbelt: Worn but not independently confirmed Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Casualty Reference: 4 Age: 21 Male Passenger Severity: Slight Injured by vehicle: 2
Seatbelt: Worn but not independently confirmed Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Friday 01/04/2016 Time 1725 Slight at LONDON ROAD, LAYBY 330METRES NORTH OF HOTEL, NEWPORT PAGNELL, MK
E: 489069 N: 242098 Junction Detail: 0 Control
Fine without high winds Road surface Dry Daylight
STAT TRAFFIC QUEUE S/BND, MC2 TRAV S & PASSING STAT VEHS WHEN C1 COMM U--TURN ACROSS PATH MC2, MC2 COLL WITH O/SIDE C1.
Road Type Single carriageway Vehicles 2 Casualties 1 Police Ref. S0010416 Speed limit 60
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1190 Road Section: 204 Accident Type(s) UU

Causation

	Factor:	Participant:	Confidence:
1st:	Failed to look properly	Vehicle 1	Very Likely
2nd:	Careless/Reckless/In a hurry	Vehicle 1	Very Likely
3rd:			
4th:			
5th:			
6th:			

Vehicle Reference 1 Car Moving from N to N U-turn Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Offside Parts damaged: 0 0 0 Age of Driver 32 Sex of Driver Male Breath test Negative

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Motorcycle over 500cc Moving from N to S Overtaking stat vehicle O/S Left hand drive: No

On main carriageway
First point of impact Front Parts damaged: 0 0 0 Age of Driver 48 Sex of Driver Male No skidding, jack-knifing or overturning Breath test Negative

Casualty Reference: 1 Age: 48 Male Driver/rider Severity: Slight Injured by vehicle: 2

Seatbelt: Not Applicable Cycle helmet Not a cyclist

Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Wednesday 17/08/2016 Time 1920 Slight at A509 JNC LONDON ROAD, TICKFORD ROUNDABOUT, NEWPORT PAGNELL, MK
E: 488707 N: 242892 Junction Detail: 1 Control 4
Fine without high winds Road surface Dry Daylight
GV1 WITH TRAILER LOADED WITH STRAW BAILS NEG RBT TO EXIT N/E ONTO A509, TRAILER MOUNTED CENT ISLND CAUSING IT TO ROLL ONTO SIDE.
Road Type Dual carriageway Vehicles 1 Casualties 1 Police Ref. S0690816 Speed limit 70
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1938 Road Section: Accident Type(s) SG

Causation

	Factor:	Participant:	Confidence:
1st:	Overloaded or poorly loaded vehicle or trailer	Vehicle 1	Possible
2nd:	Poor turn or manoevre	Vehicle 1	Very Likely
3rd:			
4th:			
5th:			
6th:			

Vehicle Reference 1 Goods 7.5 tonnes mgw and over Moving from S to NE Turning right Left hand drive: No

On main carriageway Overturned
First point of impact Offside Parts damaged: 0 0 0 Age of Driver 31 Sex of Driver Male Breath test Negative

Casualty Reference: 1 Age: 31 Male Driver/rider Severity: Slight Injured by vehicle: 1

Seatbelt: Not worn Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Tuesday 13/09/2016 Time 1850 Slight at A422 JNC WILLEN ROAD, MARSH END RBT, NEWPORT PAGNELL, MK
E: 487736 N: 242599 Junction Detail: 1 Control 4
Fine without high winds Road surface Dry Daylight
PC2 TRAV S ON WILLEN RD NEG RBT, C1 TRAV S/W ON A422 ENTERD RBT INTO PATH PC2, PC2 COLL WITH O/SIDE C1.
Road Type Dual carriageway Vehicles 2 Casualties 1 Police Ref. 160298242 Speed limit 70
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1938 Road Section: Accident Type(s) CM

Causation

	Factor:	Participant:	Confidence:
1st:	Failed to look properly	Vehicle 1	Very Likely
2nd:			
3rd:			
4th:			
5th:			
6th:			

Vehicle Reference 1 Car Moving from E to W Going ahead other Left hand drive: No

On main carriageway
First point of impact Offside Parts damaged: 0 0 0 Age of Driver 21 Sex of Driver Male No skidding, jack-knifing or overturning Breath test Not requested

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Pedal Cycle Moving from N to S Going ahead other Left hand drive: No

On main carriageway
First point of impact Front Parts damaged: 0 0 0 Age of Driver 34 Sex of Driver Male No skidding, jack-knifing or overturning Breath test Not applicable

Casualty Reference: 1 Age: 34 Male Driver/rider Severity: Slight Injured by vehicle: 2

Seatbelt: Not Applicable Cycle helmet Yes

Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Wednesday 15/03/2017 Time 0620 Slight at A509 JNC RENNY PARK ROAD, RENNY LODGE RBT, NEWPORT PAGNELL, MK
E: 488862 N: 242927 Junction Detail: 1 Control 4
Fog or mist Road surface Wet/Damp Daylight
GV2 NEG RBT TURNING RIGHT TWDS A422 S/WBND, GV1 (VAN) TRAV S/W ON A509, DRVR GV1 FELL ASLEEP & GV1 MOUNTED N/SIDE VERGE THEN ENTERD RBT & COLL WITH N/SIDE GV2.
Road Type Dual carriageway Vehicles 2 Casualties 1 Police Ref. 170121019 Speed limit 70
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1938 Road Section: Accident Type(s) CM

Causation

	Factor:	Participant:	Confidence:
1st:	Failed to judge other persons path or speed	Vehicle 1	Very Likely
2nd:	Careless/Reckless/In a hurry	Vehicle 1	Very Likely
3rd:	Other	Vehicle 1	
4th:			
5th:			
6th:			

DRIVER GV1 FELL ASLEEP AT THE WHEEL.

Vehicle Reference 1 Van or Goods 3.5 tonnes mgw and under Moving from NE to S Going ahead other Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Front Parts damaged: 0 0 0 Age of Driver 27 Sex of Driver Male Breath test Negative

Casualty Reference: 1 Age: 27 Male Driver/rider Severity: Slight Injured by vehicle: 1
Seatbelt: Unknown Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Goods 7.5 tonnes mgw and over Moving from N to S Turning right Left hand drive: No

On main carriageway
First point of impact Nearside Parts damaged: 0 0 0 Age of Driver 62 Sex of Driver Male
No skidding, jack-knifing or overturning
Breath test Negative

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Thursday 25/05/2017 Time 2021 Slight at A422 JNC LONDON RD, TICKFORD ROUNDABOUT, NEWPORT PAGNELL, MK
E: 488743 N: 242890 Junction Detail: 1 Control 4
Fine without high winds Road surface Dry Daylight
C2 EXITED RBT TRAV N/E ONTO A509 IN LN2, C1 TRAV SAME DIR IN LN1, C1 THEN COLL WITH N/SIDE C2. VEHS STOP THEN C1 DRIVES OFF.
Road Type Dual carriageway Vehicles 2 Casualties 1 Police Ref. 170164227 Speed limit 70
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1938 Road Section: Accident Type(s) MD

Causation

	Factor:	Participant:	Confidence:
1st:	Failed to look properly	Vehicle 1	Possible
2nd:			
3rd:			
4th:			
5th:			
6th:			

Vehicle Reference 1 Car Moving from S to NE Changing lane to right Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Offside Parts damaged: 0 0 0 Age of Driver 30 Sex of Driver Female Breath test Driver not contacted

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Car Moving from S to NE Going ahead other Left hand drive: No

On main carriageway
First point of impact Nearside Parts damaged: 0 0 0 Age of Driver 30 Sex of Driver Female
No skidding, jack-knifing or overturning
Breath test Driver not contacted

Casualty Reference: 1 Age: 30 Female Driver/rider Severity: Slight Injured by vehicle: 2

Seatbelt: Unknown Cycle helmet Not a cyclist

Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Monday 05/06/2017 Time 1842 Serious at A422 JNC WILLEN ROAD, MARSH END RBT, NEWPORT PAGNELL, MK
E: 487745 N: 242607 Junction Detail: 1 Control 4
Raining with high winds Road surface Wet/Damp Daylight
MC1 & MC2 TRAV WEST ON A422 APPR RBT, C1 BRAKED & LOST GRIP ON SURFACE CAUSING RIDER TO FALL, MC2 FOLL
LOST CONTRL & RIDER FELL.
Road Type Dual carriageway Vehicles 2 Casualties 2 Police Ref. 170170562 Speed limit 70
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1983 Road Section: Accident Type(s) NC

Causation

	Factor:	Participant:	Confidence:
1st:	Following too close	Vehicle 2	Very Likely
2nd:	Inexperienced or learner driver/rider	Vehicle 1	Very Likely
3rd:	Slippery road (due to weather)	Vehicle 1	Very Likely
4th:	Slippery road (due to weather)	Vehicle 2	Very Likely
5th:	Travelling too fast for conditions	Vehicle 1	Possible
6th:			

Vehicle Reference 1 Motorcycle 50cc and under Moving from E to W Stopping Left hand drive: No

On main carriageway Skidded
First point of impact Did not impact Parts damaged: 0 0 0 Age of Driver 16 Sex of Driver Male Breath test Negative

Casualty Reference: 1 Age: 16 Male Driver/rider Severity: Slight Injured by vehicle: 1

Seatbelt: Not Applicable Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Motorcycle 50cc and under Moving from E to W Stopping Left hand drive: No

On main carriageway Skidded
First point of impact Did not impact Parts damaged: 0 0 0 Age of Driver 17 Sex of Driver Male Breath test Negative

Casualty Reference: 2 Age: 17 Male Driver/rider Severity: Serious Injured by vehicle: 2

Seatbelt: Not Applicable Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Saturday 05/08/2017 Time 1350 Slight at A422 JNC WILLEN ROAD, MARSH END ROUNDABOUT, NEWPORT PAGNELL, MK
E: 487678 N: 242609 Junction Detail: 1 Control 4
Raining without high winds Road surface Wet/Damp Daylight
C2 & C1 TRAV EAST ON A422 APPR RBT, C1 COLL WITH REAR C2.
Road Type Dual carriageway Vehicles 2 Casualties 2 Police Ref. 170241882 Speed limit 70
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1938 Road Section: Accident Type(s) NB

Causation

	Factor:	Participant:	Confidence:
1st:	Failed to look properly	Vehicle 1	Very Likely
2nd:	Failed to judge other persons path or speed	Vehicle 1	Very Likely
3rd:			
4th:			
5th:			
6th:			

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 1 Car Moving from W to E Going ahead other Left hand drive: No

On main carriageway
First point of impact Front Parts damaged: 0 0 0 Age of Driver 50 Sex of Driver Female
No skidding, jack-knifing or overturning
Breath test Negative

Casualty Reference: 1 Age: 50 Female Driver/rider Severity: Slight Injured by vehicle: 1
Seatbelt: Worn but not independently confirmed Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Casualty Reference: 2 Age: 71 Female Passenger Severity: Slight Injured by vehicle: 1
Seatbelt: Worn but not independently confirmed Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Vehicle Reference 2 Car Moving from W to E Stopping Left hand drive: No

On main carriageway
First point of impact Back Parts damaged: 0 0 0 Age of Driver 26 Sex of Driver Male
No skidding, jack-knifing or overturning
Breath test Negative

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Tuesday 19/09/2017 Time 1137 Slight at A422, 290M EAST OF JNC WILLEN RD, NEWPORT PAGNELL, MK
E: 487997 N: 242686 Junction Detail: 0 Control
Fine without high winds Road surface Dry Daylight
C2 TRAV N/E STOPPED FOR TRAFFIC QUEUE AHEAD, C1 TRAV SAME DIR FAILS TO SEE QUEUE & COLL WITH REAR C2 AT SPEED. C1 THEN LEAVES SCENE.
Road Type Dual carriageway Vehicles 2 Casualties 1 Police Ref. 170281181 Speed limit 70
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1938 Road Section: Accident Type(s) NB

Causation

	Factor:	Participant:	Confidence:
1st:	Failed to look properly	Vehicle 1	Very Likely
2nd:	Failed to judge other persons path or speed	Vehicle 1	Very Likely
3rd:			
4th:			
5th:			
6th:			

Vehicle Reference 1 Car Moving from S to NE Going ahead other Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Front Parts damaged: 0 0 0 Age of Driver Sex of Driver Male Breath test Driver not contacted

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Car Moving from S to NE Going ahead but held up Left hand drive: No

On main carriageway
First point of impact Back Parts damaged: 0 0 0 Age of Driver 41 Sex of Driver Male No skidding, jack-knifing or overturning Breath test Negative

Casualty Reference: 1 Age: 41 Male Driver/rider Severity: Slight Injured by vehicle: 2

Seatbelt: Worn and independently confirmed Cycle helmet Not a cyclist

Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Thursday 21/09/2017 Time 1755 Serious at A509 JNC RENNY LODGE ROUDABOUT, NEWPORT PAGNELL, MK
E: 488884 N: 242934 Junction Detail: 1 Control 4
Raining without high winds Road surface Wet/Damp Daylight
C2 TRAV S/W ON A509 SLOWING FOR RBT AHEAD, C1 FOLL AT SPEED FAILS TO SLOW & COLL WITH REAR C2, C1 OVRTURNS.
Road Type Dual carriageway Vehicles 2 Casualties 3 Police Ref. 170295140 Speed limit 70
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1938 Road Section: Accident Type(s) NB

Causation

	Factor:	Participant:	Confidence:
1st:	Travelling too fast for conditions	Vehicle 1	Very Likely
2nd:	Poor turn or manoevre	Vehicle 1	Possible
3rd:	Failed to judge other persons path or speed	Vehicle 1	
4th:			
5th:			
6th:			

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 1 Car Moving from NE to S Going ahead other Left hand drive: No

On main carriageway Skidded and overturned
First point of impact Front Parts damaged: 0 0 0 Age of Driver 24 Sex of Driver Male Breath test Negative

Casualty Reference: 1 Age: 24 Male Driver/rider Severity: Serious Injured by vehicle: 1
Seatbelt: Worn but not independently confirmed Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Casualty Reference: 2 Age: 29 Male Passenger Severity: Slight Injured by vehicle: 1
Seatbelt: Worn but not independently confirmed Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Vehicle Reference 2 Car Moving from NE to S Stopping Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Back Parts damaged: 0 0 0 Age of Driver 31 Sex of Driver Male Breath test Negative

Casualty Reference: 3 Age: 31 Male Driver/rider Severity: Slight Injured by vehicle: 2
Seatbelt: Worn but not independently confirmed Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Wednesday 25/10/2017 Time 0244 Slight at LONDON ROAD, SOUTH OF JNC A422 RBT, NEWPORT PAGNELL, MK
E: 488809 N: 242696 Junction Detail: 0 Control
Fine without high winds Road surface Dry Darkness: no street lighting
GV1 TRAV SOUTH ON LONDN RD, PED WALKING SOUTH IN C/WAY ON GV1 N/SIDE & WEARING DARK CLOTHING, GV1 CLIPPED PED ELBOW KNOCKING HIM OVER.
Road Type Single carriageway Vehicles 1 Casualties 1 Police Ref. 170333397 Speed limit 60
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1938 Road Section: Accident Type(s) PY

Causation

	Factor:	Participant:	Confidence:
1st:	Pedestrian wearing dark clothing at night	Casualty 1	Very Likely
2nd:			
3rd:			
4th:			
5th:			
6th:			

Vehicle Reference 1 Goods 7.5 tonnes mgw and over Moving from N to S Going ahead other Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Front Parts damaged: 0 0 0 Age of Driver 55 Sex of Driver Male Breath test Negative

Casualty Reference: 1 Age: 54 Male Pedestrian Severity: Slight Injured by vehicle: 1

Seatbelt: Not Applicable Cycle helmet Not a cyclist
Ped. Location 10 Ped. Movement 1 Ped. Direction 5 Ped. Injury 0 School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Friday 01/12/2017 Time 1327 Slight at A509 JNC RENNY PARK RD, RENNY LODGE RBT, NEWPORT PAGNELL, MK
E: 488864 N: 242921 Junction Detail: 1 Control 4
Fine without high winds Road surface Dry Daylight
C1 TRAV S/W ON A509 APPR JNC, DRVR FAILS TO NEG BEND & C1 CROSSES N/SIDE VERGE ENTERING RBT & COLL WITH C2 WHO WAS NEG RBT. DRVR C1 POS B.TEST.
Road Type Dual carriageway Vehicles 2 Casualties 2 Police Ref. 170368429 Speed limit 70
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1938 Road Section: Accident Type(s) CM

Causation

	Factor:	Participant:	Confidence:
1st:	Travelling too fast for conditions	Vehicle 1	Very Likely
2nd:	Impaired by alcohol	Vehicle 1	Very Likely
3rd:			
4th:			
5th:			
6th:			

Vehicle Reference 1 Car Moving from NE to S Going ahead other Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Front Parts damaged: 0 0 0 Age of Driver 43 Sex of Driver Male Breath test Positive

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Car Moving from N to SE Going ahead other Left hand drive: No

On main carriageway
First point of impact Nearside Parts damaged: 0 0 0 Age of Driver 40 Sex of Driver Male
No skidding, jack-knifing or overturning
Breath test Negative

Casualty Reference: 1 Age: 40 Male Driver/rider Severity: Slight Injured by vehicle: 2
Seatbelt: Unknown Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Casualty Reference: 2 Age: 26 Female Passenger Severity: Slight Injured by vehicle: 2
Seatbelt: Unknown Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Monday 04/12/2017 Time 1244 Slight at WILLEN ROAD, 160M SOUTH OF CALDECOTE FARM ACCESS, NEWPORT PAGNELL, MK
E: 487786 N: 242140 Junction Detail: 0 Control
Fine without high winds Road surface Wet/Damp Daylight
GV2 TRAV SOUTH BEHIND SLOW MOVING ROADSWEEPING VEH, C1 TRAV SAME DIR FAILS TO NOTICE SLOW TRAFFIC & COLL WITH REAR GV2.
Road Type Single carriageway Vehicles 2 Casualties 2 Police Ref. 170369405 Speed limit 60
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1190 Road Section: Accident Type(s) NB

Causation

	Factor:	Participant:	Confidence:
1st:	Failed to look properly	Vehicle 1	Possible
2nd:			
3rd:			
4th:			
5th:			
6th:			

Vehicle Reference 1 Car Moving from N to S Going ahead other Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Front Parts damaged: 0 0 0 Age of Driver 20 Sex of Driver Female Breath test Negative

Casualty Reference: 1 Age: 20 Female Driver/rider Severity: Slight Injured by vehicle: 1

Seatbelt: Worn but not independently confirmed Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Goods over 3.5 tonnes and under 7.5 tonnes mgw Moving from N to S Going ahead other Left hand drive: No

On main carriageway
First point of impact Back Parts damaged: 0 0 0 Age of Driver 40 Sex of Driver Male No skidding, jack-knifing or overturning Breath test Negative

Casualty Reference: 2 Age: 40 Male Driver/rider Severity: Slight Injured by vehicle: 2

Seatbelt: Worn but not independently confirmed Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Wednesday 31/01/2018 Time 0910 Slight at LONDON ROAD, 200M SOUTH OF JNC A422 RBT, NEWPORT PAGNELL, MK
E: 488821 N: 242669 Junction Detail: 0 Control
Raining with high winds Road surface Wet/Damp Daylight
C2 TRAV SOUTH, MC1 TRAV SAME DIR & FILTERING PAST OTHER VEHS, C2 MOVED OUT TO PASS LARGE PUDDLE ON N/SIDE & COLL WITH N/SIDE MC1.
Road Type Single carriageway Vehicles 2 Casualties 1 Police Ref. 180039554 Speed limit 60
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1190 Road Section: Accident Type(s) ZZ

Causation

	Factor:	Participant:	Confidence:
1st:	Poor turn or manoevre	Vehicle 1	Very Likely
2nd:	Failed to look properly	Vehicle 2	Possible
3rd:	Failed to signal/Misleading signal	Vehicle 2	
4th:			
5th:			
6th:			

Vehicle Reference 1 Motorcycle over 500cc Moving from N to S Overtaking moving vehicle Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Offside Parts damaged: 0 0 0 Age of Driver 19 Sex of Driver Male Breath test Negative

Casualty Reference: 1 Age: 19 Male Driver/rider Severity: Slight Injured by vehicle: 1

Seatbelt: Not Applicable Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Car Moving from N to S Going ahead other Left hand drive: No

On main carriageway
First point of impact Offside Parts damaged: 0 0 0 Age of Driver 34 Sex of Driver Male
No skidding, jack-knifing or overturning
Breath test Negative

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Wednesday 28/03/2018 Time 1740 Slight at A422, EAST OF JNC WILLEN ROAD, NEWPORT PAGNELL, MK
E: 487922 N: 242666 Junction Detail: 0 Control
Fine without high winds Road surface Wet/Damp Daylight
C2 TRAV EAST ON A422 IN LN 1 & STOPPED AT TRAFF QUEUE, C1 TRAV EAST IN LN 2 MOVED INTO LN 1 & FAILED TO SEE QUEUE AHEAD, C1 COLL INTO REAR C2.
Road Type Dual carriageway Vehicles 2 Casualties 2 Police Ref. 180100693 Speed limit 70
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1938 Road Section: Accident Type(s) NB

Causation

	Factor:	Participant:	Confidence:
1st:	Failed to look properly	Vehicle 1	Very Likely
2nd:	Failed to judge other persons path or speed	Vehicle 1	Very Likely
3rd:	Distraction in vehicle	Vehicle 1	
4th:			
5th:			
6th:			

Vehicle Reference 1 Car Moving from W to E Changing lane to left Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Front Parts damaged: 0 0 0 Age of Driver 23 Sex of Driver Male Breath test Negative

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Car Moving from W to E Going ahead but held up Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Back Parts damaged: 0 0 0 Age of Driver 33 Sex of Driver Male Breath test Negative

Casualty Reference: 1 Age: 33 Male Driver/rider Severity: Slight Injured by vehicle: 2
Seatbelt: Unknown Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Casualty Reference: 2 Age: 29 Female Passenger Severity: Slight Injured by vehicle: 2
Seatbelt: Unknown Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Saturday 30/06/2018 Time 1917 Slight at LONDON ROAD, NEAR JNC A422 O/S PYMS STABLES, NEWPORT PAGNELL, MK
E: 488748 N: 242814 Junction Detail: 0 Control
Fine without high winds Road surface Dry Daylight
C2 TRAV N/W ON LONDN RD APPR JNC, C1 EXITD RBT TRAV OPP DIR ON LONDN RD, DRVR C1 LOST CONTRL & C1 COLL WITH FRONT C2.
Road Type Single carriageway Vehicles 2 Casualties 4 Police Ref. 180204729 Speed limit 60
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1938 Road Section: Accident Type(s) NN

Causation

	Factor:	Participant:	Confidence:
1st:	Careless/Reckless/In a hurry	Vehicle 1	Very Likely
2nd:	Loss of control	Vehicle 1	Very Likely
3rd:			
4th:			
5th:			
6th:			

Vehicle Reference 1 Car Moving from N to SE Going ahead other Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Front Parts damaged: 0 0 0 Age of Driver 30 Sex of Driver Male Breath test Not requested

Casualty Reference: 1 Age: 30 Male Driver/rider Severity: Slight Injured by vehicle: 1

Seatbelt: Unknown Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Car Moving from SE to N Going ahead other Left hand drive: No

On main carriageway
First point of impact Front Parts damaged: 0 0 0 Age of Driver 40 Sex of Driver Male Breath test Not requested
No skidding, jack-knifing or overturning

Casualty Reference: 2 Age: Female Passenger Severity: Slight Injured by vehicle: 2
Seatbelt: Unknown Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Casualty Reference: 3 Age: Male Passenger Severity: Slight Injured by vehicle: 2
Seatbelt: Unknown Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Casualty Reference: 4 Age: Male Passenger Severity: Slight Injured by vehicle: 2
Seatbelt: Unknown Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Tuesday 22/01/2019 Time 1830 Slight at A422 JNC LONDON ROAD, TICKFORD ROUNDABOUT, NEWPORT PAGNELL, MK
E: 488726 N: 242833 Junction Detail: 1 Control 4
Raining without high winds Road surface Wet/Damp Darkness: street lights present and lit
C2 TRAV NORTH ON LONDON RD STOPS AT ENTRY TO RBT, C1 FOLL COLLS WITH REAR C2. C1 THEN LEAVES SCENE & DRIVES OFF AT SPEED.
Road Type Single carriageway Vehicles 2 Casualties 1 Police Ref. 190024437 Speed limit 60
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1938 Road Section: Accident Type(s) NB

Causation

	Factor:	Participant:	Confidence:
1st:	Failed to look properly	Vehicle 1	Possible
2nd:			
3rd:			
4th:			
5th:			
6th:			

Vehicle Reference 1 Car Moving from S to N Going ahead other Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Front Parts damaged: 0 0 0 Age of Driver Sex of Driver Unknown Breath test Driver not contacted

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Car Moving from S to N Going ahead but held up Left hand drive: No

On main carriageway
First point of impact Back Parts damaged: 0 0 0 Age of Driver 39 Sex of Driver Unknown No skidding, jack-knifing or overturning Breath test Driver not contacted

Casualty Reference: 1 Age: 39 Driver/rider Severity: Slight Injured by vehicle: 2

Seatbelt: Unknown Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Wednesday 20/02/2019 Time 1232 Slight at LONDON ROAD, PRIV ACCESS 420M SOUTH OF JNC A422 RBT, NEWPORT PAGNELL, MK
E: 488926 N: 242477 Junction Detail: 8 Control 4
Fine without high winds Road surface Dry Daylight
C1 TRAV SOUTH ON A509 GOING WRONG WAY SO DRVR PULLED INTO ACCESS TO U-TURN, C2 ALSO TRAV SOUTH, C1 U-TURNS INTO PATH C2 & COLLS WITH C2. C1 THEN LEAVES C/WAY INTO DITCH.
Road Type Single carriageway Vehicles 2 Casualties 2 Police Ref. 190062883 Speed limit 60
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1190 Road Section: Accident Type(s) UU

Causation

	Factor:	Participant:	Confidence:
1st:	Failed to judge other persons path or speed	Vehicle 1	Very Likely
2nd:	Loss of control	Vehicle 1	Very Likely
3rd:			
4th:			
5th:			
6th:			

Vehicle Reference 1 Car Moving from N to N U-turn Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Front Parts damaged: 0 0 0 Age of Driver 76 Sex of Driver Female Breath test Negative

Casualty Reference: 1 Age: 76 Female Driver/rider Severity: Slight Injured by vehicle: 1
Seatbelt: Worn but not independently confirmed Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Car Moving from N to S Going ahead other Left hand drive: No

On main carriageway
First point of impact Front Parts damaged: 0 0 0 Age of Driver 61 Sex of Driver Female No skidding, jack-knifing or overturning Breath test Negative

Casualty Reference: 2 Age: 61 Female Driver/rider Severity: Slight Injured by vehicle: 2

Seatbelt: Worn but not independently confirmed Cycle helmet Not a cyclist

Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Friday 22/02/2019 Time 2100 Slight at WILLEN ROAD JNC ACCESS TO TRAVELLER SITE, NEWPORT PAGNELL, MK
E: 487800 N: 242062 Junction Detail: 8 Control 4
Fine without high winds Road surface Dry Darkness: no street lighting
GV2 (VAN) TRAV NORTH & TURNING RIGHT INTO TRAVELLER SITE, C1 TRAV SAME DIR POSS EXCESS SPEED & COLLS INTO REAR GV2. DRVR C1 LEAVES SCENE THEN RETURNS.
Road Type Single carriageway Vehicles 2 Casualties 2 Police Ref. 190069263 Speed limit 60
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1190 Road Section: Accident Type(s) NB

Causation

	Factor:	Participant:	Confidence:
1st:	Failed to look properly	Vehicle 1	Very Likely
2nd:	Careless/Reckless/In a hurry	Vehicle 1	Very Likely
3rd:			
4th:			
5th:			
6th:			

Vehicle Reference 1 Car Moving from S to N Going ahead other Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Front Parts damaged: 0 0 0 Age of Driver 22 Sex of Driver Female Breath test Not requested

Casualty Reference: 2 Age: 27 Male Passenger Severity: Slight Injured by vehicle: 1

Seatbelt: Unknown Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Van or Goods 3.5 tonnes mgw and under Moving from S to E Turning right Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Back Parts damaged: 0 0 0 Age of Driver 25 Sex of Driver Male Breath test Not requested

Casualty Reference: 1 Age: 25 Male Driver/rider Severity: Slight Injured by vehicle: 2

Seatbelt: Unknown Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Wednesday 22/05/2019 Time 1413 Slight at A509 LONDON ROAD, 600M SOUTH OF JNC A422, NEWPORT PAGNELL, MK
E: 489017 N: 242282 Junction Detail: 0 Control
Fine without high winds Road surface Dry Daylight
C1 (POLICE ON CALL) TRAV NORTH & OVRTKNG OTHER VEH, C3 TRAV OPP DIR SLOWS FOR C1, C2 FOLL C3 FAILS TO SLOW & COLLS WITH REAR C3.
Road Type Single carriageway Vehicles 3 Casualties 1 Police Ref. 190154603 Speed limit 60
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1190 Road Section: Accident Type(s) NB

Causation

	Factor:	Participant:	Confidence:
1st:	Distraction in vehicle	Vehicle 2	Very Likely
2nd:	Failed to judge other persons path or speed	Vehicle 2	Very Likely
3rd:			
4th:			
5th:			
6th:			

Vehicle Reference 1 Car Moving from S to N Overtaking moving vehicle Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Did not impact Parts damaged: 0 0 0 Age of Driver 26 Sex of Driver Male Breath test Negative

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Car Moving from N to S Going ahead other Left hand drive: No

On main carriageway
First point of impact Front Parts damaged: 0 0 0 Age of Driver 35 Sex of Driver Female Skidded Breath test Negative

Casualty Reference: 1 Age: 35 Female Driver/rider Severity: Slight Injured by vehicle: 2

Seatbelt: Worn and independently confirmed Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Vehicle Reference 3 Car Moving from N to S Stopping Left hand drive: No

On main carriageway
First point of impact Back Parts damaged: 0 0 0 Age of Driver 62 Sex of Driver Male No skidding, jack-knifing or overturning Breath test Negative

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, A422, Willen Road.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Accidents involving:

	Fatal	Serious	Slight	Total
Motor vehicles only (excluding 2-wheels)	0	2	19	21
2-wheeled motor vehicles	0	1	2	3
Pedal cycles	0	0	3	3
Horses & other	0	0	0	0
Total	0	3	24	27

Casualties:

	Fatal	Serious	Slight	Total
Vehicle driver	0	2	23	25
Passenger	0	0	11	11
Motorcycle rider	0	1	3	4
Cyclist	0	0	3	3
Pedestrian	0	0	1	1
Other	0	0	0	0
Total	0	3	41	44

Number of casualties meeting the criteria: **44**

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Wednesday 20/05/2015 Time 0748 Slight at V11 TONGWELL STREET JNC COTTON VALLEY SEWAGE WORKS, PINEHAM, MK
E: 488368 N: 240486 Junction Detail: 3 Control 4
Fine without high winds Road surface Dry Daylight
C2 TRAV S ON V11 APPR JNC, GV1 (VAN) TRAV OPP DIR TURNED RIGHT FROM V11 ACROSS PATH C2, GV1 COLL WITH O/SIDE C2.
Road Type Single carriageway Vehicles 2 Casualties 1 Police Ref. S1010515 Speed limit 60
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1983 Road Section: 61 Accident Type(s) ID

Causation

	Factor:	Participant:	Confidence:
1st:	Failed to judge other persons path or speed	Vehicle 1	Very Likely
2nd:	Poor turn or manoevre	Vehicle 1	Very Likely
3rd:			
4th:			
5th:			
6th:			

Vehicle Reference 1 Van or Goods 3.5 tonnes mgw and under Moving from S to E Turning right Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Front Parts damaged: 0 0 0 Age of Driver 36 Sex of Driver Male Breath test Negative

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Car Moving from N to S Going ahead other Left hand drive: No

On main carriageway
First point of impact Offside Parts damaged: 0 0 0 Age of Driver 57 Sex of Driver Female No skidding, jack-knifing or overturning Breath test Negative

Casualty Reference: 1 Age: 57 Female Driver/rider Severity: Slight Injured by vehicle: 2

Seatbelt: Worn but not independently confirmed Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Wednesday 27/05/2015 Time 1715 Slight at MICHIGAN DRIVE, NEAR DANSTEED WAY, TONGWELL, MK
E: 487708 N: 241757 Junction Detail: 0 Control
Fine without high winds Road surface Dry Daylight
C1 TRAV S/EAST ON MICHIGAN DR OVRTK OTHER VEH ON APPR TO RBT & HIT REAR C2 STAT AHEAD.
Road Type Single carriageway Vehicles 2 Casualties 1 Police Ref. S1390515 Speed limit 30
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1983 Road Section: 3 Accident Type(s) OO

Causation

	Factor:	Participant:	Confidence:
1st:	Poor turn or manoevre	Vehicle 1	Possible
2nd:			
3rd:			
4th:			
5th:			
6th:			

Vehicle Reference 1 Car Moving from N to SE Overtaking moving vehicle Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Front Parts damaged: 0 0 0 Age of Driver 35 Sex of Driver Male Breath test Negative

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Car Moving from N to SE Going ahead but held up Left hand drive: No

On main carriageway
First point of impact Back Parts damaged: 0 0 0 Age of Driver 21 Sex of Driver Female No skidding, jack-knifing or overturning Breath test Negative

