



Earth Environmental
& Geotechnical

Preliminary Ecological Appraisal

&

Biodiversity Net Gain Assessment

Waterfold Mill

Waterfold Lane

Heywood

July 2022

On behalf of

Mr. David Gibbons



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**WATERFOLD MILL
WATERFOLD LANE
HEYWOOD
PRELIMINARY ECOLOGICAL APPRAISAL & BIODIVERSITY NET GAIN ASSESSMENT
FOR
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CONTENTS

1.0	INTRODUCTION.....	1
2.0	METHODOLOGY.....	3
3.0	RESULTS AND IMPACT ASSESSMENT	1
4.0	SUMMARY AND RECOMMENDATIONS.....	14
5.0	ENHANCEMENTS	19
6.0	CONCLUSIONS.....	23
7.0	REFERENCES.....	27

FIGURES

- Figure 1 Site location plan
- Figure 2 Site Photographs: Habitats & invasive non-native species
- Figure 3 Baseline habitat map
- Figure 4 Site Photographs: Species specific features
- Figure 5 Post-Development Habitat Map

TABLES

- Table 1 Non-Statutory Sites located within 2km of the proposed development site
- Table 2 Baseline biodiversity value
- Table 3 Notable and Protected Invertebrate Species recorded within 2 km of the Site
- Table 4 Summary of likely impacts and mitigation

APPENDICES

- Appendix 1 Biodiversity Metric 3.1 condition assessment criteria
- Appendix 2 Post-Development Changes in Biodiversity Value

1.0 INTRODUCTION

- 1.1 Earth Environmental & Geotechnical Ltd were commissioned to undertake a Preliminary Ecological Appraisal of land at Waterfold Mill, Waterfold Lane, Heywood, BL9 7JY (centered at National Grid Reference SD 82107 10340).

The Development Site

- 1.2 Development proposals for the site include the erection of 2 no. residential apartment blocks, 3 storeys in height, housing 36 apartments in total. with associated parking, access roads and pathways and soft landscaping. The existing stock fence and hedgerow to the south will also be removed and re-established further south at the edge of the site boundary to facilitate the access road.
- 1.3 The survey site is located on the outskirts of the village of Heap Bridge, approximately 1.5km east of Bury Town Centre, and 3km west of Heywood. The site is immediately surrounded by the M66 motorway to the west, the River Roch to the north, and agricultural land with rural residential areas to the south and east. A railway line is located 120m south, with ecological connectivity to the site provided by the M66 screening woodland embankment (Figure 1).
- 1.4 In the wider environment, the River Roch runs through a commercial business park area, 300m north east of the site. An area of more apparent semi-natural habitats is present south of the railway line, with a quarry area located further afield, 1.1km south of the site.
- 1.5 The survey site occupies an area of 0.78 hectares and is largely comprised of sparsely vegetated ruderal land with self-seeded scrub and scattered trees, that formally formed the footprint of Waterfold Mill. Along the western boundary of the site a screening woodland area is present, that will have been planted as part of the construction of the M66 motorway, completed in 1978.

Survey Aims

- 1.6 The aims of the survey were to:
- Determine the potential for protected species and/or habitats of conservation value within the survey site in relation to the surrounding area.
 - Determine how the proposed works may impact on these species and/or habitats.
 - Assess any potential impacts of the proposed works upon surrounding designated sites or areas of conservation interest.
 - Identify the requirement for further survey work where necessary.
 - Identify the requirement for avoidance, mitigation, or compensation where necessary.
 - Propose potential enhancement for the site where appropriate.

The Surveyor

- 1.7 The Ecological Assessment was undertaken by Paul Wolstenholme BSc Hons MSc ACiEEM. Paul has over four years' experience as an Ecologist and is licenced to survey bats (survey licence number 2021-53560-CLS-CLS) and great crested newt *Triturus cristatus* (survey licence

number 2019-41740-CLS-CLS).

Figure 1. Site Location Plan 1:2500



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2.0 METHODOLOGY

Desk Study

2.1 A desk study was undertaken to inform the requirements for survey and obtain additional ecological information within 2 km of the application site. The following sources were consulted:

- Greater Manchester Ecology Unit (GMEU)
- Multi-Agency Geographic Information Centre (MAGIC) website (www.magic.gov.uk);

2.2 The following information was sought:

- recent records of notable protected and priority species (within the last 10 years);
- records of priority habitats;
- details of any statutory sites of ecological interest e.g., Sites of Special Scientific Interest (SSSI), Special Protection Area (SPA) etc.; and
- details of any non-statutory sites of ecological interest e.g., Sites of Importance for Nature Conservation (SINC), Local Wildlife Sites (LWS) etc.

2.3 Only receptors considered likely to be affected by the proposed scheme are presented within this report, with the locations of any significant records and/or designated sites presented in Figure 2. Full records can be viewed on request.

Field Survey

2.4 The field survey was undertaken by Paul Wolstenholme ACIEEM (NE Bat Licence: 2021-53560-CLS-CLS) on 3rd November 2021 and followed UKHab methodology (UHCWG, 2018), where the habitats and vegetation types of presents were recorded, together with an indication of their relative abundance. An additional site visit was made on 18th July 2022 to assess additional habitats, not present within the original site boundary provided. This survey method aims to characterise habitats and communities present and is not intended to provide a complete list of all species occurring across the site.

2.5 UKHab is a habitat classification system designed to support the evaluation of habitats for ecological impact assessment and net gain analysis. It has been designed to integrate with other UK classification systems such as Phase 1 habitat methodology (JNCC, 2016) and is becoming widely accepted as the new standard for habitat surveying within the UK.

2.6 Plant species recorded were classified according to the subjective method of DAFOR abundance ratings. The standardised terms are as follows:

- D Dominant
- A Abundant

- F Frequent
- O Occasional
- R Rare

2.7 Notable, rare, or scarce plant species were highlighted if present. Evidence of protected species or species of nature conservation importance was recorded where present at the time of survey. The information is presented using target notes (TN), locations of which are shown on Figure 3. Invasive plant or animal species listed on Schedule 9 of the Wildlife and Countryside Act (1981) (as amended) were recorded as seen.

Protected and Key Species Survey

2.8 All signs of protected species or groups encountered during the survey visit were recorded. This included observations of tracks or other signs of species such as badger, which may not be visible at the time of survey. The structure and quality of the habitats present were assessed for their suitability to support animal groups, paying particular attention to detecting signs of occupation by, or suitability for, protected species. In addition, a note was made of any animals or flora of conservation interest not protected by UK or European legislation.

Preliminary Roost Assessment

2.9 A ground-based preliminary roost assessment of all trees and structures within the application site was undertaken in accordance with best practice guidance (Collins, 2016).

2.10 All buildings were visually inspected for the present of potential roost features such as cavities and/or crevices created by damaged/lifted roofing materials, missing brickwork, and mortar, amongst other features that may provide access to suitable roosting space. Similarly, all trees were examined for potential roost features that may form as a result of either disease, decay and/or damage (i.e., animal holes, knot holes, callus rolls, wounds, and other similar features). Close focusing binoculars were used where necessary and any evidence of roosting bats, including live or dead bats, droppings, and staining due to fur oils, was noted.

2.11 An individual building or tree may support features of potential interest to roosting bats. It is not always possible to confirm usage of a feature as bats are transient in nature and may be present on one day, with no evidence of occupation present on the next. As such, any structure and/or tree has been assigned a defined category of roosting potential, based on the possible roosting features present, their associated characteristics (size, shelter, protections, conditions) and the surrounding habitat. Categories of roosting potential are defined as follows:

- **Negligible:** A structure or tree with no suitable features present that are likely to support roosting bats
- **Low:** A structure or tree with suitable features present that could potentially support low numbers roosting bats opportunistically but are unlikely to be occupied on a regular basis and/or by a significant number of individual bats.

- **Moderate:** A structure or tree with suitable features with the characteristics to provide regular shelter for low numbers of individual bats but are unlikely to support a roost of high conservation status.
- **High:** A structure or tree with suitable features with the characteristics to support large numbers of bats on a regular basis, for potentially longer periods of time.

2.12 The site was also assessed for its potential to support foraging and commuting bats.

Biodiversity Net Gain Assessment

Baseline

- 2.13 The Biodiversity Net Gain Assessment was undertaken using the 'Biodiversity Metric 3.1 Calculation Tool Beta' (BM3.1) distributed by Natural England (2022). Habitat measurements have been taken using digital mapping software (QGIS Geographic Information System version 3.26).
- 2.14 The condition of each habitat type was assessed and categorised as either good, fairly good, moderate, fairly poor, or poor. The assessment was made using the criteria within 'BM3.1 Technical Supplement' (Panks et al, 2022), this provided specific assessment criteria for each broad habitat type (1- 12 specific criteria (C1 – 12) are provided for each defined broad habitat and linear features (including function group criteria for hedgerows (A, B, C and D)).
- 2.15 Using the BM3.1, habitat values are calculated based on whether they occur commonly or whether they are rare, their area (ha) (or length (km) for linear features such as hedgerows), condition, connectivity to other habitats, and importance within the local area, usually identified from local relevant planning policies or documents. This gives a pre-development value in Habitat Units (HU), Hedgerow Units (HeU) and/or River Units (RU).

