

LONDON- WEST MIDLANDS ENVIRONMENTAL STATEMENT

Volume 5 | Technical Appendices

CFA7-15 | Colne Valley to Lower Boddington
**Ecological baseline data: designated sites,
habitat surveys and flora (EC-001-002)**
Ecology

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Department
for Transport

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Volume 5: baseline report - EC-001-002
Ecological baseline data (CFA 7-15)
Designated sites, habitat surveys and flora

1 Introduction

- 1.1.1 This document is an appendix which forms part of Volume 5 of the environmental statement (ES) for the Proposed Scheme It details ecological baseline data collected for the following ecological aspects and species:
- Designated sites;
 - Protected and notable flora;
 - Phase 1 habitats;
 - National vegetation classifications;
 - River habitats;
 - River corridors;
 - Hedgerows;
 - Ditches;
 - Ponds; and
 - Lake habitats.
- 1.1.2 The ecological baseline data detailed within this document relates to community forum areas (CFA):
- CFA7: Colne Valley;
 - CFA8: The Chalfonts and Amersham;
 - CFA9: Central Chilterns;
 - CFA10: Dunsmore, Wendover and Halton;
 - CFA11: Stoke Mandeville and Aylesbury;
 - CFA12: Waddesdon and Quainton;
 - CFA13: Calvert, Steeple Claydon, Twyford and Chetwode;
 - CFA14: Newton Purcell to Brackley; and
 - CFA15: Greatworth to Lower Boddington.
- 1.1.3 The document should be read in conjunction with Volume 2 (community forum area reports), Volume 3 (route wide effects assessment) and Volume 4 (off-route effects assessment).

2 Designated sites

2.1 Introduction

2.1.1 This section of the appendix presents details of sites designated on the basis of their importance for nature conservation, which fall within the scope of the ecological assessment for the section of the Proposed Scheme that will pass through CFA7 to CFA15 inclusive.

2.2 Methodology

2.2.1 Data searches were initially undertaken to identify designated sites within the following extents as defined in the Scope and Methodology Report (SMR):

- statutory designated sites within 10km of the route (i.e. a 10km buffer either side of the centre-line of the route within this area); and
- non-statutory designated sites within 5km of the route (i.e. a 5km buffer either side of the centre-line of the route within this area).

2.2.2 Information on designated sites was obtained from the following data sources:

- Natural England;
- Greenspace Information for Greater London (GiGL);
- Buckinghamshire County Council;
- Oxfordshire County Council
- Thames Valley Environmental Records Centre (TVERC);
- Northamptonshire County Council
- Northamptonshire Biodiversity Records Centre (NBRC); and
- Cherwell District Council.

2.2.3 All sites within the extents defined within the SMR for this area of the route were reviewed to identify those that were considered likely to be relevant to the assessment. Due to the large scale of the Proposed Scheme only details of those sites meeting the following criteria are presented within the baseline section below:

- all statutory designated sites within 500m of land required for the construction of the Proposed Scheme;
- any other statutory designated sites which are considered to potentially be subject to significant effects;
- all non-statutory designated sites within the extent of, or adjacent to, the Proposed Scheme; and

- any other non-statutory designated sites which are considered to potentially be subject to significant effects.

2.3 **Baseline**

Statutory designated sites

- 2.3.1 Table 1 provides details of statutory designated sites relevant to the assessment, based on the criteria identified in Section 2.2.

Appendix EC-001-002

Table 1 Details of statutory designated sites relevant to the assessment in CFA7 to CFA15

Site name and designation	OS grid reference	Site description	Approximate distance from the land required for the construction of the Proposed Scheme ¹ (m) and orientation	Relevant CFA number
Fray's Farm Meadows Site of Special Scientific Interest (SSSI)	TQ 056 859	Designated for species-rich grassland, wetland plants and invertebrates. It includes one of the last areas of unimproved wet alluvial grassland in Greater London and the Colne Valley. The entomological interest of the site is well documented with a good variety of dragonflies and butterfly species present.	Adjacent to the Proposed Scheme	CFA7
Denham Lock Wood SSSI	TQ 055 863	A diverse area of open mire and wet woodland with particularly varied woodland herb flora, which is rare in Greater London.	100m - south	CFA7
Denham Quarry Park Local Nature Reserve (LNR)	TQ 050 863	This site is designated for wetland birds, invertebrates and grassland habitat. A small part of this site is in the Mid Colne Valley Site of Metropolitan Importance (SMI).	Within the Proposed Scheme	CFA7
Frays Valley LNR	TQ 055 865	This site is designated for woodland, grassland, scrub and wetland habitats. This LNR is in the larger Mid Colne Valley SMI	Within the Proposed Scheme	CFA7
Denham Country Park LNR	TQ 051 872	This site is designated for woodland, grassland, scrub and wetland habitats. This LNR is in the larger Mid Colne Valley SMI.	Within the Proposed Scheme	CFA7
Ruislip Woods SSSI	TQ 066 891	This is a large ancient woodland designated for woodland plants and invertebrates with small areas of acid heath vegetation. The site lies adjacent to land required for the construction of the Proposed Scheme south of Breakspear Road North (where National Grid overhead power lines will be realigned) and is within the South Ruislip to Ickenham area (CFA6), but lies adjacent to this section (CFA7).	Adjacent to the Proposed Scheme	CFA6 & adjacent to CFA7
Mid Colne Valley SSSI	TQ 043 896	A large site which comprises five lakes: Korda Lake, Harefield Moor Lake, Broadwater Lake, Tilehouse South Lake and Long Lake. An area of broadleaved woodland, named Battlesford Wood and Ranston Covert is located in the west. The SSSI is designated for a number of features, but	Within the Proposed Scheme	CFA7

¹ Hereafter the term 'land required' is used as a shortened version of the full term 'land required for the construction of the Proposed Scheme'.

Site name and designation	OS grid reference	Site description	Approximate distance from the land required for the construction of the Proposed Scheme ¹ (m) and orientation	Relevant CFA number
		specifically its bird assemblage. It supports 70 breeding and 80 wintering bird species. Woodland breeding birds include kestrel (<i>Falco tinnunculus</i>), lesser whitethroat (<i>Sylvia curruca</i>), nuthatch (<i>Sitta europaea</i>), tawny owl (<i>Strix aluco</i>), green woodpecker (<i>Picus viridis</i>), lesser spotted woodpecker (<i>Dendrocopos minor</i>) and great spotted woodpecker (<i>Dendrocopos major</i>). Wetland birds include coot (<i>Fulica atra</i>), little ringed plover (<i>Charadrius dubius</i>), kingfisher (<i>Alcedo atthis</i>), mute swan (<i>Cygnus olor</i>), and tufted duck (<i>Aythya fuligula</i>). Gadwall (<i>Anas strepera</i>) and shoveler (<i>Anas clypeata</i>) are occasional breeders. Wintering wildfowl include tufted duck, pochard (<i>Aythya ferina</i>) and shoveler, all of which may reach national significant numbers in winter. A large winter cormorant (<i>Phalacrocorax carbo</i>) roost and a heronry is also present in Broadwater Lake. Additional reasons for designation include the water margin vegetation, wet woodland, part of the River Colne and broadleaved woodland; some of which is ancient woodland. This includes a population of coralroot (<i>Cardamine bulbifera</i>), a plant with a nationally restricted distribution. There is also calcareous grassland in an area called Coppermill Down about 950m to the east of land required for the construction of the Proposed Scheme.		
Northmoor Hill Wood LNR	TQ 037 892	This site is designated for ancient woodland.	45m - west	CFA7
Hodgemoor Wood SSSI	SU 968 935	This SSSI is designated for extensive semi-natural broadleaved woodland, which is mostly ancient woodland (both semi-natural and ancient replanted), and for the plant, bird and invertebrate species it supports. The plant species include coralroot (a nationally scarce species), narrow buckler fern (<i>Dryopteris carthusiana</i>), and the hawkweed <i>Hieracium virgulatorum</i> (all uncommon in Buckinghamshire). Breeding bird species include hawfinch (<i>Coccothraustes coccothraustes</i>), a Bird of Conservation Concern (BoCC) ² red list species; and woodcock (<i>Scolopax rusticola</i>) a BoCC amber list species. The woodland is also a habitat of principal importance (identified in Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 ³) and a local Biodiversity Action Plan (BAP) habitat. It is one of the largest tracts of semi-natural broadleaved woodland remaining in the	750m - south. However, it is located adjacent to the A355 Amersham Road, which will be utilised by construction traffic.	CFA8

² Eaton MA, Brown AF, Noble DG, Musgrove AJ, Hearn R, Aebischer NJ, Gibbons DW, Evans A and Gregory RD (2009) *Birds of Conservation Concern 3: the population status of birds in the United Kingdom, Channel Islands and the Isle of Man*. British Birds 102: 296–341.

³ Natural Environment and Rural Communities Act 2006 (Chapter 16), London, Her Majesty's Stationery Office.

Site name and designation	OS grid reference	Site description	Approximate distance from the land required for the construction of the Proposed Scheme ¹ (m) and orientation	Relevant CFA number
		Buckinghamshire Chilterns.		
Bacombe and Coombe Hills SSSI	SP 852 068	This 76.9ha site is located 360m from the western outskirts of Wendover. It is designated for species-rich lowland calcareous grassland, which is a habitat of principal importance and a local BAP habitat. The SSSI is also designated for its population of fringed gentian (<i>Gentianella ciliata</i>), which is found on Coombe Hill and represents the entire UK population. This plant was only recently discovered in the UK. Additional reasons for designation include areas of juniper (<i>Juniperus communis</i>) scrub, lowland mixed deciduous woodland (a habitat of principal importance and local BAP habitat), hazel (<i>Corylus avellana</i>) coppice and some terrestrial invertebrates, including the shield bug (<i>Elasmotethus tristriatus</i>) associated with juniper bushes and butterfly species, such as chalkhill blue (<i>Lysandra coridon</i>), brown argus (<i>Aricia agestis</i>), Duke of Burgundy (<i>Hamearis lucina</i>) and dark green fritillary (<i>Argynnis aglaja</i>). Bacombe Hill is also an LNR.	25m - south-west	CFA10
Bacombe Hill LNR	SP 859 071	This 25ha reserve is principally designated for species-rich open chalk grassland, woodland and juniper scrub, the latter of which has suffered recent decline in the Chilterns. Additional reasons for designation include the liverwort association characterised by <i>Frullania tamarisci</i> , which is very rare in the region, and the presence of the near-endemic moss <i>Seligeria paucifolia</i> .	25m - west	CFA10
Chilterns Beechwood Special Area of Conservation (SAC)	SP 831 058	This SAC is 1276.5ha in size and comprises of nine separate blocks of woodland that are located throughout the Chilterns. One of these blocks, an area of 70.2ha, is approximately 2.5km south of the land required for the construction of the Proposed Scheme. The western tip of this block, a 50m long section of woodland, is adjacent to the A4010 Little Kimble Hill/Aylesbury Road, which will be used by construction traffic. The site is designated for semi-natural dry grasslands and scrubland on chalk and limestone substrates and for beech forests. It is of international value.	2.5km - south. However, it is located adjacent to the A4010 Little Kimble Hill/Aylesbury Road, which will be utilised by construction traffic.	CFA10 & CFA11
Ellesborough and Kimble Warrens SSSI	SP 831 058	The 70.2ha area of the Chilterns Beechwood SAC described above is also designated as a SSSI for the same habitats as described for the SAC. The same 50m long section will be adjacent to the proposed construction traffic route.	2.5km - south. However, it is located adjacent to the A4010 Little Kimble Hill/Aylesbury Road, which will be utilised by construction traffic.	CFA10 & CFA11
Ham Home-cum-Hamgreen Woods	SP 698 191	This 23ha site is designated for mixed and yew woodland, parts of which are ancient semi-natural woodland. Notable species include black hairstreak butterfly (<i>Satyrrium pruni</i>) and breeding	2km - south-west. However, it is located adjacent to the A41 Bicester	CFA12

Site name and designation	OS grid reference	Site description	Approximate distance from the land required for the construction of the Proposed Scheme ¹ (m) and orientation	Relevant CFA number
SSSI		nightingale (<i>Luscinia megarhynchos</i>).	Road, which will be utilised by construction traffic.	
Grendon and Doddershall Woods SSSI	SP 710 210	<p>Designated for its network of wet woodland rides, and breeding bird and butterfly populations. Broadleaved woodland habitats are present dominated by oak (<i>Quercus</i> sp.) with ash (<i>Fraxinus excelsior</i>), field maple (<i>Acer campestre</i>), aspen (<i>Populus tremula</i>) and birch (<i>Betula</i> sp.) and a diverse shrub layer including Midland hawthorn (<i>Crataegus laevigata</i>). There is a stream and network of wide woodland rides, many wet, providing additional habitat diversity.</p> <p>Butterfly assemblage of 35 species including purple emperor (<i>Apatura iris</i>), brown hairstreak (<i>Thecla betulae</i>), black hairstreak, wood white (<i>Leptidea sinapis</i>) and five species of fritillary: the silver washed (<i>Argynnis paphia</i>), high brown (<i>Fabriciana adippe</i>), marsh (<i>Euphydryas aurinia</i>), pearl-bordered (<i>Boloria euphrosyne</i>) and small pearl-bordered (<i>Boloria selene</i>). Not all of these species have been recorded at the site recently, but it is possible that they linger on in small numbers. The breeding bird assemblage includes breeding nightingales.</p>	325m - south	CFA12
Finemere Wood SSSI	SP 718 218	<p>Ancient woodland habitat and flora primarily of the ash-maple type, where ash or oak dominate the canopy and field maple and hazel are present in the shrub layer. Midland hawthorn and coppiced hornbeam (<i>Carpinus betulus</i>) are particular features of this site and notable plant species include wood barley (<i>Hordelymus europaeus</i>), a nationally rare grass species. The flora of the rides is particularly diverse. Unimproved grassland and scrub are also present. The bird assemblage includes breeding nightingale, turtle dove (<i>Streptopelia turtur</i>) and woodcock. Large numbers of wintering birds are also present.</p> <p>Butterfly assemblage, including populations of the nationally rare wood white and black hairstreak as well as white admiral (<i>Limenitis camilla</i>), dark green fritillary, purple hairstreak (<i>Neozephyrus quercus</i>) and holly blue (<i>Celastrina argiolus</i>). Uncommon species of spider, hoverfly and moth are also present.</p> <p>The site is managed by Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust (BBOWT) as Finemere Wood Nature Reserve, which in addition to the SSSI also includes grassland, hedges, ponds and mature trees to the south of Finemere Wood.</p>	Adjacent to the Proposed Scheme	CFA12

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Site name and designation	OS grid reference	Site description	Approximate distance from the land required for the construction of the Proposed Scheme ¹ (m) and orientation	Relevant CFA number
Sheephouse Wood SSSI	SP 703 235	Ancient woodland habitat and flora with a wide range of woodland types including hazel-oak, wet ash-maple and oak-hazel-ash. There is a large population of wild service tree (<i>Sorbus torminalis</i>) and a diversity of shrub species including Midland hawthorn. Woodland rides (linear areas devoid of vegetation) tend to be very wet and support plants characteristic of marshy ground. Breeding bird assemblage of 40 species including woodcock and all three British species of woodpecker. Butterfly assemblage including white admiral, purple hairstreak and black hairstreak. Uncommon species of ground-hopper, bug and beetle are also present.	Adjacent to the Proposed Scheme	CFA ₁₂ & CFA ₁₃
Helmdon Disused Railway SSSI	SP 587 430	The site is designated for lowland calcareous grassland, a habitat of principal importance and a local BAP habitat. It supports locally scarce plant species and invertebrates and is particularly important for butterflies including the small blue (<i>Cupido minimus</i>), a species of principal importance in England (Section 41 of the NERC Act 2006). The SSSI is also important for the nationally scarce wood white butterfly and five nationally declining butterfly species.	Within the Proposed Scheme (in CFA ₁₄)	CFA ₁₄ & CFA ₁₅

- 2.3.2 In addition to the summary table above, further information has been provided in this section on the condition status⁴ for SSSI where the assessment has indicated that sites may be potentially subject to significant effects. The following descriptions of condition status assessments have been sourced from Natural England⁵.
- 2.3.3 The condition status of Fray's Farm Meadows SSSI is classified as unfavourable recovering as of July 2010. It was previously assessed as unfavourable declining due to the density of leaf litter and tall herbs, and decreasing areas of lesser pond sedge (*Carex acutiformis*) swamp. Grazing was identified as the ideal management to address the poor condition of the sward. Cattle grazing has recently commenced with the aim of improving the structural diversity of the sward and removing nutrients from the soil. A High Level Stewardship (HLS) agreement will secure favourable management for the longer term.
- 2.3.4 The condition status of Denham Lock Wood SSSI is classified as favourable as of May 2009 with no loss of habitat extent.
- 2.3.5 The condition status of the Mid Colne Valley SSSI is classified as favourable as of March 2013. It should be noted that a small proportion of this site, consisting of calcareous grassland habitat, is classified as unfavourable declining as of September 2011. However, this habitat is located approximately 100m from land required for the construction of the Proposed Scheme. The breeding bird assemblage of the SSSI, as a whole, was assessed as favourable. It has been identified that Harefield Moor Lake contains a high sediment load, which is likely to affect the aquatic flora and the productivity for breeding birds. It has been recognised that although Broadwater Lake is used for recreational means, disturbance is offset through zoning of activities to allow areas for breeding birds. Also of note is the presence of invasive species including floating pennywort (*Hydrocotyle ranunculoides*) in the River Colne and stands of Japanese knotweed (*Fallopia japonica*) in the woodland.
- 2.3.6 The condition status of Hodgemoor Wood SSSI is classified as favourable as of July 2008 with no indications of loss of woodland habitat.
- 2.3.7 The condition status of Bacombe and Coombe Hills SSSI is largely classified as favourable as of September 2010. However, there are smaller areas of unfavourable recovering and unfavourable declining habitat as of March 2010 and September 2010 respectively.
- 2.3.8 The condition status of Grendon and Doddershall Woods SSSI is classified as favourable as of September 2009. Overall, the wood was assessed as being in favourable condition with a good age range, good structural variation with plenty of dead wood and good amounts of open space created by the coppicing and ride maintenance.
- 2.3.9 The condition status of Finemere Wood SSSI is classified as unfavourable recovering as of September 2010.

⁴ The condition of the SSSI land in England is assessed by Natural England, using categories agreed across England, Scotland, Wales, and Northern Ireland through the Joint Nature Conservation Committee. There are six reportable condition categories: favourable; unfavourable recovering; unfavourable no change; unfavourable declining; part destroyed and destroyed.

⁵ Natural England; Sites of Special Scientific Interest; <http://www.naturalengland.org.uk/ourwork/conservation/designations/sssii/>; Accessed: 03 July 2013.

- 2.3.10 The condition status of Sheephouse Wood SSSI is classified as favourable as of July 2008. The wood is broadly favourable, but close to unfavourable due to the lack of disturbance stands and the effects of deer. The ride management is still not creating the gradation of conditions across the ride and coppicing is now lost but dead wood is abundant.
- 2.3.11 The condition status of Helmdon Disused Railway SSSI is classified as unfavourable recovering as of August 2013. The site entered Higher Level Stewardship (HLS) in 2012 and the management process to achieve favourable condition is now underway.
- 2.3.12 Where additional surveys have been carried out for the Proposed Scheme at accessible statutory designated sites, information is contained in the relevant Technical Appendix. For example a National Vegetation Classification (NVC) and terrestrial invertebrate survey was carried out at Helmdon Disused Railway SSSI in June 2013. The results are presented in the NVC (EC-001-002) and Terrestrial Invertebrates (EC-004-002) Appendices.

Non-statutory designated sites

- 2.3.13 Table 2 provides details of non-statutory designated sites relevant to the assessment.

Table 2 Details of non-statutory designated sites relevant to the assessment in CFA7 to CFA15

Site name and designation	OS grid reference	Site description	Distance from the land required for the construction of the Proposed Scheme ⁶ (m) and orientation	Relevant CFA number
The River Colne east of Denham Biological Notification Site (BNS)	TQ 050 870	This site is designated for river habitat including aquatic plants and supports a diverse array of wetland bird species. Coot, greylag goose (<i>Anser anser</i>), kingfisher, little ringed plover, tufted duck and mute swan regularly nest at this site. Shoveler and gadwall are also known to breed occasionally.	Within the Proposed Scheme	CFA7
Harefield Hall and The Lodge Site of Borough Importance (SBI)	TQ 058 872	This site designated for broadleaved woodland consists of a mixture of habitats including woodland, mature trees, a small pond and grassland habitats.	Within the Proposed Scheme	CFA7
Dew's Dell SBI	TQ 058 880	An old quarry that is designated for broadleaved woodland with small areas of species-rich grassland.	Within the Proposed Scheme	CFA7
London's Canals SMI	TQ 050 881	This site is designated for the diversity of wetland plant, bird and invertebrates species it supports.	Within the Proposed Scheme	CFA7
Breakspear House Woods SBI	TQ 059 895	This site is designated for broadleaved woodland with several species of ancient woodland indicator plant (although it is not listed on the ancient woodland inventory).	Adjacent to the Proposed Scheme	CFA7
Mid Colne Valley SMI	TQ 043 896	This site, which overlaps with and extends south of the Mid Colne Valley SSSI, is designated for wetland and woodland habitats, the Fray's River, species-rich grassland at Fray's Farm Meadows and wintering and breeding birds as discussed above for the SSSI. The SMI designation also lists notable invertebrate species such as Desmoulin's whorl snail (<i>Vertigo moulinsiana</i>) and glow worm (<i>Lampyrus noctiluca</i>), mammals such as water vole (<i>Arvicola amphibius</i>) and harvest mouse (<i>Micromys minutus</i>), and notable plants such as small teasel (<i>Dipsacus pilosus</i>).	Within the Proposed Scheme	CFA7
Colne Valley Gravel Pits Local Wildlife Site (LWS)	TQ 043 896	This site is designated for its wetland habitats and the diversity of wetland bird species it supports. Regular breeders include coot, greylag goose, little ringed plover, mute swan and tufted duck. The banks are of relatively recent origin, but already support various species of	Within the Proposed Scheme	CFA7

⁶ Hereafter the term 'land required' is used as a shortened version of the full term 'land required for the construction of the Proposed Scheme'.