Casualty Reference: 1 Age: 21 Female Driver/rider Severity: Slight Injured by vehicle: 2

Seatbelt: Unknown Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Tuesday 14/07/2015 Time 1538 Slight at A509 ROUNDABOUT JNC M1 SOUTHBND EXIT SLIP RD (JNC 14), PINEHAM, MK
E: 489188 N: 240929 Junction Detail: 1 Control 2
Fine without high winds Road surface Dry Daylight
C1 STAT AT TOP OF SLIP RD TO ENTER RBT, MC2 NEG RBT, C1 MOVED FORWARD OVER STOP LINE TO SEE TRAFFIC ON RBT, MC2 BRAKED & COLL WITH O/SIDE C1. ATS ON RBT NOT WORKING.
Road Type Dual carriageway Vehicles 2 Casualties 1 Police Ref. S0640715 Speed limit 70
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1983 Road Section: 208 Accident Type(s) CM

Causation

	Factor:	Participant:	Confidence:
1st:	Defective traffic signals	Vehicle 1	Very Likely
2nd:	Failed to judge other persons path or speed	Vehicle 1	Possible
3rd:			
4th:			
5th:			
6th:			

Vehicle Reference 1 Car Moving from N to SE Starting Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Offside Parts damaged: 0 0 0 Age of Driver 69 Sex of Driver Male Breath test Negative

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Motorcycle - unknown cc Moving from S to N Going ahead other Left hand drive: No

On main carriageway
First point of impact Front Parts damaged: 0 0 0 Age of Driver 42 Sex of Driver Male No skidding, jack-knifing or overturning Breath test Negative

Casualty Reference: 1 Age: 42 Male Driver/rider Severity: Slight Injured by vehicle: 2

Seatbelt: Not Applicable Cycle helmet Not a cyclist

Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Monday 27/07/2015 Time 2045 Serious at M1 MOTORWAY / A509 JNC 14 ROUNDABOUT, BROOK FURLONG, MK
E: 489250 N: 240900 Junction Detail: 1 Control 2
Fine without high winds Road surface Dry Daylight
GV1 NEG RBT TWDS M1 SOUTHBND ENTRY SLIP, GV1 ROLLED OVER ONTO N/SIDE.
Road Type Roundabout Vehicles 1 Casualties 1 Police Ref. S1260715 Speed limit 70
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1983 Road Section: 208 Accident Type(s) SG

Causation

	Factor:	Participant:	Confidence:
1st:	Overloaded or poorly loaded vehicle or trailer	Vehicle 1	Possible
2nd:	Poor turn or manoevre	Vehicle 1	Possible
3rd:			
4th:			
5th:			
6th:			

Vehicle Reference 1 Goods 7.5 tonnes mgw and over Moving from N to S Going ahead other Left hand drive: No

On main carriageway Overturned
First point of impact Nearside Parts damaged: 0 0 0 Age of Driver 37 Sex of Driver Male Breath test Negative

Casualty Reference: 1 Age: 37 Male Driver/rider Severity: Serious Injured by vehicle: 1

Seatbelt: Not worn Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Saturday 08/08/2015 Time 0800 Serious at H5 JNC V11 PINEHAM R0UNDABOUT, PINEHAM, MK
E: 488380 N: 240395 Junction Detail: 1 Control 4
Fine without high winds Road surface Dry Daylight
MC1 TRAV E ON H5 ENTERD RBT INTO PATH OF OTHER VEHS ALREADY CIRC RBT, RIDER LOST CONTRL OF MC1 & FELL.
Road Type Dual carriageway Vehicles 1 Casualties 1 Police Ref. S0400815 Speed limit 70
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1983 Road Section: 309 Accident Type(s) SG

Causation

	Factor:	Participant:	Confidence:
1st:	Travelling too fast for conditions	Vehicle 1	Possible
2nd:	Failed to look properly	Vehicle 1	Possible
3rd:	Failed to judge other persons path or speed	Vehicle 1	Possible
4th:	Sudden braking	Vehicle 1	Possible
5th:	Loss of control	Vehicle 1	Very Likely
6th:			

Vehicle Reference 1 Motorcycle over 500cc Moving from W to E Going ahead other Left hand drive: No

On main carriageway Skidded
First point of impact Did not impact Parts damaged: 0 0 0 Age of Driver 26 Sex of Driver Male Breath test Negative

Casualty Reference: 1 Age: 26 Male Driver/rider Severity: Serious Injured by vehicle: 1

Seatbelt: Not Applicable Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Saturday 19/09/2015 Time 1209 Serious at H5 JNC H6 NORTHFIELD ROUNDABOUT, PINEHAM, MK
E: 489070 N: 240391 Junction Detail: 1 Control 2
Fine without high winds Road surface Dry Daylight
MC2 & C1 STAT AT RED ATS ON RBT FACING TWDS A509 NORTH EXIT, MC2 IN MIDD LN, C1 IN LN 3 (MARKED RIGHT ONLY), C1 EXITED NORTH ONTO A509 & COLL WITH O/SIDE MC2.
Road Type Dual carriageway Vehicles 2 Casualties 1 Police Ref. S0650915 Speed limit 70
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1983 Road Section: 213 Accident Type(s) CN

Causation

	Factor:	Participant:	Confidence:
1st:	Careless/Reckless/In a hurry	Vehicle 1	Very Likely
2nd:	Failed to look properly	Vehicle 1	Very Likely
3rd:	Poor turn or manoevre	Vehicle 1	
4th:			
5th:			
6th:			

Vehicle Reference 1 Car Moving from S to NE Changing lane to left Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Nearside Parts damaged: 0 0 0 Age of Driver 40 Sex of Driver Female Breath test Negative

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Motor Cycle over 125 cc and up to 500cc Moving from S to NE Going ahead other Left hand drive: No

On main carriageway
First point of impact Offside Parts damaged: 0 0 0 Age of Driver 37 Sex of Driver Male No skidding, jack-knifing or overturning Breath test Negative

Casualty Reference: 1 Age: 37 Male Driver/rider Severity: Serious Injured by vehicle: 2

Seatbelt: Not Applicable Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Sunday 27/09/2015 Time 1700 Slight at H5 JNC H6 NORTHFIELD ROUNDABOUT, NORTHFIELD, MK
E: 489052 N: 240328 Junction Detail: 1 Control 4
Fine without high winds Road surface Dry Daylight
C2 NEG RBT TWDS H5 W/BND EXIT, C1 TRAV N ON H6 ENTERD RBT, C1 COLL WITH N/SIDE C2. EITHER C1 OR C2 JUMPED RED ATS.
Road Type Dual carriageway Vehicles 2 Casualties 1 Police Ref. S1600915 Speed limit 70
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1983 Road Section: 213 Accident Type(s) CM

Causation

	Factor:	Participant:	Confidence:
1st:	Failed to look properly	Vehicle 1	Possible
2nd:	Failed to look properly	Vehicle 2	Possible
3rd:	Disobeyed automatic traffic signal	Vehicle 1	Possible
4th:	Disobeyed automatic traffic signal	Vehicle 2	Possible
5th:			
6th:			

Vehicle Reference 1 Car Moving from S to N Starting Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Front Parts damaged: 0 0 0 Age of Driver 76 Sex of Driver Female Breath test Negative

Casualty Reference: 1 Age: 76 Female Driver/rider Severity: Slight Injured by vehicle: 1
Seatbelt: Unknown Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Car Moving from E to W Going ahead other Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Nearside Parts damaged: 0 0 0 Age of Driver 41 Sex of Driver Male Breath test Negative

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Thursday 10/12/2015 Time 1835 Slight at H6 JNC H5 NORTHFIELD ROUNDABOUT, NORTHFIELD, MK
E: 489082 N: 240360 Junction Detail: 1 Control 2
Raining without high winds Road surface Wet/Damp Darkness: street lights present and lit
ALLEGED THAT OTHER VEH CUT IN FRONT OF C1 CAUSING C1 TO BRAKE HARD, C2 FOLL THEN HIT REAR C1. C1 AND OTHER VEH DROVE OFF. DIR TRAV POSS WEST ON A509.
Road Type Dual carriageway Vehicles 2 Casualties 2 Police Ref. S1031215 Speed limit 70
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1983 Road Section: 213 Accident Type(s) NB

Causation

	Factor:	Participant:	Confidence:
1st:	Failed to look properly	Vehicle 1	Very Likely
2nd:	Failed to judge other persons path or speed	Vehicle 1	Very Likely
3rd:	Failed to look properly	Vehicle 1	Very Likely
4th:	Failed to judge other persons path or speed	Vehicle 1	Very Likely
5th:			
6th:			

Vehicle Reference 1 Car Moving from E to W Going ahead other Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Back Parts damaged: 0 0 0 Age of Driver Sex of Driver Unknown Breath test Driver not contacted

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Car Moving from E to W Going ahead other Left hand drive: No

On main carriageway
First point of impact Front Parts damaged: 0 0 0 Age of Driver 24 Sex of Driver Male No skidding, jack-knifing or overturning Breath test Negative

Casualty Reference: 1 Age: 34 Female Passenger Severity: Slight Injured by vehicle: 2
Seatbelt: Not worn Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Casualty Reference: 2 Age: 18 Female Passenger Severity: Slight Injured by vehicle: 2
Seatbelt: Not worn Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Sunday 21/02/2016 Time 1306 Slight at H5 JNC H6 NORTHFIELD ROUNDABOUT, PINEHAM, MK
E: 489058 N: 240382 Junction Detail: 1 Control 2
Fine without high winds Road surface Dry Daylight
GV1 (VAN) & PSV2 STAT ON RBT AT RED ATS, APPEARS GV1 ATTEMPT TO CUT ACROSS PATH PSV2 TO TRAV N ON A509 & HIT O/SIDE FRONT PSV2. GV1 OVRTRND.
Road Type Dual carriageway Vehicles 2 Casualties 1 Police Ref. S1080216 Speed limit 70
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1983 Road Section: 213 Accident Type(s) CO

Causation

	Factor:	Participant:	Confidence:
1st:	Poor turn or manoevre	Vehicle 1	Very Likely
2nd:	Aggressive driving	Vehicle 1	Very Likely
3rd:			
4th:			
5th:			
6th:			

Vehicle Reference 1 Van or Goods 3.5 tonnes mgw and under Moving from S to NE Changing lane to left Left hand drive: No

On main carriageway Overturned
First point of impact Front Parts damaged: 0 0 0 Age of Driver 43 Sex of Driver Female Breath test Negative

Casualty Reference: 1 Age: 43 Female Driver/rider Severity: Slight Injured by vehicle: 1
Seatbelt: Unknown Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Bus or coach Moving from S to SE Turning right Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Front Parts damaged: 0 0 0 Age of Driver 45 Sex of Driver Male Breath test Negative

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Monday 11/04/2016 Time 1047 Slight at H5 PORTWAY, 100METRES WEST OF JNC H6 RBT, NORTHFIELD, MK
E: 488940 N: 240357 Junction Detail: 0 Control
Fine without high winds Road surface Dry Daylight
C3, C1 & C2 TRAV WEST ON H5 FROM RBT, C3 BRAKES, C1 FAILS TO REACT & COLLS WITH REAR C3, C2 THEN COLL WITH REAR C1.
Road Type Dual carriageway Vehicles 3 Casualties 2 Police Ref. S0350416 Speed limit 70
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1983 Road Section: 304 Accident Type(s) NB

Causation

	Factor:	Participant:	Confidence:
1st:	Following too close	Vehicle 1	Very Likely
2nd:	Careless/Reckless/In a hurry	Vehicle 1	Very Likely
3rd:	Careless/Reckless/In a hurry	Vehicle 2	Very Likely
4th:	Careless/Reckless/In a hurry	Vehicle 3	Very Likely
5th:	Inexperience with type of vehicle	Vehicle 3	Possible
6th:			

Vehicle Reference 1 Car Moving from E to W Going ahead other Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Front Parts damaged: 0 0 0 Age of Driver 51 Sex of Driver Male Breath test Negative

Casualty Reference: 1 Age: 51 Male Driver/rider Severity: Slight Injured by vehicle: 1

Seatbelt: Unknown Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Car Moving from E to W Going ahead other Left hand drive: No

On main carriageway
First point of impact Front Parts damaged: 0 0 0 Age of Driver 47 Sex of Driver Female No skidding, jack-knifing or overturning Breath test Negative

Vehicle Reference 3 Car Moving from E to W Going ahead other Left hand drive: No

On main carriageway
First point of impact Back Parts damaged: 0 0 0 Age of Driver 52 Sex of Driver Male No skidding, jack-knifing or overturning Breath test Negative

Casualty Reference: 2 Age: 25 Male Passenger Severity: Slight Injured by vehicle: 3

Seatbelt: Unknown Cycle helmet Not a cyclist

Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Tuesday 19/04/2016 Time 1231 Slight at H4 JNC WILLEN ROAD, TONGWELL ROUNDABOUT, TONGWELL, MK
E: 487811 N: 241759 Junction Detail: 1 Control 4
Fine without high winds Road surface Dry Daylight
C2 & C1 TRAV S ON WILLEN RD STAT AT RBT ENTRY, C2 STARTED TO MOVE OFF THEN STOPPED, C1 MOVED OFF & HIT REAR C2.
Road Type Single carriageway Vehicles 2 Casualties 1 Police Ref. S0880416 Speed limit 60
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1983 Road Section: 8 Accident Type(s) NB

Causation

	Factor:	Participant:	Confidence:
1st:	Failed to look properly	Vehicle 1	Very Likely
2nd:	Failed to judge other persons path or speed	Vehicle 1	Very Likely
3rd:	Careless/Reckless/In a hurry	Vehicle 1	
4th:			
5th:			
6th:			

Vehicle Reference 1 Car Moving from N to S Starting Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Front Parts damaged: 0 0 0 Age of Driver 19 Sex of Driver Female Breath test Negative

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Car Moving from N to S Stopping Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Back Parts damaged: 0 0 0 Age of Driver 45 Sex of Driver Female Breath test Negative

Casualty Reference: 1 Age: 45 Female Driver/rider Severity: Slight Injured by vehicle: 2

Seatbelt: Unknown Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Tuesday 31/05/2016 Time 0929 Slight at H6 CHILDS WAY, 100METRES S/W OF JNC H5 RBT, BROUGHTON, MK
E: 489070 N: 240230 Junction Detail: 0 Control
Fine without high winds Road surface Dry Daylight
C2 TRAV S/W FROM RBT IN LN 1, GV1 TRAV S/W IN LN 2 MOVED INTO LN 1 & COLL WITH C2 PUSHING C2 OFF THE ROAD.
Road Type Dual carriageway Vehicles 2 Casualties 1 Police Ref. S1250516 Speed limit 70
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1983 Road Section: 634 Accident Type(s) MS

Causation

	Factor:	Participant:	Confidence:
1st:	Failed to look properly	Vehicle 1	Very Likely
2nd:			
3rd:			
4th:			
5th:			
6th:			

Vehicle Reference 1 Goods 7.5 tonnes mgw and over Moving from NE to S Changing lane to left Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Nearside Parts damaged: 0 0 0 Age of Driver 44 Sex of Driver Male Breath test Negative

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Car Moving from NE to S Going ahead other Left hand drive: No

On main carriageway
First point of impact Offside Parts damaged: 0 0 0 Age of Driver 29 Sex of Driver Male No skidding, jack-knifing or overturning Breath test Negative

Casualty Reference: 1 Age: 29 Male Driver/rider Severity: Slight Injured by vehicle: 2

Seatbelt: Worn but not independently confirmed Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Friday 03/06/2016 Time 1310 Slight at A509 JNC 14 M1 ROUNDABOUT, BROOK FURLONG, MK
E: 489246 N: 240886 Junction Detail: 1 Control 4
Fine without high winds Road surface Dry Daylight
LORRY IN CENTRE OF RBT REVERSING TO ACCESS M1 S/BND ENTRY SLIP, C2 PASSING LORRY ON ITS N/SIDE, GV1 (VAN) ALSO ON N/SIDE & CUT IN FRONT OF C2 COLL WITH N/SIDE FRONT C2. DRVR C2 POSS SIEZURE.
Road Type Roundabout Vehicles 2 Casualties 1 Police Ref. S0280616 Speed limit 70
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1983 Road Section: 803 Accident Type(s) MD

Causation

	Factor:	Participant:	Confidence:
1st:	Failed to look properly	Vehicle 1	Very Likely
2nd:	Poor turn or manoevre	Vehicle 1	Possible
3rd:			
4th:			
5th:			
6th:			

Vehicle Reference 1 Van or Goods 3.5 tonnes mgw and under Moving from N to S Going ahead other Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Offside Parts damaged: 0 0 0 Age of Driver 33 Sex of Driver Male Breath test Negative

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Car Moving from N to S Going ahead other Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Nearside Parts damaged: 0 0 0 Age of Driver 27 Sex of Driver Male Breath test Not provided (medical reasons)

Casualty Reference: 1 Age: 27 Male Driver/rider Severity: Slight Injured by vehicle: 2

Seatbelt: Unknown Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Sunday 12/06/2016 Time 1945 Slight at H5 JNC V11 PINEHAM ROUNDABOUT, PINEHAM, MK
E: 488389 N: 240366 Junction Detail: 1 Control 2
Raining without high winds Road surface Wet/Damp Daylight
MC1 NEG RBT, DIR TRAV NOT KNOWN, RIDER LOST CONTRL & FELL FROM MACHINE.
Road Type Dual carriageway Vehicles 1 Casualties 1 Police Ref. S0760616 Speed limit 70
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1983 Road Section: 309 Accident Type(s) SG

Causation

	Factor:	Participant:	Confidence:
1st:	Slippery road (due to weather)	Vehicle 1	Possible
2nd:	Deposit on road (eg oil, mud, chippings)	Vehicle 1	Possible
3rd:			
4th:			
5th:			
6th:			

Vehicle Reference 1 Motorcycle over 500cc Moving from Un to Un Going ahead other Left hand drive: No

On main carriageway
First point of impact Did not impact Parts damaged: 0 0 0 Age of Driver 67 Sex of Driver Male No skidding, jack-knifing or overturning Breath test Negative

Casualty Reference: 1 Age: 67 Male Driver/rider Severity: Slight Injured by vehicle: 1

Seatbelt: Not Applicable Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Tuesday 18/10/2016 Time 1521 Slight at H5 JNC V11 PINEHAM ROUNDABOUT, PINEHAM, MK
E: 488397 N: 240368 Junction Detail: 1 Control 4
Fine without high winds Road surface Dry Daylight
PSV2 STAT AT RBT ENTRY & MOVED OFF TO ENTER RBT, DIR TRAV NOT KNOWN, C1 NEG RBT CHANGED DIR ON RBT CAUSING PSV2 TO BRAKE, PASS ON PSV2 SLIPPED OFF SEAT.
Road Type Dual carriageway Vehicles 2 Casualties 1 Police Ref. 160298022 Speed limit 70
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1983 Road Section: Accident Type(s) ZZ

Causation

	Factor:	Participant:	Confidence:
1st:	Junction overshoot	Vehicle 2	Possible
2nd:			
3rd:			
4th:			
5th:			
6th:			

Vehicle Reference 1 Bus or coach Moving from Un to Un Starting Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Did not impact Parts damaged: 0 0 0 Age of Driver 50 Sex of Driver Male Breath test Driver not contacted

Casualty Reference: 1 Age: Female Passenger Severity: Slight Injured by vehicle: 1

Seatbelt: Not Applicable Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Car Moving from Un to Un Going ahead other Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Did not impact Parts damaged: 0 0 0 Age of Driver Sex of Driver Not traced Breath test Driver not contacted

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIS PARTIES

Friday 18/11/2016 Time 1502 Slight at A509 ROUNDABOUT OVER M1 JNC 14, PINEHAM, MK
E: 489179 N: 240830 Junction Detail: 1 Control 2
Fine without high winds Road surface Dry Daylight
GV1 (FORGN REG L/H DRIVE) NEG RBT IN LN 1, C2 TRAV ALONGSIDE IN LN 2, GV1 MOVED INTO LN 2 & CLIPPED C2 CAUSING C2 TO SPIN.
Road Type Roundabout Vehicles 2 Casualties 1 Police Ref. 160334932 Speed limit 60
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1983 Road Section: Accident Type(s) MD

Causation

	Factor:	Participant:	Confidence:
1st:	Vehicle blind spot	Vehicle 1	Very Likely
2nd:	Poor turn or manoevre	Vehicle 1	Possible
3rd:			
4th:			
5th:			
6th:			

Vehicle Reference 1 Goods 7.5 tonnes mgw and over Moving from S to N Changing lane to right Left hand drive: Yes

On main carriageway No skidding, jack-knifing or overturning
First point of impact Front Parts damaged: 0 0 0 Age of Driver 43 Sex of Driver Male Breath test Negative

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Car Moving from S to N Going ahead other Left hand drive: No

On main carriageway
First point of impact Nearside Parts damaged: 0 0 0 Age of Driver 75 Sex of Driver Female No skidding, jack-knifing or overturning Breath test Negative

Casualty Reference: 1 Age: 75 Female Driver/rider Severity: Slight Injured by vehicle: 2

Seatbelt: Unknown Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Sunday 26/03/2017 Time 1600 Slight at A509 / M1 JNC 14 ROUNDABOUT, BROOK FURLONG, MK
E: 489242 N: 240758 Junction Detail: 1 Control 2
Fine without high winds Road surface Dry Daylight
C1 & PC2 NEG RBT TWDS A509 S/BND EXIT, ATS CHANGE TO GREEN, C1 & PC2 MOVE OFF TOGETHER & COLL.
Road Type Dual carriageway Vehicles 2 Casualties 1 Police Ref. 170112017 Speed limit 70
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1983 Road Section: Accident Type(s) CO

Causation

	Factor:	Participant:	Confidence:
1st:	Failed to look properly	Vehicle 1	Possible
2nd:	Failed to look properly	Vehicle 2	Possible
3rd:			
4th:			
5th:			
6th:			

Vehicle Reference 1 Car Moving from NE to S Starting Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Nearside Parts damaged: 0 0 0 Age of Driver 51 Sex of Driver Female Breath test Negative

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Pedal Cycle Moving from NE to S Starting Left hand drive: No

On main carriageway
No skidding, jack-knifing or overturning
First point of impact Offside Parts damaged: 0 0 0 Age of Driver 58 Sex of Driver Male Breath test Not applicable

Casualty Reference: 1 Age: 58 Male Driver/rider Severity: Slight Injured by vehicle: 2

Seatbelt: Not Applicable Cycle helmet Yes
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Saturday 15/07/2017 Time 1830 Slight at A509 JNC COACHWAY ACCESS ROAD, BROOK FURLONG, MK
E: 489213 N: 240562 Junction Detail: 3 Control 4
Fine without high winds Road surface Dry Daylight
C1 TRAV S/W ON A509 FROM JNC 14 IN LN 1, C2 TRAV S/W IN LN 2 CUTS ACROSS PATH C1 & TURNS LEFT INTO COACHWAY, C2 COLL WITH C1 THEN FAILS TO STOP.
Road Type Dual carriageway Vehicles 2 Casualties 1 Police Ref. 170214319 Speed limit 70
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1983 Road Section: Accident Type(s) EB

Causation

	Factor:	Participant:	Confidence:
1st:	Poor turn or manoevre	Vehicle 1	Very Likely
2nd:	Careless/Reckless/In a hurry	Vehicle 1	Very Likely
3rd:			
4th:			
5th:			
6th:			

Vehicle Reference 1 Car Moving from NE to S Going ahead other Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Back Parts damaged: 0 0 0 Age of Driver 25 Sex of Driver Female Breath test Negative

Casualty Reference: 1 Age: 25 Female Driver/rider Severity: Slight Injured by vehicle: 1
Seatbelt: Worn but not independently confirmed Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Car Moving from NE to SE Turning left Left hand drive: No

On main carriageway
First point of impact Front Parts damaged: 0 0 0 Age of Driver Sex of Driver No skidding, jack-knifing or overturning
Unknown Breath test Driver not contacted

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Monday 25/09/2017 Time 1445 Slight at H5 JNC H6 NORTHFIELD ROUNDABOUT, NORTHFIELD, MK
E: 489111 N: 240336 Junction Detail: 1 Control 2
Fine without high winds Road surface Dry Daylight
C2 NEG RBT SOUTH DIR IN CENT LN FOLL BY C1, OTHER VEH AHEAD BRAKES & SUDD CHANGES DIR CAUSING C2 TO BRAKE, C1 FAILS TO REACT & COLLS WITH REAR C2.
Road Type Dual carriageway Vehicles 2 Casualties 2 Police Ref. 170295238 Speed limit 70
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1983 Road Section: Accident Type(s) NB

Causation

	Factor:	Participant:	Confidence:
1st:	Failed to judge other persons path or speed	Vehicle 1	Possible
2nd:	Sudden braking	Vehicle 2	Possible
3rd:			
4th:			
5th:			
6th:			

Vehicle Reference 1 Car Moving from N to S Going ahead other Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Front Parts damaged: 0 0 0 Age of Driver 38 Sex of Driver Female Breath test Negative

Casualty Reference: 1 Age: 38 Female Driver/rider Severity: Slight Injured by vehicle: 1

Seatbelt: Unknown Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Car Moving from N to S Going ahead other Left hand drive: No

On main carriageway
First point of impact Back Parts damaged: 0 0 0 Age of Driver 32 Sex of Driver Male No skidding, jack-knifing or overturning Breath test Negative

Casualty Reference: 2 Age: 32 Male Driver/rider Severity: Slight Injured by vehicle: 2

Seatbelt: Unknown Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Monday 30/10/2017 Time 1054 Slight at H5 JNC V11 PINEHAM ROUNDABOUT, WILLEN, MK
E: 488363 N: 240382 Junction Detail: 1 Control 4
Fine without high winds Road surface Dry Daylight
GV1 TRAV E ON H5 ENTERS RBT IN MIDDLE LN, C2 TRAV SAME DIR ENTERS RBT IN O/S LN, GV1 CUTS ACROSS RBT & COLL WITH C2 PUSHING C2 ONTO CENT ISLND.
Road Type Dual carriageway Vehicles 2 Casualties 1 Police Ref. 170332119 Speed limit 70
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1983 Road Section: Accident Type(s) CO

Causation

	Factor:	Participant:	Confidence:
1st:	Poor turn or manoevre	Vehicle 1	Very Likely
2nd:	Careless/Reckless/In a hurry	Vehicle 1	Very Likely
3rd:	Fatigue	Vehicle 1	
4th:			
5th:			
6th:			

Vehicle Reference 1 Goods vehicle - unknown weight Moving from W to E Going ahead other Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Offside Parts damaged: 0 0 0 Age of Driver 51 Sex of Driver Male Breath test Negative

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Car Moving from W to E Going ahead other Left hand drive: No

On main carriageway
First point of impact Nearside Parts damaged: 0 0 0 Age of Driver 29 Sex of Driver Female No skidding, jack-knifing or overturning Breath test Negative

Casualty Reference: 1 Age: 29 Female Driver/rider Severity: Slight Injured by vehicle: 2

Seatbelt: Unknown Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Sunday 18/02/2018 Time 0635 Slight at V11 JNC H4 TONGWELL ROUNDABOUT, TONGWELL, MK
E: 487819 N: 241700 Junction Detail: 1 Control 4
Fine without high winds Road surface Wet/Damp Darkness: street lights present and lit
GV1 (VAN) TRAV N/W ON V11, DRVR FAILS TO NEG RBT & GV1 COLL WITH SPLITTER ISLND THEN CENT ISLND OF RBT.
Road Type Single carriageway Vehicles 1 Casualties 1 Police Ref. 180057730 Speed limit 60
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1983 Road Section: Accident Type(s) SG

Causation

	Factor:	Participant:	Confidence:
1st:	Fatigue	Vehicle 1	Possible
2nd:	Illness or disability, mental or physical	Vehicle 1	Possible
3rd:			
4th:			
5th:			
6th:			

Vehicle Reference 1 Van or Goods 3.5 tonnes mgw and under Moving from SE to N Going ahead other Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Front Parts damaged: 0 0 0 Age of Driver 47 Sex of Driver Male Breath test Negative

Casualty Reference: 1 Age: 47 Male Driver/rider Severity: Slight Injured by vehicle: 1

Seatbelt: Worn and independently confirmed Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Saturday 24/02/2018 Time 1549 Serious at A509 JNC 14 M1 ROUNDABOUT, BROOK FURLONG, MK
E: 489182 N: 240919 Junction Detail: 1 Control 2
Fine without high winds Road surface Dry Daylight
C2 TRAV N ON RBT & STAT AT RED ATS, GV1 (VAN WITH TRAILER) TRAV N ON RBT, DRVR GV1 FAILS TO SEE STAT C2 AHEAD, GV1 COLL WITH REAR C2 THEN CAREERS ACROSS S/BND SLIP RD & COLL WITH TRAFF SIGNALS & TWO STAT VEHS ON SLIP RD.
Road Type Roundabout Vehicles 2 Casualties 1 Police Ref. 180065772 Speed limit 40
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1983 Road Section: Accident Type(s) NB

Causation

	Factor:	Participant:	Confidence:
1st:	Travelling too fast for conditions	Vehicle 1	Possible
2nd:	Failed to judge other persons path or speed	Vehicle 1	Possible
3rd:	Poor turn or manoevre	Vehicle 1	
4th:			
5th:			
6th:			

Vehicle Reference 1 Van or Goods 3.5 tonnes mgw and under Moving from S to N Going ahead other Left hand drive: No

On main carriageway Skidded and overturned
First point of impact Front Parts damaged: 0 0 0 Age of Driver 29 Sex of Driver Male Breath test Negative

Casualty Reference: 1 Age: 29 Male Driver/rider Severity: Serious Injured by vehicle: 1

Seatbelt: Unknown Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Car Moving from S to N Going ahead but held up Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Back Parts damaged: 0 0 0 Age of Driver 58 Sex of Driver Female Breath test Negative

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Wednesday 28/02/2018 Time 0525 Slight at H5 PORTWAY, 150M WEST OF JNC V11 PINEHAM RBT, WILLEN, MK
E: 488209 N: 240361 Junction Detail: 0 Control
Fine without high winds Road surface Frost/Ice Darkness: street lights present and lit
PC1 TRAV EAST ON H5 IN LN 1, C2 TRAV EAST IN LN 2, PC1 MOVED INTO LN 2 & INTO PATH C2, C2 COLL WITH REAR PC1.
Road Type Dual carriageway Vehicles 2 Casualties 1 Police Ref. 180063729 Speed limit 70
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1983 Road Section: Accident Type(s) MD

Causation

	Factor:	Participant:	Confidence:
1st:	Failed to look properly	Vehicle 1	Very Likely
2nd:	Failed to judge other persons path or speed	Vehicle 1	Very Likely
3rd:	Careless/Reckless/In a hurry	Vehicle 1	
4th:			
5th:			
6th:			

Vehicle Reference 1 Pedal Cycle Moving from W to E Changing lane to right Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Back Parts damaged: 0 0 0 Age of Driver 27 Sex of Driver Male Breath test Not applicable

Casualty Reference: 1 Age: 27 Male Driver/rider Severity: Slight Injured by vehicle: 1

Seatbelt: Not Applicable Cycle helmet Yes
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Car Moving from W to E Going ahead other Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Front Parts damaged: 0 0 0 Age of Driver 65 Sex of Driver Female Breath test Negative

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Friday 09/03/2018 Time 2200 Slight at H5 JNC H6 NORTHFIELD ROUNDABOUT, NORTHFIELD, MK
E: 489092 N: 240356 Junction Detail: 1 Control 2
Fine without high winds Road surface Wet/Damp Darkness: street lights present and lit
C2 NEG RBT IN LN 1, DIR TRAV NOT KNOWN, GV1 NEG RBT IN LN 2 DRIFTED INTO LN 1 & COLL WITH C2.
Road Type Dual carriageway Vehicles 2 Casualties 3 Police Ref. 180080504 Speed limit 70
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1983 Road Section: Accident Type(s) CM

Causation

	Factor:	Participant:	Confidence:
1st:	Poor turn or manoevre	Vehicle 1	Possible
2nd:			
3rd:			
4th:			
5th:			
6th:			

Vehicle Reference 1 Goods vehicle - unknown weight Moving from Un to Un Going ahead other Left hand drive: No

On main carriageway
First point of impact Nearside Parts damaged: 0 0 0 Age of Driver Sex of Driver Male
No skidding, jack-knifing or overturning
Breath test Driver not contacted

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Car Moving from Un to Un Going ahead other Left hand drive: No

On main carriageway
First point of impact Offside Parts damaged: 0 0 0 Age of Driver 33 Sex of Driver Male Breath test Driver not contacted
No skidding, jack-knifing or overturning

Casualty Reference: 1 Age: 33 Male Driver/rider Severity: Slight Injured by vehicle: 2
Seatbelt: Unknown Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Casualty Reference: 2 Age: 28 Female Passenger Severity: Slight Injured by vehicle: 2
Seatbelt: Unknown Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Casualty Reference: 3 Age: 7 Female Passenger Severity: Slight Injured by vehicle: 2
Seatbelt: Unknown Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Monday 04/06/2018 Time 1615 Slight at M1 MOTORWAY, SOUTHBND EXIT SLIP LANE TO JNC 14 ROUNDABOUT, PINEHAM, MK
E: 489171 N: 240924 Junction Detail: 1 Control 2
Fine without high winds Road surface Dry Daylight
C2 TRAV ON S/BND EXIT SLIP STOPS AT RBT FOR RED ATS, C1 STOPS BEHIND C2, DRVR C1 FOOT SLIPPED OFF CLUTCH PEDAL, C1 HIT REAR C2.
Road Type Dual carriageway Vehicles 2 Casualties 1 Police Ref. 180168903 Speed limit 70
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1983 Road Section: Accident Type(s) NB

Causation

	Factor:	Participant:	Confidence:
1st:	Inexperience with type of vehicle	Vehicle 1	Very Likely
2nd:	Other	Vehicle 1	Very Likely
3rd:			
4th:			
5th:			
6th:			

DRVR C1 FOOT SLIPPED OFF CLUTCH PEDAL.