Measuring Change in Biodiversity

- 2.16 The current indicative development layout plan (Drawing no. M21-13-08; Alternative Development Plan; Option 4) and baseline habitats (Figure 3) were referred to in order to calculate the area, type, and condition of each predicted habitat once the scheme is implemented.
- 2.17 BM3.1 was used to calculate the likely net change in biodiversity value of the application site by comparing the existing baseline against the predicted post-development units which would be provided by implementation of the current development plan.
- 2.18 Net change in biodiversity value can be calculated by subtracting the forecasted future biodiversity value of the site, post-management, from its current biodiversity value ('baseline'). Biodiversity values are based on the predicted habitats and condition state following the implementation of a 30-year management plan (minimum management period recommended by the government with the biodiversity net gain scheme)
- 2.19 It should be noted that this layout plan is an indicative layout and does not necessarily represent the final approved composition of the development and associated landscaping (if included). It

is anticipated that biodiversity calculations will be re-calculate following the completion of the final development layout plan. Recommendations for achieving a net gain within the site has been provide for this, where appropriate.

Limitations

- 2.20 The majority of the site was accessible, with the exception of the steepest areas of the riverbank. As a result, any sings of notable/protected riparian species utilising these areas may have been missed. A precautionary approach in relation to these species has therefore been adopted.
- 2.21 Due to the time of year some plant species may have been missed, but given the habitat types, the survey data is considered sufficient to inform this assessment and any necessary recommendations. It should be noted that any survey based on a single site visit will miss a significant proportion of the species present on or using the site. As such this report includes an assessment of only the likely presence of notable species.
- 2.22 The baseline survey and condition assessment was undertaken using the previous version of the metric (BM 3.0), which has been updated post-survey to the most current version. This is not considered to be a limitation as the habitat condition criteria for the habitats present has not changed significantly.

3.0 RESULTS AND IMPACT ASSESSMENT

DESIGNATED SITES

- 3.1 There are no European designated sites within 5km. Records provided by Greater Manchester Ecology Unit identified two Local Nature Reserves (LNRs) of district level (statutory) importance and a further five locally important (non-statutory) Sites of Biological Interest (SBIs) within 2km. show that there are not any nationally important (statutory) sites within 2km. These are listed and described in Table 1.

Table 1. Designated Sites located within 2km of the proposed development site.

Site	Habitats recorded
Hollins Vale LNR	Hollins Vale is a Local Nature Reserve (LNR) located approx. 1.6km south of the site. Hollins Vale is a farmland reserve with areas of woodland and wetland. The woods support abundant populations of bluebell <i>Hyacinthoides non-scripta</i>, lesser celandine <i>Ficaria verna</i>, wood anemone <i>Anemone nemorosa</i> and violets <i>Viola sp.</i> The grassland areas are cattle grazed and flower rich. Populations of birds and butterflies are abundant.
Chesham Woods LNR	Chesham Woods is a Local Nature Reserve (LNR) located approx. 1.6km south of the site. The LNR comprises six small woods, three semi-natural with the remaining three semi-ornamental within the grounds of demolished large houses. Dry stone walls are an important feature of the site. Habitats present include broad-leaved semi-natural woodland and plantation woodland, scrub, improved grassland, amenity grassland, neutral grassland, and an area of orchard.
Railway Cutting at Heywood	Railway Cutting at Heywood is a Site of Biological Importance (SBI) located approx. 700m southeast of the site. This cutting is part of the Heywood link of the East Lancs Railway. It supports a diverse mosaic of habitats including neutral grassland, heathland, tall ruderal vegetation, scrub, and young semi-natural broadleaved woodland. The railway ballast provides habitat for short ephemeral vegetation. The site is an important refuge for wildlife in the Heywood area and a core site within the East Lancs Railway Wildlife Corridor linking the River Roch in Bury through to Castleton. The site's primary importance is the presence of twayblade which has a limited distribution in Greater Manchester and this site is the only known location in Rochdale.
Townside	Townside is a Site of Biological Importance (SBI) located approx. 1.4km west of the site. This site has been designated due to locally important populations of smooth newt <i>Lissotriton vulgaris</i>, common frog <i>Rana temporaria</i>, and aquatic invertebrates, as well as bat foraging habitat.

Site	Habitats recorded
Smethurst & Elbut Woods (West & East)	Smethurst & Elbut Woods (West & East) is a Site of Biological Importance (SBI) located approx. 1.4km northeast of the site. This is a riparian woodland along the northern bank of the River Roch and is designated as it provides woodland connectivity to important ancient woodland areas.
Lomax Wood	Lomax Wood is a Site of Biological Importance (SBI) located approx. 1.9km northeast of the site. This is a riparian woodland along the southern bank of the River Roch and is designated as it provides woodland connectivity to important ancient woodland areas.
Pilsworth	Pilsworth is a Site of Biological Importance (SBI) located approx. 1.7km southeast of the site. This SBI supports areas of mature semi-natural woodland with large fishing lakes. Brightly brook also runs directly through the site.

- 3.2 Due to the distance of the proposed development from the above listed sites and the limited scale of the proposed work it is not anticipated that there will be any direct or residual impacts to the majority of the designated sites listed. However, the Railway Cutting at Heywood SBI is ecologically connected to the site by the woodland corridor along the western boundary and may provide functional connectivity for wildlife between the SBI and the River Roch.
- 3.3 For this reason, it is considered possible that in-direct impacts to the Railway Cutting at Heywood SBI, through the disruption of wildlife connectivity, may occur and should be considered within development plans.

PROTECTED SPECIES AND HABITATS

Botany and Habitats

- 3.4 Habitats are discussed in order of dominance below.

Sparsely vegetated land – Ruderal/Ephemeral (s 17)

- 3.5 The majority of the site is formed by the disturbed ground of the former mill footprint, with bare loose substrate and early succession vegetation of less than 75% coverage. Constant species present included creeping bent *Agrostis stolonifera* (A); Yorkshire-Fog *Holcus lanatus* (F); False oatgrass *Arrhenatherum elatius* (F); smooth meadow-grass *Poa pratensis* (F); crested dog's-tail *Cynosurus cristatus* (LF); tufted hair-grass *Deschampsia cespitosa* subsp. *cespitosa* (O); meadow foxtail *Alopecurus pratensis* (O); ribwort plantain *Plantago lanceolata* (F); white clover *Trifolium repens* (F); common ragwort *Senecio jacobaea* (O); bramble *Rubus fruticosus* agg. (O); red clover *Trifolium pratense* (O); and broad-leaved dock *Rumex obtusifolius* (O).
- 3.6 A significant area of this habitat was dominated by tall ruderal vegetation (Figure 2: Photo 1; s 16 17 in Figure 3) including abundant Himalayan balsam *Impatiens glandulifera* (A); mugwort *Artemisia vulgaris* (A); rosebay willowherb *Chamerion angustifolium* (A); common nettle *Urtica*

dioica (F); creeping thistle *Cirsium arvense* (F); garlic mustard *Alliaria petiolata* (F); and common knapweed *Centaurea nigra* (LF). Along the southern boundary of the site, this habitat is present along an earth bund (Figure 2: Photo 2; 71 in Figure 3) with the additional species Canadian fleabane *Conyza canadensis* (F); creeping buttercup *Ranunculus repens* (LF); Spear thistle *Cirsium vulgare* (O); greater plantain *Plantago major* (O); and male-fern *Dryopteris filix-mas* (O).

- 3.7 Shorter sward areas of this habitat are present in the central western area of the site (Figure 2: Photo 3) with less frequent tall ruderal vegetation and more expansive areas of bare ground. Incidences of field horsetail *Equisetum arvense* (O); colt's-foot *Tussilago farfara* (R); zig-zag clover *Trifolium medium* (R); and the garden escapee garden lupin *Lupinus polyphyllus* (LF); were additionally observed in this environment.
- 3.8 Scattered scrub was frequent throughout this habitat (Figure 2: Photo 4; 10 in Figure 3) with young saplings and shrubs of elder *Sambucus nigra* (O); willow *Salix* sp. (O); alder *Alnus glutinosa* (O); common hawthorn *Crataegus monogyna* (R); pedunculate oak *Quercus robur* (R); and dog-rose *Rosa canina* (R) observed. Along the northern riparian boundary of the site, scattered mature and semi-mature trees are also present (11 in Figure 3) including willow (F); common hawthorn (O); sycamore *Acer pseudoplatanus* (O); and ash *Fraxinus excelsior* (O).
- 3.9 This habitat is considered to be of low distinctiveness and supports early successional habitats and ruderal vegetation typical of highly disturbed areas. This habitat has been assessed to be in poor condition, due to a limited diversity of early successional habitats, presence on non-native invasive species and expansive areas of bare ground. Full condition criteria is provided within Appendix 1: Table A1.

Developed land; sealed surface (u1b)

- 3.10 Along the southern boundary of the site runs Waterfold Lane (Figure 2: Photo 5; u1b in Figure 3). This is a hard-standing road for vehicle access that support negligible botanical species and does not provide wide diversity of ecological niches for local biodiversity. Therefore, it is considered to have negligible biodiversity value.

