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Henperch Quarry

Working Methods and Restoration Proposals

Prepared for Silkstone Environmental Ltd

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Report Status	Authorised for Release	Date	Position
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1. INTRODUCTION

- 1.1. Wavin (UK) Ltd is seeking planning permission for an extension of time for a further 10 years at their existing Henperch Quarry, Denby Dale West Yorkshire (hereafter referred to as 'the site') whose location and extent is shown in Figure 1.

1.1. Planning Background

- 1.1.1. The quarry is currently being worked under planning permission 2009/70/91780/E0 (granted 4th March 2010) which was a Section 73 application for a variation of conditions under planning permission: 91/62/01709/C5 (granted 20th Sept 1991). The current permission states that the extraction of all minerals shall be completed by 31st December 2021 and the site fully restored by 31st October 2023.
- 1.1.2. A planning Application has been submitted to Kirklees Metropolitan District Council in March 2020 for the 10 year extension of time.
- 1.1.3. Kirklees Ecology Unit responded to the application and requested clarification and further detail on a small number of points including the following:
- Clarification on how the removal of hedgerow **H2** will be done to minimise the impacts to bats;
 - Information on how the proposed habitats contribute to the local biodiversity with reference to the geographical area of the site (Pennine foothills).
 - Details of the native seed mix to be used to establish the species rich grassland.
 - Details of the methods used to establish the proposed species-rich grassland and the maintenance hereafter including cutting dates or grazing regime.
 - Establishment of the new pond and wetland area with details of native species to be planted

1.2. Ecological Background

- 1.2.1. **RDF** Ecology prepared a detailed Preliminary Ecological Appraisal (**RDF** Ecology, 2020) for the planning application based upon an extended phase 1 habitat and protected species walkover survey of the application site completed in 2019.

1.3. Project Brief and Objectives

- 1.3.1. **RDF** Ecology has been appointed to respond to the issues raised by Kirklees Ecology Unit and provide further clarification on the points raised.

2. REMOVAL OF HEDGEROW H2

- 2.1. The location of hedgerow **H2** is shown in Figure 3. The majority of this hedgerow would be removed to accommodate future quarrying operations.
- 2.2. Hedgerow **H2** is a mature gappy hedgerow of hawthorn with some semi-mature ash (*Fraxinus excelsior*), pedunculate oak (*Quercus robur*) and sycamore (*Acer pseudoplatanus*). The base of the hedgerow is grazed and comprised improved pasture with perennial ryegrass (*Lolium perenne*), common bent (*Agrostis capillaris*), red fescue (*Festuca rubra*) and white clover (*Trifolium repens*) with some stands of common nettle (*Urtica dioica*) and cleavers (*Galium aparine*) and bare areas around the roots where livestock have trampled the vegetation.
- 2.3. The largest trees in hedgerow **H2** comprise semi-mature ash, oak and sycamore. Whilst the trees are quite large they have been cut back in previous years meaning that have larger lower trunks but the upper structure is younger and contains very little dead wood or features of potential value to roosting bats. During a ground level inspection no obvious potential roost features (PRF's) were observed. These trees were assessed to be of negligible or very low value to roosting bats and no further survey work was recommended.
- 2.4. The hedgerow is likely to be used by nesting birds during the bird breeding season (March to September inclusive).

2.1. Mitigation Proposals

2.1.1. Breeding Birds

- 2.1.1.1. With certain exceptions, all wild birds, their eggs, nests and young are protected under the *Wildlife and Countryside Act 1981* (as amended).
- 2.1.1.2. Given the protection afforded to wild birds and their nests the following precautionary measures are recommended with regard to the removal of hedgerow **H2**:
 - That removal of hedgerow **H2** should be completed outside of the bird breeding season (March to September inclusive). Where this is not possible a suitably qualified and experienced ecologist should complete a survey of the hedgerow immediately prior to its removal to search for nesting birds and to advise on exclusion zones or timing of works if nesting birds are recorded.