Vehicle Reference 1 Car Moving from N to SE Starting Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Front Parts damaged: 0 0 0 Age of Driver 36 Sex of Driver Male Breath test Negative

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Car Moving from N to SE Going ahead but held up Left hand drive: No

On main carriageway
First point of impact Back Parts damaged: 0 0 0 Age of Driver 40 Sex of Driver Male No skidding, jack-knifing or overturning Breath test Negative

Casualty Reference: 1 Age: 40 Male Driver/rider Severity: Slight Injured by vehicle: 2

Seatbelt: Unknown Cycle helmet Not a cyclist

Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Saturday 22/09/2018 Time 1750 Slight at H5 JNC V11 PINEHAM ROUNDABOUT, NORTHFIELD, MK
E: 488365 N: 240347 Junction Detail: 1 Control 2
Raining without high winds Road surface Wet/Damp Daylight
C1 TRAV WEST NEG RBT, DRVR LOST CONTRL ON RBT EXIT, C1 SKIDDED & LEFT C/WAY TO N/SIDE COLL WITH BARRIER.
Road Type Dual carriageway Vehicles 1 Casualties 1 Police Ref. 180293967 Speed limit 70
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1983 Road Section: Accident Type(s) SG

Causation

	Factor:	Participant:	Confidence:
1st:	Travelling too fast for conditions	Vehicle 1	Possible
2nd:			
3rd:			
4th:			
5th:			
6th:			

Vehicle Reference 1 Car Moving from E to W Going ahead other Left hand drive: No

On main carriageway Skidded
First point of impact Front Parts damaged: 0 0 0 Age of Driver Sex of Driver Male Breath test Driver not contacted

Casualty Reference: 1 Age: Male Driver/rider Severity: Slight Injured by vehicle: 1

Seatbelt: Unknown Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Friday 12/10/2018 Time 1550 Slight at H5 PORTWAY, 100M WEST OF JNC V11 RBT, WILLEN LAKE, MK
E: 488255 N: 240352 Junction Detail: 0 Control
Fine with high winds Road surface Dry Daylight
ALL VEHS TRAV WEST ON H5, C3 TRAV IN LN 2 & SLOWING, GV2 (VAN) TRAV IN LN 1 MOVES INTO LN 2, C1 FOLL COLLS INTO REAR GV2, GV2 COLL WITH REAR C3.
Road Type Dual carriageway Vehicles 3 Casualties 2 Police Ref. 180317373 Speed limit 70
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1983 Road Section: Accident Type(s) MD

Causation

	Factor:	Participant:	Confidence:
1st:	Driving too slow for conditions or slow veh	Vehicle 3	Possible
2nd:	Failed to look properly	Vehicle 2	Possible
3rd:	Failed to judge other persons path or speed	Vehicle 1	
4th:			
5th:			
6th:			

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 1 Car Moving from E to W Going ahead other Left hand drive: No

On main carriageway
First point of impact Front Parts damaged: 0 0 0 Age of Driver 38 Sex of Driver Male
No skidding, jack-knifing or overturning
Breath test Negative

Casualty Reference: 1 Age: 38 Male Driver/rider Severity: Slight Injured by vehicle: 1
Seatbelt: Worn and independently confirmed Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Casualty Reference: 2 Age: 29 Female Passenger Severity: Slight Injured by vehicle: 1
Seatbelt: Worn and independently confirmed Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Vehicle Reference 2 Van or Goods 3.5 tonnes mgw and under Moving from E to W Changing lane to right Left hand drive: No

On main carriageway
First point of impact Back Parts damaged: 0 0 0 Age of Driver 65 Sex of Driver Male
No skidding, jack-knifing or overturning
Breath test Negative

Vehicle Reference 3 Car Moving from E to W Stopping Left hand drive: No

On main carriageway
First point of impact Back Parts damaged: 0 0 0 Age of Driver 41 Sex of Driver Female
No skidding, jack-knifing or overturning
Breath test Negative

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Tuesday 06/11/2018 Time 1400 Slight at H5 JNC A5130 NORTHFIELD ROUNDABOUT, NORTHFIELD, MK
E: 489112 N: 240370 Junction Detail: 1 Control 2
Fine without high winds Road surface Dry Daylight
C2 NEG RBT TWDS A5130 EXIT WHEN STRUCK FROM BEHIND BY C1.
Road Type Dual carriageway Vehicles 2 Casualties 1 Police Ref. 180347896 Speed limit 70
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1983 Road Section: Accident Type(s) CO

Causation

	Factor:	Participant:	Confidence:
1st:	Temporary road layout (eg contraflow)	Vehicle 1	Possible
2nd:	Disobeyed Give Way or Stop sign or markings	Vehicle 1	Possible
3rd:	Careless/Reckless/In a hurry	Vehicle 1	
4th:			
5th:			
6th:			

Vehicle Reference 1 Car Moving from W to E Going ahead other Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Front Parts damaged: 0 0 0 Age of Driver 25 Sex of Driver Female Breath test Driver not contacted

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Car Moving from W to E Going ahead other Left hand drive: No

On main carriageway
First point of impact Back Parts damaged: 0 0 0 Age of Driver 52 Sex of Driver Female No skidding, jack-knifing or overturning Breath test Driver not contacted

Casualty Reference: 1 Age: 52 Female Driver/rider Severity: Slight Injured by vehicle: 2

Seatbelt: Unknown Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Sunday 09/12/2018 Time 2310 Slight at H5 JNC H6 NORTHFIELD ROUNDABOUT, NORTHFIELD, MK
E: 489053 N: 240328 Junction Detail: 1 Control 2
Fine without high winds Road surface Dry Darkness: street lights present and lit
C1 NEG RBT TO EXIT W/BND ONTO H5, C2 TRAV NORTH ON H6 & ENTERING RBT ON GREEN ATS, C1 PASSES THRU RED ATS ON RBT & COLLS WITH C2.
Road Type Dual carriageway Vehicles 2 Casualties 1 Police Ref. 180383925 Speed limit 70
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1983 Road Section: Accident Type(s) CM

Causation

	Factor:	Participant:	Confidence:
1st:	Failed to judge other persons path or speed	Vehicle 1	Very Likely
2nd:	Defective traffic signals	Vehicle 1	Very Likely
3rd:			
4th:			
5th:			
6th:			

Vehicle Reference 1 Car Moving from E to W Going ahead other Left hand drive: No

On main carriageway Overturned
First point of impact Front Parts damaged: 0 0 0 Age of Driver 61 Sex of Driver Male Breath test Negative

Casualty Reference: 1 Age: 61 Male Driver/rider Severity: Slight Injured by vehicle: 1
Seatbelt: Worn and independently confirmed Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Car Moving from S to N Going ahead other Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Front Parts damaged: 0 0 0 Age of Driver 26 Sex of Driver Male Breath test Negative

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Tuesday 15/01/2019 Time 0728 Slight at M1 MOTORWAY, SOUTHBND EXIT SLIP ROAD TO JNC 14 RBT, PINEHAM, MILTON KEYNES
E: 489131 N: 240945 Junction Detail: 0 Control
Fine without high winds Road surface Dry Darkness: street lighting unknown
C2 TRAV SOUTH & IN STAT TRAFF ON SLIP RD, GV1 TRAV SAME DIR COLLS WITH REAR C2. GV1 PULLS AROUND C2 THEN DRIVES OFF FROM SCENE.
Road Type Slip road Vehicles 2 Casualties 1 Police Ref. 190016874 Speed limit 70
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1983 Road Section: Accident Type(s) NB

Causation

	Factor:	Participant:	Confidence:
1st:	Careless/Reckless/In a hurry	Vehicle 1	Possible
2nd:			
3rd:			
4th:			
5th:			
6th:			

Vehicle Reference 1 Goods vehicle - unknown weight Moving from N to SE Going ahead other Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Front Parts damaged: 0 0 0 Age of Driver Sex of Driver Unknown Breath test Driver not contacted

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Car Moving from N to SE Going ahead but held up Left hand drive: No

On main carriageway
No skidding, jack-knifing or overturning
First point of impact Back Parts damaged: 0 0 0 Age of Driver 25 Sex of Driver Male Breath test Driver not contacted

Casualty Reference: 1 Age: 25 Male Driver/rider Severity: Slight Injured by vehicle: 2

Seatbelt: Unknown Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Thursday 07/02/2019 Time 0840 Slight at V11 JNC H5 PINEHAM ROUNDABOUT, FOX MILNE, MK
E: 488390 N: 240333 Junction Detail: 1 Control 4
Fine without high winds Road surface Dry Daylight
C2 TRAV NORTH ON V11 & STAT AT ENTRY TO RBT, C1 TRAV SAME DIR COLLS WITH REAR C2.
Road Type Single carriageway Vehicles 2 Casualties 1 Police Ref. 190045180 Speed limit 60
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1983 Road Section: Accident Type(s) NB

Causation

	Factor:	Participant:	Confidence:
1st:			
2nd:			
3rd:			
4th:			
5th:			
6th:			

Vehicle Reference 1 Car Moving from S to N Going ahead other Left hand drive: No

On main carriageway
First point of impact Front Parts damaged: 0 0 0 Age of Driver Sex of Driver
No skidding, jack-knifing or overturning
Unknown Breath test Driver not contacted

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Car Moving from S to N Going ahead but held up Left hand drive: No

On main carriageway
No skidding, jack-knifing or overturning
First point of impact Back Parts damaged: 0 0 0 Age of Driver 43 Sex of Driver Female Breath test Driver not contacted

Casualty Reference: 1 Age: 43 Female Driver/rider Severity: Slight Injured by vehicle: 2

Seatbelt: Unknown Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Monday 11/02/2019 Time 1536 Slight at A509 ROUNDABOUT JNC 14 M1, PINEHAM, MK
E: 489198 N: 240738 Junction Detail: 1 Control 2
Fine without high winds Road surface Dry Daylight
C1, C2 & C3 TRAV NORTH ON A509 APPR RBT, C1 BRAKES LATE & HARD, C2 FOLL COLLS WITH REAR C1, C3 FOLL C2 & COLLS WITH REAR C2.
Road Type Dual carriageway Vehicles 3 Casualties 1 Police Ref. 190064219 Speed limit 70
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1983 Road Section: Accident Type(s) NB

Causation

	Factor:	Participant:	Confidence:
1st:	Sudden braking	Vehicle 1	Possible
2nd:	Nervous/Uncertain/Panic	Vehicle 1	Possible
3rd:	Following too close	Vehicle 2	Possible
4th:	Following too close	Vehicle 3	Possible
5th:			
6th:			

Vehicle Reference 1 Car Moving from S to N Stopping Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Back Parts damaged: 0 0 0 Age of Driver 20 Sex of Driver Female Breath test Not requested

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Car Moving from S to N Going ahead other Left hand drive: No

On main carriageway
First point of impact Front Parts damaged: 0 0 0 Age of Driver 62 Sex of Driver Male
No skidding, jack-knifing or overturning
Breath test Not requested

Casualty Reference: 1 Age: 64 Female Passenger Severity: Slight Injured by vehicle: 2

Seatbelt: Unknown Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Vehicle Reference 3 Car Moving from S to N Going ahead other Left hand drive: No

On main carriageway
First point of impact Front Parts damaged: 0 0 0 Age of Driver 24 Sex of Driver Male
No skidding, jack-knifing or overturning
Breath test Negative

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Wednesday 13/03/2019 Time 0640 Slight at A509 ROUNDABOUT JNC 14 M1, PINEHAM, MK
E: 489179 N: 240913 Junction Detail: 1 Control 2
Fine without high winds Road surface Wet/Damp Daylight
GV2 (VAN) TRAV NORTH ON RBT & STAT AT RED ATS, C1 TRAV SAME DIR COLLS WITH REAR GV2. C1 THEN LEAVES SCENE.
Road Type Roundabout Vehicles 2 Casualties 1 Police Ref. 190078199 Speed limit 60
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1983 Road Section: Accident Type(s) NB

Causation

	Factor:	Participant:	Confidence:
1st:			
2nd:			
3rd:			
4th:			
5th:			
6th:			

Vehicle Reference 1 Car Moving from S to N Going ahead other Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Front Parts damaged: 0 0 0 Age of Driver 35 Sex of Driver Female Breath test Driver not contacted

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Van or Goods 3.5 tonnes mgw and under Moving from S to N Going ahead but held up Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Back Parts damaged: 0 0 0 Age of Driver 32 Sex of Driver Male Breath test Driver not contacted

Casualty Reference: 1 Age: 32 Male Driver/rider Severity: Slight Injured by vehicle: 2

Seatbelt: Unknown Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Thursday 04/07/2019 Time 1545 Slight at A509 JNC M1 ROUNDABOUT- JNC 14, BROOK FURLONG, MK
E: 489237 N: 240755 Junction Detail: 1 Control 2
Fine without high winds Road surface Dry Daylight
C2 & GV1 (VAN) STAT AT RBT ENTRY TOP OF N/BND EXIT SLIP RD FROM M1, ATS TURNED GREEN C2 & GV1 MOVED OFF, OTHER VEH APP FROM RIGHT THRU RED ATS, C2 BRAKED, GV1 HIT REAR C2.
Road Type Roundabout Vehicles 2 Casualties 1 Police Ref. 190207636 Speed limit 60
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1983 Road Section: Accident Type(s) NB

Causation

	Factor:	Participant:	Confidence:
1st:			
2nd:			
3rd:			
4th:			
5th:			
6th:			

Vehicle Reference 1 Van or Goods 3.5 tonnes mgw and under Moving from SE to N Starting Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Front Parts damaged: 0 0 0 Age of Driver 39 Sex of Driver Male Breath test Driver not contacted

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Car Moving from SE to N Stopping Left hand drive: No

On main carriageway
No skidding, jack-knifing or overturning
First point of impact Back Parts damaged: 0 0 0 Age of Driver 42 Sex of Driver Male Breath test Driver not contacted

Casualty Reference: 1 Age: 42 Male Driver/rider Severity: Slight Injured by vehicle: 2

Seatbelt: Unknown Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Friday 11/10/2019 Time 1651 Serious at V11 TONGWELL ST JNC CARLETON GATE, WILLEN, MK
E: 488201 N: 241385 Junction Detail: 3 Control 4
Fine without high winds Road surface Wet/Damp Daylight
C2 STAT ON CARLTN GT TO TURN RIGHT ONTO V11, GV1 (VAN) TRAV N/W ON V11 APPR JNC, DRVR GV1 CLAIMS TO HAVE BLACKED OUT & GV1 COLLS WITH O/SIDE C2. GV1 THEN COLLS WITH TRAFF SIGN.
Road Type Single carriageway Vehicles 2 Casualties 1 Police Ref. 190316337 Speed limit 60
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1983 Road Section: Accident Type(s) ZZ

Causation

	Factor:	Participant:	Confidence:
1st:	Illness or disability, mental or physical	Vehicle 1	Very Likely
2nd:			
3rd:			
4th:			
5th:			
6th:			

Vehicle Reference 1 Van or Goods 3.5 tonnes mgw and under Moving from SE to N Going ahead other Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Front Parts damaged: 0 0 0 Age of Driver 46 Sex of Driver Male Breath test Negative

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Car Moving from S to SE Waiting to turn right Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Offside Parts damaged: 0 0 0 Age of Driver 60 Sex of Driver Female Breath test Negative

Casualty Reference: 1 Age: 60 Female Driver/rider Severity: Serious Injured by vehicle: 2

Seatbelt: Worn and independently confirmed Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Monday 25/11/2019 Time 2017 Slight at H5 JNC V11 PINEHAM ROUNDABOUT, FOX MILNE, MK
E: 488381 N: 240345 Junction Detail: 1 Control 4
Raining without high winds Road surface Wet/Damp Darkness: street lights present and lit
PC2 TRAV WEST ON H5 NEG RBT, C1 TRAV NORTH ON V11 DOES NOT SEE PC2 & ENTERS RBT COLL WITH PC2 AT LOW SPEED. PC2 NO LIGHTS.
Road Type Dual carriageway Vehicles 2 Casualties 1 Police Ref. 190371724 Speed limit 70
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1983 Road Section: Accident Type(s) CM

Causation

	Factor:	Participant:	Confidence:
1st:	Not displaying lights at night or in poor visibility	Vehicle 2	Very Likely
2nd:			
3rd:			
4th:			
5th:			
6th:			

Vehicle Reference 1 Car Moving from S to N Going ahead other Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Front Parts damaged: 0 0 0 Age of Driver 41 Sex of Driver Male Breath test Negative

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Pedal Cycle Moving from E to W Going ahead other Left hand drive: No

On main carriageway
First point of impact Nearside Parts damaged: 0 0 0 Age of Driver 51 Sex of Driver Male No skidding, jack-knifing or overturning Breath test Not applicable

Casualty Reference: 1 Age: 51 Male Driver/rider Severity: Slight Injured by vehicle: 2

Seatbelt: Not Applicable Cycle helmet Yes

Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Wednesday 18/12/2019 Time 2012 Slight at M1 MOTORWAY, NORTHBND ON-SLIP RD FROM JNC 14 RBT, PINEHAM, MK
E: 489147 N: 240831 Junction Detail: 0 Control
Fine without high winds Road surface Wet/Damp Darkness: no street lighting
GV1 & C2 TRAV ON SLIP RD N/BND, FRONT C2 COLLS WITH O/SIDE GV1. C2 OVRTURNS.
Road Type Slip road Vehicles 2 Casualties 2 Police Ref. 190395296 Speed limit 70
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1983 Road Section: Accident Type(s) ZZ

Causation

	Factor:	Participant:	Confidence:
1st:	Careless/Reckless/In a hurry	Vehicle 2	Possible
2nd:	Failed to judge other persons path or speed	Vehicle 2	Possible
3rd:	Following too close	Vehicle 1	
4th:			
5th:			
6th:			

Vehicle Reference 1 Goods 7.5 tonnes mgw and over Moving from SE to N Going ahead other Left hand drive: No

On main carriageway
First point of impact Offside Parts damaged: 0 0 0 Age of Driver Sex of Driver Male No skidding, jack-knifing or overturning Breath test Negative

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Car Moving from SE to N Going ahead other Left hand drive: No

On main carriageway
First point of impact Front Parts damaged: 0 0 0 Age of Driver 31 Sex of Driver Female No skidding, jack-knifing or overturning Breath test Negative

Casualty Reference: 1 Age: 31 Female Driver/rider Severity: Slight Injured by vehicle: 2
Seatbelt: Unknown Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Casualty Reference: 2 Age: 20 Male Passenger Severity: Slight Injured by vehicle: 2
Seatbelt: Unknown Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Thursday 26/12/2019 Time 2050 Slight at H5 JNC H6 NORTHFIELD ROUNDABOUT, NORTHFIELD, MK
E: 489062 N: 240325 Junction Detail: 1 Control 2
Fine without high winds Road surface Dry Darkness: street lights present and lit
C2 NEG RBT TO EXIT W/BND ONTO H5, C1 NEG RBT COLLS WITH O/SIDE C2. DRVR C1 ALCOHOL IMPRMNT, C1 DID NOT EXCHANGE DETAILS & LEFT THE SCENE.
Road Type Dual carriageway Vehicles 2 Casualties 1 Police Ref. 190406027 Speed limit 70
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1983 Road Section: Accident Type(s) CO

Causation

	Factor:	Participant:	Confidence:
1st:	Impaired by alcohol	Vehicle 1	Possible
2nd:			
3rd:			
4th:			
5th:			
6th:			

Vehicle Reference 1 Car Moving from E to W Going ahead other Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Front Parts damaged: 0 0 0 Age of Driver Sex of Driver Female Breath test Driver not contacted

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Car Moving from E to W Going ahead other Left hand drive: Yes

On main carriageway
First point of impact Offside Parts damaged: 0 0 0 Age of Driver Sex of Driver No skidding, jack-knifing or overturning
Unknown Breath test Driver not contacted

Casualty Reference: 1 Age: 21 Passenger Severity: Slight Injured by vehicle: 2

Seatbelt: Unknown Cycle helmet Not a cyclist
Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Friday 27/12/2019 Time 1950 Slight at A509 JNC WITH M1 JNC 14 ROUNDABOUT, PINEHAM, MK
E: 489195 N: 240739 Junction Detail: 1 Control 2
Fine without high winds Road surface Wet/Damp Darkness: street lighting unknown
C2 TRAV NORTH ON A509 STAT AT ENTRY TO RBT, C1 FOLL COLLS WITH REAR C2.
Road Type Dual carriageway Vehicles 2 Casualties 1 Police Ref. 190403179 Speed limit 70
Crossing: Control 0 Facilities 0 Local Authority: E06000042 Parish: 1983 Road Section: Accident Type(s) NB

Causation

	Factor:	Participant:	Confidence:
1st:	Failed to look properly	Vehicle 1	Very Likely
2nd:	Failed to judge other persons path or speed	Vehicle 1	Possible
3rd:			
4th:			
5th:			
6th:			

Vehicle Reference 1 Car Moving from S to N Going ahead other Left hand drive: No

On main carriageway No skidding, jack-knifing or overturning
First point of impact Front Parts damaged: 0 0 0 Age of Driver 32 Sex of Driver Male Breath test Negative

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Vehicle Reference 2 Car Moving from S to N Going ahead but held up Left hand drive: No

On main carriageway
First point of impact Back Parts damaged: 0 0 0 Age of Driver 46 Sex of Driver Female No skidding, jack-knifing or overturning Breath test Negative

Casualty Reference: 1 Age: 46 Female Driver/rider Severity: Slight Injured by vehicle: 2

Seatbelt: Unknown Cycle helmet Not a cyclist

Ped. Location Ped. Movement Ped. Direction Ped. Injury School pupil: 0

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
A509, Tongwell Street.

CONFIDENTIAL ROAD ACCIDENT INFORMATION: NOT TO BE TRANSMITTED TO THIRD PARTIES

Accidents involving:

	Fatal	Serious	Slight	Total
Motor vehicles only (excluding 2-wheels)	0	3	29	32
2-wheeled motor vehicles	0	2	2	4
Pedal cycles	0	0	3	3
Horses & other	0	0	0	0
Total	0	5	34	39

Casualties:

	Fatal	Serious	Slight	Total
Vehicle driver	0	3	27	30
Passenger	0	0	10	10
Motorcycle rider	0	2	1	3
Cyclist	0	0	3	3
Pedestrian	0	0	0	0
Other	0	0	0	0
Total	0	5	41	46

Number of casualties meeting the criteria: **46**

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
Tongwell Street (fatal).

Monday 11/01/2016 Time 1428 Fatal at V11 TONGWELL STREET, VICINITY OF M1 FOOTBRIDGE, WILLEN, MK
E: 488085 N: 241539 Junction Detail: 0 Control
Fine without high winds Road surface Wet/Damp Daylight

Vehicle Reference 1 Minibus Moving from N to S Going ahead other Left hand drive: No

Casualty Reference: 1 Age: 65 Male Driver/rider Severity: Slight Injured by vehicle: 1
Seatbelt: Worn but not independently confirmed Cycle helmet Not a cyclist

Vehicle Reference 2 Car Moving from S to N Going ahead other Left hand drive: No

Casualty Reference: 2 Age: 60 Male Driver/rider Severity: Fatal Injured by vehicle: 2
Seatbelt: Worn and independently confirmed Cycle helmet Not a cyclist

Vehicle Reference 3 Car Moving from S to N Going ahead other Left hand drive: No

Casualty Reference: 3 Age: 66 Female Driver/rider Severity: Serious Injured by vehicle: 3
Seatbelt: Worn and independently confirmed Cycle helmet Not a cyclist

Accidents between dates **01/02/2015** **and** **31/01/2020** (60) months

Selection:
Selected using Manual Selection

Notes:
Tongwell Street (fatal).

Accidents involving:

	Fatal	Serious	Slight	Total
Motor vehicles only (excluding 2-wheels)	1	0	0	1
2-wheeled motor vehicles	0	0	0	0
Pedal cycles	0	0	0	0
Horses & other	0	0	0	0
Total	1	0	0	1

Casualties:

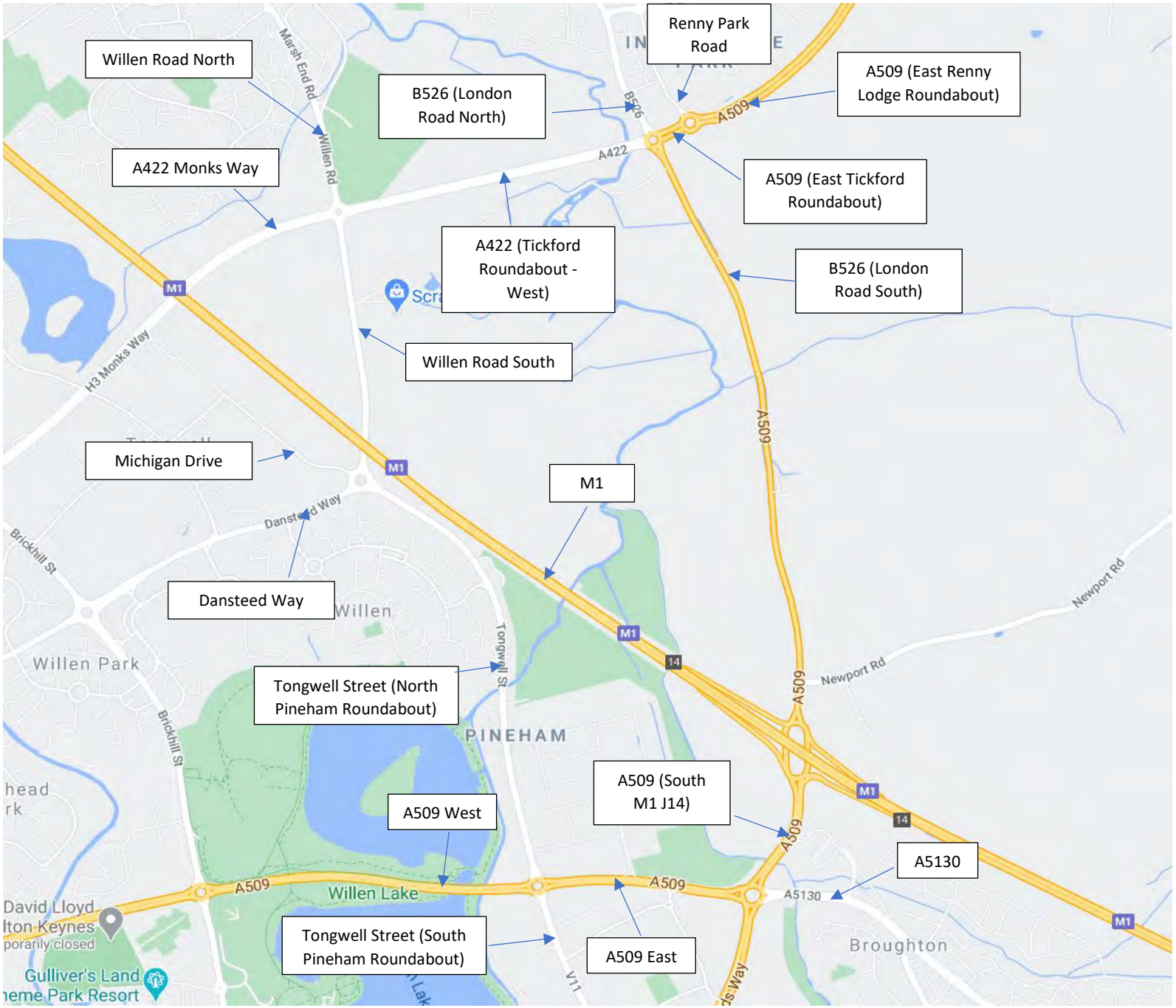
	Fatal	Serious	Slight	Total
Vehicle driver	1	1	1	3
Passenger	0	0	0	0
Motorcycle rider	0	0	0	0
Cyclist	0	0	0	0
Pedestrian	0	0	0	0
Other	0	0	0	0
Total	1	1	1	3

Number of casualties meeting the criteria: **3**

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Appendix 9.4

AADT Location Plan


Willen Road North
Renny Park Road
A509 (East Renny Lodge Roundabout)
B526 (London Road North)
A422 Monks Way
A509 (East Tickford Roundabout)
A422 (Tickford Roundabout - West)
B526 (London Road South)
Willen Road South
Michigan Drive
M1
Dansteed Way
Tongwell Street (North Pineham Roundabout)
A509 (South M1 J14)
A509 West
A5130
Tongwell Street (South Pineham Roundabout)
A509 East
Willen
Willen Park
PINEHAM
Willen Lake
Broughton
Newport Rd
Brickhill St
Marsh End Rd
Willen Rd
A422
A509
M1
14
A5130
H3 Monks Way
Tongwell St
David Lloyd
Gulliver's Land

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Appendix 10.1

Construction Dust Assessment Methodology

APPENDIX 10.1 Construction Dust Assessment Methodology

1. This appendix contains the construction dust assessment methodology used in the assessment.

2. To assess the potential impacts, construction activities are divided into demolition, earthworks, construction and trackout. The descriptors included in this section are based upon the IAQM construction dust guidance. The assessment follows the steps recommended in the guidance.

Step 1: Screen the requirement for assessment

3. The first step is to screen out the requirement for a construction dust assessment, this is usually a somewhat conservative level of screening. An assessment is usually required where there is:

    - a 'human receptor' within:
        - 350m of the boundary of the site; or
        - 50m of the route used by construction vehicles on the public highway, up to 500m from the site entrance(s).
    - an 'ecological receptor':
        - 50m of the boundary of the site; or
        - 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s).

Step 2A: Defining the Potential Dust Emission Magnitude

Demolition

4. The dust emission magnitude category for demolition is varied for each site in terms of timing, building type, duration and scale. Examples of the potential dust emission classes are provided in the guidance as follows:

    - Large: Total building volume >50,000m^3, potentially dusty construction material, on-site crushing and screening, demolition activities >20m above ground level;
    - Medium: Total building volume 20,000m^3 – 50,000m^3, potentially dusty construction material, demolition activities 10m – 20m above ground level; and
    - Small: Total building volume <20,000m^3, construction material with low potential for dust release, demolition activities <10m above ground, demolition during wetter months.

Earthworks

5. The dust emission magnitude category for earthworks is varied for each site in terms of timing, geology, topography and duration. Examples of the potential dust emission classes are provided in the guidance as follows

    - Large: Total site area >10,000m^2, potentially dusty soil type (e.g. clay), >10 heavy earth moving vehicles active at any one time, formation of bunds >8m in height, total material moved >100,000 tonnes;
    - Medium: Total site area 2,500 – 10,000m^2, moderately dusty soil type (e.g. silt), 5 – 10 heavy earth moving vehicles active at any one time, formation of bunds 4 – 8m in height, total material moved 20,000 – 100,000 tonnes; and
    - Small: Total site area < 2,500m^2, soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <4m in height, total material moved <10,000 tonnes, earthworks during wetter months.

Construction

6. The dust emission magnitude category for construction is varied for each site in terms of timing, building type, duration, and scale. Examples of the potential dust emissions classes are

provided in the guidance as follows:

- Large: Total building volume >100,000m^3, on site concrete batching;
- Medium: Total building volume 25,000 – 100,000m^3, potentially dusty construction material (e.g. concrete), on site concrete batching; and
- Small: Total building volume <25,000m^3, construction material with low potential for dust release (e.g. metal cladding or timber).

Trackout

7. Factors which determine the dust emission magnitude class of trackout activities are vehicle size, vehicle speed, vehicle number, geology and duration. Examples of the potential dust emissions classes are provided in the guidance as follows:

- Large: >50 HDV (>3.5t) trips in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100m;
- Medium: 10 – 50 HDV (>3.5t) trips in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 – 100m; and
- Small: <10 HDV (>3.5t) trips in any one day, surface material with low potential for dust release, unpaved road length <50m.

Step 2B: Defining the Sensitivity of the Area

8. The sensitivity of the area is defined for dust soiling, human health and ecosystems. The sensitivity of the area takes into account the following factors:

- The specific sensitivities of receptors in the area;
- The proximity and number of those receptors;
- In the case of PM10, the local background concentration; and
- Site-specific factors, such as whether here are natural shelters such as trees, to reduce the risk of wind-blown dust.

9. Table A1 has been used to define the sensitivity of different types of receptors to dust soiling, health effects and ecological effects.

Sensitivity of Area	Dust Soiling	Human Receptors	Ecological Receptors
High	Users can reasonably expect enjoyment of a high level of amenity. The appearance, aesthetics or value of their property would be diminished by soiling. The people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land. Examples include dwellings, museums and other culturally important collections, medium and long term car parks and car showrooms.	Locations where members of the public are exposed over a time period relevant to the air quality objective for PM10 (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day) Examples include residential properties, hospitals, schools and residential care homes should also be considered as having equal sensitivity to residential areas for the purposes of this assessment.	Locations with an international or national designation and the designated features may be affected by dust soiling. Locations where there is a community of a particularly dust sensitive species such as vascular species included in the Red Data List For Great Britain. Examples include a Special Area of Conservation (SAC) designated for acid heathlands or a local site designated for lichens adjacent to the demolition of a large site containing concrete (alkali) buildings.