Modified grassland (g4)

- 3.11 A small section of the adjacent pasture field, south of the site, is located within the site boundary (Figure 2: Photo 6; g4 in Figure 3). This habitat is represents cattle grazed agricultural grassland, dominated by perennial ryegrass *Lolium perenne* (D); with frequent Yorkshire fog (F); occasional common nettle (O); pineappleweed *Matricaria discoidea* (O); Greater Plantain *Plantago major* (O); and rare broad-leaved dock *Rumex obtusifolius* (R).
- 3.12 This habitat is man-made and extremely common and widespread in the wider area. It is intensively grazed, with a poor diversity and an abundance of species indicative of sub-optimal conditions. Therefore, this habitat has been assessed as poor condition. Full condition criteria are provided within Appendix 1: Table A1.
- 3.13 *Other neutral grassland (g3c)*
- 3.14 A narrow strip of unmanaged grassland is present as the verge between the pasture field to the south and Waterfold lane (Figure 2: Photo 7; g3c in Figure 3). This area represents a MG1 grassland type (*Arrhenatherum* neutral grassland), with abundant false oat-grass (A); and

Yorkshire fog (A); locally frequent cock's-foot *Dactylis glomerata* (LF); with occasional meadow foxtail (O); creeping bent (O); common couch *Elytrigia repens* (O); and rough meadow-grass *Poa trivialis* (O). A range of ruderal herbs are also present including frequent cleavers *Galium aparine* (F); and occasional common ragwort *Senecio jacobaea* (O); creeping thistle (O); spear thistle (O); common nettle (O); Cow parsley *Anthriscus sylvestris* (O); creeping buttercup (O); and Himalayan balsam (O). Scattered bramble (O) is also present.

- 3.15 This habitat type is common and widespread within road verge areas such as this, however, due to limited management it provides some structural diversity to the landscape and is considered to be a habitat of medium distinctiveness. This particular example of this habitat has been assessed as poor condition due to significant bare ground and scattered scrub, limited diversity of sward height and the presence of non-native invasive species and those indicative of sub-optimal conditions.
- 3.16 *Native hedgerow (h2b)*
- 3.17 A 125m section of native hawthorn *Crataegus monogyna* (D); is present within the site boundary, along Waterfold lane (Figure 2: Photo 8; h2b in Figure 3). The hedgerow is completely dominated by a single woody species, untrimmed at approx. 2m high x 1.4m wide, with significant canopy gaps.
- 3.18 Native hedgerows such as this are considered to be a priority habitat. However, as a species-poor defunct hedgerow, this hedgerow does not support any features that would qualify it as a 'important' hedgerow under the Hedgerow Regulations 1997. In addition, this section of hedgerow has been assessed as poor condition due to limited size, significant canopy gaps, and highly disturbed understorey with signs of nutrient enrichment.

Other woodland; broadleaved (w1g) – (adjacent to the site)

- 3.19 Beyond the western boundary of the site is a corridor of planted screening woodland protecting the site from the adjacent M66 motorway (w1g in Figure 3). The woodland is situated on the motorway embankment and comprises of frequent mature, semi-mature and young saplings of ash (F); hawthorn (A); Sycamore *Acer pseudoplatanus* (O); pedunculate oak (O); alder (O); willow sp. (O); and apple *Malus sp.* (O).
- 3.20 The understorey was characterised by abundant bramble (A); with frequent bracken *Pteridium aquilinum* (F); Himalayan balsam (F); rosebay willowherb (F); false oatgrass (F); and occasional Mugwort (O); creeping thistle (O); creeping bent (O); Yorkshire-fog (O); broad buckler-fern *Dryopteris dilatata* (O); and male-fern (O).
- 3.21 This habitat is common and widespread in this environment, however as a woodland area dominated by broadleaved trees it is considered to be of medium distinctiveness. The current condition of this habitat has been assessed to be poor due to the presence of invasive species, limited presence of deadwood and limited diversity in canopy structure due to plantation origin. Full condition criteria are provided within Appendix 1: Table A2.

Biodiversity Baseline

- 3.22 Habitat types and their relative conditions are summarised in Table 2 & 3. Within the application site, area-based habitats generated: 1.53 habitat units (HU) and 0.25 hedgerow units (HeU).

Table 2. Baseline Area-based Habitats, Condition and Unit Scores

Habitat Type	Condition	Strategic Significance	Area (ha)	Habitat Units (HU)
Sparsely vegetated land – Ruderal/Ephemeral	Poor	Low	0.67	1.34
Urban - Developed land; sealed surface	Poor	Low	0.36	1.44
Grassland - Modified grassland	Poor	Low	0.036	0.07
Grassland – Other neutral grassland	Poor	Low	0.015	0.12
Total Habitat Units				1.53

Table 3. Baseline Hedgerow-based Habitats, Condition and Unit Scores

Habitat Type	Condition	Strategic Significance	Length (km)	Hedgerow Units (HeU)
Native hedgerow	Poor	Low	0.125	0.25
Total Hedgerow Units				0.25

- 3.23 Under current development plans a buffer of at least 10m has been included to protect the vegetation present along the bank top of the adjacent River Roch. As a result, no impact of river-unit scores will occur as a result of either riparian-encroachment or watercourse encroachment. Considering this, an assessment of riverine value is not considered appropriate and is not included within calculations.

Invasive Species

- 3.24 Non-native invasive species are listed under Schedule 9 of the Wildlife and Countryside Act 1981 (as amended). Under this legislation it is an offence to cause to grow these species in the wild. There is also now a requirement for landowners to manage these species if they are present on their land.
- 3.25 Himalayan balsam was observed to be frequent across the site, present in all habitats with particularly dense stands within the northern areas of the site. Stands of Japanese knotweed *Fallopia japonica*; were also observed along the margins of the adjacent river corridor (Figure 2: Photo 9 – 12; Target note: TN1 – 4 in Figure 3). As such, the spread of invasive non-native species should be considered as a receptor to the proposed development.

Figure 2. Photo 1: Tall ruderal area of sparsely vegetated land, north of site



Figure 2. Photo 2: Area of short-sward vegetation within sparsely vegetated land, southwest of site



Figure 2. Photo 3: Vegetated earth-bund, south of site



Figure 2. Photo 4: Area of scattered scrub, southwest of site



Figure 2. Photo 5: Waterfold Lane, South of Site



Figure 2. Photo 6: Modified Grassland, South of Site



Figure 2. Photo 7: Other Neutral Grassland, South of Site



Figure 2. Photo 8: Native hedgerow, South of Site



Figure 2. Photo 9: TN1: Japanese knotweed along riverbank



Figure 2. Photo 10: TN2: Japanese knotweed along riverbank



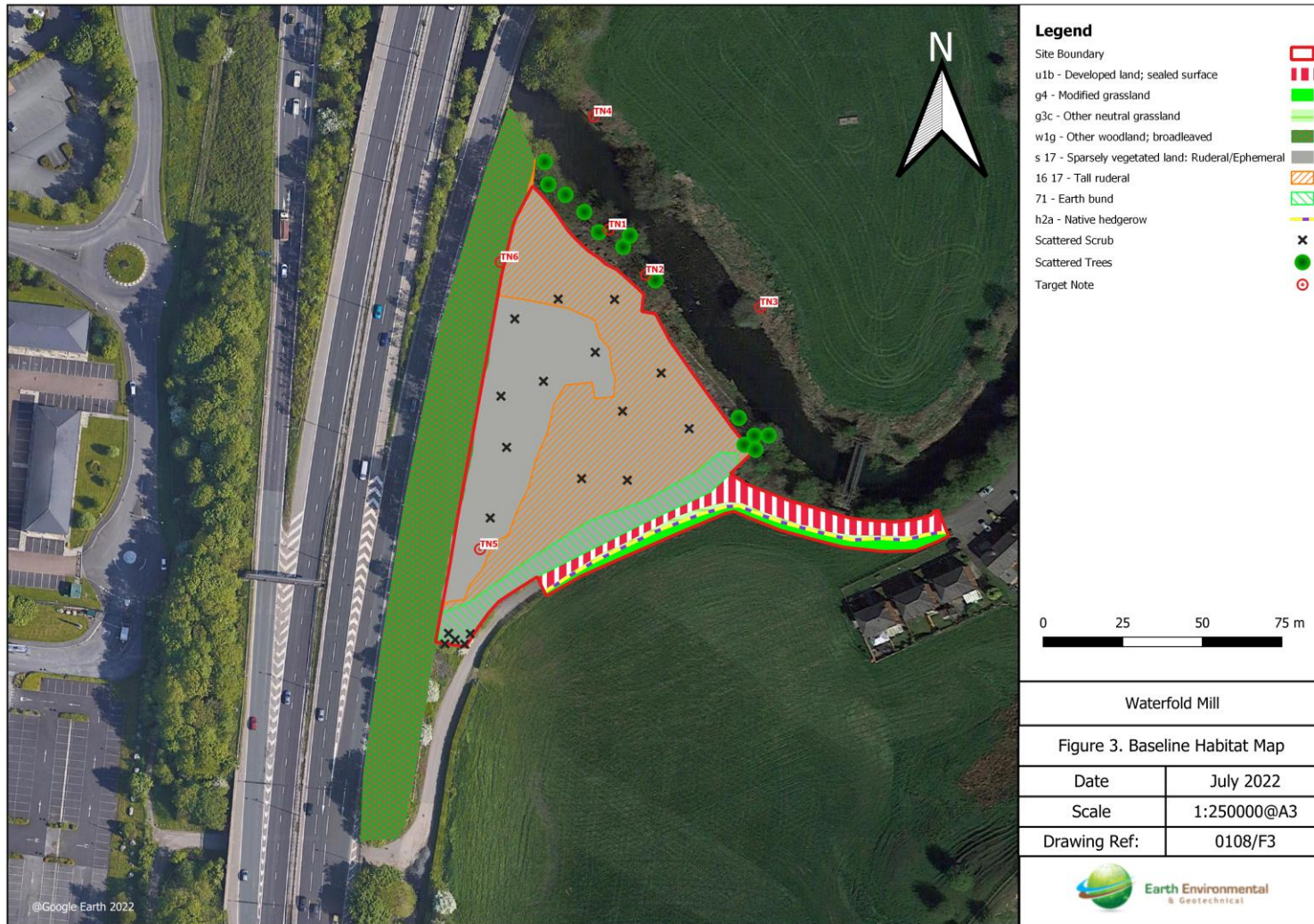
Figure 2. Photo 11: TN3: Japanese knotweed along riverbank