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		willow (<i>Salix</i> sp.), as well as fen plants including water plantain (<i>Alisma plantagoaquatica</i>), yellow iris (<i>Iris pseudacorus</i>) and gipsywort (<i>Lycopus europaeus</i>).		
Broadwater Lake (Herts & Middlesex Wildlife Trust Reserve)	TQ 043 896	This site, which overlaps with and extends south of the Mid Colne Valley SSSI, is designated for birds and wetland habitats similar to the SSSI. However, the Wildlife Trust designation also includes reference to the River Colne as an important bat habitat supporting large numbers of Daubenton's bat (<i>Myotis daubentonii</i>).	30m - east	CFA7
Nightingale Wood BNS	TQ 039 886	This site is designated for its stream and woodland, parts of which are ancient woodland.	100m - north-west	CFA 7
Northmoor Hill Wood and Wyatt's Covert LWS	TQ 037 892	This site is designated for ancient woodland. It includes wet springs and streams and a geological feature known as a 'swallow hole' where an above ground stream flows underground. The site is one of a group of woodlands between Denham Green and Gerrards Cross.	Adjacent to the Proposed Scheme	CFA7
Tilehouse Gravel Pits BNS	TQ 037 897	This site is designated for similar reasons to the Mid Colne Valley SSSI including standing water, water margin habitats and water-birds, including breeding pochard. The area of the site crossed by the route is wet woodland and broadleaved woodland.	Within the Proposed Scheme	CFA7
Great Halings Wood LWS	TQ 031 894	This site is designated for ancient woodland including a species diverse ground flora, under a canopy dominated by mature beech (<i>Fagus sylvatica</i>), with a hazel coppice understorey. A total of 18 ancient woodland Indicator plant species have been recorded. The soils are acidic with only a few base-rich indicator plants being found in a former quarry, where more calcareous soils may have been exposed.	Adjacent to the Proposed Scheme	CFA7
Juniper Wood BNS	TQ 026 897	This site is designated for ancient woodland and consists of hazel coppice with oak standards.	Adjacent to the Proposed Scheme	CFA7
Chalfont St. Giles Churchyard BNS	SU 991 935	This site is designated for calcareous grassland and is bounded by hedgerows.	Within the Proposed Scheme	CFA8
Brentford Wood LWS	SU 959 954	The site is designated for semi-natural broadleaved woodland and ancient woodland. It consists of gha of semi-natural broadleaved woodland and ancient woodland and approximately 11ha of mixed plantation. Dominant tree species are pedunculate oak (<i>Quercus robur</i>), beech, hornbeam and ash. Badgers (<i>Meles meles</i>) have been recorded in this woodland.	The route will pass adjacent to the site, and at a depth of 40m through a tunnel. The site is also located adjacent to the A355 Amersham Road which will be utilised by construction traffic.	CFA8

Shardeloes Lake LWS	SU 939 983	The site is designated for standing open water and wetland birds. Between 2003 and 2011, the site supported wintering gadwall, green sandpiper (<i>Tringa ochropus</i>), shoveler, snipe (<i>Gallinago gallinago</i>), teal (<i>Anas crecca</i>), whooper swan (<i>Cygnus cygnus</i>) and wigeon (<i>Anas penelope</i>).	The route will pass 20m below the site through a tunnel.	CFA8
Mop End Lane LWS	SU 930 977	Designated for species-rich hedgerows that line this old sunken boundary lane.	Adjacent to the Proposed Scheme	CFA8 & CFA9
Weedonhill Wood/High Springs/Ostler's Wood (Weedonhill Complex) LWS	SU 940 990	Designated for semi-natural broadleaved woodland and ancient woodland. The wood includes lowland beech and yew woodland, parts of which qualify as a habitat of principal importance. This site supports coralroot, a scarce plant in Britain. Ancient woodland indicators include pill sedge (<i>Carex pilulifera</i>), wood spurge (<i>Euphorbia amygdaloides</i>), woodruff (<i>Galium odoratum</i>) and bluebell (<i>Hyacinthoides non-scripta</i>).	The route will pass 20m below the site through a tunnel (in CFA 9)	CFA8 & CFA9
Hyde Heath Common BNS	SP 929 004	This BNS is designated for broadleaved woodland, which is also ancient woodland and a habitat of principal importance and a local BAP habitat, and open grassland.	Adjacent to the Proposed Scheme	CFA9
Hyde House Wood BNS	SP 928 007	Designated for broadleaved woodland with a diverse shrub and ground flora. It is a habitat of principal importance and a local BAP habitat.	Adjacent to the Proposed Scheme	CFA9
Mantle's Wood LWS	SP 922 002	Replanted ancient woodland managed for forestry during the past 100 years and designated for its lowland mixed deciduous woodland, parts of which qualify as a habitat of principal importance and local BAP habitat. The wood is situated west of Hyde Heath and is adjacent to several other areas of ancient woodland. The north-western part of this wood is considered to be the most valuable, and comprises mature beech maidens (80-100 years old) with occasional cherry (<i>Prunus</i> sp.) and oak, hornbeam (including old coppice stems), large mature field maples and locally some mature large ash. The understorey has holly (<i>Ilex aquifolium</i>), maple (<i>Acer</i> sp.) and regenerating hornbeam and cherry. The ground flora is locally dominated by bluebell and wood millet (<i>Milium effusum</i>). Thirty ancient woodland indicator plants have been recorded. The remainder of the site is largely conifer/beech plantation.	Within the Proposed Scheme	CFA9
Hedgemoor and Farthings Wood LWS	SP 917 003	Partially replanted woodland managed for forestry during the past 100 years designated for its lowland mixed deciduous woodland, parts of which qualify as a habitat of principal importance and local BAP habitat. Hedgemoor Wood consists mostly of mature beech woodland with frequent ash and wild cherry (<i>Prunus avium</i>); and occasional hornbeam, oak, field maple, birch and sycamore (<i>Acer pseudoplatanus</i>). A number of old trees are	Within the Proposed Scheme	CFA9

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		present including pollards with frequent standing deadwood. Holly is locally frequent in the understorey with occasional hazel, hawthorn (<i>Crataegus monogyna</i>), elder (<i>Sambucus nigra</i>), box (<i>Buxus sempervirens</i>) and yew (<i>Taxus baccata</i>). The LWS includes woodland on clay and chalk with corresponding variety in species diversity, including many ancient woodland indicator species. Bluebell and dog's mercury (<i>Mercurialis perennis</i>) are dominant. Most of Farthings Wood consists of mature plantations of Corsican pine (<i>Pinus nigra</i> subsp. <i>Laricio</i>) often under-planted with beech. Hedgerows are present along the boundaries.		
Hyde Lane Verge BNS	SP 914 004	A narrow lane bounded on both sides by tall holly hedges with occasional hazel. There are two oaks at the southern end. Green hellebore (<i>Helleborus viridis</i>) has been recorded.	Adjacent to the Proposed Scheme	CFA9
Rook Wood LWS	SP 905 006	Replanted ancient woodland managed for forestry during the past 100 years designated for its lowland mixed deciduous woodland, a habitat of principal importance and local BAP habitat. The woodland is dominated by beech, with box locally frequent in the shrub layer, and there is a Corsican pine plantation in the south-east of the wood. The wood supports a rich understorey and field layer with a range of ancient woodland indicator species present.	Adjacent to the Proposed Scheme	CFA9
Sibley's Coppice LWS	SP 908 016	Ancient woodland designated for its lowland mixed deciduous woodland, a habitat of principal importance and local BAP habitat. On the southern edge of South Heath, this acid oak and beech wood has 17 indicator plants including several which are rare in Buckinghamshire, namely sessile oak (<i>Quercus petraea</i>), southern woodrush (<i>Luzula forsteri</i>) and remote sedge (<i>Carex remota</i>). There are also three more unusual plant species to the county which grow here because of the damp and sandy, acid conditions; these are heath wood-rush (<i>Luzula multiflora</i>), oval sedge (<i>Carex ovalis</i>) and pill sedge. Amongst mature oak and beech trees are large rowan (<i>Sorbus aucuparia</i>), cherry and downy birch (<i>Betula pubescens</i>) with natural regeneration of all species.	Within the Proposed Scheme	CFA9
Meadow behind car park, Great Missenden BNS	SP 894 016	The site is a damp lush meadow, designated for its neutral grassland. The River Misbourne passes through the meadow from north to south, but is often dry. Patches of scrub and a small pond are also present.	50m - west	CFA9
Hunts Green Lane LWS	SP 901 037	This lane is designated for species-rich hedgerows and relict woodland ground flora. Hazel and holly are the dominant species in the hedges lining either side of this ancient lane. Other species include spindle (<i>Euonymus europaeus</i>) and hornbeam. The ground flora features relict woodland species, such as yellow archangel (<i>Lamiastrum galeobdolon</i>), wood	100m - east	CFA10

		sorrel (<i>Oxalis acetosella</i>), wood melick (<i>Melica uniflora</i>) and bluebell.		
Rocky Lane near Roberts Wood BNS	SP 884 054	The designated section of the lane is just west of Kingsash and approximately 430m long. It comprises a road side verge, the north side of which contains diverse chalk grassland plant species. Several notable bird species have been recorded at the eastern end of the lane, including yellowhammers (<i>Emberiza citrinella</i>), which are a species of principal importance.	80m - east	CFA10
Wendover Rifle Range BNS	SP 874 065	An old gravel pit, designated for its species-rich grassland, which has developed on a well-drained substrate.	Within the Proposed Scheme	CFA10
Hampden Pond, Wendover BNS	SP 870 073	This 0.9ha site at the southern edge of Wendover comprises a large pond surrounded by woodland. Notable species recorded at the site include great crested newt (<i>Triturus cristatus</i>), yellow wagtail (<i>Motacilla flava</i>) and spotted flycatcher (<i>Muscicapa striata</i>), which are species of principal importance.	70m - east	CFA10
Grassland at North Lee BNS	SP 834 090	Designated for semi-improved neutral grassland. This BNS, a former Agricultural Research Centre, consists of an area of rough grassland surrounded by numerous disused buildings.	Within the Proposed Scheme (in CFA 11)	CFA10 & CFA11
Aylesbury Sewage Works LWS	SP 787 146	Designated for breeding and overwintering birds. Aylesbury Sewage Works LWS largely consists of areas of pasture, open water and scrub. The LWS is adjacent to the River Thames and numerous bird species have been recorded including water rail (<i>Rallus aquaticus</i>), snipe, kingfisher and little owls (<i>Athene noctua</i>). Approximately 5.7ha of the 10.9ha site is lowland meadow, a local BAP habitat and a habitat of principal importance as identified in Section 41 of the NERC Act 2006.	60m - east	CFA11
River Thames, south-east Putlowes and north of Aylesbury BNS	SP 785 146	Designated for its floodplain grassland and riparian habitat. Floodplain grassland supporting species uncommon in the county, including flowering rush (<i>Butomus umbellatus</i>), fat duckweed (<i>Lemna gibba</i>) and unbranched bur-reed (<i>Sparganium emersum</i>). The river flows through improved grassland used as pasture and most banks and river margins comprise rank grassland but there are also some good examples of emergent flora in riparian habitats.	140m - north-east. However, it flows under the A41 Bicester Road, which will be utilised by construction traffic.	CFA11
Waddesdon Park BNS	SP 754 160	The BNS encompasses Waddesdon Manor National Trust site and surrounding parkland. The site consists of parkland habitat with mature broadleaved trees and 36 species of lichen.	30m - south. However, part of the site's northern boundary is adjacent to the A41, which will be utilised by construction traffic.	CFA12
Sunny Hill Farm Pastures	SP 759 180	Unimproved neutral grassland with ridge-and-furrow supporting good species diversity and rare plant species. Vegetation communities include a range of wet grassland types as well	5m - east	CFA12

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LWS		as species-rich neutral grassland. There are also ponds at the site, one with rich flora including uncommon plant species. Black poplar (<i>Populus nigra</i>), a tree with the centre of its UK distribution in the area, is present on site. County rare and uncommon plant species recorded at the site include tubular water-dropwort (<i>Oenanthe fistulosa</i>), brown sedge (<i>Carex disticha</i>), smooth brome (<i>Bromus racemosus</i>), upright brome (<i>Bromus erectus</i>), thread-leaved water-crowfoot (<i>Ranunculus trichophyllus</i>) and great burnet (<i>Sanguisorba officinalis</i>).		
Waddesdon Station Complex LWS	SP 758 180	Designated for calcareous species-rich grassland, this land at a derelict railway station once supported common spotted orchid (<i>Dactylorhiza fuchsii</i>), bee orchid (<i>Ophrys apifera</i>) and pyramidal orchid (<i>Anacamptis pyramidalis</i>), as well as common sedge (<i>Carex nigra</i>) and carnation sedge (<i>Carex panicea</i>). Fine-leaved sandwort (<i>Minautia hybrida</i>) has also been recorded; a nationally scarce species. The banks of the cutting to the east supports a species-rich grassland and there are also areas of wet flush and scrub. In addition, the site offers good bird habitat and also attracts various butterfly species, including marbled white (<i>Melanargia galathea</i>), common blue (<i>Polyommatus icarus</i>) and small copper (<i>Lycena phlaeas</i>).	Within the Proposed Scheme	CFA12
Waddesdon Common LWS	SP 754 183	This LWS consists of seven unimproved species-rich meadows, several of which exhibit ridge-and-furrow. There are also three ponds on site. The floristic diversity of these meadows is extensive and has benefited from the implementation of the countryside stewardship scheme. Two county rare species, meadow thistle (<i>Cirsium dissectum</i>) and distant sedge (<i>Carex distans</i>), are present, as well as several county uncommon species including fen bedstraw (<i>Galium uliginosum</i>), tubular water-dropwort, brown sedge and lesser spearwort (<i>Ranunculus flammula</i>). The site also supports a variety of bird and butterfly species.	Within the Proposed Scheme	CFA12
Blackgrove Meadows BNS	SP 756 184	Neutral grassland with wintering birds, pond and an important species-rich hedgerow. The meadows, which show ridge-and-furrow, are liable to flooding and during winter support mallard (<i>Anas platyrhynchos</i>), snipe and teal.	Adjacent to the Proposed Scheme	CFA12
Grendon and Doddershall Meadows LWS	SP 721 206	Designated for diverse grassland, scrub and pond habitats, and flora including county uncommon plant species namely sneezewort (<i>Achillea ptarmica</i>) and fen bedstraw. Farmland bird assemblage including skylark (<i>Alauda arvensis</i>) and yellowhammer. Butterfly assemblage including common blue and marbled white.	Within the Proposed Scheme	CFA12

BNS along track leading to Aylesbury Link disused railway line	SP 709 216	Narrow track with hedgerows supporting county uncommon plant species including spiny restharrow (<i>Ononis spinosa</i>), which are characteristic of calcareous soils.	Within the Proposed Scheme	CFA12
Finemere Wood Nature Reserve	SP 712 218	This nature reserve managed by BBOWT consists of semi-improved grassland in addition to Finemere Wood SSSI, as well as hedges, ponds and mature trees forming supporting habitat to nearby woodlands.	Within the Proposed Scheme	CFA12
Greatsea Wood LWS	SP 714 229	Ancient semi-natural broadleaved woodland of the oak-ash-maple type separated from the adjacent Romer Wood LWS by a species-rich central ride. Largely replanted but with mature woodland and good ground flora around the edges. The site supports the following county uncommon and rare plants: upright brome, oval sedge, carnation sedge, pale sedge (<i>Carex pallescens</i>), heath wood-rush, lesser spearwort and wild service tree. Wild service tree and bluebell are listed in the local BAP.	Adjacent to the Proposed Scheme	CFA12
Romer Wood LWS	SP 712 231	This is an ancient semi-natural broadleaved woodland of the oak-ash-maple type separated from the adjacent Greatsea Wood LWS by a species-rich central ride. The site is designated for the same features as stated for Greatsea Wood LWS.	Adjacent to the Proposed Scheme	CFA12
Decoypond Wood LWS	SP 695 239	A small ancient semi-natural woodland comprising a mix of wet ash and relic hazel coppice with oak, birch and field maple. Amongst a variety of plants are wood sedge (<i>Carex sylvatica</i>), bluebell, primrose (<i>Primula vulgaris</i>), wood millet and three-veined sandwort (<i>Moehringia trinervia</i>), with sedges and meadowsweet (<i>Filipendula ulmaria</i>) in the damper areas.	Within the Proposed Scheme	CFA13
Calvert Railway Station LWS	SP 689 247	Old railway station with diverse wet grassland and scattered scrub which supports county uncommon and rare plant species including devil's-bit scabious (<i>Succisa pratensis</i>), quaking-grass (<i>Briza media</i>), pepper-saxifrage (<i>Silaum silaus</i>), carnation sedge, betony (<i>Stachys officinalis</i>), sneezewort and common spotted orchid. There are records at the site for trailing St. John's-wort (<i>Hypericum humifusum</i>) and trailing tormentil (<i>Potentilla anglica</i>). The scattered scrub and overall habitat mosaic provides favourable conditions for invertebrates including butterflies and dragonflies, reptiles including common lizard (<i>Zootoca vivipara</i>), and breeding birds. The LWS has been subject to vegetation clearance in the last few years. Further details are provided below this table.	Within the Proposed Scheme	CFA13

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Area north-west of Calvert Brickworks BNS	SP 683 244	Rough neutral grassland with wet area towards the lake in the BNS. Contains adder's-tongue fern (<i>Ophioglossum vulgatum</i>), bee orchid and common spotted orchid. Invertebrate records include dingy skipper (<i>Erynnis tages</i>) and grizzled skipper (<i>Pyrgus malvae</i>).	275m - west. However, this site is adjacent to Perry Hill, which will be utilised by construction traffic.	CFA13
Calvert Jubilee LWS	SP 684 254	Designated for grassland, scrub, woodland and wetland habitats. It is also an important site for overwintering wildfowl; species recorded at the site include tufted duck, teal, pochard and water rail. Other bird records include nightingale and treecreeper (<i>Certhia familiaris</i>). The variety of habitats host some rare plants, including the county uncommon species blue fleabane (<i>Erigeron acer</i>), devil's-bit scabious and heath grass (<i>Danthonia decumbens</i>). The site is also designated for its invertebrate assemblage including green hairstreak (<i>Callophrys rubi</i>), dingy and grizzled skipper butterflies and numerous dragonflies. The site is managed as a nature reserve by BBOWT.	Within the Proposed Scheme	CFA13
Calvert Brick Pits LWS	SP 676 250	Large lake surrounded by a mosaic of hawthorn and blackthorn (<i>Prunus spinosa</i>) scrub and rabbit-grazed grassland glades. Includes areas of diverse calcareous grassland, with numerous plant species present in short cropped turf. County uncommon plant species present include trailing tormentil and blue fleabane. Supports large numbers of butterflies.	Within the Proposed Scheme	CFA13
Redland Bridge, Steeple Claydon BNS	SP 695 264	A section of a small river that is designated for notable water quality, which flows under a road from Steeple Claydon to Calvert.	Within the Proposed Scheme	CFA 13
Padbury Brook, Three Bridge Mill BNS	SP 675 268	A section of the watercourse designated for notable water quality and associated marginal habitat.	Within the Proposed Scheme	CFA13
Railway Cutting north of Twyford BNS	SP 660 271	Part of the former Great Central Main Line (GCML) disused railway. It is designated for hawthorn scrub and diverse grassland. The grassland offers good potential habitat for reptiles, breeding birds and foraging bats.	Within the Proposed Scheme	CFA13
Chetwode Cutting BNS	SP 639 290	Disused railway track designated for neutral grassland and two well-vegetated fish ponds. The marginal vegetation of the ponds include rushes, willows and the county uncommon unbranched bur-reed.	Within the Proposed Scheme	CFA13
Church Copse LWS	SP 640 340	Hazel coppice with mature oak, an abundance of birdlife and good variety of trees and shrubs. Ground flora includes wood anemone (<i>Anemone nemorosa</i>), primrose, bluebell, remote and wood sedge, with wetter areas supporting pendulous sedge (<i>Carex pendula</i>),	30m - east	CFA13

		comfrey (<i>Symphytum officinale</i>) and soft rush (<i>Juncus effusus</i>).		
Barton Hartshorn Railway Wood LWS	SP 634 305	Wet osier willow (<i>Salix viminalis</i>) wood with remnant fen and wet grassland areas and some notable plant species, including greater tussock sedge (<i>Carex paniculata</i>), sharp-flowered rush (<i>Juncus acutiflorus</i>), blunt-flowered rush (<i>Juncus subnodulosus</i>) and fen bedstraw.	Within the Proposed Scheme	CFA13
Old LNER Railway District Wildlife Site (DWS) ⁷	SP 613 344	The site is a disused railway line, south east of Brackley, designated for species-rich grassland, tall herb vegetation, rough grassland and small wooded areas. It is also of interest for butterflies and other invertebrates. There is scrub along the edges with a strip of grassland down the centre. The areas of species-rich grassland are limited in their extent. The site includes some small stands of lowland calcareous grassland, a habitat of principal importance and a local BAP habitat; species include upright brome, greater knapweed (<i>Centaurea scabiosa</i>) and field scabious (<i>Knautia arvensis</i>).	Within the Proposed Scheme	CFA14
Turweston Manor Grassland LWS	SP 602 386	Designated for species-rich fen and calcareous grassland. Part of the LWS comprises lowland fen, which is a habitat of principal importance and a local BAP habitat. Lowland calcareous grassland is also a habitat of principal importance. Several locally scarce plant species are present in these habitats, including blunt-flowered rush, sharp-flowered rush, fen bedstraw, brown sedge and bottle sedge (<i>Carex rostrata</i>), water horsetail (<i>Equisetum fluviatile</i>) and marsh valerian (<i>Valeriana dioica</i>). The calcareous grassland flora includes hoary plantain (<i>Plantago media</i>), lady's bedstraw (<i>Galium verum</i>), salad burnet (<i>Sanguisorba minor</i>) and cowslip (<i>Primula veris</i>). The area supports a variety of animal species, including brown hare (<i>Lepus europaeus</i>) and grey partridge (<i>Perdix perdix</i>), both of which are species of principal importance, kingfisher and several damselflies. The existing cattle grazing management is required to maintain the integrity and conservation status of this site.	Within the Proposed Scheme	CFA14
Fox Covert (Whitfield) LWS	SP 594 396	Designated for its semi-natural broadleaved woodland, which has a canopy dominated by ash, pedunculate oak, field maple and wild cherry trees, and an understorey composed of old hazel coppice, English elm (<i>Ulmus procera</i>) and hawthorn. The ground flora, which includes several species of ancient woodland indicator plant (although it is not listed on the ancient woodland inventory), is largely dominated by bramble (<i>Rubus fruticosus agg.</i>) and common nettle (<i>Urtica dioica</i>), with large areas of cow parsley (<i>Anthriscus sylvestris</i>) and herb robert (<i>Geranium robertianum</i>). The woodland is also of value to breeding birds,	Within the Proposed Scheme	CFA14

⁷ The Old London and North Eastern railway (LNER) is the name provided to a series of connected railway lines and includes the Former Greater Central Main Line, which is discussed in the Waddesdon and Quatinton area (CFA12) and the Calvert, Steeple Claydon, Twyford and Chetwode area (CFA13).

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		badgers and invertebrates.		
Radstone Road Verge LWS	SP 584 416	This fairly wide road verge, designated for its species-rich neutral grassland, supports a number of less common flowering plant species including extensive areas of strawberry clover (<i>Trifolium fragiferum</i>), common centaury (<i>Centaureum erythraea</i>), bee orchid and common spotted orchid. The ditch bordering the verge also features a rare lichen species, known as <i>Cladonia rangiformis</i> .	Within the Proposed Scheme	CFA14 & CFA15
Halse Copse South LWS	SP 575 416	Designated for woodland. The northern half is ancient woodland and the rest is an example of lowland deciduous woodland, a habitat of principal importance as identified in Section 41 of the NERC Act 2006 and a local BAP habitat. This woodland is dominated by pedunculate oak and ash. The understorey of this woodland consists mainly of hawthorn and hazel thickets. Other species include common spotted orchid, enchanter's nightshade (<i>Circaea lutetiana</i>), giant fescue (<i>Festuca gigantea</i>), rough meadow grass (<i>Poa trivialis</i>) and dock (<i>Rumex</i> sp.). The woodland is characterised by three rides that begin in the west, south and eastern woodland margins, which all converge into the centre of the woodland where an open glade is present and some replanting has also taken place. A manmade spring-fed watercourse also runs through the southern ride past the glade and out of the northern side of the woods.	Within the Proposed Scheme	CFA15
Halse Copse Meadow LWS	SP 572 421	Designated for its species-rich neutral grassland meadow. A typical example of a lowland meadow with an abundance of common herb species including common knapweed (<i>Centaurea nigra</i>) and bird's-foot trefoil (<i>Lotus corniculatus</i>). To the north it lies adjacent to Halse Copse North LWS and is bordered by hawthorn hedgerows on its three other boundaries. The site also attracts a variety of insects including bees, crickets, grasshoppers and butterflies, such as meadow brown (<i>Maniola jurtina</i>) and ringlet (<i>Aphantopus hyperantus</i>).	80m - East	CFA15
Halse Copse North LWS	SP 571 423	Designated for woodland, of which all is ancient woodland, a habitat of principal importance and a local BAP habitat. The western most 1.2ha of the LWS comprises a grass field, which will be next to an area of land required for the construction of the Proposed Scheme that will be used for ecological compensation.	Adjacent to the Proposed Scheme	CFA15
Washbrook Spinney LWS	SP 561 439	Designated for semi-natural broadleaved woodland comprising ash and field maple with a ground flora dominated by dog's mercury.	470m - north. However, it may be subject to changes in ground water.	CFA15

Washbrook Lake LWS	SP 563 439	Designated for open standing water and marshy grassland.	675m - north. However, it may be subject to changes in ground water.	CFA15
Trafford Bridge Marsh LWS	SP 516 480	Designated for semi-improved grassland, swamp and lowland fen, of which the latter is a habitat of principal importance and local BAP habitat. It also includes part of the River Cherwell, which has natural banks and some aquatic plants. Valuable as an unusual piece of habitat in the Cherwell Valley that represents a once-common association of species. The swamp, grassland and river provide a mosaic of habitats with good botanical interest.	Within the Proposed Scheme	CFA15
Aston le Walls Railway Line LWS	SP 486 507	Designated for its species-rich neutral grassland. A linear site that acts as a wildlife corridor in the landscape, the LWS consists of dense hawthorn and blackthorn scrub and tall species rich grassland comprising knapweed (<i>Centaurea sp.</i>), black medick (<i>Medicago lupulina</i>), ribbed melilot (<i>Melilotus officinalis</i>) and meadow vetchling (<i>Lathyrus pratensis</i>). Grassland within the LWS supports a good number of grasshoppers and crickets. Other habitats include a series of ponds alongside areas of recently planted woodland that create a valuable wildlife habitat in conjunction with the railway line.	Within the Proposed Scheme	CFA15

- 2.3.14 In addition to the summary table above, where relevant, further information has been provided in this section for those non-statutory sites where the assessment has indicated that potentially they may be subject to significant effects.
- 2.3.15 Biological Notification Sites (BNS) preceded Local Wildlife Sites (LWS) as a local non-statutory designation. They were first designated in the late 1980s and have since been revised. There are no formal citations and for some sites survey data was not obtainable. All BNS are in the process of being re-surveyed and assessed under LWS criteria; until this process is complete the two designations will continue to be in use. Local planning documents in Buckinghamshire treat BNS as equivalent to LWS.
- 2.3.16 At Grendon and Doddershall Meadows LWS, certain areas to the west of this site are in an unfavourable condition. BBOWT consider on-going management as a requirement to return it to a more favourable condition or, at least, to prevent any further decline.
- 2.3.17 At Calvert Railway Station LWS, the site largely consisted of scattered scrub and ephemeral/short perennial habitats. However, field surveys during 2013 in support of the Proposed Scheme confirmed that certain areas of vegetation at the site had recently been cleared. Also present were large areas of deadwood and rubble within the site boundary that supports a suitable habitat mosaic for invertebrates and reptiles. Although the LWS had changed in characteristics following areas of vegetation clearance it was determined as still having ecological value, albeit only partially linked to the notification of the LWS.
- 2.3.18 Old LNER Railway DWS was previously designated as an LWS; however, its value was downgraded due to the loss of ecological interest. The site still contains lowland calcareous grassland of BAP priority habitat quality, which is important for supporting butterflies and is also likely to be of importance for other invertebrates.
- 2.3.19 The marshy land at Trafford Bridge Marsh LWS is drying out as a result of shading from the poplar plantation situated in this area. The site has also lost certain fen species due to succession.
- 2.3.20 Where additional surveys have been carried out for the Proposed Scheme at the non-statutory designated site, this information is contained in the relevant Technical Appendix.

3 Protected and/or notable flora

3.1 Introduction

- 3.1.1 This section of the appendix presents baseline information relating to protected and/or notable flora (including vascular and non-vascular plants, and notable trees) for the section of the Proposed Scheme that will pass through CFA7 to 15 inclusive.

3.2 Methodology

3.2.1 Desk study records relating to protected and/or notable flora (including notable trees) were obtained from the following data sources.

- Greenspace Information for Greater London (GiGL);
- Buckinghamshire and Milton Keynes Environmental Records Centre (BMERC);
- Hertfordshire Biological Records Centre (HEBERC);
- Northamptonshire Biological Records Centre;
- British Bryological Society;
- Chilterns Conservation Board;
- site management plans, where information was publically available; and
- meetings with the county recorders for plants for Buckinghamshire and Northamptonshire.

3.2.2 Records of protected and/or notable flora were also obtained during the course of Phase 1 habitat and NVC surveys. Protected and/or notable flora are those included on the JNCC Conservation Designations for UK Taxa list⁸ and the London Biodiversity Action Plan (BAP) Priority list⁹. They also include species recorded during field surveys or included in species lists supplied by third parties that are considered, on the basis of expert opinion, to be uncommon and confined to and characteristic of good plant habitats such as old grassland, long-established wetlands, or ancient woodland. The London BAP Priority Species and Species of Conservation Concern list¹⁰ is referred to in the remainder of this report as the London Priority List.