2.1.2. Bats

- 2.1.2.1. All UK species of bat are afforded full protection under Section 9 of the Wildlife and Countryside Act 1981 (as amended) through their inclusion on Schedule 5 of the Act and also receive full protection as European Protected Species under Section 41 of The Conservation of Habitats and Species Regulations 2017 through their inclusion on Schedule 2.
- 2.1.2.2. A new survey of the hedgerow should be undertaken to look for any potential use by roosting bats, if the hedgerow is not removed before May 2021. The survey should be completed in the appropriate season (May to August/September inclusive) prior to the removal of the hedgerow. If evidence of roosting bats is identified then a licence from NE will be required to remove any trees that include roosting bats. If no evidence is recorded the hedgerow can be removed without the need for a licence.
- 2.1.2.3. Prior to the removal of hedgerow **H2**, hedgerow **H3** will be allowed to grow out to provide an alternative, robust commuting corridor for bats that are no longer able to use hedgerow **H2** after its removal. This will maintain connectivity between Skelmanthorpe village and Hob Royd Shrogg and Miry Greaves Shrogg LWS to the north and Denby Dale village and the restored habitats on the former quarry in the south of the application site boundary. The hedgerow will also provide foraging opportunities for commuting bats.
- 2.1.2.4. The hedgerow should be removed outside of the bird nesting season (March to September inclusive).
- 2.1.2.5. The final quarry restoration will expand the commuting corridor along hedgerow **H3** with additional native broad-leaved woodland planting to the east of the hedgerow thereby creating a wider and more valuable commuting corridor for bats in the long term along the sheltered slopes of the final landform and also provide extended foraging habitat.

3. HABITAT RESTORATION

- 3.1. In preparing the updated restoration proposals consideration was given to the previous restoration plans, local habitat types and plant communities, the sites location in relation to the habitats included within the Kirklees Wildlife Habitat Network (KWHN) and the habitats being lost through continued quarrying operations.
- 3.2. The overall aim of the restoration is to restore the land to a higher ecological value than existing, to strengthen the integrity of the KWHN and thereby provide a net biodiversity gain.
- 3.3. To achieve its aim the restoration plan will:
 - Minimise the ecological effects of the continued operation of the quarry through progressive site restoration in accordance with the current planning application; and,
 - Ensure that the biodiversity enhancement measures proposed as part of the site restoration works are completed and managed in accordance with best practice to maximise their biodiversity benefits.

3.1. Restoration Principles

- 3.1.1. The final restoration plan has been prepared with consideration to the sites location within the KWHN and within the wider Pennine foothills and was designed to:
 - Link existing woodland within Hob Royd Shrogg and Miry Greaves Shrogg LWS and areas of mixed plantation woodland established on the previously restored quarry workings to the south
 - To mirror the local landscape which contains narrow areas of woodland with adjacent areas of agricultural grassland
 - To utilise locally occurring native tree species in the planting mix to mirror local Pennine valley and lowland woodland communities
 - To create grasslands that reflect the character of the locality, but with higher botanical value supporting a more diverse range of species and in the case of the wildflower hay meadow, managed more sympathetically to maintain their value into the future.
 - The create a new pond and wetland to replace those lost through quarrying operations.

3.2. Grassland Habitat Types and Seed mixes

- 3.2.1. The restored grasslands habitats will include an area of agricultural pasture (3.5ha) and an area of wildflower hay meadow (0.93ha)

3.2.1. Agricultural Grassland

- 3.2.1.1. The agricultural grassland seed mix will be selected to mimic MG6 *Lolium perenne-Cynosurus cristatus* grassland which occurs widely throughout the Southern Pennines as grazed pasture and also within the locality of the site. The currently proposed seed mix to be used will be RE9 Farmland Mixture (MG6 Grassland) from Germinal or a similar mix from suppliers such as Emorsgate seeds available at the time of restoration. The species content for the Germinal RE9 Farmland mixture is included in Appendix 1

3.2.2. Hay Meadow Grassland

- 3.2.2.1. The area of hay meadow will be partially created on an area of improved grassland and also on newly restored quarry workings. The meadow will not be created until restoration commences allowing it to be used for livestock grazing during the quarrying operations and until the replacement agricultural grassland has been created.
- 3.2.2.2. The hay meadow seed mix will be selected to replicate MG5 *Cynosurus cristatus-Centaurea nigra* grassland. The currently proposed seed mix to be used will be Emorsgate EM2 – Standard General Purpose Meadow Mixture. The species content for the Emorsgate EM2 Standard General Purpose Meadow Mixture is included in Appendix 2.

