



THE  
ENVIRONMENT  
PARTNERSHIP

# Haweswater Aqueduct Resilience Programme

Chapter 9A - Appendix 9A.2

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**United Utilities**

Environmental Statement



Water for the North West



## Haweswater Aqueduct Resilience Programme

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# 1. Phase 1 Habitats Technical Appendix

## 1.1 Introduction

- 1) TEP was appointed by United Utilities to complete an Ecological Impact Assessment (EclA) for the Haweswater Aqueduct Resilience Programme - Proposed Marl Hill Section. The EclA is required to inform an Environmental Impact Assessment (EIA) and support production of the Environmental Statement (ES).
- 2) A series of ecological surveys was undertaken to complete the EclA. This Appendix is one of a series of Ecological Technical Reports (ETRs) produced to support the EclA. This ETR documents the methods and findings of the extended Phase 1 Habitat surveys undertaken by Bowland Ecology.

## 1.2 Summary of Findings

- 3) A wider area was surveyed than will be potentially impacted by the proposed works within the Marl Hill Section. Consequently only some of the habitats surveyed and presented within the following Technical Appendix, including Target Note descriptions (Appendix B) will be used to inform the EclA.
- 4) The habitats which fall within influencing distance of the proposed works, including the Braddup Compound and the Bonstone Compound and associated construction access areas, which will be included within the EclA are summarised in Table 1.

**Table1: Habitats Within Proposed Marl Hill Section**

Habitat	Quantity Within Application Boundary		Relevant Target Notes / Feature References	
	Braddup Compound	Bonstone Compound	Braddup Compound	Bonstone Compound
<b>Area habitats</b>				
Broadleaved semi-natural woodland	< 0.01 ha	Not present		
Mixed plantation woodland	0.06 ha	Not present		
Dense / Continuous scrub	0.01 ha	Not present		
Semi-improved neutral grassland	0.21 ha	2.08 ha	TN4	TN16
Poor semi-improved grassland	14.41 ha	6.93 ha		
Marshy grassland	1.14 ha	< 0.01 ha	TN3	
Tall ruderals	0.11 ha	Not present		
Buildings and hardstanding	0.01 ha	0.02 ha	TN1, TN2, TN5	TN27, TN28
Residential	0.01 ha	Not present		
Spoil	0.02 ha	Not present		
Standing water	< 0.01 ha	0.01 ha	TN44	
<b>Linear habitats</b>				

Habitat	Quantity Within Application Boundary		Relevant Target Notes / Feature References	
	Braddup Compound	Bonstone Compound	Braddup Compound	Bonstone Compound
Running water (mesotrophic) *	111.8 m	242.8 m	W523, W557, W521, W520, W541, W530, W535	W480, W483
Intact native species poor hedgerow**	120.4 m	95.6 m	H12	H5
Walls	Not present	210.4 m		
Dry ditch	454.3 m	310.1 m		
<b>Trees</b>				
Scattered broadleaved trees	18 no.	5 no.		

\* Further details of the watercourse within the Proposed Marl Hill Section, including descriptions and valuations, are presented at Chapter 9B and relevant Appendices.

\*\* Further details of the hedgerows within the Proposed Marl Hill Section, including an assessment for hedgerow importance and valuation, are presented at Appendix 9A.3.

5) Habitats adjacent to (up to 50m) and distant but within potential influence (50m to 250m) of the Proposed Marl Hill Section are listed at Table 2.

**Table 2: Habitats Adjacent and Offsite Relevant to the Proposed Marl Hill Section**

Habitats Present <50m		Habitats Present 50m-250m	
Braddup Compound	Bonstone Compound	Braddup Compound	Bonstone Compound
<ul style="list-style-type: none"> <li>▪ Broadleaved semi-natural woodland</li> <li>▪ Mixed plantation woodland</li> <li>▪ Dense / continuous scrub</li> <li>▪ Semi-improved neutral grassland</li> <li>▪ Poor semi-improved grassland</li> <li>▪ Marshy grassland</li> <li>▪ Tall ruderals</li> <li>▪ Buildings and hardstanding</li> <li>▪ Residential</li> <li>▪ Spoil</li> <li>▪ Amenity grassland</li> <li>▪ Scattered broadleaved trees</li> <li>▪ Standing water</li> <li>▪ Running water (mesotrophic)</li> <li>▪ Dry ditch</li> <li>▪ Intact native species poor hedgerow</li> <li>▪ Wall</li> </ul>	<ul style="list-style-type: none"> <li>▪ Mixed plantation woodland</li> <li>▪ Marshy grassland</li> <li>▪ Semi-improved neutral grassland</li> <li>▪ Poor semi-improved grassland</li> <li>▪ Buildings and hardstanding</li> <li>▪ Bare ground</li> <li>▪ Standing water</li> <li>▪ Running water (mesotrophic)</li> <li>▪ Intact native species rich hedgerow</li> <li>▪ Intact native species poor hedgerow</li> <li>▪ Walls</li> <li>▪ Scattered broadleaved trees</li> <li>▪ Dry ditch</li> </ul>	<ul style="list-style-type: none"> <li>▪ Broad-leaved semi-natural woodland</li> <li>▪ Mixed plantation woodland</li> <li>▪ Broad-leaved plantation woodland</li> <li>▪ Coniferous plantation woodland</li> <li>▪ Coniferous recently felled woodland</li> <li>▪ Marsh / Marshy grassland</li> <li>▪ Tall ruderals</li> <li>▪ Dense / continuous scrub</li> <li>▪ Semi-improved neutral grassland</li> <li>▪ Poor semi-improved grassland</li> <li>▪ Improved grassland</li> <li>▪ Buildings and hardstanding</li> <li>▪ Residential</li> <li>▪ Spoil</li> <li>▪ Amenity grassland</li> <li>▪ Standing water</li> <li>▪ Running water (mesotrophic)</li> <li>▪ Intact native species poor hedgerow</li> <li>▪ Walls</li> <li>▪ Scattered broadleaved trees</li> <li>▪ Dry ditch</li> </ul>	<ul style="list-style-type: none"> <li>▪ Broadleaved semi-natural woodland</li> <li>▪ Mixed plantation woodland</li> <li>▪ Semi-improved neutral grassland</li> <li>▪ Poor semi-improved grassland</li> <li>▪ Semi-improved acid grassland</li> <li>▪ Marsh / marshy grassland</li> <li>▪ Buildings and hardstanding</li> <li>▪ Bare ground</li> <li>▪ Scattered broadleaved trees</li> <li>▪ Standing water</li> <li>▪ Running water (mesotrophic)</li> <li>▪ Intact native species rich hedgerow</li> <li>▪ Intact native species poor hedgerow</li> <li>▪ Dry ditch</li> <li>▪ Walls</li> </ul>

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# Appendix A. Phase 1 Habitats Overview Report

1 Project Details			
Project Name:	Haweswater Aqueduct Resilience Programme	Project Number:	80061155
Written:	Ellen Milner, <i>Principal Ecologist</i> Alice Helyar, <i>Principal Ecologist</i>	Approved:	Claire Wilson, <i>Principal Ecologist</i> Eve Loxham, <i>Ecologist</i>
Report reference:	TR4 Phase 1 Habitat Overview Report V1 TR4 Phase 1 Habitat Overview Report V2	Date:	15/10/2019 19/06/2020
2 Project Drawings			
TR4 Phase 1 Plans Proposed Marl Hill Section Sheets 1 to 7		BOW167_HARP_9.5_PHASE 1_TR4	
3 Ecology Surveys			
Surveyors:	Eve Loxham MBiolSci (Hons), GradCIEEM Mark Breaks BSc (Hons) Ellen Milner MA, MRes, CEnv, MCIEEM Sophie King MSc, BSc Catrin Watkin MRes, BSc (Hons) Abigail Hamer BSc (Hons)		
Survey date(s):	18/07/2019, 31/07/2019, 07/08/2019, 08/08/2019, 10/10/2019, 20/11/2019, 27/11/2019, 06/02/2020, 14/05/2020, 19/05/2020, 20/05/2020.		
Survey Method:	The extended Phase 1 habitat survey followed standard methodology (JNCC, 2010 and CIEEM, 2013). All features of ecological significance were target noted and a colour coded map of the habitats on site has been produced.		
Weather Conditions:	<p>18/07/2019 – Cloud cover (3/8), Wind Beaufort F3, 19 °C, no precipitation.</p> <p>31/07/2019– Cloud cover (2/8), Wind Beaufort F2, 20 °C, no precipitation.</p> <p>07/08/2019– Cloud cover 6/8, Wind Beaufort F3, 22°C, no precipitation.</p> <p>08/08/2019– Cloud cover (2/8), Wind Beaufort F2, 20 °C, no precipitation.</p> <p>10/10/2019– Cloud cover (7/8), Wind Beaufort F3-5, 11°C, no precipitation.</p> <p>20/11/2019 – Cloud cover (5/8), Wind Beaufort F3, 5°C, no precipitation.</p> <p>27/11/2019 – Cloud cover (4/8), Wind Beaufort F2, 10°C, no precipitation.</p> <p>06/02/2020 – Cloud cover (4/8), Wind Beaufort F2, 6°C, light rain.</p> <p>14/05/2020 - Cloud cover (4/8), Wind Beaufort F1, 9°C, no precipitation.</p> <p>19/05/2020 – Cloud cover (3/8), Wind Beaufort F0-2, 14°C, no precipitation.</p> <p>20/05/2020 - Cloud cover (0/8), Wind Beaufort F0-2, 20°C, no precipitation.</p>		
Limitations to the survey:	<p>The surveys were carried out between July 2019 and May 2020.</p> <p>Densely planted coniferous trees, dense understory vegetation or dense scrub within some woodlands prevented a thorough internal inspection of the habitat to determine the presence of badger setts. This is not considered a significant limitation since further survey for badger sett presence is required once the development boundary/route option is finalised and prior to works commencing. The optimal time for badger sett surveys is autumn and spring. During summer, dense vegetation growth can inhibit the visibility of sett entrances. During winter, badger activity is reduced. This is not considered a significant limitation due to further survey requirements as</p>		



	<p>explained above.</p> <p>Summer months are considered sub-optimal for ground level roost assessment of trees (Collins, 2016). This is due to foliage obscuring parts of the tree. Where this limitation applies, further survey during the optimal months is recommended.</p> <p>Buildings were assessed from external elevations only for bat roosting potential.</p> <p>Optimal survey months for Phase 1 Habitat Surveys vary between habitat types, e.g. woodlands are best surveyed in spring, grasslands in mid-summer and heathlands in autumn. Where habitats were not surveyed during the optimal time of year, these have been recorded within the target note as requiring further survey.</p> <p>At the edge of access boundaries, surveys of boundary features (e.g. tree lines, watercourses, hedgerows) were only possible from one elevation. Once the development boundary/route option is finalised, further survey may be required.</p>
<b>4 Ecological Designations</b>	
<i>Is site within close proximity to a statutory** or non-statutory^ protected site?</i> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
SAC/SPA/ RAMSAR	<input checked="" type="checkbox"/> Bowland Fells Special Protection Area (SPA) North Pennines Dales Meadows Special Area of Conservation (SAC)
SSSI/NNR	<input checked="" type="checkbox"/> Bowland Fells Site of Special Scientific Interest (SSSI) Coplow Quarry SSSI Langcliffe Cross Meadows SSSI Bell Sykes Meadows SSSI Salthill and Bellmanpark Quarries SSSI Myttons Meadows SSSI Field Head Meadow SSSI Hodder River Section SSSI
SBI/BHS	<input checked="" type="checkbox"/> Braddup Wood North Biological Heritage Site (BHS) Braddup Wood South BHS Cross Lane Roadside Verges BHS Gibb's Wood and Bonstone Wood BHS Bonstone Brook Pastures BHS Feazer Wood BHS Hospital Wood BHS Moor Piece BHS Bradford Fell, Easington Fell and Harrop Fell BHS Waddington Fell and Browsholme Moor BHS River Hodder BHS Ashnott Wood BHS Crag House Roadside Verges BHS Ashnott Meadow BHS Waddington Fell Road, Roadside Verges BHS Birkett Fell, Hodder Bank Fell and Mossthwaite Fell BHS

5 Habitat Summary
<p><b>Broad leaved semi-natural woodland</b></p> <p>Limited in the survey area to five small blocks, one of which, Bonstone Wood is associated with Bonstone Brook. This habitat is part of Gibb's Wood and Bonstone Wood BHS. Oak (<i>Quercus sp.</i>) and alder (<i>Alnus glutinosa</i>) dominate the canopy with additional species including sycamore (<i>Acer pseudoplatanus</i>), silver birch (<i>Betula pendula</i>), beech (<i>Fagus sylvatica</i>) and ash (<i>Fraxinus excelsior</i>). The ground flora is botanically interesting and includes species such as English bluebell (<i>Hyacinthoides non-scripta</i>), ramsons (<i>Allium ursinum</i>), wood avens (<i>Geum urbanum</i>), moschatel (<i>Adoxa moschatellina</i>), enchanter's nightshade (<i>Circaea lutetiana</i>), remote sedge (<i>Carex remota</i>) and early purple orchid (<i>Orchis mascula</i>).</p>
<p><b>Mixed plantation woodland</b></p> <p>Nine blocks of mixed plantation woodland are present within the TR4 survey area, including those located at TR4.TN6, TN11, TN12, TN24, TN41, TN42, TN47 and TN72. Of note is a thin, linear strip bordering Sandy Ford Brook which contains mixed broadleaf and coniferous tree species including sycamore, oak, alder, rowan (<i>Sorbus aucuparia</i>) and Scots pine (<i>Pinus sylvestris</i>). The understory comprises scattered gorse (<i>Ulex europaeus</i>) and bramble (<i>Rubus fruticosus</i>). The ground flora generally tends to be limited (TR4.TN11, TN12, TN24, TN41, TN42) to grasses, with Rhododendron and Himalayan balsam (<i>Impatiens glandulifera</i>) (WCA Schedule 9 invasive species) being present in a number of the mixed plantation woodlands (e.g. TR4.TN11, TN41, TN42 and TN47).</p>
<p><b>Broadleaved plantation woodland</b></p> <p>Broadleaved plantation woodland is a rare habitat, occurring at TR4.TN30, where it surrounds a coniferous plantation woodland. The woodland comprises alder and hawthorn (<i>Crataegus monogyna</i>), all of which are immature. There is no understory, and the groundflora is grassland dominated.</p>
<p><b>Conifer plantation woodland</b></p> <p>Three small blocks of conifer plantation woodland occur within the southern survey area of TR4, at TR4.TN31, TN36 and TN37. The canopies are dominated by single species of conifers, e.g. Scots pine, and the understory is sparse but with locally dominant Rhododendrons (Schedule 9 of the Wildlife and Countryside Act 1981, as amended) and/or holly present. Ground flora is absent or grassland dominated by tufted hair grass, with honeysuckle (<i>Lonicera periclymenum</i>), wood sorrel and soft rush. Scattered fallen trees and deadwood are present.</p>
<p><b>Scattered scrub</b></p> <p>Individual scattered hawthorn and willow (<i>Salix spp.</i>) scrub is occasional throughout TR4 along the field and track margins, possibly a remnant from historical hedgerows, e.g. TR4.TN20, TR4.WC18. It is most commonly found at Waddington Fell Quarry (TR54.TN56 and TN66) where the habitat is quite extensive along the eastern side of the survey area.</p>
<p><b>Dense scrub</b></p> <p>One block of continuous scrub is present in the southern survey area of TR4 at TR4.TN33; it is dense bramble scrub on a recently felled woodland.</p>
<p><b>Scattered trees</b></p> <p>Scattered trees are occasional throughout the open fields and tracksides of TR4. Species present are predominantly oak and sycamore.</p>
<p><b>Semi-improved neutral grassland</b></p> <p>Species-rich hay meadows are found in large sections of the northern survey area of TR4 (e.g. TR4.TN13, TN14, TN16, TN23). These areas are less-intensively managed and maintain a high sward height. Species recorded include crested dogs-tail (<i>Cynosurus cristatus</i>), sweet vernal grass (<i>Anthoxanthum odoratum</i>), rough meadow grass (<i>Poa trivialis</i>), marsh foxtail (<i>Alopecurus geniculatus</i>), great burnet (<i>Sanguisorba officinalis</i>), yellow rattle (<i>Rhinanthus minor</i>), eyebright (<i>Euphrasia sp.</i>), Yorkshire fog (<i>Holcus lanatus</i>), soft rush (<i>Juncus effusus</i>), red fescue (<i>Festuca rubra</i>), tufted hair grass (<i>Deschampsia cespitosa</i>), creeping buttercup (<i>Ranunculus repens</i>), creeping thistle (<i>Cirsium arvense</i>), annual meadow grass (<i>Poa annua</i>), common nettle (<i>Urtica dioica</i>), cuckoo flower (<i>Cardamine pratensis</i>), common mouse-ear (<i>Cerastium fontanum</i>), tall fescue (<i>Festuca arundinacea</i>), field woodrush (<i>Luzula campestris</i>), meadow buttercup (<i>Ranunculus acris</i>), pignut (<i>Conopodium majus</i>), lesser stitchwort (<i>Stellaria graminea</i>) and heath bedstraw (<i>Galium saxatile</i>). The eastern field of TR4 at the northern side of the track (TR4.TN15) surrounding the ponds is particularly sedge-rich and also includes carnation sedge (<i>Carex panicea</i>), oval sedge (<i>Carex leporina</i>), star sedge (<i>Carex echinata</i>), glaucous sedge (<i>Carex flacca</i>), common sedge (<i>Carex nigra</i>), yellow sedge (<i>Carex demissa</i>) and hairy sedge (<i>Carex</i></p>