Figure 2. Photo 12: TN4: Japanese knotweed along riverbank



Figure 3. Baseline Habitat Map



Amphibians

- 3.26 Great Crested Newt *Triturus cristatus* (GCN) is a European Protected Species (EPS). It is listed under Annex IV of the EC Directive on the Conservation of Natural Habitats and Wild Fauna and Flora. This is implemented in the UK through The Conservation of Habitats and Species Regulations 2017 and the species is fully protected under the Wildlife and Countryside Act 1981 (as amended).
- 3.27 GCN, which have the highest protection of all amphibians under UK and EU law, favour still water bodies, such as ponds with good vegetation. They breed in ponds, but spend much of the year terrestrially, within habitat such as rough grassland and woodland, which provides good foraging and hibernacula. Great crested newts are known to travel, usually, within a 250m radius of breeding ponds, but can occasionally travel up to 500m. All other amphibians are afforded some protection at varying levels under the Wildlife and Countryside Act (1981).
- 3.28 Greater Manchester Ecology Unit (GMEU) did not return any recent records for GCN or any other amphibians within 2km of the site, however, reports of presence of GCN have been identified from the Natural England Licence Returns data set, with the closest record 1.6 km south of the site from 2016.
- 3.29 The site itself does support suitable terrestrial habitat, with a diversity of vegetation structure providing both foraging and sheltering opportunities. No waterbodies are present either within the site or considered to be ecologically connected to the site within 500m. The closest such waterbody is approx. 900m south of the site. This is at the extreme range of GCN dispersal capabilities (Kupfer, A., Kneitz, S, 2000) and as a result it is considered highly unlikely that any individual GCN would be present at any time and are not considered further in this report.
- 3.30 The site may support however, more wider ranging amphibians such as common frog *Rana temporaria*; and common toad *Bufo bufo*; for which the piles of brash and wood-chippings present on site (Figure 4: Photo 1; TN5 in Figure 3) may provide suitable shelter during the hibernation period (October – March, inclusive). It is therefore recommended that Precautionary working methods are recommended which are suitable for common amphibians.
- 3.31 No further survey work is recommended for this species group.

Badger

- 3.32 Badgers *Meles meles* are protected under the Protection of Badgers Act 1992. This Act makes it illegal to disturb a Badger whilst it is in a sett, to kill, injure or take a Badger and to obstruct the entrance to a Badger sett.
- 3.33 GMEU returned a single record for badger within 2 km of the site, relating to observation of a dead individual, along the M66 motorway to the south.
- 3.34 The screening woodland and riverbank along the boundaries of the site are considered to offer suitable sett creation habitat due to the presence of sloping topology and earth substrate with

significant vegetative cover. The open areas of the site and grassland areas in the wider environment are also considered to offer potential foraging habitat.

- 3.35 No evidence of badgers (setts, pathways, latrines, hairs etc) was observed during the survey, however badgers are highly mobile animals, with the ability to excavate new setts at any time. As a result, the presence of badgers within the site cannot be ruled out.
- 3.36 It is therefore recommended that precautionary working measures in relation to badger are implemented during the construction phase to ensure avoidance of harm to this species. If at any time a badger sett is discovered on or near to the site boundary, all work must stop while a suitably qualified ecologist is consulted.

Bats

- 3.37 All bat species are European Protected Species under the Conservation (Natural Habitats etc.) Regulations 1994. This is implemented in the UK through the Conservation of Habitats and Species Regulations 2017. Bats are also protected under the Wildlife and Countryside Act 1981 (as amended), the Countryside and Rights of Way Act 2000 and the Natural Environment and Rural Communities Act (2006). It is illegal to disturb or damage a bat roost.
- 3.38 GMEU returned records for four different bat species/groups, including common pipistrelle *Pipistrellus pipistrellus* (both roost and activity records); Soprano pipistrelle *Pipistrellus pygmaeus* (activity records only); noctule bat *Nyctalus noctula* (activity records only); Daubenton's bat *Myotis daubentonii* (activity records only); unidentified *Pipistrellus* sp. (both roost and activity records) and unidentified bat species (activity records). No records related to the site itself.
- 3.39 No buildings or structures are present within the site. A single mature willow tree was observed within the northwest of the site (Figure 4: Photo 2; TN6 in Figure 3) which supported a transverse split on a primary branch, approx. 5m high, facing northeast. This feature was open and exposed however within limited sheltered space to support roosting bats. As such, it has been assessed to have low potential to support roosting bats.
- 3.40 The woodland corridor along the western boundary has also been assessed to have some potential for local populations of foraging and commuting bats, providing connectivity between the wider area to the River Roch which may act as a valuable foraging resource. However, the influence of immediately adjacent motorway is considered to limit the bat potential of this corridor, likely acting to deter bats from the area, and as such, the overall potential of this feature has been assessed as low.
- 3.41 As per industry standard guidance (Collins 2016), no further surveys are required in relation to roosting bats. However, it is recommended that should the identified tree require removed that soft-felling techniques are implemented to allow any roosting bats, if present, to escape of their own volition.
- 3.42 Further survey will be required in relation to foraging/roosting bats as impacts are anticipated to the woodland corridor as a result of the proposed development. As per industry standard guidance, this will involve bat activity surveys in each of the active periods: Spring (April – May),

Summer (June – August) and Autumn (September – October). The results of these surveys will help highlight the abundance and diversity of bats utilising the site for foraging and/or commuting, determining the level of mitigation (if any) required.

Nesting Birds

- 3.43 Under the Wildlife and Countryside Act 1981 (as amended) all UK birds are protected whilst nesting. In addition, Schedule 1 of the Act lists species that are also protected from disturbance.
- 3.44 GMEU returned records for 19 different notable and/or protected bird species within 2 km of the site. This included 5 species listed within Schedule 1 including barn owl *Tyto alba*; common scoter *Melanitta nigra*; hobby *Falco Subbuteo*; kingfisher *Alcedo atthis*; and peregrine falcon *Falco peregrinus*.
- 3.45 The site itself is not considered to offer significant nesting habitat for these species due to the lack of significant tree cavities, tall structures, waterbodies, and the high disturbance of the M66 motorway, however the open vegetated areas may offer shelter for small mammals, providing foraging potential for barn owl, hobby, and peregrine falcon. The river corridor itself will also provide foraging opportunities for kingfisher.
- 3.46 No evidence of any of these species was observed during the site visit and there are significant similar foraging opportunities in the wider environment. Further to this, no impacts to the river corridor are anticipated as a result of the proposed development and as such, no significant impacts to local populations of schedule 1 species are likely to occur.
- 3.47 The site habitats will, however, offer suitability for foraging and nesting for other bird species, with opportunities present within the woodland corridor and trees for passerine species and sheltered vegetation within the open areas for ground nesting birds. As birds may nest on site in the summer months, mitigation will be necessary to avoid harm and disturbance to nesting birds if works to vegetation take place within the nesting period (March – September).
- 3.48 No further survey or mitigation is recommended for this species unless vegetation clearance occurs between March and September (inclusive).

Invertebrates

- 3.49 GMEU returned records for 4 notable invertebrate species within 2 km of the site. All species are listed as species of principal importance S41 under Section 41 of the Natural Environment and Rural Communities Act 2006, with one species (white letter hairstreak) is afforded further legal protection due to its endangered status. No records related to the site itself. Table 3 details the species recorded, their status and habitat/food plant associations.
- 3.50 Although suitable habitat structures are present for all species recorded, associated food plants are present in significant abundances within the site, in particular for white-letter hairstreak, for which no elm trees were observed within the site. The only exception is small heath, which has associations with of finer grasses such as fescues *Festuca* spp., meadow-grasses (*Poa* sp) and bents (*Agrostis* spp.), which are present within the site. This species, however, typically favours drier habitats such as heathland, downland, and coastal dunes.