3.3. Ground preparation

- 3.3.1. The best results will arise by sowing the grassland mixtures onto ground that is not highly fertile and does not have a problem with perennial weeds. Good seedbed preparation is essential to success.
- 3.3.2. The agricultural grassland will be created on restored quarry workings utilising sub-soils recovered from screening bunds and sub-soil piles. Restoration will be progressive as the quarry operations move to the west.
- 3.3.3. Prior to use, the existing vegetation on the sub-soil would be sprayed off with an appropriate approved herbicide to remove invasive species such as creeping thistle (*Cirsium arvense*) and broad-leaved dock (*Rumex obtusifolius*). These sub-soils will be spread thinly on site with minimal trafficking to avoid unwanted soil compaction. Once sub-soils have been laid the area will be ripped using an appropriate subsoiler (such as a

winded tyne subsoiler) to alleviate any soil compaction and before seedbed preparation.

- 3.3.4. All soiling works will be completed when soil moisture levels are suitable and machines will be low ground pressure tracked vehicles wherever possible.
- 3.3.5. The area of wildflower meadow will be partially created on an area of previously quarried land restored to improved agricultural grassland and an adjacent area of quarry to be restored at a later date.
- 3.3.6. Prior to seed bed cultivation the improved grassland would be re-surveyed to ensure that it has not developed into a more interesting wildflower grassland that should be retained with improved management rather than ploughed prior to re-seeding.
- 3.3.7. If the improved grassland has developed a diversity of species worth retaining then the recommended seed mix will only be used on the restored land and then the whole area managed as a single unit.
- 3.3.8. If the improved grassland is still species poor it will be sprayed off and the ground cultivated along with the restored quarry and re-seeded with the recommended seed mix.

3.4. Sowing

- 3.4.1. Seed is best sown in the autumn or spring but can be sown at other times of the year if there is sufficient warmth and moisture. The seed must be surface sown and can be applied by machine or broadcast by hand so long as an even distribution is achieved.
- 3.4.2. The seed will not be incorporated or covered, but will be firmed into the soil with a light roller to give good soil/seed contact.

3.5. Aftercare—First year management

- 3.5.1. Most sown meadow wild flower and grass species are perennial; they will be slow to germinate and grow and will not usually flower in their first growing season. There will often be a flush of annual weeds from the soil in the first growing season which may grow up and obscure the meadow seedlings beneath. This annual weed growth is easily controlled by topping or mowing.
- 3.5.2. Newly sown meadows will be mown regularly throughout the first year of establishment to a height of 40-60mm, removing cuttings if dense. This will control annual weeds and help maintain balance between faster growing grasses and slower developing wild flowers.

- 3.5.3. Avoid cutting in the spring and early summer if the mixture has been sown with a nurse cover of cornfield annuals, or is autumn sown and contains Yellow Rattle. These sown annuals should be allowed to flower, then in mid-summer cut back and the cut vegetation removed. It is important to cut back cornfield annuals before they die back, set seed or collapse: this cut will reveal the developing meadow mixture and give it the space it needs to develop.
- 3.5.4. Any residual perennial weeds such as docks or thistles will be carefully dug out or spot treated with an appropriate approved herbicide.

3.6. Future Management of Wildflower Hay Meadow

- 3.6.1. In the second and subsequent years the hay meadow will be managed by traditional meadow management based upon a main summer hay cut in combination with autumn/winter and possibly spring mowing or grazing.
- 3.6.2. The meadow will be cut for hay in August to give the meadow species an opportunity to flower and set seed. The sward will not be cut any shorter than 100mm. The cut vegetation will be left to dry and shed seed for 1-7 days and may be turned to speed up this process and increase seed shedding. Once dry the hay should be baled and removed from site.
- 3.6.3. Once the hay crop has been removed from the site the aftermath can be grazed through to late autumn/winter to produce a sward height no shorter than 50mm with grazing continuing into spring if required, but no later than the middle of April. Cattle grazing is the preferred option, but grazing with sheep would be acceptable. Grazing will be stopped if the ground become too poached in wet weather or the vegetation is being too heavily grazed.

3.7. Wetland Habitats

- 3.7.1. The pond will be constructed as part of the final restoration land form construction in a low lying area of the agricultural grassland to the north. Its is south of the woodland planting to prevent any shading of the pond margins.
- 3.7.2. The pond will have a deeper area down to 2.5m to retain water through most summers along with wide shallow margins to create the diverse wet grassland and marsh habitats. The pond will be fenced to prevent damage by livestock.
- 3.7.3. Once the pond earthworks are complete the banks will be cultivated and sown with a suitable pond margin seed mix. The currently proposed seed mix to be used will be Emorsgate EP1 – Pond Edge Mixture. The species

content for the Emorsgate EP1 Pond Edge Mixture is included in Appendix 3. Another suitable alternative would be Boston Seeds BS6M: Wetland & Pond Edge Wildflower Seed mixture.