Sensitivity of Area	Dust Soiling	Human Receptors	Ecological Receptors
Medium	Users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home. The appearance, aesthetics or value of their property could be diminished by soiling. The people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land. Examples include parks and places of work.	Locations where the people exposed are workers and exposure is over a time period relevant to the air quality objective for PM10 (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day). Examples include office and shop workers, but will generally not include workers occupationally exposed to PM10, as protection is covered by Health and Safety at Work legislation.	Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown. Locations with a national designation where the features may be affected by dust deposition. Example is a Site of Special Scientific Interest (SSSI) with dust sensitive features.
Low	The enjoyment of amenity would not reasonably be expected. Property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling. There is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land. Examples include playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short term car parks and roads.	Locations where human exposure is transient. Indicative examples include public footpaths, playing fields, parks and shopping streets.	Locations with a local designation where the features may be affected by dust deposition. Example is a local Nature Reserve with dust sensitive features.

10. Based on the sensitivities assigned of the different types of receptors surrounding the site and numbers of receptors within certain distances of the site, a sensitivity classification for the area can be defined for each. Tables A2 to A4 indicate the method used to determine the sensitivity of the area for dust soiling, human health and ecological impacts, respectively.

11. For trackout, as per the IAQM construction dust guidance, it is only considered necessary to consider trackout impacts up to 50m from the edge of the road.

Table A2: Sensitivity of the Area to Dust Soiling Effects on People and Property

Receptor Sensitivity	Number of Receptors	Distances from the Source (m)			
		<20	<50	<100	<350
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table A3: Sensitivity of the area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM_{10} Conc.	Number of Receptors	Distances from the Source (m)				
			<20	<50	<100	<200	<350
High	>32µg/m^3	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	28-32 µg/m^3	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	24-28 µg/m^3	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<24µg/m^3	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	>32µg/m^3	>10	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	28-32 µg/m^3	>10	Medium	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	24-28 µg/m^3	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	<24 µg/m^3	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

Table A4: Sensitivity of the area to Ecological Impacts

Receptor Sensitivity	Distances from the Source (m)	
	<20	<50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

Step 2C: Defining the Risk of Impacts

12. The final step is to use both the dust emission magnitude classification with the sensitivity of the area, to determine a potential risk of impacts for each construction activity, before the application of mitigation. Tables A5 to A7 indicate the method used to assign the level of risk for each construction activity.

Table A5: Risk of Dust Impacts from Demolition

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible

Table A6: Risk of Dust Impacts from Earthworks/Construction

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table A7: Risk of Dust Impacts from Trackout

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Negligible
Low	Low Risk	Low Risk	Negligible

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Appendix 10.2

Construction Phase Recommended Mitigation Measures

APPENDIX 10.2 Construction Phase Recommended Mitigation Measures

1. This appendix contains the construction phase recommended mitigation measures.

2. Site-specific mitigation measures are divided into general measures, applicable to all sites and measures specific to earthworks, construction and trackout. Depending on the level of risk assigned to each site, different mitigation is assigned. The method of assigning mitigation measures as detailed in the IAQM construction dust guidance has been used.

3. For those mitigation measures that are general, the highest risk category assigned to the construction activity has been applied. In this case, the 'medium risk' site mitigation measures have been applied, as determined by the dust risk assessment.

4. There are two categories of mitigation measure – 'highly recommended' and 'desirable', which are indicated according to the dust risk level identified for each construction phase. Desirable measures are presented in *italics*.

Communications

- Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.
- Display the name and contact details of people accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.
- Display the head or regional office contact information.

Dust Management

- Develop and implement a DMP, which may include measures to control other emissions, approved by the Local authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures. The desirable measures should be included as appropriate for the site. The DMP may include monitoring of dust deposition, dust flux, real-time continuous PM10 monitoring and/or visual inspections.

Site Management

- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
- Make the complaints log available to the local authority when asked.
- Record any exceptional incidents that cause dust and/or air emissions, either on- or off-site or the action taken to resolve the situation in the log book.

Monitoring

- *Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority if asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of site boundary, with cleaning to be provided if necessary.*
- Carry out regular site inspections to monitor compliance with any dust management plan, record inspection results, and make an inspection log available to the local authority when asked.
- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
- If required, agree dust deposition, dust flux, or real-time PM10 continuous monitoring location with the Local Authority.

Preparing and maintaining the site

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
- Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.
- Avoid site runoff of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.
- Cover, seed or fence stockpiles to prevent wind whipping.

Operating Vehicles/Machinery and Sustainable Travel

- Ensure all vehicles switch off engines when stationary - no idling vehicles.
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.
- *Impose and signpost a maximum-speed-limit of 15mph on surfaced and 10mph on unsurfaced haul roads and work areas, where applicable.*
- Produce a construction logistics plan to manage the sustainable delivery of goods and materials.
- *Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).*

Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
- Ensure equipment is readily available on site to clean and dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

Waste Management

- Avoid bonfires and burning of waste materials.

Specific to Earthworks

- *Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.*
- *Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.*
- *Only remove the cover in small areas during work and not all at once.*

Specific to Construction

- *Avoid scabbling (roughening of concrete surfaces) if possible.*
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.
- *Ensure bulb cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.*
- *For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.*

Specific to Trackout

- *Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.*
- *Avoid any dry sweeping of large areas.*
- *Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.*
- *Record all inspections of haul routes and any subsequent action in the site log book.*
- *Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable)*

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Appendix 10.3

Noise Survey

Cole Jarman

Appendix 10.3

Subject:	**Noise Survey**		
Project:	**Milton Keynes East**		
Date:	**2 March 2021**	**Prepared:**	**MH**
Revision:	**0**	**Approved:**	**AS**

10 Environmental Noise Survey

10.1 Methodology and Instrumentation

10.1.1 A mixed attended/unattended environmental noise survey was undertaken at the site between 9th February 2021 and 12th February 2021. Unattended noise monitoring at the site was for the duration of the measurement period, with attended measurements being made when setting up on 9th and collecting on 12th.

10.1.2 The unattended noise measurements were used to quantify the ambient noise levels at the site during day and night time periods at key locations around the site. The loggers were left for multiple days to ensure that the measured noise levels were representative.

10.1.3 Attended measurements were made in line with the shortened measurement procedure detailed in the *Calculation of Road Traffic Noise* (1988) document. The attended noise measurements were made at various distances back from the local roads in order to provide a better understanding of the noise propagation across the site.

10.1.4 The attended measurement and unattended logging positions are marked on the attached site plan 20/0112/SP1, and are described below. Attended measurement positions are referred to at MPx and unattended loggers at LPx:

- MP1 – Free-field position located 1.2m above local ground level on the western boundary of the site, approximately 20m from the Kerb of Willen Road.
- MP2 – Free-field position located 1.2m above local ground level towards the middle of the site, approximately 160m from the Kerbs of both Willen Road and the A422.
- MP3 – Free-field position located 1.2m above local ground level towards the southern end of the western boundary of the site, approximately 115m from the Kerb of Willen Road.
- MP4 – Free-field position located 1.2m above local ground level on the southern boundary of the site.

- LP1 – Free-field position located 1.2m above local ground level at the northern site boundary, approximately 20m from the kerb of the A422.
- LP2 – Free-field position located 1.2m above local ground level on the existing bunding to the west of Caldecote Farm.
- LP3 – Free-field position located 1.2m above local ground level towards the eastern end of the southern site boundary.

10.1.5 Logger position LP1 was selected primarily to quantify noise from the A422. Position LP2 was selected to quantify the noise levels generated from operations on Caldecote Farm. Position LP3 was selected to quantify noise in the south eastern corner of the site, include noise from the M1.

10.1.6 Attended position MP1 was selected to quantify noise from Willen Road. Attended positions MP2-4 were selected to help establish how noise propagates across the site.

10.1.7 Measurements at all positions were made in the L_{Aeq}, L_{Amax}, L_{A10} and L_{A90} indices (see the Glossary of Acoustic Terms for an explanation of the noise units used). All attended measurements were made over 15-minute periods. All logging measurements were made over consecutive 15-minute periods and 100ms data was also recorded during all measurements. Continuous audio recording was made at LP2 and LP3.

10.1.8 The noise measurements were performed using the equipment detailed in table T1 below:

Item	Manufacturer	Type
Sound Level Analyser (x4)	Rion	NL-52
Acoustic Calibrator (x1)	Rion	NC-74
Acoustic Calibrator (x3)	Rion	NC-75
Weatherproof Windshield (x4)	Rion	WS-15

T1 Equipment used during environmental noise survey

10.1.9 The microphones of the sound level meters used for attended and unattended measurements were extended with cables and fitted within weatherproof windshields.

10.1.10 All sound level meters were calibrated before and after the measurement periods to ensure a consistent and acceptable level of accuracy was maintained throughout. No significant drift was observed during the attended or unattended surveys.

10.1.11 Weather conditions when setting up the unattended noise monitors and undertaking the attended measurements were clear, dry and cold, with no wind and dry roads. The noise climate at all locations was dominated by road noise from either the M1, the A422 and Willen Road.

10.1.12 When collecting the survey equipment, the weather was dry, cool and overcast, with no precipitation and a steady breeze from the south-west. The noise climate was dominated by the M1, the A422 and Willen Road. Analysis of publicly available weather data from local stations show that the weather conditions were suitable for noise measurements throughout the survey.

10.2 Results

10.2.1 The unattended noise survey results can be seen in the attached time history graphs 20/0112/TH01-03.

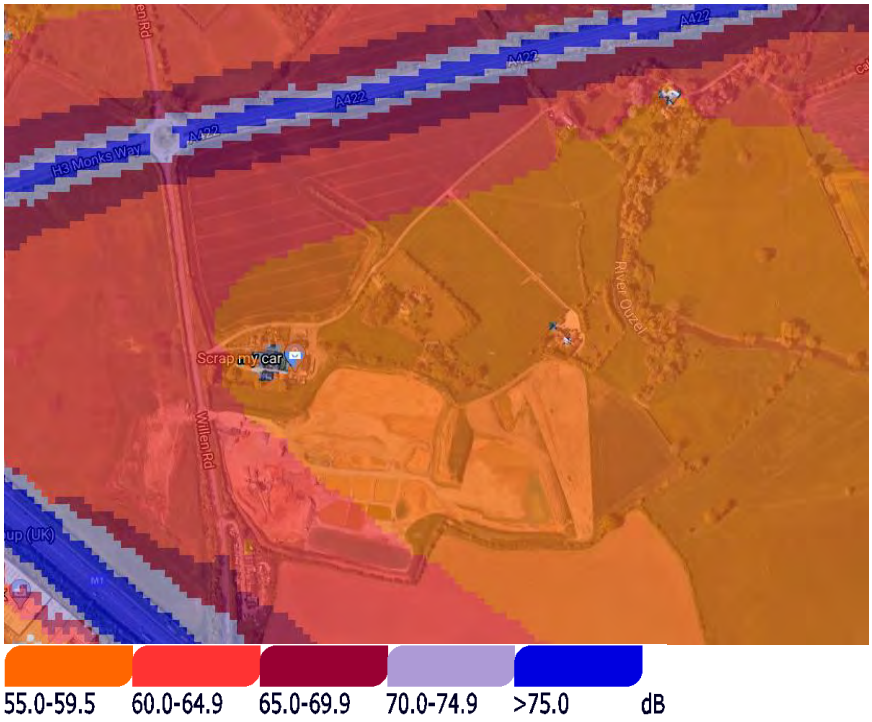
10.2.2 The attended noise survey results can be seen in attached schedule 20/0112/SCH1.

10.3 National Noise Mapping

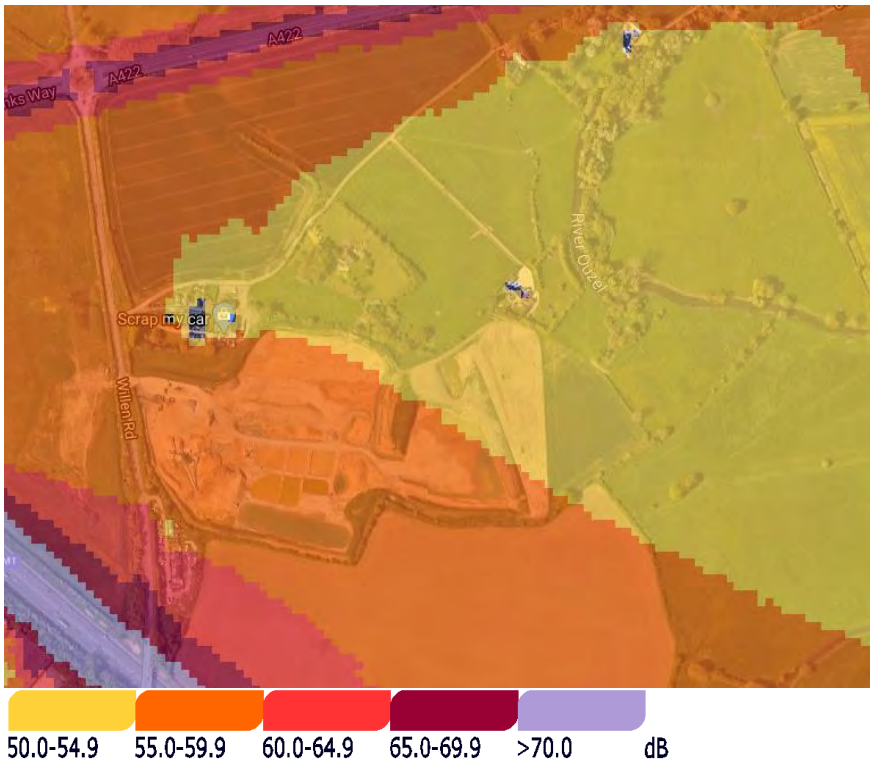
10.3.1 The survey works were undertaken during a period during 2021 in which Coronavirus lockdown restrictions were in force and so it is acknowledged that ongoing restrictions may have had an impact on the measured survey results due to a reduction in people travelling around the country. It is noted that the noise climate around the site is dominated primarily by the A422, Willen Road and the M1.

10.3.2 The development site is covered by the DEFRA noise maps, which are UK wide noise maps based on traffic flows. In order to aid the validation of the survey, and to allow for the noise levels to be adjusted if necessary, the noise levels shown on the maps have been compared to the measured noise levels. Full details of the mapping is shown below.

10.3.3 The DEFRA day and night time calculated noise levels (from road traffic noise sources only) across the proposed development site (outlined in white) are shown in the figures below. The contour plots are taken from *Extrium*'s England Noise and Air Quality Viewer overlaid on to satellite imagery by *Google*.



DEFRA Daytime ambient noise levels ($L_{Aeq,16h}$ dB).



DEFRA Night time ambient noise levels ($L_{Aeq,8h}$ dB).

10.4 Discussion

10.4.1 The levels shown on the DERFA noise maps are between 3-6 dB higher than those measured on site, depending on the exact measurement location.

10.4.2 It is noted that there are inevitably some limitations on the accuracy of quantifying the levels shown on the noise maps as they are shown in 5 dB increments. To minimise the impact of this, care has been taken when reading the resultant noise levels to ensure that any errors will over estimate the noise climate to ensure a worst case assessment.

10.4.3 The higher measured levels from the noise maps have been taken as the basis for the noise break-in assessment with octave band information taken from the measurement positions. Impulsive noise levels (L_{Amax}) have been taken from the measured data as a reduction in vehicle movements would not be expected to change the overall level of a short duration source.

End of Section

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Appendix 10.4

CEMP Guidance

Cole Jarman

Appendix 10.4

Subject: **Example Code of Construction**
Project: **Milton Keynes East**
Date: **March 2021** **Prepared:** **RM**
Revision: **0** **Approved:** **MH**

1 Construction Noise Criteria

1.1 In order to assess the effects of construction noise, it is necessary to establish standards below which the impact is considered to be acceptable. Hence, if an assessment indicates that the standards are likely to be exceeded, alternative construction methods would need to be considered or specific means of mitigation adopted. Proposed construction noise criteria are set out in the table below. The construction noise criteria refer to the total ambient noise level including existing sources and construction noise. The criteria are based on guidance given in Annex E of BS 5228-1:2009.

		Total Noise Levels at Designated Noise Sensitive Locations	
Period	**Hours**	**Ambient Construction Noise Level $L_{Aeq,T}$, dB(A)**	**Period T over which Ambient $L_{Aeq,T}$ is applicable, hours**
Mondays to Fridays	0700-1900	65	any 4 hours
Mondays to Fridays (if permitted)	1900-2300	55	any 1 hour
Saturdays (if permitted)	0700-1300	65	any 4 hours
	1300-1900	55	any 1 hour
	1900-2300	55	
Sundays (if permitted)	0700-0900	55	any 1 hour
	0900-1900	55	
	1900-2300	55	
Any day (if permitted)	2200-0800	Construction Noise Levels subject to negotiation with EHO	

T1 Construction Noise limits

T2 *(i) Construction noise levels in the schedule relate to free-field conditions, where designated noise sensitive locations are located more than 3.5m from building façades or other reflective surfaces other than the ground. Where noise designated noise sensitive locations are located within 1.0m from building façades, the permitted noise levels can be increased by 3 dB(A).*

T3 *(ii) The ambient noise level, $L_{Aeq,T}$ at a designated noise sensitive location is the total L_{Aeq} from all the noise sources in the vicinity over the specified period.*

T4 *(iii) The existing ambient noise level, $L_{Aeq,T}$ at a designated noise sensitive location is the total L_{Aeq} from all the noise sources in the vicinity over the specified period prior to the commencement of the Works.*

2 Section 61 Agreements and Code of Construction Practice

2.1 The Environmental Protection Act 1990 gives Local Authorities powers to control noise from construction sites by reference to Sections 60 and 61 of the Control of Pollution Act 1974 (COPA). Section 61 facilitates a process by which a Contractor agrees a method of working with a Local Authority, often stipulating hours and methods of working and occasionally agreeing specific noise limits at sensitive locations. The advantage of such an agreement is that compliance with it protects the Contractor from being served with a notice to cease works on account of the noise impact. The Local Authority has the power under Section 60 of COPA to serve such a notice if it deems the construction noise to be causing a nuisance.

2.2 As a means of minimizing the risk of noise disturbance and disruption, the Developer may make it a contractual obligation for the Contractor(s) to establish Section 61 Agreements (or similar) with the Local Planning Authority for the works to be carried out. The content of those agreements cannot as yet be defined in detail, but the following areas might be discussed and included.

- Hours of working: limited to those times when the sensitivity of affected parties nearby is not so acute.
- Methods and types of plant: particular construction or demolition methods may be disallowed on the site due to the severity of the noise typically generated, as may certain types of plant.
- Low noise plant and noise mitigation: directives on the selection of low noise plant where practical may be included as well as specific types of mitigation for equipment or processes which lend themselves to the same.
- Noise limits: occasionally and under specific circumstances it may be appropriate to set noise limits for certain periods and at certain locations.
- Monitoring, liaison and reporting: the agreement may specify that noise monitoring is required at certain locations for record keeping and evaluation purposes. Particular parties responsible for liaison and reporting to the local planning authority and other nominated parties may also be identified.

2.3 Section 61 Agreements can be a valuable tool which will enable the local authority to control the noise impact from construction activity while giving the Contractor an agreed framework within which the operations can be carried out. This minimises the risk of disruption to operations without leading to unacceptable consequences for noise sensitive parties. In order to demonstrate the method of control that would be imposed by the Employer on any contractor undertaking construction works on the site, the following section contains an example for a Code of Construction Practice dealing with noise.

2.4 It is noteworthy that Section 61 agreements are not considered compulsory, be represent one method for agreeing a construction methodology with a local authority.

3 Example Code of Construction Practice

Operational Hours

3.1 The normal working hours within the site shall be Mondays to Fridays between 0800 and 1800 hours and Saturdays between 0800 and 1300 hours, with no working on Sundays or Public Holidays. Exceptionally, consent for work outside these hours may be given after any necessary consultation, particularly with the Environmental Health Officer (EHO). Fourteen days' notice should normally be required from the Contractor when seeking such consent.

3.2 The noise levels scheduled below for periods outside normal working hours shall only be permitted when consent has been given to exceptional working.

Ambient Noise Levels

3.3 The ambient noise level, $L_{Aeq,T}$ from all sources when measured 1.5m above the ground at any noise sensitive receiver position shall either not exceed the appropriate level given in the agreed Schedule or not exceed by more than 3dB(A) the existing ambient noise level, $L_{Aeq,T}$, at the receiver location measured over the same period, whichever is the greater.

3.4 If ambient noise levels are above or close to the limits set out in the schedule, it may be appropriate to carry out noise monitoring at or near the noise sensitive receiver locations prior to commencement of the works. The updated data should be made available to the Contractor. It should act as the baseline existing ambient noise level data with which compliance with the requirements set out is to be tested. The data should either be measured at or be corrected to be representative of the pre-existing noise levels at the noise sensitive positions and provided in terms of hourly L_{A90}, L_{Aeq} and $L_{Amax,S}$ noise indices.

3.5 Exceptionally, the Contractor may be given permission to carry out works which exceed the noise levels in the Schedule, provided that 14 days' notice of the date and timing of the work is given and the Contractor demonstrates that he has taken all reasonable measures to mitigate the noise nuisance. After consultation with the Local Authority and any other interested bodies a decision would normally be given within 7 days of receipt of the notice.

3.6 If the need arises to measure noise levels at a location other than one of the designated noise sensitive locations, the permitted noise level shall be related to the nearest designated noise sensitive location. The permitted noise levels at another location shall take into account the difference in distance, topography and screening between the noise source and the nearest designated noise sensitive location and the noise source and the measuring location.

3.7 Proposed construction noise criteria are set out in table T1 above.

3.8 The Contractor shall employ the best practical means to minimise the noise produced by thier operations and shall have regard to the recommendations in BS5228:2009 "Code of practice for noise and vibration control on construction and open sites".

3.9 Without prejudice to the generality of the Contractor's obligations set out above the Contractor shall comply in particular with the following requirements: -

- All vehicles and mechanical plant used for the purpose of carrying out the works shall be fitted with effective exhaust silencers and shall be maintained in good and efficient working order so that extraneous noises shall be reduced to a minimum.
- All compressors and generators shall be "sound reduced" models fitted with properly lined and sealed acoustic covers which shall be kept closed whenever the machines are in use. All ancillary pneumatic percussion tools shall be fitted with mufflers or silencers of the type recommended by the manufacturers. Generators shall be positioned and enclosed so as to minimise noise transmission to the inhabitants in the neighbourhood as agreed with the Employers Agent.
- All pumps shall be positioned and enclosed so as to minimise noise transmission to inhabitants in the neighbourhood.
- All machines in intermittent use shall be shut down in the intervening periods between work or, where this is impracticable, throttled down to a minimum.
- No machine shall be permitted which uses a system of dropping a heavy weight, power assisted or by gravity, for the purpose of breaking up paving or foundations.
- Where earth bunding, solid site hoardings and the like are to be built and may act as a noise barrier, they should be constructed as early as possible in the construction programme.
- Access to the Site shall be such as to ensure a minimum of disturbance to persons in adjacent buildings by vehicles or plant entering or leaving the Site. No deliveries to Site shall take place outside the agreed working hours.
- Any work agreed to be carried out between 2200 and 0800 hours will be subject to agreement to noise levels with Environmental Health Officer. The Contractor shall provide details on work involved, machinery or plant used, exact location, and calculated noise levels at monitoring points.

3.10 Any fixed or static plant operating outside normally permitted working hours shall not give rise to a 'rating level', as defined in BS4142:1997 "Rating industrial noise affecting mixed residential and industrial areas," in excess of the existing free-field background L_{A90} noise levels at noise control stations. The existing baseline free-field background noise levels are to be provided as explained earlier.

3.11 Without prejudice to the foregoing and to requirements of particular clauses in the Conditions of Contract, the Contractor shall not be permitted to carry out works as stated below, except where such work is absolutely necessary for the saving of life or property and the safety of the Works or as is required under the terms of the Contract.

3.12 Piling, including sheet piling, by percussive methods outside the hours of 0800 to 1800 Mondays to Fridays.

3.13 The maintenance of mechanical or other constructional plant in the proximity of noise sensitive buildings outside the hours of 0800 to 1800 on Mondays to Saturdays or at any time on Sundays and public holidays.

End of Section

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Appendix 10.5

Construction Noise Activity Schedule

Construction noise activity schedule

Activity	Plant	Source data ref	Quantity	Typical Noise level at 10m for one Plant item operating dB(A)	Estimated Percentage on time	Typical L_{Aeq} at 10m for all plant item dB(A)	Noise level per activity dB(A)
Establish site compound	Tracked excavator	C.2.3	1	78	80	77	83
	Dump truck	C.2.30	1	79	80	78	
	Dozer (towing roller)	C.2.36	1	81	50	78	
	Wheeled mobile Crane	C4.43	1	70	25	64	
	Delivery wagons - arrive/depart	C11.4	1	83	20	76	

Activity	Plant	Source data ref	Quantity	Typical Noise level at 10m for one Plant item operating dB(A)	Estimated Percentage on time	Typical L_{Aeq} at 10m for all plant item dB(A)	Noise level per activity dB(A)
Site hoarding	Tracked excavator	C2.21	2	73	80	75	81
	Nail gun	C4.95	2	73	20	69	
	Dump truck	C2.30	2	79	50	79	

Activity	Plant	Source data ref	Quantity	Typical Noise level at 10m for one Plant item operating dB(A)	Estimated Percentage on time	Typical L_{Aeq} at 10m for all plant item dB(A)	Noise level per activity dB(A)
Haul road construction	Tracked excavator	C.2.3	2	78	80	80	85
	Dump truck	C.2.30	2	79	80	81	
	Dozer (towing roller)	C.2.36	1	81	50	78	
	Lorry (4-axle wagon)	C.2.34	1	80	20	73	

Activity	Plant	Source data ref	Quantity	Typical Noise level at 10m for one Plant item operating dB(A)	Estimated Percentage on time	Typical L_{Aeq} at 10m for all plant item dB(A)	Noise level per activity dB(A)
Use of site compound	Diesel generator	C.4.84	1	74	100	74	78
	Telescopic handler	C.2.35	1	71	25	65	
	Delivery wagons - arrive/depart	C11.4	1	83	20	76	

Activity	Plant	Source data ref	Quantity	Typical Noise level at 10m for one Plant item operating dB(A)	Estimated Percentage on time	Typical L_{Aeq} at 10m for all plant item dB(A)	Noise level per activity dB(A)
Drainage works	Tracked excavator	C.4.63	2	77	80	79	85
	Articulated dump truck	C.5.16	2	81	80	83	
	Telescopic handler	C.2.35	1	71	25	65	

Activity	Plant	Source data ref	Quantity	Typical Noise level at 10m for one Plant item operating dB(A)	Estimated Percentage on time	Typical L_{Aeq} at 10m for all plant item dB(A)	Noise level per activity dB(A)
Remediation - Earthworks	Tracked excavator	C.2.15	5	76	80	82	90
	Dozer	C.2.12	2	81	80	83	
	Articulated dump truck	C.5.16	5	81	80	87	
	Vibratory roller	C.5.22	2	81	80	83	
	Water pump	C.4.88	5	68	100	75	

Activity	Plant	Source data ref	Quantity	Typical Noise level at 10m for one Plant item operating dB(A)	Estimated Percentage on time	Typical L_{Aeq} at 10m for all plant item dB(A)	Noise level per activity dB(A)
Remediation - Process area	Screen stockpiler	C.10.15	2	81	50	81	84
	Tracked crusher	C.1.15	1	84	50	81	

Activity	Plant	Source data ref	Quantity	Typical Noise level at 10m for one Plant item operating dB(A)	Estimated Percentage on time	Typical L_{Aeq} at 10m for all plant item dB(A)	Noise level per activity dB(A)
Groundwater treatment	Diesel generator for submersible pump	C.8.23	1	62	50	59	69
	Diesel surface water pump	C.8.22	1	71	50	68	



Activity	Plant	Source data ref	Quantity	Typical Noise level at 10m for one Plant item operating dB(A)	Estimated Percentage on time	Typical L_{Aeq} at 10m for all plant item dB(A)	Noise level per activity dB(A)
Residential substructure - piling & groundbeams	P.C. concrete piling - Hydraulic hammer rig	C.3.1	1	89	80	88 L_{Aeq}	91
	Tracked mobile crane	C.3.29	1	70	25	64	
	Delivery wagons - arrive/depart	C.11.4	1	83	20	76	
	Hand-held hydraulic breaker	C.1.7	1	93	30	88	
	Hydraulic breaker power pack	C.1.8	1	74	30	69	
	Pumping concrete - mixer truck + pump	C4.28	1	75	75	74	
	Poker vibrator	C4.33	1	78	50	75	
	Compressor	D6.19	1	72	50	69	



Activity	Plant	Source data ref	Quantity	Typical Noise level at 10m for one Plant item operating dB(A)	Estimated Percentage on time	Typical L_{Aeq} at 10m for all plant item dB(A)	Noise level per activity dB(A)
Residential substructure - Rafts	Delivery wagons - arrive/depart	C11.4	1	83	10	73	84
	Tracked excavator	C4.64	2	75	50	75	
	Dump truck (tipping fill)	C2.30	2	79	50	79	
	Roller (rolling fill)	C2.37	1	79	30	74	
	Pumping concrete - mixer truck + pump	C4.28	2	75	50	75	
	Poker vibrator	C4.33	2	78	50	78	
	Compressor	D6.19	1	72	20	65	

Activity	Plant	Source data ref	Quantity	Typical Noise level at 10m for one Plant item operating dB(A)	Estimated Percentage on time	Typical L_{Aeq} at 10m for all plant item dB(A)	Noise level per activity dB(A)
Superstructure	Delivery wagons - arrive/depart	C11.4	1	79	20	72	81
	Wheeled mobile Crane (35t)	C4.43	1	70	50	67	
	Lifting platform	C4.57	1	67	50	64	
	Telescopic handler	C4.54	1	79	50	76	
	Pumping concrete - mixer truck + pump	C4.28	1	75	50	72	
	Compressor for power tools	D7.11	1	74	50	71	
	Circular saw	C4.72	1	79	30	74	

Activity	Plant	Source data ref	Quantity	Typical Noise level at 10m for one Plant item operating dB(A)	Estimated Percentage on time	Typical L_{Aeq} at 10m for all plant item dB(A)	Noise level per activity dB(A)
External Works	Delivery wagons - arrive/depart	C11.4	1	83	10	73	83
	Tracked excavator	C4.17	1	71	50	68	
	Dozer	C5.13	1	82	50	79	
	Asphalt paver + tipper lorry	C5.31	1	77	80	76	
	Vibratory roller	C5.20	1	75	80	74	
	Vibratory plate (petrol)	C2.41	1	80	25	74	

Activity	Plant	Source data ref	Quantity	Typical Noise level at 10m for one Plant item operating dB(A)	Estimated Percentage on time	Typical L_{Aeq} at 10m for all plant item dB(A)	Noise level per activity dB(A)
Landscaping	Telescopic handler	C.2.35	1	71	25	65	76
	Delivery wagons - arrive/depart	C11.4	1	83	20	76	

	Calculated noise levels				
Activity	**AP1**	**AP2**	**AP3**	**AP4**	**AP5**
Establish site compound	54	77	69	74	60
Site hoarding	51	75	67	71	57
Haul road construction	55	79	71	75	61
Use of site compound	49	72	64	69	55
Drainage works	55	79	71	75	61
Remediation - Earthworks	61	84	76	81	67
Remediation - Process area	54	78	70	74	60
Groundwater treatment	39	62	55	59	45
Residential substructure - piling	62	85	77	82	68
Residential substructure - Rafts	54	78	70	74	61
Superstructure	51	75	67	71	57
External Works	53	77	69	73	59
Landscaping	47	70	62	67	53

T1 Worst Case Assessment

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Appendix 10.6

Noise Assessment

Cole Jarman

Milton Keynes East (Bloor)

Noise Assessment

Report 20/0112/R1

Milton Keynes East (Bloor)

Noise Assessment

Report 20/0112/R1

DLP Planning Limited

4 Abbey Court
Fraser Road
Priory Business
Bedford
MK44 3WH

Revision	Description	Date	Prepared	Approved
0	1st issue	23 February 2021	Matthew Heyes	Fred Davies
1	2nd issue	7 October 2021	Matthew Heyes	Fred Davies

This report and associated surveys have been prepared and undertaken for the private and confidential use of our client only. If any third party whatsoever comes into possession of this report, they rely on it at their own risk and Cole Jarman Limited accepts no duty or responsibility (including in negligence) to any such third party.

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Table of Contents

1 Introduction 4

2 Site Description 4

3 Planning Policy, Guidance and Design Criteria 5

4 Environmental Noise Survey 6
4.1 Methodology and Instrumentation 6
4.2 Results 7
4.3 National Noise Mapping 8
4.4 Discussion 9

5 Noise Break-In 10
5.1 AVO Level 1 Assessment 10
5.2 Background Ventilation 13
5.3 Internal Noise Levels 14
5.4 External Amenity Areas 17

6 Conclusion 18

Attachments

Glossary of Acoustic Terms

20/0112/SP1
Site plan showing noise measurement positions.