3.2.3 In addition to those mentioned above, the following are also considered notable:

- those on the IUCN Red List of threatened plants;
- those on the Vascular Plant Red Data List for Great Britain published by JNCC;
- those on the revised Red List of Bryophytes in Britain¹¹;
- species of principal importance for the conservation of biodiversity in England¹²;
- species identified as nationally scarce or rare¹³; and
- species identified from Buckinghamshire and Northamptonshire local wildlife site designation criteria.

⁸ <http://jncc.defra.gov.uk/page-3408>

⁹ <http://www.lbp.org.uk/londonpriority.html> first accessed in May 2013

¹⁰ <http://www.lbp.org.uk/londonpriority.html>

¹¹ Revised Red List of Bryophytes in Britain. *Field Bryology*, No. 103, February 2011.

¹² Identified as species listed under Section 41 (S41) of the natural Environment and Rural Communities (NERC) Act, 2006

¹³ JNCC Conservation designations for UK taxa

3.3 Deviations, constraints and limitations

3.3.1 The baseline has not been constrained by any restrictions on access to desk study records. Constraints and limitations with regards to field surveys were as follows:

- completeness of survey data was dependant on access to land. In some case this was not granted;
- when surveying from Public Rights of Way it was not possible to walk over habitats to assess the species present; and
- some sites were visited at times of year when many plant species are not in evidence, and others are hard to identify (especially the winter months). At any time of year a few species may be difficult to identify because they lack seasonal characters essential to identification, e.g. fruits.

3.4 Baseline

3.4.1 Records of protected and/or notable species from locations within the proposed scheme are relevant to the assessment, and accordingly reported below. So too are records from more distant locations that are potentially subject to adverse effects.

Desk study

3.4.2 A summary of desk study records of protected or notable flora considered relevant to the assessment is provided in Table 1.

Table 3: Desk study records of protected and/or notable species records relevant to the assessment in CFA 7 to CFA 15 inclusive.

Common name	Scientific name	Status	Location	Comments (Source of record etc.)	OS grid reference	CFA	Within the Proposed Scheme (Yes/No)
Box	<i>Buxus sempervirens</i>	Nationally rare	Denham, Woodland south of Denham Lodge	BMERC	TQ04768610	7	No
Good-King-Henry	<i>Chenopodium bonus-henricus</i>	Red list: Vulnerable	Denham Golf Club island, west of Colne	BMERC	TQ05058663	7	No
Slender parsley-piert	<i>Aphanes australis</i>	County scarce	Denham	BMERC	TQ08N	7	No
Golden-scaled male fern	<i>Dryopteris affinis ssp. affinis</i>	County scarce	Denham	BMERC	TQ08N	7	No
Field garlic	<i>Allium oleraceum</i>	Red list: Vulnerable	Denham	GIGL	TQ051873	7	No
Wild cotoneaster	<i>Cotoneaster cambricus</i>	WCA Schedule 8; Red list: Critically endangered;	Denham	GIGL	TQ056876	7	No

Common name	Scientific name	Status	Location	Comments (Source of record etc.)	OS grid reference	CFA	Within the Proposed Scheme (Yes/No)
		Nationally rare					
Slender tare	<i>Vicia parviflora</i>	Red list: Vulnerable; Nationally scarce	Battlesford Wood, Denham	GIGL	TQ040891	7	No
Bluebell	<i>Hyacinthoides non-scripta</i>	WCA Schedule 8	West Hyde	HEBRC	TQ015915	7	Yes
Bluebell	<i>Hyacinthoides non-scripta</i>	WCA Schedule 8	Maple Cross: Shire lane area	HEBRC	TQ010930	7	Yes
Bluebell	<i>Hyacinthoides non-scripta</i>	WCA Schedule 8	West Hyde	HEBRC	TQ030910	7	Yes
Bluebell	<i>Hyacinthoides non-scripta</i>	WCA Schedule 8	Maple Cross area	HEBRC	TQ030930	7	Yes
Spear-leaved willowherb	<i>Epilobium lanceolatum</i>	County rare	Mantle's Green	BMERC	SU950 970	8	Yes
Sainfoin	<i>Onobrychis viciifolia</i>	Red list: Near threatened	Chalfont St. Peters	BMERC	TQ019 907	8	No
Coralroot	<i>Cardamine bulbifera</i>	Nationally scarce	Ash Grove	BMERC	SU937 987	8	No
Golden-scaled male fern	<i>Dryopteris affinis ssp. affinis</i>	County scarce	Shardloes	BMERC	SU93859800	8	No
White helleborine	<i>Cephalanthera damasonium</i>	Species of Principal importance; Red list: Vulnerable	Near Coleshill	BMERC	SU948967	8	No
Coralroot	<i>Cardamine bulbifera</i>	Nationally scarce	Little Missenden	BMERC	SU99J	9	No
Coralroot	<i>Cardamine bulbifera</i>	Nationally scarce	Keeper's Wood	BMERC	SU932990	9	No
Pale lady's mantle	<i>Alchemilla xanthochlora</i>	County scarce	Suffolk Bridge	BMERC	SU914992	9	No
Toothwort	<i>Lathraea squamaria</i>	County scarce	Suffolk Bridge	BMERC	SU914992	9	No
Wood barley	<i>Hordelymus europaeus</i>	Nationally scarce	South Heath	BMERC	SP90A	9	Yes
Wood barley	<i>Hordelymus europaeus</i>	Nationally scarce	Stocking's Wood	BMERC	SP899017	9	No
Wild pansy	<i>Viola tricolor</i>	Red list: Near	Little	BMERC	SU99J	9	No

Common name	Scientific name	Status	Location	Comments (Source of record etc.)	OS grid reference	CFA	Within the Proposed Scheme (Yes/No)
		threatened	Missenden				
Box	<i>Buxus sempervirens</i>	Nationally rare	Hodgemoor and Farthings Wood	BMERC	SP917005	9	Yes
Box	<i>Buxus sempervirens</i>	Nationally rare	Woodlands Park	BMERC	SP888034	9	No
Maiden pink	<i>Dianthus deltoides</i>	Red List: Near threatened; Nationally scarce; Locally extinct as native	Hyde Heath area (road verge)	BMERC	SU924995	9	No
Brittle bladder-fern	<i>Cystopteris fragilis</i>	County rare	South Heath	C251 1st submission	SP900011	9	No
Green-flowered helleborine	<i>Epipactis phyllanthes</i>	Nationally scarce; County rare	Lotts Wood, Weedon Hill Woods complex	Richard Carter (pers. com.)	SU937990	9	Yes
Common wintergreen	<i>Pyrola minor</i>	County extinct	Lotts Wood, Weedon Hill Woods complex	Richard Carter (pers. com.)	SU937990	9	Yes
Bramble sp.	<i>Rubus scaber</i> ¹⁴	County scarce	Sibley's Coppice	NVC Data	SP696235	9	Yes
Dodder	<i>Cuscuta epithymum</i>	Red list: Nationally vulnerable; County scarce	Wendover	BMERC	SP80T	10	Yes
Common juniper	<i>Juniperus communis</i>	Species of Principal importance; Nationally important	Wendover	BMERC	SP80T	10	Yes
Toothwort	<i>Lathraea squamaria</i>	County scarce	Wendover	BMERC	SP80T	10	Yes
Water-soldier	<i>Stratiotes aloides</i>	Red list: Near threatened; Nationally rare	Wendover	BMERC	SP80T	10	Yes
Corn marigold	<i>Glebionis segetum</i>	Red list: Nationally vulnerable	Wendover Bypass	BMERC	SP863078	10	Yes
Black poplar	<i>Populus nigra ssp.</i>	Locally	Wellwick	BMERC	SP851083	10	Yes

¹⁴ Taxonomy follows 'Brambles of the British Isles' by ES Edees & A Newton.

Common name	Scientific name	Status	Location	Comments (Source of record etc.)	OS grid reference	CFA	Within the Proposed Scheme (Yes/No)
	<i>betulifolia</i>	important	Farm				
Round-fruited rush	<i>Juncus compressus</i>	Red list: Near threatened	World's End	BMERC	SP8oP	10	Yes
Mudwort	<i>Limosella aquatica</i>	Red list: Least concern	Weston Turville Reservoir SSSI	Draft Environmental Statement May 2013	SP869o62	10	No
Orange foxtail	<i>Alopecurus aequalis</i>	Red list: Least concern	Weston Turville Reservoir SSSI	Draft Environmental Statement May 2013	SP869o62	10	No
Grey club rush	<i>Schoenoplectus tabernaemontani</i>	Red list: Least concern	Weston Turville Reservoir SSSI	Draft Environmental Statement May 2013	SP869o62	10	No
Fringed gentian	<i>Gentianopsis crinita</i>	WCA Schedule 8; Species of Principal importance; Red list: Critically endangered; Nationally rare; County rare	Bacombe and Coombe Hills SSSI	Draft Environmental Statement May 2013	SP848o65	10	No
Box	<i>Buxus sempervirens</i>	Nationally rare	Not Specified	Draft Environmental Statement May 2013	Unknown	10	No
Box	<i>Buxus sempervirens</i>	Nationally rare	Hedgerow, King's Lane	BMERC	SP897o38	10	No
Box	<i>Buxus sempervirens</i>	Nationally rare	Hedgerow, King's Lane	BMERC	SP892o39	10	No
Field gromwell	<i>Lithospermum arvense</i>	Red List: Endangered	Field edge near Rocky Lane	BMERC	SP883o55	10	No
Wood barley	<i>Hordelymus europaeus</i>	Nationally scarce	Wendover	BMERC	SP8oT	10	No
Pale St John's-wort	<i>Hypericum montanum</i>	Red List: Near threatened	Grassland between railway and A413, Wendover	BMERC	SP872o7o	10	No
Common juniper	<i>Juniperus communis</i>	Species of Principal Importance; Nationally	Bacombe Hill	BMERC	SP862o73	10	No

Common name	Scientific name	Status	Location	Comments (Source of record etc.)	OS grid reference	CFA	Within the Proposed Scheme (Yes/No)
		important					
Wood barley	<i>Hordelymus europaeus</i>	Nationally scarce	Not Specified	Draft Environmental Statement May 2013	Unknown	10	No
White helleborine	<i>Cephalanthera damasonium</i>	Species of Principal importance; Red list: Vulnerable	Not Specified	Draft Environmental Statement May 2013	Unknown	10	No
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	East of Nash Lee	BMERC	SP851082	10	No
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Nash Lee Moat	BMERC	SP843084	10	No
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Stream south of Nash Lee	BMERC	SP843085	10	No
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	World's End	BMERC	SP80P	10	No
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Orchard north of Nash Lee	BMERC	SP80P	10	No
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Stock Grove Farm, Nash Lee	BMERC	SP837088	11	No
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Land north of Nash Lane, Wendover	BMERC	SP842089	11	Yes
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Land north of Nash Lane, Wendover	BMERC	SP843091	11	Yes
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Land north of Nash Lane, Wendover	BMERC	SP820092	11	Yes
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Marsh Hill Farm, Marsh	BMERC	SP821090	11	No
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Marsh Hill Farm, Marsh	BMERC	SP820091	11	No
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Marsh Hill Farm, Marsh	BMERC	SP819092	11	No
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Stoke Brook north of Nash Lee	BMERC	SP844092	11	Yes
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Fields north of Nash Lee	BMERC	SP845092	11	Yes

Common name	Scientific name	Status	Location	Comments (Source of record etc.)	OS grid reference	CFA	Within the Proposed Scheme (Yes/No)
			Orchard				
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Land just off Risborough Road	BMERC	SP8309	11	Yes
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Hideaway Farm	BMERC	SP8409	11	No
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Land at Stoke House	BMERC	SP839095	11	No
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Land off Bishopstone Road	BMERC	SP815097	11	No
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Stoke Brook south of Aylesbury	BMERC	SP832099	11	No
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Stoke Brook	BMERC	SP831101	11	No
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Standalls Farm, Bishopstone	BMERC	SP8110	11	Yes
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Moat Farm, Stoke Mandeville	BMERC	SP8210	11	No
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Stoke Brook	BMERC	SP814105	11	No
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Stoke Brook	BMERC	SP823107	11	Yes
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Stoke Brook	BMERC	SP818109	11	Yes
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Stoke Brook	BMERC	SP819109	11	Yes
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Fields adjacent to Hall End, Stoke Mandeville	BMERC	SP826109	11	No
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Fields adjacent to Hall End, Stoke Mandeville	BMERC	SP827109	11	No
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Bishopstone	BMERC	SP81A	11	No

Common name	Scientific name	Status	Location	Comments (Source of record etc.)	OS grid reference	CFA	Within the Proposed Scheme (Yes/No)
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Fields north west of Bishopstone	BMERC	SP806110	11	No
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Fields adjacent to Hall End, Stoke Mandeville	BMERC	SP828110	11	No
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Sedrup Farm, Lower Hartwell	BMERC	SP8011	11	No
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Area south of Southcourt, Aylesbury	BMERC	SP8111	11	No
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Sedrup Farm, Lower Hartwell	BMERC	SP799118	11	No
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Sedrup Farm, Lower Hartwell	BMERC	SP802118	11	No
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Sedrup Farm, Lower Hartwell	BMERC	SP804119	11	Yes
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Sedrup Farm, Lower Hartwell	BMERC	SP805119	11	Yes
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Sedrup Brook	BMERC	SP807119	11	Yes
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Park Villa, west of Southcourt	BMERC	SP8012	11	Yes
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Track to Wellwick Farm	BMERC	SP798128	11	Yes
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Land at Aylesbury Park Golf Club	BMERC	SP7913	11	Yes
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Area south of Putlowes	BMERC	SP7814	11	No
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Putlowes	BMERC	SP784150	11	No
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Fleet Marston	BMERC	SP7715	11	Yes

Common name	Scientific name	Status	Location	Comments (Source of record etc.)	OS grid reference	CFA	Within the Proposed Scheme (Yes/No)
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Field north east of Upper Cranwell	BMERC	SP771159	11	Yes
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Fleet Marston Farm	BMERC	SP7716	11	No
Stinking Chamomile	<i>Anthemis cotula</i>	Red List: Vulnerable	Grassland at North Lee	BMERC	SP835090	11	No
Good-King-Henry	<i>Chenopodium bonus-henricus</i>	Red List: Vulnerable	South of Putlowes	BMERC	SP7814	11	No
Box	<i>Buxus sempervirens</i>	Nationally rare	Waddesdon Estate	BMERC	SP755166	12	Yes
Dwarf spurge	<i>Euphorbia exigua</i>	Red List: Near threatened	Waddesdon	BMERC	SP71N	12	No
Corn buttercup	<i>Ranunculus arvensis</i>	Species of Principal importance; Red list: Critically endangered	Waddesdon	BMERC	SP71N	12	No
Shepherd's-needle	<i>Scandix pecten-veneris</i>	Species of Principal importance; Red list: Critically endangered; County scarce	Waddesdon	BMERC	SP71N	12	No
Fine-leaved sandwort	<i>Minuartia hybrida</i>	Species of Principal importance; Red List: Endangered; Nationally scarce; County scarce	Waddesdon Station	BMERC	SP757179	12	No
Dwarf spurge	<i>Euphorbia exigua</i>	Red list: Near threatened	Waddesdon station	BMERC	SP758179	12	No
Good-King-Henry	<i>Chenopodium bonus-henricus</i>	Red List: Vulnerable	Waddesdon Station SINC Complex	BMERC	SP758179	12	No
Heath dog-violet	<i>Viola canina ssp canina</i>	Red list: Near threatened	Waddesdon Station	BMERC	SP758179	12	No
Round-fruited rush	<i>Juncus compressus</i>	Red list: Near threatened	Sunny Hill Farm Pastures	BMERC	SP759180	12	No

Common name	Scientific name	Status	Location	Comments (Source of record etc.)	OS grid reference	CFA	Within the Proposed Scheme (Yes/No)
Tubular water-dropwort	<i>Oenanthe fistulosa</i>	Species of Principal importance; Red list: Vulnerable	Sunny Hill Farm Pastures	BMERC	SP759180	12	No
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Sunny Hill Farm Pastures	BMERC	SP759180	12	No
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Railway Centre Quainton	BMERC	SP71J	12	No
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Waddesdon Common	BMERC	SP754183	12	No
Distant sedge	<i>Carex distans</i>	County scarce	Waddesdon Common	BMERC	SP754183	12	No
Common gromwell	<i>Lithospermum officinale</i>	County scarce	Scrub near railway, Quainton	BMERC	SP710219	12	Yes
Good-King-Henry	<i>Chenopodium bonus-henricus</i>	Red List: Vulnerable	Railway near Botolph Claydon	BMERC	SP746242	12	No
Dwarf spurge	<i>Euphorbia exigua</i>	Red list: Near threatened	Waddesdon station (north of line, east of bridge)	BMERC	SP758179	12	No
Heath spotted orchid	<i>Dactylorhiza maculata ssp. ericetorum</i>	County scarce	Grendon and Doddershall Meadows LWS (part)	BMERC	SP723206	12	No
Heath spotted orchid	<i>Dactylorhiza maculata ssp. ericetorum</i>	County scarce	Grendon and Doddershall Meadows LWS (part)	BMERC	SP725204	12	No
Bottle sedge	<i>Carex rostrata</i>	County rare	Grendon and Doddershall Meadows LWS (part)	BMERC	SP723206	12	No
Field gromwell	<i>Lithospermum arvense</i>	Red list: Endangered	Woodlands Farm, Quainton	BMERC	SP72A	12	No
Grape-hyacinth	<i>Muscari neglectum</i>	Species of Principal importance; Red list: Vulnerable; Nationally rare	Field south of Finemere Wood	BMERC	SP720215	12	No
Sneezewort	<i>Achillea ptarmica</i>	Unusual in	Grendon and Doddershall	Grendon and Doddershall	SP721206	12	Yes

Common name	Scientific name	Status	Location	Comments (Source of record etc.)	OS grid reference	CFA	Within the Proposed Scheme (Yes/No)
		Bucks	Meadows LWS	Meadows LWS citation			
Fen bedstraw	<i>Galium uliginosum</i>	Unusual in Bucks	Grendon and Doddershall Meadows LWS	Grendon and Doddershall Meadows LWS citation	SP721206	12	Yes
Oval sedge	<i>Carex leporina</i>	Unusual in Bucks	Grendon and Doddershall Meadows LWS	Grendon and Doddershall Meadows LWS citation	SP721206	12	Yes
Blunt-flowered rush	<i>Juncus subnodulosus</i>	Unusual in Bucks	Grendon and Doddershall Meadows LWS	Grendon and Doddershall Meadows LWS citation	SP721206	12	Yes
Meadow thistle	<i>Cirsium dissectum</i>	County rare	Waddesdon Common	Aylesbury Vale County Wildlife Sites Project - Waddesdon Common Survey Report, 02/07/03.	SP754183	12	No
Wild cabbage	<i>Brassica oleracea</i> var. <i>oleracea</i>	Nationally scarce	Calvert	BMERC	SP62X	13	Yes
Sea-buckthorn	<i>Hippophae rhamnoides</i>	Nationally scarce	Calvert	BMERC	SP62X	13	Yes
Sea-buckthorn	<i>Hippophae rhamnoides</i>	Nationally scarce	Calvert Jubilee	BMERC	SP684250	13	No
Sea-buckthorn	<i>Hippophae rhamnoides</i>	Nationally scarce	Calvert Jubilee	BMERC	SP68372503	13	No
Mat-grass	<i>Nardus stricta</i>	County scarce	Calvert	BMERC	SP62X	13	Yes
True fox-sedge	<i>Carex vulpina</i>	Species of Principal importance; Red list: Vulnerable; Nationally rare; County rare	Calvert Jubilee	BMERC	SP68372503	13	No
Marsh pea	<i>Lathyrus palustris</i>	Red list: Near threatened; Nationally scarce	Calvert Jubilee	BMERC	SP68372503	13	No
Eared willow	<i>Salix aurita</i>	County scarce	Calvert Jubilee	BMERC	SP684250	13	No
Marsh stitchwort	<i>Stellaria palustris</i>	Species of Principal importance; Red	Wet meadow behind Seven Stars Public House, near	BMERC	SP674267	13	No

Common name	Scientific name	Status	Location	Comments (Source of record etc.)	OS grid reference	CFA	Within the Proposed Scheme (Yes/No)
		list: Vulnerable	Twyford				
Marsh stitchwort	<i>Stellaria palustris</i>	Species of Principal importance; Red list: Vulnerable	Field behind Red Lion Public House, Twyford	BMERC	SP664266	13	No
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Twyford	BMERC	SP667267	13	No
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Briarhill	BMERC	SP62Y	13	No
Dwarf spurge	<i>Euphorbia exigua</i>	Red list: Near threatened	Twyford	BMERC	SP62T	13	No
Dwarf spurge	<i>Euphorbia exigua</i>	Red list: Near threatened	Railway cutting north of Twyford	BMERC	SP660273	13	Yes
Fringed water-lily	<i>Nymphoides peltata</i>	Nationally scarce	Twyford	BMERC	SP62T	13	No
Small teasel	<i>Dipsacus pilosus</i>	County scarce	Abandoned Railway, North of Chetwode	BMERC	SP633302	13	No
Sainfoin	<i>Onobrychis viciifolia</i>	Red list: Near threatened	Abandoned Railway, North of Chetwode	BMERC	SP633302	13	No
Carnation sedge	<i>Carex panicea</i>	County rare	Calvert Railway station	Calvert Railway Station LWS citation	SP689247	13	Yes
Betony	<i>Betonica officinalis</i>	County rare	Calvert Railway station	Calvert Railway Station LWS citation	SP689247	13	Yes
Sneezewort	<i>Achillea ptarmica</i>	County rare	Calvert Railway station	Calvert Railway Station LWS citation	SP689247	13	Yes
Blue fleabane	<i>Erigeron acris</i>	County rare	Calvert Jubilee LWS	Calvert Jubilee LWS – citation	SP684254	13	Yes
Devil's-bit scabious	<i>Succisa pratensis</i>	County rare	Calvert Jubilee LWS	Calvert Jubilee LWS – citation	SP684254	13	Yes
Heath-grass	<i>Danthonia decumbens</i>	County rare	Calvert Jubilee LWS	Calvert Jubilee LWS – citation	SP684 254	13	Yes
Black poplar	<i>Populus nigra ssp. betulifolia</i>	Locally important	Westbury West	BMERC	SP63C	14	No
Black poplar	<i>Populus nigra ssp.</i>	Locally	Westbury	BMERC	SP606357	14	No

Common name	Scientific name	Status	Location	Comments (Source of record etc.)	OS grid reference	CFA	Within the Proposed Scheme (Yes/No)
	<i>betulifolia</i>	important	West				
Night-flowering catchfly	<i>Silene noctiflora</i>	Red list: Vulnerable; County rare	Turweston	BMERC	SP602366	14	No
Marsh valerian	<i>Valeriana dioica</i>	County rare or scarce	Turweston Manor Grassland	Turweston Manor Grassland - LWS citation	SP602386	14	Yes
Blunt-flowered rush	<i>Juncus subnodulosus</i>	County rare or scarce	Turweston Manor Grassland	Turweston Manor Grassland - LWS citation	SP602386	14	Yes
Bottle sedge	<i>Carex rostrata</i>	County rare or scarce	Turweston Manor Grassland	Turweston Manor Grassland - LWS citation	SP602386	14	Yes
Silver hair-grass	<i>Aira carophyllea</i>	County scarce	Hay meadow, Grove Hill Farm, Westbury	BMERC	SP604357	14	No
Red hemp-nettle	<i>Galeopsis angustifolia</i>	Species of Principal importance; Red list: Critically endangered; Nationally scarce; County scarce	Hay meadow, Grove Hill Farm, Westbury	BMERC	SP604357	14	No
Red hemp-nettle	<i>Galeopsis angustifolia</i>	Species of Principal importance; Red list: Critically endangered; Nationally scarce; County scarce	Westbury West	BMERC	SP605358	14	No
Narrow-fruited cornsalad	<i>Valerianella dentata</i>	Red list: Endangered	Turweston	BMERC	SP603363	14	No
Upright goosefoot	<i>Chenopodium urbicum</i>	Species of Principal importance; Red list: Critically endangered; Nationally rare	Turweston	BMERC	SP603366	14	No
Stinking chamomile	<i>Anthemis cotula</i>	Red list: Vulnerable	Oatley's Farm, Turweston	BMERC	SP613372	14	No
Dwarf	<i>Euphorbia exigua</i>	Red list: Near	Oatley's	BMERC	SP613372	14	No

Common name	Scientific name	Status	Location	Comments (Source of record etc.)	OS grid reference	CFA	Within the Proposed Scheme (Yes/No)
spurge		threatened	Farm, Turweston				
Corn spurrey	<i>Spergula arvensis</i>	Red list: Vulnerable; Locally rare	Halse Copse	Northants BRC	SP574416	15	No
Marsh stitchwort	<i>Stellaria palustris</i>	Species of principal importance; Red list: Vulnerable; Locally scarce	Trafford Bridge Marsh	Northants BRC	SP516480	15	No
Many-seasoned thread-moss	<i>Bryum intermedium</i>	Rare and declining species but too early to put into a threat category	South of Redhill Wood just off Banbury Road	British Bryological Society	SP5050	15	No
Scarce redshank	<i>Ceratodon conicus</i>	Critically Endangered	South of Redhill Wood just off Banbury Road	British Bryological Society	SP 5050	15	No
Spiral chalk-moss	<i>Pterygoneurum lamellatum</i>	Extinct / Regionally Extinct	SP 5050 - south of Redhill Wood just off Banbury Road	British Bryological Society	SP 5050	15	No

Field survey

3.4.3 A summary of protected or notable flora considered relevant to the assessment recorded during field surveys is provided in Table 4.