Table 3. Notable and Protected Invertebrate Species recorded within 2 km of the Site

Common name	Scientific Name	Order	Status*	Associations		
				Broad biotope	Habitat	Food plant
Cinnebar moth	<i>Tyria jacobaeae</i>	Lepidoptera	S41 – research only	Open habitats	Tall sward & scrub	Common ragwort
Blood-vien	<i>Timandra comae</i>	Lepidoptera	S41 – research only	Open habitats	Tall sward & scrub	Daisy family (Asteraceae) Docks (<i>Rumex</i> sp.)
Small Heath	<i>Coenonympha pamphilus</i>	Lepidoptera	NT; S41	Open habitats	Short sward & bare ground	Grasses (<i>Poaceae</i>)
White-letter Hairstreak	<i>Satyrrium w-album</i>	Lepidoptera	EN; Legal protection; S41	Tree-associated	Arboreal	Elm (<i>Ulmus</i> sp.)

*S41 = listed under Section 41 of Natural Environment and Rural Communities Act 2006; NT = Near-threatened status within Red Data Book for Invertebrates UK; EN = Endangered status within Red Data Book for Invertebrates UK

- 3.51 The site currently supports common and widespread botanical species, relatively disconnected from the wider area by major roads and agricultural land. More favourable invertebrate habitat for notable species is likely to be present within the open semi-natural habitats and quarry areas, south of the site and loss of site habitats is not considered to represent a significant negative impact for invertebrates within the wider area.
- 3.52 No further surveys are required in relation to invertebrates.

Reptiles

- 3.53 All native reptile species found in the U.K. are protected from intentional or reckless harm or killing through Schedule 5 of the Wildlife & Countryside Act 1981 (as amended). They are also all listed as species of principal importance under Section 41 of the Natural Environment and Rural Communities Act 2006.
- 3.54 GMEU did not return any records for native reptile species within 2 km of the site, however reptiles are difficult to detect and as a result are often under recorded. The site supports good suitability habitat with a diverse vegetation structure providing both sheltering, foraging and open basking areas. Connectivity to the site is provided by the riparian habitats along the River Roch, as well as the railway corridor, located only 100m south of the site, an environment for which reptiles are frequently observed. In addition to this, woodchip piles are present within the site (TN5 in Figure 3) which may provide suitable egg-laying habitat for grass snake *Natrix natrix helvetica*.
- 3.55 With the suitability of habitats present and connectivity to the wider area, the presence of reptiles within the site cannot be ruled out. It is therefore required for further surveys to establish presence/likely absence. As per industry standard guidance (froglife 1999; 2016), 7 visits will be

required during suitable weather conditions at the appropriate time of year for reptile detectability (April – May & September).

Riparian Mammals

- 3.55.1 Both European Water vole *Arvicola amphibius* and European otter *Lutra lutra* are fully protected under section 9 of the Wildlife and Countryside Act 1981(as amended). Schedule 5 of this Act makes it an offence to: intentionally kill, take, or injure an individual; intentionally or recklessly damage or destroy a place of shelter or protection; intentionally or recklessly disturb an individual while occupying a place of shelter or protection; damage or obstruct access to a place of shelter or protection.
- 3.56 GMEU did not return any recent records for either species, however, a single historic record (2009) was returned for water vole 1.7 km south of the site, within a network of waterbodies and ditches directly connected to the River Roch.
- 3.57 No evidence of either species was observed during the site visit; however, a full inspection of the riverbank could not be undertaken due to the steep topology. Considering this, the presence of either species cannot be ruled out.
- 3.58 No direct impacts are anticipated to the riverbank itself from the proposed development and a set buffer zone will be established upon the bank top, protecting any semi-natural habitats. In addition to this, precautionary working methods in relation to riparian mammals should be implemented during the construction phase to prevent any direct impacts to individual animals.
- 3.59 With this action in place, no further surveys are recommended for this species group.

Other Protected Species or Habitats/Species of Conservation Interest

European Hedgehog

- 3.60 GMEU returned a single recent record for European hedgehog within residential areas, approx. 1.6 km west of the site. Hedgehogs are protected under the Wildlife and Countryside Act 1981 (as amended) and are listed as a priority species under the UK Post-2010 Biodiversity Framework. They are also listed as 'vulnerable to extinction' within the ICUN red list for British mammals.
- 3.61 The woodland corridor and areas of taller vegetation and scrub within the site will provide suitable foraging and sheltering areas for hedgehog, and as they are highly active wide-ranging species, it is likely that individual hedgehogs will be present within the site from time-to-time. Therefore, precautionary measures in relation to hedgehogs should be implemented during the construction phase to prevent any negative impacts to individual animals.
- 3.62 With this action in place, no further surveys are recommended for this species.

Figure 4. Photo 1: TN5: Wood chipping piles and debris, south of site



Figure 4. Photo 2: TN6: Mature willow with bat roosting potential, northwest of site



4.0 SUMMARY AND RECOMMENDATIONS

- 4.1 No European sites are present within 5 km of the site and no statutory sites are present within 2 km. All non-statutory (local/district level importance) designated sites are considered to be a significant distance from the site and no direct impacts are anticipated as a result of the proposed development. Ecological connectivity to the Railway Cutting at Heywood SBI is however, considered to be present via the woodland corridor of the railway and M66. This may provide functionally connecting habitat for notable/protected species from the SBI, such as bats and/or reptiles. Further surveys have therefore been recommended to establish the presence/absence of these species and help determine the importance of the site in relation to the SBI and the wider area.
- 4.2 The site occupies an area of approximately 0.78 hectares and is comprised of sparsely vegetated land dominated by ruderal vegetation with scattered scrub and trees. Small sections of modified and unmanaged grassland are also present along the southern boundary, alongside a defunct hedgerow field boundary. Landtake of the development will involve to loss of all habitats to be replaced by the development of 2 no. residential apartment blocks, 3 storeys in height, housing 36 apartments in total. with associated parking, access roads and pathways and soft landscaping. No direct impacts to the woodland corridor along the western boundary, or the River Roach along the northern boundary are anticipated.
- 4.3 All habitats identified are common and widespread and any loss is will not represent a significant ecological impact. Loss of habitat will however result in a loss in biodiversity value and a appropriate landscaping plan should be designed in order to deliver a biodiversity net gain within the site. Recommendations for this have been provided within the 'Enhancements' section.
- 4.4 In addition to this, the development should avoid the impact and compaction of any root protection areas of trees and therefore it is recommended that the advice of an arboriculturist should be sought to assess the impacts on trees and to identify their specific root protection areas.
- 4.5 In addition to this, the following ecological constraints have been identified within the proposed development:

River Roch

- 4.6 The River Roch runs immediately adjacent to the site. To further protect the nearby river habitats and preserve the water quality, a buffer zone of at least 10m (as part of the proposed riverbank easement) should be established on the bank top, with the implementation of appropriate pollution prevention measures to ensure there are no direct adverse effects to the River Roch (and their protected species).

Invasive Non-Native Species

- 4.7 The invasive non-native species Himalayan balsam and Japanese knotweed have been identified to be present both within and adjacent to the site. It is therefore recommended that in order to prevent the unnecessary spread of these species, then an environmental management plan is developed which includes the following measures:

- A 'tool-box' talk to be delivered to all contractors on site to provide awareness of the presence of both Himalayan balsam and Japanese knotweed, and how to identify these species.
- Appropriate bio-security measures to minimise the risk of accidental spread.
- Appropriate methods of removal and disposal.
- On-going management plan to control each species both during and post development.

Amphibians

4.8 The site has potential to support low numbers of common amphibians and so the following precautionary working methods are recommended in order to prevent any negative impacts to individual animals:

- Prior to works commencing any compost heaps, log piles, brash piles and stone piles must be removed carefully and preferably by hand.
- Vegetation removal should occur in a uniform direction, cutting down all vegetation to a minimum 10cm height prior to top-soil removal to allow any amphibians present to leave the site of their own volition.
- Work on the site may create rubble piles which, if left, may have the potential to be utilised as places of rest or shelter. Consequently, such debris must be removed from the site immediately or placed into skips prior to removal.
- Escape routes for amphibians must be provided within any pits dug for the foundations. Such ramps must be no steeper than 45 degrees in angle and must be constructed using rough wooden planks.
- If at any point during these activities, or at any other stage during works, an amphibian is discovered, they should be removed carefully to an area of undisturbed vegetation within or adjacent to the site.

Badger

4.9 The proposed work is unlikely to have significant impacts upon local badger populations. However, as badgers may use the site occasionally for foraging or commuting, the following precautionary measures must be taken to ensure avoidance of harm to this species:

- No construction work must take place at night.
- All steep-sided pits, ditches etc must be covered overnight to prevent badgers or any other roaming animals from falling in. Alternatively, a ramp can be provided at the end of the excavated area to enable animals to escape and so prevent them becoming trapped. All such excavations must be inspected each morning to ensure no animals have become trapped overnight.

- If at any time a badger sett is discovered, all work must stop while a suitably qualified ecologist is consulted.
- The storage of chemicals and hazardous materials must be in line with best practice guidelines. They must be kept secure so that they cannot be accessed or knocked over by roaming animals and must not be stored near site boundaries where wildlife is more prevalent.