<p><i>hirta</i>). Semi-improved neutral grassland is rare in the southern survey area of TR4.</p> <p>Small areas of semi-improved neutral grassland are found within unmanaged sections of species-poor semi-improved grassland of TR4, for example within fenced sections with no access for cattle (e.g. TR4.TN4, TN22, TN38), and along roadside verges (TR4.TN20, TN44).</p>
<p>Semi-improved acid grassland</p> <p>A very small area of semi-improved acid grassland is present in TR4 near TR4.TN22, characterised by the presence of tormentil (<i>Potentilla erecta</i>) and heath bedstraw along with sweet vernal grass and crested dog's-tail.</p>
<p>Poor semi-improved grassland</p> <p>This habitat is the most common in the survey areas, particularly within the southern survey area where it is the dominant habitat type. It is species poor, dominated by commonly occurring grassland species and is intensively managed as sheep grazed pasture and/or for silage production and may have been reseeded. Soft rush is a common occurrence in the grasslands, e.g. TR4.TN7 and TN29.</p> <p>Bonstone Brook Pastures BHS lies immediately adjacent to the southern boundary of the survey area.</p>
<p>Marshy grassland</p> <p>This habitat is common in TR4 and is generally sheep or cattle grazed. These areas are not typically species-rich and species assemblage includes soft rush, compact rush (<i>Juncus conglomeratus</i>), common sorrel (<i>Rumex acetosa</i>), creeping thistle (<i>Cirsium arvense</i>) and common nettle (<i>Urtica dioica</i>). More species-rich examples occur in the northern survey area near TR4.TN13 and TN14, whereas extensive areas of species-poor marshy grassland/rush pasture occur in the southern survey area (e.g. TR4.TN3 and TN32).</p>
<p>Flush</p> <p>Flushes are rare in TR4, with one recorded at TR4.TN70 within Waddington Fell Quarry, where a small area of flush surrounding a slow through flow of water between TR4.P16 and TR4.P17 was identified. The habitat is dominated by soft rush with scattered <i>Sphagnum</i> mosses, hemp agrimony (<i>Eupatorium cannabinum</i>) and bulrush (<i>Typha latifolia</i>).</p>
<p>Tall ruderal</p> <p>Tall ruderal vegetation forms small stands throughout the species-poor semi-improved grassland of TR4 and typically comprises common nettle, broadleaved dock (<i>Rumex obtusifolius</i>) and common hogweed (<i>Heracleum sphondylium</i>). One example of a small stand of tall ruderals dominated by common nettle, occurs at TR4.TN39.</p>
<p>Continuous bracken</p> <p>Continuous bracken (<i>Pteridium aquilinum</i>) occurs within Waddington Fell Quarry at three locations, with one extensive stand at TR4.TN65 and TN52.</p>
<p>Wet dwarf shrub heath</p> <p>Wet dwarf shrub heath is rare in TR4, occurring within Waddington Fell Quarry e.g. TR4.TN61 where it occurs as part of a complex mosaic of habitats and at TR4.TN68 where it is located at the flat base of slope, in a roughly circular depression with water present just beneath the surface. Species include ling (<i>Calluna vulgaris</i>), bilberry (<i>Vaccinium myrtillus</i>), cross leaved heath (<i>Erica tetralix</i>), common cotton grass (<i>Eriophorum angustifolium</i>), hare's tail cottongrass (<i>Eriophorum vaginatum</i>), wavy hair grass (<i>Deschampsia flexuosa</i>), cranberry (<i>Vaccinium oxycoccos</i>), <i>Sphagnum</i> mosses (at least four species), several sedge species, feather mosses, sheep's fescue (<i>Festuca ovina</i>) and carnation sedge (<i>Carex panicea</i>). There are some pools of stagnant water within the habitat. The topography is undulating and there are mossy hummocks.</p>
<p>Dry dwarf shrub heath</p> <p>Dry dwarf shrub heath is the dominant habitat (apart from quarry/exposed rock) within Waddington Fell Quarry (e.g. TR4.TN50, TN56, TN63, TN66 and TN67). The area is unmanaged (the heather is not burnt or maintained), and on relatively flat ground surrounding the ponds, although it slopes upwards to the west, and downwards to the east. Dominant species is ling heather, with abundant bilberry, and a carpet of mosses (rarely <i>Sphagnum</i>s), several sedge species, mat grass (<i>Nardus stricta</i>), crowberry (<i>Empetrum nigrum</i>), willowherb species (<i>Epilobium</i> sp.), foxglove, broadleaved dock, bracken, some immature self-seeded rowan and willow, red fescue, heath woodrush (<i>Luzula multiflora</i>) and wavy hair grass. The heather shrub is mature and all of a similar age.</p> <p>Dry dwarf shrub heath does not occur within the other survey areas in TR4.</p>
<p>Standing water</p>

<p>Several ponds excavated in the last ten years are present within the northern section of TR4. A total of seven ponds/shallow scrapes are located north of an access track to a farm property at TR4.TN14 and TR4.TN5 (TR4.P1 and TR4.P2, the other five were dry at the time of eDNA survey). These ponds have been excavated as temporary scrapes specifically developed for use by wading and ground nesting birds.</p> <p>An isolated pond is present within the centre of sheep-grazed fields beyond the north-western boundary section of the southern TR4 survey area (TR4.P9).</p> <p>Up to six ponds were identified within Waddington Fell Quarry (TR4.TN44, TN50, TN55 and TN60), these are settling lagoons and the northern three of these are relatively new ponds on bare rock/earth and are not well developed, with poor quality submerged and emergent vegetation. The southern ponds are more developed and contain emergent vegetation.</p>
<p><b>Running water</b></p> <p>Twenty four watercourses are present within the three survey areas comprising TR4. Several of the watercourses comprise drainage ditches or channelised streams that drain the permanent pastures, e.g. TR4.WC8, WC9, WC12, WC16, WC17, WC18, WC19 and WC20. Channels with a semi-natural appearance occur at TR4.WC4, WC5 and WC6. Bonstone Brook (TR4.WC5) runs through the northern survey area of TR4 and is part of Gibb's Wood and Bonstone Wood BHS. Other more minor ditches are present in the survey area. Sandy Ford Brook (TR4.WC1) runs through the southern survey area of TR4; however this was mostly dry at the time of survey with only small areas of standing water remaining.</p> <p>Small channels are present between the ponds/lagoons at Waddington Quarry.</p> <p>The watercourses associated with the survey area are hydrologically connected to the River Hodder and River Ribble.</p>
<p><b>Introduced shrub</b></p> <p>Himalayan balsam (WCA Schedule 9 invasive species) is frequent within TR4 as the understory of the woodland bordering Sandy Ford Brook and also along the access road (Cross Lane). It is also found at TR4.TN7, TN9, TN11, TN48 and TR4.WC1. Rhododendron, a WCA Schedule 9 invasive species, is found within woodlands at TR4.TN11, TN31, TN41, TN42, TN47 and TN53, as well as a mature stand close to a residential property at TR4.TN36a.</p>
<p><b>Species rich intact hedgerow</b></p> <p>A small number of species rich hedgerows are present in TR4. These comprise field maple (<i>Acer campestre</i>), hawthorn (<i>Crataegus monogyna</i>), hazel (<i>Corylus avellana</i>), holly (<i>Ilex aquifolium</i>), pedunculate oak (<i>Quercus robur</i>), rose (<i>Rosa</i> sp.), blackthorn (<i>Prunus spinosa</i>) and elder (<i>Sambucus nigra</i>).</p>
<p><b>Species-poor intact hedgerow</b></p> <p>A total of thirteen hedgerows are present in TR4. The majority (eleven) are species-poor comprising of hawthorn, holly, blackthorn and more rarely guelder rose (<i>Viburnum opulus</i>) and willow (<i>Salix</i> sp.). Interesting ground flora is limited to primrose (<i>Primula vulgaris</i>), barren strawberry (<i>Potentilla sterilis</i>) and common dog violet (<i>Viola riviniana</i>). Some of the hedgerows in TR4 have been more recently planted or supplemented (are less than 30 years old).</p>
<p><b>Species rich intact hedgerow</b></p> <p>There are two species-rich hedgerows within TR4, H3 and H4, both within the northern survey area. These hedgerows have a number of woody species including hawthorn, blackthorn, field maple, hazel, holly, pedunculate oak, rose species, field maple, sycamore and elder. They are situated at the boundary of grazed fields and connect to a broadleaved woodland at the south. No notable ground flora species were recorded.</p>
<p><b>Wall</b></p> <p>Dry stone walls are present rarely as land boundaries within TR4.</p>
<p><b>Dry ditch</b></p> <p>A small number of minor ditches were noted within TR4, at field margins and within marshy grassland, which were dry at the time of survey.</p>
<p><b>Ephemerals and short perennials</b></p> <p>Extensive areas of ephemerals and short perennials are present within the Waddington Fell Quarry complex (TR4.TN56 and TN62), at these locations it is colonising in the locations of former lagoons or forms a mosaic with other habitats, including bare ground, scattered scrub and dry dwarf shrub heath. Species include immature willow scrub, soft rush, crowberry, ling heather, rosebay willowherb (<i>Chamaenerion angustifolium</i>), several sedge species, birch saplings (<i>Betula</i> spp.), sheep fescue, ragwort (<i>Jacobaea vulgaris</i>), coltsfoot (<i>Tussilago farfara</i>), marsh thistle (<i>Cirsium palustre</i>),</p>

<p>New Zealand willowherb (<i>Epilobium brunnescens</i>), male fern and sheep sorrel (<i>Rumex acetosella</i>). The area is unmanaged and has naturally self-seeded from the surrounding landscape. There is a diverse structure.</p>
<p><b>Bare ground</b></p> <p>Bare ground includes hardstanding, gravel and bare earth. It is infrequent in the survey area, and is largely associated with roads, farm tracks and parking areas etc.</p>
<p><b>Acid/Neutral other exposure</b></p> <p>Small areas of rock exposure protrude through the surface on a steep slope within land at Waddington Quarry (TR4.TN67). Rocks are sparsely vegetated with ling heather, foxglove, bilberry and cowberry (<i>Vaccinium vitis-idaea</i>).</p>
<p><b>Quarry</b></p> <p>Quarry floor consisting of exposed rock, land slips and spoil mounds (sand, gravel, silt). The habitat is largely devoid of life being newly/recently exposed rock, however, occasionally there are scattered ephemeral / short perennial colonisers which include New Zealand willowherb, marsh thistle, common daisy (<i>Bellis perennis</i>), rosebay willowherb, Yorkshire fog, <i>Polytrichum</i> moss, sheep's fescue, wavy hair grass, and ragwort, where substrates enable the establishment of vegetation. There are pools of standing water from collected rainfall. These do not contain any emergent or submerged vegetation.</p>
<p><b>Buildings</b></p> <p>A small number of buildings are present in the survey area (e.g. TR4.TN1, TN2, TN5, TN9, TN18, TN19, TN25, TN27, TN28). Some of these are operational buildings others are disused and, in some cases, dilapidated barns/agricultural buildings. Occupied residential buildings are also present, some associated with farms.</p>

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## Appendix B. Target Notes Report

1 Project Details			
Project Name:	Haweswater Aqueduct Resilience Programme	Project Number:	80061155
Written:	Ellen Milner, <i>Principal Ecologist</i> Eve Loxham, <i>Ecologist</i>	Approved:	Claire Wilson, <i>Principal Ecologist</i> Alice Helyar, <i>Principal Ecologist</i>
Report reference:	TR4 Target Note Report V1 TR4 Target Note Report V2	Date:	14/10/2019 17/06/2020
2 Project Drawings			
TR4 Phase 1 Plans Proposed Marl Hill Section Sheets 1 to 7		BOW167_HARP_9.5_PH1_TR4	
3 Ecology Surveys			
Surveyors:	Eve Loxham MBiolSci (Hons), GradCIEEM Mark Breaks BSc (Hons) Ellen Milner MA, MRes, CEnv, MCIEEM Sophie King MSc, BSc Catrin Watkin MRes, BSc (Hons) Abigail Hamer BSc (Hons)		
Survey date(s):	18/07/2019, 31/07/2019, 07/08/2019, 08/08/2019, 10/10/2019, 20/11/2019, 27/11/2019, 06/02/2020, 14/05/2020, 19/05/2020, 20/05/2020.		
Survey Method:	<p>The extended Phase 1 habitat survey followed standard methodology (JNCC, 2010 and CIEEM, 2013). All features of ecological significance were target noted and a colour coded map of the habitats on site has been produced.</p> <p>Buildings and structures were assessed in accordance with Collins, 2016 with regard to the potential to support bat roosts.</p> <p>Habitat Condition has been assessed in accordance with Natural England Biodiversity Metric (July 2019).</p>		
Weather Conditions:	<p>18/07/2019 – Cloud cover (3/8), Wind Beaufort F3, 19 °C, no precipitation.</p> <p>31/07/2019– Cloud cover (2/8), Wind Beaufort F2, 20 °C, no precipitation.</p> <p>07/08/2019– Cloud cover 6/8, Wind Beaufort F3, 22°C, no precipitation.</p> <p>08/08/2019– Cloud cover (2/8), Wind Beaufort F2, 20 °C, no precipitation.</p> <p>10/10/2019– Cloud cover (7/8), Wind Beaufort F3-5, 11°C, no precipitation.</p> <p>20/11/2019 – Cloud cover (5/8), Wind Beaufort F3, 5°C, no precipitation.</p> <p>27/11/2019 – Cloud cover (4/8), Wind Beaufort F2, 10°C, no precipitation.</p> <p>06/02/2020 – Cloud cover (4/8), Wind Beaufort F2, 6°C, light rain.</p> <p>14/05/2020 - Cloud cover (4/8), Wind Beaufort F1, 9°C, no precipitation.</p> <p>19/05/2020 – Cloud cover (3/8), Wind Beaufort F0-2, 14°C, no precipitation.</p> <p>20/05/2020 - Cloud cover (0/8), Wind Beaufort F0-2, 20°C, no precipitation.</p>		
Limitations to the survey:	The surveys were carried out between July 2019 and May 2020.		

Densely planted coniferous trees, dense understory vegetation or dense scrub within some woodlands prevented a thorough internal inspection of the habitat to determine the presence of badger setts. This is not considered a significant limitation since further survey for badger sett presence is required once the development boundary/route option is finalised and prior to works commencing. The optimal time for badger sett surveys is autumn and spring. During summer, dense vegetation growth can inhibit the visibility of sett entrances. During winter, badger activity is reduced. This is not considered a significant limitation due to further survey requirements as explained above.

Summer months are considered sub-optimal for ground level roost assessment of trees (Collins, 2016). This is due to foliage obscuring parts of the tree. Where this limitation applies, further survey during the optimal months is recommended.

Buildings were assessed from outside elevations only for bat roosting potential.

Optimal survey months for Phase 1 Habitat Surveys vary between habitat types, e.g. woodlands are best surveyed in spring, grasslands in mid-summer and heathlands in autumn. Where habitats were not surveyed during the optimal time of year, these have been recorded within the target note as requiring further survey.

At the edge of access boundaries, surveys of boundary features (e.g. tree lines, watercourses, hedgerows) were only possible from one elevation. Once the development boundary/route option is finalised, further survey may be required.