Table 4: Records of protected and or notable species records relevant to the assessment obtained during field survey in CFA 7 to 15 inclusive

Common name	Scientific name	Status	Location	Comments (Source of record etc)	OS grid reference	CFA	Within the Proposed Scheme (Yes/No)
Bluebell	<i>Hyacinthoides non-scripta</i>	WCA Schedule 8	Little Halings Wood	Field data	TQ 030 896	7	No
Bluebell	<i>Hyacinthoides non-scripta</i>	WCA Schedule 8	Mantles Wood	Field data	SU 920 998	9	No
Bluebell	<i>Hyacinthoides non-scripta</i>	WCA Schedule 8	Hedgemoor	Field data	SU 968 935	9	No

Black poplar	<i>Populus nigra</i> <i>ssp. betulifolia</i>	Locally important	South of Wendover	Field data	SP 8440 0916	10	Yes
Black poplar	<i>Populus nigra</i> <i>ssp. betulifolia</i>	Locally important	Hartwell Estate land, west of Aylesbury	Field data	SP 8033 1183	11	Yes
Black poplar	<i>Populus nigra</i> <i>ssp. betulifolia</i>	Locally important	Hartwell Estate land, west of Aylesbury	Field data	SP 8066 1163	11	Yes
Black poplar	<i>Populus nigra</i> <i>ssp. betulifolia</i>	Locally important	Hartwell Estate land, west of Aylesbury	Field data	SP 8074 1188	11	Yes
Black poplar	<i>Populus nigra</i> <i>ssp. betulifolia</i>	Locally important	Yew Tree Farm, Stoke Mandeville	Field data	SP 8360 0993	11	Yes
Black poplar	<i>Populus nigra</i> <i>ssp. betulifolia</i>	Locally important	Yew Tree Farm, Stoke Mandeville	Field data	SP 8373 0984	11	Yes
Black poplar	<i>Populus nigra</i> <i>ssp. betulifolia</i>	Locally important	Yew Tree Farm, Stoke Mandeville	Field data	SP 8303 1021	11	No
Black poplar	<i>Populus nigra</i> <i>ssp. betulifolia</i>	Locally important	Yew Tree Farm, Stoke Mandeville	Field data	SP 8323 1001	11	No
Black poplar	<i>Populus nigra</i> <i>ssp. betulifolia</i>	Locally important	South of Quainton	Field data	SP 7348 1874	12	Yes
Midland hawthorn	<i>Crataegus</i> <i>laevigata</i>	Locally important	Calvert Waste Terminal	NVC Data	SP537445	13	Yes
Black poplar	<i>Populus nigra</i> <i>ssp. betulifolia</i>	Locally important	Finemere Quarry	NVC Data	SP628323	14	No
Common whitebeam	<i>Sorbus aria</i>	Locally important	Finemere Quarry	NVC Data	SP627319	14	Yes
Squirreltail fescue	<i>Vulpia</i> <i>bromoides</i>	Locally important	Finemere Quarry	NVC Data	SP909016	14	Yes
Bluebell	<i>Hyacinthoides</i> <i>non-scripta</i>	WCA Schedule 8	Halse Copse	Field data	SP 570 424	15	No
Large-leafed lime	<i>Tilia</i> <i>platyphyllos</i>	Nationally scarce	Halse Copse	Field data	SP 570 424	15	No
Midland hawthorn	<i>Crataegus</i> <i>laevigata</i>	Locally important	Halse Copse at Bungalow Farm	NVC Data	SP572424	15	No
Tufted forget-me-not	<i>Myosotis laxa</i>	Locally important	Unregistered land to the south east of Bulls Lane and Banbury Lane	NVC Data	SP628313	15	No

Discussion

CFA 7

3.4.4 Data for CFA7 are derived from both desk study, including records from the Buckinghamshire and Milton Keynes Environmental Records Centre (BMERC), from the Hertfordshire Biological Records Centre (HEBRC), and from Greenspace

Information for Greater London (GIGL), and from field survey data. None of the records fall within the land required for the construction of the Proposed Scheme. From the vicinity of Denham, desk studies record the nationally rare box (*Buxus sempervirens*) from woodland south of Denham Lodge. Although it is thought to be native at some sites within the UK, box has been widely cultivated and its native range is uncertain. The Buckinghamshire records are likely to refer to introductions. The vulnerable Good-King-Henry (*Chenopodium bonus-henricus*), a perennial species of roadsides and nitrogen-rich grassy places, was recorded at Denham Golf Course¹⁵. Two county scarce species were recorded from the Denham area - slender parsley-piert (*Aphanes australis*), an arable weed, and golden-scaled male fern (*Dryopteris affinis* ssp. *affinis*), a species of woodlands and other shady places. Two Red List vulnerable species, field garlic (*Allium oleraceum*) and slender tare (*Vicia parviflora*) were recorded from the Denham area. Also from the Denham area, there is a record of the Red List critically endangered wild cotoneaster (*Cotoneaster cambricus*), which is legally protected as a WCA Schedule 8 species but only ever known as a protected native plant in the UK from a single site on coastal limestone in North Wales. The record must - if it is correct - relate to a plant of garden origin; however, it is more likely to be an error for one of the multitude of similar-looking garden cotoneaster species, which are very widely naturalised (or escaping) and notoriously difficult to identify.

- 3.4.5 Bluebell (*Hyacinthoides non-scripta*), legally protected as a Schedule 8 species, was recorded during field survey at Little Halings Wood in the vicinity of Denham Green.

CFA 8

- 3.4.6 Data for CFA8 are derived solely from desk study data from BMERC. The nationally scarce coralroot (*Cardamine bulbifera*) has been recorded from beech woodland on chalk at Ash Grove in the vicinity of Little Missenden. The species of principal importance and vulnerable white helleborine (*Cephalanthera damsonium*), a woodland species, has been recorded from near Coleshill. The county rare spear-leaved willowherb (*Epilobium lanceolatum*), a species of waysides, walls and waste places, has been recorded at Mantle's Green. Sainfoin (*Onobrychis viciifolia*), a Red List near-threatened species that occurs in grassland and bare places, mostly on chalk and limestone, has been recorded from Chalfont St Peters. However, this species is commonly planted today on new roads, in wild-flower seed-mixtures etc. The county scarce golden-scaled male fern (*Dryopteris affinis* ssp. *affinis*) was recorded from Shardeloes.

CFA 9

- 3.4.7 Data for the Central Chilterns area (CFA9) are derived from both desk study from BMERC and from field survey data. From desk study data, the nationally scarce coralroot (*Cardamine bulbifera*) has been recorded outside the land required for the construction of the Proposed Scheme in beech woodland on chalk and in Keeper's Wood. The arable weed, wild pansy (*Viola tricolor*), a national near threatened species was also recorded from near Little Missenden. The county rare brittle bladder-fern

¹⁵ This species is over-recorded due to confusion with spear-leaved orache (*Atriplex prostrata*).

(*Cystopteris fragilis*) has been recorded from South Heath, in the vicinity of Great Missenden. Two county scarce species have been recorded from Suffolk Bridge - pale lady's-mantle (*Alchemilla xanthochlora*) and toothwort (*Lathraea squamaria*), a parasitic species of woody plants such as hazel and elm.

- 3.4.8 The nationally scarce green-flowered helleborine (*Epipactis phyllanthes*) has been recorded from Lotts Wood in the Weedon Hill Woods complex. It grows in a range of habitats from scrub to bare field-layers in deep shade amongst beech, oak, sweet chestnut and conifer forests, and prefers dry to moist alkaline soils. The county extinct common wintergreen (*Pyrola minor*) has been recorded from a road verge in Lotts Wood in the Weedon Hill Woods complex. The county scarce wood barley (*Hordelymus europaeus*), a woodland species, has been recorded from Stocking's Wood. The nationally rare box (*Buxus sempervirens*), has been recorded from Woodlands Park. Although it is thought to be native at some sites within the UK, box has been widely cultivated and its native range is uncertain. The Buckinghamshire records are likely to refer to introductions. The near threatened and nationally scarce maiden pink (*Dianthus deltoides*), a dry grassland species, is locally extinct as a native species but has been historically recorded from a road verge in the Hyde Heath area. All of these records are from outside the land required for the construction of the Proposed Scheme.
- 3.4.9 The nationally rare box (*Buxus sempervirens*), has been recorded from Hodgemoor and Farthings Wood from within the land required for the construction of the Proposed Scheme, but as stated in 1.4.12, this is likely to relate to an introduction.
- 3.4.10 The county scarce wood barley (*Hordelymus europaeus*), a woodland species, has been recorded from South Heath from within the land required for the construction of the Proposed Scheme.
- 3.4.11 The county scarce bramble species (*Rubus scaber*) has been recorded from Sibley's Coppice from within the land required for the construction of the Proposed Scheme.
- 3.4.12 From field survey, bluebell (*Hyacinthoides non-scripta*), legally protected as a Schedule 8 species, and an ancient woodland indicator, was recorded outside the land required for the construction of the Proposed Scheme at Mantles Wood (in the vicinity of Hyde Heath) and Hedgemoor (in the vicinity of Chalfont St. Giles).

CFA 10

- 3.4.13 Data for the Wendover, Dunsmore and Halton area (CFA 10) are derived from desk study data, from the BMERC and the draft Environmental Statement May 2013, and from field survey data.
- 3.4.14 The following species have been recorded from desk study data from the Wendover area from within the land required for construction of the Proposed Scheme. The nationally vulnerable and county scarce dodder (*Cuscuta epithymum*), is a parasitic species of small shrubs and herbs. The county scarce toothwort (*Lathraea squamaria*) is a parasitic species of woody plants such as hazel and elm. Common juniper (*Juniperus communis*) is a nationally important, shrub of calcium-rich soils in Buckinghamshire. Water soldier, a national near threatened aquatic plant is native to

the fens of East Anglia, but is a widespread garden escape, so Buckinghamshire records are considered likely to relate to garden escapes. The nationally vulnerable corn marigold (*Glebionis segetum*) has been recorded from the Wendover by-pass. This arable weed is also a species of new road verge seed mixes so may have been sown.

- 3.4.15 From desk study data, Weston Turville Reservoir SSSI supports three plant species of Red List least concern. Mudwort (*Limosella aquatica*) grows on the muddy fringes at the southern end of the reservoir at its only Buckinghamshire site, as does orange foxtail (*Alopecurus aequalis*), whereas grey club rush (*Schoenoplectus tabernaemontani*), a largely coastal species which occurs at only two sites in Buckinghamshire, also occurs around the reservoir's southern fringes. However this species is spreading in wet places near main roads due to the influence of de-icing salt, and is now common in motorway balancing ponds etc. and is probably under-recorded. None of these records are from within the land required for construction of the Proposed Scheme.
- 3.4.16 The Red List near threatened round-fruited rush (*Juncus compressus*), a wetland species, has been recorded from desk study data from World's End which is within the land required for construction of the Proposed Scheme.
- 3.4.17 The only known UK population of the nationally important fringed gentian (*Gentianopsis crinita*) is known from desk study data from chalk grassland at the Bacombe and Coombe Hills SSSI, from outside the land required for the construction of the Proposed Scheme.
- 3.4.18 Two nationally rare species - box and wood barley (*Hordelymus europaeus*), along with one species of principal importance, white helleborine (*Cephalanthera damasonium*) have been recorded from desk study data from outside the land required for construction of the Proposed Scheme. Box has been recorded from two locations along a hedgerow at King's Lane, and at a third unknown location; wood barley has been recorded from Wendover, and a second unknown location; and the location of the white helleborine is similarly unknown. The records of box may relate to 'introductions' (see CFAg for discussion). Wood barley and white helleborine are woodland species.
- 3.4.19 The endangered field gromwell (*Lithospermum arvense*), an arable weed, has been recorded from a field edge near Rocky Lane; the near threatened pale St. Johns-wort (*Hypericum montanum*) has been recorded from grassland between the railway and A413 at Wendover; and common juniper (*Juniperus communis*), a species of principal importance and a shrub of calcium-rich soils in Buckinghamshire, has been recorded from Bacombe Hill.
- 3.4.20 Five records of the locally important black poplar (*Populus nigra* ssp. *betulifolia*), one of the UK strongholds of which is in the Vale of Aylesbury, have been recorded from desk study data, all in the Nash Lee area, and from outside the land required for construction of the Proposed Scheme.

- 3.4.21 The locally important black poplar (*Populus nigra* ssp. *betulifolia*), has been recorded from field survey data from farmland south of Wendover from within the land required for construction of the Proposed Scheme.

CFA11

- 3.4.22 Data for CFA 11 are derived from desk study data from BMERC, and from field survey data.
- 3.4.23 The locally important black poplar (*Populus nigra* ssp. *betulifolia*), one of the UK strongholds of which is in the Vale of Aylesbury, has been recorded from desk study data from 43 locations across CFA 11 (see Table 1). Of these 43 records, 18 are from within the land required for construction of the Proposed Scheme, with 25 recorded from outside the land required for construction of the Proposed Scheme.
- 3.4.24 From desk study data, the vulnerable stinking chamomile (*Anthemis cotula*), an arable weed, has been recorded from grassland at North Lee, and the vulnerable Good-King-Henry (*Chenopodium bonus-henricus*), a perennial species of roadsides and nitrogen-rich grassy places has been recorded from south of Putlowes.
- 3.4.25 Black poplar was recorded from field survey data from within the land required for construction of the Proposed Scheme at the Hartwell Estate land, west of Aylesbury (3 records) and from Yew Tree Farm, Stoke Mandeville (2 records). The species was also recorded from outside the land required for construction of the Proposed Scheme at Yew Tree Farm, Stoke Mandeville (2 records)

CFA12

- 3.4.26 Data for CFA12 are derived from both desk study data from BMERC and the Grendon and Doddershall Meadows LWS citation, and from field survey data.
- 3.4.27 The locally important black poplar (*Populus nigra* ssp. *betulifolia*) has been recorded from field survey from within the land required for construction of the Proposed Scheme at land south of Quainton. This species has one of its UK strongholds in the Vale of Aylesbury.
- 3.4.28 All of the records listed below are derived from desk study data.
- 3.4.29 Three notable species have been recorded from outside the land required for construction of the Proposed Scheme at Sunny Hill Farm Pastures, near Waddesdon. These are the locally important black poplar, and the Red List near threatened round-fruited rush (*Juncus compressus*) and tubular water-dropwort (*Oenanthe fistulosa*), a species of principal importance and a Red List vulnerable species, which are both species of marshes and wet places.
- 3.4.30 Four arable weeds have been recorded from outside the land required for construction of the Proposed Scheme from the Waddesdon area - shepherd's-needle (*Scandix pecten-veneris*) and corn buttercup (*Ranunculus arvensis*), both of which are species of principal importance and Red List critically endangered, and dwarf spurge (*Euphorbia exigua*) which is near threatened. Good-King-Henry (*Chenopodium bonus-henricus*) a vulnerable arable weed has been recorded from both the Waddesdon SINC complex and from the railway near Botolph Claydon.

- 3.4.31 The nationally rare box (*Buxus sempervirens*), has been recorded from the Waddesdon Estate from within the land required for construction of the Proposed Scheme. Although it is thought to be native at some sites within the UK, box has been widely cultivated and its native range is uncertain. Away from chalk escarpments, the Buckinghamshire records are likely to refer to introductions. The Red List near threatened heath dog violet (*Viola canina* ssp. *canina*), the Red List endangered and principle of species importance fine-leaved sandwort (*Minuartia hybrida*), and the near threatened dwarf spurge (*Euphorbia exigua*) have been recorded outside the land required for construction of the Proposed Scheme at Waddesdon Station. The locally important black poplar has been recorded from outside the land required for construction of the Proposed Scheme at both Waddesdon Common and from the railway centre at Quainton, with tubular water-dropwort (*Oenanthe fistulosa*), a species of principal importance and a Red List vulnerable species, also recorded from Waddesdon Common.
- 3.4.32 Grendon and Doddershall Meadows Local Wildlife Site (LWS) supports wetland and grassland species within the land required for construction of the Proposed Scheme. The county rare bottle sedge (*Carex rostrata*) grows in very wet places; and blunt-flowered rush (*Juncus subnodulosus*), unusual in Buckinghamshire, grows on the wetland to rush-pasture transition. Other species grow in wet grassy places; oval sedge (*Carex leporina*), unusual in Buckinghamshire; the county scarce heath spotted orchid (*Dactylorhiza maculata* ssp. *ericetorum*); and sneezewort (*Achillea ptarmica*) and fen bedstraw (*Galium uliginosum*) both of which are unusual in Buckinghamshire. Of these, blunt-flowered rush and fen bedstraw tend to occur in moderately base-rich habitats, while heath spotted-orchid and bottle sedge tend to grow in more acidic places.
- 3.4.33 Two county scarce species of wet grassland, distant sedge (*Carex distans*) and meadow thistle (*Cirsium dissectum*) have been recorded from outside the land required for construction of the Proposed Scheme in the Waddesdon area, as has dwarf spurge (*Euphorbia exigua*), a near threatened arable weed recorded from a field near the railway.
- 3.4.34 The endangered species, field gromwell (*Lithospermum arvense*) - an arable weed - has been recorded outside the land required for construction of the Proposed Scheme at Woodlands Farm, Quainton, while the county scarce species, common gromwell (*Lithospermum officinale*) - a species of grassy and bushy places, hedgerows and wood-borders mostly on basic soils has been recorded from the land required for construction of the Proposed Scheme in scrub adjacent to the railway near Quainton.
- 3.4.35 Grape-hyacinth (*Muscari neglectum*), has been recorded outside the land required for construction of the Proposed Scheme, from a field at the southern edge of Finemere Wood. As a native species of dry grassland in East Anglia, it is listed as a species of principal importance, Red List vulnerable and nationally rare; but elsewhere - including Buckinghamshire - it occurs as an introduction (probably an escape from

gardens), although according to the Floras over-recorded for the garden grape-hyacinth (*Muscari armeniacum*) (Stace, 2010)¹⁶.

CFA 13

- 3.4.36 Data for CFA 13 are derived solely desk study, from the BMERC, from the Calvert Railway Station LWS citation and the Calvert Jubilee LWS citation, and from field survey data.
- 3.4.37 Calvert Railway Station LWS comprises wet grassland on clay and supports plants that favour these conditions, including the county rare species carnation sedge (*Carex panicea*), betony (*Betonica officinalis*) and sneezewort (*Achillea ptarmica*). The county rare species blue fleabane (*Erigeron acris*), devil's-bit scabious (*Succisa pratensis*) and heath-grass (*Danthonia decumbens*) have been recorded at Calvert Jubilee LWS, which lies 140 metres to the east of the original site for Calvert Railway Station, and supports a variety of habitats. The blue fleabane grows on a long-disused rubbish tip, the devil's-bit scabious occurs on damper ground, and the heath-grass grows along the top of an old railway embankment. All of the species referred to above have been recorded from within the land required for construction of the Proposed Scheme.
- 3.4.38 Two nationally scarce species and a county scarce species have been recorded from within the land required for construction of the Proposed Scheme in the vicinity of Calvert. The nationally scarce wild cabbage (*Brassica oleracea* var. *oleracea*) is a common casual species on tips and roadsides; the nationally scarce sea buckthorn (*Hippophae rhamnoides*) is widely planted along roads inland and often self-sown (so this record probably relates to an introduction); and the county scarce mat-grass (*Nardus stricta*), is a species of acidic soils.
- 3.4.39 The near threatened dwarf spurge (*Euphorbia exigua*), an arable weed, has been recorded from a railway cutting north of Twyford, from within the land required for construction of the Proposed Scheme.
- 3.4.40 The wetland species true fox-sedge (*Carex vulpina*) - a species of principal importance, Red List vulnerable, nationally rare, and county rare - has been recorded from within the land required for construction of the Proposed Scheme at Calvert Jubilee. It is a species of wet places on heavy soils, in ditches and marshes and by streams; the near threatened and nationally scarce marsh pea (*Lathyrus palustris*) which occurs in fens and tall damp grassland, the county scarce eared willow (*Salix aurita*) which grows on heathland and scrub on acid soils, and the nationally scarce sea buckthorn (*Hippophae rhamnoides*), recorded from two locations, have also been recorded from this location, but from outside the land required for construction of the Proposed Scheme. Sea buckthorn is likely to have been planted - see 1.4.41.
- 3.4.41 A species of principal importance, vulnerable and locally scarce species, marsh stitchwort (*Stellaria palustris*), has been recorded outside the land required for construction of the Proposed Scheme, from a wet meadow behind the Seven Stars

¹⁶ Stace (2010). New Flora of the British Isles. 3rd edition. Cambridge University Press.

Public House, near Twyford, and from a field behind the Red Lion public house in Twyford. This is a species of wet grassy habitats, marshes and fens.

- 3.4.42 The locally important black poplar (*Populus nigra* ssp. *betulifolia*), which has one of its UK strongholds in the Vale of Aylesbury. This has been recorded from outside the land required for construction of the Proposed Scheme from the vicinity of Twyford and from Briarhill. The near threatened dwarf spurge (*Euphorbia exigua*), an arable weed and the nationally scarce fringed water-lily (*Nymphoides peltata*) a species of ponds and slow rivers has also been recorded from this vicinity.
- 3.4.43 The county scarce small teasel (*Dipsacus pilosus*) grows in damp places in open woods, hedgerows and by streams, and has been recorded from outside the land required for construction of the Proposed Scheme from the abandoned railway north of Chetwode. The near-threatened sainfoin (*Onobrychis viciifolia*) which grows on grassland and bare places, mostly on chalk and limestone, has also been recorded here but this species is commonly planted on new roads, in wild-flower seed-mixtures etc.
- 3.4.44 From field survey data, the locally important Midland hawthorn (*Crataegus laevigata*) was recorded from the Calvert Waste Terminal.

CFA14

- 3.4.45 Data for CFA 14 are derived from desk study data, from BMERC and from the Turweston Manor Grassland LWS citation, and from field survey data.
- 3.4.46 The locally important black poplar (*Populus nigra* ssp. *betulifolia*), one of the UK strongholds of which is in the Vale of Aylesbury, has been recorded from two locations at Westbury West. The nationally important night-flowering catchfly (*Silene noctiflora*), an arable weed has been recorded from Turweston. Buckinghamshire is in the top 15 richest vice-counties in the UK in respect of rare and declining arable plant species¹⁷. Neither of these species was recorded from land required for construction of the Proposed Scheme.
- 3.4.47 Three wetland species which are scarce or rare in Buckinghamshire were recorded from Turweston Manor Grassland LWS which lies within land required for construction of the Proposed Scheme. Marsh valerian (*Valeriana dioica*) is a species of wet places on calcareous or slightly acidic soils. The county rare bottle sedge (*Carex rostrata*) grows in very wet places; and blunt-flowered rush (*Juncus subnodulosus*), unusual in Buckinghamshire, grows on the wetland to rush-pasture transition.
- 3.4.48 The following species were recorded from within the vicinity of Turweston. The critically endangered upright goosefoot (*Chenopodium urbicum*) and the endangered narrow-fruited cornsalad (*Valerianella dentata*), both arable weeds were recorded from the same location outside the land required for construction of the Proposed Scheme. The vulnerable stinking chamomile (*Anthemis cotula*) and the near threatened dwarf spurge (*Euphorbia exigua*), both arable weeds were recorded from the same tetrad, and from the data source it is not possible to determine whether or

¹⁷ Plantlife 2007 - New Priorities for Arable Plant Conservation.

not these species are located within the land required for construction of the Proposed Scheme.

- 3.4.49 Two notable species were recorded from the same hay meadow at Grove Hill Farm, Westbury. These were silver hair-grass (*Aira carophyllea*), a county scarce species, and red hemp-nettle (*Galeopsis angustifolia*), which is critically endangered species, a species of principal importance, and nationally and county scarce. The former is a pioneer species of open habitats, while the latter is now scarce in Great Britain, and mainly occurs in central southern England found on light sandy or chalky soils in field margins. Red hemp-nettle has also been recorded from a second location at Westbury West. The locations for these species records lie outside the land required for construction of the Proposed Scheme.
- 3.4.50 From field survey data, three locally important species were recorded from Finemere Quarry - black poplar (*Populus nigra* ssp. *betulifolia*), common whitebeam (*Sorbus aria*) and squirreltail fescue (*Vulpia bromoides*), the last of which is increasing common, particularly along railway lines .

CFA15

- 3.4.51 Data for the Greatworth to Lower Boddington area (CFA 15) are derived from desk study from BMERC, Northants BRC, the British Bryological Society, the Waddesdon Station complex LWS citation, and from field survey data.
- 3.4.52 From desk study data, the vulnerable and locally rare corn spurrey (*Spergula arvensis*), which occurs on usually sandy cultivated ground was recorded from Greatworth. A species of principal importance, vulnerable and locally scarce species, marsh stitchwort (*Stellaria palustris*) occurs in usually base-rich marshes and fens. One habitat it is associated with in Northamptonshire is floodplain grazing marsh or inundation grassland. The record was from the vicinity of Chipping Warden. Both of these records were from outside the land required for construction of the Proposed Scheme.
- 3.4.53 From desk study data, three species of notable bryophyte¹⁸ were recorded from outside the land required for construction of the Proposed Scheme. All of the records were from south of Redhill Wood just off Banbury Road. The rare and declining (but too early to put into a threat category) many-seasoned thread-moss (*Bryum intermedium*) is found on unshaded, basic soils in a range of habitats; the critically endangered scarce redshank (*Ceratodon conicus*) was last recorded in the UK in Oxfordshire in 1990¹⁹; and the extinct / regionally extinct spiral chalk-moss (*Pterygoneurum lamellatum*).
- 3.4.54 From field survey, Halse Copse, in the vicinity of Greatworth, from outside the land required for construction of the Proposed Scheme, supported bluebell (*Hyacinthoides non-scripta*), legally protected as a Schedule 8 species and an indicator species of ancient woodland, the nationally scarce large-leaved lime (*Tilia platyphyllos*), a scarce

¹⁸ From Hodgett, N. 'A Revised Red List of Bryophytes in Britain.' Field Bryology, No. 103, February 2011.

¹⁹ Porley, R. D. England's Rare Mosses and Liverworts: Their History, Ecology and Conservation.

woodland species of base-rich soils, and the locally important Midland hawthorn (*Crataegus laevigata*).

- 3.4.55 The locally important tufted forget-me-not (*Myosotis laxa*), a species of damp places, was recorded from unregistered land to the south east of Bulls Lane and Banbury Lane.