Bats

Roosting Bats

- 4.10 A single mature willow was identified along the boundary of the site with low potential to support roosting bats, located at SD 82092 10388. This tree is not currently anticipated to be affected, and no further survey is required however should plans change and this tree is required to be removed it is recommended that soft-felling techniques are used including:
- Sectional felling and careful lowering of each section to be placed on the ground.
 - If possible, felling against an adjacent tree, followed by careful lowering of the stem to the ground.
 - Once felled, the tree/sections should be left in-situ for a minimum 24 hours to allow any roosting bats to leave of their own volition.

Foraging and Commuting Bats

- 4.11 The woodland corridor along the western boundary has been assessed as having low potential for foraging/commuting bats. No direct impacts are currently anticipated to this corridor, however, should layout plan change significantly it is recommended that further surveys are undertaken to establish the abundance and diversity of bats utilising the site.
- 4.12 As per industry standard guidance (Collins 2016) this will require a walked transect survey to be undertaken during each season of the bat activity period (Spring (April – May); Summer (June – August); and Autumn (September – October). Each transect survey will involve an experienced bat surveyor walking a designed transect route (to cover all suitable foraging/commuting) features, during appropriate weather conditions (above 10°C, avoiding high winds and heavy rain), starting at sunset and finishing at least two hours after. The surveyor will be equipped with a professional bat detector and will record the bat species present, and the activity type observed.
- 4.13 The transect survey will be supplemented with the deployment of a static monitoring device at an appropriate location within the site. This device will be set to record bat activity between sunset and sun rise and will be left for a minimum 5 days during each deployment. Recordings will then be analysed using sound analysis software.

- 4.14 The combination of these two methods will help determine the composition of the bat assemblage present within the site and the importance of the features observed. With this information, the impact to foraging/commuting bats can be assessed, and mitigation measures proposed.

Nesting Birds

- 4.15 As there is suitable habitat for nest building, the following measures are needed to ensure compliance with legislation during the removal of any vegetation that might support breeding birds:
- All nesting birds are protected by law. To avoid committing an offence, any works to habitats that might be used by nesting birds, such as the trees, scrub, and tall vegetation, should be undertaken outside the bird breeding season (March to August inclusive). If this is not possible, the habitat should be checked immediately prior to works commencing by a suitably qualified ecologist. If there are breeding birds present, works cannot continue until the chicks have fledged and left the nest.
 - If this is not possible, a suitably qualified ecologist should check the vegetation on site to determine the presence / absence of nesting birds prior to the start of any works.
 - If birds are found actively nesting on site, the nest and surrounding vegetation (c. 5m) must be left undisturbed until the young have fledged.

Reptiles

- 4.16 Suitable foraging/sheltering habitat for reptiles is present within the site, with connectivity provided by the adjacent River Roch to the north, and the railway corridor to the south. It is therefore recommended that reptile surveys are undertaken within the site to establish presence/likely absence.
- 4.17 As per industry standard guidance (froglife 1999; 2016) this should involve the deployment of artificial refugia (roof tiles and/or tins) within suitable areas of the site, followed by 7 visits over the months of April, May, and September where reptiles are most easily detected. Each visit will involve the inspection of each refugia and suitable habitat within the site during the appropriate time of the day and weather conditions (morning or evening; full or partial sun; 12 -18.C). Reptile species, sex and abundance will be recorded during each visit.
- 4.18 Following the survey, an estimate of the population size can be made and the potential impact on reptiles as a result of the development can be assessed.

Riparian Mammals

- 4.19 The River Roch along the northern boundary of the site provides some potential for habitat for otter and water vole. As no direct impacts to the watercourse are proposed then no impacts are perceived. The following is recommended as a precaution:
- Adherence to good pollution prevention practices.

- The mitigation for badgers should be adhered to, to prevent any harm from commuting species.
- No construction work must take place at night and any temporary lighting (if required) should be positioned facing away from the watercourse and only used when necessary.

Other Protected Species or Habitats/Species of Conservation Interest

European Hedgehog

- 4.20 As hedgehogs may occasionally use the site the following precautionary measures relating to hedgehogs must be put in place:
- Any wood or brash piles within the development area must be removed carefully by hand. If a hedgehog is found it must be removed carefully and placed in an undisturbed area outside the development zone.
 - Ramps must be placed into any deep trenches or excavated holes, to allow hedgehogs an escape route should they fall in.

5.0 ENHANCEMENTS

Biodiversity Net Gain

5.1 Under current development proposals (Drawing no. M21-13-08; Alternative Development Plan; Option 4), approx. 0.70 ha of ruderal ephemeral land will be lost to the development, to be replaced by access roads, residential dwellings, and public open space. A hedgerow will also be planted along the southern boundary of the site and additionally at the development entrance. All other habitats within the site will be retained within their current form. Development areas are highlighted within Figure 5. Under BM3.1, development areas fall into the following classifications:

- **Developed land, sealed surface:** This includes access roads, pedestrian pathways, and residential houses. Area of this habitat type within residential plots is defined by a 70:30 ratio of developed land: vegetated garden (as per BM 3.1 guidance (Panks *et al.* 2022)). This habitat type has a negligible biodiversity value.
- **Modified Grassland:** This represents areas of close mown grassland to be incorporated into the areas of public open space. Species composition is likely to be a poor diversity of fast growing, manageable grasses, and therefore this habitat would be unable to achieve a condition greater than poor.
- **Introduced Shrub:** This represents the planting of low maintenance shrubs within the areas of public open space. This type of habitat is typically comprised of non-native species, subject to an intensive pruning regime for aesthetic purposes. As a result, condition for this habitat is fixed at 'poor'.
- **Urban Tree:** Current layout plans indicate that approximately 73 trees, anticipated to comprised of newly planted and existing retained trees will be present post-development that can be classified as Urban trees as they will be oversailing urban habitats. All trees are currently precautionarily set as small trees as it is not known whether they will grow beyond a diameter at breast height (DBH) of 30cm. However, trees are anticipated to over sail vegetation of some form and be free of damage and vandalism. Therefore, they are anticipated to achieve moderate condition over a 30-year period. Actual tree numbers may vary within the final landscaping plan and re-calculation of biodiversity value may be required when tree numbers are confirmed.
- **Native Hedgerow (with/without trees):** This includes a newly planted hedgerow along the southern boundary of the site, as well as a small length of hedgerow with trees along the entrance of the site. It is anticipated that these habitats will be formed of native woody species forming a complete canopy to an appropriate height and width. As such, this habitat has been incorporated within calculations as moderate condition.

- **Other neutral grassland:** With the re-adjustment of the existing field boundary and hedgerow further south, it is anticipated that a narrow strip of grassland of similar composition to the existing verge will be re-created. With appropriate management it is anticipated that this can achieve moderate condition.
- 5.2 If no further habitat interventions are incorporated into landscaping plans, it has been calculated that the proposed development will result in a biodiversity gain of 0.05 area-based habitat units (HU) and a gain of 0.32 hedgerow-based units (HeU), representing a biodiversity net gain of 3.13% in HU and 125% in HeU. Full results are provided within Appendix 2: Table A3 & 4.
- 5.3 It should be noted that the current layout plan is only considered to be indicative, and the biodiversity net gain will be required to be re-calculated follow the production of the final approved landscaping plan.

Further Intervention

- 5.4 In order to further increase net gains in biodiversity value, post development, the following additional habitat interventions are suggested:
- **Development of Mixed Scrub** – Within the riverbank easement it is recommended that this area is allowed to naturally develop into dense mixed scrub. Low intensity interventions will help improve the condition of this habitat, such as the removal of invasive non-native species and the development of a ‘rough’ transitional edge of tall herbs and grasses. This will form an area of mixed scrub, anticipated to achieve moderate condition within 5 years. This will provide a valuable foraging resource for birds and bats, as well as suitable shelter for riparian mammals.
 - **Wildflower Planting** – Within the remaining open undeveloped areas, it is recommended that wildflower plantings are established to provide a valuable source of pollen and nectar for local invertebrate populations, which in-turn will attract other wildlife. Planting should include a bespoke mix of native wildflowers and grasses, suitable for the local environment. Based on the species records returned by GMEU, this could include the following species:

Fescue	<i>Festuca</i> sp.
Meadow grass	<i>Poa</i> sp.
Bent grass	<i>Agrostis</i> sp.
Daisy species	<i>Asteraceae</i>

Management of this habitat should involve a low intensity mowing regime, cut between late august and early January only. In this environment, this intervention would form the habitat type ‘other neutral grassland’, anticipated to achieve moderate condition in 1 year.

- **Woodland Management** – The retained woodland should be managed to improve the current condition. Management actions should include the removal of non-native invasive species, closure of significant canopy gaps and the discouragement of animal browsing through barrier fencing. It is anticipated that with appropriate management, this habitat can achieve moderate condition within 10 years.