#### 4 Target notes

TR4.TN1	
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Single storey, stone operations building with a pitched gable roof. The roof tiles and ridge tiles are concrete with a light covering of moss. There are some gaps at the roof edge and ventilation gaps over the door lintel on the gable end that are partially cobwebbed. There are also ventilation blocks in the stonework. There is a potential access gap for bats at the ridge, and there are gaps along the building sides beneath fascia boards, which are 5 cm wide. The gaps may allow access into the roof void (if present) or building interior. There are scattered raised tiles which may also provide an access point for bats. There is a large circular ventilation window at the gable with direct access to a mixed woodland linear feature. This building has moderate potential to support a bat roost.

Habitat Condition: Not applicable (no assessment required)

TR4.TN2	
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A small, single-storey, pitched roof operations building with rendered walls and a stone tiled roof. There is potential



internal access for bats and birds via a partially open window on the southern elevation. There are scattered gaps beneath lifted stone roof slabs. In general, the rendering is in poor condition but there are no gaps of sufficient size for bats to access. The building is well sealed at the roof verge. There is a potential gap beneath the ridge tile and a horizontal gap at the ridge tile edges. Overall, it has low roosting potential for bats.

Habitat Condition: Not applicable (no assessment required)

TR4.TN3



An area of marshy grassland dominated by compact rush (*Juncus conglomeratus*) and soft rush (*Juncus effusus*) with Yorkshire fog (*Holcus lanatus*), perennial rye grass (*Lolium perenne*), white clover (*Trifolium repens*), creeping thistle (*Cirsium arvense*), common nettle (*Urtica dioica*) and creeping buttercup (*Ranunculus repens*). The grassland is not a particularly species-rich example of the habitat. Potential for brown hare (*Lepus europaeus*) laying up sites/forms and ground nesting birds.




Habitat Condition (provisional): Moderate (Score 2)




TR4.TN4



A small area of semi-improved neutral grassland with an undulating topography and a tall sward (no evidence of management through mowing or grazing). It is species rich and the species composition includes wavy hair grass (*Deschampsia flexuosa*), cock's-foot (*Dactylis glomerata*), Yorkshire fog, white clover, red clover (*Trifolium pratense*), meadow vetchling (*Lathyrus pratensis*), meadow buttercup (*Ranunculus acris*), selfheal (*Prunella vulgaris*), ribwort plantain (*Plantago lanceolata*), creeping buttercup, broad-leaved dock (*Rumex obtusifolius*) and meadow foxtail (*Alopecurus pratensis*). An abundance of invertebrates was noted during the survey. Suitable habitat for small mammals and nesting birds.

Habitat Condition (provisional): Moderate (Score 2)

<p>TR4.TN5</p>		
<p>A single storey but tall operational building. The building is a well-sealed stone building with a pitched roof comprising stone tiles. There are ventilation slats on the windows which are well sealed. There are small gaps beneath the roof slates and thin ventilation gaps beneath the door lintel. Sections of the wall are rendered and painted. There is a slim vertical gap beneath south western corner fascia over the corner stone. Overall, the building has low roosting potential for bats.</p> <p>Habitat Condition: Not applicable (no assessment required)</p>		
<p>TR4.TN6</p>		
<p>Mixed plantation woodland. The canopy comprises sycamore (<i>Acer pseudoplatanus</i>), alder (<i>Alnus glutinosa</i>), rowan (<i>Sorbus aucuparia</i>) and Scots pine (<i>Pinus sylvestris</i>). The understory comprises dominant common gorse (<i>Ulex europaeus</i>) with some hawthorn (<i>Crataegus monogyna</i>). The ground flora includes foxglove (<i>Digitalis purpurea</i>), bramble (<i>Rubus fruticosus</i> agg.), Yorkshire fog, common bent (<i>Agrostis capillaris</i>) and wavy hair grass. The habitat is suitable for the excavation of badger (<i>Meles meles</i>) setts (although no evidence of badger found). It also provides breeding bird habitat, trees with potential bat roosting habitat and terrestrial habitat for amphibians.</p> <p>Habitat Condition (provisional): Moderate (Score 2)</p>		
<p>TR4.TN7</p>		
<p>An area of relatively unmanaged species-poor semi-improved grassland with a tall sward which has encroaching Himalayan balsam (<i>Impatiens glandulifera</i>) (Schedule 9, Wildlife and Countryside Act, 1981 as amended) from nearby watercourse (TR4.WC1). Potential for brown hare laying up sites/forms.</p> <p>Habitat Condition (provisional): Poor (Score 1)</p>		

TR4.TN8		
<p>Brown hare observed in marshy grassland. Potential for laying up sites/forms. Potential for ground nesting birds. Habitat Condition: Not applicable (no assessment required)</p>		
TR4.TN9		
<p>A traditional stone barn with a pitched stone tile roof and stone ridge tiles. There are multiple gaps beneath the roof tiles and between the wall masonry where there are gaps in the mortar. There are suitable access points for birds and bats via large gaps above the loosely fitting timber barn doors. Overall the building is considered to have moderate potential to support a bat roost due to it being located exposed in the landscape (on a windy hill) but with good connectivity via nearby trees. Scattered Himalayan balsam is present around building. A barn owl (<i>Tyto alba</i>) (Schedule 1 Wildlife and Countryside Act, 1981 as amended) roost was confirmed to be present within the building – five pellets and white dropping splashes were found at the barn door on the eastern elevation, and an adult was observed leaving the barn on 31.07.2019. The building also provides potential for other nesting birds. Habitat Condition: Not applicable (no assessment required)</p>		
TR4.TN10	No photo.	
<p>Curlew (<i>Numenius arquata</i>) heard calling in field north of building described at TR4.TN9. Potential for ground nesting birds. Habitat Condition: Not applicable (no assessment required)</p>		
TR4.TN11		
<p>Mixed plantation woodland; the central area is planted with several conifer species, with rare rowan and alder. The boundary of the plantation is planted with beech (<i>Fagus sylvatica</i>) and elder (<i>Sambucus nigra</i>). It is closely planted but</p>		

internally it is bright and open, with much light reaching the woodland floor. The understory is dominated by holly (*Illex aquifolium*) scrub, with numerous fallen trees. The ground flora comprises piles of brash, tufted hair-grass (*Deschampsia cespitosa*), common nettle, lady fern (*Athyrium filix-femina*) and bramble. There is a central access path through the woodland and a pheasant coup fenced off in the centre of the woodland. The central area is densely vegetated with Schedule 9 invasive species; rhododendron (*Rhododendron* sp.) and Himalayan balsam. The woodland provides suitable habitat for nesting birds and has potential for badger sett excavation (although no evidence of badger was found), along with terrestrial habitat for amphibians. The woodland also provides suitable roosting, foraging and commuting habitat for bats.

Habitat Condition (provisional): Poor (Score 1)




TR4.TN12	
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Mixed plantation woodland fenced off and intersected by a private road. Canopy species include silver birch (*Betula pendula*) and oak (*Quercus* sp.). There has been some replanting with hornbeam (*Carpinus betulus*), hazel (*Corylus avellane*) and holly. The ground flora is dominated by tufted hair grass and the understory is absent. With the exception of the additional planting, the woodland appears unmanaged. Bird boxes are present throughout with nesting species every year (anecdotal evidence from the landowner). The woodland is open and bright with abundant light reaching the woodland floor. South of the access road the canopy species are similar with additional sycamore and Scots pine. Some trees have features which could be used by roosting bats, though these are limited due to the age of the trees. the woodland also provides suitable foraging and commuting habitat for bats, nesting bird habitat and terrestrial habitat for amphibians.




Habitat Condition (provisional): Moderate (Score 2)




TR4.TN13	
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Species-rich semi-improved neutral grassland with a number of acid indicators present. The grassland is dominated by tufted hair grass. The grassland lies on a gentle north facing slope and is subject to light sheep and cattle grazing. There are sections which are occasionally managed through strimming but otherwise it is uncut throughout the year. Species include Yorkshire fog, tormentil (*Potentilla erecta*), heath bedstraw (*Galium saxatile*), compact rush, soft rush, sharp flowered rush (*Juncus acutiflorus*), marsh thistle (*Cirsium palustre*), sedges, bird's-foot trefoil (*Lotus corniculatus*), star sedge (*Carex echinate*), marsh willowherb (*Epilobium palustre*), common bent, purple moor grass (*Molinia caerulea*), white clover, water mint (*Mentha aquatica*), meadowsweet (*Filipendula ulmaria*), lesser spearwort (*Ranunculus flammula*), lesser stitchwort (*Stellaria graminea*), marsh valerian (*Filipendula ulmaria*), marsh bedstraw (*Galium palustre*), hard rush (*Juncus inflexus*), yarrow (*Achillea millefolium*), quaking grass (*Briza media*), selfheal, ribwort plantain, barren strawberry (*Potentilla sterilis*), red clover and crested dog's-tail (*Cynosurus cristatus*). It was invertebrate rich and the land occupier has confirmed brown hare and hedgehog (*Erinaceus europaeus*) to be present. Potential for ground nesting birds.

Habitat Condition (provisional): Good (Score 3)	
TR4.TN14	
<p>Two small scrapes within the grassland described at TR4.TN13 with a shallow water level which dry out in some years. Species include marsh willowherb, jointed rush (<i>Juncus articulatus</i>), bulbous rush (<i>Juncus bulbosus</i>), lesser spearwort, common spike rush (<i>Eleocharis palustris</i>), marsh speedwell (<i>Veronica scutellata</i>), common yellow sedge (<i>Carex demissa</i>), forget-me-not species (<i>Myosotis</i> sp.), mat-grass (<i>Nardus stricta</i>), glaucous sedge (<i>Carex flacca</i>), marsh arrowgrass (<i>Triglochin palustris</i>), carnation sedge (<i>Carex panicea</i>), sneezewort (<i>Achillea ptarmica</i>), common mouse ear (<i>Cerastium fontanum</i>) and horsetail species (<i>Equisetum</i> sp.). It is occasionally managed to clear excessive vegetation growth and dead plant matter, and periodical habitat management is carried out to enhance diversity. The land occupier confirms that palmate newt (<i>Lissotriton helveticus</i>), common frog (<i>Rana temporaria</i>) and common toad (<i>Bufo bufo</i>) are known to utilise the scrapes. Dragonfly and damselflies are also present. Potential for ground nesting birds.</p>	
Habitat Condition (provisional): Good (Score 3)	
TR4.TN15	
<p>Approximately five scrapes within semi-improved neutral grassland, which have been purposefully excavated for lapwing (<i>Vanellus vanellus</i>) breeding. The scrapes are shallow (approx. 20 to 40cm) and periodically dry throughout the summer. Water enters the scrapes from the adjacent access road, filling the eastern pool first, then soaking westwards. There is some flow between the scrapes and an oily film on the water surface. The land occupier confirms common toad and common frog are frequently observed along the roadside. Plant species present include brooklime (<i>Veronica beccabunga</i>), floating sweet grass (<i>Glyceria fluitans</i>), soft rush, water mint, lesser spearwort, water starwort species (<i>Callitriche</i> sp.), bulbous rush, jointed rush and horsetail species.</p>	
Habitat Condition (provisional): Good (Score 3)	
TR4.TN16	

<p>A traditional hay meadow which has been restored. The meadow is cut once per year, after 15<sup>th</sup> July, with no fertiliser added and it is lightly sheep grazed. Species include yellow rattle (<i>Rhinanthus minor</i>), common mouse ear, creeping thistle, bird's-foot trefoil, meadow buttercup, common sorrel (<i>Rumex acetosa</i>), eyebright species (<i>Euphrasia</i> sp.), ribwort plantain, sweet vernal grass (<i>Anthoxanthum odoratum</i>), meadow foxtail, Yorkshire fog, crested dog's-tail, common yellow sedge, meadow vetchling, common bent, Timothy (<i>Phleum pratense</i>), creeping bent (<i>Agrostis stolonifera</i>), meadow grass species (<i>Poa</i> sp.), meadowsweet, horsetail species, heath bedstraw, lesser stitchwort, marsh thistle, lesser celandine (<i>Ficaria verna</i>), autumn hawkbit (<i>Scorzoneroides autumnalis</i>) and sneezewort. Potential for ground nesting birds, and small mammals at the edges which are left uncut.</p> <p>Habitat Condition (provisional): Good (Score 3)</p>	
TR4.TN17	
<p>Brown hare flushed northwards into tall grasses – potential for laying up sites and forms. Potential for ground nesting birds.</p> <p>Habitat Condition: Not applicable (no assessment required)</p>	
TR4.TN18	No photo
<p>Stone house and barn with associated outbuildings. The building complex is known to support breeding barn owl (Schedule 1 Wildlife and Countryside Act, 1981 as amended) and roosting bats. Other nesting birds are also present (non-Schedule 1).</p> <p>Habitat Condition: Not applicable (no assessment required)</p>	
TR4.TN19	
<p>Farm building, known breeding barn owl (Schedule 1 Wildlife and Countryside Act, 1981 as amended). Potential for other nesting birds and roosting bats.</p> <p>Habitat Condition: Not applicable (no assessment required)</p>	

<p>TR4.TN20</p>	
<p>A botanically interesting semi-improved neutral grassland roadside verge with scattered hawthorn scrub present. The verge is located on a steep earth bank vegetated with barren strawberry, primrose (<i>Primula vulgaris</i>), violet (<i>Viola</i> sp.), ribwort plantain, field woodrush (<i>Luzula campestris</i>), heath bedstraw, common mouse ear, germander speedwell (<i>Veronica chamaedrys</i>), fescue sp. (<i>Festuca</i> sp.), common bent, crested dog's-tail and perennial rye grass. There is a dry ditch to the south which supports wetland species including water mint and rush species.</p> <p>Habitat Condition (provisional): Good (Score 3)</p>	
<p>TR4.TN21</p>	
<p>Broadleaved woodland, with some small stands of conifer species, surrounding a small brook (TR4.WC5). The topography is a mixture of gentle slopes down to the watercourse and steep earth banks. Canopy species include oak, ash (<i>Fraxinus excelsior</i>), larch (<i>Larix</i> sp.), elm (<i>Ulmus</i> sp.) species and sycamore. The understorey layer is developed and comprises scattered hawthorn. The ground flora is grassy and includes English bluebell (<i>Hyacinthoides non-scripta</i>), moschatel (<i>Adoxa moschatellina</i>), fern species, ramsons (<i>Allium ursinum</i>), wood avens (<i>Geum urbanum</i>), wood sorrel (<i>Oxalis acetosella</i>), enchanter's nightshade (<i>Circaea lutetiana</i>), remote sedge (<i>Carex remota</i>), giant fescue (<i>Festuca gigantea</i>), false brome (<i>Brachypodium sylvaticum</i>) and dog's mercury (<i>Mercurialis perennis</i>). Some deadwood is also present throughout the understory. Bird boxes are installed throughout and along with the trees and scrub, providing nesting habitat. The woodland also provides potential bat roosting, foraging and commuting habitat and terrestrial habitat for invertebrates and amphibians.</p> <p>Habitat Condition (provisional): Good (Score 3)</p>	
<p>TR4.TN22</p>	
<p>Species-rich semi-improved neutral grassland located on steep sloping banking bank adjacent to a brook. The grassland is also lightly grazed by cattle. Species present include upright hedge parsley (<i>Torilis japonica</i>), herb Robert (<i>Geranium</i></p>	

<p><i>robertianum</i>), scarlet pimpernel (<i>Anagallis arvensis</i>), giant fescue, sweet vernal grass, tormentil, wood sorrel, water avens (<i>Geum rivale</i>) and crested dog's-tail. Potential for ground nesting birds and small mammals.</p> <p>Habitat Condition (provisional): Good (Score 3)</p>	
<p>TR4.TN23</p>	
<p>Species-rich semi-improved neutral grassland with yarrow, common mouse ear, barren strawberry, common bent, white clover, creeping thistle, Yorkshire fog, sweet vernal grass, ribwort plantain, bird's-foot trefoil, cock's-foot, field woodrush, hairy sedge (<i>Carex hirta</i>), red fescue (<i>Festuca rubra</i>), quaking grass, red clover, crested dog's-tail, eyebright species, tormentil, mouse ear hawkweed (<i>Pilosella officinarum</i>), fairy flax (<i>Linum catharticum</i>) and great burnet (<i>Sanguisorba officinalis</i>). Potential for ground nesting birds at top of slope on level ground.</p> <p>Habitat Condition (provisional): Good (Score 3)</p>	
<p>TR4.TN24</p>	
<p>Mixed plantation woodland. Canopy species include alder, sessile oak (<i>Quercus petraea</i>), sycamore, Scots pine and ash. The understory is mostly absent apart from scattered hawthorn at the woodland edges. The ground flora is grassy, dominated by tufted hair grass. There is abundant deadwood on the ground. The woodland gently slopes to the north. The woodland is bright and airy internally, with light penetrating to the woodland floor. The habitat has potential for nesting birds, terrestrial habitat for amphibians, brown hares and roosting/foraging bats.</p> <p>Habitat Condition (provisional): Moderate (Score 2)</p>	
<p>TR4.TN25</p>	
<p>A double storey stone barn with a pitched, slated roof. There are multiple lifted slates and a gap under the ridge tile on the southwestern elevation which are suitable for bats. There is also a gap and a cavity between stonework on the south-western elevation. A double window on the southern elevation has no glass pane and is a good entry point for</p>	



bats and barn owls. There is also an open doorway and windows on the eastern elevation. The roof is unlined internally. Overall the building has moderate bat roosting potential. There is also potential for breeding barn owl and other nesting birds.