- 3.7.4. To quickly establish marginal aquatic vegetation it is proposed that sections of the bank be lined coir fibre rolls pre-planted with marginal aquatic species. The tables below contain details of candidate species to be included within the coir rolls and will depend upon availability at the time that the restoration works are undertaken.

Common Name	Scientific Name	Usage	%
Yellow Iris	<i>Iris pseudacorus</i>	Taller marginal, marshy shallows and seasonally flooded scrapes	15%
Purple Loosestrife	<i>Lythrum salicaria</i>	Taller marginal, marshy shallows and seasonally flooded scrapes	15%
Cuckooflower	<i>Cardamine pratensis</i>	Marshy shallows and seasonally flooded scrapes	10%
Water Forget-me-not	<i>Myosotis scorpioides</i>	Low marginal plants	10%
Ragged Robin	<i>Lychnis flos-cuculi</i>	Marshy shallows and seasonally flooded scrapes	10%
Lesser Pond Sedge	<i>Carex acutiformis</i>	Low marginal plants	10%
Water Mint	<i>Mentha aquatica</i> agg.	Low marginal plants	5%
Water Plantain	<i>Alisma plantago-aquatica</i>	Low marginal plants	5%
Marsh Marigold	<i>Caltha palustris</i>	Low marginal plants, marshy shallows and seasonally flooded scrapes	5%
Lesser Spearwort	<i>Ranunculus flammula</i>	Low marginal plants, marshy shallows and seasonally flooded scrapes	5%
Marsh Woundwort	<i>Stachys palustris</i>	Low marginal plants, marshy shallows and seasonally flooded scrapes	5%
Gypsywort	<i>Lycopus europaeus</i>	Low marginal plants, marshy shallows and seasonally flooded scrapes	5%

3.7.1. Tall Marginals

- 3.7.1.1. Many of the taller marginal species are likely to colonise naturally, particularly Bulrush (*Typha latifolia*), Common Reed (*Phragmites australis*) and Reed Sweet-grass (*Glyceria maxima*).

- 3.7.1.2. If intentionally planting taller species the following would be recommended.

Common Name	Scientific Name	Usage	%
Common Reed	<i>Phragmites Australis</i>	Taller marginal	70%
Yellow Iris	<i>Iris pseudacorus</i>	Taller marginal, marshy shallows and seasonally flooded scrapes	15%
Purple Loosestrife	<i>Lythrum salicaria</i>	Taller marginal, marshy shallows and seasonally flooded scrapes	10%
Hemp Agrimony	<i>Agrimonia eupatorium</i>	Taller marginal and marshy shallows	5%