4 Phase 1 habitat survey

4.1 Introduction

- 4.1.1 This section of the appendix details the Phase 1 habitat survey baseline relevant to the section of the Proposed Scheme that will pass through CFA7 to 15 inclusive. Habitats present within statutory and non-statutory designated sites are described but the reasons for designation and citation details are provided elsewhere in the relevant habitat sub-sections of this Appendix.

4.2 Methodology

- 4.2.1 Details of the standard methodology utilised for Phase 1 habitat survey are provided in Scope and Methodology Report Addendum (Volume 5: Appendix CT-001-000/2).
- 4.2.2 Where access was not available for field surveys, other information sources have been used to provide a description of habitats relevant to the assessment. This includes pre-existing habitat survey data, notable plant species data, and statutory and non-statutory nature conservation site citations from:
- Natural England (NE);
 - Greenspace Information for Greater London (GiGL);
 - Buckinghamshire and Milton Keynes Environmental Records Centre (BMERC)
 - Hertfordshire Biological Records Centre (HEBRC);
 - Thames Valley Environmental Records Centre (TVERC); and
 - Northamptonshire Biodiversity Records Centre (NBRC).
- 4.2.3 GIS information on the location of ancient woodland and Habitats of Principle Importance²⁰, available from NE, was also reviewed.
- 4.2.4 The Joint Nature Conservation Committee (JNCC) manual for Phase 1 habitat survey does not specify in detail how to separate unimproved neutral grassland, semi-improved neutral grassland and poor semi-improved grassland types. Instead this is left to the discretion of the surveyor based on the typical diversity of grasslands in their 'natural' state in a particular region or locality. During habitat surveys in CFA7 to 15, these three grassland types were separated based on the following criteria, which have been developed by NE (2010²¹):

²⁰ Habitats of Principle Importance are listed in Section 41 of the Natural Environment and Rural Communities (NERC) Act (2006)

²¹ Natural England (2010). Farm Environment Plan Manual. 3rd Edition

- unimproved neutral grassland - more than 15 species/m² including grasses; cover of perennial rye-grass (*Lolium perenne*) less than 10%; herb cover usually not less than 30%; and at least two frequent indicator species and two occasional indicator species in the sward (indicator species are listed in the Natural England, 2010: p.74);
- semi-improved, neutral grassland - eight to 15 species/m² including grasses; cover of perennial rye-grass less than 25%; herb cover usually approximately 20-30%; and at least four indicator species present in the sward; and
- poor semi-improved grassland - sward dominated by grasses and with none of the characteristics described above. Not meeting JNCC description for improved grassland.

4.2.5 Where field data was obtained it was possible to compare a vegetation stand with qualifying criteria for Habitats of Principal Importance, which have been developed by the Joint Nature Conservation Committee (JNCC)²². Otherwise vegetation has been described as a habitat of principle importance if it appears to qualify from data available from one or more of the GIS inventories supplied by NE or local records centres, although access may not have been available to confirm this in the field.

4.3 Deviations, constraints and limitations

4.3.1 All surveys were conducted following best practice guidelines and in accordance with the Scope and Methodology Report Addendum (Volume 5: Appendix CT-001-000/2).

4.3.2 Field surveys undertaken to date have been limited to locations where landowner permission was obtained.

4.3.3 Provided that land access was not actively refused, surveys were conducted from public rights of way (PRoW). Where land access permission was actively refused, habitats were assessed from aerial photography, Ordnance Survey (OS) Maps and other information sources.

4.3.4 A small number of Phase 1 habitat surveys were conducted outside of the optimal season (April to August). However, they provided sufficient botanical data to allow broad habitat descriptions and to identify notable habitats.

4.3.5 Where access has not been obtained for survey, an assumption has been that hedgerows are intact and species-poor.

4.4 Baseline

CFA7

4.4.1 Land in and adjacent to land required for construction of the Proposed Scheme includes the River Colne and a number of large lakes created by gravel extraction (approximately 25% of this area). Aquatic and water-margin habitats, together with surrounding woodland and semi-natural ancient woodland are frequent

²² BRIG (ed. Ant Maddock) 2008. *UK Biodiversity Action Plan; Priority Habitat Descriptions*. (Updated December 2011).

(approximately 15% of this area). Remaining parts of this area are arable land west of the A412 and between Harefield No. 2 Lake and Harvil Road (approximately 60% of this area).

- 4.4.2 Access for survey was not obtained for Dew's Farm including the Newyear's Green Bourne; Uxbridge Golf Course, Buckinghamshire Golf Course and farmland east of South Harefield. In addition, access for farmland in between the A412 and M25 was not secured until spring 2013. Also refused access for survey were Savay Lake and Harefield No. 2 Lake, which are in a Site of Metropolitan Importance for nature conservation (SMI), and Juniper Wood, Northmoor Hill Wood and Wyatt's Covert, which are semi-natural ancient woodland and Habitats of Principle Importance. Data for these sites was obtained from desk study sources.

Woodland

- 4.4.3 There is up 27ha of semi-natural broadleaved woodland within land required for the construction of the Proposed Scheme, the majority of which qualifies as a lowland deciduous woodland habitat of principle importance and includes the following:

- the Mid Colne Valley Site of Special Scientific Interest (SSSI) includes Ranston Covert and Battlesford Wood which form a continuous stretch of woodland between the A412 and the River Colne. This woodland, which is a designated feature of the SSSI, comprises three types. On gently sloping ground, the southern part of the woodland is dominated by ash (*Fraxinus excelsior*) and sycamore (*Acer pseudoplatanus*), with frequent elder (*Sambucus nigra*) in the scrub layer. This woodland type is partially ancient woodland and contains ancient woodland indicator plant species such as dog's mercury (*Mercurialis perennis*). Located towards the centre of the woodland, on a steeper gradient, a second type is dominated by beech (*Fagus sylvatica*) and ash with pedunculate oak (*Quercus robur*), bramble (*Rubus fruticosus* agg.) and occasional bluebell (*Hyacinthoides non-scripta*). The majority is ancient woodland, and a population of coralroot, a notable plant species, was recorded here. The third woodland type, wet woodland, was recorded along the west bank of the River Colne and was comprised of hawthorn (*Crataegus monogyna*) and alder (*Alnus glutinosa*). A second population of coralroot was recorded from this woodland;
- wet woodland is also found encompassing the lakes in the Mid Colne Valley SSSI at Savay Lake and Harefield Lake No. 2. This woodland is characterised by willows (*Salix* spp.) and alder with an elder and hawthorn understorey and common nettle and bramble ground flora;
- the Dews Dell Site of Borough Importance (SBI) for nature conservation is partly within the land required for the construction of the Proposed Scheme to the west of Harvil Road. This site is largely secondary woodland on the site of a quarry and includes stands of pedunculate oak with frequent sycamore, silver birch, (*Betula pendula*) and English elm (*Ulmus procera*). The shrub layer includes species such as buckthorn (*Rhamnus catharticus*), Midland hawthorn (*Crataegus laevigata*), spindle (*Euonymus europaeus*) and field rose (*Rosa arvensis*); and

- two blocks of woodland located to the south of the Chilterns Railway. One of these woodlands is located to the west of the Grand Union Canal and includes Windows Cruise Covert and Flagmore Covert. The second is found to the east of the canal.

4.4.4 There are also several semi-natural broadleaved woodlands located adjacent to the land required for the construction of the Proposed Scheme:

- west of the A412, there are three woodlands that are non-statutory Local Wildlife Sites (LWSs): Great Halings Wood; Juniper Wood; and Northmoor Hill Wood and Wyatt's Covert. They are all semi-natural ancient woodland and Habitats of Principle Importance lowland deciduous woodland. Typical canopy species include pedunculate oak, silver birch, ash, hazel (*Corylus avellana*), hornbeam (*Carpinus betulus*) and beech. They include ancient woodland indicator species such as bluebell, which was recorded from surveys in Great Halings Wood;
- Little Halings Wood contains a high diversity of ancient woodland indicators including bluebell, dog's mercury, moschatel (*Adoxa moschatellina*) and primrose (*Primula vulgaris*). The canopy is dominated by silver birch and hornbeam with an elder and hawthorn understorey. Parts of this woodland qualify as a habitat of principle importance; and
- Breakspear House Wood SBI, north-east of South Harefield, is a habitat of principle importance lowland deciduous woodland. It is dominated by ash and comprises several ancient woodland indicator species.

4.4.5 There is an additional area of approximately 4.7ha of young plantation broadleaved woodland in land required for the construction of the Proposed Scheme and located to the east of Durdent Court.

Scrub

4.4.6 Small areas of dense scrub are present near Dew's Farm and adjacent to farmland and woodland close to the M25. Typical species at Dew's Farm include hawthorn and elder, with occasional hazel and ash trees. Scrub habitat comprises up to 1.6ha within land required for the construction of the Proposed Scheme.

Hedgerows

4.4.7 This area includes small fields, and good numbers of dense and diverse hedgerows with trees. In total, approximately 7km of hedgerow habitat was recorded in the land required for the construction of the Proposed Scheme. This includes approximately:

- 2km of intact species-poor hedgerow;
- 0.5km of defunct species-rich hedgerow;
- 3km of defunct species-poor hedgerow;
- 0.5km of species-rich hedgerow with trees; and
- 1km of species-poor hedgerow with trees.

- 4.4.8 Hedgerows that comprise native species qualify as a habitat of principle importance. Typical woody species include pedunculate oak, holly (*Ilex aquifolium*), hawthorn, blackthorn (*Prunus spinosa*), field maple (*Acer campestre*) and elder.
- 4.4.9 Access was available to survey approximately 2.3km of hedgerows in, or partially within, the land required for the construction of the Proposed Scheme. Further details are provided in the hedgerow section of Appendix EC-002-001.

Grassland

- 4.4.10 Several areas of amenity and improved grassland were identified in the land required for the construction of the Proposed Scheme (approximately 9.7ha and 4.7ha respectively). These were typically close-mown and dominated by perennial rye-grass. In addition, poor semi-improved grassland comprises an approximate area of 35ha and include the following:
- poor semi-improved grassland within land required for the construction of the Proposed Scheme is located to the south of the Chilterns Railway and west of the Grand Union Canal;
 - a strip of poor semi-improved grassland is present in the land required for the construction of the Proposed Scheme on a narrow causeway of land between Broadwater Lake and the River Colne. It is dominated by false oat-grass (*Arrhenatherum elatius*) with a low number of occasional herbs including creeping buttercup (*Ranunculus repens*), bird's foot trefoil (*Lotus corniculatus*), meadow vetchling (*Lathyrus pratensis*), pineappleweed (*Matricaria discoidea*), greater plantain (*Plantago major*) and black knapweed (*Centaurea nigra*).
 - two fields of species-poor semi-improved grassland are in land required for the construction of the Proposed Scheme: one to the north and one to the south of Moorhall Road. Coarse grass species were dominant including false oat grass and cock's-foot (*Dactylis glomerata*) with a low diversity of herbaceous species evident including creeping thistle (*Cirsium arvense*) and common ragwort (*Senecio jacobea*). This grassland is mainly unmanaged and had a dense, thatched structure.

Wetlands

- 4.4.11 Swamp habitat and marginal vegetation is small in area (less than 0.1ha within land required for the construction of the Proposed Scheme) and patchily distributed around the lakes and along the margins of the River Colne. These habitats are not managed and are largely dominated by bulrush (*Typha latifolia*), common reed (*Phragmites australis*), lesser pond sedge (*Carex acutiformis*) and reed sweet-grass (*Glyceria maxima*) in areas of swamp, with fen areas supporting reed canary grass (*Phalaris arundinacea*), great willowherb (*Epilobium hirsutum*), purple loosestrife (*Lythrum salicaria*) and yellow flag (*Iris pseudacorus*).
- 4.4.12 Small teasel (*Dipsacus pilosus*) was recorded growing at the edge of the lakes in the SSSI, a notable species in Greater London and Buckinghamshire. Wetland vegetation is one of the designated features for the Mid Colne Valley SSSI and Mid Colne SMI (the latter includes all of the lakes in this area).

Watercourses

- 4.4.13 The River Colne is a chalk river supporting several species indicative of this habitat type. It qualifies as a habitat of principle importance due to being a chalk river that contains six Category B species and vegetation indicative of fast flowing streams (*Callitricho-Batrachion* vegetation)²³. It is a special interest feature of the Mid-Colne Valley SSSI and is also designated as an SMI. It links two SSSIs (the Mid-Colne Valley SSSI and Frays Farm Meadow SSSI, to the south) and several non-statutory sites of nature conservation importance. The invasive species floating pennywort (*Hydrocotyle ranunculoides*) dominates parts of the channel in the area surveyed.
- 4.4.14 A 300m stretch of the News Years Green Bourne is within land required for the construction of the Proposed Scheme west of Harvil Road, near Dew's Farm. It is less than 2m wide and overgrown with scrub and trees. It was surveyed from PRoW due to access restraints.
- 4.4.15 The proposed scheme will cross the Grand Union Canal on a viaduct. The area within land required for the construction of the Proposed Scheme consists of hard engineered banks with sparse marginal vegetation which includes gypsywort (*Lycopus europaeus*) and sedge sp. (*Carex* sp.).

Water bodies

- 4.4.16 There are numerous lakes in this area which have been created following gravel extraction. Eight of these lakes are within land required for the construction of the Proposed Scheme, which together have an area of approximately 21ha, comprising: Harefield Moor Lake, Harefield No. 2, Savay Lake, Korda Lake, Long Pond, Pynesfield Lake, Broadwater Lake and a lake south of the Chiltern Railways line. Tilehouse Lake South is directly adjacent to the land required for the construction of the Proposed Scheme. Broadwater Lake, Korda Lake, Long Pond and Harefield Moor Lake form part of the Mid Colne Valley SSSI. There are an additional eleven lakes within 250 m of the land required for the construction of the Proposed Scheme.
- 4.4.17 There are a total of 20 ponds and lakes located within the land required for the construction of the Proposed Scheme and a total of 46 water bodies within 250m of it.
- 4.4.18 Access was available to carry out Phase 1 habitat surveys of five water bodies, all of which are within land required for the construction of the Proposed Scheme. None contain great crested newts and none were scoped in for a detailed pond survey.

Tall herb and fern

- 4.4.19 Tall herb vegetation was occasionally recorded along woodland edges and grassland in the Colne Valley and included the species common nettle and great willowherb.
- 4.4.20 Stands of Japanese knotweed (*Fallopia japonica*) were frequent around many of the lakes in the Colne Valley, particularly Long Pond, Korda Lake and the western edge of Broadwater Lake. A large stand of this species was recorded along the western edge

²³ Morgan, V et al; JNCC DEFRA; The identification of UK BAP priority rivers: generating a spreadsheet of potential priority river water bodies. Background and technical notes; 2011; http://jncc.defra.gov.uk/pdf/UKBAP_RiversTech-Dec2011.pdf; Accessed: 9 September 2012

of Tilehouse South Lake and in woodland west of the River Colne. All of these locations are in the land required for the construction of the Proposed Scheme.

Arable/cultivated land

- 4.4.21 Arable farmland comprises an approximate area of 221ha in the area. No field margins or headlands managed to benefit wildlife were recorded.

Other habitats

- 4.4.22 Other habitats present include buildings, bare ground and hard standing with no associated vegetation.

CFA8

- 4.4.23 Farmland around the three ventilation shafts and associated satellite construction site compounds consists of mixed arable and improved grassland surrounded by hedgerows. Other habitats in the area include semi-natural broadleaved woodland (much of which is ancient woodland) and ponds. The route of the Proposed Scheme passes underneath the Chilterns in a bored tunnel, the Chilterns Tunnel, which passes below the River Misbourne in two locations.
- 4.4.24 Access for survey was not obtained for the River Misbourne downstream of Shardeloes Lake, the River Misbourne north-east of Chalfont St Giles, and farmland north and south of Bottom House Farm Lane. In addition, access was not secured to arable farmland north of Coleshill until June 2013.

Woodland

- 4.4.25 There is approximately 2.7ha of semi-natural broadleaved woodland within land required for construction of the Proposed Scheme. The majority of the semi-natural broadleaved woodland was recorded either side of the River Misbourne in Shardeloes Lake LWS. This is predominantly wet woodland comprising ash, sycamore, pedunculate oak and willow species in the canopy and common nettle in the ground flora.
- 4.4.26 In addition, there is approximately 2ha of plantation broadleaved woodland, and 0.2ha of mixed plantation woodland, located in the land required for construction of the Proposed Scheme. The entirety of the plantation broadleaved woodland habitat comprises young trees planted on land between the A404 and Wieldon Lane.
- 4.4.27 Further areas of woodland that are in close proximity either to the land required for construction of the Proposed Scheme or else to associated construction access routes and local highways diversions, include:
- Hodgemoor Wood SSSI, which is one of the largest tracts of semi-natural broadleaved woodland remaining in the Buckinghamshire Chilterns. It is designated for an important assemblage of plants, birds and invertebrates. The plant species include coral root (a nationally scarce²⁴ species characteristic of the Chilterns), lady fern (*Athyrium filix-femina*), narrow buckler fern (*Dryopteris carthusiana*) and a hawkweed (*Hieracium* sp.), all of which are

²⁴ JNCC (undated). *Conservation Designations for UK Taxa* [on-line]. <http://jncc.defra.gov.uk/default.aspx?page=3408> (accessed September, 2013).

uncommon in Buckinghamshire. The woodland is also a lowland deciduous woodland habitat of principle importance. The site is approximately 600m south of the Chalfont St. Giles ventilation shaft and substation but is adjacent to the A355 Amersham Road, which will be used as a construction traffic route and to Botterells Lane, which will be used as a temporary local traffic diversion;

- Weedonhill Complex LWS comprises both semi-natural and plantation ancient woodland. Ancient woodland species which have been recorded in this woodland include goldilocks buttercup, wood millet, yellow archangel and coralroot.
- Brentford Wood LWS are which consists of approximately 9ha of ancient semi-natural broadleaved woodland and approximately 11ha of mixed plantation woodland. The Chilterns tunnel will pass approximately 50m beneath the site, east of Coleshill;
- in addition to the areas of ancient woodland that fall within designated sites, a further five areas of ancient woodland are adjacent to land required for the construction of the Proposed Scheme. Three of them, Roberts Wood, Second Wood and Wheatley Wood are close to the alignment of the Chilterns Tunnel. The first of these is semi-natural broadleaved woodland and ancient woodland, and the second and third are plantation on ancient woodland sites. A fourth wood, Bow Wood, is semi-natural broadleaved woodland and ancient woodland. It is adjacent to a part of Bottom House Farm Lane that will be used as a construction traffic route. A fifth woodland, Hales Wood, is plantation on an ancient woodland site. It is adjacent to part of Bottom House Farm Lane that will be used as temporary traffic diversion (which is not however, in land required for the construction of the Proposed Scheme); and
- the remaining areas of woodland close to the Chilterns tunnel or adjacent to Bottrells Lane which will be used for construction traffic are Bellhouse Wood, David's Wood, First Wood, Rushcroft Wood, Perryfield Plantation and part of Hales Wood. They are comparatively small and none are ancient woodland.

Scrub

- 4.4.28 There is approximately 1ha of dense and scattered scrub located within the land required for the construction of the Proposed Scheme at Turners Wood in Chalfont St Giles and adjacent to large expanses of arable farmland at Three Oaks Farm in Chalfont St Peter. Typical species include blackthorn and hawthorn.

Hedgerows

- 4.4.29 This area includes small fields with diverse hedges, mainly without gaps, and good numbers of hedgerow trees. In total, there are approximately 3km of hedgerow habitat within, or partially within land required for the construction of the Proposed Scheme. This includes approximately:
- 0.5km of intact, species-rich hedgerow;
 - 1km of intact, species-poor hedgerow;

- 1km of defunct, species-poor hedgerow; and
- 0.5km of species-rich hedgerow with trees.

- 4.4.30 Many hedgerows in the area are species-rich and, due to their composition of native species, qualify as a habitat of principle importance. Species present in the hedgerows include hornbeam, field maple, hazel, ash and pedunculate oak. Ground flora species include dog's mercury, ramsons (*Allium ursinum*), wood anemone (*Anemone nemorosa*) and bluebell.
- 4.4.31 Access was available to survey approximately 1km of hedgerows within land required for the construction of the Proposed Scheme. Further details are provided in the hedgerow section of Appendix EC-002-001.

Grassland

- 4.4.32 There is approximately 13ha of improved grassland and 0.3ha of amenity grassland recorded within land required for the construction of the Proposed Scheme. More diverse grassland types were also recorded:
- there is approximately 0.2ha of unimproved calcareous grassland within the land required for the construction of the Proposed Scheme This grassland is located at Chalfont St Giles Churchyard Biological Notification Site (BNS); this would qualify as a habitat of principle importance; and
 - poor semi-improved grassland, totalling an approximate area of 11ha, was recorded at Ashwells Farm, Turners Wood Farm and in land east of the River Misbourne at Chalfont St Giles. Typical species recorded from Ashwells Farm include cock's-foot, Yorkshire fog, common sorrel (*Rumex acetosa*) and meadow buttercup.

Watercourses

- 4.4.33 The land required for the construction of the Proposed Scheme passes below the River Misbourne at two locations: east of Chalfont St. Giles and east of Little Missenden adjacent to Shardeloes Lake.
- 4.4.34 The River Misbourne is a spring-fed chalk stream, which retains a diverse range of natural features such as riffles and pools, and various macrophyte assemblages that include water-crowfoot sp. (*Ranunculus* sp.) and watercress (*Nasturtium officinale*). The reaches surveyed are well connected with the flood plain and include reedbeds and marshy areas. The Misbourne qualifies as a habitat of principle importance due to being a chalk river that contains vegetation indicative of fast flowing streams (*Callitricho-Batrachion* vegetation)²⁵.

Water bodies

- 4.4.35 Shardeloes Lake LWS contains a large area of open water with swamp habitat dominated by reed sweet grass and bulrush at its margins. Sixteen species of aquatic macrophyte were recorded during field surveys at Shardeloes Lake. Though the lake is

²⁵Morgan, V et al; JNCC DEFRA; *The identification of UK BAP priority rivers: generating a spreadsheet of potential priority river water bodies. Background and technical notes*; 2011; http://jncc.defra.gov.uk/pdf/UKBAP_RiversTech-Dec2011.pdf; Accessed: 9 September 2012

dominated by filamentous green algae (indicating high nutrient levels), it had low turbidity and is not shaded.

4.4.36 There is one pond within the land required for the construction of the Proposed Scheme and a total of nine ponds within 250m of it. The majority are concentrated near Chalfont St. Peter and the River Misbourne. There are an additional seven ponds within 100m of the alignment of the Chiltern tunnel.

4.4.37 Access was available to four ponds during Phase 1 habitat surveys: one is located within the land required for the construction of the Proposed Scheme at Ashwells Farm. One pond, which is outside the land required for the construction of the Proposed Scheme, contains great crested newts and therefore qualifies as habitat of principle importance. No ponds met the criteria for a detailed pond survey.

Arable/cultivated land

4.4.38 Arable farmland comprises an area of approximately 7ha within land required for the construction of the Proposed Scheme. No arable field margins managed for wildlife were recorded.

Other habitats

4.4.39 Other habitats include buildings and hardstanding with no associated plant communities.

CFA9

4.4.40 Land in the Central Chilterns area (CFA9) is predominantly agricultural and includes expanses of grazed pasture and arable fields that are bounded by intact hedgerows. Semi-natural ancient woodland is present within and adjacent to the land required for the construction of the Proposed Scheme.

4.4.41 Access for survey was not gained for Mantle's Wood; land around Hedgemoor Wood; land in and around Jones Hill Wood; land to the east of South Heath; Abbey Wood south east of Great Missenden and Farthings Wood. In addition, access to land north of Great Missenden and scattered woodland between South Heath and Little Missenden, including parts of Rooks Wood and No Man's Wood, was not secured until spring 2013. Access to Mantles Wood LWS and Hedgemoor and Farthing Wood LWS was also refused. Data for these sites was obtained from desk study data sources.

Woodland

4.4.42 There is approximately 15ha of woodland within the land required for the construction of the Proposed Scheme, 11ha of which is semi-natural broadleaved woodland, which is a habitat of principle importance. Woodland is also adjacent to land required for the construction of the Proposed Scheme. Woodland recorded in this area includes:

- three non-statutory sites (Mantles Wood LWS, Hedgemoor and Farthing Wood LWS and Sibley's Coppice LWS) are within the land required for the construction of the Proposed Scheme. With the exception of Hedgemoor Wood, these woodlands are classified as ancient woodland. Farthing Wood and parts of Mantles Wood have a high proportion of Scot's Pine (*Pinus sylvestris*) in the canopy and are classified as ancient replanted woodland,

whereas the remaining areas of Mantles Wood and the whole of Sibley's Coppice meet the criteria for semi-natural ancient woodland. These woodlands are dominated by beech, with pedunculate oak, ash, hornbeam and wild cherry (*Prunus avium*). Rowan (*Sorbus aucuparia*) and holly are present in the shrub layer. Ancient woodland indicator ground flora species are diverse and include wood sedge (*Carex sylvatica*) and bluebell;

- Jenkin's Wood and Havenfields Wood are classified as semi-natural ancient woodland and are respectively within and adjacent to land required for the construction of the Proposed Scheme, north of Hyde Heath; and
- Rock Wood LWS is adjacent to land identified for mitigation for the Proposed Scheme. Parts of this site are semi-natural ancient woodland with areas of pine plantation and up to 15 ancient woodland indicators.

4.4.43 Smaller areas of broadleaved and mixed woodland that are within, or adjacent to the land required for the construction of the Proposed Scheme include John's Plantation, New Firs, and Closures and Hyde Plantation.

Hedgerows

4.4.44 The majority of the hedgerows in this area are intact and comprise native species. Approximately 16km of hedgerow habitat were recorded in the land required for the construction of the Proposed Scheme. This includes approximately:

- 2km of intact species-rich hedgerow;
- 10km of intact species-poor hedgerow;
- 1km of defunct species-poor hedgerow;
- 0.5km of species-rich hedgerow with trees; and
- 3km of species-poor hedgerow with trees.