Habitat Condition: Not applicable (no assessment required)

TR4.TN26	
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Brown hare flushed out of marshy grassland /nettles adjacent to the pump house.  
Habitat Condition: Not applicable (no assessment required)

TR4.TN27	
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Moderately sized and tall, single storey pump house with a pitched and offset gable roof. The walls are stone and the roof and ridge tiles are slate. A section of mortar has flaked off on the eastern gable end, however the resulting gap is infilled and does not lead to a cavity. The building is well sealed with negligible potential for roosting bats.




Habitat Condition: Not applicable (no assessment required)

TR4.TN28	
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A single storey brick rendered building with a shallow pitched roof. The roof and ridge tiles are stone. There is a scattering of moss along the ridge tiles. There are multiple, narrow gaps between the stone tiles with suitability for roosting bats. The stone roof tile edges have large horizontal gaps at the gable ends. Overall the building has low to moderate bat roosting potential.

Habitat Condition: Not applicable (no assessment required)

TR4.TN29	
<p>Species-poor semi-improved grassland with scattered patches of soft rush on level ground or very gentle southward sloping ground. The grassland is grazed by sheep and the sward is short. Suitable ground nesting bird and brown hare laying up/forms habitat.</p> <p>Habitat Condition (provisional): Poor (Score 1)</p>	
TR4.TN30	
<p>Broadleaved plantation woodland on a steep south facing slope. Canopy species include alder and hawthorn, all of which are immature. There is no understory, and the groundflora is grassland dominated. Potential habitat for nesting birds, foraging bats, large mammals (including badger) and small mammals. This woodland surrounds a coniferous plantation woodland in the centre (TR4.TN31) and is partially fenced off from the surrounding grazed fields.</p> <p>Habitat Condition (provisional): Moderate (Score 2)</p>	
TR4.TN31	
<p>Coniferous woodland plantation. Canopy is dominated by Scots pine. Understory is sparse but locally dominant Rhododendrons (Schedule 9 of the Wildlife and Countryside Act 1981, as amended) and holly present. Ground flora is grassland dominated by tufted hair grass, with honeysuckle (<i>Lonicera periclymenum</i>), wood sorrel and soft rush. Potential habitat for nesting birds, small mammals, large mammals (including badger) and foraging/commuting bats. The ground is generally flat but gently slopes south and east towards TR4.WC3. The woodland is partially fenced off from the surrounding grazed fields. Scattered fallen trees and deadwood are present, particularly at the eastern edge.</p> <p>Habitat Condition (provisional): Poor (Score 1)</p>	

<p>TR4.TN32</p>	
<p>Marshy grassland on a gentle southward sloping field. Species include 50% rush cover, marsh thistle, Yorkshire fog, bent species (<i>Agrostis</i> sp.), jointed rush, strawberry species (<i>Potentilla</i> sp.), springy turf moss (<i>Rhytidiadelphus squarrosus</i>), common sorrel, ribwort plantain, tufted hair grass, mat grass and fescue species. There are marshy seepages throughout gullies which hold small amounts of water. The area is lightly sheep grazed. Potential habitat for nesting birds, small mammals, terrestrial habitat for amphibians and brown hare.</p> <p>Habitat Condition (provisional): Moderate (Score 2)</p>	
<p>TR4.TN33</p>	
<p>Former plantation woodland which has been felled and there is regeneration of alder (immature), with dense bramble dominated scrub. Several of the felled trees are laid flat and there is an abundance of deadwood. The habitat is on a gentle south facing slope. Roe deer (<i>Capreolus capreolus</i>) identified within the habitat. Additional vegetative species include; foxglove, willowherb species, soft rush, gorse, marsh thistle, lady fern, springy turf moss and Yorkshire fog. Potential for brown hare, nesting birds, small mammals, large mammals (including badger foraging, but not sett establishment due to the waterlogged ground), foraging bats and amphibian habitat.</p> <p>Habitat Condition (provisional): Moderate (Score 2)</p>	
<p>TR4.TN34</p>	
<p>Brown hare flushed from TR4.H8. Suitable habitat for laying up/forms.</p> <p>Habitat Condition (provisional): Not applicable (no assessment required)</p>	




TR4.TN35	
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Snipe (*Gallinago gallinago*) flushed adjacent to TR4.WC11. Suitable habitat for wintering and ground nesting birds.  
 Habitat Condition (provisional): Not applicable (no assessment required)




TR4.TN36	
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Mature coniferous plantation woodland on an eastern-facing slope close to Bashall Brook (TR4.WC15). The planting lines and gullies between rows are visible. There is a small amount of fallen trees and deadwood. There is no understory or ground flora; the woodland floor comprises scattered brash and leaf litter. The woodland is not fenced off and there is an abundance of sheep droppings. The trees are lichen-rich. There are concentrations of bird droppings on several of the tree trunks and an owl pellet was identified. A brown hare was flushed from the edges of the woodland during the survey. Potential for brown hare and nesting birds.

Habitat Condition (provisional): Poor (Score 1)




<p>TR4.TN36a</p>	
<p>A mature stand of Rhododendron (Schedule 9 of the Wildlife and Countryside Act 1981, as amended). Habitat Condition (provisional): Poor (Score 1)</p>	
<p>TR4.TN37</p>	
<p>Small block of mostly coniferous woodland, with some broadleaved trees (including oak and silver birch). The understory comprises holly and bramble. The groundflora consists of male fern, wood sorrel, bracken, herb Robert, broad buckler fern and an abundance of leaf litter. The woodland is present at the side of the road and is partially fenced off. Potential habitat for large mammals (including badger), nesting birds, brown hare and foraging/commuting/roosting bats. Habitat Condition (provisional): Moderate (Score 2)</p>	
<p>TR4.TN38</p>	
<p>Semi-improved neutral grassland on steep, west facing slope beneath scattered mature oak trees. The grassland is more species-rich than the adjacent grassland, likely due to reduced grazing pressure and nutrient retention, being on a steep slope. Species identified include lesser celandine, barren strawberry, tufted hair grass, opposite-leaved golden saxifrage (<i>Chrysosplenium alternifolium</i>), ragwort (<i>Jacobaea vulgaris</i>), bent species, creeping thistle, stitchwort species (<i>Stellaria</i> sp.), <i>Polytrichum</i> species, dog's mercury and an abundance of bryophytes. Potential habitat for nesting birds. Habitat Condition (provisional): Moderate (Score 2)</p>	




<p>TR4.TN39</p>		
<p>Brown hare flushed from area of tall ruderal. The tall ruderals appear to have established in an area of disturbed ground.. Suitable habitat for brown hare laying up / forms and nesting birds.</p> <p>Habitat Condition (provisional): Poor (Score 1)</p>		
<p>TR4.TN40</p>		
<p>Mixed plantation woodland comprising semi-mature Scots pine, ash, cherry (<i>Prunus avium</i>), larch and alder. The understory is sparse and species noted comprise holly and gorse scrub. The groundflora is grassland dominated at the western edge with Yorkshire fog, meadow grass species, lesser celandine, bramble and bracken. The woodland borders TR4.WC1 and is fenced off from the surrounding grasslands, preventing access by grazing animals. Protected species potential include bats (foraging/commuting/roosting), badger setts, nesting birds, brown hare refugia and otter laying up sites.</p> <p>Habitat Condition (provisional): Poor (Score 1)</p>		
<p>TR4.TN41</p>		
<p>Semi-mature mixed plantation woodland to the north of an access track which is fenced off and separated from TR4.TN40. Canopy species comprise Scots pine, silver birch, larch and alder. The understory is dominated by mature and dense rhododendron growth (Schedule 9 Wildlife and Countryside Act 1981, as amended), which is up to 5 m in height. The ground flora is sparse and grassland dominated; species present include Yorkshire fog, common sorrel and creeping buttercup. There is also an abundance of leaf litter. This woodland borders the northern section of TR4.WC16. Potential habitat for bats (foraging/commuting/roosting), badger setts, nesting birds, brown hare refugia and otter laying up sites.</p> <p>Habitat Condition (provisional): Poor (Score 1)</p>		


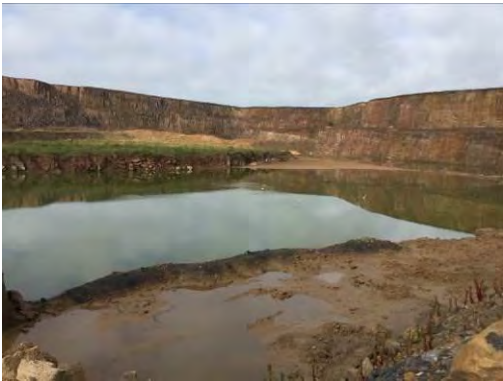
<p>TR4.TN42</p>	
<p>A small, roughly square, fenced off area of mixed plantation woodland surrounded by species-poor semi-improved grassland (sheep grazed). The canopy species include Scots pine, larch and ash. The understory comprises holly and rhododendron (Schedule 9 Wildlife and Countryside Act 1981, as amended) and the ground flora is grassland dominated with some scattered bramble. Protected species potential for bats, nesting birds, brown hare and badger.</p> <p>Habitat Condition (provisional): Poor (Score 1)</p>	
<p>TR4.TN43</p>	
<p>Large pile of manure adjacent to the access track which is leeching pollutants into the surrounding grassland.</p> <p>Habitat Condition (provisional): Not applicable (no assessment required)</p>	
<p>TR4.TN44</p>	
<p>Small area of standing water in a small depression between the access track and tree line. The area is overgrown with grass and rushes, with occasional duckweed (<i>Lemna</i> sp.) present. Potential for amphibians, however, it may dry out during periods of dry weather.</p> <p>Habitat Condition (provisional): Poor (Score 1)</p>	

<p>TR4.TN45</p>	
<p>Badger print within soft mud along the access track adjacent to TR4.WC18.  Habitat Condition (provisional): Not applicable (no assessment required)</p>	
<p>TR4.TN46</p>	
<p>Badger print within mud along access track.  Habitat Condition (provisional): Not applicable (no assessment required)</p>	
<p>TR4.TN47</p>	
<p>Mixed plantation woodland surrounding TR4.WC19. Canopy species comprise conifer species, larch and alder. Understorey is dense holly and rhododendron (Schedule 9 Wildlife and Countryside Act 1981, as amended). The ground flora includes bramble, snow drops, coarse grass species (e.g. cock's foot) and Himalayan balsam (Schedule 9 Wildlife and Countryside Act 1981, as amended). Protected species potential for badger, nesting birds, commuting bats, refugia for brown hare and lay up sites for otter.  Habitat Condition (provisional): Poor (Score 1)</p>	









<p>TR4.TN48</p>	
<p>Small are of Himalayan balsam (Schedule 9 Wildlife and Countryside Act 1981, as amended) growing adjacent to wTR4.WC19. Area is approximately 2 m<sup>2</sup> just beyond the northern side of the fence.</p> <p>Habitat Condition (provisional): Poor (Score 1)</p>	
<p>TR4.TN49</p>	
<p>Large pile of spoil and manure which is adjacent to the access track and is leeching pollutants into the surrounding grassland.</p> <p>Habitat Condition (provisional): Not applicable (no assessment required)</p>	
<p>TR4.TN50</p>	
<p>Dry dwarf shrub heath surrounding ponds (TR4.P16 and TR4.P17) and is the dominant habitat in the area. The area is unmanaged (the heather is not burnt or maintained), and on relatively flat ground surrounding the ponds, although it slopes upwards to the west, and downwards to the east. Dominant species is ling heather (<i>Calluna vulgaris</i>), with abundant bilberry (<i>Vaccinium myrtillus</i>), and a carpet of mosses (rarely <i>Sphagnum</i>s), several sedge species, mat grass, crowberry (<i>Empetrum nigrum</i>), willowherb species, foxglove, broadleaved dock, bracken, some immature self-seeded rowan and willow, red fescue, heath woodrush (<i>Luzula multiflora</i>) and wavy hair grass. The heather shrub is mature and all of a similar age. Potential for nesting birds, foraging bats, small mammals, amphibians, reptiles and otter lay-up sites. An abundance of predated frogs and toads were note at the water edge and hundreds of tadpoles are present within the ponds.</p> <p>Habitat Condition (provisional): Moderate (Score 2)</p>	




<p>TR4.TN51</p>	
<p>Unmanaged habitat mosaic including semi-improved grassland, marshy grassland and scattered dry dwarf shrub heath. Dominant species include soft rush, foxglove, Yorkshire fog with additional male fern, hard fern (<i>Blechnum spicant</i>), red fescue, marsh thistle, ling heather, <i>Polytrichum</i> mosses, heath woodrush, heath bedstraw and compact rush. Potential habitat for nesting birds, small mammals, foraging bats, amphibians, reptiles, otter lay-up sites.</p> <p>Habitat Condition (provisional): Moderate (Score 2)</p>	
<p>TR4.TN52</p>	
<p>Unmanaged, dense and continuous bracken which extends down the slope (facing south-east). Potential for nesting birds, small mammals, amphibians, reptiles and otter lay-up sites. There are scattered willow scrub trees within the bracken along with grass species and scattered heather.</p> <p>Habitat Condition (provisional): Moderate (Score 2)</p>	
<p>TR4.TN53</p>	
<p>Rhododendron (Schedule 9 Wildlife and Countryside Act 1981, as amended) shrub at the pond edge.</p> <p>Habitat Condition (provisional): Poor (Score 1)</p>	

<p>TR4.TN54</p>	
<p>Waddington quarry. The rock face extends around the site for approximately 1 km and the average approximate height is 30 m. This quarry has been operational since the 1960s and is therefore inactive in some areas where quarrying has finished, e.g. the northern section of the quarry appears to be less frequently accessed. Vegetation growth within the quarry face itself is sparse and consists of ferns and scattered willow scrub. There is an abundance of fractures within the rock face which orientate are randomly orientated and are of a range of sizes and depths. These provide suitable potential habitat for nesting birds and roosting bats. The majority of the quarry face is exposed within the landscape; however, some areas are sheltered from the prevailing wind by protruding rocks or natural curves within the rock face. Shallow sloping areas of the quarry face may also be suitable for reptiles.</p> <p>Habitat Condition (provisional): Moderate (Score 2)</p>	
<p>TR4.TN55</p>	
<p>Large expanse of open water at the base of the quarry, roughly 200 m by 100 m. A large number of gull species were present at the time of the survey, likely nesting on the adjacent spoil heaps. The water does not appear to support any emergent vegetation and is collected rainwater. This area provides a useful resource for foraging bats, nesting birds, amphibians and reptiles, using nearby habitats.</p> <p>Habitat Condition (provisional): Poor (Score 1)</p>	