4. FIGURES

Figure 1—Site Location

Figure 2—Nature Conservation Designations

Figure 3—Phase I Habitats

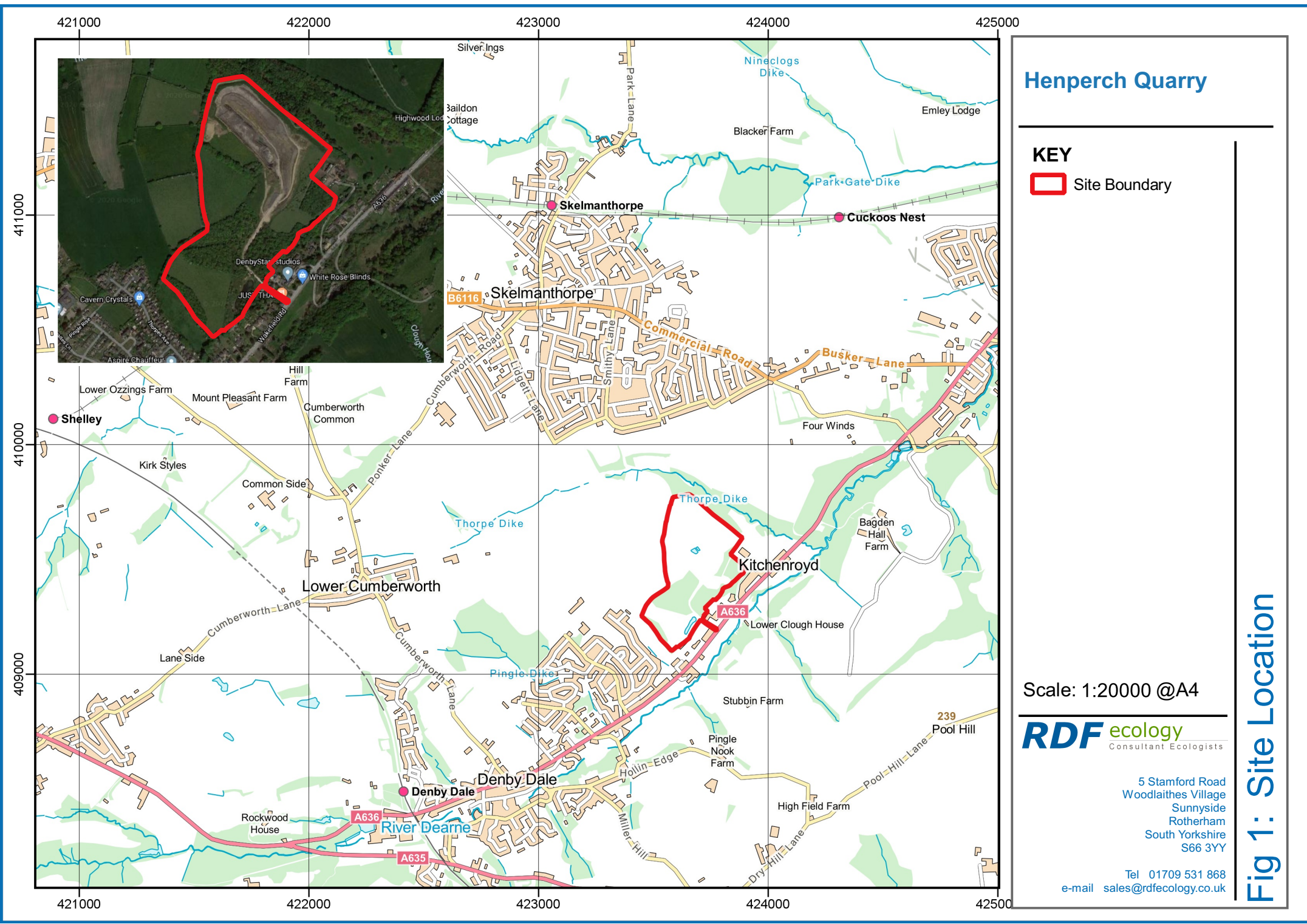
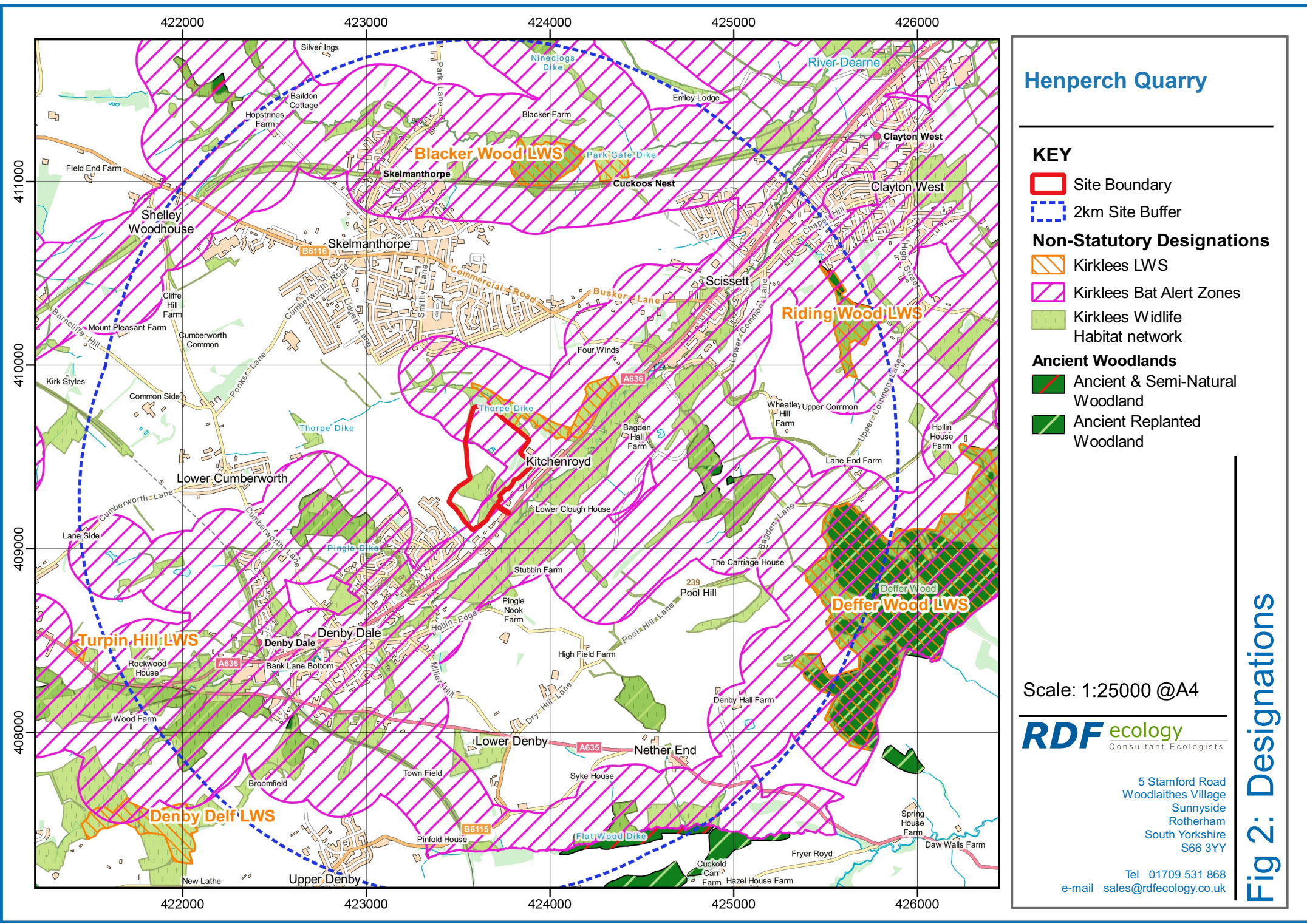
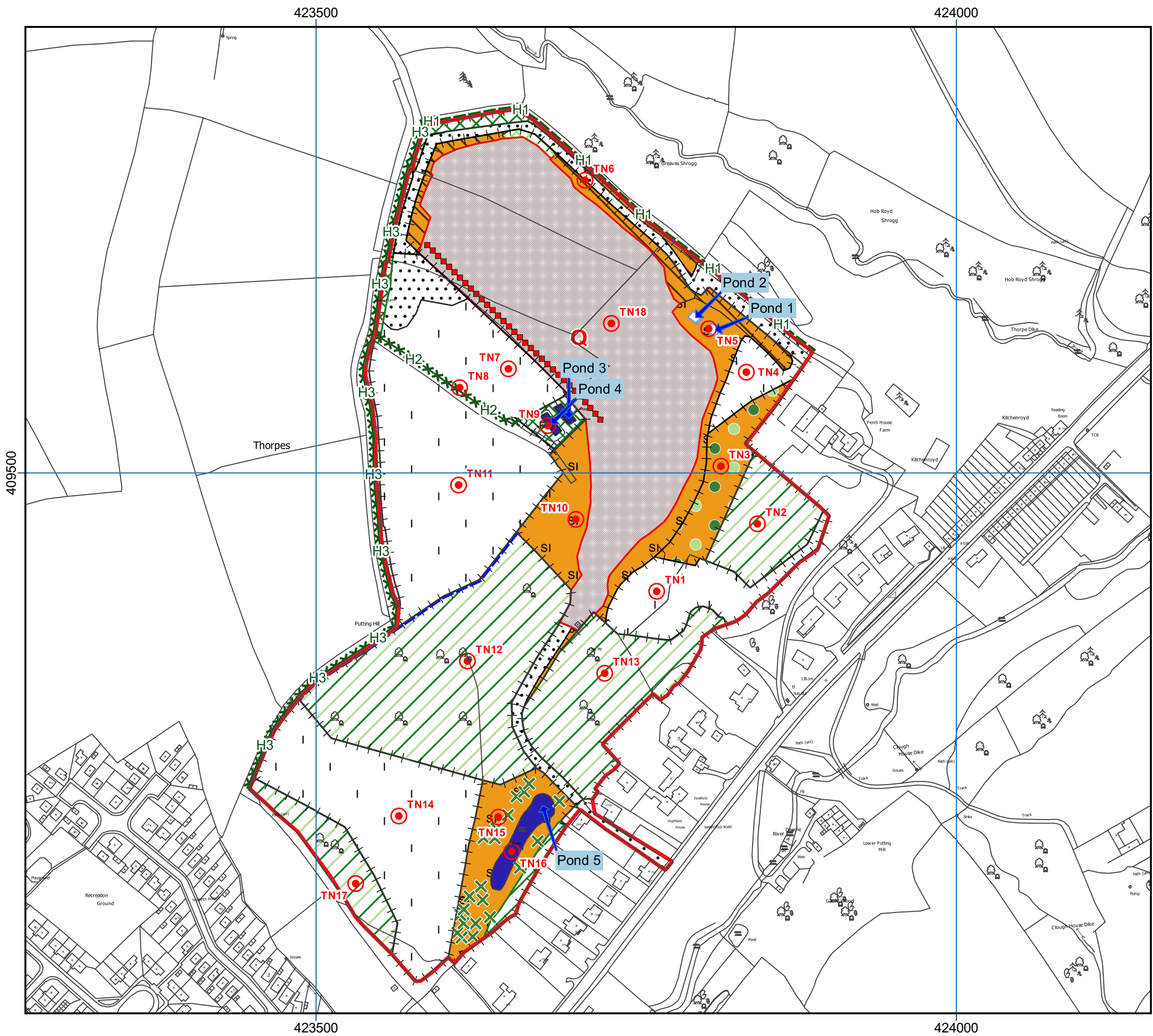