20/0112/TH01-03
Time histories showing the measured noise levels at positions LP1-LP3

20/0112/SCH1
Schedule showing measured noise levels at positions MP1-4.

Appendix A
Planning and noise guidance.

Appendix B
Site masterplan.

End of Section

1 Introduction

1.1 Planning permission is being sought for the development of a new mixed residential site located south of the A422 and east of Willen Road, Newport Pagnell.

1.2 Cole Jarman have been instructed to conduct a noise impact assessment for the proposed development and provide details of any mitigation measures required to ensure that a good level of amenity can be achieved within the new dwellings.

1.3 This report provides details of an environmental noise survey undertaken at the site along with an assessment of noise break-in to the proposed dwellings in line with relevant planning and guidance documentation. Where practicable and necessary details of mitigation measures have been provided.

2 Site Description

2.1 The proposed development site is located in the north western corner of a larger plot of land allocated for a mixed residential and employment development, south of Newport Pagnell.

2.2 The site is bound to the north by the A422 and to the west by Willen Road. Beyond the A422 is arable land followed by Newport Pagnell Town Football & Social Club and various dwellings. Beyond Willen Road is a plot of land allocated for employment.

2.3 To the south of the development site is arable land which forms part of the overall allocated land, beyond this is the M1. The river Ouzel runs to the east of site, and beyond this is arable land which is also allocated for mixed residential and employment use as part of the overall scheme.

2.4 There are existing properties located within the development land which will be retained. These are Caldecote Farm located on the western boundary close to Willen Road, Caldecote Cottage located close to the centre of the site, and Moat Cottage located on the eastern boundary.

2.5 Caldecote Farm contains a commercial car scrapping element operated out of a small compound in the south eastern corner of the land. The current red line boundary shows that this is being removed as part of the development and so this hasn't been considered within this report.

3 Planning Policy, Guidance and Design Criteria

3.1 Appendix A of this report sets out guidance from NPPF, NPSE, ProPG, BS 8233:2014 and AVO. Internal and external noise criteria have been derived from these.

3.2 Based on the guidance set out within Appendix A, the following noise level criteria are sought for the proposed development:

Internal Noise Criteria

- 35dB $L_{Aeq,16h}$ in bedrooms or habitable rooms during the day;
- 30dB $L_{Aeq,8h}$ in bedrooms during the night;
- 45-55dB $L_{Amax,F}$ in bedrooms for typical events occurring no greater than 10-15 times during the night.

Internal Noise (Overheating Scenario) criteria

- Aspirational target of AVO assessment Medium risk or below.

External Criteria

- Aspirational target of 55dB $L_{Aeq,16h}$ in external amenity areas.

4 Environmental Noise Survey

4.1 Methodology and Instrumentation

4.1.1 A mixed attended/unattended environmental noise survey was undertaken at the site between 9th February 2021 and 12th February 2021. Unattended noise monitoring at the site was for the duration of the measurement period, with attended measurements being made when setting up on 9th and collecting on 12th.

4.1.2 The unattended noise measurements were used to quantify the ambient noise levels at the site during day and night time periods at key locations around the site. The loggers were left for multiple days to ensure that the measured noise levels were representative.

4.1.3 Attended measurements were made in line with the shortened measurement procedure detailed in the *Calculation of Road Traffic Noise* (1988) document. The attended noise measurements were made at various distances back from the local roads in order to provide a better understanding of the noise propagation across the site.

4.1.4 The attended measurement and unattended logging positions are marked on the attached site plan 20/0112/SP1, and are described below. Attended measurement positions are referred to at MPx and unattended loggers at LPx:

- MP1 – Free-field position located 1.2m above local ground level on the western boundary of the site, approximately 20m from the Kerb of Willen Road.
- MP2 – Free-field position located 1.2m above local ground level towards the middle of the site, approximately 160m from the Kerbs of both Willen Road and the A422.
- MP3 – Free-field position located 1.2m above local ground level towards the southern end of the western boundary of the site, approximately 115m from the Kerb of Willen Road.
- MP4 – Free-field position located 1.2m above local ground level on the southern boundary of the site.
- LP1 – Free-field position located 1.2m above local ground level at the northern site boundary, approximately 20m from the kerb of the A422.
- LP2 – Free-field position located 1.2m above local ground level on the existing bunding to the west of Caldecote Farm.
- LP3 – Free-field position located 1.2m above local ground level towards the eastern end of the southern site boundary.

4.1.5 Logger position LP1 was selected primarily to quantify noise from the A422. Position LP2 was selected to quantify the noise levels generated from operations on Caldecote Farm. Position LP3 was selected to quantify noise in the south eastern corner of the site, include noise from the M1.

4.1.6 Attended position MP1 was selected to quantify noise from Willen Road. Attended positions MP2-4 were selected to help establish how noise propagates across the site.

4.1.7 Measurements at all positions were made in the L_{Aeq}, L_{Amax}, L_{A10} and L_{A90} indices (see the Glossary of Acoustic Terms for an explanation of the noise units used). All attended measurements were made over 15-minute periods. All logging measurements were made over consecutive 15-minute periods and 100ms data was also recorded during all measurements. Continuous audio recording was made at LP2 and LP3.

4.1.8 The noise measurements were performed using the equipment detailed in table T1 below:

Item	Manufacturer	Type
Sound Level Analyser (x4)	Rion	NL-52
Acoustic Calibrator (x1)	Rion	NC-74
Acoustic Calibrator (x3)	Rion	NC-75
Weatherproof Windshield (x4)	Rion	WS-15

T1 Equipment used during environmental noise survey

4.1.9 The microphones of the sound level meters used for attended and unattended measurements were extended with cables and fitted within weatherproof windshields.

4.1.10 All sound level meters were calibrated before and after the measurement periods to ensure a consistent and acceptable level of accuracy was maintained throughout. No significant drift was observed during the attended or unattended surveys.

4.1.11 Weather conditions when setting up the unattended noise monitors and undertaking the attended measurements were clear, dry and cold, with no wind and dry roads. The noise climate at all locations was dominated by road noise from either the M1, the A422 and Willen Road.

4.1.12 When collecting the survey equipment, the weather was dry, cool and overcast, with no precipitation and a steady breeze from the south-west. The noise climate was dominated by the M1, the A422 and Willen Road. Analysis of publicly available weather data from local stations show that the weather conditions were suitable for noise measurements throughout the survey.

4.2 Results

4.2.1 The unattended noise survey results can be seen in the attached time history graphs 20/0112/TH01-03.

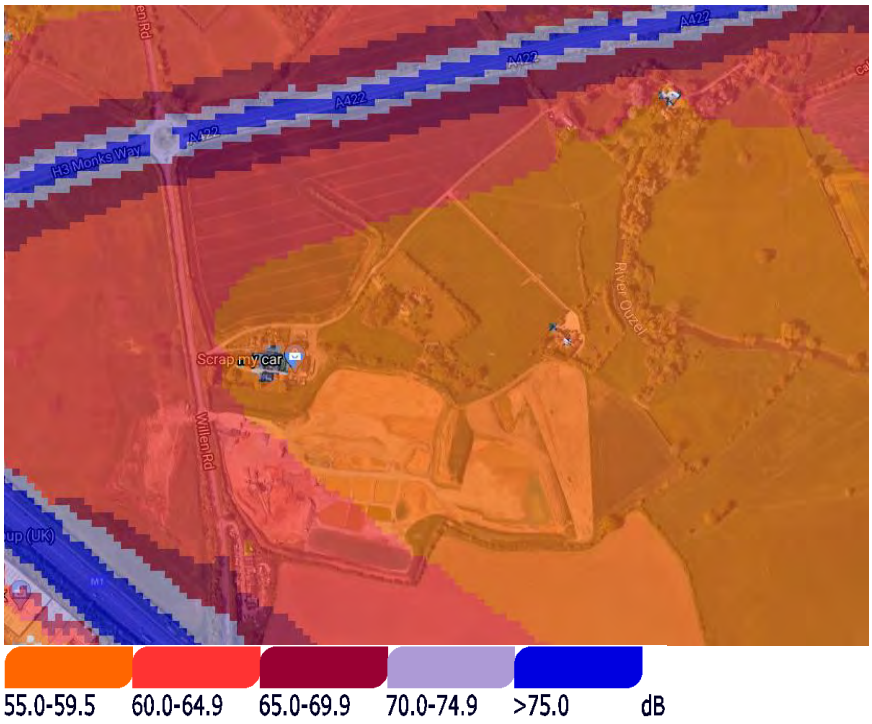
4.2.2 The attended noise survey results can be seen in attached schedule 20/0112/SCH1.

4.3 National Noise Mapping

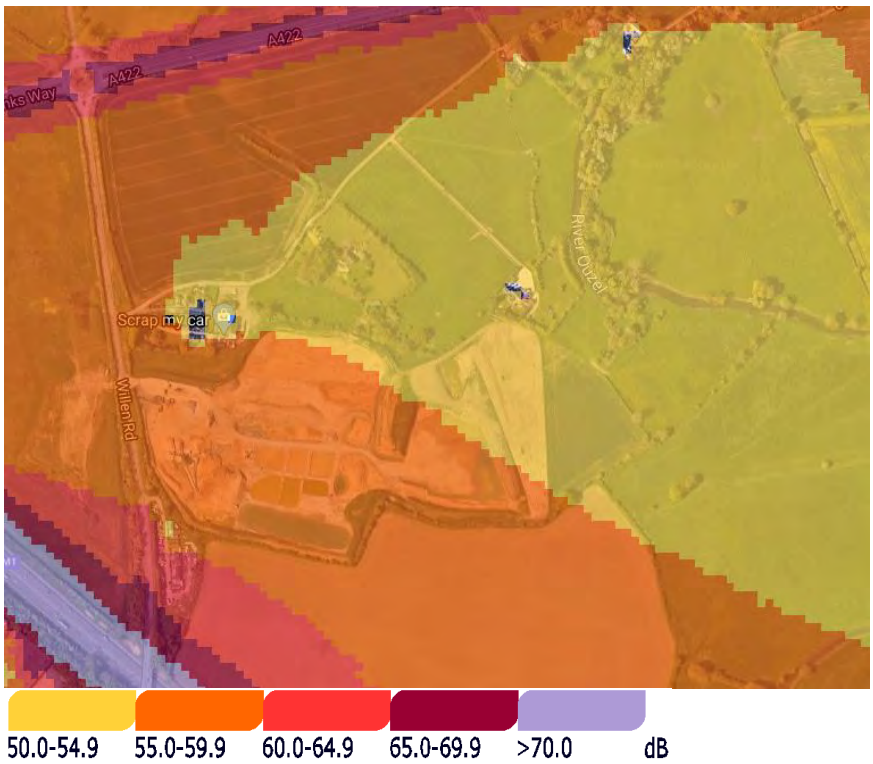
4.3.1 The survey works were undertaken during a period during 2021 in which Coronavirus lockdown restrictions were in force and so it is acknowledged that ongoing restrictions may have had an impact on the measured survey results due to a reduction in people travelling around the country. It is noted that the noise climate around the site is dominated primarily by the A422, Willen Road and the M1.

4.3.2 The development site is covered by the DEFRA noise maps, which are UK wide noise maps based on traffic flows. In order to aid the validation of the survey, and to allow for the noise levels to be adjusted if necessary, the noise levels shown on the maps have been compared to the measured noise levels. Full details of the mapping is shown below.

4.3.3 The DEFRA day and night time calculated noise levels (from road traffic noise sources only) across the proposed development site (outlined in white) are shown in the figures below. The contour plots are taken from *Extrium*'s England Noise and Air Quality Viewer overlaid on to satellite imagery by *Google*.



DEFRA Daytime ambient noise levels ($L_{Aeq,16h}$ dB).



DEFRA Night time ambient noise levels ($L_{Aeq,8h}$ dB).

4.4 Discussion

4.4.1 The levels shown on the DERFA noise maps are between 3-6 dB higher than those measured on site, depending on the exact measurement location.

4.4.2 It is noted that there are inevitably some limitations on the accuracy of quantifying the levels shown on the noise maps as they are shown in 5 dB increments. To minimise the impact of this, care has been taken when reading the resultant noise levels to ensure that any errors will over estimate the noise climate to ensure a worst case assessment.

4.4.3 The higher measured levels from the noise maps have been taken as the basis for the noise break-in assessment with octave band information taken from the measurement positions. Impulsive noise levels (L_{Amax}) have been taken from the measured data as a reduction in vehicle movements would not be expected to change the overall level of a short duration source.

5 Noise Break-In

5.1 AVO Level 1 Assessment

5.1.1 An AVO Level 1 assessment has been undertaken based on the existing noise climate as detailed in section 0 above and the current Masterplan as shown in attached Appendix B. The results of the assessment at relevant locations are shown below:

	Noise Level, $L_{Aeq, T}$		AVI Level 1 risk	
Location	**Day (16h)**	**Night (8h)**	**Day**	**Night**
Dwellings 40m from A422	67	57	High	High
Dwellings 40m from Willen Road	60-65	59-56	Medium/High	High/Medium
Dwellings on Southern Boundary	60-58	56	Medium	Medium
Dwellings towards the centre of site	<58	<55	Medium	Medium

T2 AVO Level 1 Assessment

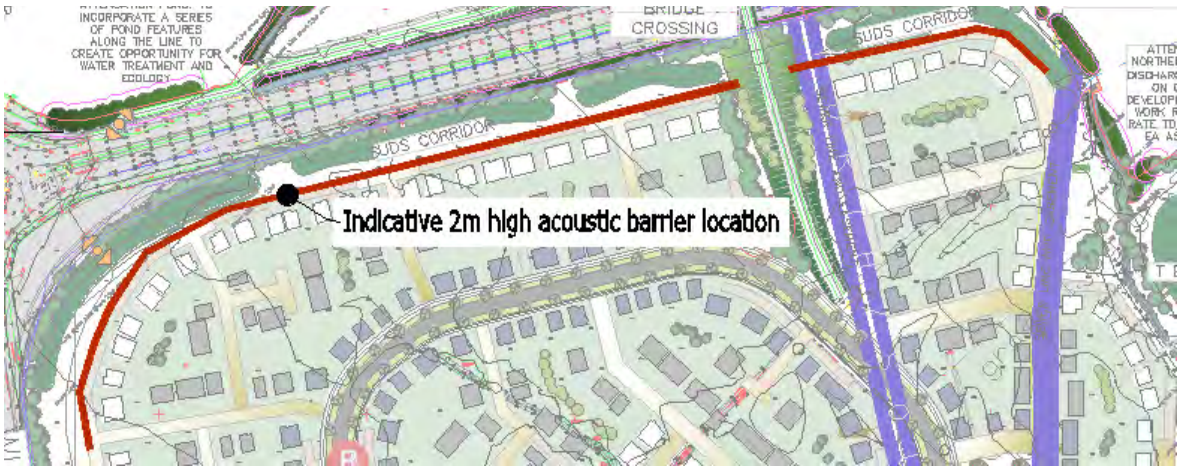
5.1.2 It can be seen that during both the day and night time periods facades located on the front of houses facing the A422 and facades to the northern edge of Willen Road would be categorised as 'High' risk following guidance in the AVO and so a Level 2 assessment would be required for these dwellings.

5.1.3 The results above are for the site as it is now, and so no allowance has been made for additional losses associated with the fully developed site, such as acoustic screening associated with the new dwellings both of the development site and adjacent land.

5.1.4 The noise levels at the facades of houses screened form the nearby noise sources by a close row of houses in front of them would be expected to be at least 5-10 dB lower than the noise levels on the front row. Based on this all dwellings screened from the A422 would be Low/Medium risk according to the AVO Guidelines.

Mitigation

5.1.5 Any dwellings located in the high-risk areas detailed above will require mitigation to habitable rooms with a view of the A422 in order to meet the requirements of the AVO. Where possible acoustic screening should be used to reduce the noise levels prior to installing mitigation to the houses. With this in mind an acoustic barrier is recommended along the length of the A422 and up to 50m from the A422 along Willen Road. This should have a minimum surface density of 10 kg/m^2 and be a minimum of 2m high compared to road level. A potential location for the barrier is shown below. However this could be moved closer to the road if required.



5.1.6 This barrier would be expected to reduce the noise levels at ground floor window level by >5 dB and so all ground floor habitable rooms would be 'Medium' risk as part of the level 1 assessment and so no further mitigation would be required to these rooms.

5.1.7 When considering the internal noise levels, the risk is linked to both the absolute noise levels and the duration that overheating occurs (to be determined by others) as per AVO diagrams B-2 and B-3.

5.1.8 As acoustic consultants, we are not qualified to undertake assessments of the time that an overheating condition will occur within a dwelling across a given year, and, as such, cannot give comment on the likely level of disturbance from noise that residents will experience when opening their windows to control overheating.

5.1.9 As such, we recommend that a TM59 assessment is undertaken by a suitably qualified party in order to establish the likely duration for which the overheating scenario will occur throughout a given year.

5.1.10 Following the issue of a TM59 assessment, it will then be possible to undertake a Level 2 AVO assessment as per the figure below. This will conclude as to whether alternative methods of cooling will be required to reduce the need to open windows. The relevant thresholds for the Level 2 assessment are shown in the following figure.

Internal ambient noise level [Note 2]			Examples of Outcomes [Note 5]	
$L_{Aeq,T}$ [Note 3] during 07:00 – 23:00 [Note 6]	$L_{Aeq,8h}$ during 23:00 – 07:00	Individual noise events during 23:00 – 07:00 [Note 4]		
> 50 dB	> 42 dB	Normally exceeds 65 dB L_{AFmax}	Noise causes a material change in behaviour e.g. having to keep windows closed most of the time	Avoiding certain activities during periods of intrusion. Having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.
Increasing noise level			Increasing likelihood of impact on reliable speech communication during the day or sleep disturbance at night	At higher noise levels, more significant behavioural change is expected and may only be considered suitable if occurring for limited periods. As noise levels increase, small behaviour changes are expected e.g. turning up the volume on the television; speaking a little more loudly; having to close windows for certain activities, for example ones which require a high level of concentration. Potential for some reported sleep disturbance. Affects the acoustic environment inside the dwelling such that there is a perceived change in quality of life. At lower noise levels, limited behavioural change is expected unless conditions are prevalent for most of the time. [Note 6]
≤ 35 dB	≤ 30 dB	Do not normally exceed L_{AFmax} 45 dB more than 10 times a night	Noise can be heard, but does not cause any change in behaviour	Noise can be heard, but does not cause any change in behaviour, attitude, or other physiological response [Note 7]. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.

Table 3-3 Guidance for Level 2 assessment of noise from transport sources [note 1] relating to overheating condition.

Note 1 The noise levels suggested in Tables 3-2 and 3-3 assume a steady road traffic noise source but may be adapted for other types of transport.

5.1.11 Should the TM59 assessment show that the overheating scenario will occur regularly, then mitigation may be required. The AVO states that any mitigation measures should either provide alternative methods of cooling habitable rooms without the need to open windows i.e. through mechanical ventilation/comfort cooling/attenuated natural ventilation, or by reducing how often the overheating scenario occurs, such as through solar shading. Potential examples which can be looked at in more detail include:

Reduction of noise levels at habitable room windows

- Consideration should be given to the orientation of façades so that habitable rooms face away from the nearest road. It should be noted that these windows would have to be on the opposite façade to the given road (not at a 90° angle to it).

Reduction of overheating time

- This could potentially be done through the use of solar shading/changing the orientation of the houses to reduce solar gain. Details of how this should be achieved, and its effectiveness must be provided by a mechanical services engineer. While this will not change the overall internal noise levels, it does alter the threshold for acceptable internal noise levels.

Provision of alternative cooling methods

- This could be achieved through large acoustic vents, comfort cooling systems or potentially through mechanical ventilation with a suitable boost mode (it should be noted however that the AVO guide does warn that this would require a system capable of providing a significant airflow). The requirements for either of these systems would need to be provided by a mechanical services consultant.

5.1.12 It is understood that the client is considering the use of large vents in the façade to provide suitable cooling via natural ventilation. The AVO guide states that this is expected to achieve a reduction of between 17-29 dB. These must be specified to achieve a minimum reduction of 20 dB when fully open and must be installed to all habitable rooms with a view of the A422 (i.e not screened by other houses or an acoustic barrier.

5.1.13 When in their closed position the vents must provide the same performance as any glazed elements in the same location as detailed within the following sections.

5.2 Background Ventilation

5.2.1 The current noise levels across the site have been used to establish the noise levels at the various proposed facades across the site.

5.2.2 The façades of the proposed dwellings are expected to comprise standard cavity masonry and blockwork construction. This does not necessarily preclude the use of lightweight façade elements, though further assessment would likely be required to ensure adequate sound insulation is provided.

5.2.3 As no plans are currently available showing proposed habitable room sizes and glazing area, we have conducted our calculations based on assumptions of typical room sizes for bedrooms and living rooms. The dimensions of these rooms are as set out in table T3 below:

Room	Dimension		
	Floor area (m^2)	Height (mm)	Glazing area (m^2)
Bedroom	7.5	2800	2
Living Room	20	2800	7

T3 Assumed typical room dimensions

5.2.4 If the final floor or glazing areas differ drastically from those quoted above, then revisions to the calculations would be necessary.

5.3 Internal Noise Levels

5.3.1 In order to adequately control noise ingress to habitable rooms and bedrooms throughout the development, it will be necessary for elements of the external building fabric to achieve certain minimum levels of sound insulation performance. An assessment of noise intrusion has therefore been undertaken based on the results of the noise survey.

5.3.2 In lieu of building layouts at this stage, room dimensions have been based upon typical sizes for similar residential dwellings as noted previously within section 5.1. If the room or glazing dimensions are to vary significantly from these values, a review of the scheme of mitigation will be required.

Glazing

5.3.3 Double glazing of a performance beyond that of standard thermal double glazing will be required to meet the internal noise criteria with windows closed across all habitable rooms throughout the development. Locations where the upgraded glazing configurations are required are detailed below. These will need to meet the following specifications:

Glazing Type	Sound Reduction Index (SRI) at Octave Band Centre Frequency (Hz)						Indicative R_w
	125	250	500	1k	2k	4k	
Glazing Type G1 *Indicative Glazing Configuration: 10mm float glass, 16mm air gap, 9.1mm float glass*	29	33	44	46	49	49	*45*
Glazing Type G2 *Indicative Glazing Configuration: 10mm float glass, 12mm air gap, 6mm float glass*	26	27	34	40	39	46	*37*
Glazing Type G3 *Indicative Glazing Configuration: 6mm float glass, 12mm air gap, 4mm float glass*	22	22	28	39	39	42	*33*

T4 Glazing specifications

5.3.4 The indicative single figure R_w values and glazing configurations quoted in table T4 above are for guidance only, alternative configurations may be utilised. The octave band sound reduction performance quoted above much be achieved by the glazing system taken as a whole in its installed condition.

5.3.5 The specification applies to the glazing, the frames and all seals on any openable parts of the systems, and any required ventilation or condensation control mechanisms. This list is not exhaustive: no part of the glazing system shall cause the above figures not to be achieved.

5.3.6 The supplier should be expected to prove by means of certified test results that the above sound reduction figures can be achieved by the system being proposed. The tests shall be conducted in accordance with BS EN ISO 10140 2010 Parts 1 to 5, or BS EN ISO 140 1998 Part 5.

5.3.7 The require location for each glazing type is detailed below:

- Glazing Type G1 will be required for windows with a full or partial view of the A422 (3 sides of the dwelling) including those within 200m of the A422, facing Willen Road.
- Glazing Type G2 will be required to all other dwellings with a view of Willen Road and located on the Southern Boundary of the site.
- Glazing Type G3 will be required to all other habitable rooms.

5.3.8 It is noted that there are no requirements in terms of internal noise to non-habitable rooms such as bathrooms. To such spaces, standard thermal double glazing would be suitable.

5.3.9 Windows should not be sealed, but openable for times when purge ventilation is required (examples given in Approved Document F include purging of fumes from burnt food when cooking or removal of fumes when painting).

Ventilation

5.3.10 As is standard, it will be necessary to provide trickle ventilation to achieve suitable background ventilation rates with windows closed. It is necessary to consider such ventilation as part of any BS 8233 assessment:

"any room should have adequate ventilation (e.g. trickle ventilators should be open) during assessment"

5.3.11 To provide sufficient background airflow whilst also providing a suitable level of noise mitigation, acoustically rated trickle vents will be required as is the standard approach for dwelling construction to provide suitable ventilation when windows are closed.

5.3.12 Internal noise levels have been assessed on the basis of up to one unit in bedrooms and two in living rooms.

5.3.13 It is expected that the ventilation provision will allow ventilation in accordance with Approved Document F 'Ventilation' of the Building Regulations. This should be confirmed by the relevant consultants.

5.3.14 The trickle vents must meet the minimum specification laid out in table T5 below:

	Installed Element Normalised Level Difference (dB $D'_{n,e}$) at Octave Band Centre Frequency (Hz)						
	125	**250**	**500**	**1k**	**2k**	**4k**	***Indicative* $D'_{n,e,w}$**
Vent Type A *Indicative vent type: Fresh 100 dB*	40	38	39	41	50	50	*43*
Vent Type B *Indicative vent type: Titon Silentbloc: 8000mm2 free area, 445mm long*	33	32	40	45	46	51	*42*
Vent Type C *Indicative vent type: Standard $D'_{n,e,w}$ 35* trickle vent	35	35	34	35	34	29	*35*

T5 Required ventilation acoustic performance

5.3.15 These ventilators should have an installed element-normalised level difference ($D'_{n,e}$) when tested in accordance with BS EN 10140:2010 parts 1 to 5 of not less than that indicated in table T5 above. Typical vents which would achieve the above performance requirements are identified within the table as indicative examples.

5.3.16 The indicative single figure $D'_{n,e,w}$ values and vent types quoted above are for guidance only, alternatives may be utilised provided the octave band performance quoted is achieved. The required vent locations are shown below:

- Vent Type A will be required to all habitable rooms requiring Type G1 Glazing.
- Vent Type B will be required to all habitable rooms requiring Type G2 Glazing.
- Vent Type C will be required to all habitable rooms requiring Type G3 Glazing.

5.4 External Amenity Areas

5.4.1 It is recommended that all garden spaces are located so that the houses provide acoustic screening between the garden and the nearest existing roads. Where this is done all gardens would be expected to have an area which achieves the aspirational criterion of <55 dB $L_{Aeq\ 16h}$.

5.4.2 Where the layout means that some gardens have a view of the A422 it will be necessary to provide acoustic screening from the road with a 2m high acoustic fence. This must be imperforate and achieve a minimum surface density of 10 kg/m^2. With this in place the worst case gardens would be expected to have areas below 60 dB $L_{Aeq, 16h}$. Whilst this is above the aspirational criterion within BS 8233: 2014 the noise levels have been reduced as far as possible and so are considered to be acceptable.

5.4.3 The results of the noise contours show that the aspirational criteria within gardens is exceeded at all locations across the site. To mitigate this as far as possible it is recommended that the houses are located between the gardens and the M1 so as to provide some acoustic screening. Where possible the houses should be located close together to enhance this screening.

5.4.4 Gardens located further away from the M1 and screened by the houses would achieve the aspirational criterion of 55 dB $L_{Aeq, 16h}$

6 Conclusion

6.1 Planning permission is being sought for the development of a new mixed residential site located south of the A422 and east of Willen Road, Newport Pagnell.

6.2 This report has provided details of the undertaken environmental noise survey at the site, a review of relevant British Standards and Guidance, and DEFRA noise modelling around the site. In addition, Cole Jarman have conducted an assessment of noise break-in to residences across the proposed development based on the measured noise survey data and the noise modelling.

6.3 An AVO Level 1 assessment has been conducted showing that dwellings located close to the A422 are 'high' with regard to noise during periods of overheating.

6.4 An initial AVO Level 2 assessment has been undertaken which has shown that with suitable acoustic vents to all habitable rooms within the 'high' risk area internal noise levels during periods of overheating can be suitably controlled.

6.5 During cooler periods it has been found that a suitable level of amenity can be provided within the proposed residences, with acoustically enhanced glazing and ventilation openings necessary for some dwellings. Acoustic performance requirements for the relevant façade elements are provided.

End of Section

Glossary of Acoustic Terms

L_{Aeq}:

The notional steady sound level (in dB) which over a stated period of time, would have the same A-weighted acoustic energy as the A-weighted fluctuating noise measurement over that period. Values are sometimes written using the alternative expression dB(A) L_{eq}.

L_{Amax}:

The maximum A-weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise when occasional loud noises occur, which may have little effect on the L_{Aeq} noise level. Unless described otherwise, L_{Amax} is measured using the "fast" sound level meter response.

L_{A10} & L_{A90}:

If non-steady noise is to be described, it is necessary to know both its level and degree of fluctuation. The L_{An} indices are used for this purpose. The term refers to the A-weighted level (in dB) exceeded for n% of the time specified. L_{A10} is the level exceeded for 10% of the time and as such gives an indication of the upper limit of fluctuating noise. Similarly L_{A90} gives an indication of the lower levels of fluctuating noise. It is often used to define the background noise.

L_{A10} is commonly used to describe traffic noise. Values of dB L_{An} are sometimes written using the alternative expression dB(A) L_{n}.

L_{AX}, L_{AE} or SEL

The single event noise exposure level which, when maintained for 1 second, contains the same quantity of sound energy as the actual time varying level of one noise event. L_{AX} values for contributing noise sources can be considered as individual building blocks in the construction of a calculated value of L_{Aeq} for the total noise. The L_{AX} term can sometimes be referred to as Exposure Level (L_{AE}) or Single Event Level (SEL).