<p>TR4.TN56</p>	
<p>Mid succession, vegetated former lagoon. This area is a large, flat expanse which stretches into the centre of the quarry. The habitats are a mosaic and include bare ground, scattered scrub, ephemeral / short perennial, and dry dwarf shrub heath. species include immature willow scrub, soft rush, crowberry, ling heather, rosebay willowherb, several sedge species, birch saplings, sheep fescue, ragwort, coltsfoot (<i>Tussilago farfara</i>), marsh thistle, New Zealand willowherb (<i>Epilobium brunnescens</i>), male fern and sheep sorrel. Suitable for nesting birds, small mammals, reptiles and foraging bats. The area is unmanaged which has naturally self-seeded from the surrounding landscape. There is a diverse structure, with some areas bare ground and others dense scrub. Rabbit (<i>Oryctolagus cuniculus</i>) or brown hare footprints were identified along with deer (not identified to species level) prints.</p> <p>Habitat Condition (provisional): Good (Score 3)</p>	
<p>TR4.TN57</p>	
<p>Quarry floor consisting of rock and spoil mounds (sand, gravel, silt), with scattered ephemeral / short perennial colonisers which include New Zealand willowherb, marsh thistle, common daisy, rosebay willowherb, Yorkshire fog, <i>Polytrichum</i> moss, marsh thistle, sheep's fescue, wavy hair grass, and ragwort. There are pools of standing water from collected rainfall. These do not contain any emergent or submerged vegetation. Potential habitat for nesting birds and reptile basking on the southern facing, wind protected slopes. Deer and rabbit/hare footprints were observed.</p> <p>Habitat Condition (provisional): Moderate (Score 2)</p>	
<p>TR4.TN58</p>	
<p>Recent land slip at the quarry edge which is approximately 50 m wide. The boundary fence has been replaced and repaired. The resulting land slip has produced large protruding rocks, which provide a perch for birds of prey such a peregrine (formerly confirmed to be breeding within the quarry).</p>	

Habitat Condition (provisional): Not applicable (no assessment required)	
TR4.TN59	
<p>Large rock pile at the side of an access trackway which provides suitable refugia for reptiles.</p> <p>Habitat Condition (provisional): Not applicable (no assessment required)</p>	
TR4.TN60	
<p>The settling ponds at the northern end of the site are actively used to store water and are also abstracted for current quarrying activities. The edges consist of sparsely vegetated bunds (see TR4.TN69). Several bird species use the ponds and nest on the nearby bunds and surrounding habitats, however, there appears to be no emergent or submerged vegetation within the water and large amounts of suspended silt.</p> <p>Habitat Condition (provisional): Poor (Score 1)</p>	
TR4.TN61	
<p>Former active quarry area which is now a flat plateau at the top of the quarry, where the habitat is characterised as wet dwarf shrub heath. Dominant species include ling, bilberry, hare's tail cotton grass (<i>Eriophorum vaginatum</i>), <i>Polytrichum</i> sp., <i>Sphagnum</i> mosses (at least four species), crowberry, feather mosses, heath rush (<i>Juncus squarrosus</i>), cross leaved heath (<i>Erica tetralix</i>), wavy hair grass, sheep fescue, several sedge species and heath bedstraw. The ground is tussocky with the grasses and mosses forming mounds. The heather shrub is all of a similar age. The habitat provides potential opportunities for nesting birds, reptiles, small mammals and amphibians. Possible common lizard (<i>Zootoca vivipara</i>) sighting (recorded at the time of the survey). An abundance of green hairstreak butterflies (<i>Callophrys rubi</i>) were noted. Further NVC survey recommended depending on development proposals.</p> <p>Habitat Condition (provisional): Moderate (Score 2)</p>	

TR4.TN62	
<p>Two former lagoons, which are now bare earth with scattered short perennial / ephemeral vegetation and soft rush. Potential for nesting birds and reptiles.</p> <p>Habitat Condition (provisional): Poor (Score 1)</p>	
TR4.TN63	
<p>Dry dwarf shrub heath upon the exposed quarry face on a steep south-east facing slope. Species present include those listed in TR4.TN50. Suitable habitat for reptiles and nesting birds.</p> <p>Habitat Condition (provisional): Moderate (Score 2)</p>	
TR4.TN64	
<p>Small, dry pond choked with a dense covering of vegetation which has dried over the exposed pond floor. Species identified include water crowfoot (<i>Ranunculus aquatilis</i>) and water starwort species. The pond will likely hold water during periods of rainfall and is fringed with soft rush. Potential for nesting birds, amphibians and reptiles.</p> <p>Habitat Condition (provisional): Moderate (Score 2)</p>	
TR4.TN65	No photo.
<p>Continuous bracken on a steep south facing slope over a carpet of mosses. Potential for reptiles, amphibians, nesting birds and small mammals.</p> <p>Habitat Condition (provisional): Moderate (Score 2)</p>	

TR4.TN66	
<p>Mature willow scrub with a ground layer of dry dwarf shrub heath and scattered soft rush. Potential for small mammals, nesting birds, foraging bats, amphibians and reptiles.</p> <p>Habitat Condition (provisional): Moderate (Score 2)</p>	
TR4.TN67	
<p>Exposed rock pile adjacent to an area of dry dwarf shrub heath within the slope of continuous bracken. Steep south facing slope with potential for reptiles, small mammals and nesting birds. Rocks are sparsely vegetated with ling heather, foxglove, bilberry and cowberry (<i>Vaccinium vitis-idaea</i>).</p> <p>Habitat Condition (provisional): Moderate (Score 2)</p>	
TR4.TN68	No photo.
<p>Wet dwarf shrub heath at the flat base of slope, in a roughly circular depression where water is held just beneath the surface. Species include ling, bilberry, cross leaved heath, common cotton grass (<i>Eriophorum angustifolium</i>), hare's tail cottongrass, wavy hair grass, cranberry (<i>Vaccinium oxycoccos</i>), <i>Sphagnum</i> mosses (at least 4 types), several sedge species, feather mosses, sheep's fescue and carnation sedge (<i>Carex panicea</i>). There are some pools of stagnant water within the habitat. The topography is undulating and there are mossy hummocks. The heather vegetation is of a similar age throughout. Potential for amphibians, reptiles, nesting birds, small mammals and foraging bats.</p> <p>Habitat Condition (provisional): Moderate (Score 2)</p>	
TR4.TN69	
<p>Ephemeral / short perennial vegetated pathway with spoil bunds either side. The track appears unused but once provided access around the site. Species include daisy, ling, willow scrub, wavy hair grass, ribwort plantain, brooklime,</p>	

broadleaved dock, bird's-foot trefoil, marsh thistle, soft rush, sweet vernal grass (*Anthoxanthum odoratum*), ragwort, lady's mantle (*Alchemilla vulgaris*), crowberry, square stalked St. John's wort (*Hypericum tetrapterum*), creeping cinquefoil (*Potentilla reptans*), silverweed (*Argentina anserina*), soft rush and yarrow. This habitat is suitable for nesting birds, small mammals, invertebrates and foraging bats.

Habitat Condition (provisional): Moderate (Score 2)

TR4.TN70



Small area of flush surrounding a slow through flow of water between TR4.P16 and TR4.P17. The habitat is dominated by soft rush with scattered *Sphagnum* mosses, hemp agrimony (*Eupatorium cannabinum*) and bulrush (*Typha latifolia*). Suitable for reptiles, amphibians and nesting birds. Further south of the flush there is a lack of *Sphagnum*s and the habitat grades into marshy grassland.

Habitat Condition (provisional): Good (Score 3)

TR4.TN71



Ephemeral / short perennial vegetation surrounding lagoon. Sections of the habitat are located on steep west facing slopes, with patches of bare earth. Species include daisy, common sedge (*Carex nigra*), marsh thistle, soft rush, willow, ling heather, sheep fescue, common mouse ear, ragwort, rosebay willowherb and birds foot trefoil. Vegetation is short and transitions at the lagoon edge to marshy grassland. Suitable for ground nesting birds, reptiles and invertebrates.



Habitat Condition (provisional): Moderate (Score 2)


TR4.TN72



Mixed plantation woodland on an eastern facing slope at the edge of the boundary. Canopy species include rowan, larch and alder. The trees have been planted over dry dwarf shrub heath, dominated by ling. Suitable for nesting birds, small mammals, reptiles, foraging bats and terrestrial amphibian habitat.



Habitat Condition (provisional): Moderate (Score 2)	
TR4.TN73	
<p>Herb-rich semi-improved neutral grassland verge at the entrance to the quarry with some acidic indicator species. Some areas are recently disturbed as evidenced by locally dominant patches of common nettle. Species include Yorkshire fog, meadow vetchling, creeping thistle, common nettle, red fescue, cuckoo flower (<i>Cardamine pratensis</i>), creeping buttercup, marsh thistle, dandelion (<i>Taraxacum</i> agg.), common sorrel, ribwort plantain, heath bedstraw, field woodrush, common mouse ear and ragwort. Evidence of use by rabbits is present. Possible orchid species was also identified on the northern verge, close to the access track. Suitable habitat for nesting birds and small mammals.</p> <p>Habitat Condition (provisional): Moderate (Score 2)</p>	
<b>Watercourses</b>	
TR4.WC1	
<p>A watercourse which was dry at time of survey, consisting of cobbles and boulder bed. The watercourse is approximately 3 m wide with steep earth banks, which are vegetated with mixed woodland. Himalayan balsam is abundant along the watercourse corridor. Other species along the banks include male fern, common nettle, bramble, honeysuckle and common gorse. It is heavily shaded by overhanging trees. The brook has a moderate flow which is ochreous. Some sections of the watercourse are densely vegetated and some sections flow through an open field. The upstream section, close to a barn, is surrounded by dense marshy grassland with a species composition comprising; soft rush, marsh thistle, common hogweed (<i>Heracleum sphondylium</i>), broadleaved dock, common nettle, sycamore trees and Himalayan balsam. Negligible protected species potential (otter (<i>Lutra lutra</i>), water vole (<i>Arvicola amphibius</i>), white clawed crayfish (crayfish; <i>Austropotamobius pallipes</i>)).</p> <p>Habitat Condition (provisional): Moderate (Score 2)</p>	

TR4.WC2	
<p>A slow flowing ditch within marshy grassland. The channel is 1 m wide, with the width of water within the channel at the time of surveying being 40 cm; the water depth is approximately 4 cm. The ditch has moderately steep earth banks which are cattle poached and are densely vegetated, with soft rush being the dominant species. The watercourse itself is well vegetated, with species comprising; water mint, floating sweet grass, marsh bedstraw and water forget-me-not (<i>Myosotis scorpioides</i>). The ditch has negligible potential for protected species.</p> <p>Habitat Condition (provisional): Moderate (Score 2)</p>	

TR4.WC3	
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A slow flowing stream which in the upstream reaches passes through woodland. The maximum width is 50 cm and depth is 5 cm. The stream has steep but low earth banks which are densely vegetated. Bank species comprise wood sorrel, lady fern, common nettle, springy turf moss, creeping buttercup, foxglove, bramble, cleavers (*Galium aparine*) and holly. There is fallen dead wood over the stream. In channel vegetation includes brooklime. The substrate beneath the water is sandy with clay and gravel. Common frog was observed on the bank during the survey. In the central section the watercourse increases in width to 1.5 m with shallow banks. This section has negligible potential for protected species. South of the woodland the stream is straightened with artificial concrete embankments and is significantly less vegetated. The watercourse then flows under a culvert and reappears further south in the field, where the flow increases in speed the earth banks are vegetated by common gorse and soft rush. Over shading and shallow water reduces its suitability for water vole and it has negligible potential for other protected species.




Habitat Condition (provisional): Moderate (Score 2)

TR4.WC4	
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A slow flowing drainage ditch with shallow earth banks. The channel is approximately 1 m wide with a few centimetres of water at time of survey. The channel is well vegetated with brooklime and the margins are vegetated with silverweed (*Potentilla anserina*), bittercress (*Cardamine* sp.), water mint, compact rush and soft rush. The earth banks are rush dominated by water mint, heath bedstraw, tufted hair grass and Yorkshire fog. There is no protected species potential because the ditch is very shallow, not densely vegetated and there is no connectivity to other watercourses.

Habitat Condition (provisional): Moderate (Score 2)

TR4.WC5	
<p>A moderately to fast flowing brook bordered by broadleaved woodland. The banks are gently sloping and vegetated with dog's mercury and grasses. The substrate comprises bedrock, boulders, rubble and gravel. There are steep earth banks in places. There is protected species potential for otter and white clawed crayfish. Kingfisher (<i>Alcedo atthis</i>) is known to be present downstream. No water vole potential due to over shading resulting in a lack of abundant lush bankside vegetation.</p> <p>Habitat Condition (provisional): Good (Score 3)</p>	
TR4.WC6	
<p>A slow flowing ditch along field boundary. The upper reaches are mostly dry and further downstream the ditch begins to hold more water and has flow. The banks are steep and dominated by soft rush and Yorkshire fog, crested dog's-tail and cock's-foot on the south-western bank. The north eastern bank consists of a mature scrub and tree line including the species hawthorn, alder, ash and oak. The ditch is heavily shaded by overhanging trees. The depth is approximately less than 5 cm and width is less than 30 cm. There is no potential for protected species due to the lack of depth, over shading and vegetated banks (water vole) and lack of connectivity (otter). The substrate is a mixture of gravel, pebbles and boulders. The margins are sheep poached. Further downstream the channel is more open /unshaded within a field. Locally dominant patches of brooklime line the channel and common nettle is frequent.</p> <p>Habitat Condition (provisional): Moderate (Score 2)</p>	
TR4.WC7	
<p>Shallow slow flowing ditch adjacent to hawthorn hedge. The ditch drains run off from the field and joins with TR4.WC6 at the downstream end. No potential for protected species. Dominated by cock's-foot, soft rush, Yorkshire fog, meadow grass species. Upstream there are locally dominant patches of brooklime and the ditch is adjacent to a scrub and tree line. Width is 30 cm and depth is up to 6 cm.</p>	

Habitat Condition (provisional): Moderate (Score 2)	
TR4.WC8	
<p>Slow flowing, very shallow stream with sand and earth banks. The watercourse gently meanders down the field edge and is approximately 0.7 m wide, and between 15 to 20 cm deep. The banks are vegetated with short grasses from the surrounding species-poor semi-improved grassland. The substrate consists of exposed rock, cobbles and silt. There is an accumulation of leaves and branches suggesting a recent flood. The watercourse is shaded by adjacent mature alder, holly, hawthorn, and willow trees / scrub. The water edges are cattle poached in places. The watercourse is unmodified and the bordering riparian habitat is limited. The watercourse is a linear feature connecting nearby woodlands together, which provides bats with foraging and commuting habitat. The water is ochreous in colour. Due to the lack of depth and shading, it is considered to have negligible potential for water vole and crayfish. The watercourse has nesting bird potential (e.g. within the overhanging trees, scrub and grasses at the edges) and commuting otter potential, although there are no suitable holt locations.</p> <p>Habitat condition (provisional): Moderate (Score 2)</p>	
TR4.WC9	
<p>Slow-flowing stream along a field boundary. The watercourse is tree lined (alder and holly) and shaded. There is some pooling in areas, with soft rush dominating the vegetation. Leaf litter present within the channel. The width is approximately 50 cm and depth is up to 10 cm. The banks are earth and are steeply sloping in places, which are grass dominated. Sheep and cattle poached edges are present. Negligible potential for water vole or crayfish. Commuting otter potential but no otter holt suitability. Potential linear feature for use by foraging and commuting bats.</p> <p>Habitat condition (provisional): Moderate (Score 2)</p>	
TR4.WC10	

Tree lined and shaded stream at the boundary of a marshy grassland field. The stream has steep earth banks which are vegetated with rushes and grasses. it has a width of approximately 0.5m and depth approximately 10 cm. Several ferns, mossy boulders and leaf litter is present within the channel. There is potential for commuting otter, and holt potential at the downstream end where the tree roots protrude into the watercourse. Negligible water vole potential. The water is slow flowing in an approximately straight channel until it reaches the downstream end and turns west where it becomes a more steeply-cut valley with meanders. Foraging and commuting bat potential. Downstream the watercourse is within a steeply cut valley with marginal vegetation identified including male fern, foxglove, tufted hair grass, fescue species and holly. The watercourse is suitable for crayfish; several rocks, cobbles boulders provide suitable refugia. The watercourse is fenced off from cattle.

Habitat condition (provisional): Good (Score 3)



Tree lined and shaded stream with steep earth banks which are vegetated with rushes and grasses. The width is approximately 0.5 m and depth 10 cm. Ferns and mossy boulders are present within the channel and there is accumulated leaf litter. The watercourse is slow-flowing and a generally straight channel. There is negligible potential for water vole, but it is suitable for otter (commuting and holt), crayfish and nesting birds. A snipe was flushed from the surrounding habitats during the survey.

Habitat condition (provisional): Moderate (Score 2)



Slow to stagnant flowing stream with shallow grass dominated banks. There is an accumulation of silt, mud and leaves. The watercourse is unfenced within a field and is poached at the edges. The adjacent vegetation is indicative of recently disturbed ground and includes nettle, rushes and coarse grasses. The channel is mostly unshaded but there are some

scattered mature trees and scrub nearby that provide some limited shade. There is a small patch of brooklime present, but otherwise emergent or submerged vegetation is not present. At the downstream end, the banks have recently been reprofiled. Negligible potential for protected species.