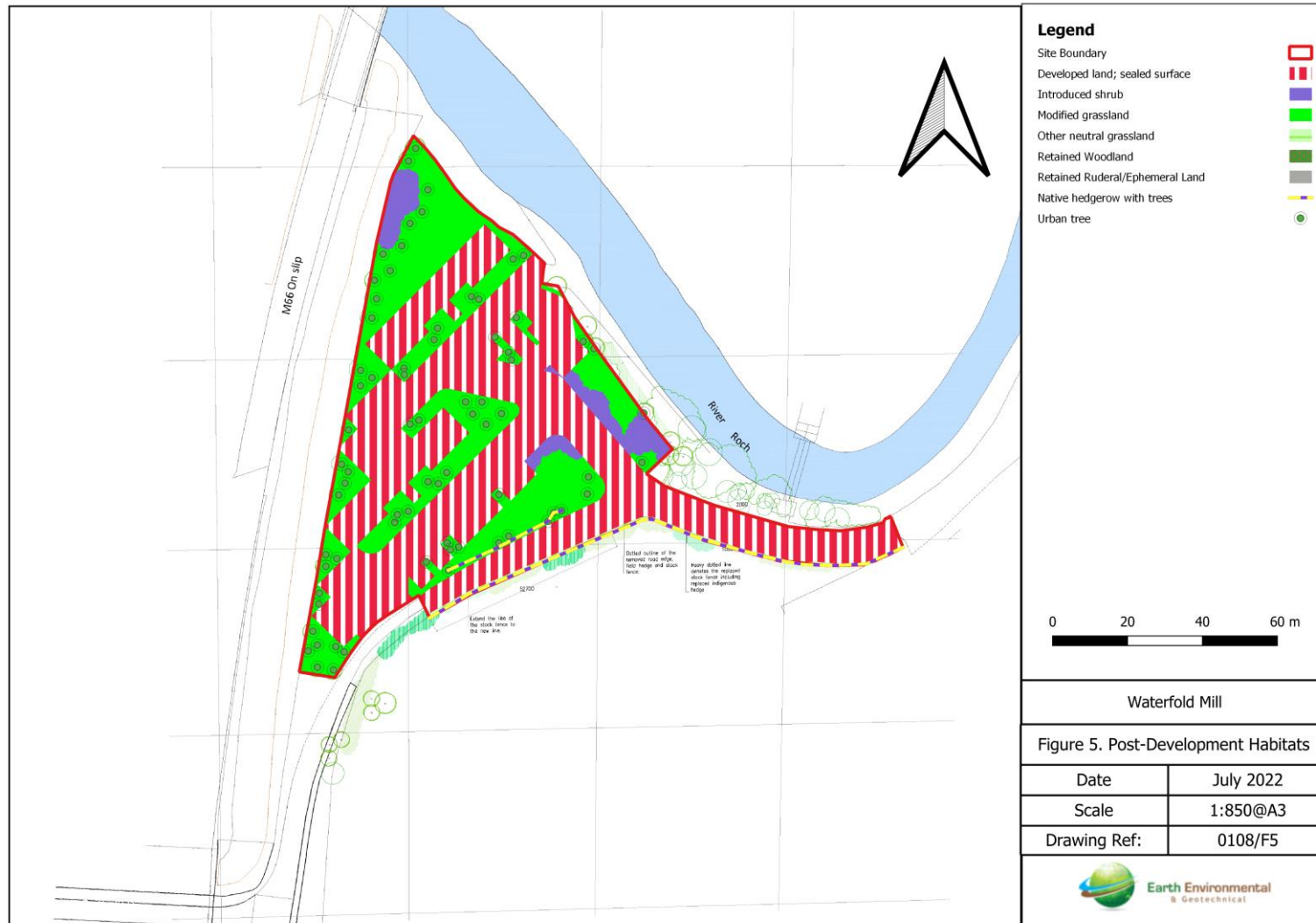
Biological Enhancements

- 5.5 It is recommended that any habitat creations outline within the landscaping plan, such as tree planting, should be designed to positively enhance the ecological value of the site. Any planting plan should include native flowering plant species, shrubs and trees and varieties, to maximise the benefit for local native wildlife. Suitable species include:

Oak	<i>Quercus robur</i>
Field maple	<i>Acer campestre</i>
Hazel	<i>Corylus avellana</i>
Hawthorn	<i>Crataegus monogyna</i>
Blackthorn	<i>Prunus spinosa</i>
Holly	<i>Ilex aquifolium</i>
Dogwood	<i>Cornus sanguinea</i>
Spindle	<i>Euonymus europaeus</i>
Gelder rose	<i>Viburnum opulus</i>
Wild cherry	<i>Prunus avium</i>
Wild privet	<i>Ligustrum vulgare</i>

- 5.6 It is recommended that if any artificial lighting scheme is implemented on the site, even if temporary, the lighting is aimed away from the boundary habitats and aquatic habitats nearby.
- 5.7 Wood or brash piles could be created for reptiles, amphibians, invertebrates, and hedgehogs on the site.
- 5.8 Consideration could be given to using a surface for the trackway/driveway/parking areas that allows for vegetation growth (such as grass crete or similar) rather than solid tarmac or hardcore.
- 5.9 A hedgehog shelter could be provided to enhance the site for sheltering hedgehogs. If included, this should be placed next to linear features (with the entrances facing the linear features) such as hedgerows or buildings and placed away from roads and out of direct sunlight. In addition to this, bird and bat boxes could be installed within trees and structures around the site.
- 5.10 For further advice on biological enhancements a suitable qualified ecologist should be consulted for appropriate design and placement of any suggested measures.

Figure 5. Post-Development Habitat Map



6.0 CONCLUSIONS

- 6.1 The current site boundary is of a relatively low ecological importance but there are some impacts to consider and mitigate for. A summary of likely impacts and mitigation is provided in Table 4 below.
- 6.2 Through the below precautionary methods, it is considered that all significant impacts upon biodiversity, including any potential adverse impacts upon specific protected species, habitats and designated sites will likely be able to be wholly mitigated in line with relevant wildlife legislation, chapter 15 of the National Planning Policy Framework (MHCLG, 2019); and development control policies as set out in the local plans.

Table 4. Summary of likely impacts and mitigation.

Feature	Likely Impacts	Further Surveys	Likely Mitigation and Enhancement Measures	Residual Effect
Statutory Sites	None as none present within at least 2km.	N/A	N/A	Neutral
Non-Statutory Sites	Potential impacts on functionally connecting habitat	Species specific surveys to be undertaken	Enhancement of retained woodland corridor Species specific mitigation to be designed following survey results	To be determined by further surveys.
Habitats	Loss of low value habitats. Root protection damage and/or compaction of tree/hedgerow roots.	N/A	Implementation of suggested habitat interventions in order to achieve biodiversity net gain within site. Implementation of wildlife sensitive lighting and habitat enhancement features. Arboriculturist should be sought to assess the impacts on the trees and hedgerows and to identify their specific root protection areas.	Positive
Invasive non-native species	Spread of invasive non-native species	N/A	Development of environmental management plan in relation to invasive non-native species Precautionary pre-construction advice. Removal of invasive species using appropriate removal and disposal methods.	Positive

Feature	Likely Impacts	Further Surveys	Likely Mitigation and Enhancement Measures	Residual Effect
Amphibians	Potential injury/death of common amphibians during construction. Loss of foraging/commuting /hibernation habitat.	N/A	Precautionary pre-construction advice. Precautionary construction techniques including stone piles to be removed by hand. Enhancement of foraging and commuting habitat through the planting of native species. Creation of brash or wood piles for shelter and hibernation to compensate for lost habitats.	Neutral
Badger	Potential injury/death during construction. Loss of foraging/commuting habitat.	N/A	Precautionary construction techniques. Enhancement of foraging habitat through the planting of native species.	Positive
Bats	Potential disturbance/destruction of bat roost if present. Potential disturbance of commuting and foraging habitat.	Bat activity surveys to be undertaken during each season of the bat activity period (April – October)	Soft felling of any trees with bat potential (i.e., mature willow at SD 82092 10388) Implementation of wildlife sensitive lighting. No night work or task lighting to be used during construction, Enhancement of retained boundary habitats through planting of trees which are of value to bat prey species.	To be determined by further surveys.
Birds	Disturbance of nesting birds.	N/A	Works to be undertaken outside of breeding bird season or after an ecologist has confirmed no active nests. Mitigate for loss of nesting habitat through native planting.	Positive

Feature	Likely Impacts	Further Surveys	Likely Mitigation and Enhancement Measures	Residual Effect
Reptiles	Loss of potential commuting and foraging habitat.	Reptile presence/absence surveys to be undertaken within April, May and/or September	Retention of suitable habitat areas and site connectivity Precautionary construction techniques including stone piles to be removed by hand and ecological supervision. Enhancement of foraging and commuting habitat through the planting of native species. Creation of brash or wood piles for shelter and hibernation.	To be determined by further surveys.
Riparian Mammals	Potential injury/death during construction. Loss of foraging/commuting habitat.	N/A	Precautionary construction techniques. Buffer zone of at least 10m along bank top to be established and protected. Development of a pollution prevention plan to reduce/mitigate in the event of pollution incidences in aquatic and terrestrial environments. Enhancement of foraging/sheltering habitat through encouragement of natural habitat regeneration and invasive non-native species removal	Positive
Other Mammals	Loss of habitat. Injury/ and or death.	N/A	Sensitive habitat removal including brash piles to be removed by hand. Precautionary construction techniques including no night work. Enhancement of site through hedgehog-friendly planting and a recommendation for a hedgehog shelter. Landscaping plans to feature native species planting.	Neutral