4.4.45 Hyde Lane Verge BNS is described in desk study information as comprising a 6m high holly hedge on either side of Hyde Lane with occasional hazel and mature pedunculate oak standards. However, surveys of the verge from PRow found its southern and central sections to be species-rich with 12 woody species recorded in the hedgerow east of Hyde Lane and 10 species in the hedgerow to the west. Woody species recorded from these hedgerows include hornbeam, hazel, field maple, spindle and blackthorn. In addition, six ancient woodland indicator species were recorded from the base of these hedgerows. The northern section of the verge differs to other sections as it comprises a species-poor hedgerow to the east of Hyde Lane with no hedgerow on the west side. The notable plant species green hellebore (*Helleborus viridis*) has been recorded here historically.

4.4.46 Many hedgerows in the area are species-rich and due to the composition of native species, qualify as a habitat of principle importance. Species typically present in these hedgerows include field maple (*Acer campestre*), hazel, elm (*Ulmus sp.*), hawthorn, blackthorn, holly, ash and dogwood (*Cornus sanguinea*).

4.4.47 Access was available to survey approximately 2.1km of hedgerows within, or partially within, the land required for the construction of the Proposed Scheme. Further details are provided in the hedgerow section of Appendix EC-002-001.

Parkland and Scattered Trees

4.4.48 There is a line of mature trees along a track from Jenkin's Wood and along the track from Springfield Farm to Havenfield Wood both of which are within the land required for construction for the Proposed Scheme.

Grassland

4.4.49 In addition to amenity and improved grassland, (about 3ha and 48ha respectively) which are common in the land required for the construction of the Proposed Scheme, semi-improved (approximately 7ha) and poor semi-improved grassland (approximately 9ha) were also recorded in the area. These include:

- the grassland at Woodlands Park, which comprise the grasses Yorkshire fog (*Holcus lanatus*), soft brome, (*Bromus hordeaceus*), sweet vernal grass (*Anthoxandum odoratum*), cock's foot and the herbaceous species yarrow, autumn hawkbit, ribwort plantain, selfheal, creeping buttercup and germander speedwell;
- grassland at Mulberry Park Hill comprises sweet vernal grass, Yorkshire fog, and common bent (*Agrostis capillaris*); and
- grassland at Mantles Farm include the herbaceous species agrimony (*Agrimonia eupatoria*), common ragwort, selfheal and white clover (*Trifolium repens*).

Water bodies

4.4.50 There are no large water bodies within 250m of the land required for the construction of the Proposed Scheme in this area. There are five ponds located within the land required for the construction of the Proposed Scheme and a total of 15 ponds within 250m of it, scattered between South Heath and Hyde Heath.

4.4.51 Access for Phase 1 habitat surveys was available for four of the ponds within 250m of the land required for the construction of the Proposed Scheme; one of which is located within it. This pond contains great crested newt and therefore qualifies as a habitat of principle importance. No ponds met the criteria to be scoped in for detailed pond surveys.

Arable/cultivated land

4.4.52 Arable fields are common in this area, totalling an approximate 107ha. However, no arable field margins specifically managed for wildlife were recorded during field surveys.

4.4.53 There are five small traditional orchards located within the area which qualify as a habitat of principle importance. One orchard at Mulberry Park Hill, north of South Heath is approximately 0.2ha and is located within the land required for the construction of the Proposed Scheme. The other four are located adjacent to land

required for the construction of the Proposed Scheme, two of which are in Park Farm, north of South Heath with the third located at Mantles Farm and the fourth at Hyde Farm in Hyde Heath.

Other habitats

- 4.4.54 Other habitats include buildings and hard standing with no associated plant communities.

CFA10

- 4.4.55 The Dunsmore Wendover and Halton area (CFA10) includes the northern edge of the Chilterns AONB. Vegetation established on the Chilterns ridge includes large areas of woodland and farmland of arable and pasture bounded by intact hedgerows. The northern parts of this area are more open and flat as the land required for the construction of the Proposed Scheme leaves the Chilterns and enters the Vale of Aylesbury north of Wendover.
- 4.4.56 Access for survey was not obtained to Upper Wendover Dean Farm, Durham Farm in Wendover Dean, Boswell's Farm and Nash Lee Farm, which are all within the land required for the construction of the Proposed Scheme. In addition, access to Springfield Farm and Chapel Farm was not secured until spring 2013. Wendover Rifle range BNS, Rushmore Wood ancient woodland and Bacombe Hill SSSI, all of which are adjacent to the land required for the construction of the Proposed Scheme, were also refused access. Data for these sites was obtained from desk study.

Woodland

Up to 4ha of semi-natural broadleaved woodland, which is a habitat of principle importance, present within the land required for the construction of the Proposed Scheme, including:

- Jones' Hill Wood, located about 1km west of The Lee, is classified as semi-natural ancient woodland and dominated by beech. Jones' Hill Wood is a lowland deciduous woodland habitat of principle importance and partially within the land required for the construction of the Proposed Scheme; and
- secondary woodland comprising ash, sycamore and oak with a holly understorey is located west of the A413. The woodland is within the land required for the construction of the Proposed Scheme.

- 4.4.57 Four further woodlands are adjacent to land required for the construction of the Proposed Scheme, include:

- Rushmore Wood, a semi-natural broadleaved ancient woodland located southeast of Jones Hill Wood;
- Bacombe Hill SSSI, which although designated for species-rich calcareous grassland, is buffered by woodland on the lower slopes of the hill. The woodland, which is dominated by hazel with pedunculate oak standards, is located south of Ellesborough Road;
- broadleaved woodland on the west side of Kings Lane, located between Jones' Hill Wood and Rushmore Wood; and

- woodland at Wendover Rifle Range BNS, located northwest of Kingash.

Scrub

4.4.58 Scrub is located within the Dunsmore and Wendover area:

4.4.59 dense scrub, with a combined area of approximately 1.6ha, is located in the land required for the construction of the Proposed Scheme at Grove Farm; along the verges of Nash Lee Road; the A413; and the Chiltern Mainline railway west of Wendover, including the Grassland Between the Railway and A41 BNS. This habitat type is also located adjacent to the land required for the construction of the Proposed Scheme along the A413 north of Wendover; and

- scattered scrub is present in land required for the construction of the Proposed Scheme west of the A413, north of Wendover Dean. Typical species include blackthorn and hawthorn.

Hedgerows

4.4.60 This area is characterised by small fields with dense, diverse hedges often with hedgerow trees. In total, approximately 22km of hedgerow habitat was recorded in the land required for the construction of the Proposed Scheme. This includes approximately:

- 3km of intact, species-rich hedgerow;
- 8km of intact, species-poor hedgerow;
- 7km of defunct, species-poor hedgerow;
- 3km of species-rich hedgerow with trees; and
- 1km of species-poor hedgerow with trees.

4.4.61 Many hedgerows in the area are species-rich and qualify as a habitat of principle importance as they largely comprise native species. Typical species include hawthorn, blackthorn, elder, field maple, rose, ash and elm.

4.4.62 Access was available to survey approximately 4.4km of hedgerows in, or partially within, the land required for the construction of the Proposed Scheme. Further details are provided in the hedgerow section of Appendix EC-002-001.

Parkland and Scattered Trees

4.4.63 Black poplar, a notable tree species, was recorded within the land required for the construction of the Proposed Scheme to the north and west of the orchard at Nash Lee, and to the north of Wellick Farm. There are additional desk study records of six native black poplar bordering a stream to the south of Nash Lee.

Grassland

4.4.64 In addition to widespread improved and amenity grassland, which comprise an approximate area of 91ha and 2.6ha respectively, the following grasslands, with a combined area of roughly 16ha, are also present within land required for the construction of the Proposed Scheme:

- calcareous semi-improved grassland, is located on the road verges of Chesham Lane and on a road verge along the A413 just north of Wendover Rifle Range adjacent to the land required for the construction of the Proposed Scheme. This grassland is adjacent to the Grassland Between the Railway and A41 BNS. Species recorded from these verges include upright brome (*Bromus erectus*), wild majorum (*Origanum vulgare*) and salad burnet (*Sanguisorba minor*);
- semi-improved grassland is located within the land required for the construction of the Proposed Scheme at Durham Farm in Wendover Dean. Typical species for semi-improved grasslands in this area include false oat-grass and cock's-foot with occasional herbs including bird's-foot trefoil, ribwort plantain and meadow buttercup;
- an area of semi-improved grassland dominated is located within the land required for the construction of the Proposed Scheme to the northwest of Wendover at Wellick Farm; and
- poor semi-improved grassland is located within the land required for the construction of the Proposed Scheme at Grove Farm and south-west of the orchard north of Nash Lee Road.

Water bodies

- 4.4.65 There are no large water bodies within 250m of the land required for the construction of the Proposed Scheme. There are four ponds located within the land required for the construction of the Proposed Scheme and a total of 17 ponds within 250m of it, with the majority concentrated near Wellick Farm and Rushmoor Wood.
- 4.4.66 Access was available to nine ponds for Phase 1 habitat surveys within 250m of the land required for the construction of the Proposed Scheme: three are located within it. One pond at Hartley Farm and one at Wellick Farm, contains great crested newts. Both of these ponds are within 250m of the land required for the construction of the Proposed Scheme with the pond at Hartley Farm within it.
- 4.4.67 The ponds at Hartley Farm and Wellick Farm were also scoped in for a detailed pond survey. In total, eight species of submerged and emergent aquatic plants were recorded, including frogbit (*Hydrocharis morsus-ranae*) and water dock (*Rumex hydrolapathum*).
- 4.4.68 There is a wet ditch at Wellick Farm that is shaded and lacks marginal vegetation.

Arable/cultivated land

- 4.4.69 Arable fields are the dominant landscape in this area with an approximate area of 136ha. No arable field margins of sufficient quality to qualify as Habitats of Principle Importance were identified during field surveys.
- 4.4.70 There are two Habitats of Principle Importance traditional orchards within the land required for the construction of the Proposed Scheme. One is located at Road Barn Farm, north-west of Kingash and the second, a larger orchard, is located north of Nash Lee Road.

Other habitats

4.4.71 Other habitats present include buildings and hard standing with no associated plant communities.

CFA11

4.4.72 The area between Stoke Mandeville and Aylesbury is dominated by arable and pasture fields, bounded by intact hedgerows, often with drainage ditches. The Proposed Scheme crosses a number of watercourses, including Stoke Brook in the south of the area near Stoke Mandeville, Bear Brook and Sedrup Ditch west of Aylesbury, and the River Thame towards the north of the area near Fleet Marston.

4.4.73 Access for survey was not obtained to farmland east of Upper Winchendon known as Sheepcote Hill Farm; farmland south of Stoke Mandeville, and Fleet Marston Farm, north west of Aylesbury. Information for these sites was gathered from desk study only.

Woodland

4.4.74 Semi-natural broadleaved woodland within, or partially within, the land required for the construction of the Proposed Scheme comprises an area of approximately 2ha, including the following:

- Aylesbury Park Golf Club contains two small stands of mature semi-natural broadleaved woodland dominated by pedunculate oak in the canopy layer and hawthorn in the shrub layer, with a number of ancient woodland indicator species including hairy brome (*Bromus ramosus*), field rose and three-nerved sandwort (*Moehringia trinervia*);
- Fleet Marston Spinney is a strip of woodland and dense scrub in the north of the area dominated by ash with occasional pedunculate oak and a limited ground flora comprising cow parsley (*Anthriscus sylvestris*), herb Robert (*Geranium robertianum*), cleavers (*Galium aparine*) and common nettle. There is evidence of grazing by deer in the woodland; and
- semi-natural broadleaved woodland at Hartwell House comprises mature beech, pedunculate oak, ash and horse chestnut (*Aesculus hippocastanum*), with an understorey of hawthorn and a ground flora dominated by common nettle.

4.4.75 An area of semi-natural mixed woodland, located to the north of A418 Oxford Road and south of Aylesbury Park Golf Club and Hartwell House, approximately 2ha in area, is partially within land required for the construction of the Proposed Scheme. The canopy layer comprises ash, sycamore, Scot's pine, beech and oak. The understorey includes hazel and elder with common nettle, ground ivy (*Glechoma hederacea*) and wood brome. This woodland is listed as a lowland deciduous woodland habitat of principle importance.

4.4.76 Plantation broadleaved woodland comprising an area of approximately 12ha was recorded within, or partially within, land required for the construction of the Proposed Scheme, including:

- patches of woodland throughout Aylesbury Park Golf Club where typical tree species include densely planted wild cherry, common lime (*Tilia x europaea*) and ash. Young sycamore and elder are occasional in the understorey, while the ground flora is sparse with exception to patches of common nettle. The approximate age of the plantation is estimated to be 15-20 years old. Further areas of plantation woodland of similar character were recorded from Waddon Hill Farm, west of Aylesbury Park Golf Club;
- young plantation comprising field maple, ash, wild cherry and hawthorn borders arable fields to the west of Fleet Marston. Spreading hedge parsley (*Torilis arvensis*), false oat-grass and common nettle were recorded in the ground flora; and
- mature oak and ash plantation at Hartwell House with an understorey comprising of hawthorn and bramble.

Scrub

- 4.4.77 Small areas of dense and scattered scrub with a combined area of approximately 5.3ha are located in land required for the construction of the Proposed Scheme within Fleet Marston Spinney, northwest of Putlowes Farm and at Whitethorn Farm in Stoke Mandeville. Typical species include blackthorn and hawthorn.

Hedgerows

- 4.4.78 In total, approximately 33km of hedgerow habitat was recorded within the land required for the construction of the Proposed Scheme. This includes approximately:
- 4km of intact, species-rich hedgerow;
 - 12km of intact, species-poor hedgerow;
 - 11km of defunct, species-poor hedgerow;
 - 1km of species-rich hedgerow with trees; and
 - 5km of species-poor hedgerow with trees.
- 4.4.79 The majority of hedgerows in this area form field boundaries and are dominated by native species such as hawthorn and blackthorn.
- 4.4.80 Access was available to survey approximately 6.8km of hedgerows in, or partially within, the land required for the construction of the Proposed Scheme. Further details are provided in the hedgerow section of Appendix EC-002-001.

Parkland and scattered trees

- 4.4.81 Mature, broadleaved scattered trees are present at Aylesbury Park Golf Club and Hartwell House, including pedunculate oak, horse chestnut, ash and sycamore.
- 4.4.82 Black poplar, which is a notable tree species, was recorded in fourteen areas within land required for the Proposed Scheme. Locations for native black poplar include Stoke Brook, Sedrup Farm, Sedrup Brook, Aylesbury Park Golf Club, Stoke House Farm, Mill House Farm, Putlowes Farm and a field northeast of Upper Cranwell.

Grassland

4.4.83 In addition to amenity grassland and improved grassland which comprise an area of approximately 58ha and 104ha respectively, semi-improved grassland, with an area of approximately 18ha was recorded within land required for the construction of the Proposed Scheme, and includes:

- Grassland at North Lee BNS comprises neutral semi-improved grassland at a former agricultural research centre;
- Putlowes Farm, north of the River Thames, where typical species include cock's foot, Yorkshire fog, common vetch (*Vicia sativa*) and meadow buttercup;
- Aylesbury Park Golf Club comprises an area of rough neutral grassland comprising cock's foot, common bent, red fescue, ox-eye daisy and black knapweed;
- Land to the northwest of Hartwell House comprises neutral grassland, where typical species in this cattle-grazed grassland include Yorkshire fog, rough meadow grass (*Poa trivialis*) and creeping buttercup; and
- Whitethorn Farm and Stoke House Farm, both of which are in the south of the area.

4.4.84 In addition, poor semi-improved grassland was recorded within, or partially within, land required for construction of the Proposed Scheme, comprising approximately 34ha. Poor semi-improved grassland was recorded at Stoke House Farm, Whitethorn Farm, Park House, Hartwell Cottage, Putlowes Farm, Aylesbury Park Golf Club and land to north of the Golf Club.

Watercourses

4.4.85 The River Thames and its tributaries are frequently crossed by the Proposed Scheme including:

- River Thames has natural unshaded earth banks allowing marginal vegetation to develop, including the dominant species common reed, common spike rush (*Eleocharis palustris*), reed sweet-grass, water mint (*Mentha aquatica*) and water forget-me-not (*Myosotis scorpioides*). The river still retains natural features such as meanders, diversity of flow rates, berms and native marginal vegetation. It qualifies as a habitat of principle importance due to vegetation indicative of fast flowing streams (*Callitriche-Batrachion* vegetation)²⁶. Part of the River Thames, approximately 120m to the east of land required for the Proposed Scheme, is a LWS;
- Stoke Brook is dominated by tall herbs and grasses including common nettle, meadowsweet (*Filipendula ulmaria*) and cock's foot. Areas of dense scrub and trees are also present, including ash, native black poplar, field maple, goat willow (*Salix capraea*), crack willow (*Salix fragilis*), elder, hawthorn and

²⁶ Morgan, V et al; JNCC DEFRA; *The identification of UK BAP priority rivers: generating a spreadsheet of potential priority river water bodies. Background and technical notes*; 2011; http://jncc.defra.gov.uk/pdf/UKBAP_RiversTech-Dec2011.pdf; Accessed: 9 September 2012

blackthorn;

- Bear Brook and Hartwell and Lower Hartwell ditches flow into the River Thames. The ditches, which have been heavily modified (deepened and straightened), are generally shaded, although some macrophytes can be seen. Occasional reed sweet-grass, bulrush and yellow flag are present with a low abundance of fool's watercress (*Apium nodiflorum*), gypsywort, great willowherb and bittersweet (*Solanum dulcamara*);
- Sedrup ditch is heavily shaded by mixed plantation woodland on the west bank with marginal vegetation limited to scattered great willowherb, fool's watercress and meadowsweet; and
- Fleet Marston Brook is a tributary of the River Thames and the marginal vegetation comprises common reed with localised patches of water dock, fool's watercress and watercress (*Nasturtium officinale*). The banks are covered in tall ruderal vegetation comprising great willowherb and common nettle.

Water bodies

- 4.4.86 There are 31 ponds or ditches/linear water bodies located within or adjacent to the land required for the construction of the Proposed Scheme and a total of 51 water bodies within 250m of it, with the majority concentrated around Lower Hartwell and Fleet Marston.
- 4.4.87 Access was available to 47 water bodies during Phase 1 habitat surveys within 250m of the land required for the construction of the Proposed Scheme; 29 of which are located within or adjacent to it. Ten ponds within 250m of the land required for the construction of the Proposed Scheme contain great crested newts and, therefore, qualify as a habitat of principle importance. Six of these ponds are located within the land and are clustered at both Putlowes Farm and Aylesbury Park Golf Club.
- 4.4.88 Nine ponds were scoped in for detailed pond survey, predominantly around Putlowes Farm and Aylesbury Park Golf Club. In total 25 species of submerged and emergent aquatic plants were recorded from these ponds, including water-plantain (*Alisma plantago-aquatica*), various-leaved water-starwort (*Callitriche platycarpa*), mare's-tail (*Hippuris vulgaris*), ivy-leaved duckweed (*Lemna trisulca*) and water dock.
- 4.4.89 There are no large water bodies within 250m of the land required for the construction of the Proposed Scheme.

Arable/cultivated land

- 4.4.90 Arable habitat is frequent in the Stoke Mandeville and Aylesbury area comprising approximately 174ha. No arable field margins managed specifically for wildlife have been reported during field surveys.
- 4.4.91 A small traditional orchard is present at Stoke House Farm in Stoke Mandeville adjacent to the land required for the construction of the Proposed Scheme. This orchard qualifies as a habitat of principle importance.

Other habitats

4.4.92 Other habitats present include buildings and hard standing with no associated plant communities.

CFA12

4.4.93 Land in the southern part of Waddesdon and Quainton area (CFA12) is predominantly arable and improved grassland bounded by hedgerows. In addition, the northern section of this area is dominated by several large semi-natural broadleaved ancient woodlands (remnants of the historic Bernwood Forest) and a large area of unimproved grassland at Grendon and Doddershall Meadows LWS. The Aylesbury Link railway also runs through this area.

4.4.94 Access for survey was not obtained to Sheephouse Wood SSSI and Grendon and Doddershall Meadows LWS. Data for these sites was obtained from desk study data sources. In addition, access for survey at Little Manor Farm (south-west of the Proposed Scheme) and Fieldside Farm, Doddershall (north-east of the land required for the construction of the Proposed Scheme) was not secured until spring 2013 and phase 1 habitat surveys were not carried out.

Woodland

4.4.95 Two areas of semi-natural broadleaved woodland with an approximate area of 4ha are located within land required for the construction of the Proposed Scheme. Both woodlands qualify as lowland deciduous woodland Habitats of Principle Importance, and comprise of the following:

- a narrow belt of semi-natural ancient woodland located between Aylesbury Link railway and Calvert Waste Terminal. It is directly adjacent to Sheephouse Wood SSSI but does not form part of the SSSI. Dominant canopy species include pedunculate oak and ash with a hawthorn shrub layer. The ground flora includes the ancient woodland indicator species wood anemone and bluebell; and
- a triangular patch of woodland dominated by self-seeded birch is located at the junction of the Aylesbury Link Railway and the disused Akeman Street railway.

4.4.96 In addition to these woodlands, there are several semi-natural broadleaved woodlands adjacent to land required for the construction of the Proposed Scheme, including:

- Sheephouse Wood SSSI and Finemere Wood SSSI, which are located in the north of this area, east of the Aylesbury Link railway. Typical canopy species include pedunculate oak and ash with occasional beech, silver birch and wild cherry. The shrub layer is dominated by hazel with abundant hawthorn, field maple and honeysuckle (*Lonicera periclymenum*). The ground flora is diverse and comprises bluebell, dog's mercury, lesser celandine (*Ranunculus ficaria*), primrose and wood anemone. The notable species, wild service tree (*Sorbus torminalis*) and midland hawthorn, are present in Sheephouse Wood. Both

Finemere Wood and Sheephouse Wood comprise areas of semi-natural and replanted ancient woodland;

- Greatsea and Romer Wood LWS is largely classified as ancient replanted woodland and located between Sheephouse Wood and Finemere Wood. The rides in this predominantly broadleaved woodland are exceptionally species-rich; and
- broadleaved woodland surrounding ponds at Upper South Farm and encompassing buildings at Doddershall House.

Scrub

- 4.4.97 Areas of dense and scattered scrub (approximately 13ha in total) are located within land required for the construction of the Proposed Scheme around Waddesdon adjacent to A41; south of Quainton in close proximity to Upper South Farm; either side of the Aylesbury Link Railway which runs along the eastern edge of Calvert landfill site; either side of the access road from the A41 to Finemere Wood Nature Reserve, using the disused Akeman Street railway; and along the corridor of the River Ray. Scrub is typically dominated by blackthorn and hawthorn with occasional species such as wild privet (*Ligustrum vulgare*) and hazel.
- 4.4.98 Belts of dense scrub surrounding a fishing lake at Woodlands Farm, east of the Aylesbury Link railway contain blackthorn, hawthorn, elder, bramble, dogwood and occasional silver birch and alder.

Hedgerows

- 4.4.99 In total, approximately 29.5km of hedgerow was recorded in the land required for the construction of the Proposed Scheme. This includes approximately:
- 1km of intact, species-rich hedgerow;
 - 20km of intact, species-poor hedgerow;
 - 0.5km of defunct, species-rich hedgerow;
 - 2km of defunct, species-poor hedgerow;
 - 3km of species-rich hedgerow with trees; and
 - 3km of species-poor hedgerow with trees.
- 4.4.100 The majority of hedges in this area are composed of native species and qualify as a Habitats of Principle Importance. Most of the hedgerows are intact and provide connectivity across the arable landscape. Typical species include hawthorn, blackthorn, rose species, elder and pedunculate oak. Midland hawthorn is also locally present in this area around Finemere Wood.
- 4.4.101 Access was available to survey approximately 8.1km of hedgerows in, or partially within, the land required for the construction of the Proposed Scheme. Further details are provided in the hedgerow section of Appendix EC-002-001.

Parkland and Scattered Trees

- 4.4.102 Native black poplar, a notable tree species, is present to the north-west of Cranwell Farm.

Grassland

- 4.4.103 In addition to improved grassland, which has an approximate area of 114ha, unimproved grassland (13ha), semi-improved grassland (13ha) and poor semi-improved grassland (37ha) was identified within, or partially within, land required for the construction of the Proposed Scheme in the following areas:

- Grendon and Doddershall Meadows LWS is an unimproved neutral grassland located within land required for construction of the Proposed Scheme. The notable species present in this grassland include sneezewort (*Achillea ptarmica*), fen bedstraw (*Galium uliginosum*), oval sedge (*Carex ovalis*) and blunt flowered rush (*Juncus subnodulosus*), all of which are infrequent in Buckinghamshire. Other plant species common in old meadows are frequent, including ox-eye daisy (*Leucanthemum vulgare*), lady's bedstraw, bird's-foot trefoil, black knapweed, common sorrel and meadow barley (*Hordeum secalinum*). These meadows are likely to qualify as a habitat of principle importance lowland meadow;
- Waddesdon Common LWS is an unimproved neutral meadow containing several species that are uncommon in Buckinghamshire, including distant sedge, fen bedstraw, tubular water-dropwort, brown sedge and lesser spearwort.
- Waddesdon Station Complex LWS is designated for species-rich calcareous grassland and partially within land required for the construction of the Proposed Scheme;
- a narrow strip of unimproved calcareous grassland, a habitat of principle importance, located on the track to old railway bridge leading to Oak Tree Farm. This grassland is dominated by red fescue (*Festuca rubra*) and common bent and contains the chalk grassland indicator species meadow oat grass (*Avenula pubescens*), spiny restharrow (*Ononis spinosa*) and dropwort (*Filipendula vulgaris*);
- marshy neutral grassland, a habitat of principle importance, was recorded south of the Muxwell Brook and partly in the land required for the construction of the Proposed Scheme. It is dominated by glaucous sedge (*Carex flacca*) with a range of other species indicative of damp conditions, such as compact rush (*Juncus conglomeratus*), carnation sedge (*Carex panacea*) and occasional ragged robin (*Lychnis flos-cuculi*) and southern marsh orchid (*Dactylorhiza praetermissa*);
- west of the Aylesbury Link railway line at Greatmoor Farm and Oak Tree Farm is a linear stretch of semi-improved neutral grassland. This grassland is dominated by false-oat grass but also comprises bird's-foot trefoil, selfheal and meadow buttercup;

- semi-improved neutral grassland east of the existing railway line at the nature reserve at Finemere Woods and Finemere Meadows comprises abundant red fescue with other species including meadow fescue, crested dog's-tail, bird's foot trefoil, black knapweed, and occasional yellow rattle (*Rhinanthus minor*), wild carrot (*Daucus carota*), common fleabane, agrimony and meadow vetchling;
- at Woodlands Farm, semi-improved grassland comprises Yorkshire fog, crested dog's tail, common bent and meadow vetchling; and
- species-poor semi-improved grassland was recorded within and partially within land required for the construction of the Proposed Scheme in arable field margins at Blackgrove Farm and Greatmoor Farm; grassland surrounding Doddershall House; and within Bucks Railway Centre and Greatmoor Farm.