Habitat condition (provisional): Moderate (Score 2)

TR4.WC13



Slow flowing rocky and cobble stream flowing through coniferous woodland (TR4.TN36). The width is approximately 1 m and depth is shallow (only a few centimetres). The substrate comprises clay, pebbles and cobbles. The banks are vertical and undercut further downstream (the photo depicts the upstream end where the banks are gradual). There is no aquatic or bankside vegetation and the watercourse is heavily shaded. Within the channel there is abundant accumulated coniferous brash and leaf litter. The stream emerges from a marshy seepage in the sheep grazed field to the east of woodland. A small section outside the shade of the woodland is vegetated with bittercress, blinks (*Montia fontana*), soft rush and *Polytrichum* sp. moss. The channel edges are poached by cattle. No protected species potential.

Habitat condition (provisional): Poor (Score 1)

TR4.WC14



Narrow stream with a slow trickle of water that runs parallel to TR4.WC13 on the eastern edge of the coniferous woodland (TR4.TN36). The channel is approximately 10 cm wide and less than 5 cm deep. The banks have a shallow gradient and are grass dominated. The channel is almost indistinguishable from the adjacent sheep grazed field except for a line of soft rush. The substrate is a mixture of earth and pebbles. Bankside vegetation includes soft rush, marsh thistle, bryophytes, meadowsweet, common sorrel, creeping buttercup, foxglove and hawthorn. Negligible protected species potential.

Habitat condition (provisional): Moderate (Score 2)

TR4.WC15





Bashall Brook. The watercourse flows within a steep wooded river corridor that is shaded along much of its length by canopy species including sycamore and hazel. The width is on average approximately 4 m, although it narrows in places where the channel meanders. The depth is variable with several pools, riffles and pebble bars present. There are some small waterfalls as well as exposed areas of bedrock. The substrate comprises cobbles, bedrock and boulders. The water quality is good (clear). There is a lack of aquatic vegetation at the time of the survey. The ground flora includes common male fern, harts tongue fern, opposite-leaved golden saxifrage, wood sorrel and holly. The habitat is suitable for crayfish, otter (foraging, commuting and holts), foraging bats, spawning fish, including salmonids and nesting birds. At the downstream (southern) end of the watercourse, the channel edge has been straightened/reinforced adjacent to the residential property.

Habitat condition (provisional): Good (Score 3)

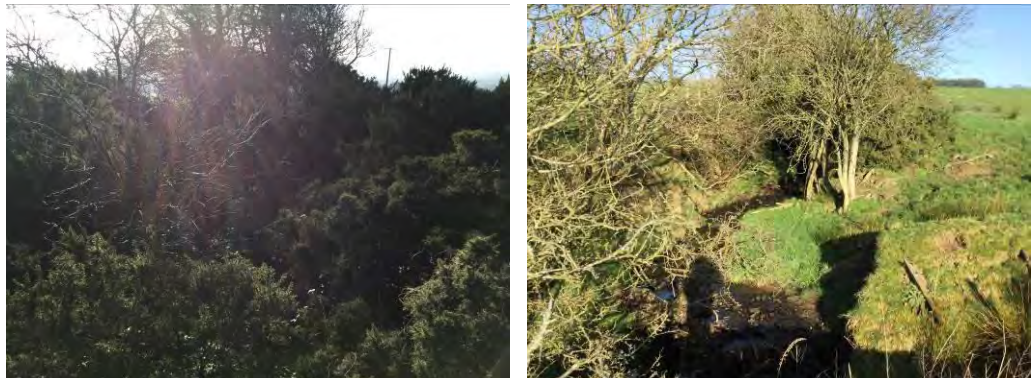
TR4.WC16



Small, shallow slow flowing stream, running through mixed plantation woodland (TR4.TN41). The woodland is fenced off from the surrounding grazed species-poor semi-improved grassland. The width is approximately 30 cm and depth 2 cm. The embankments are shallow sloping bare earth. The northern section is heavily shaded by woodland and has abundant in channel brash and leaf litter. The southern section is less shaded due to fewer tree species overhanging the channel, with less leaf litter and brash. A small number of boulders and cobbles are present in the channel. The stream is culverted beneath the access track. Protected species potential for commuting otter, however, it has negligible for crayfish and water vole.

Habitat condition (provisional): Moderate (Score 2)

TR4.WC17



A narrow, shallow fast flowing stream, which flows north to south and is culverted beneath the farm track. The width if



approximately 0.75 m and depth less than 10 cm. The substrate is earth with abundant cobbles and stones. The banks are earth and gently sloping in places, and vertical/undercut in areas where the watercourse has cut into the landscape. The watercourse is lined by a thin belt of dense scrub. Bankside vegetation features semi mature rowan trees, hawthorn, hazel, gorse and holly. Protected species potential for otter, water vole and commuting bats.

Habitat condition (provisional): Moderate (Score 2)

TR4.WC18



Narrow, shallow, fast-flowing stream, which flows north to south. Approximately 0.5 m wide and less than 0.2 m deep. The substrate is earth with abundant cobbles and stones. The banks are earth and shallow sloped, and the stream has cut into the landscape. The banks are vegetated by marshy grassland dominated soft rush with gorse, holly and hawthorn scrub, alongside ash and alder trees, forming a scrub-lined valley. Protected species potential for otter and crayfish. Negligible potential for water vole.

Habitat condition (provisional): Moderate (Score 2)

TR4.WC19







Narrow, shallow, fast flowing stream which flows north to south. The channel is 0.3 m wide and less than 0.2m deep. The substrate is earth and bedrock with small cobbles and boulders. The banks are shallow earth with some large boulders, leaf litter and brash. The vegetation surrounding the stream is mixed plantation woodland described in TR4.TN47. Rhododendron and Himalayan balsam both Schedule 9 of the Wildlife and Countryside Act 1981 as amended, were identified. The watercourse is culverted beneath the access track. Protected species potential for otter and crayfish. Negligible potential for water vole.

Habitat condition (provisional): Poor (Score 1)

TR4.WC20



<p>This watercourse flows north to south with a moderate flow and is approximately 1 m wide and up to 0.5 m deep. The substrate is earth with cobbles, stones and boulders. The banks are earth and steeply cut at a 70° angle and dominated by grasses and soft rush. The stream is culverted beneath the access track. The northern section is heavily shaded by ash and hazel trees with an understory of bramble. The southern section is more open, with occasional gorse, young rowan and mature oak. Protected species potential for otter and crayfish.</p> <p>Habitat condition (provisional): Moderate (Score 2)</p>	
TR4.WC21	
<p>Narrow, fast flowing stream, with flows north to south and culverted underneath the access track. The stream sinks to beneath the ground south of the access track. The width is approximately 0.3 m and depth 0.2 m. The substrate is earth with pebbles and boulders. The banks are steep and dominated by dense rush growth.</p> <p>Habitat condition (provisional): Moderate (Score 2)</p>	
TR4.WC22	
<p>Very slow flowing outfall from pond which flows approximately south-west between two small hillocks. The channel is indistinct and dry in places. The depth is up to 4 cm. The channel is fringed by soft rush with shade provided by willow scrub. Negligible protected species potential but suitable for amphibians in stagnant areas.</p> <p>Habitat condition (provisional): Moderate (Score 2)</p>	
TR4.WC23	
<p>A very narrow overflow channel running between ponds/lagoons. Vertical earth banks are up to 30 cm tall and the channel is approximately 10 cm wide. In some areas the channel is indistinguishable beneath the rushes / flush. Fringed by soft rush and continuous bracken in the wider area. Negligible protected species potential.</p>	

Habitat condition (provisional): Moderate (Score 2)	
TR4.WC24	
<p>The watercourse was dry at the time of survey (survey undertaken following a prolonged period of dry weather) with a damp bed in a few small areas. The channel is fenced off and very narrow, approximately 30 cm wide. There are steep earth banks which are vegetated with common nettle, horsetail, soft rush, common sorrel and broadleaved dock. The substrate is rocky and there is gorse scrub on the eastern bank. Negligible protected species potential.</p> <p>Habitat Condition (provisional): Moderate (Score 2)</p>	



### References


- JNCC (1993 revised 2010) *Handbook for Phase 1 Habitat Survey: A technique for environmental audit (reprint)*. Joint Nature Conservation Committee, Peterborough.
- CIEEM (2013) *Guidelines for Preliminary Ecological Appraisal*. Chartered Institute of Ecology and Environmental Management, Winchester.
- Natural England (July 2019). *The Biodiversity Metric 2.0: Auditing and accounting for biodiversity value: technical supplement (Beta version)*.
- Collins (2016). *Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edition)*. The Bat Conservation Trust, London.

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## Appendix C. GWDTE Survey

1. Project Details			
Project Name:	Haweswater Aqueduct Resilience Programme	Project Number:	<b>80061155</b>
Written:	Jeremy James, <i>Principal Ecologist</i>	Approved:	Alice Helyar, <i>Principal Ecologist</i>
Report reference:	TR4 GWDTE Habitat Assessment Report	Date:	27/05/2020
2. Project Drawings			
GWDTE Survey Proposed Marl Hill Section "TR4 North" and "TR4 South"			
3. Habitat Survey Methods			
Surveyors:	Jeremy James, MSc, BSc (Hons), CEcol, CEnv, MCIEEM		
Survey date(s):	20/04/2020, 22/04/2020, 27/04/2020 and 29/04/2020.		
Survey Method:	The ecological component of the field survey followed the Phase 1 habitat survey methodology to classify and map the habitats. More detailed recording was focused on habitats which, based on professional judgement, were considered likely to constitute GWDTE, taking into consideration vegetation composition, observed groundwater and surface water levels and flows, topography and landscape situation. The National Vegetation Classification (NVC) (Rodwell, 1991 <i>et seq</i> ) was used to classify the main vegetation types encountered. Due to the early timing of the survey, this was a high level assessment undertaken in conjunction with the SNIFFER WFD95 Wetland Typology.		
Weather Conditions:	20/04/2020 – Sunny, light breeze (Beaufort Scale 1), 0/8 cloud, 9-14°C. 22/04/2020 – Sunny, light breeze (Beaufort Scale 1), 0/8 cloud, 9-14°C. 27/04/2020 – Sunny, calm (Beaufort Scale 0), 4/8 cloud, 16°C. 29/04/2020 – Overcast and cloudy with a light breeze (Beaufort Scale 1), 8/8 cloud, 12°C. All surveys followed a prolonged period of dry weather.		
Limitations to the survey:	The survey was carried out early in the growing season, constraining detailed survey and classification of plant communities. The survey also followed a period of prolonged dry weather, thus seasonal water features were possibly not evident during the survey period and certain habitats such as marshy grassland may not appear as extensive.		

4. GWDTE Habitat Assessment Results			
Target Note Reference: TR4.GW1			
			
Photo ID:	TR4.GW1	Grid reference:	SD 69834 48492
<b>Description:</b> Area of seepage/flush within broadleaved woodland, stream at base of slope and sheep grazed pasture in the wider area. Remnant stand of ash woodland, with beech, alder and oak in the canopy. Limited shrub layer, woodland likely to be previously open to grazing.			
<b>Species list:</b> <i>Caltha palustris</i> , <i>Filipendula ulmaria</i> , <i>Chrysosplenium oppositifolium</i> , <i>Cratoneuron cf filicinum</i> .			
Phase 1 Habitat Type:	Affinity with NVC:	WFD95 Wetland Type:	
A1.1.1 and E2 (flush/spring)	W7c Alder/Ash woodland with seepages/flush	3d seepages/flushes	
Landscape Setting:		Hydrological features:	
3c and 4 – stream downslope and slope		Stream	
Soil indicators:	Vegetation indicators:	Vegetation height:	Existing pressures:
Mineral soil	Other - <i>Caltha</i> , <i>Filipendula</i> , <i>Cratoneuron cf filicinum</i>	Ankle	Potentially diffuse pollution/enrichment
Target Note Reference: TR4.GW2			
			
Photo ID:	TR4.GW2	Grid reference:	SD 69891 48439

<b>Description:</b> Fenced of bowl like depression adjacent to stream, supporting rush dominated marshy grassland/fen meadow vegetation.			
<b>Species list:</b> <i>Juncus acutiflorus/articulatus</i> , <i>Caltha palustris</i> , <i>Filipendula ulmaria</i> , <i>Valeriana dioica</i> , <i>Lathyrus pratensis</i> , <i>Calliergonella cuspidatum</i> , <i>Geum rivale</i> .			
<b>Phase 1 Habitat Type:</b>	<b>Affinity with NVC:</b>	<b>WFD95 Wetland Type:</b>	
B5	Affinities with M23/M27 - unable to distinguish clearly due to timing of survey	2a marshy grassland/3d seepage	
<b>Landscape Setting:</b>		<b>Hydrological features:</b>	
3c and 4 – stream downslope and slope		Stream	
<b>Soil indicators:</b>	<b>Vegetation indicators:</b>	<b>Vegetation height:</b>	<b>Existing pressures:</b>
Mineral soil	Other - <i>Caltha</i> , <i>Filipendula</i> , <i>Cratoneuron cf filicinum</i>	Knee	Potentially diffuse pollution/enrichment
<b>Target Note Reference:</b> TR4.GW3			
			
<b>Photo ID:</b>	TR4.GW3	<b>Grid reference:</b>	SD 69891 48439
<b>Description:</b> Perched area of marshy grassland with seepage down to stream. Surrounded by woodland and pasture. No clear dominance, species present and recorded during the survey (early in season) included: rushes, sedges, purple moor grass and herbs.			
<b>Species list:</b> <i>Juncus acutiflorus/articulatus</i> , <i>J. inflexus</i> , <i>J. effusus</i> , <i>Carex flacca/panacea</i> , <i>Geum rivale</i> , <i>Filipendula ulmaria</i> , <i>Molinia caerulea</i>			
<b>Phase 1 Habitat Type:</b>	<b>Affinity with NVC:</b>	<b>WFD95 Wetland Type:</b>	
B5	No clear affinities - elements of M23 (rush frequency) and M25 marked by <i>Molinia</i> presence/tussocky nature of vegetation in places	2a marshy grassland/3d seepage	
<b>Landscape Setting:</b>		<b>Hydrological features:</b>	
3c and 4 – stream downslope and slope		Stream	
<b>Soil indicators:</b>	<b>Vegetation indicators:</b>	<b>Vegetation height:</b>	<b>Existing pressures:</b>
Mineral soil	Rushes, sedges, herbs and purple moor grass.	Knee	Potentially diffuse pollution/enrichment

**Target Note Reference: TR4.GW4**




<b>Photo ID:</b>	TR4.GW4	<b>Grid reference:</b>	SD 69995 48898
<b>Description:</b> Seasonal ditch with stands of soft rush, heavily cattle poached.			
<b>Species list:</b> <i>Juncus effusus</i> with <i>Urtica dioica</i> , <i>Filipendula ulmaria</i> , <i>Juncus inflexus</i> , <i>Cirsium palustre</i> , <i>Valeriana dioica</i>			
<b>Phase 1 Habitat Type:</b>	<b>Affinity with NVC:</b>	<b>WFD95 Wetland Type:</b>	
B5	No clear fit with an NVC community - area too small, degraded by cattle poaching and grazing (possible affinities with M23?)	2a marshy grassland	
<b>Landscape Setting:</b>		<b>Hydrological features:</b>	
4 slope (Upland/upland fringe – sloping ground)		Ditch	
<b>Soil indicators:</b>	<b>Vegetation indicators:</b>	<b>Vegetation height:</b>	<b>Existing pressures:</b>
Mineral soil	Rushes, sedges, herbs and purple moor grass.	Knee	Grazing, poaching

**Target Note Reference: TR4.GW5**



<b>Photo ID:</b>	TR4.GW5	<b>Grid reference:</b>	SD 70116 49004
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<b>Description:</b> Extensive area of marshy grassland, on flushed slopes over clay, in mosaic with more neutral grassland.			
<b>Species list:</b> Mixture of <i>Molinia caerulea</i> , <i>Juncus effusus</i> , <i>J. inflexus</i> , <i>J. acutiflorus/articulatus</i> , <i>Calliergonella cuspidatum</i> , <i>Carex flacca/panacea</i> , <i>Agrostis stolonifera</i> , <i>Valeriana dioica</i> , <i>Cirsium palustre</i> , <i>Succisa pratensis</i>			
<b>Phase 1 Habitat Type:</b>	<b>Affinity with NVC:</b>	<b>WFD95 Wetland Type:</b>	
B5	Affinities with M25b but too early in season to be able to classify accurately.	2a marshy grassland	
<b>Landscape Setting:</b> Upland/upland fringe – sloping ground		<b>Hydrological features:</b> Seasonal ditches on slopes, possibly spring fed in places.	
4 slope		Stream	
<b>Soil indicators:</b>	<b>Vegetation indicators:</b>	<b>Vegetation height:</b>	<b>Existing pressures:</b>
Mineral soil	Rushes, sedges, herbs and purple moor grass.	Knee	Grazing, poaching
<b>Target Note Reference:</b> TR4.GW6			
			