Fig 1: Site Location





Henperch Quarry

KEY

Site Boundary

Phase 1 Habitats

Broad-leaved woodland plantation

Mixed plantation woodland

Mixed plantation woodland and neutral grassland

Dense scrub

Dense bramble scrub

SI Semi-improved neutral grassland

Improved grassland

Tall ruderal and semi-improved neutral grassland mosaic

Inundation vegetation

Standing water

Q Quarry

Bare ground

Species poor hedgerow with trees

Defunct species poor hedgerow

Dry ditch

Quarry edge

Fence

X Scattered scrub

• Target Notes

Scale: 1:3000 @A3

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Fig 3: Phase 1 Habitats

5. REFERENCES

5.1. Project References

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5.2. Technical References

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6. APPENDICES

6.1. Appendix 1—Agricultural grassland Seed Mix

RE9 (Farmland Mixture - MG6 Grassland)		
Mix %	Common Name	Scientific Name
0.5%	Autumn Hawkbit	<i>Leontodon autumnalis</i>
2.0%	Black Medick	<i>Medicago lupulina</i>
2.5%	Common Bent	<i>Agrostis capillaris</i>
2.0%	Common Knapweed	<i>Centaurea nigra</i>
0.2%	Common Mouse-Ear	<i>Cerastium fontanum</i>
25.0%	Crested Dog's-tail	<i>Cynosurus Cristatus</i>
1.0%	Dandelion	<i>Taraxacum officinale</i>
5.5%	Golden Oat-Grass	<i>Trisetum flavescens</i>
0.5%	Meadow Vetchling	<i>Lathyrus pratensis</i>
2.0%	Red Clover	<i>Trifolium pratense</i>
3.5%	Ribwort Plantain	<i>Plantago lanceolata</i>
12.5%	Rough Stalked Meadow Grass	<i>Poa trivialis</i>
1.5%	Self-heal	<i>Prunella vulgaris</i>
25.0%	Slender Creeping Red Fescue	<i>Festuca rubra litoralis</i>
2.5%	Smooth Stalked Meadow-grass	<i>Poa pratensis</i>
2.0%	Sweet Vernal Grass	<i>Anthoxanthum odoratum</i>
2.0%	White Clover	<i>Trifolium repens</i>
2.0%	Yarrow	<i>Achillea millefolium</i>
0.5%	Yellow Flag	<i>Iris pseudacorus</i>
2.3%	Yellow Rattle	<i>Rhinanthus minor</i>
5.0%	Yorkshire Fog	<i>Holcus lanatus</i>

Supplier: Germinal Amenity. Web: germinalamenity.com

6.2. Appendix 2—Hay Meadow Seed Mix

This meadow mixture contains a very wide range of species. It may be used to create a very diverse sward where conditions vary across a site. It is also useful in situations where precise soil and site characteristics have not been established before sowing.