Watercourses

- 4.4.104 The Proposed Scheme will cross Fleet Marston Brook, the River Ray and its tributaries: Muxwell Brook and Tetchwick Brook. The large flood compensation drain at Greatmoor Farm is also within land required for the construction of the Proposed Scheme, though not crossed by the route.
- 4.4.105 These watercourses are characterised by shaded banks covered in dense scrub and poor marginal and channel vegetation, limited to occasional fool's watercress. These watercourses contain few natural features and have limited marginal or emergent vegetation.
- 4.4.106 All watercourses and their vegetation are described in detail in the River Corridor Survey (RCS) and River Habitat Survey (RHS) sections in Appendices EC-002-001.

Water bodies

- 4.4.107 There is one large water body at Calvert Landfill within 250m of the land required for the construction of the Proposed Scheme. There are 41 ponds or ditches/linear water bodies located within, or adjacent to, the land required for the construction of the Proposed Scheme and a total of 120 water bodies (including the large water body at Calvert Landfill) within 250m of it, with the majority concentrated near Waddesdon and Quainton.
- 4.4.108 Access was available to 31 water bodies during Phase 1 Habitat surveys within 250m of the land required for the construction of the Proposed Scheme, 19 of which are located within it. 11 ponds contain great crested newts within 250m of the land required for the construction of the Proposed Scheme and therefore qualify as Habitats of Principle Importance; seven of which are located within it.
- 4.4.109 Three ponds were scoped in for a detailed pond survey, two of which are at Woodlands Farm with the third at Buckinghamshire Railway Centre. In total 17 species of submerged and emergent aquatic plants were recorded, including water-plantain and pink water-speedwell (*Veronica catenata*). Invasive non-native species New Zealand pigmyweed (*Crassula helmsii*) and parrot's feather (*Myriophyllum aquaticum*) were also recorded in one pond.

Arable/cultivated land

- 4.4.110 Arable farmland, with an approximate area of 136ha, is the dominant habitat type within the extent of the Proposed Scheme in this area. Arable field margins, which are specifically managed for wildlife, are present at Waddesdon Manor farmland as part of an environmental stewardship scheme.
- 4.4.111 A very small traditional orchard is present at Woodlands Farm in the extent of the Proposed Scheme. The orchard comprises less than 10 mature trees with a diverse grass understorey of cock's-foot, crested dog's-tail (*Cynosurus cristatus*), false oat grass and Yorkshire fog. This habitat qualifies as a traditional orchard habitat of principle importance.

Other habitats

- 4.4.112 Other habitats present include buildings, bare ground and the landfill site to the north of this area.

CFA13

- 4.4.113 Land at Calvert, Steeple Claydon, Twyford and Chetwode (CFA13) largely comprises arable land and improved pasture intersected by hedgerows. There are significant water bodies at Calvert Brick Pits LWS and Calvert Jubilee LWS, a large area of semi-improved grassland at Home Farm, and ancient woodland at Decoypond Wood LWS. The Aylesbury Link railway and the East-West railway are present in the south of the area, with Former Great Central Main Line (GCML) disused railway running south to north.
- 4.4.114 Access for survey was not obtained for large tracts of land in the north of the area around Chetwode, Preston Bissett and Barton Hartshorn. There was also no access to Decoypond Wood LWS and the land north of Sheephouse Wood SSSI. Information for these sites was gathered from desk study data only.

Woodland

- 4.4.115 Semi-natural broadleaved woodland of approximately 16ha is present within, or partially within, land required for the construction of the Proposed Scheme and includes the following:
- Decoypond Wood LWS is an ancient woodland that is partially within land required for the construction of the Proposed Scheme. This woodland is a lowland deciduous woodland habitat of principle importance comprising a mix of wet ash and relic hazel coppice with oak, birch and field maple. A variety of ancient woodland indicator plants are present including wood sedge, bluebell, primrose, wood millet (*Milium effusum*) and three-veined sandwort, with sedges and meadowsweet in the damper areas. The old decoy pond is hardly evident; and
 - Calvert Jubilee LWS is partly within land required for the construction of the Proposed Scheme. Woodland is present along parts of the perimeter of the site. The canopy is dominated by ash and pedunculate oak with occasional crack willow and a shrub layer of elder, hawthorn and field rose. Ground flora

species include three-veined sandwort, greater stitchwort (*Stellaria holostea*), wild strawberry (*Fragaria vesca*) and black bryony (*Tamus communis*);

- Wet woodland is present along the northern boundary of Calvert Brick Pits LWS. The woodland is located on a north-facing earth mound up to 10m in height. The lower slopes of the woodland are dominated by crack willow and goat willow grading into pedunculate oak dominated woodland with a hawthorn and elder understorey. Several black poplars were recorded in the west side of this woodland;
- Barton Hartshorn Railway Wood LWS comprises osier (*Salix viminalis*) dominated woodland with a limited understory and occasional pignut (*Conopodium majus*) and remote sedge (*Carex remota*) on the banks of dissecting streams;
- oak and ash dominated woodland is present at the Calvert Estate. The shrub layer comprises hawthorn and bramble with several ancient woodland indicators in the ground flora including bluebell, yellow archangel, wood anemone and goldilocks buttercup (*Ranunculus auricomus*). An area of willow carr is also present in the north of Calvert Estate, to the east of Brackley Lane, Calvert; and
- additional areas of semi-natural broadleaved woodland are also found at Pond farm, to the north of Decoypond Wood LWS, Moat Farm, Chetwode Priory Estate and on the Former GCML disused railway including the Chetwode Cutting BNS.

4.4.116 Other areas of woodland within land required for the construction of the Proposed Scheme are located at Moat Farm in Goddington, along the Former GCML disused railway in Chetwode, Manthorn Farm in Chetwode, around the margins of Grebe Lake (Calvert Brick Pits and Moor Sailing Club a non-statutory designated site) and at Manor Farm in Barton Hartshorn. Typical canopy species include pedunculate oak and hazel.

4.4.117 Plantation broadleaved woodland of approximately 6ha is located within land required for the construction of the Proposed Scheme in farmland to the north Calvert Jubilee LWS, Pond Farm, Barleyfields Farm, Barton Hill Farm and along the eastern boundary of Calvert Brick Pits. Typical canopy species include ash, pedunculate oak, alder and sycamore.

Scrub

4.4.118 Scrub habitat, with an approximate area of 23ha, was recorded within, or partially within, land required for the construction of the Proposed Scheme; this includes:

- Dense and scattered scrub dominated by hawthorn, blackthorn and bramble buffer the lake at Calvert Jubilee LWS. Dense scrub borders the majority of the lake including to the area between the lake and the existing railway;
- Calvert Brick Pits LWS includes large areas of dense and scattered scrub predominantly composed of blackthorn and hawthorn. Diverse ground flora is

present in more open areas, and described in the grassland and other habitats sections below;

- Calvert Railway Station LWS comprises scattered hawthorn, bramble and blackthorn scrub which is re-establishing following mechanical clearance of the site;
- The Former GCML disused railway cutting between Twyford and Newton Purcell which includes Chetwode Cutting BNS and Railway Cutting North of Twyford BNS contains dense scrub composed of hawthorn, Midland hawthorn, field rose and blackthorn and occasional pedunculate oak and ash trees. It is included within land required for the construction and operation of the Proposed Scheme to ensure its value as a visual screen is retained.
- Scrub is also present at Portway Farm, the Hermitage near Chetwode and along the Padbury Brook in Twyford. Typical species include blackthorn and hawthorn.

Hedgerows

4.4.119 In total, approximately 40.5km of hedgerow habitat was recorded in the land required for the construction of the Proposed Scheme. This includes approximately:

- 2km of intact, species-rich hedgerow;
- 13km of intact, species-poor hedgerow;
- 0.5km of defunct, species-rich hedgerow;
- 2km of defunct, species-poor hedgerow;
- 10km of species-rich hedgerow with trees; and
- 13km of species-poor hedgerow with trees.

4.4.120 The majority of these hedgerows are intact, long-established and comprise native species and as such qualify as a habitat of principle importance. Typical species include blackthorn, hawthorn, Midland hawthorn, field maple and field rose with ash and pedunculate oak standard trees. Typical ground flora species include herb Robert, dog's mercury, and wood false brome.

4.4.121 Access was available to survey approximately 8.9km of hedgerows in, or partially within, the land required for the construction of the Proposed Scheme. Further details are provided in the hedgerow section of Appendix EC-002-001.

Parkland and Scattered Trees

4.4.122 Native black polar, a notable tree species, was identified along Padbury Brook in Twyford, Calvert Brick Pits LWS and in a hedgerow at Church View Farm in Twyford.

Grassland

4.4.123 There is approximately 70ha of improved grassland and small patches of amenity grassland (up to 1.4ha) within land required for the construction of the Proposed

Scheme. In addition, there are several stands of semi-improved (approximately 8ha), poor-semi improved grassland (approximately 25ha) and marshy grassland (up to 0.2ha), including:

- neutral poor semi-improved grassland is present at Calvert Railway Station LWS. The survey data does not identify any of the notable or indicator species within the citation and it appears the unmanaged grassland has reverted to a coarse grass sward with limited herbs. The citation states that the site supports species indicative of moist conditions including carnation sedge, betony (*Stachys officinalis*) and sneezewort, which are rare in the county. Devil's-bit *scabious* (*Succisa pratensis*), quaking-grass (*Briza media*), pepper-saxifrage (*Silaum silaus*) and common spotted orchid were also noted;
- wet grassland at Barton Hartshorn Railway Wood LWS which includes the indicator species greater tussock sedge (*Carex paniculata*), sharp flowered and blunt flowered rushes (*Juncus acutiflorus*), with abundant fen bedstraw. The majority is likely to be outside of land required for the construction of the Proposed Scheme;
- neutral semi-improved grassland is found on the Former GCML disused railway cutting, including at the Railway Cutting North of Twyford BNS and Chetwode Cutting BNS. Grassland within the Railway Cutting North of Twyford BNS is dominated by false oat grass with occasional herbaceous species including black knapweed, lady's bedstraw and agrimony;
- marshy grassland was recorded within an area of thinned willow carr located in the northern end of the Calvert Estate. Poor semi-improved grassland was also recorded along the western boundary of the site; and
- an area of semi-improved ridge and furrow grassland is present at Home Farm, Twyford. Smaller areas of semi-improved grassland are present at Seven Stars Cottage in Twyford; Chetwode Priory, Rosehill Cottage and The Hermitage in Chetwode; and on the active railway in the south of the area;
- species-poor semi-improved grassland was recorded at Three Bridge Mill, Home Farm, Moat Farm and Land in the Chetwode Priory Estate.

4.4.124 Additional grassland habitat located adjacent to land required for the construction of the Proposed Scheme include:

- early successional grassland to the north Calvert Brick Pits LWS and Calvert Jubilee LWS includes calcareous indicator species such as fairy flax (*Linum catharticum*), yellow-wort (*Blackstonia perfoliata*) and downy oat grass (*Helictotrichon pubescens*) with the calcifuges heath speedwell (*Veronica officinalis*) and mouse-ear-hawkweed (*Pilosella officinarum*), hairy sedge (*Carex hirta*) is common in the sward, associated with wild strawberry, agrimony and common spotted orchid (*Dactylorhiza fushcii*); and
- two areas of floodplain grazing marsh are present: north of Godington between Padbury Brook and one of its tributaries, adjacent to the Proposed Scheme; and north-east of Twyford between Padbury Brook and Mill Stream.

Wetlands

- 4.4.125 There are small remnant patches of fen vegetation around the wet woodland at Barton Hartshorn Railway Wood LWS. Wetland species include greater tussock sedge, sharp-flowered rush and fen bedstraw.
- 4.4.126 The lakes at Calvert Jubilee LWS and Calvert Brick Pits LWS have small areas of swamp vegetation in the shallow margins to the north comprising largely of great willowherb, bulrush, and reed canary-grass. This is most extensive at the north-eastern end of the lake at Calvert Brick Pits LWS and the northern margin at Calvert Jubilee LWS.

Watercourses

- 4.4.127 The Padbury Brook is crossed by the route twice; to the north of Twyford, and to the east of Moat Farm, Goddington. It is the largest watercourse in the area and has a natural meandering channel with berms, sand banks and diverse bank vegetation and macrophytes including yellow water lily (*Nuphur lutea*). This brook qualifies as a habitat of principle importance due to the presence of a 'Category A' species, Spined Loach²⁷. There are also a number of ditches and field drains in or adjacent to the land required for construction of the Proposed Scheme.
- 4.4.128 All watercourses and their vegetation are described in detail in the RCS and RHS sections of Appendices EC-002-001.

Water bodies

- 4.4.129 There are two large water bodies within 250m of the land required for the construction of the Proposed Scheme: Grebe Lake at Calvert Brick Pits LWS and a lake at Calvert Jubilee LWS.
- 4.4.130 There are 51 ponds or ditches/linear water bodies located within the land required for the construction of the Proposed Scheme and a total of 124 water bodies within 250m of it, with the majority concentrated near Calvert and Chetwode.
- 4.4.131 Access was available to 67 water bodies during Phase 1 habitat surveys within 250m of the land required for the construction of the Proposed Scheme, 35 of which are located within it. Of the 67 ponds, 12 contain great crested newts and therefore qualify as a habitat of principle importance. One of these ponds is located within the land required for the construction of the Proposed Scheme with another adjacent to it.
- 4.4.132 A single pond at Chetwode was scoped in for a detailed pond survey. In total four species of submerged and emergent aquatic plants were recorded, including bulrush.

Tall herb and fern

- 4.4.133 Tall ruderal vegetation of approximately 2ha was recorded within land required for the construction of the Proposed Scheme west of the Landfill site at the Calvert Estate.

²⁷ Morgan, V et al; JNCC DEFRA; The identification of UK BAP priority rivers: generating a spreadsheet of potential priority river water bodies. Background and technical notes; 2011; http://jncc.defra.gov.uk/pdf/UKBAP_RiversTech-Dec2011.pdf; Accessed: 9 September 2012

Arable/cultivated land

- 4.4.134 Arable farmland is the dominant habitat type comprising an area of approximately 290ha within land required for the construction of the Proposed Scheme. Arable field margins which are specifically managed for wildlife were recorded south of Preston Bissett. These 10m wide margins comprises semi-improved grass which is dominated by Timothy, reed canary-grass, hogweed and creeping thistle. These arable margins qualify as a habitat of principle importance. In addition, 5m wide coarse grass margins were recorded in farmland northwest of Calvert Jubilee LWS, though they do not qualify as a habitat of principle importance.
- 4.4.135 Three small traditional orchards are located adjacent to the land required for the construction of the Proposed Scheme at Rose Hill Farm in Steeple Claydon, Manor Farm in Goddington and at Rosehill Farm in Chetwode. These are typically dominated by apple and plum trees and qualify as a habitat of principle importance.

Other habitats

- 4.4.136 Open habitat mosaic on previously developed land, a habitat of principle importance, was identified at Calvert Jubilee LWS and Calvert Brick Pitts LWS, Tf his habitat is established on nutrient poor sub-soil that retains open structure from soil erosion. The dominant species at Calvert Jubilee LWS include blue fleabane (*Erigeron acer*), bird's-foot trefoil, glaucous sedge; wild strawberry is frequent throughout the stand. Ant hills in the stand support species such as heath speedwell and eyebright (*Euphrasia nemorosa* agg).
- 4.4.137 Other habitats present include buildings, hard-standing refuse areas and bare ground on the Former GCML disused railway with no associated plant communities.

CFA14

- 4.4.138 Land within and adjacent to the Proposed Scheme in the Newton Purcell to Brackley area (CFA14) is predominantly comprised of arable land and pasture with numerous intact hedgerows and a few small areas of woodland and grassland. Between Newton Purcell and Mixbury the Proposed Scheme will be on or beside the Former GCML railway where it crosses Grassy Plantation woodland, south-west of Finmere and Mossycorner Spinney. Further north it crosses the Banbury to Verney disused railway, the Great Ouse river, Turweston Manor Grassland LWS and Helmdon Disused Railway SSSI.
- 4.4.139 Access for survey was not obtained for Turweston Manor Grassland LWS, Turweston Manor, Manor Farm, Oatley's Farm and Version Farm. Woodland at Mixbury plantation, Widmore plantation, Park Thorns, Diggings Wood and Grassy plantation, all of which qualify as lowland deciduous woodland Habitats of Principle Importance, were refused access for survey.

Woodland

- 4.4.140 There is approximately 19ha of semi-natural and 16ha of plantation broadleaved woodland located within the land required for the construction of the Proposed Scheme, with additional woodland adjacent to it. This includes the following:
- Fox Covert LWS is partly within land required for the construction of the

Proposed Scheme. Canopy species include ash, pedunculate oak and more rarely Scot's pine, with a shrub layer of hazel, field maple, hawthorn and elder. The ground layer includes herb Robert, bluebell and lesser celandine (*Ranunculus ficaria*);

- Grassy Plantation, west of Finmere Quarry, is partially within the land required for the construction of the Proposed Scheme with Widmore Plantation and Mixbury Plantation adjacent to it. These woodlands qualify as a lowland deciduous woodland Habitats of Principle Importance;
- an unnamed woodland which extends onto the Former GCML disused railway line is located to the south of Grassy Plantation and west of Finmere Quarry and within the land required for the construction of the Proposed Scheme. This woodland also qualifies as a lowland deciduous woodland Habitats of Principle Importance;
- Finmere Quarry contains two areas of semi-natural broadleaved woodland adjacent to the land required for the construction of the Proposed Scheme. Species recorded from accessible areas include pedunculate oak, sycamore, silver birch and ash with a poorly developed shrub layer and a ground flora dominated by bracken;
- woodland on the former GCML railway from Tibbett's Farm, Mixbury and stretching north to the Great Ouse river is within the land required for the construction of the Proposed Scheme. The woodland comprises a canopy of pedunculate oak, ash, hazel, field maple, sycamore and a shrub layer dominated by hawthorn and bramble. Semi-mature oak and ash woodland with a dense hawthorn and elder understorey were also recorded on the embankment of the former GCML railway at Newton Purcell, south of Finmere Quarry;
- woodland at Mossycorner Spinney, east of Mixbury, has a canopy comprising oak, ash and willow with an understorey of hawthorn and elder. The woodland is within the land required for the construction of the Proposed Scheme;
- Foxhill Spinney, north of Brackley is adjacent to the land required for the construction of the Proposed Scheme;
- a young plantation woodland is found to the north of the Banbury to Verney disused railway and south of the Great Ouse river. The woodland is partially located within the land required for the construction of the Proposed Scheme;
- a young ash plantation is located to the south of Radstone within land required for the construction of the Proposed Scheme; and
- 6 small plantation woodlands are located to the east and southeast of Turweston, all of which are within the land required for the construction of the Proposed Scheme.

Scrub

- 4.4.141 Dense and scattered scrub is located within the land required for the construction of the Proposed Scheme on Helmdon Disused Railway SSSI and along the Banbury to Verney disused railway at Westbury. It is also located adjacent to the Proposed Scheme at Finmere Quarry. Typical species recorded include hawthorn, bramble and ash saplings. Dense and scattered scrub habitat account for approximately 4.7ha of the land required for the construction of the Proposed Scheme in the Newton Purcell to Brackley area.

Hedgerows

- 4.4.142 In total, an approximate 39km of hedgerow habitat was recorded in the land required for the construction of the Proposed Scheme. This includes approximately:
- 4km of intact, species-rich hedgerow;
 - 20km of intact, species-poor hedgerow;
 - 6km of defunct, species-poor hedgerow;
 - 1km of species-rich hedgerow with trees; and
 - 8km of species-poor hedgerow with trees.
- 4.4.143 Many hedgerows qualify as a habitat of principle importance as they largely comprise native species. Typical woody species recorded from hedgerows in this area include hawthorn, blackthorn, field maple, field rose and dog rose (*Rosa canina*).
- 4.4.144 Access was available to survey approximately 5.7km of hedgerows in, or partially within, the land required for the construction of the Proposed Scheme. Further details are provided in the hedgerow section of Appendix EC-002-001

Grassland

- 4.4.145 In addition to large areas of improved grassland (approximately 79ha) and smaller stands of amenity grassland (approximately 3ha), there is approximately 5ha of semi-improved grassland and up to 1ha of unimproved calcareous grassland in the area:
- unimproved calcareous grassland is located in the land required for the construction of the Proposed Scheme at Helmdon Disused Railway SSSI near Radstone. The grassland, which is a lowland calcareous grassland habitat of principle importance, is dominated by upright brome (*Bromus erectus*), glaucous sedge and quaking grass (*Briza media*), as well as a range of calcicole herbs including stemless thistle (*Cirsium acaule*), salad burnet and kidney vetch (*Anthyllis vulneraria*);
 - semi-improved and species-poor semi-improved grasslands are present on Helmdon Disused Railway SSSI and include abundant false oat grass, red fescue, Yorkshire fog, black knapweed. In damper areas tufted hair grass and hard rush (*Juncus inflexus*) are dominant;
 - Turweston Manor Grassland LWS comprises an area of unimproved calcareous grassland that includes hoary plantain (*Plantago media*), bird's-foot trefoil,

ladies' bedstraw, salad burnet, glaucous sedge and cowslip;

- Radstone Road Verge LWS is a species-rich neutral grassland which is partially within the land required for the construction of the Proposed Scheme. Plant species recorded from this LWS include common centaury (*Centaureum erythraea*) and common spotted orchid.
- marshy grassland and semi-improved grassland is located to the south and west of Radstone, partially within land required for the construction of the Proposed Scheme. Species recorded from this area include plicate sweet-grass (*Glyceria notata*) and marsh foxtail (*Alopercurus geniculatus*);
- semi-improved neutral grassland is located within the land required for the construction of the Proposed Scheme at Warren Farm in Westbury, and Tibbett's Farm and adjacent to the Proposed Scheme at Manor Farm in Radstone. Calcicole indicator species on the former GCML railway at Tibbett's Farm include greater knapweed (*Centaurea scabiosa*), salad burnet and wild basil (*Clinopodium vulgare*); and
- poor semi-improved grassland is located within the Proposed Scheme to the east and north of Turweston.

Wetlands

4.4.146 Fen and swamp habitat of approximately 3.7ha was recorded in three areas within land required for the construction of the Proposed Scheme:

- Turweston Manor Grassland LWS contains lowland fen, a habitat of principle importance, with several plants that are unusual in Buckinghamshire such as sharp flowered rush, fen bedstraw, brown sedge, bottle sedge, water horsetail (*Equisetum fluviale*) and marsh valerian (*Valeriana dioica*);
- swamp vegetation dominated by floating sweet grass (*Glyceria fluitans*) and great willowherb is located at the bottom of the Helmdon Disused Railway SSSI; and
- either side of a small tributary of the Great Ouse river is dominated by reed canary grass with occasional tall herb species including great willowherb.

Watercourses

4.4.147 The Proposed Scheme crosses the Great Ouse river at three locations. This river can be classified as a habitat of principle importance due to the presence of otter and natural features such as eroding and stable cliffs.

4.4.148 Two further watercourses (both tributaries of the Ouse), the Radstone Brook and watercourse east of Mixbury, are crossed by the Proposed Scheme; a system of drains flowing to the Padbury Brook to the south of Finmere are also crossed by the Proposed Scheme.

4.4.149 All watercourses and their vegetation are described in detail in the RCS and RHS sections of Appendices EC-002-001.

Water bodies

- 4.4.150 There is one large area (approximately 1.2ha) of standing water within 250m of the land required for the construction of the Proposed Scheme at Finmere Quarry. There are eight ponds located within the land required for the construction of the Proposed Scheme and a total of 57 ponds within 250m of it, with the majority concentrated near Finmere and Chetwode.
- 4.4.151 Access was available to 13 ponds during Phase 1 habitat surveys within 250m of the land required for the construction of the Proposed Scheme: one is located within it. Two of the ponds within 250m of the Proposed Scheme contain great crested newts and therefore qualify as Habitats of Principle Importance. One of these ponds is located at Warren Farm and the second at the former Newton Purcell station.
- 4.4.152 Two ponds were scoped in for a detailed pond survey: these are located at the former Newton Purcell station and Glebe Farm, Turweston. In total eight species of submerged and emergent aquatic plants were recorded from these ponds, including bulrush and common duckweed (*Lemna minor*).

Tall herb and fern

- 4.4.153 There is approximately 4ha of tall herb and fern vegetation in the area:
- Tall herb communities at Helmdon Disused Railway SSSI are within land required for the construction of the Proposed Scheme. The dominant species are common nettle, cleavers, false oat grass and bramble.
 - Tall herb vegetation in transition to scrub is also present at Radstone Cottage and is dominated by ash saplings, rough meadow grass, common nettle, and cow parsley.
 - Land at the former Newton Purcell train station on the southern section of the former GCML railway comprises tall ruderal vegetation within land required for construction of the Proposed Scheme. Species recorded from this habitat include rosebay willowherb, wild teasel (*Dipsacus fullonum*) and bristly ox-tongue (*Helminthotheca echioides*).