<b>Photo ID:</b>	TR4.GW6	<b>Grid reference:</b>	SD 70019 49091
<b>Description:</b> Level area of ground next to stream with interesting vegetation of sedge tussocks, rush and moss.			
<b>Species list:</b> Dominated by a mixture of <i>Juncus inflexus</i> , <i>Carex flacca/panacea</i> , <i>Aulaacomnium palustre</i> , <i>Brachythecium cf rivulare</i> , <i>Caltha palustris</i> , <i>Carex cf nigra</i> , <i>Succisa pratensis</i> , <i>Valeriana dioica</i> , <i>Lotus cf uliginosus</i> , <i>Filipendula ulmaria</i> .			
<b>Phase 1 Habitat Type:</b>	<b>Affinity with NVC:</b>	<b>WFD95 Wetland Type:</b>	
B5	Affinities with a number of NVC communities (M25, M26, M27) - not able to assign. Suggest that this is an undescribed variant and/or too early in the season to classify.	2a marshy grassland	
<b>Landscape Setting:</b> Upland/upland fringe – sloping ground		<b>Hydrological features:</b> Ditch	
3c and 4 – stream downslope and slope		Stream	
<b>Soil indicators:</b>	<b>Vegetation indicators:</b>	<b>Vegetation height:</b>	<b>Existing pressures:</b>
Mineral soil	Rushes, sedges, herbs and bryophytes.	Knee	Grazing, poaching

**Target Note Reference: TR4.GW7**






<b>Photo ID:</b>	TR4.GW7	<b>Grid reference:</b>	SD 70385 48942
<b>Description:</b> Seepage areas with rushes, fine sedges and herbs within extensive area of sheep/cattle grazed pastures.			
<b>Species list:</b> <i>Carex cf flava sens. lat.</i> , <i>Juncus actuiiflorus/articulatus</i> , <i>Lathyrus sp</i> , <i>Carex flacca/panacea</i> , <i>Valeriana dioica</i> , <i>Filipendula ulmaria</i> , <i>Succisa pratensis</i>			
<b>Phase 1 Habitat Type:</b>	<b>Affinity with NVC:</b>	<b>WFD95 Wetland Type:</b>	
E2	No clear fit with an NVC community – due to grazing, early timing of survey and small size of stand of vegetation.	2a marshy grassland	
<b>Landscape Setting:</b>		<b>Hydrological features:</b>	
3d seepage/flush		Stream	
<b>Soil indicators:</b>	<b>Vegetation indicators:</b>	<b>Vegetation height:</b>	<b>Existing pressures:</b>
Mineral soil	Rushes, sedges, herbs	Ankle	Grazing, poaching, nutrient enrichment

**Target Note Reference: TR4.GW8**



<b>Photo ID:</b>	TR4.GW8	<b>Grid reference:</b>	SD 70762 45364
<b>Description:</b> Mosaic of recently cut marshy grassland and neutral grassland - difficult to assign in terms of the NVC. Possible affinities with MG10 <i>Holcus lanatus</i> - <i>Juncus effusus</i> grassland. Large stands of rush, tufted hair grass and short sedges. Unlikely to be strongly ground water dependent.			
<b>Species list:</b> <i>Juncus effusus</i> , <i>J.articulatus</i> , <i>Deschampsia cespitosa</i> , <i>Carex flacca/panacea</i> , <i>Agrostis stolonifera</i> , <i>Anthoanthum odoratum</i> , <i>Rhytidiadelphus squarrosus</i> .			
<b>Phase 1 Habitat Type:</b>	<b>Affinity with NVC:</b>	<b>WFD95 Wetland Type:</b>	

B5	Possible affinities with MG10 <i>Holcus lanatus</i> - <i>Juncus effusus</i> grassland		2a marshy grassland
<b>Landscape Setting:</b>		<b>Hydrological features:</b>	
Upland meadows		N/A	
<b>Soil indicators:</b>	<b>Vegetation indicators:</b>	<b>Vegetation height:</b>	<b>Existing pressures:</b>
Mineral soil	Rushes	Ankle	Cutting, nutrient enrichment, drainage
<b>Target Note Reference: TR4.GW9</b>			
			
<b>Photo ID:</b>	TR4.GW9	<b>Grid reference:</b>	SD 70583 45325
<b>Description:</b> Extensive area of upland mire on gently sloping ground. Dominated by purple moor grass with cotton grass, sphagnum and ericoids.			
<b>Species list:</b> <i>Molinia caerulea</i> with <i>Eriophorum angustifolium</i> , <i>Sphagnum palustre</i> , <i>Rhytidiadelphus</i> , <i>Vaccinium myrtillus</i> , <i>Polytichum commune</i> , <i>Anthoxanthum odoratum</i> , <i>Vaccinium oxycoccus</i>			
<b>Phase 1 Habitat Type:</b>	<b>Affinity with NVC:</b>	<b>WFD95 Wetland Type:</b>	
E1.7 Wet modified blanket bog	M25 <i>Molinia caerulea</i> - <i>Potentilla erecta</i> mire	8a Peat Bog	
<b>Landscape Setting:</b>		<b>Hydrological features:</b>	
Upland meadows		N/A	
<b>Soil indicators:</b>	<b>Vegetation indicators:</b>	<b>Vegetation height:</b>	<b>Existing pressures:</b>
Peat	Cotton grass, purple moor grass, sphagnum	Knee	Historic drainage, and possible tree planting
<b>Target Note Reference: TR4.GW10</b>			
			
<b>Photo ID:</b>	TR4.GW10	<b>Grid reference:</b>	SD 70591 45248

<b>Description:</b> Very small area of marshy grassland upslope of pond and below modified bog. Not ground water dependent.			
<b>Species list:</b> <i>Juncus effusus</i> , <i>J. articulatus</i> with <i>Agrostis stolonifera</i> , <i>Lathyrus sp.</i> , <i>Deschampsia cespitosa</i> , <i>Lotus cf uliginosus</i>			
<b>Phase 1 Habitat Type:</b>	<b>Affinity with NVC:</b>	<b>WFD95 Wetland Type:</b>	
B5	Small area, not able to classify.	2a marshy grassland	
<b>Landscape Setting:</b>		<b>Hydrological features:</b>	
Upland meadows		Pond	
<b>Soil indicators:</b>	<b>Vegetation indicators:</b>	<b>Vegetation height:</b>	<b>Existing pressures:</b>
Mineral soil	Rushes	Ankle	Nutrient enrichment, grazing
<b>Target Note Reference:</b> TR4.GW11			
			
<b>Photo ID:</b>	TR4.GW11	<b>Grid reference:</b>	SD 70473 45098
<b>Description:</b> Gently sloping extensive area of upland marshy/acidic grassland. Wet acid grassland/marshy grassland - mixed dominance with rushes, purple moor grass and acid grassland species.			
<b>Species list:</b> <i>Juncus effusus</i> , <i>Nardus stricta</i> , <i>Festuca cf rubra</i> , <i>Molinia caerulea</i> , <i>Potentilla erecta</i> , <i>Rhytidiadelphus sp.</i> , <i>Craex cf pancea</i> , <i>Pedicularis palustris</i> , <i>Polytrichum commune</i> , <i>Calliergonella cuspidatum</i> , <i>J. squarrosus</i>			
<b>Phase 1 Habitat Type:</b>	<b>Affinity with NVC:</b>	<b>WFD95 Wetland Type:</b>	
B5	Affinities with M25 <i>Molinia caerulea</i> - <i>Potentilla erecta</i>	2a marshy grassland	
<b>Landscape Setting:</b>		<b>Hydrological features:</b>	
Upland meadows			
<b>Soil indicators:</b>	<b>Vegetation indicators:</b>	<b>Vegetation height:</b>	<b>Existing pressures:</b>
Mineral soil	Rushes, purple moor grass	Knee	Nutrient enrichment, drainage

**Target Note Reference: TR4.GW12**





<b>Photo ID:</b>	TR4.GW12	<b>Grid reference:</b>	SD 70579 44732
<b>Description:</b> Extensive area of upland marshy grassland on gently sloping ground.			
<b>Species list:</b> <i>Juncus effusus</i> , <i>J. articulatus/acutiflorus</i> , <i>Cardanime pratensis</i> , <i>Agrostis stolonifera</i> , <i>Anthoxanthum odoratum</i> , <i>Calliergonella cuspidatum</i> , <i>Rhodiadelphus squarrosus</i>			
<b>Phase 1 Habitat Type:</b>	<b>Affinity with NVC:</b>	<b>WFD95 Wetland Type:</b>	
B5	Difficult to assign - affinities with M23 <i>Juncus effusus-Galium palustre</i> rush pasture	2a marshy grassland	
<b>Landscape Setting:</b>		<b>Hydrological features:</b>	
Upland/upland fringe meadows		Several small dry ponds. <i>Glyceria</i> , <i>Potamogeton polyginofolius</i>	
<b>Soil indicators:</b>	<b>Vegetation indicators:</b>	<b>Vegetation height:</b>	<b>Existing pressures:</b>
Mineral soil	Rushes	Knee	Drainage, enrichment, poaching, over grazing



**Target Note Reference: TR4.GW13**





<b>Photo ID:</b>	TR4.GW13	<b>Grid reference:</b>	SD 70720 44510
<b>Description:</b> Gently sloping ground with marshy grassland. Dominated by rushes forming a small stand of vegetation between stream/ditch and mixed plantation.			
<b>Species list:</b> <i>Juncus effusus</i> with <i>J. articulatus/J. acutiflorus</i> , <i>Agrostis stolonifera</i> , <i>Rumex obtusifolius</i> , <i>Cirsium palustre</i> , <i>R. acetosa</i>			
<b>Phase 1 Habitat Type:</b>	<b>Affinity with NVC:</b>	<b>WFD95 Wetland Type:</b>	
B5	Difficult to assign - affinities with M23 <i>Juncus</i>	2a marshy grassland	


				<i>effusus-Galium palustre</i> rush pasture			
<b>Landscape Setting:</b>			<b>Hydrological features:</b>				
Upland/upland fringe meadows			3c streamside - downslope				
<b>Soil indicators:</b>		<b>Vegetation indicators:</b>		<b>Vegetation height:</b>		<b>Existing pressures:</b>	
Mineral soil		Rushes		Knee		Drainage, poaching	
<b>Target Note Reference: TR4.GW14</b>							
							
<b>Photo ID:</b>		TR4.GW14		<b>Grid reference:</b>		SD 70820 44631	
<b>Description:</b> Gently sloping ground with marshy grassland on either side of a stream, partly open to grazing and part within areas of planted broadleaved trees. Dominated by rushes.							
<b>Species list:</b> <i>Juncus effusus</i> with <i>J.articulatus</i> / <i>J. actuiflorus</i> , <i>Agrostis stolonifera</i> , <i>Anthoxanthum odoratum</i> , <i>Carex hirta</i> .							
<b>Phase 1 Habitat Type:</b>		<b>Affinity with NVC:</b>			<b>WFD95 Wetland Type:</b>		
B5		Difficult to assign - affinities with M23 <i>Juncus effusus-Galium palustre</i> rush pasture			2a marshy grassland		
<b>Landscape Setting:</b>				<b>Hydrological features:</b>			
3c streamside				3c streamside - downslope			
<b>Soil indicators:</b>		<b>Vegetation indicators:</b>		<b>Vegetation height:</b>		<b>Existing pressures:</b>	
Mineral soil		Rushes		Knee		Drainage, poaching, nutrient enrichment, tree planting	
<b>Target Note Reference: TR4.GW15</b>							
							
<b>Photo ID:</b>		TR4.GW15		<b>Grid reference:</b>		SD 71080 45070	
<b>Description:</b> Gently sloping ground with marshy grassland							
<b>Species list:</b> <i>Juncus effusus</i> with <i>Deschampsia cespitosa</i> , <i>Rumex obtusifolius</i>							
<b>Phase 1 Habitat Type:</b>		<b>Affinity with NVC:</b>			<b>WFD95 Wetland Type:</b>		
B5		Difficult to assign - affinities with M23 <i>Juncus</i>			2a marshy grassland		

		<i>effusus-Galium palustre</i> rush pasture	
<b>Landscape Setting:</b>		<b>Hydrological features:</b>	
3c streamside		3c streamside - downslope	
<b>Soil indicators:</b>	<b>Vegetation indicators:</b>	<b>Vegetation height:</b>	<b>Existing pressures:</b>
Mineral soil	Rushes	Knee	Drainage, nutrient enrichment
<b>Target Note Reference:</b> TR4.GW16			
			
<b>Photo ID:</b>	TR4.GW16	<b>Grid reference:</b>	SD 71029 45429
<b>Description:</b> Sheep and cattle grazed upland pasture with spring fed marshy grassland/inundation vegetation. Extends into adjacent pasture with a mosaic of upland grassland, difficult to distinguish the extent of marshy grassland/spring fed vegetation due to preceding long period of dry weather, early timing of survey and grazing.			
<b>Species list:</b> Dominated by <i>Juncus effusus</i> with <i>Caltha palustris</i> , <i>Cardanime pratensis</i> , <i>Ranunculus flamula</i> , <i>Juncus articulatus/acuteiflorus</i> frequent, <i>Carex flacca/panacea</i> , <i>C. sp.</i> , <i>Calliargonella cuspidatum</i> .			
<b>Phase 1 Habitat Type:</b>	<b>Affinity with NVC:</b>	<b>WFD95 Wetland Type:</b>	
B5	Difficult to assign - affinities with M23 <i>Juncus effusus-Galium palustre</i> rush pasture	2a marshy grassland	
<b>Landscape Setting:</b>		<b>Hydrological features:</b>	
4 slope		Spring	
<b>Soil indicators:</b>	<b>Vegetation indicators:</b>	<b>Vegetation height:</b>	<b>Existing pressures:</b>
Mineral soil	Rushes	Ankle	Drainage, poaching, nutrient enrichment
<b>Target Note Reference:</b> TR4.GW17			
			
<b>Photo ID:</b>	TR4.GW17	<b>Grid reference:</b>	SD 71288 45304
<b>Description:</b> Gently sloping area of upland pasture, dominated by rush, recently cut.			
<b>Species list:</b> <i>Juncus effusus</i> with neutral grassland species, <i>Agrostis stolonifera</i> , <i>Rumex obtusifolius</i>			

<b>Phase 1 Habitat Type:</b>	<b>Affinity with NVC:</b>	<b>WFD95 Wetland Type:</b>	
B5	Difficult to assign - affinities with M23 <i>Juncus effusus-Galium palustre</i> rush pasture	2a marshy grassland	
<b>Landscape Setting:</b>		<b>Hydrological features:</b>	
Upland/upland fringe meadows		N/A	
<b>Soil indicators:</b>	<b>Vegetation indicators:</b>	<b>Vegetation height:</b>	<b>Existing pressures:</b>
Mineral soil	Rushes	Ankle	Drainage, nutrient enrichment, cutting
<b>Target Note Reference: TR4.GW18</b>			
			
<b>Photo ID:</b>	TR4.GW18	<b>Grid reference:</b>	SD 71209 44992
<b>Description:</b> Area of upland/upland fringe marshy grassland dominated by rush, low species diversity.			
<b>Species list:</b> <i>Juncus effusus</i> with <i>Juncus articulatus/acutiflorus</i>			
<b>Phase 1 Habitat Type:</b>	<b>Affinity with NVC:</b>	<b>WFD95 Wetland Type:</b>	
B5	Difficult to assign - affinities with M23 <i>Juncus effusus-Galium palustre</i> rush pasture	2a marshy grassland	
<b>Landscape Setting:</b>		<b>Hydrological features:</b>	
Upland/upland fringe meadows		N/A	
<b>Soil indicators:</b>	<b>Vegetation indicators:</b>	<b>Vegetation height:</b>	<b>Existing pressures:</b>
Mineral soil	Rushes	Ankle	Drainage , nutrient enrichment
<b>Target Note Reference: TR4.GW19</b>			
			