End of Section



Cole Jarman

Figure 20/0112/SP1

Title:

Site plan showing measurement positions

- Measurement Positions
- Logger Positions
- Site Boundary

North

Project:

Milton Keynes East (Bloor)

Date: February 2021

Revision: -

Scale: Not to scale

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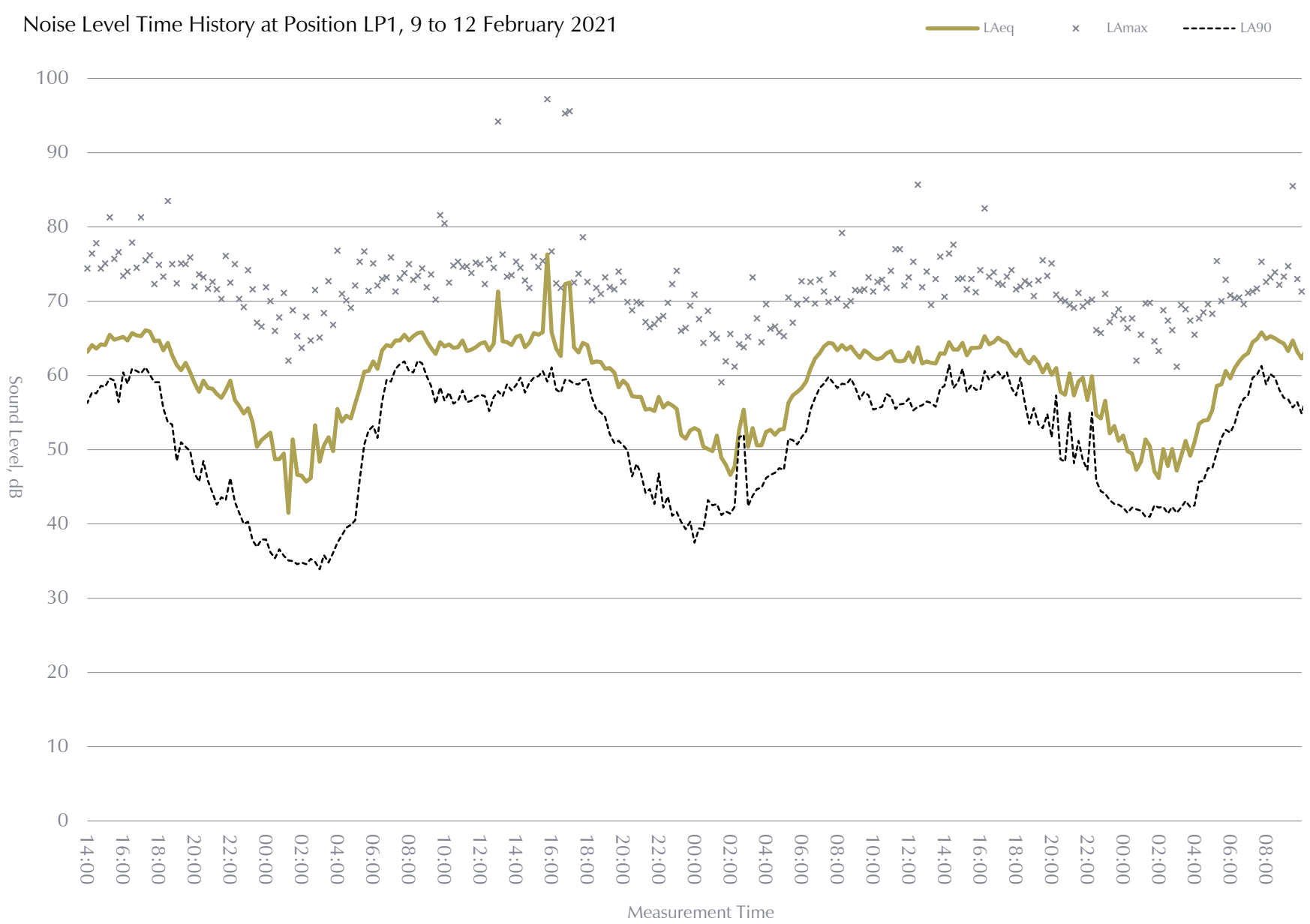


Figure 20/0112/TH01

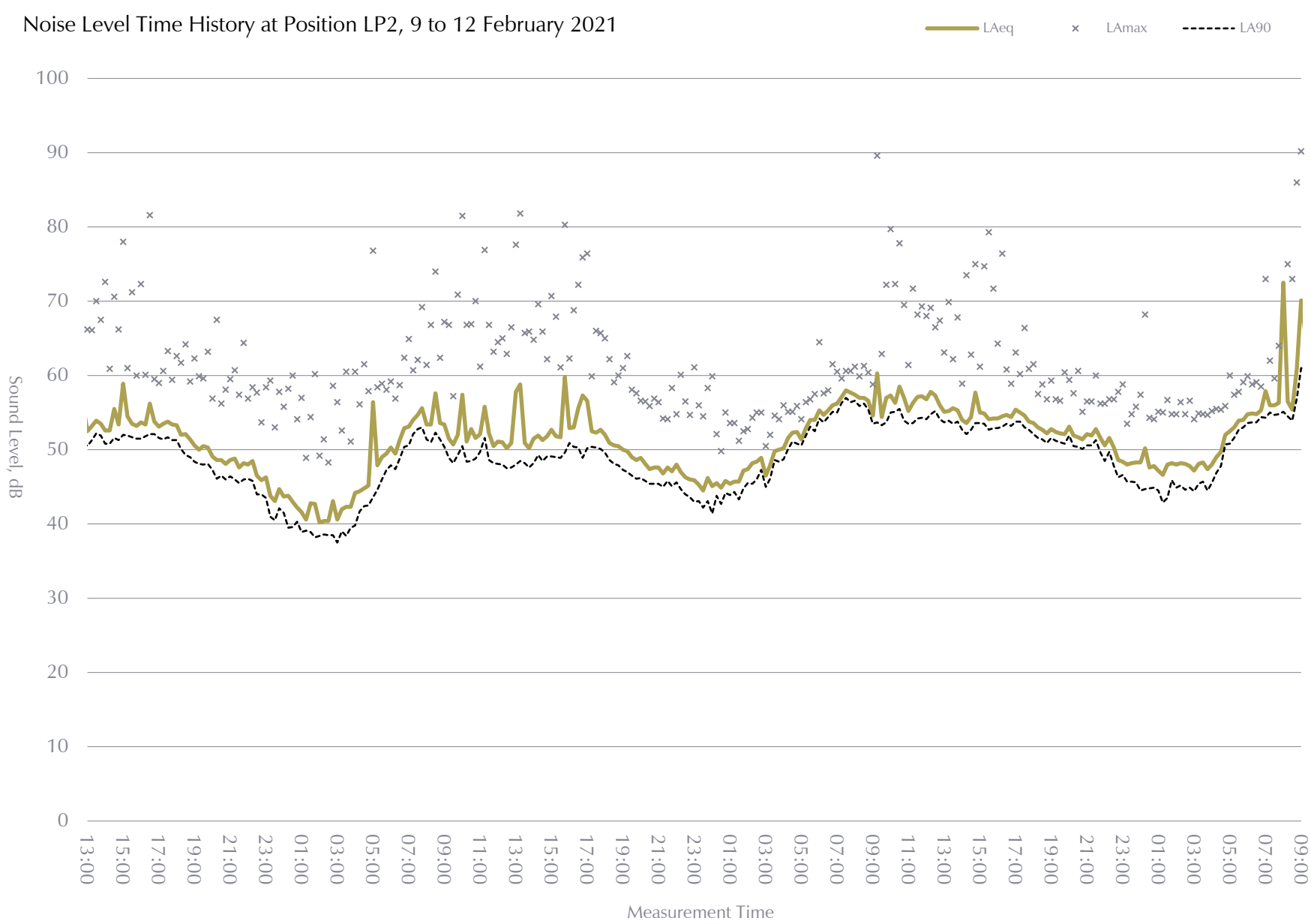


Figure 20/0112/TH02

Noise Level Time History at Position LP3, 9 to 12 February 2021

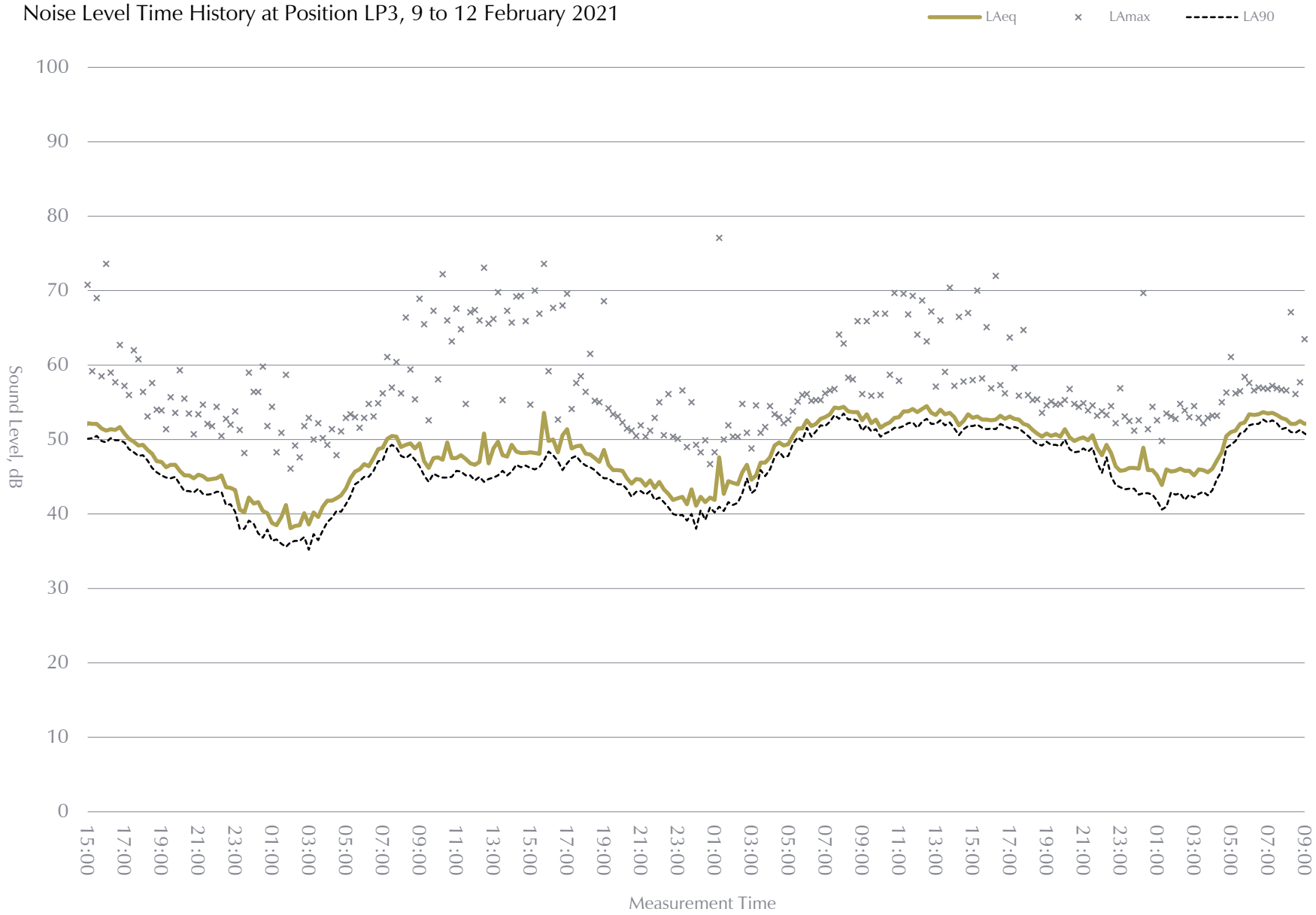


Figure 20/0112/TH03

Noise Survey Results

Measurement Position 1

Start Time	L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
11:01	59.4	77.4	61.8	55.6
11:16	59.5	68.5	62.0	55.8
11:31	62.9	87.3	62.4	56.0
11:46	60.9	82.7	61.9	56.0
12:01	59.2	67.7	61.6	56.0
12:16	63.6	83.5	62.9	56.4
12:31	60.0	66.4	62.2	56.7
12:46	59.5	67.6	61.8	55.8
13:01	59.9	72.6	62.5	55.9

Measurement Position 2

Start Time	L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
11:27	58.2	80.0	58.0	53.1
11:42	61.1	84.6	58.9	53.5
11:57	55.6	66.4	57.6	52.9
12:12	62.3	83.3	59.1	52.6
12:27	55.2	64.8	57.1	52.5
12:42	55.1	66.6	57.0	52.6
12:57	54.9	63.3	56.9	52.3
13:12	55.9	68.5	58.2	52.9

Measurement Position 3

Start Time	L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
11:30	51.5	64.4	53.0	49.6
11:45	50.9	60.6	52.5	49.1
12:00	51.8	64.4	53.3	50.0
12:15	51.5	69.5	52.9	49.2
12:30	64.3	102.3	53.7	49.3
12:45	52.1	58.2	53.8	50.0
13:00	53.3	64.8	55.1	50.9
13:15	53.7	60.1	55.4	51.6
13:30	55.7	68.8	57.3	53.8
13:45	55.2	61.8	56.8	53.1

Measurement Position 4

Period	L_{Aeq}	L_{Amax}	L_{A10}	L_{A90}
12:15	53.6	79.4	54.4	50.6
12:30	52.4	64.2	53.9	50.7
12:45	52.2	75.8	53.5	50.1
13:00	52.4	64.8	53.9	50.5
13:15	51.8	75.2	53.0	50.0
13:30	51.4	64.0	53.0	49.6
13:45	51.3	70.3	52.3	49.9
14:00	53.3	71.0	53.3	49.9

Appendix A

Subject:	**Planning Considerations and Guidance**		
Project:	**Milton Keynes East (Bloor)**		
Date:	**February 2021**	**Prepared:**	**MH**
Revision:	**0**	**Approved:**	**AS**

This document sets out the various standards and national guidance upon which the design advice has been based.

National Planning Policy Framework (NPPF)

A1.1 The National Planning Policy Framework (NPPF), published in March 2012 and updated in June 2019, is currently the relevant document for defining the national policy toward noise sensitive development. It refers to the Noise Policy Statement for England (NPSE), which is discussed in the subsequent section.

A1.2 The current policy on sustainable development influences the emphasis of any noise assessment. The development of a quiet, rural site is by most measures less sustainable than the development of a site located near existing infrastructure and facilities. The rating of development sites based on prevailing noise levels should reflect this.

A1.3 Specifically, on the subject of noise, paragraph 180 of NPPF states:

"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

a. mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;

b. identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason;"

A1.4 Paragraph 180 references the Noise Policy Statement for England and no other particular standards.

A1.5 On the general issue of amenity, paragraph 127 states that planning policies and decisions should ensure that developments:

"create places that […] promote health and well-being, with a high standard of amenity for existing and future users…"

A1.6 Further to this, paragraph 170 states that planning policies and decisions should contribute to and enhance the natural and local environment by:

"preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution"

A1.7 A notable inclusion in the July 2018 edition of NPPF is the 'agent of change' principle in paragraph 182. In terms of noise, this principle requires that those proposing a new noise sensitive development incorporate sufficient mitigation such that the operation of existing premises in the area is not unreasonably restricted in order to control noise impact upon the new development:

"Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed."

A2 Noise Policy Statement for England (NPSE)

A2.1 This NPSE does not set quantitative guidelines for the suitability of noise sensitive development in an area depending on the prevailing levels of noise. Absent, therefore, is reference to specific noise thresholds which determine whether noise sensitive development is suitable and, if so, whether particular mitigation factors need to be considered.

A2.2 Instead, the NPSE sets out three aims:

The first aim of the Noise Policy Statement for England

"Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development."

The second aim of the Noise Policy Statement for England

"Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development."

The third aim of the Noise Policy Statement for England

"Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development."

A2.3 Paragraph 2.24 states that all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life. It also states that this does not mean that such adverse effects cannot occur.

A2.4 In essence, therefore, each development site must be judged on its ability to deliver on each of the stated aims. Quantifying the prevailing noise levels is therefore an essential first step in assessing a given site.

A2.5 The NPSE refers to SOAEL, the Significant Observed Adverse Effect Level. This is defined as the level above which significant adverse impacts on health and quality of life occur. Given the overall thrust of the NPSE, the SOAEL is therefore an important assessment standard although the document also comments that:

"It is not possible to have a single objective noise based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times."

A2.6 Attention is drawn to the fact that the SOAEL is the level above which significant adverse effects can be observed. Importantly, it should be noted that the overall objective is to avoid or minimise significant adverse impacts; some degree of impact is acceptable and it is not necessary to seek to achieve no impact at all.

A3 Planning Practice Guidance (PPG)

A3.1 The Department for Communities and Local Government 'Planning Practice Guidance' (PPG) was published on 6 March 2014 and updated in July 2019.

A3.2 The PPG on Noise expands upon the NPPF and NPSE and sets out more detailed guidance on noise assessment. Like the NPPF and NPSE, the guidance does not include any specific noise levels but sets out further principles that should underpin an assessment.

A3.3 The PPG includes a section on noise, which states:

"*Plan-making and decision making need to take account of the acoustic environment and in doing so consider:*

whether or not a significant adverse effect is occurring or likely to occur;

whether or not an adverse effect is occurring or likely to occur; and

whether or not a good standard of amenity can be achieved."

A3.4 It then refers to the NPSE and states that the aim is to identify where the overall effect of the noise exposure falls in relation to Significant Observed Adverse Effect Level [1] (SOAEL), the Lowest Observed Adverse Effect Level [2] (LOAEL) and the No Observed Effect Level [3] (NOEL).

A3.5 The guidance then presents a table, which is reproduced as table 0 overleaf. The implication of the final line of the table is that only the 'noticeable and very disruptive' outcomes are unacceptable and should be prevented. All other outcomes (i.e. all other lines in the table) can be acceptable, depending upon the specific circumstances and factors such as the practicalities of mitigation.

[1] The level of noise exposure above which significant adverse effects on health and quality of life occur.
[2] The level of noise exposure above which adverse effects on health and quality of life can be detected.
[3] The level of noise exposure below which no effect at all on health or quality of life can be detected.

Response	Examples of Outcomes	Increasing effect level	Action
NOEL *(No Observed Effect Level)*			
Not present	No Effect	No Observed Effect	No specific measures required
NOAEL *(No Observed Adverse Effect Level)*			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No specific measures required
LOAEL *(Lowest Observable Adverse Effect Level)*			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
SOAEL *(Significant Observed Adverse Effect Level)*			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

AT1 Summary of Noise Exposure Hierarchy (from PPG)

A3.6 Under the topic of further considerations relating to mitigating the impact of noise on residential developments, the PPG states:

"Noise impacts may be partially offset if residents have access to one or more of:

a relatively quiet facade (containing windows to habitable rooms) as part of their dwelling;

a relatively quiet external amenity space for their sole use, (e.g. a garden or balcony). Although the existence of a garden or balcony is generally desirable, the intended benefits will be reduced if this area is exposed to noise levels that result in significant adverse effects;

a relatively quiet, protected, nearby external amenity space for sole use by a limited group of residents as part of the amenity of their dwellings; and/or

a relatively quiet, protected, external publically accessible amenity space (e.g. a public park or a local green space designated because of its tranquillity) that is nearby (e.g. within a 5 minute walking distance)."

A3.7 This is not to say that access to the above items is mandatory, rather that it can help to offset any noise impacts.

A3.8 The PPG also considers the potential risk of conflict between new development and existing businesses. It states that it may be necessary for mitigation to be put in place as part of a new development, to avoid existing activities having a significant adverse effect on residents or users of the proposed scheme. It goes on to state:

"The agent of change will also need to define clearly the mitigation being proposed to address any potential significant adverse effects that are identified. Adopting this approach may not prevent all complaints from the new residents/users about noise or other effects, but can help to achieve a satisfactory living or working environment, and help to mitigate the risk of a statutory nuisance being found if the new development is used as designed (for example, keeping windows closed and using alternative ventilation systems when the noise or other effects are occurring).

It can be helpful for developers to provide information to prospective purchasers or occupants about mitigation measures that have been put in place, to raise awareness and reduce the risk of post-purchase/occupancy complaints."

A3.9 It goes on to make the further note:

"For noise sensitive developments, mitigation measures can include […] optimising the sound insulation provided by the building envelope."

A4 Internal and External Noise Design Criteria

A4.1 **The World Health Organisation (WHO) Guidelines 1999**

A4.1.1 The Guidelines for Community Noise (World Health Organisation, 1999) included values for community noise in specific environments.

A4.1.2 It is important to note that the WHO Guidelines are aspirational, as illustrated by the National Noise Incidence Study (NNIS, 2000), which indicates that 55% of the population of England and Wales are exposed to external noise levels above 55 dB $L_{Aeq, day}$. A National Physical Laboratory (NPL) report (with reference CMAM 16, dated September 1998) reviewing the original 1980 WHO Guidelines and the 1995 draft version of the current Guidelines stated:

"*Exceedances of the WHO guideline values do not necessarily imply significant noise impact and indeed, it may be that significant impacts do not occur until much higher degrees of noise exposure are reached.*"

"*As such, it would be unwise to use the WHO guidelines as targets for any form of strategic assessment, since, given the prevalence of existing noise exposure at higher noise levels, there might be little opportunity for and little real need for any across the board major improvements. On the other hand, the most constructive use for the WHO guidelines will be to set thresholds above which greater attention should be paid to the various possibilities for noise control action when planning new developments. It is important to make clear at this point that exceedances do not necessarily imply an over-riding need for noise control, merely that the relative advantages and disadvantages of noise control action should be weighed in the balance.*"

A4.1.3 To prevent moderate annoyance in outdoor living areas, such as gardens and balconies of dwellings, the WHO guideline value is 50 dB $L_{Aeq, 16h}$. This can be described as an upper limit for the average noise level across the daytime and evening period (07:00h to 23:00h). The corresponding guideline value to prevent serious annoyance is stated as 55 dB $L_{Aeq, 16h}$. However, it is again noted that these levels are aspirational in nature, as described in A4.1.2 above.

A4.1.4 In terms of the internal noise environment, in order to achieve maximum speech intelligibility and to avoid moderate annoyance, the guideline value for noise levels within dwellings is stated as 35 dB $L_{Aeq, 16h}$ (covering the day and evening 07:00h to 23:00h). The corresponding value for the night period (23:00h to 07:00h) to avoid sleep disturbance is 30 dB $L_{Aeq, 8h}$.

A4.1.5 Additionally in terms of sleep disturbance, a guideline value of 45 dB L_{Amax} is given. In relation to this value, the Guidelines state:

"When the background noise is low, noise exceeding 45 dB L_{Amax} should be limited, if possible…"

"For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB L_{Amax} more than 10–15 times per night…"

A4.2 WHO Environmental Noise Guidelines 2018

A4.2.1 An updated version of the Guidelines was published in October 2018. It constitutes a significant revision of the 1999 Guidelines, rather than comprising minor amendments. In relation to road traffic and railway noise, the guidance states the following:

Road Traffic Noise

For average noise exposure, the GDG strongly recommends reducing noise levels produced by road traffic below **53 decibels (dB)** L_{den}, as road traffic noise above this level is associated with adverse health effects.

For night noise exposure, the GDG strongly recommends reducing noise levels produced by road traffic during night time below **45 dB** L_{night}, as night-time road traffic noise above this level is associated with adverse effects on sleep.

To reduce health effects, the GDG strongly recommends that policy-makers implement suitable measures to reduce noise exposure from road traffic in the population exposed to levels above the guideline values for average and night noise exposure. For specific interventions, the GDG recommends reducing noise both at the source and on the route between the source and the affected population by changes in infrastructure.

Railway Noise

For average noise exposure, the GDG strongly recommends reducing noise levels produced by railway traffic below **54 dB** L_{den}, as railway noise above this level is associated with adverse health effects.

For night noise exposure, the GDG strongly recommends reducing noise levels produced by railway traffic during night time below **44 dB** L_{night}, as night-time railway noise above this level is associated with adverse effects on sleep.

To reduce health effects, the GDG strongly recommends that policy-makers implement suitable measures to reduce noise exposure from railways in the population exposed to levels above the guideline values for average and night noise exposure. There is, however, insufficient evidence to recommend one type of intervention over another.

A4.2.2 The L_{den} is an equivalent sound level that represents the situation over the full 24 hour day, taking account of the L_{day} (0700-1900h), with a penalty of 5dB(A) for evening noise $L_{evening}$ (1900-2300h) and a penalty of 10dB(A) for night time noise L_{night} (2300-0700). The L_{night} index is equivalent to the $L_{Aeq,\ 8h}$ index as used in other standards such as BS 8233 (but not necessarily with the same numerical guidelines).

A4.2.3 The guidance no longer specifies L_{Amax} criteria but states in section 2.2.2:

"In many situations, average noise levels like the L_{den} or L_{night} indicators may not be the best to explain a particular noise effect. Single-event noise indicators – such as the maximum sound pressure level ($L_{A,max}$) and its frequency distribution – are warranted in specific situations, such as in the context of night-time railway or aircraft noise events that can clearly elicit awakenings and other physiological reactions that are mostly determined by $L_{A,max}$. Nevertheless, the assessment of the relationship between different types of single-event noise indicators and long-term health outcomes at the population level remains tentative. The guidelines therefore make no recommendations for single-event noise indicators."

A4.2.4 As with the 1999 WHO document, the guideline values in the 2018 document represent aspirational targets to be achieved in the long term, rather than values that should immediately be adopted into relevant policy.

A4.2.5 This is reflected in the following excerpt from the government's Aviation 2050 consultation document (which relates to aircraft noise but the principle of the statement is relevant to other noise sources):

"The government is considering the recent new environmental noise guidelines for the European region published by the World Health Organisation (WHO). It agrees with the ambition to reduce noise and to minimise adverse health effects, but it wants policy to be underpinned by the most robust evidence on these effects, including the total cost of action and recent UK specific evidence which the WHO report did not assess."

A4.2.6 Therefore, other current standards and guidance, such as BS 8233, still represent the most relevant and appropriate basis for assessment.

A4.3 British Standard BS 8233:2014

A4.3.1 Guideline values for dwellings with respect to internal and external noise levels are included in BS 8233:2014 Guidance on sound insulation and noise reduction for buildings (BSi).

A4.3.2 The standard states 50 dB $L_{Aeq,\,T}$ as being desirable as a steady state noise level not to be exceeded in gardens. It also states 55 dB $L_{Aeq,\,T}$ as an upper guideline value. The time period T is usually taken to be the 16 hour day (07:00h to 23:00h).

A4.3.3 Paragraph 7.7.3.2 of the standard goes on to say the following:

"For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.

Other locations, such as balconies, roof gardens and terraces, are also important in residential buildings where normal external amenity space might be limited or not available, i.e. in flats, apartment blocks, etc. In these locations, specification of noise limits is not necessarily appropriate. Small balconies may be included for uses such as drying washing or growing pot plants, and noise limits should not be necessary for these uses. However, the general guidance on noise in amenity space is still appropriate for larger balconies, roof gardens and terraces, which might be intended to be used for relaxation. In high-noise areas, consideration should be given to protecting these areas by screening or building design to achieve the lowest practicable levels. Achieving levels of 55 dB $L_{Aeq,T}$ or less might not be possible at the outer edge of these areas, but should be achievable in some areas of the space."

A4.3.4 It can be seen that external noise levels, especially on small balconies to apartment blocks, are not proposed to be a controlling index by which suitability of a residential site is defined.

A4.3.5 Therefore, when designing noise sensitive developments that incorporate gardens or other external amenity areas, the intent shall be to provide an area for each property in which the noise levels are consistent with these standards. Where these standards cannot be achieved, then reasonable measures shall be employed to provide screening or other forms of mitigation so as to minimise the noise levels in the external amenity areas.

A4.3.6 An important principle here is that sustainable development sites will often be exposed to relatively high levels of environmental noise, and while means are available to insulate internal spaces, they are not always available to protect external spaces. Strict adherence to the enforcement of such external noise criteria would preclude development in the majority of areas considered for development in semi-urban or urban environments or in areas in the vicinity of transportation noise sources. This is why the external standards shall be viewed as targets or triggers of mitigation measures rather than thresholds not to be exceeded in all circumstances.

A4.3.7 Buildings can be designed to achieve specific levels of insulation against external noise. It is reasonable, therefore, to set specific internal noise standards as the test of whether a development satisfies the requirements of the NPPF and the aims of the NPSE. In essence, these require a high quality design that achieves a good standard of amenity.

A4.3.8 Guidance in respect of indoor ambient noise levels is contained in Table 4 of BS 8233:2014 and tabulated below.

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 dB $L_{Aeq, 16h}$	-
Dining	Dining room/area	40 dB $L_{Aeq, 16h}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq, 16h}$	30 dB $L_{Aeq, 8h}$

Note 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.

AT2 Table 4 of BS 8233:2014

A4.3.9 The previous edition of BS 8233 included quantitative guidance with respect to night-time L_{Amax} noise levels in bedrooms. BS 8233:2014 does not provide such guidance, however in paragraph 7.7.5.1.1 it is noted that the recommendations for ambient noise in hotel bedrooms are similar to those for living accommodation and Table H.3 in Annex H.3 gives example night-time L_{Amax} limits in hotel bedrooms of 45-55 dB.

A4.3.10 The WHO study informing the 1999 Guidelines derived the L_{Amax} night time noise standard on the basis of 10 to 15 occurrences per night.

A4.4 ProPG: Planning and Noise (2017)

A4.4.1 ProPG is a guidance document prepared by a working group consisting of representatives of the Association of Noise Consultant (ANC), Institute of Acoustics (IOA) and Chartered Institute of Environmental Health (CIEH). It provides professional practice guidance on Planning and Noise with regard to new residential development that will be exposed to airborne noise from transport sources. It is also noted that good professional guidance should have regard to any reasonably foreseeable changes to existing, and/or new sources, as well as sources currently effecting the site.

A4.4.2 ProPG provides two stages of assessment, the first being an initial site risk assessment and the second being a full assessment. The second is only necessary when the initial risk assessment and circumstances dictate.

Stage 1: Initial Site Noise Risk Assessment

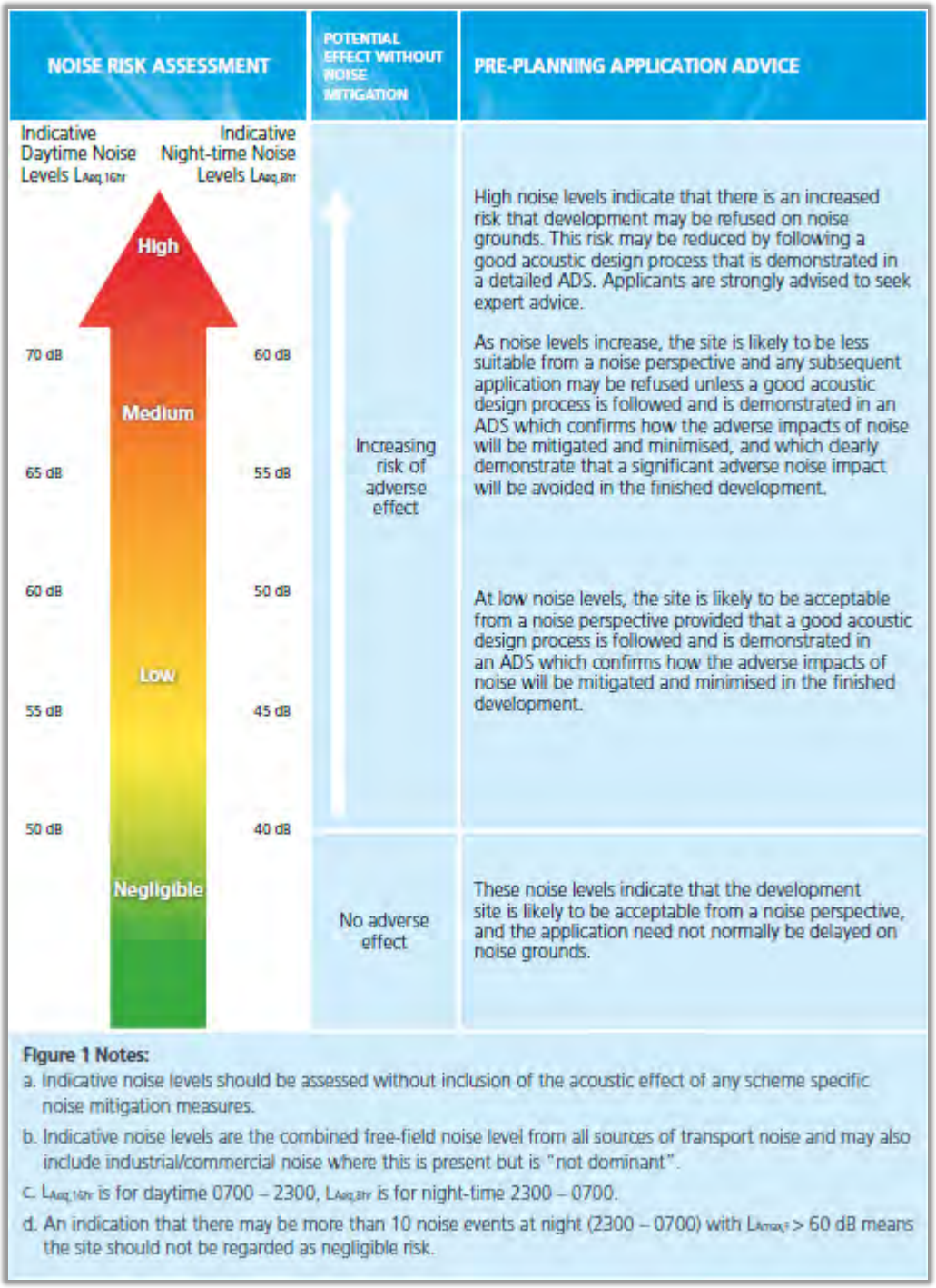
A4.4.3 ProPG suggests that a Stage 1 initial site risk assessment should be undertaken on all sites at the earliest possible opportunity in order to gauge the potential effect of noise on future residential premises, without the benefit of any noise mitigation measures.

A4.4.4 It is important to note that the initial 'Stage 1' assessment at a proposed residential development is not the basis for the eventual recommendation to the decision maker. It is intended to highlight the importance of good acoustic design within a scheme. For example, a

site with a high risk of adverse effect without noise mitigation may not necessarily be unsuitable for development; however, the importance of good acoustic design provided by experts would be critical at such a site, with a detailed acoustic design statement provided.

A4.4.5 ProPG states that a site which displays a low risk of adverse effect without noise mitigation is more likely to be acceptable from a noise perspective, provided that a good acoustic design process is followed, and sites with no risk of adverse effect need not normally be delayed on noise grounds.

A4.4.6 The criteria provided for Stage 1 assessment of the L_{Aeq} noise levels for day and night within the initial site risk assessment are provided below:



A4.4.7 The initial noise risk assessment also considers the effect of L_{Amax} maximum noise levels at night (2300-0700h), where the guidance states:

"An indication that there may be more than 10 noise events at night (2300 – 0700) with $L_{Amax,F}$ > 60 dB means the site should not be regarded as a negligible risk."

Stage 2: Overview

A4.4.8 Stage 2 of the ProPG guidance provides a systematic consideration of key elements of acoustic design. The guidance advocates a proportional, risk based approach to the Stage 2 assessment. The Stage 1 risk assessment should inform whether careful consideration is required, with the detailed input of specialist acoustic consultants essential at higher risk sites, or straightforward accelerated decision making potentially possible in relation to lower risk sites.

Stage 2: Element 1 – Good Acoustic Design Process

A4.4.9 ProPG states that a good acoustic design process is an implicit part of achieving the requirements of government noise policy, as set out in the NPSE and NPPF, and outlined in Supplementary Document 1 of the ProPG.

A4.4.10 However, it is also stated that good acoustic design does not simply constitute compliance with recommended internal and external criteria, if the solution adversely affects living conditions within the spaces, and hence the quality of life of the inhabitants. The following example is provided:

"Using fixed unopenable glazing for sound insulation purposes is generally unsatisfactory and should be avoided; occupants generally prefer the ability to have control over the internal environment using openable windows, even if the acoustic conditions would be considered unsatisfactory when open. Solely relying on sound insulation of the building envelope to achieve acceptable acoustic conditions in new residential development, when other methods could reduce the need for the approach, is not regarded as good acoustic design."

A4.4.11 Applicants must therefore consider all possibilities for mitigation including but not limited to:

- Checking the feasibility of relocating, or reducing noise levels from relevant sources;
- Considering options for planning the site or building layout;
- Considering the orientation of proposed building(s);
- Selecting construction types and methods for meeting building performance requirements;
- Assessing the viability of alternative solutions;
- Assessing external amenity area noise;
- Examining the effects of noise control measures on ventilation, fire regulation, health and safety, cost, CDM (construction, design and management) etc.