EM2 – Standard General Purpose Meadow Mixture		
Wild Flowers		
%	Scientific Name	Common name
0.5	<i>Achillea millefolium</i>	Yarrow
1.6	<i>Centaurea nigra</i>	Common Knapweed
3	<i>Daucus carota</i>	Wild Carrot
3	<i>Galium verum</i>	Lady's Bedstraw
0.3	<i>Knautia arvensis</i>	Field Scabious
0.3	<i>Leontodon hispidus</i>	Rough Hawkbit
2.5	<i>Leucanthemum vulgare</i>	Oxeye Daisy - (Moon Daisy)
3	<i>Malva moschata</i>	Musk Mallow
0.8	<i>Plantago lanceolata</i>	Ribwort Plantain
1	<i>Poterium sanguisorba</i> - (<i>Sanguisorba minor</i>)	Salad Burnet
0.6	<i>Primula veris</i>	Cowslip
0.3	<i>Prunella vulgaris</i>	Selfheal
0.8	<i>Ranunculus acris</i>	Meadow Buttercup
1.2	<i>Rhinanthus minor</i>	Yellow Rattle
1.1	<i>Rumex acetosa</i>	Common Sorrel
Grasses		
8	<i>Agrostis capillaris</i>	Common Bent
28	<i>Cynosurus cristatus</i>	Crested Dog's-tail
24	<i>Festuca rubra</i>	Slender-creeping Red-fescue
4	<i>Phleum bertolonii</i>	Smaller Cat's-tail
16	<i>Poa pratensis</i>	Smooth-stalked Meadow-grass

Sowing Rates

kg/ha	kg/acre	g/m ²	Order Mixture
40	16	4	Order this mixture

Supplier: <https://wildseed.co.uk/home>

6.3. Appendix 3—Wetland Habitats

Seed Mix	Sowing Rate
Emorsgate EP1 – Pond Edge Mixture	4g/m ²
https://wildseed.co.uk/mixtures/view/13	
Boston Seeds BS6M: Wetland & Pond Edge Wildflower Seeds	5g/m ²
https://www.bostonseeds.com/library/BS6M-Wetland-and-Pond-Edge-Wildflower-Meadow-Seed-Mixture.pdf	

EP1 – Pond Edge Mixture		
%	Scientific Name	Common name
Wildflowers		
0.5	<i>Achillea ptarmica</i>	Sneezewort
2	<i>Angelica sylvestris</i>	Wild Angelica
0.2	<i>Caltha palustris</i>	Marsh Marigold
1.5	<i>Centaurea nigra</i>	Common Knapweed
1	<i>Eupatorium cannabinum</i>	Hemp Agrimony
3	<i>Filipendula ulmaria</i>	Meadowsweet
0.5	<i>Geum rivale</i>	Water Avens
0.5	<i>Hypericum tetrapterum</i>	Square-stalked St John's Wort
4	<i>Iris pseudacorus</i>	Yellow Iris
1	<i>Lotus pedunculatus</i>	Greater Bird's-foot Trefoil
0.8	<i>Lycopus europaeus</i>	Gypsywort
0.6	<i>Lythrum salicaria</i>	Purple Loosestrife
0.1	<i>Mentha aquatica</i>	Water Mint
0.1	<i>Pulicaria dysenterica</i>	Common Fleabane
2	<i>Ranunculus acris</i>	Meadow Buttercup
0.6	<i>Sanguisorba officinalis</i>	Great Burnet
0.8	<i>Silene flos-cuculi</i> - (<i>Lychnis flos-cuculi</i>)	Ragged Robin
0.5	<i>Succisa pratensis</i>	Devil's-bit Scabious
0.3	<i>Vicia cracca</i>	Tufted Vetch
Grasses		
10	<i>Agrostis capillaris</i>	Common Bent
3	<i>Alopecurus pratensis</i>	Meadow Foxtail (w)
3	<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass (w)
3	<i>Briza media</i>	Quaking Grass (w)
24	<i>Cynosurus cristatus</i>	Crested Dog's-tail
2	<i>Deschampsia cespitosa</i>	Tufted Hair-grass (w)
32	<i>Festuca rubra</i>	Slender-creeping Red-fescue
3	<i>Hordeum secalinum</i>	Meadow Barley (w)