<b>Photo ID:</b>	TR4.GW19	<b>Grid reference:</b>	SD 71201 44941
<b>Description:</b> Area of upland/upland fringe marshy grassland dominated by rush, low species diversity.			
<b>Species list:</b> <i>Juncus effusus</i> with <i>Juncus articulatus/acutiflorus</i>			



<b>Phase 1 Habitat Type:</b>	<b>Affinity with NVC:</b>	<b>WFD95 Wetland Type:</b>	
B5	Difficult to assign - affinities with M23 <i>Juncus effusus-Galium palustre</i> rush pasture	2a marshy grassland	
<b>Landscape Setting:</b>		<b>Hydrological features:</b>	
Upland/upland fringe meadows		N/A	
<b>Soil indicators:</b>	<b>Vegetation indicators:</b>	<b>Vegetation height:</b>	<b>Existing pressures:</b>
Mineral soil	Rushes	Ankle	Drainage , nutrient enrichment
<b>Target Note Reference: TR4.GW20</b>			
			
<b>Photo ID:</b>	TR4.GW20	<b>Grid reference:</b>	SD 71830 45308
<b>Description:</b> Mosaic of vegetation adjacent to stream, stands of marshy grassland inundation vegetation. Former characterised by abundant soft rush and the latter by locally abundant flote grass.			
<b>Species list:</b> <i>Juncus effusus</i> with <i>Glyceria cf fluitans</i> , <i>Veronica beccabunga</i> , <i>Urtica dioica</i>			
<b>Phase 1 Habitat Type:</b>	<b>Affinity with NVC:</b>	<b>WFD95 Wetland Type:</b>	
B5	Affinities with M23 <i>Juncus effusus</i> mire and Swamp communities (S22) - small stand of vegetation, difficult to assign.	2a marshy grassland	
<b>Landscape Setting:</b>		<b>Hydrological features:</b>	
3c waterside: streamside		Stream	
<b>Soil indicators:</b>	<b>Vegetation indicators:</b>	<b>Vegetation height:</b>	<b>Existing pressures:</b>
Mineral soil	Rushes	Ankle	Drainage, nutrient enrichment, cutting
<b>Target Note Reference: TR4.GW21</b>			
			
<b>Photo ID:</b>	TR4.GW21	<b>Grid reference:</b>	SD 71963 44982

<b>Description:</b> Gently sloping area of upland pasture, dominated by rush, recently cut.			
<b>Species list:</b> Dominated by <i>Juncus effusus</i> , with <i>Cirsium palustre</i> , <i>Agrostis stolonifera</i> , <i>Cirsium sp</i>			
<b>Phase 1 Habitat Type:</b>	<b>Affinity with NVC:</b>	<b>WFD95 Wetland Type:</b>	
B5	Difficult to assign - affinities with M23 <i>Juncus effusus-Galium palustre</i> rush pasture	2a marshy grassland	
<b>Landscape Setting:</b>		<b>Hydrological features:</b>	
Upland/upland fringe meadows		N/A	
<b>Soil indicators:</b>	<b>Vegetation indicators:</b>	<b>Vegetation height:</b>	<b>Existing pressures:</b>
Mineral soil	Rushes	Ankle	Drainage, enrichment
<b>Target Note Reference:</b> TR4.GW22			
			
<b>Photo ID:</b>	TR4.GW22	<b>Grid reference:</b>	SD 72085 45220
<b>Description:</b> Small area of marshy grassland, significantly modified by agriculture.			
<b>Species list:</b> Dominated by <i>Juncus effusus</i> with <i>Glyceria cf fluitans</i> , <i>Impatiens glanduifera</i>			
<b>Phase 1 Habitat Type:</b>	<b>Affinity with NVC:</b>	<b>WFD95 Wetland Type:</b>	
B5	Affinities with M23 <i>Juncus effusus</i> and S22 <i>Glyceria fluitans</i> swamp	2a marshy grassland, 3c other springs	
<b>Landscape Setting:</b>		<b>Hydrological features:</b>	
Lowland/upland fringe meadows and springs/streams.		N/A	
<b>Soil indicators:</b>	<b>Vegetation indicators:</b>	<b>Vegetation height:</b>	<b>Existing pressures:</b>
Mineral soil	Rushes	Ankle	Drainage, nutrient enrichment, invasive non native species.

**Target Note Reference: TR4.GW23**




<b>Photo ID:</b>	TR4.GW23	<b>Grid reference:</b>	SD 72039 45085
<b>Description:</b> Sheep grazed pasture with large stands of rush, species poor.			
<b>Species list:</b> Dominated by <i>Juncus effusus</i> with <i>Agrostis stolonifera</i> , <i>Cirsium sp</i> , <i>Urtica dioica</i> , <i>Calliergonella cuspidatum</i>			
<b>Phase 1 Habitat Type:</b>	<b>Affinity with NVC:</b>	<b>WFD95 Wetland Type:</b>	
B5	Affinities with M23 <i>Juncus effusus-Galium palustre</i> rush pasture - mosaic with MG10 <i>Holcus lanatus</i> - <i>Juncus effusus</i> rush-pasture	2a marshy grassland	
<b>Landscape Setting:</b>		<b>Hydrological features:</b>	
Lowland/upland fringe meadows		N/A	
<b>Soil indicators:</b>	<b>Vegetation indicators:</b>	<b>Vegetation height:</b>	<b>Existing pressures:</b>
Mineral soil	Rushes	Knee	Drainage, nutrient enrichment

**Target Note Reference: TR4.GW24**



<b>Photo ID:</b>	TR4.GW24	<b>Grid reference:</b>	SD 72334 45325
<b>Description:</b> Ditch in sheep grazed pasture with fringing soft rush. Species poor.			
<b>Species list:</b> Dominated by <i>Juncus effusus</i> with <i>Agrostis stolonifera</i> and <i>Urtica dioica</i>			
<b>Phase 1 Habitat Type:</b>	<b>Affinity with NVC:</b>	<b>WFD95 Wetland Type:</b>	
B5	Affinities with M23 <i>Juncus effusus-Galium palustre</i> rush pasture	2a marshy grassland	

<b>Landscape Setting:</b>		Hydrological features:	
Lowland/upland fringe meadows		Ditch	
<b>Soil indicators:</b>	<b>Vegetation indicators:</b>	<b>Vegetation height:</b>	<b>Existing pressures:</b>
Mineral soil	Rushes	Knee	Drainage, nutrient enrichment
<b>Target Note Reference: TR4.GW25</b>			
			
<b>Photo ID:</b>	TR4.GW25	<b>Grid reference:</b>	SD 71972 44892
<b>Description:</b> Sheep grazed pastures and stream with band of soft rush dominated marshy grassland.			
<b>Species list:</b> Dominated by <i>Juncus effusus</i> with <i>Angelica sylvestris</i> , <i>Urtica dioica</i> , <i>Impatiens glanduifera</i> , <i>Agrostis stolonifera</i> , <i>Rumex obtusifolius</i>			
<b>Phase 1 Habitat Type:</b>	<b>Affinity with NVC:</b>	<b>WFD95 Wetland Type:</b>	
B5	Affinities with M23 <i>Juncus effusus</i> - <i>Galium palustre</i> rush pasture	2a marshy grassland	
<b>Landscape Setting:</b>		Hydrological features:	
Lowland meadows		Stream	
<b>Soil indicators:</b>	<b>Vegetation indicators:</b>	<b>Vegetation height:</b>	<b>Existing pressures:</b>
Mineral soil	Rushes	Knee	Drainage, nutrient enrichment, game rearing, invasive non native species.
<b>Target Note Reference: TR4.GW26</b>			
			
<b>Photo ID:</b>	TR4.GW26	<b>Grid reference:</b>	SD 71974 44802
<b>Description:</b> Large stand of soft rush on previous conifer plantation, considered to be remnant marshy grassland. Recent replacement tree planting evident.			

<b>Species list:</b> <i>Juncus effusus</i> , <i>Rubus fruticosus</i>			
<b>Phase 1 Habitat Type:</b>	<b>Affinity with NVC:</b>	<b>WFD95 Wetland Type:</b>	
B5	Whilst some affinities with M23 <i>Juncus effusus-Galium palustre</i> rush pasture (due to abundance of <i>Juncus</i> ) it is not possible to classify due to high levels of modification and woodland planting.	2a marshy grassland	
<b>Landscape Setting:</b>		<b>Hydrological features:</b>	
Lowland meadows		Stream	
<b>Soil indicators:</b>	<b>Vegetation indicators:</b>	<b>Vegetation height:</b>	<b>Existing pressures:</b>
Mineral soil	Rushes	Waist	Drainage, nutrient enrichment, tree planting/afforestation.

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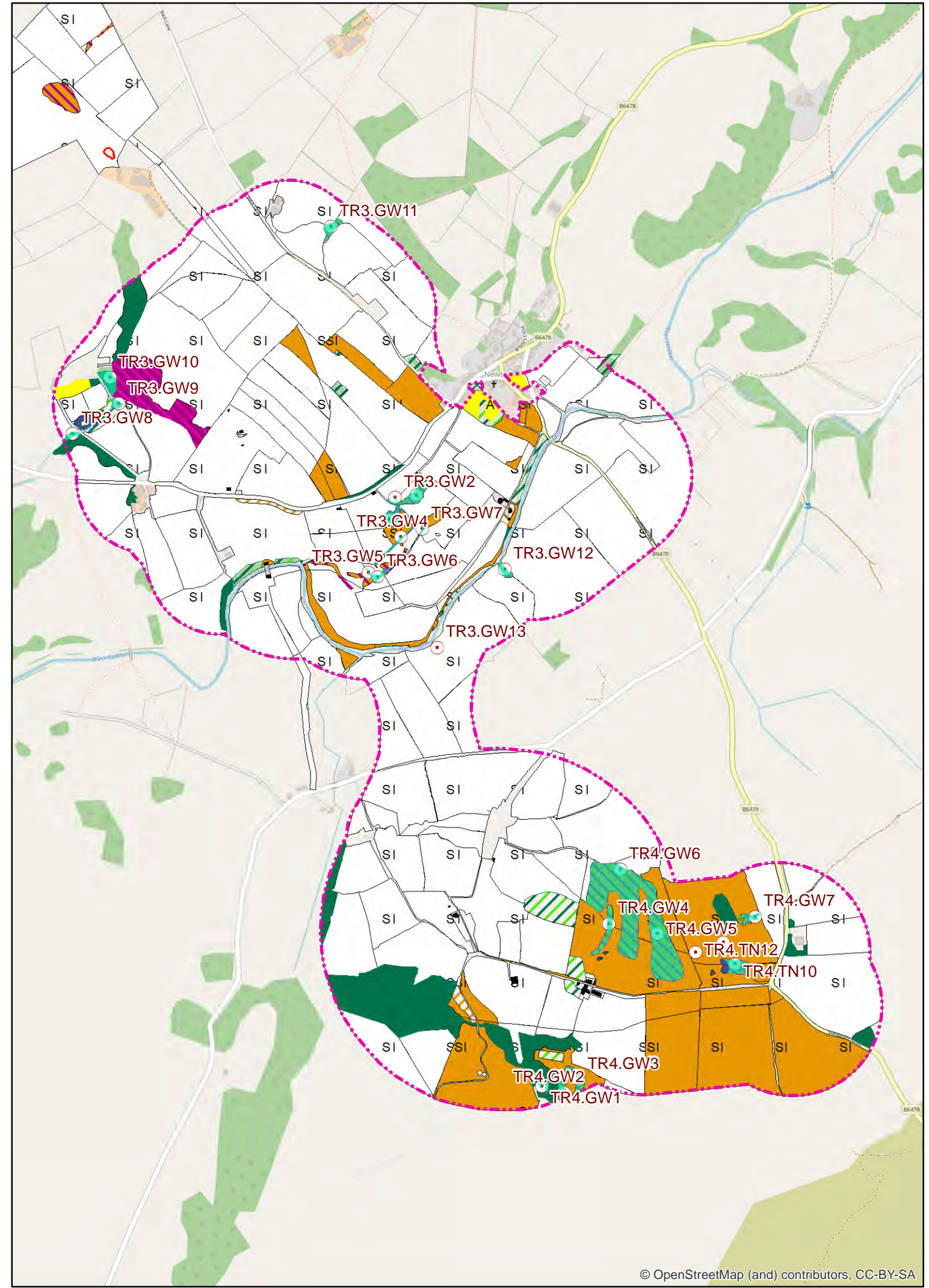
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TR3 SOUTH TR4 NORTH

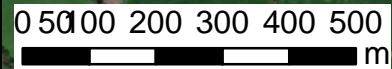


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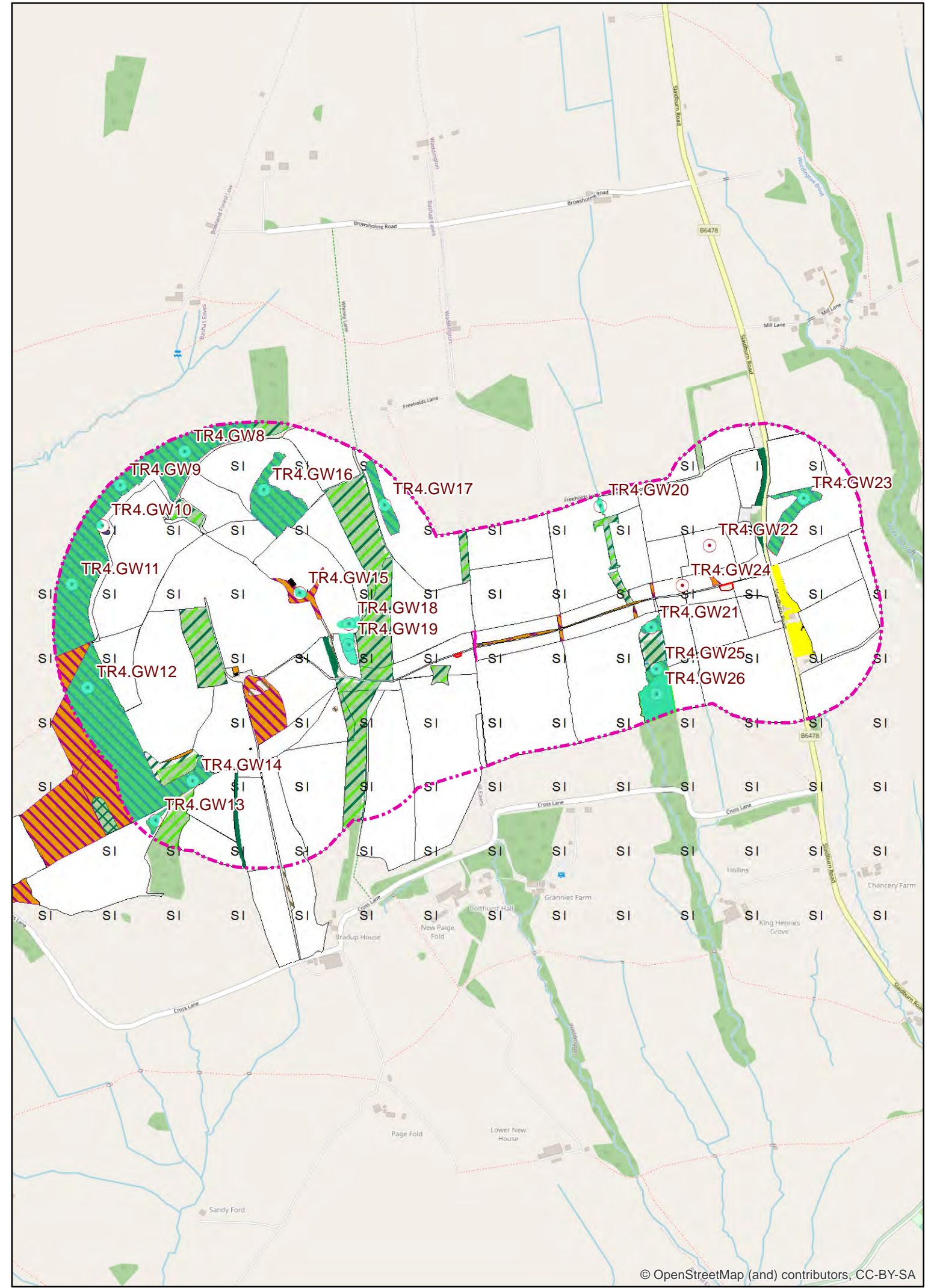


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