Stage 2: Element 2 – Internal Noise Level Guidelines

A4.4.12 ProPG considers the guidance provided within BS 8233:2014 to be suitable for the assessment of internal noise levels. However, the ProPG provides additional commentary. The following table reproduces the internal ambient criteria provided within Figure 2 of ProPG. The guidance from BS 8233:2014 is displayed in black, with additional comments and criteria from ProPG in blue:

Activity	Location	0700h to 2300h	2300h to 0700h
Resting	Living room	35 dB $L_{Aeq, 16h}$	-
Dining	Dining room/area	40 dB $L_{Aeq, 16h}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq, 16h}$	30 dB $L_{Aeq, 8h}$ 45 dB $L_{AMax,F}$ (Note 4)

NOTE 4 Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values. In most circumstances in noise sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45dB $L_{Amax,F}$ more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events (see Appendix A [which advocates reference to available dose-response relationships appropriate for the types of noise source being considered]).

NOTE 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal L_{Aeq} target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved. The more often internal L_{Aeq} levels start to exceed the internal L_{Aeq} target levels by more than 5 dB, the more that most people are likely to regard them as "unreasonable". Where such exceedances are predicted, applicants should be required to show how the relevant number of rooms affected has been kept to a minimum. Once internal L_{Aeq} levels exceed the target levels by more than 10 dB, they are highly likely to be regarded as "unacceptable" by most people, particularly if such levels occur more than occasionally. Every effort should be made to avoid relevant rooms experiencing "unacceptable" noise levels at all and where such levels are likely to occur frequently, the development should be prevented in its proposed form (see Section 3.D [which states that if certain criteria are fulfilled the noise practitioner should recommend refusal on noise grounds alone, regardless of any case for the development]).

AT3 Table 4 of BS 8233:2014 with ProPG annotations in blue

A4.4.13 It should be noted that the guidance above includes criteria for L_{Amax} noise levels, along with further guidance relating to the assessment of maximum levels in Note 4.

Stage 2: Element 3 – External Amenity Area Noise Assessment

A4.4.14 With regard to external amenity spaces, ProPG references the guidance provided within BS 8322:3014, section 6. ProPG presents a statement summarising BS 8233:2014 section 6 which states:

"The acoustic environment of external amenity areas that are an intrinsic part of the overall design should always be assessed and noise levels should ideally not be above the range 50 – 55 dB $L_{Aeq, 16h}$"

A4.4.15 The standard continues:

"These guideline values may not be achievable in all circumstances where development might be desirable. In such a situation, development should be designed to achieve the lowest practicable noise levels in these external amenity spaces but should not be prohibited."

A4.4.16 ProPG also references guidance within the PPG on noise, which states:

"If external amenity spaces are an intrinsic part of the overall design, the acoustic environment of those spaces should be considered so that they can be enjoyed as intended"

A4.4.17 It is highlighted within ProPG that both BS 8233:2014 and the PPG on noise require a decision to be made as to whether or not external amenity areas are intrinsically important to the required design. However, it is noted that the PPG also states that noise impacts may be partially offset if the residents of affected dwellings are provided, through the design of the development or the planning process, with access to alternative spaces as set out in paragraph A3.6 of this appendix.

A4.4.18 ProPG section 2.51 states that Local Planning Authorities (LPAs) will be best placed to provide guidance in relation to what is 'relatively quiet', as the concept will inherently vary between scenarios.

A4.4.19 The advice in section 2.52 of ProPG highlights the increased importance of LPAs protecting publically accessible external amenity spaces in areas that typically exhibit heightened existing noise climates, such as cities, where development is necessary but private external amenity areas below 55 dB $L_{Aeq,16h}$ are not practicable. Publically accessible spaces such as parks and squares in these areas may be providing respite for nearby residents and, therefore, should be protected.

Stage 2: Element 4 – Assessment of Other Relevant Issues

A4.4.20 This section of the guidance relates to all other relevant issues and seeks to build upon relevant national and local planning and noise policies. Examples are provided including, but not limited to, the following:

- Compliance with relevant national and local policy
- Magnitude and extent of compliance with ProPG
- Likely occupants of the development
- Acoustic design v unintended adverse consequences
- Acoustic design v wider planning objectives

A4.4.21 Other issues specific to the site may be added by the LPA, where relevant.

Industrial Noise

A4.4.22 The scope of the ProPG is restricted to sites that are exposed predominantly to noise from transportation sources. However, there is a special case where industrial or commercial noise is

present on the site but is "not dominant" i.e. the impact would be rated as lower than adverse (subject to context) if a BS 4142:2014 assessment was to be carried out. In such a case, the contribution of the industrial/commercial noise may be included in the noise level used to establish the degree of risk associated with the site. If included, this should be clearly stated.

A4.4.23 Where industrial or commercial noise is "dominant" i.e. where the impact would be rated as adverse or greater (subject to context) if a BS 4142:2014 assessment was to be carried out, then the risk assessment should *not* be applied to the industrial or commercial noise component. Regard should be had to the guidance in BS 4142:2014.

A4.4.24 The judgement on whether or not to undertake a BS4142 assessment to determine dominance should be proportionate to the level of risk. In low risk cases a subjective judgement of dominance, based on audibility, would normally be sufficient.

A4.5 The AVO Guide

A4.5.1 The Association of Noise Consultants document *'Acoustics, Ventilation and Overheating Guide'* (AVO) provides guidance for internal noise criteria when additional ventilation is required for thermal comfort.

A4.5.2 A key principle which must be understood is that "Overheating" in the context of the AVO relates to "chronic" overheating. This does not cover overheating during short term heatwaves or similar such events, but rather sustained periods where the internal spaces within a building remain at elevated temperatures.

A4.5.3 Overheating within buildings is a complex problem to measure and analyse and there is no single temperature above which an internal space can be classed as "overheating". The overheating condition is dependent on many factors such as duration, external ambient temperatures and other factors.

A4.5.4 The Chartered Institute of Building Services Engineers (CIBSE) have issued two main tools which are intended to help building designers determine whether internal areas are overheating and to determine thermal comfort (not in relation to acoustics). These are known as TM52[4] and TM59[5].

A4.5.5 Whilst these tools are not directly relevant to acoustics, TM59 is referenced in the AVO as an assessment tool (which would be utilised by services engineers or similar) which can be drawn from to help inform an AVO assessment.

A4.5.6 The three main methods for providing control of overheating provided by the AVO guidance are:

- Passive ventilative cooling – Introducing external air to a space to provide a cooling effect without the use of fans. The most common method is to use open windows but other façade

[4] CIBSE TM52: *The Limits of Thermal Comfort: Avoiding Overheating in European Buildings* (2018)
[5] CIBSE TM59: *Design methodology for the assessment of overheating risk in homes* (2017)

openings can also be used. Note that trickle vents do not enable sufficient airflow to have a significant cooling effect.

- Mechanical ventilative cooling – Using fans to introduce external air to a space to provide a cooling effect. Due to the airflow required, this type of system often involves significant plant and duct size requirements.

- Comfort cooling – Using a mechanical system to cool the air within a space to achieve a user-defined setpoint. This type of system will require some form of mechanical device to cool the air, such as a fan coil unit (FCU).

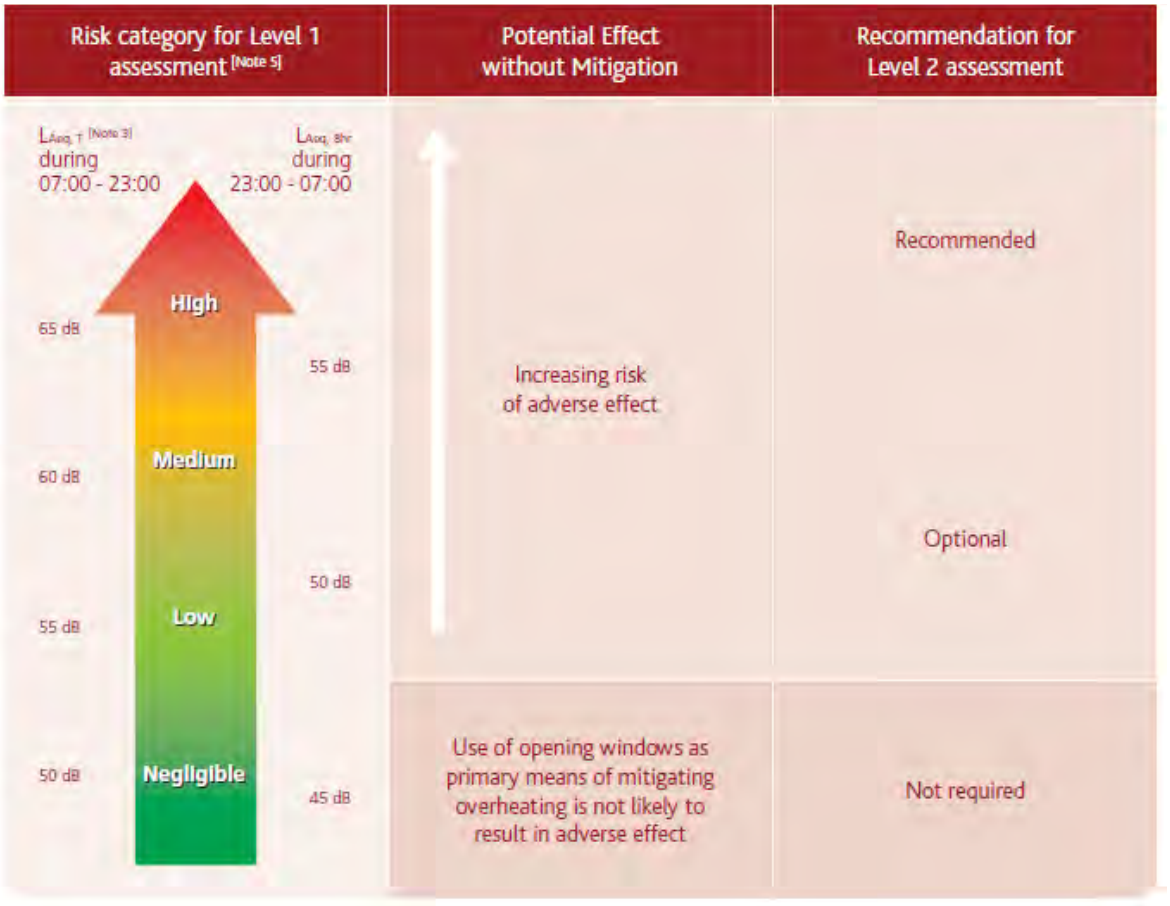
A4.5.7 It is proposed to adopt a scheme of mechanically ventilated cooling.

A4.5.8 Where windows are opened in order to provide passive ventilative cooling to a residential building, the AVO guidance states that it is reasonable for the internal ambient noise levels to be higher than those set out in BS 8233:2014 for background ventilation:

'It is suggested here that the desirable internal noise standard within Table 4 of BS 8233:2014 should be achieved when providing adequate ventilation as defined by ADF whole dwelling ventilation. However it is considered reasonable to allow higher levels of internal ambient noise from transport sources when higher rates of ventilation are required in relation to the overheating condition.'

A4.5.9 The guidance suggests an initial 'Level 1' assessment, where day and night-time **external** noise levels are correlated to a number of risk categories ranging from 'Negligible' to 'High'. The "risk" is taken to relate the potential for issues to arise in respect to the levels of noise affecting receptors, when overheating control is provided via open windows.

A4.5.10 Table 3-2 of the guidance, which sets out the Level 1 risk assessment categories, potential effects and recommendations for further assessment is reproduced below (along with its explanatory notes):



T1 Table 3-2 Guidance for Level 1 site risk assessment of noise from transport noise sources [Note 1] relating to overheating condition.

Note 1 - The noise levels suggested assume a steady road traffic noise source but may be adapted for other types of transport. All levels are external free-field noise levels.

Note 2 - The values presented in this table should not be regarded as fixed thresholds and reference can also be made to relevant dose-response relationships [15, 17].

Note 3 - A decision must be made regarding the appropriate averaging period to use. The averaging period should reflect the nature of the noise source, the occupancy profile and times at which overheating might be likely to occur. Further guidance can be found within the 2014 IEMA Guidelines.

Note 4 - Refer also to references [1, 17, 18, 22] for further guidance regarding individual noise events. Where 78dB $L_{AF,max}$ is normally exceeded during the night-time period (2300 – 0700), a Level 2 assessment is recommended.

Note 5 - The risk of an adverse effect occurring will also depend on how frequently and for what duration the overheating condition occurs. Refer to Figure 3-2.

Note 6 - To evaluate the risk category for a dwelling, all three aspects of external noise exposure (i.e. daytime, night-time and individual noise events) should be evaluated. The highest risk category for any of the three aspects applies.

A4.5.11 If following the initial Level 1 assessment, it is determined that a more detailed Level 2 assessment may be necessary, a more involved and detailed consideration of **internal** noise levels can be undertaken. The Level 2 assessment considers internal noise levels and the proposed façade mitigation measures (including the method of providing cooling). The duration over which overheating may occur is also an important consideration.

A4.5.12 The noise levels within habitable rooms, with the cooling strategy in place, are calculated and compared to the thresholds provided within Table 3-3 "Guidance for Level 2 assessment of noise from transport noise sources relating to overheating condition". This table is reproduced below (again with the associated informative notes):

Internal ambient noise level [Note 2]			Examples of Outcomes [Note 5]	
$L_{Aeq,T}$ [Note 3] during 07:00 – 23:00 [Note 6]	$L_{Aeq,8h}$ during 23:00 – 07:00	Individual noise events during 23:00 – 07:00 [Note 4]		
> 50 dB	> 42 dB	Normally exceeds 65 dB L_{Amax}	Noise causes a material change in behaviour e.g. having to keep windows closed most of the time	Avoiding certain activities during periods of intrusion. Having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.
Increasing noise level			Increasing likelihood of impact on reliable speech communication during the day or sleep disturbance at night	At higher noise levels, more significant behavioural change is expected and may only be considered suitable if occurring for limited periods. As noise levels increase, small behaviour changes are expected e.g. turning up the volume on the television; speaking a little more loudly; having to close windows for certain activities, for example ones which require a high level of concentration. Potential for some reported sleep disturbance. Affects the acoustic environment inside the dwelling such that there is a perceived change in quality of life. At lower noise levels, limited behavioural change is expected unless conditions are prevalent for most of the time. [Note 6]
≤ 35 dB	≤ 30 dB	Do not normally exceed L_{Amax} 45 dB more than 10 times a night	Noise can be heard, but does not cause any change in behaviour	Noise can be heard, but does not cause any change in behaviour, attitude, or other physiological response [Note 8]. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.

T2 Table 3-3 Guidance for Level 2 assessment of noise from transport noise sources [note 1] relating to overheating condition.

Note 1 - The noise levels suggested in Tables 3-2 and 3-3 assume a steady road traffic noise source but may be adapted for other types of transport.

Note 2 - The values presented in this table should not be regarded as fixed thresholds and reference can also be made to relevant dose-response relationships such as those described in a DEFRA 2014 study [15, 21, 22]. With the exception of individual noise events, the references [15, 21] are based on evidence drawn from external noise levels. There is currently very little robust

evidence linking internal averaged noise levels with health outcomes and occupant behaviour. Internal ambient noise levels would normally be considered for living rooms and bedrooms during the daytime. At night, the levels would normally only be applicable to bedrooms.

Note 3 - A decision must be made regarding the appropriate averaging period to use. The averaging period should reflect the nature of the noise source, the occupancy profile and times at which overheating might be likely to occur. Further guidance can be found within the 2014 IEMA Guidelines.

Note 4 - Refer to references [1, 17, 18, 22] for further guidance regarding individual noise events. The $L_{AF,max}$ indicator associated with the upper category is intended for road traffic; it may be more appropriate to use the "one additional noise-induced awakening" method for noise from rail traffic or aircraft.

Note 5 - The potential for adverse effect will also depend on how frequently and for what duration the overheating condition occurs. Refer to Figure 3-2.

Note 6 - The daytime levels presented in this table may not be appropriate for residential care homes or other situations where conditions for daytime resting are known to be of particular importance.

Note 7 - When evaluating the potential for adverse effect, all three aspects of noise exposure (i.e. daytime, night-time and individual noise events) should be evaluated.

Note 8 - BS 8233 states that where development is considered necessary or desirable, the internal target levels may be relaxed by up to 5dB and reasonable internal conditions still achieved.

Note 9 - It is known that physiological responses do occur at lower levels of L_{AFmax} than 45dB.

A4.5.13 As detailed in Note 5 above, the level of assessed impact varies depending on the duration for which the 'overheating condition' occurs. Figure 3-2 provides qualitative guidance on combined effect of internal ambient noise level and duration for the overheating situation and is reproduced below (notionally referred to as an AVO diagram):

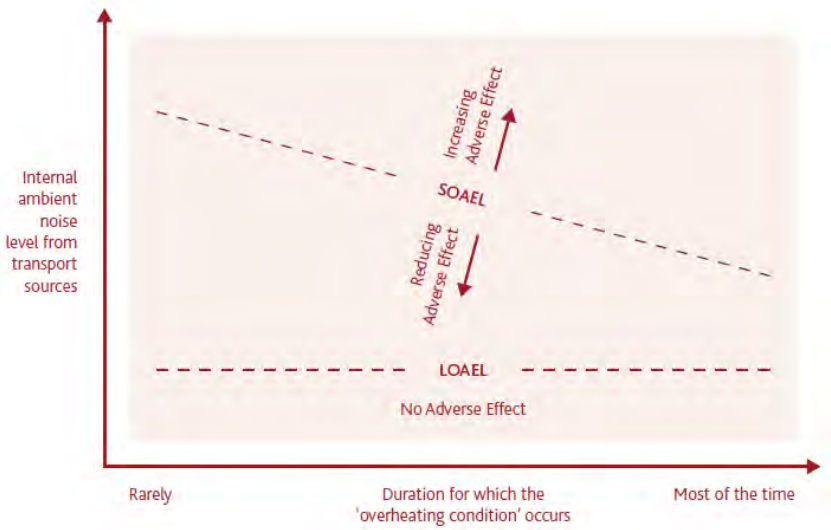


Figure 3-2 Qualitative guidance on combined effect of internal ambient noise level and duration for the overheating situation

A4.5.14 The aim would be to ensure that internal noise levels are mitigated to fall below the Significant Observed Adverse Effect Levels (SOAEL), taking due account of the duration over which overheating occurs. No quantitative guidance is provided in respect to the "Duration" aspect of the plot above, and consultants are required to use professional judgement to determine appropriate levels to be adopted for the SOAEL and Lowest Observed Adverse Effect Level (LOAEL).

A4.5.15 The guidance notes that no specific single noise threshold can be determined, and it suggests each site is considered on its own merits; however, it does indicatively suggest that a range of external noise levels of 53 and 63dB $L_{Aeq,16h}$ daytime and 48 and 55dB $L_{Aeq,8h}$ night time as thresholds of Medium and High risk sites, depending on duration and occurrence of overheating, as well as context.

A4.5.16 The examples at the end of the AVO Guide set a range of SOAELs between 40 and 50dB $L_{Aeq,16h}$, when the duration for which the overheating scenario occurs varies between 'rarely' and 'most of the time'. For the same duration identifiers, the equivalent range during the night is 35 to 42dB $L_{Aeq,8h}$.

A4.5.17 An upper limit of 64dB L_{Amax} is stated for individual noise events, applying the logic of the above ranges compared to the lower level would give a range of 50 to 64dB L_{Amax}.

A4.5.18 The following noise levels are however attributed to the graph y-axis in the worked example set out in Appendix B of the guide (linked to the stage 2 assessment level criteria and 8233 criteria +5dB):

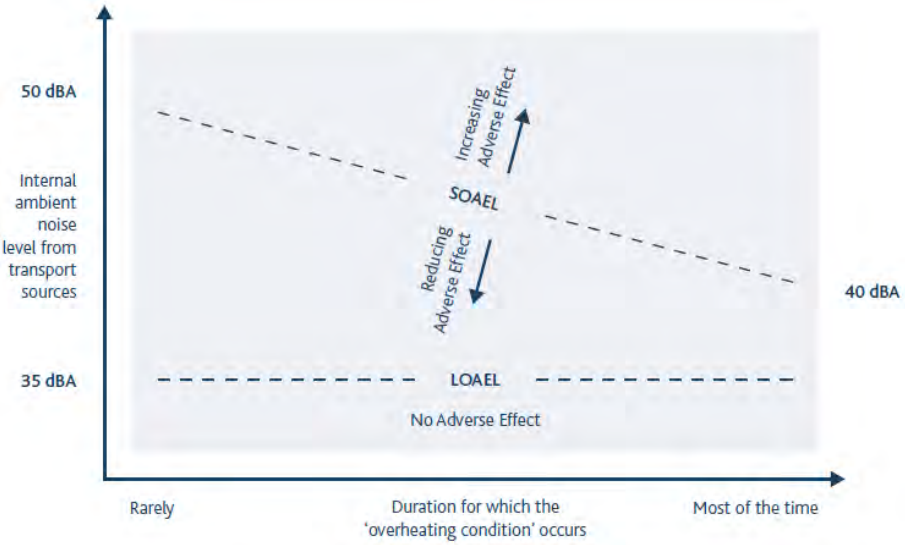


Figure B-2 'AVO Diagram' indicating noise levels associated with adverse effects during the daytime used in [the Appendix B] worked example.

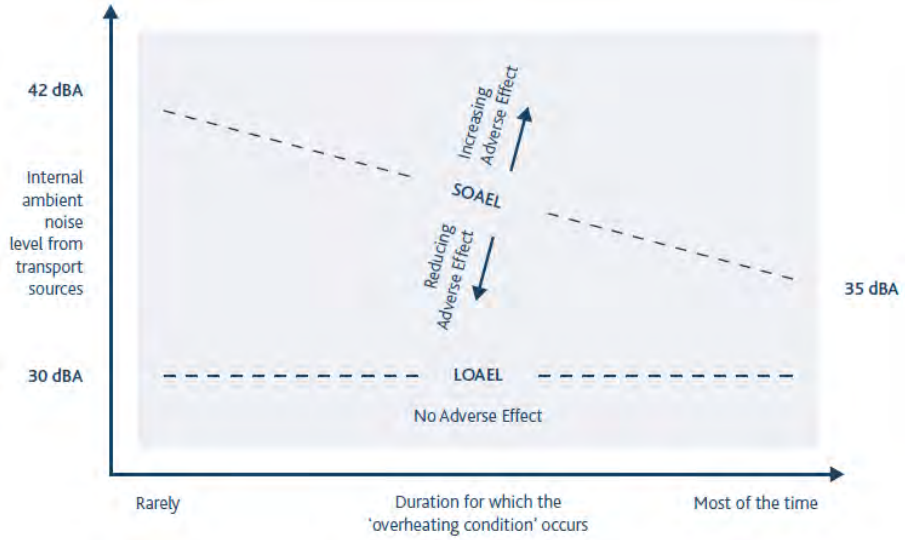


Figure B-3 'AVO Diagram' indicating noise levels associated with adverse effects during the night-time used in [the Appendix B] worked example

A4.5.19 The duration for which overheating occurs is clearly a significant consideration. To provide context – a receptor which may be classified as Medium and High risk (in the context of the AVO) at Level 1 assessment stage (using openable windows as a cooling strategy), may in fact be acceptable with no change to the ventilation strategy, providing the overheating condition only occurs rarely.

A4.5.20

A5 BS 4142:2014

A5.1 Regarding noise impact from a commercial or industrial source, BS 4142:2014 provides an assessment methodology and criteria relating to:

a. sound from industrial and manufacturing processes;

b. sound from fixed installations which comprise mechanical and electrical plant and equipment;

c. sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and

d. sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train or ship movements on or around an industrial and/or commercial site.

A5.2 The application of the standard is detailed below:

"This standard is applicable to the determination of the following levels at outdoor locations:

a) rating levels for sources of sound of an industrial and/or commercial nature; and
b) ambient, background and residual sound levels,

for the purposes of:

1) investigating complaints;
2) assessing sound from proposed, new, modified or additional source(s) of sound of an industrial and/or commercial nature; and
3) assessing sound at proposed new dwellings or premises used for residential purposes."

A5.3 The rating level of noise from the facility is calculated, over a set period, at each of the nearest noise sensitive locations. This rating level is then compared with the existing background sound level.

A5.4 The standard recommends the following reference time period T_r over which the specific sound should be evaluated, for each of the day and night periods:

T_r = 1 hour during the day; and

T_r = 15 minutes during the night.

A5.5 The standard states that daytime is typically between 07:00h and 23:00h. Accordingly, night-time is between 23:00h and 07:00h.

A5.6 The reason for the shorter night time assessment period of 15 minutes is identified in the standard as follows:

"The shorter reference time interval at night means that short duration sounds with an on time of less than 1 h can lead to a greater specific sound level when determined over the reference time interval during the night than when determined during the day."

A5.7 The rating level of noise for the assessment periods, $L_{Ar,\,Tr}$ is the calculated noise level at the nearest receiver location, adjusted depending on the acoustic characteristic of the noise source. Adjustment factors are based on any tonality, impulsivity, intermittency and other characteristics present in the resultant sound at the receiver position. The level or appropriateness of any penalty will depend both on the type of noise source and the context in which it is perceived. Similarly, in accordance with BS 4142, the period of time for which an individual noise source is active during the relevant reference time period will also be considered in establishing the rating level.

A5.8 It will also be necessary to consider the existing noise climate and what sound sources contribute to it. For example, where a noise generating activity is proposed adjacent to an existing similar noise generating site, the impact of the new noise source would be less than if it were to be planned in a location where its character and type is different to and more noticeable than any existing noise source nearby.

A5.9 With regard to the background sound level against which the rating level is compared, the standard states the following:

"In using the background sound level in the method for rating and assessing industrial and commercial sound it is important to ensure that values are reliable and suitably represent both the particular circumstances and periods of interest. For this purpose, the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods."

A5.10 The periods of interest over a 24 hour day are usually related to day time activities (07:00-23:00h) and night time (23:00-07:00h). However the standard makes the following statement:

"Among other considerations, diurnal patterns can have a major influence on background sound levels and, for example, the middle of the night can be distinctly different (and potentially of lesser importance) compared to the start or end of the night-time period for sleep purposes. Furthermore, in this general context it can also be necessary to separately assess weekends and weekday periods."

A5.11 Therefore, the periods of time which are typically considered 'waking up' and 'falling asleep' stages, for example 06:00h to 07:00h and 23:00h to 24:00h, may need to be considered independently. Alternative periods may also be identified where breakdown beyond the standard day and night time analysis will be necessary, for example where background sound levels are shown to be regularly elevated. Similarly, both weekend and weekday periods may need to be considered separately, with criteria set for both. The requirement to analyse specific time periods should be considered for each site individually.

A5.12 Once the rating level at each receptor has been calculated, reference can be made to the following commentary in BS 4142 in relation to conducting an initial assessment of the impact,

based on the difference between the rating level of the noise source and the pre-existing background sound level.

"Obtain an initial estimate of the impact of the specific sound by subtracting the measured background sound level (see Clause 8) from the rating level (see Clause 9), and consider the following.

NOTE 1 More than one assessment might be appropriate.

a) Typically, the greater this difference [between industrial site noise rating level and baseline background level], the greater the magnitude of the impact.

b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.

c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.

d) The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

NOTE 2 Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact."

A5.13 It can be seen that the likelihood of a significant adverse impact occurs once the rating level is at least 10 dB greater than the representative background sound level (depending on context).

A5.14 In addition to the above, BS 4142 also states:

"For a given difference between the rating level and the background sound level, the magnitude of the overall impact might be greater for an acoustic environment where the residual sound level is high than for an acoustic environment where the residual sound level is low.

Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night."

A5.15 When assessing whether the existing sound levels are low, it is also relevant to refer to other standards which provide absolute thresholds for suitable noise levels inside buildings, such as BS 8233:2014 as described above. A rating level of 30 dB is typically considered a lower limit for design criteria; background levels below 30 dB and rating levels below 35 dB were considered 'very low' in BS 4142:1997. Where the existing background level is considered low on this basis, the aim would typically be to achieve a rating level of 30 dB, regardless of the comparison with the background level.

A5.16 Following the initial impact assessment described above, it is necessary to modify the initial impact assessment based on context.

A5.17 The standard states the following (with emphasis added) regarding the introduction of a new noise-sensitive receptor in paragraph 8.5:

"Measure the background sound at the intended location of any new noise-sensitive receptor(s) in the absence of any specific sound.

NOTE Where a new noise-sensitive receptor is introduced and there is extant industrial and/or commercial sound, it ought to be recognized that the industrial and/or commercial sound forms a component of the acoustic environment. ***In such circumstances other guidance and criteria in addition to or alternative to this standard can also inform the appropriateness of both introducing a new noise-sensitive receptor and the extent of required noise mitigation.****"*

A5.18 This explicitly states that standards other than BS 4142 can be considered in the context of a scheme, where new noise sensitive development is proposed next to an existing noise source.

A5.19 It goes on to state that where the initial estimate of the impact needs to be modified due to the context, all pertinent factors should be taken into consideration, including the following:

"1) The absolute level of sound. For a given difference between the rating level and the background sound level, the magnitude of the overall impact might be greater for an acoustic environment where the residual sound level is high than for an acoustic environment where the residual sound level is low.

Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night.

Where residual sound levels are very high, the residual sound might itself result in adverse impacts or significant adverse impacts, and the margin by which the rating level exceeds the background might simply be an indication of the extent to which the specific sound source is likely to make those impacts worse.

2) The character and level of the residual sound compared to the character and level of the specific sound. Consider whether it would be beneficial to compare the frequency spectrum and temporal variation of the specific sound with that of the ambient or residual sound, to assess the degree to which the specific sound source is likely to be distinguishable and will represent an incongruous sound by comparison to the acoustic environment that would occur in the absence of the specific sound. Any sound parameters, sampling periods and averaging time periods used to undertake character comparisons should reflect the way in which sound of an industrial and/or commercial nature is likely to be perceived and how people react to it.

NOTE 3 Consideration ought to be given to evidence on human response to sound and, in particular, industrial and/or commercial sound where it is available. A number of studies are

listed in the "Effects on humans of industrial and commercial sound" portion of the "Further reading" list in the Bibliography.

3) The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions, such as:

i) facade insulation treatment;

ii) ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation; and

iii) acoustic screening."

A5.20 As detailed in point 1 above following the initial impact assessment it is necessary to consider if the assessed impact should be changed due to the absolute level of the noise. When considering absolute noise levels for new dwellings it is appropriate to consider the criteria for dwellings near to industrial noise given within BS 8233. Where the noise rating level is below the criteria set for external amenity areas within BS 8233 the noise impact is considered to not be an adverse impact.

A5.21 Where the impact affects internal noise levels it is appropriate to install mitigation in the form of façade insulation treatment and alternative ventilation. In order to establish the required performance of this mitigation it is necessary to consider the absolute internal noise levels from the industrial source.

A5.22 BS 8233 provides appropriate criteria for absolute noise levels from industrial noise within dwellings. This is based on the following guidance on internal noise within dwellings in BS 8233:

"This subclause applies to external noise as it affects the internal acoustic environment from sources without a specific character, previously termed "anonymous noise". Occupants are usually more tolerant of noise without a specific character than, for example, that from neighbours which can trigger complex emotional reactions. For simplicity, only noise without character is considered in Table 4. For dwellings, the main considerations are:

a) for bedrooms, the acoustic effect on sleep; and

b) for other rooms, the acoustic effect on resting, listening and communicating.

NOTE Noise has a specific character if it contains features such as a distinguishable, discrete and continuous tone, is irregular enough to attract attention, or has strong low-frequency content, in which case lower noise limits might be appropriate."

A5.23 The guidance above makes it clear that noise which has a specific character may require lower noise criteria than proposed for anonymous steady noise sources. BS 4142 deals with this by applying penalties to certain characteristic. Consequently, the rating level already accounts for

noise which has a specific character, such that the L_{Aeq} noise level will be lower than the rating level.

A5.24 Paragraph 6.5.2 of BS 8233 states the following for residential developments in areas affected by industrial noise:

"Where industrial noise affects residential or mixed residential areas, the methods for rating the noise in BS 4142 should be applied. BS 4142 describes methods for determining, at the outside of a building:

a) noise levels from factories, industrial premises or fixed installations, or sources of an industrial nature in commercial premises; and

b) background noise level."

A5.25 The quote above is explicit in stating that the methods for **rating** the noise in BS 4142 should be applied i.e. deriving a rating level, L_{Ar}. It does not state that a full BS 4142 'assessment' should be conducted. The reference to the background noise level relates only to a statement of the scope of BS 4142.

A5.26 It is clear that BS 4142 notes the use of façade insulation treatment (and associated appropriate ventilation) as mitigation. This is consistent with PPG guidance as noted in relevant sections of this appendix. In terms of ventilation, it notes that such mechanisms should be provided to reduce the need to have windows open but it does not state that windows must be kept closed. This principle is in line with BS8233 guidance where assessment should be considered with windows closed, but background ventilation provided; it is also in line with PPG where windows can be closed some of the time (i.e. not all of the time) to ensure a SOAEL is not reached.

A5.27 BS 8233 directs BS 4142 to be used in order to establish the noise rating level from the industrial noise source. This allows for the character of the source to be fully taken into account so that the noise criteria from BS 8233 table 4 (Section 7) can be applied to this type of source. It is important to highlight that BS 8233 is explicit when stating that only the noise rating levels from BS 4142 should be applied. It does not state that a full assessment in line with the BS 4142 methodology should be conducted.