Feature	Likely Impacts	Further Surveys	Likely Mitigation and Enhancement Measures	Residual Effect
Invertebrates	Destruction/death/injury, disturbance and loss of shelter and foraging habitat.	N/A	Creation of brash or wood piles for shelter and hibernation which can be used by invertebrates. Landscaping plans to feature native species planting to encourage and support invertebrate populations.	Neutral

7.0 REFERENCES

- CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management.
- Collins, J. (ed.) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd Edn). The Bat Conservation Trust, London.
- Froglife (1999). Advice Sheet 10. Reptile survey: an introduction to planning, conducting, and interpreting surveys for snake and lizard conservation. Froglife, Peterborough.
- Froglife (2016) Surveying for reptiles, Froglife, Peterborough
- Google maps (Accessed 2021) <https://www.google.co.uk/maps>
- JNCC, (2010), Handbook for Phase 1 habitat survey - a technique for environmental audit
- Kupfer, A., Kneitz, S. (2000). Population ecology of the great crested newt (*Triturus cristatus*) in an agricultural landscape: dynamics, pond fidelity and dispersal. Herpetological Journal 10, 165–171.
- MAGIC (2020) https://magic.defra.gov.uk/About_MAGIC.htm. Natural England.
- Ministry of Housing, Communities and Local Government (MHCLG) (2019). National Planning Policy Framework. [Internet]. Available from: <https://www.gov.uk/government/publications/national-planning-policy-framework--2>.
- Natural England (2022). The Biodiversity Metric 3.1. Available at: <http://publications.naturalengland.org.uk/publication/6049804846366720>
- Panks, S. et al. (2022) Biodiversity metric 3.1: Auditing and accounting for biodiversity – User Guide. Natural England.
- UK Habitat Classification Working Group (UHCWG) (2018). UK Habitat Classification – Habitat Definitions V1.0 at <https://ecountability.co.uk/UKHabworkinggroup-UKHab>

Appendix 1. Biodiversity Metric 3.1 Condition Assessment Criteria

Sparsely Vegetated Land

Sparsely Vegetated Land – Ruderal/Ephemeral

Table A1. Condition assessment of ruderal/ephemeral habitat within the site

Criteria	Description	Pass/Fail
1	Vegetation structure is varied, providing opportunities for insects, birds, and bats to live and breed. A single ecotone (i.e., scrub, grassland, herbs) should not account for more than 80% of the total habitat area.	Fail
2	There is a diverse range of flowering plant species, providing nectar sources for insects. These species may be either native, or non-native but beneficial to wildlife.	Fail
3	Invasive non-native species (Schedule 9 of WCA) cover less than 5% of total vegetated area.	Fail
Final Assessment		Condition
All criteria failed – poor diversity of grasses with high abundance of ruderal vegetation, bare ground, and invasive species.		Poor

Grassland

Modified Grassland

Table A2. Condition assessment of modified grassland within the site

Criteria	Description	Pass/Fail
1	There must be 6-8 species per m2. If a grassland has 9 or more species per m2 it should be classified as a medium distinctiveness grassland habitat type. NB - this criterion is essential for achieving moderate condition.	Fail
2	Sward height is varied (at least 20% of the sward is less than 7 cm and at least 20% is more than 7 cm) creating microclimates which provide opportunities for insects, birds, and small mammals to live and breed.	Fail
3	Some scattered scrub (including bramble) may be present, but scrub accounts for less than 20% of total grassland area. Note - patches of shrubs with continuous (more than 90%) cover should be classified as the relevant scrub habitat type.	Pass
4	Physical damage is evident in less than 5% of total grassland area. Examples of physical damage include excessive poaching, damage from machinery use or storage, erosion caused by high levels of access, or any other damaging management activities.	Fail
5	Cover of bare ground is between 1% and 10%, including localised areas (for example, a concentration of rabbit warrens).	Fail
6	Cover of bracken less than 20%.	Pass
7	There is an absence of invasive non-native species (as listed on Schedule 9 of WCA, 1981).	Pass
Final Assessment		Condition
Species-poor with bare ground greater than 10% and limited sward diversity		Poor

Other Neutral Grassland

Table A3. Condition assessment of other neutral grassland within the site

Criteria	Description	Pass/Fail
1	The appearance and composition of the vegetation closely matches characteristics of the specific grassland habitat type (see UKHab definition). Wildflowers, sedges, and indicator species for the specific grassland habitat type are very clearly and easily visible throughout the sward. NB - This criterion is essential for achieving moderate condition for non-acid grassland types only.	Pass
2	Sward height is varied (at least 20% of the sward is less than 7 cm and at least 20 per cent is more than 7 cm) creating microclimates which provide opportunities for insects, birds, and small mammals to live and breed.	Fail
3	Cover of bare ground between 1% and 5%, including localised areas, for example, rabbit warrens.	Fail
4	Cover of bracken less than 20% and cover of scrub (including bramble) less than 5%.	Fail
5	There is an absence of invasive non-native species (as listed on Schedule 9 of WCA, 1981). Combined cover of species indicative of sub-optimal condition ¹ and physical damage (such as excessive poaching, damage from machinery use or storage, damaging levels of access, or any other damaging management activities) accounts for less than 5% of total area.	Fail
6	There are greater than 9 species per metre squared. NB - This criterion is essential for achieving good condition (non-acid grassland types only).	Fail
Final Assessment		Condition
Clearly a specific habitat type, but fails all other criteria		Poor

Woodland and Forest

Other woodland; broadleaved

Table A4. Condition assessment of other woodland; broadleaved habitat within the site

Criteria	Description	Assessment	Score
1	Age distribution of trees	Mature, semi-mature and young trees present - Good	3
2	Wild, domestic, and feral herbivore damage	Some evidence of browsing pressure but not extensive - Moderate	2
3	Invasive plant species	Himalayan balsam present throughout understorey - Poor	1
4	Number of native tree species	6 native tree species identified - Good	3
5	Cover of native tree and shrub species	Cover of sycamore (non-native) >20% - Moderate	2
6	Open space within woodland	Large open areas in woodland (>40%)	1
7	Woodland regeneration	All three age classes present	3
8	Tree health	Some evidence of decay and damage present within mature trees (>11%)	2
9	Vegetation and ground flora	Male & broad buckler fern present (ancient woodland indicator species)	3
10	Woodland vertical structure	Mature canopy dominant – no clear sub-canopy	1

Criteria	Description	Assessment	Score
11	Veteran trees	No veteran trees present	1
12	Amount of deadwood	Limited deadwood present	1
13	Woodland disturbance	Common nettle and cleavers present indicating nutrient enrichment	1
Final Assessment		Overall Score	Condition
Majority of criteria poor – screening woodland with poor structure, limited dead wood and signs of enrichment.		24	Poor

Appendix 2. Post-Development Changes in Biodiversity Value

Table A5. Post-Development Area-Based Habitat Gains/Losses

Habitat Type	Impact/Action	Target Condition	Strategic Significance	Time-to Target	Area (ha)	Habitat Units (HU)	Habitat Management
Current Proposed Development							
Urban – Developed land; sealed surface	Creation	N/A - Other	Low	0	0.496	0.00	Development residential dwellings, access roads and pedestrian walkways
Urban – Introduced Shrub	Creation	Poor	Low	1	0.038	0.07	Introduced shrub planting around public open space
Urban – Urban Tree	Retention/Creation	Moderate	Low	27	0.28	0.83	Tree retention and planting around development
Grassland – Modified Grassland	Creation	Poor	Low	1	0.29	0.56	Amenity grassland within public open space
Grassland – Modified Grassland	Loss	Poor	Low	N/A	0.036	0.07	Section of grass pasture to be lost
Grassland – Other Neutral Grassland	Creation	Moderate	Low	5	0.009	0.06	Re-creation of grass verge
Grassland – Other Neutral Grassland	Loss	Poor	Low	N/A	0.015	0.12	Loss of existing grass verge
Sparsely vegetated land – Ruderal/Ephemeral	Loss	N/A	Low	N/A	0.70	-1.39	Loss of habitat as part of development
Post-Development Biodiversity Units (HU)						1.53	
Baseline Biodiversity Units (HU)						1.58	
Percentage Change in Biodiversity (%)						3.13%	

Table A4. Post-Development Hedgerow-Based Habitat Gains/Losses

Habitat Type	Impact/Action	Target Condition	Strategic Significance	Time-to Target	Length (km)	Hedgerow Units (HeU)	Habitat Management
Native Hedgerow	Creation	Moderate	Low	20	0.17	0.57	Hedgerow planting with trees along southern boundary
Native Hedgerow	Loss	Poor	Low	N/A	0.125	0.25	Loss of existing hedgerow
Post-Development Biodiversity Units (HU)						0.57	
Baseline Biodiversity Units (HU)						0.25	
Percentage Change in Biodiversity (%)						126.28%	