End of Section

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Appendix B



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KEY

- SITE LOCATION (40.78 HA)
- RESIDENTIAL (18.84 HA)
  - Approx. 670 UNITS @ 35 DPH
  - Approx. 760 UNITS @ 40 DPH
- EDGE TREATMENT- MAIN STREET
- EDGE TREATMENT- NEIGHBOURHOOD CORE
- EDGE TREATMENT- GREEN EDGE
- LOCAL CENTRE (1 HA)
- PRIMARY SCHOOL (2.2 HA)
- GREEN INFRASTRUCTURE (20.7 HA)
- EMPLOYMENT
- PRIMARY ACCESS/LINK ROAD
- PEDESTRIAN CYCLE LINKS
- GREENWAY LINKS
  PEDESTRIAN LINK BETWEEN SPORTS PITCHES EASTERN PARKLANDS, EMPLOYMENT & SOUTHERN PARKLANDS
- MILTON KEYNES PROPOSED GRID ROAD
  FIG 4.2 MILTON KEYNES EAST STRATEGIC URBAN EXTENSION DEVELOPMENT FRAMEWORK SPD
- EXISTING PUBLIC FOOTPATHS
- SEWER LINE
  WITH 3M EASEMENT EITHER SIDE OF PIPE
- RIVER OUZEL / LOVAT
- FLOOD ZONE 3
  SUBJECT TO FURTHER STUDY
- EXISTING VEGETATION
  SUBJECT TO FURTHER STUDY

WILLEN ROAD, NEWPORT PAGNELL - **INDICATIVE MASTERPLAN (DRAFT)**

Pegasus Design

PLANNING | DESIGN | ENVIRONMENT | ECONOMICS | WWW.PEGASUSGROUP.CO.UK | TEAM/DRAWN BY: AMW | APPROVED BY P.M: MCC | DATE: 16/11/20 | SCALE: 1:2500 @ A1 | DRWG: P19-2619_03 SHEET NO: __ REV: F | CLIENT: BLOOR HOMES |

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For and on behalf of
Bloor Homes South Midlands

ENVIRONMENTAL STATEMENT
FIGURES

Milton Keynes East,
Land at Willen Road,
Willen Road,
Newport Pagnell,
Milton Keynes

Prepared by
DLP Planning Ltd
Bedford

October 2021

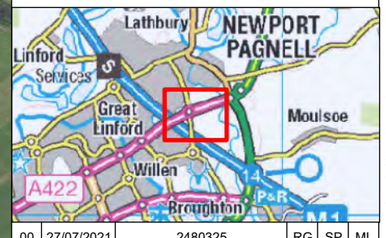
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Figure 7.1

Study Area



Legend:
Original Study Area



Rev	Date	Description	Drn	Chk	App
00	27/07/2021	2480325	RG	SP	ML

Newport Pagnell

RSK biocensus
EXPERTS IN ECOLOGY

TITLE: Figure 7.1
Survey Area

0 60 120
Metres
SCALE: 1:4,500 @ A3

N W E S

REV 00

Document Path: U:\Ecology\2480000s\2480300s\2480325 - Newport Pagnell\07 GIS\2480325-Survey Area.aprx

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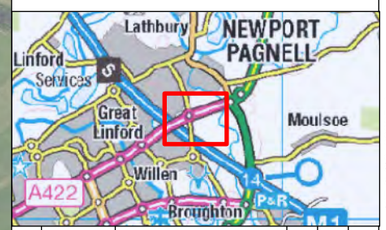
Figure 7.2

Phase 1 Habitat Plan

487250 487500 487750 488000 488250 488500

243000 242750 242500 242250 242000

Legend:
- Site Boundary
- Broad-leaved Plantation Woodland
- Scrub
- Lowland Meadow
- Impoved Grassland
- Tall Ruderal Vegetation
- Arable
- Building
- Hardstanding
- Bare ground
- Hedge
- Gappy Hedge
- Wet Ditch
- Dry Ditch



Rev	Date	Description	Drn	Chk	App
00	27/07/2021	2480325	RG	SP	ML

Newport Pagnell

RSK biocensus
EXPERTS IN ECOLOGY

TITLE: Figure 7.2
Phase 1 Habitat Plan

0 60 120
Metres
SCALE: 1:4,500 @ A3

N W E S

REV 00

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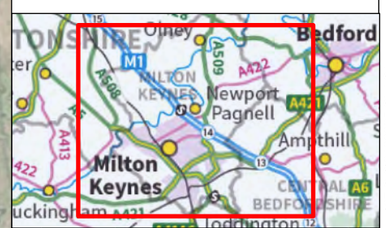
Figure 7.3

Statutory Designated Sites

475000 477500 480000 482500 485000 487500 490000 492500 495000 497500 500000

252500 250000 247500 245000 242500 240000 237500 235000 232500

Legend:
- Site Boundary
- 2km Buffer
- 10km Buffer
- Site of Special Scientific Interest
- National Nature Reserve
- Local Nature Reserve



Rev	Date	Description	Drn	Chk	App
00	27/07/2021	2480325	RG	SP	ML

Newport Pagnell

RSK biocensus
EXPERTS IN ECOLOGY

TITLE: Figure 7.3
Statutory Designated Sites

0 1,000 2,000
Metres
SCALE: 1:85,000 @ A3

N W E S

REV 00

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Figure 7.4

Mitigation and Enhancement

487250 487500 487750 488000 488250 488500

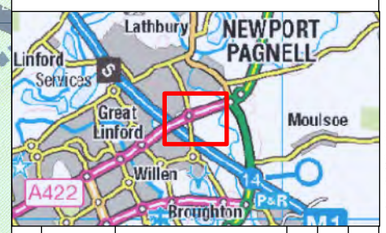
243000 242750 242500 242250 242000

Recreation Ground
SPORTS PITCHES
A 422
MONKS WK
WILLEN ROAD
CALDECOTE COTTAGE
MOAT COTTAGE
PRIMARY SCHOOL (2.2 HA)
RIVER OUZEL
M1

0 20 50 100m

Legend:

- Site Boundary
- New lowland meadow priority habitat creation
- Amenity grassland, attenuation lagoons and area mainteded as dark corridor for foraging bats
- Sustainable drainage features
- Flood attenuation basins and landscape buffer to river Ouzel corridor maintained as dark corridor for foraging bats
- Central greenway
- Retained hedgerow
- Proposed additional hedge planting around margins sports field
- New barn owl box provision



Rev	Date	Description	Drn	Chk	App
00	27/07/2021	2480325	RG	SP	ML

Newport Pagnell

RSK biocensus EXPERTS IN ECOLOGY

TITLE: Figure 7.4
Mitigation and Enhancement Plan

0 60 120
Metres
SCALE: 1:4,500 @ A3

N W E S

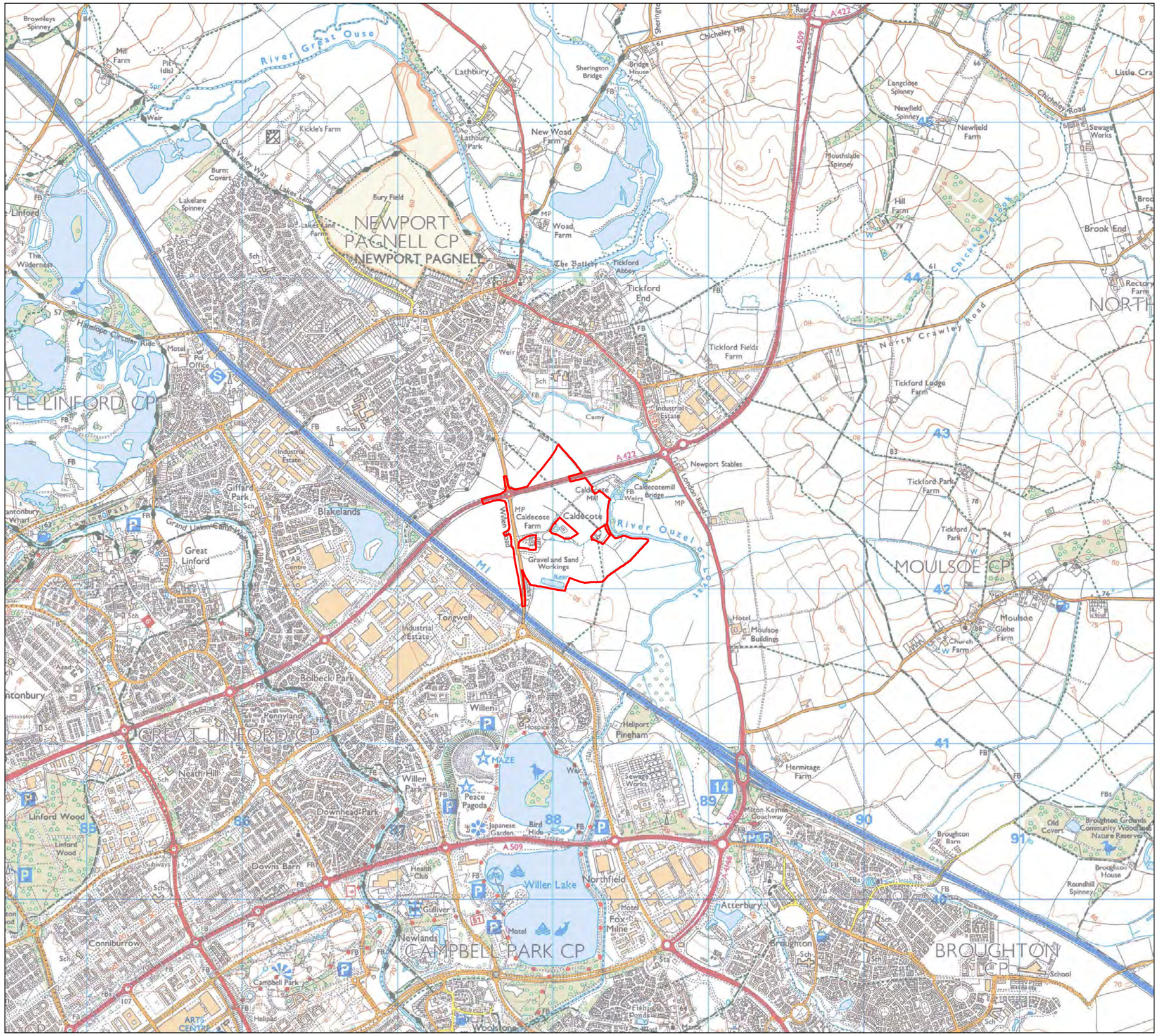
REV 00

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Figure 8.1

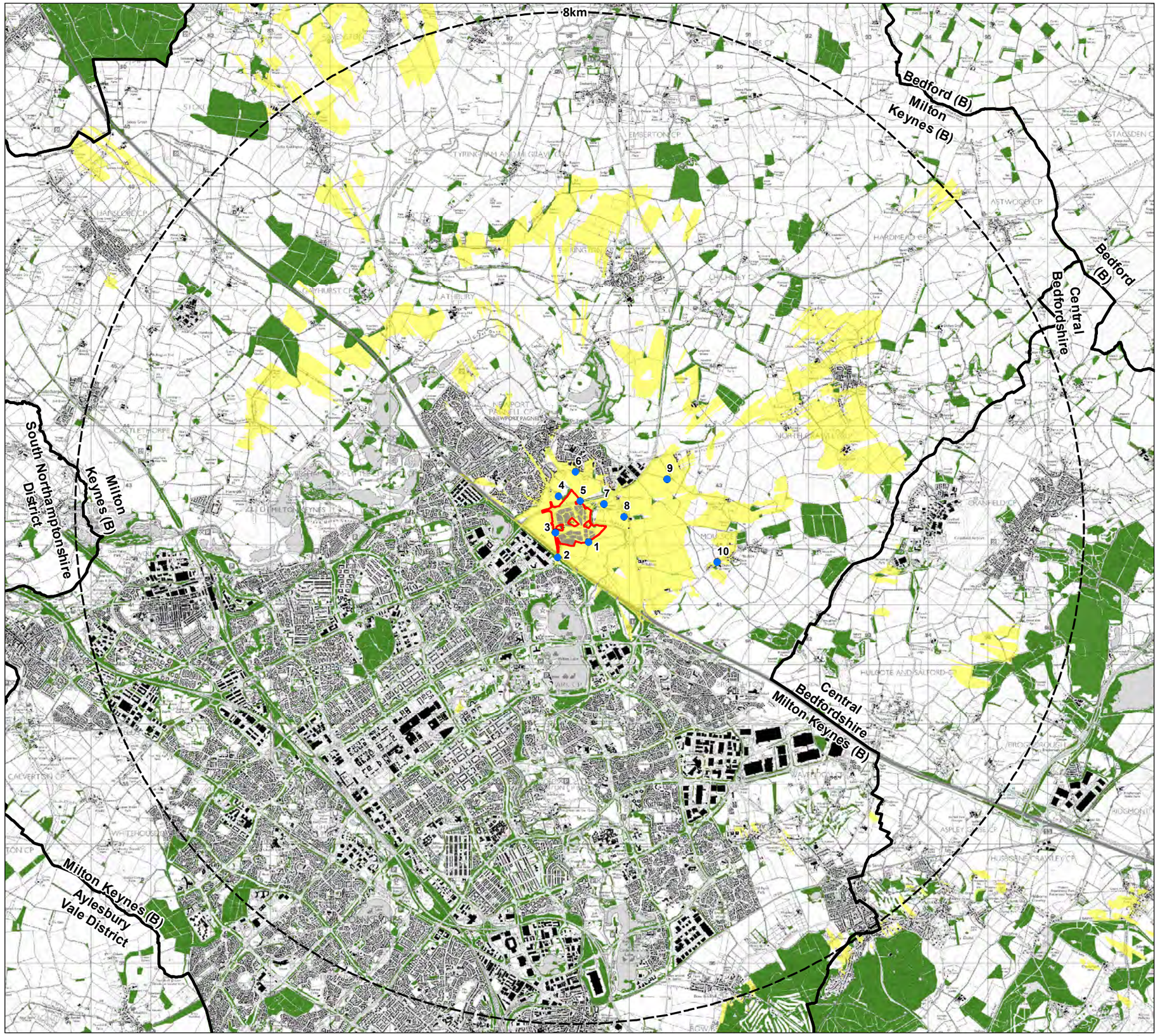
Site Location Plan


NEWPORT PAGNELL CP
NEWPORT PAGNELL
GREAT LINFORD CP
CAMPBELL PARK CP
MOULSOE CP
BROUGHTON CP
River Great Ouse
River Ouzel or Lo
Grand Union Canal
Ouse Valley Way
Lakes Lane
Chicheley Road
North Crawley Road
London Road
A422
A509
A1146
M1
Willen Road
Sherington Bridge
Lathbury
Lathbury Park
New Woad Farm
Woad Farm
Kickle's Farm
Bury Field
Lakes Lane Farm
Burnt Covert
Lakelane Spinney
Linford
The Wilderness
Hillslope Circular Ride
Motel
Pol Office
Schools
Industrial Estate
Giffard Park
Blakelands
Great Linford
Tongwell
Bolbeck Park
Pennyland
Neath Hill
Linford Wood
Downs Barn
Downhead Park
Willen
Willen Park
Peace Pagoda
Japanese Garden
Bird Hide
MAZE
Willen Lake
Health Club
Gulliver's
Newlands
Conniburrow
Campbell Park
ARTS CENTRE
Woolstone
Heliport Pineham
Hospice
Sewage Works
Northfield
Atterbury
Fox Milne
Broughton
Broughton Barn
Broughton Grounds Community Woodland Nature Reserve
Broughton House
Roundhill Spinney
Old Covert
Hermitage Farm
Milton Keynes Coachway
Tickford Abbey
The Battery
Tickford End
Tickford Fields Farm
Tickford Lodge Farm
Tickford Park Farm
Tickford Park
Industrial Estate
Caldecote
Caldecote Farm
Caldecote Mill
Caldecotemill Bridge
Gravel and Sand Workings
Cemy
Newport Stables
Sherington Bridge
Bridge House
Chicheley Hill
Longclose Spinney
Newfield Spinney
Newfield Farm
Mouthslade Spinney
Hill Farm
Brook End
Rectory Farm
Sewage Works
Moulsoe Buildings
Moulsoe Glebe Farm
Church Farm
Antonbury Wharf
Mill Farm
Weir
Pit (dis)
Brownleys Spinney
Hotel
Motel
Fish Ponds
Manor
Sch
FB
MP
Rest
F Sta
Spr
Weirs
AR Centre
Subways
Health Club
Campbell Park
Helipad
Industrial Estate
Schools
Hospice
Sewage Works

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Figure 8.2

Screened Zone of Theoretical Visibility and Viewpoint Location Plan



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KEY

- Site Boundary
- Viewpoint Location
- Local Authority Boundary
- Development Parcels
- OS Open Map Local Woodland
- OS Open Map Local Building
- Zone of Theoretical Visibility (12.5m)

Screened ZTV Production Information -
- DTM data used in calculations is OS Terrain 5 that has been combined with OS Open Map Local data for woodland and buildings to create a Digital Surface Model (DSM).

- Indicative woodland and building heights are modelled at 15m and 8m respectively.
- Viewer height set at 1.7m (in accordance with para 6.11 of GLVIA Third Edition)
- Calculations include earth curvature and light refraction

N.B. This Zone of Theoretical Visibility (ZTV) image illustrates the theoretical extent of where the development may be visible from, assuming 100% atmospheric visibility, and includes the screening effect from vegetation and buildings, based on the assumptions stated above.

FIGURE 8.2

Screened Zone of Theoretical Visibility and Viewpoint Location Plan

DRWG No: **P19-2619_03** Sheet No: **-** REV: **C**

Date: 30/09//2021

Scale: 1:65,000 @ A3

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Figure 8.3

Environmental Designations Plan

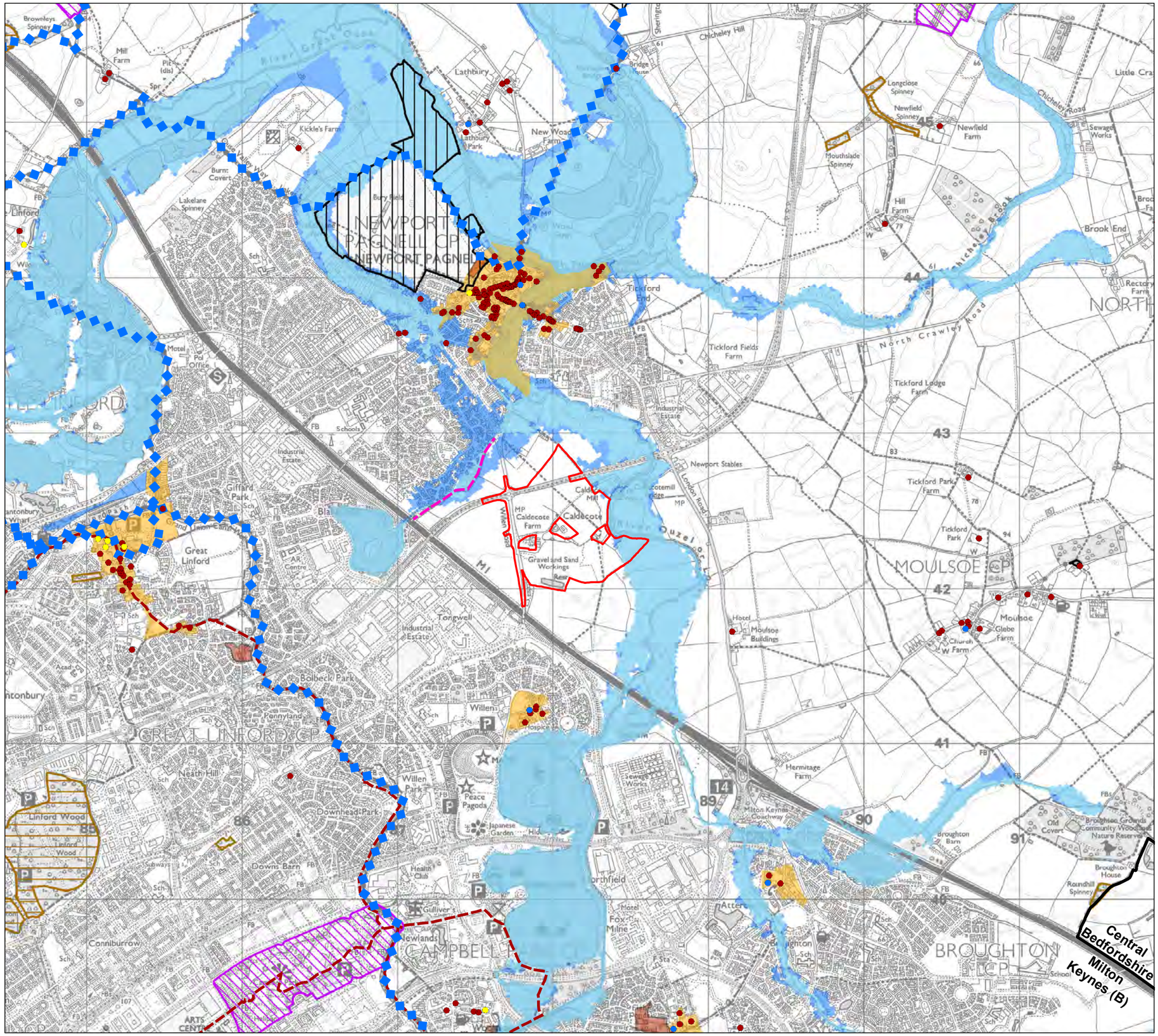
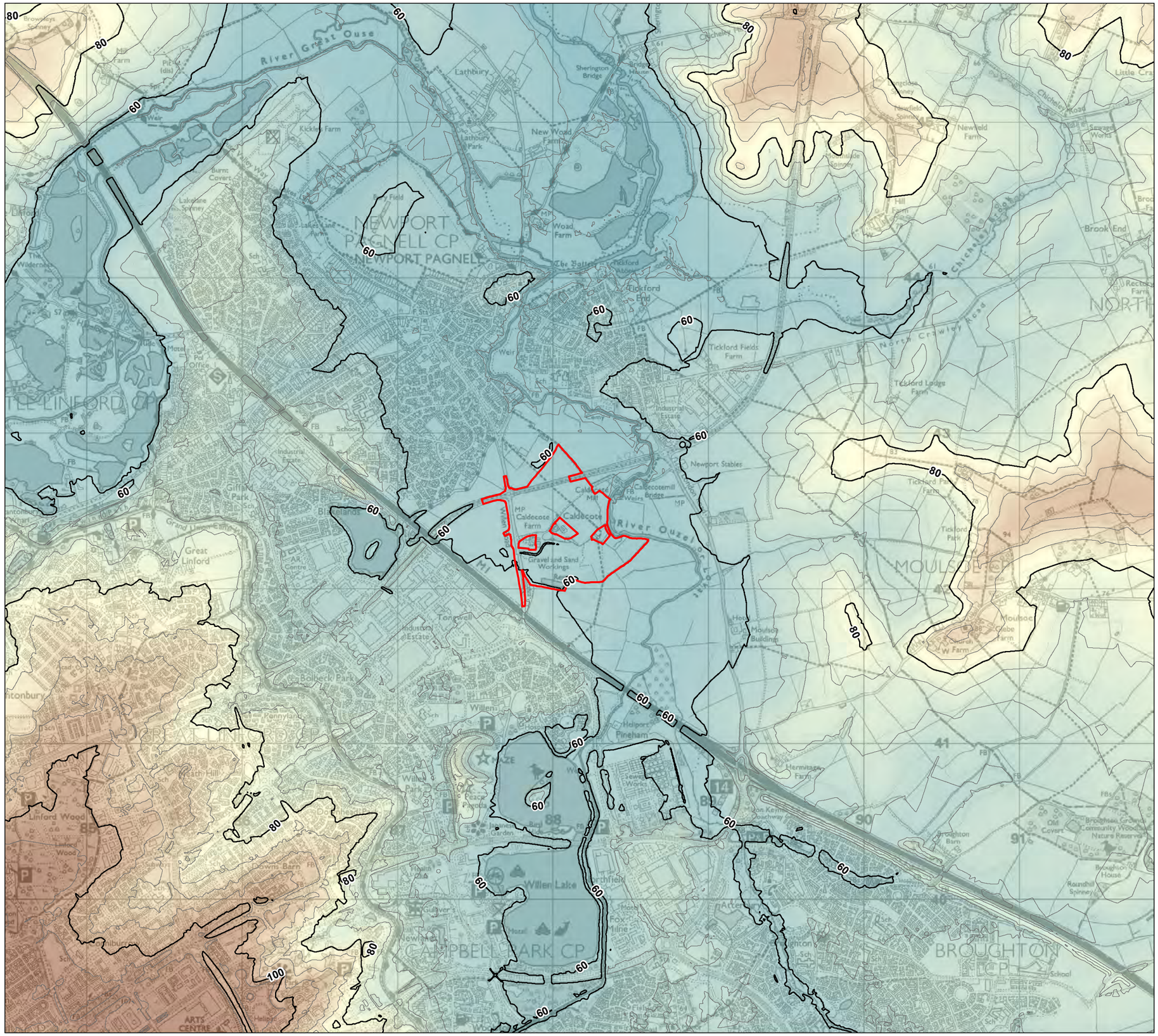

NEWPORT PAGNELL CP
NEWPORT PAGNELL
GREAT LINFORD CP
CAMPBELL
MOULSOE CP
BROUGHTON
NORTH
Chicheley Hill
Lathbury
New Wood Farm
Lathbury Park
Kickle's Farm
Burnt Covert
Lakelane Spinney
Bury Field
Tickford End
Tickford Fields Farm
Tickford Lodge Farm
Tickford Park Farm
Newfield Farm
Longclose Spinney
Newfield Spinney
Mouthslade Spinney
Hill Farm
Brook End
North Crawley Road
Chicheley Road
Sewage Works
Newport Stables
Caldecote Mill
Caldecote
MP Caldecote Farm
Gravel and Sand Workings
Industrial Estate
Motel
Post Office
Schools
Gifford Park
Great Linford
Tongwell
Boilbeck Park
Pennyland
Willen
Willen Park
Peace Pagoda
Japanese Garden
Neath Hill
Linford Wood
Downhead Park
Downs Barn
Health Club
Conniburrow
Newlands
Hotel
Fox Milne
Moulsoe Buildings
Church W Farm
Moulsoe Glebe Farm
Hermitage Farm
Milton Keynes Coachway
Broughton Barn
Broughton Brooks Community Woodland Nature Reserve
Old Covert
Broughton House
Roundhill Spinney
Central Bedfordshire
Milton Keynes (B)
M1
A422
A509
A5
River Great Ouse
Ouzel Brook
Chicheley Brook
Grand Union Canal
London Road
Willen Road
Sherington
Brownleys Spinney
Mill Farm
Pits (dis)
Spr
Linford
Wic
Motel
Pol Office
Schools
Industrial Estate
Great Linford
Antonbury Wharf
Acad
Sch
AR Centre
Bla
Tongwell
Industrial Estate
Boilbeck Park
Pennyland
Willen
Willen Park
Peace Pagoda
Japanese Garden
Neath Hill
Linford Wood
Downhead Park
Downs Barn
Health Club
Conniburrow
Newlands
Gulliver
Hotel
Fox Milne
Hermitage Farm
Milton Keynes Coachway
Broughton Barn
Old Covert
Broughton House
Roundhill Spinney
Hotel
Moulsoe Buildings
Church W Farm
Moulsoe Glebe Farm
Tickford Park
Tickford Park Farm
Tickford Lodge Farm
Tickford Fields Farm
Industrial Estate
Newport Stables
Caldecote Mill
Caldecote
MP Caldecote Farm
Gravel and Sand Workings
Rest
Motel
Pol Office
Schools
Gifford Park
Great Linford
Tongwell
Boilbeck Park
Pennyland
Willen
Willen Park
Peace Pagoda
Japanese Garden
Neath Hill
Linford Wood
Downhead Park
Downs Barn
Health Club
Conniburrow
Newlands
Gulliver
Hotel
Fox Milne
Hermitage Farm
Milton Keynes Coachway
Broughton Barn
Old Covert
Broughton House
Roundhill Spinney
Tickford Park
Tickford Park Farm
Tickford Lodge Farm
Tickford Fields Farm
Industrial Estate
Newport Stables
Caldecote Mill
Caldecote
MP Caldecote Farm
Gravel and Sand Workings
Rest
Longclose Spinney
Newfield Spinney
Newfield Farm
Mouthslade Spinney
Hill Farm
Brook End
Sewage Works
Lathbury
Lathbury Park
New Wood Farm
Kickle's Farm
Burnt Covert
Lakelane Spinney
Bury Field
Tickford End
Chicheley Hill
Chicheley Road
North Crawley Road
Chicheley Brook
Ouzel Brook
River Great Ouse
Grand Union Canal
London Road
Willen Road
Sherington
Brownleys Spinney
Mill Farm
Pits (dis)
Spr
Linford
Wic

Figure 8.4

Topography Plan



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0 1 km

N

KEY

Site boundary

Contour

DTM (metres above ordnance datum)

High : 113.56

Low : 50.9582

FIGURE 8.4

Topography Plan

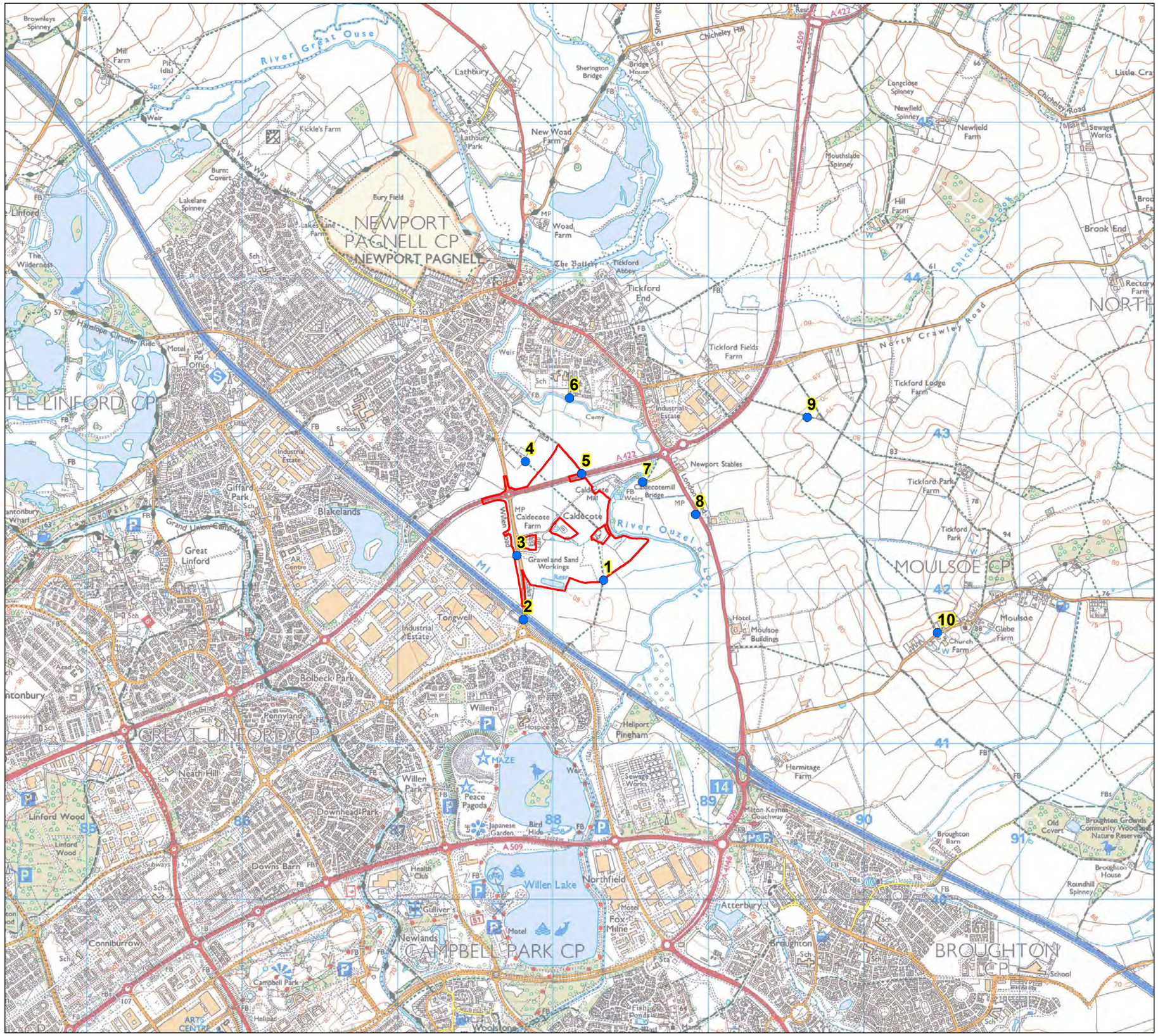
DRWG No: **P19-2619_22** Sheet No: **-** REV: **A**

Date: 29/09/2021

Scale: 1:25,000 @ A3

Figure 8.5

Viewpoint Location Plan



KEY

- Site Boundary
- Viewpoint Location

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0 1 km

N

FIGURE 8.5

Viewpoint Location Plan

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Date: 29/09/2021

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