Arable/cultivated land

- 4.4.154 Arable fields are common in the Newton Purcell and Brackley area with an approximate area of 209ha. No arable field margins qualifying as a habitat of principle importance have been reported during Phase 1 habitat surveys undertaken to date.
- 4.4.155 There are four small traditional orchards adjacent to land required for the construction of the Proposed Scheme at Tibbetts Farm in Mixbury, Oaks Farm west of Finmere, Versions Farm in Brackley and Hall Farm in Radstone. This habitat type is listed as a habitat of principle importance. The traditional orchard at Tibbett's Farm is mixed with native broadleaved tree species in addition to cultivated fruit trees, and includes a diverse grassland understorey. The orchard is estimated to only be 10-15 years of age.

Other habitats

- 4.4.156 Open mosaic habitat on previously developed land, a habitat of principle importance, is partially within land required for the construction of the Proposed Scheme at Finmere Quarry. Stands of willow and birch scrub form a mosaic with open areas which comprise species such as heath speedwell, sheep's sorrel (*Rumex acetosella*), creeping thistle, willowherb spp., white clover, lesser trefoil and colt's-foot (*Tussilago farfara*).
- 4.4.157 Short ephemeral and perennial vegetation is present at the former Newton Purcell train station established on shallow nutrient poor substrate, and includes annual meadow grass (*Poa annua*), dandelion (*Taraxacum officinale*), perforate St. John's-wort (*Hypericum perforatum*), field forget-me-not (*Myostis arvensis*) and creeping cinquefoil.
- 4.4.158 Other habitats present include buildings and hard standing, with no associated plant communities.

CFA15

- 4.4.159 Land in and adjacent to the land required for construction of the Proposed Scheme within the Greatworth to Lower Boddington area (CFA15) largely consists of arable and pasture fields intersected by numerous intact hedgerows. There are several woodlands and three disused railways in this area. Wetland habitats includes the River Cherwell, the Highfurlong Brook, Trafford Bridge Marsh, and a number of ponds at Lower Thorpe and Aston le Walls. There are smaller areas of fen habitat concentrated in the Cherwell valley, and areas of semi-improved neutral grassland throughout the area.
- 4.4.160 Access for survey was not obtained for the Edgcote area south of the proposed crossing of the River Cherwell; the habitats bordering the River Cherwell; south west of Eydon; Washbrook Farm north-west of Aston le Walls; and land west of Upper Boddington.

Woodland

- 4.4.161 There is approximately 8.3ha of semi-natural broadleaved woodland located within, or partially within land required for the construction of the Proposed Scheme was recorded in this area. This includes:
- Halse Copse South LWS, which is an ancient woodland and qualifies as a lowland deciduous woodland habitat of principle importance. This woodland is dominated by ash, field maple and oak in the canopy, with an understorey of hazel, hawthorn and blackthorn. The ground flora is diverse and contains many ancient woodland indicator species including bluebell, wood sorrel, pignut and three-nerved sandwort. Halse Copse North LWS is adjacent to the land required for the construction of the Proposed Scheme. This is also an ancient woodland and habitat of principle importance;
 - Fox Covert (Glyn Davies Wood) which is west of Lower Boddington. This wood qualifies as a habitat of principle importance and is partly in the land required for the construction the Proposed Scheme. The canopy is dominated by ash

and pedunculate oak with hazel, honeysuckle, bramble, hawthorn and elder in the understorey. A number of ancient woodland indicator ground flora species are present including wood meadow-grass (*Poa nemoralis*), field rose and three-nerved sandwort;

- Calves Close Spinney, north-east of Chipping Warden, is partly within land required for the construction and operation of the Proposed Scheme. The woodland qualifies as a habitat of principle importance and is dominated by sycamore with some older pedunculate oak with a sparse understorey and nettle-dominated ground flora; and
- an unnamed woodland near Lower Thorpe comprises a canopy of pedunculate oak, ash and occasional Scot's pine. This woodland has a dense understorey of hazel, elder and hawthorn with common nettle and bramble in the ground flora. This woodland qualifies as a lowland deciduous woodland habitat of principle importance;
- several small areas of woodland which do not qualify as a habitat of principle importance lie within land required for the construction of the Proposed Scheme, and include small areas near Aston le Walls and Culworth. In addition, Painters Spinney, to the north of Greatworth is adjacent to land required for the construction of the Proposed Scheme.

4.4.162 There is approximately 4.8ha of plantation broadleaved woodland and approximately 1.6ha of plantation mixed woodland within land required for construction of the Proposed Scheme in this area. This is principally distributed west of Aston le Walls and around Chipping Warden aerodrome. Osierbed Spinney, which is located to the east of Edgcote, is partially within land required for the construction of the Proposed Scheme. This woodland has been described as a lowland deciduous woodland habitat of principle importance on the national inventory, though habitat surveys show it is a species-poor plantation dominated by poplar trees (*Populus sp.*).

4.4.163 Scrub

4.4.164 Small areas of dense and scattered scrub (approximately 2.5ha and 0.6ha respectively) are located throughout this area in the following locations: Greatworth Hall Farm, Fox Covert, Culworth Grounds Farm, and along the disused railway near Culworth. Typical scrub species include hawthorn and blackthorn.

Hedgerows

4.4.165 In total, approximately 48km of hedgerows are within, or partially within, land required for the construction of the Proposed Scheme in this area. This includes approximately:

- 14km of intact, species-rich hedgerow;
- 13km of intact, species-poor hedgerow;
- 1km of defunct species-rich hedgerow;
- 1km of defunct, species-poor hedgerow;

- 15km of species-rich hedgerow with trees; and
- 4km of species-poor hedgerow with trees.

4.4.166 The majority of hedges comprise native species and qualify as a habitat of principle importance. Most of the hedgerows are intact and typical species include hawthorn, blackthorn, rose species, elder and oak. Hedges in the Thorpe Mandeville area are notable in that they contain occasional spindle.

4.4.167 Access was available to survey approximately 17.9km of hedgerows in, or partially within, the land required for the construction of the Proposed Scheme. Further details are provided in the hedgerow section of Appendix EC-002-001.

Grassland

4.4.168 There is approximately 145ha of improved grassland within land required for the construction of the Proposed Scheme, with an additional 2.4ha of amenity grassland. Grassland habitats with high species diversity include 2.5ha of unimproved neutral grassland and 24ha of semi-improved neutral grassland at the following locations:

- Trafford Bridge Marsh LWS on the northern bank of the River Cherwell contains an area of semi-improved neutral grassland, which is dominated by cock's-foot, Yorkshire fog, crested dog's-tail, false oat grass together with broadleaved species, such as meadow buttercup, creeping buttercup, lesser stitchwort, cut-leaved cranesbill and red clover. The edges of the grassland are inside the land required for the construction of Proposed Scheme;
- Radstone Road Verge LWS is designated for species-rich neutral grassland which include the plant species common centaury and common spotted orchid;
- Aston le Walls Railway Line LWS comprises areas of unmanaged semi-improved neutral grassland dominated by false oat grass and sheep-grazed areas dominated by perennial rye-grass. The nine neutral grassland indicator species that are listed in the LWS citation were not recorded during the site survey;
- unimproved neutral grassland is present near Lower Thorpe, where several grass species were recorded including crested dog's-tail, meadow fescue, downy oat grass, upright brome and meadow brome, as well as several broadleaved species such as yellow rattle, black knapweed and lady's bedstraw. Pignut, an indicator of ancient grassland, is widespread throughout;
- semi-improved neutral grassland is also present near Lower Thorpe. This sheep-grazed grassland comprises rough meadow-grass, cock's foot and crested dog's tail, with occasional upright brome, meadow fescue (*Festuca pratensis*) and pignut;
- an area of marshy grassland is partially within land required for the construction of the Proposed Scheme. This grassland, which is located south-east of Thorpe Mandeville, is dominated by tufted-hair grass with soft rush,

marsh horsetail (*Equisetum palustre*) and meadowsweet;

- semi-improved neutral grassland at Halse Grange Farm contains species indicative of unimproved grasslands including common spotted orchid and, reputedly, adder's tongue fern (*Ophioglossum vulgatum*). The largest of these grassland areas is sheep-grazed and is dominated by the grasses Yorkshire fog, narrow-leaved meadow-grass (*Poa angustifolia*) and crested dog's-tail, together with broadleaved herbs including creeping thistle, common sorrel, creeping buttercup and meadow vetchling. In the western part of this field there is occasional marsh thistle (*Cirsium palustre*) and cuckoo flower (*Cardamine pratensis*), indicating damper conditions; and
- semi-improved neutral grassland is located within land required for the construction of the Proposed Scheme at Greatworth Hall Farm, Lower Thorpe Farm in Sulgrave, the Bungalow in Greatworth, Barn Owl Cottage, land west of Spella Bungalow and land northwest of Appletree Lane. This habitat type is also located adjacent to the land required for the construction of the Proposed Scheme at Bungalow Farm in Greatworth, and Culworth Grounds Farm.

4.4.169 There is also approximately 29ha of poor semi-improved grassland at various locations within land required for construction of the Proposed Scheme including Greatworth Hall Farm, Lower Thorpe Farm, Culworth Grounds Farm and Magpie Farm. A number of scattered grasslands are probably managed as rough pasture and for a hay crop.

Wetlands

4.4.170 Wetland habitats in this area includes approximately 1.4ha of fen and swamp habitat. Within the land required for the construction of the Proposed Scheme wetland habitat is mainly located along the floodplain of the River Cherwell, at the Trafford Bridge Marsh LWS. Meadowsweet and wild angelica (*Angelica sylvestris*) dominate tall fen vegetation, which grades into swamp vegetation dominated by greater pond sedge (*Carex riparia*), with lesser pond sedge and branched bur-reed (*Sparganium erectum*). This fen habitat qualifies as a habitat of principle importance.

4.4.171 Tall herb fen adjacent to the land required for the construction of the Proposed Scheme south-east of Thorpe Mandeville is dominated by meadowsweet and great willowherb and also contains marsh marigold (*Caltha palustris*).

Watercourses

4.4.172 Watercourses in the area include the River Cherwell and its tributary Culworth Brook, Highfurlong Brook and the Boddington Canal Feeder, and approximately seven drainage ditches, all of which are partially within land required for the construction of the Proposed Scheme:

- the River Cherwell retains some natural features such as meanders and berms. It qualifies as a habitat of principle importance due to 'Geological Conservation

Review (GCR) site of importance for its fluvial geomorphology²⁸;

- both channels of Culworth Brook which have been straightened and have limited macrophyte vegetation or natural features that would result in it qualifying as a habitat of principle importance;
- Highfurlong Brook is meandering and heavily shaded by overhanging trees on the banks but retains some natural features; and
- Boddington Canal Feeder is an artificial channel with steep banks covered in dense scrub.

Water bodies

- 4.4.173 Two hectares of standing water habitat was recorded in this area. This comprises several water bodies, of which some, managed as fishing lakes are present adjacent to the land required for the construction of the proposed scheme at Lower Thorpe and Aston Le Walls.
- 4.4.174 There are 71 ponds within 250m of the land required for the construction of the Proposed Scheme, with the majority concentrated near Aston le Walls, Edgcote and Thorpe Mandeville. Twenty nine ponds are located within the land required for the construction of the Proposed Scheme. Of these, 16 ponds were scoped for great-crested newt survey during the Phase 1 habitat surveys. Eleven of these ponds contain great crested newt and, therefore, qualify as Habitats of Principle Importance.
- 4.4.175 Seven ponds were scoped in for a detailed pond survey. In total 29 species of submerged and emergent aquatic plants including water-plantain, wild angelica, marsh horsetail, marsh bedstraw, ivy leaved duckweed, water stitchwort (*Mysoton aquaticum*) and water dock. Two ponds close to Aston le Walls had a higher diversity of plants than others in the sample but were recently planted with aquatic vegetation.

Arable/cultivated land

- 4.4.176 There is approximately 321ha of arable farmland within land required for the construction of the Proposed Scheme. Poor semi-improved grassland arable margins were recorded at Culworth Grounds Farm, Greatworth Hall Farm and Halse Grange Farm.

Other habitats

- 4.4.177 Other habitats present include buildings and hard standing, with no associated plant communities. Approximately 5.5ha of ephemeral/short perennial vegetation was recorded within land required for the construction of the Proposed Scheme at Chipping Warden Aerodrome. Species recorded from this habitat include forget-me-not (*Mysotis* sp.) and buttercup (*Ranunculus* sp.) species, common centaury and hop trefoil (*Trifolium campestre*).

²⁸ Morgan, V et al; JNCC DEFRA; The identification of UK BAP priority rivers: generating a spreadsheet of potential priority river water bodies. Background and technical notes; 2011; http://jncc.defra.gov.uk/pdf/UKBAP_RiversTech-Dec2011.pdf; Accessed: 9 September 2012

5 National Vegetation Classification (NVC)

5.1 Introduction

5.1.1 This section of the appendix details National Vegetation Classification²⁹ (NVC) baseline data relevant to the section of the Proposed Scheme that will pass through CFA7 to 15 inclusive.

5.2 Methodology

5.2.1 Details of the standard methodology utilised for NVC survey are provided in the Scope and Methodology Report Addendum (Volume 5: Appendix CT-001-000/2).

5.2.2 Local site designations and Biodiversity Action Plan (BAP) habitat inventories from the following sources were reviewed for records of notable plant and habitat assemblages:

- Hertfordshire and Middlesex Wildlife Trust;
- Greenspace Information for Greater London;
- Buckinghamshire and Milton Keynes Environmental Records Centre;
- Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust;
- Thames Valley Biological Records Centre (TVERC);
- Northamptonshire County Council; and
- Northamptonshire Biodiversity Records Centre.

5.2.3 The following county floras and wildlife site selection criteria were reviewed to ascertain the conservation status of plant species and habitats:

- James, T.J. (2009). Flora of Hertfordshire. Hertfordshire Natural History Society. Welwyn Garden City
- Northamptonshire Biodiversity Partnership (2010) Wildlife Site Selection Criteria Northamptonshire; and
- Buckinghamshire and Milton Keynes Environmental Records Centre and Thames Valley Environmental Records Centre (2009) Criteria for the Selection of Local Wildlife Sites in Berkshire, Buckinghamshire and Oxfordshire.

5.2.4 Information produced by the Biodiversity Reporting and Information Group³⁰ was reviewed to ascertain criteria necessary for a habitat to be considered as being of principal importance. Habitats of principle importance include sixty-five habitats that form priorities for conservation in England as identified in Section 4.1 of the Natural Environment and Rural Communities (NERC) Act 2006.

²⁹ NVC is a detailed survey and classification system that is used to compare plant communities with a range of defined community types.

³⁰ BRIG (ed. Ant Maddock) 2008. UK Biodiversity Action Plan; Priority Habitat Descriptions. (Updated December 2011).

5.2.5 Land parcels were selected for a detailed survey following a two stage process:

- Ordnance Survey (OS) maps, Natural England GIS data and aerial photographs were reviewed to assess the likely occurrence of habitats of principle importance. This includes habitats such as ancient woodland, traditional orchards and lowland fen; and
- land parcels were then scoped in or out for a NVC survey if after the Phase 1 Habitat survey, the habitats present were considered to be of sufficient quality to be considered a habitat of principal importance or local BAP (LBAP) habitats.

5.2.6 Details of the locations where NVC surveys were conducted are provided in Table 5 Summary of NVC surveys undertaken within CFA 7 to 15 inclusive below and in accompanying map series.

Table 5 Summary of NVC surveys undertaken within CFA7 to 15 inclusive

NVC survey site name	Ecology survey code	Location	OS Grid Reference	Habitat types included in survey	Survey date	CFA number	Distance from the Proposed Scheme (m) and orientation
Mid Colne Valley SSSI	020_PH2_027001	Denham	TQ 041 889	Mosaic: W21 progressing towards W6 and W8 (not possible to assign a sub community)	20/07/2012	CFA7	Within Proposed Scheme
	020_PH2_028003	Denham	TQ 038 892	Semi-natural broad leaved woodland: W8 - species-poor and not attributable to any sub-community.	03/05/2013	CFA7	Within Proposed Scheme
	020_PH2_028001	Denham	TQ 040 888	Semi-natural broad leaved woodland: W8e with small areas dominated by beech which are referable to W12.	21/05/2013	CFA7	Within Proposed Scheme
	020_PH2_028002	Denham	TQ 041 888	Semi-natural broad leaved woodland: W8d	21/05/2013	CFA7	Within Proposed Scheme
	020_PH2_028004	Denham	TQ 038 898	Poor semi-improved grassland with tall ruderal herbs (close to MG1a)	05/06/2013	CFA7	Within Proposed Scheme
	020_PH2_028005	Denham	TQ 047 895	Broad leaved semi-natural woodland (secondary woodland, tall ruderal ground flora)	05/06/2013	CFA7	Within Proposed Scheme
Land north of Great Halings Wood	020_PH2_029001	east of Chalfont St Peter	TQ 029 898	Semi-natural broad leaved woodland: W8b	22/05/2013	CFA7	Within Proposed Scheme
	020_PH2_029002	east of Chalfont St Peter	TQ 030 893	Semi-natural broad leaved woodland: W8	22/05/2013	CFA7	21.8 north west of Proposed Scheme
	020_PH2_029003	east of Chalfont St Peter	TQ 031 895	Semi-natural broad leaved woodland: W10c with localised areas of W12b	22/05/2013	CFA7	Within Proposed Scheme
PRoW in km 43- Keeper's Wood	020_PH2_043001	Keeper's Wood, west of Amersham	SU 933 898	Semi-natural broad leaved woodland: W14	13/05/2013	CFA9	Within Proposed Scheme
PRoW km 44- Mantle's Wood	020_PH2_044001	Mantle's Wood, Hyde Heath	SP 921 000	Semi-natural broad leaved woodland: W14 (typical community, no subcommunity)	13/05/2013	CFA9	Within Proposed Scheme

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NVC survey site name	Ecology survey code	Location	OS Grid Reference	Habitat types included in survey	Survey date	CFA number	Distance from the Proposed Scheme (m) and orientation
PRoW km 44- Mantle's Farm	020_PH2_044002	Mantle's Wood, Hyde Heath	SP 922 993	Semi-natural broad leaved woodland: W14 (typical community, no subcommunity)	13/05/2013	CFA9	101.9 north west of Proposed Scheme
PRoW km 45- Hedgemoor Wood	020_PH2_045001	Hedgemoor Wood, Great Missenden	SP 917 004	Semi-natural broad leaved woodland: W14 (typical community, no subcommunity)	14/06/2013	CFA9	Within Proposed Scheme
Land lying to the west of Kings Lane, South Heath, Great Missenden	020_PH2_046001	east of Great Missenden	SP 909 016	Semi-natural broad leaved woodland: W14 (typical community, no subcommunity)	10/08/2012	CFA9	Within Proposed Scheme
The Coppice and Sibley's Coppice, South Heath, Great Missenden	020_PH2_046002	east of Great Missenden	SP 910 015	Semi-natural broad leaved woodland: W14 (typical community, no subcommunity)	10/08/2012	CFA9	Within Proposed Scheme
Mulberry Park Hill, Potter Row, Great Missenden (HP16 9LT)	020_PH2_047001	north-east of Great Missenden	SP 899 023	Semi-improved grassland: MG5a	10/06/2013	CFA9	Within Proposed Scheme
	020_PH2_047002	north-east of Great Missenden	SP 898 023	Semi-improved grassland: MG5 (broadly conforming to stand type, not possible to assign subcommunity)	10/06/2013	CFA9	Within Proposed Scheme
	020_PH2_047003	north-east of Great Missenden	SP 899 024	Semi-improved grassland: MG5 (broadly conforming to stand type, not possible to assign subcommunity)	10/06/2013	CFA9	Within Proposed Scheme
	020_PH2_047004	north-east of Great Missenden	SP 898 024	Semi-improved grassland: MG5 (broadly conforming to stand type, not possible to assign subcommunity)	10/06/2013	CFA9	Within Proposed Scheme
Aylesbury Park Golf Club	020_PH2_063001	west of Aylesbury	SP 794 135	Semi-natural broad leaved woodland: W21b	02/05/2013	CFA11	Within Proposed Scheme
Putlowes Farm, Fleet Marston, Aylesbury (HP18 oPY)	020_PH2_064001	north-west of Aylesbury, A41	SP 780 141	Semi-improved grassland: MG1f	14/06/2013	CFA11	265.8 north east of Proposed Scheme

NVC survey site name	Ecology survey code	Location	OS Grid Reference	Habitat types included in survey	Survey date	CFA number	Distance from the Proposed Scheme (m) and orientation
Land near Station Road, south-west of Quainton	020_PH2_071001	south-west of Quainton	SP 736 191	Semi-improved grassland: MG6b sharing several species and possibly transitional to MG5	10/06/2013	CFA12	Within Proposed Scheme
Finemere Wood (BBOWT)	020_PH2_075001	north-west of Quainton	SP 712 218	Semi-improved grassland: MG5	10/08/2012	CFA12	Within Proposed Scheme
	020_PH2_074001	north-west of Quainton	SP 716 213	Semi-improved grassland: MG5 (broadly conforming stand type, not possible to assign subcommunity, possibly reverting from previous agricultural grassland)	10/08/2012	CFA12	Within Proposed Scheme
Woodlands Farmhouse, Doddershall, Quainton	020_PH2_074002	north east of Quainton	SP 715 211	Semi-improved grassland: MG6 (intermediate with MG5a)	27/06/2013	CFA12	Within Proposed Scheme
	020_PH2_074003	north east of Quainton	SP 714 211	Semi-improved grassland: MG5a	27/06/2013	CFA12	Within Proposed Scheme
PRoW km 75- Oak Tree Farm	020_PH2_075003	Oak Tree Farm Track, Edgcott	SP 709 216	Unimproved calcereous grassland: CG6 (only roadly conforming to this NVC type, not possible to assign subcommunity)	13/05/2013	CFA12	Within Proposed Scheme
Calvert Waste Terminal (Woods) C	020_PH2_075002	south-east of Calvert	SP 705 219	Vegetation mosaic: MG5a; MG1a; and MG1 with abundant Calamagrostis epigejos (no NVC subcommunity)	13/06/2013	CFA12	13.3 north east of Proposed Scheme
	020_PH2_076001	south-east of Calvert	SP 704 221	Vegetation mosaic: MG5a; MG1a; and MG1 with abundant Calamagrostis epigejos (no NVC subcommunity)	13/06/2013	CFA12	Within Proposed Scheme
	020_PH2_076002	south-east of Calvert	SP 701 226	Marshy grassland: No close match but referable to MG8 (undescribed variety)	13/06/2013	CFA12	Within Proposed Scheme
Calvert Waste Terminal (A)	020_PH2_078001	south-east of Calvert	SP 689 240	Semi-natural broad leaved woodland: W6	22/05/2013	CFA12/13	146.1 east of Proposed Scheme
	020_PH2_078002	south of Calvert	SP 690 242	Semi-natural broad leaved woodland: W8 (not possible to assign subcommunity)	22/05/2013	CFA12/13	Within Proposed Scheme

NVC survey site name	Ecology survey code	Location	OS Grid Reference	Habitat types included in survey	Survey date	CFA number	Distance from the Proposed Scheme (m) and orientation
	020_PH2_078003	south of Calvert	SP 689 244	Semi-natural broad leaved woodland: W10a	22/05/2013	CFA12/13	Within Proposed Scheme
	020_PH2_076003	south of Calvert	SP 696 235	Semi-natural broad leaved woodland: W8 but not attributable to any sub-community as has affinities to W10	16/05/2013	CFA12	Within Proposed Scheme
Land on the south east side of the road from Calvert to Steeple Claydon	020_PH2_078004	north-east of Bicester	SP 689 246	Grassland mosaic: early-successional grassland with affinities to MG1d, MG1e and MG5	13/06/2013	CFA13	Within Proposed Scheme
Nature reserve at Calvert Jubilee	020_PH2_079004	north of Calvert	SP 682 253	Neutral to calcareous early-successional grassland with affinities to several CG grassland types but a poor fit for all	07/07/2012	CFA13	13.7 north east of Proposed Scheme
	020_PH2_079001	north of Calvert	SP 686 247	Dense scrub: W21a	23/05/2013	CFA13	Within Proposed Scheme
	020_PH2_079002	north of Calvert	SP 682 255	Dense scrub: W21a	23/05/2013	CFA13	4.5 north east of Proposed Scheme
	020_PH2_079003	north of Calvert	SP 681 253	Dense scrub: W21	23/05/2013	CFA13	Within Proposed Scheme
	020_PH2_079005	north of Calvert	SP 684 251	Grassland/scrub mosaic: W22a (co-dominant), MG1e (co-dominant) and MG9a (subordinate)	09/07/2013	CFA13	Within Proposed Scheme
Land on the north side of School Hill, Charndon (Grebe Lake)	020_PH2_080001	north-westNW of Calvert	SP 675 253	Neutral to calcareous early-successional grassland with affinities to CG2d but a poor fit	27/06/2013	CFA13	5.1 north of Proposed Scheme
	020_PH2_080002	north-west of Calvert	SP 680 253	Neutral to calcareous early-successional grassland with loose affinities to CG2 but a poor fit	12/06/2013	CFA13	Within Proposed Scheme
	020_PH2_080003	north-west of Calvert	SP 678 253	Semi-improved neutral grassland: MG5	12/06/2013	CFA13	79.9 north of Proposed Scheme
	020_PH2_080004	north-west of	SP 678 254	Semi-improved neutral grassland: MG10b	12/06/2013	CFA13	67.8 north of

NVC survey site name	Ecology survey code	Location	OS Grid Reference	Habitat types included in survey	Survey date	CFA number	Distance from the Proposed Scheme (m) and orientation
		Calvert					Proposed Scheme
	020_PH2_080005	north-west of Calvert	SP 679 254	Neutral to calcareous grassland with affinities to CG7 but a poor fit for this NVC type	12/06/2013	CFA13	Within Proposed Scheme
	020_PH2_080006	north-west of Calvert	SP 680 254	Neutral to calcareous grassland with affinities to CG7 but a poor fit for this NVC type	12/06/2013	CFA13	Within Proposed Scheme
Church View Farm, Church St, Twyford, Buckingham	020_PH2_082001	north-west of Twyford	SP 660 271	Unimproved neutral grassland: MG1e	26/07/2013	CFA13	Within Proposed Scheme
	020_PH2_082002	north-west of Twyford	SP 660 272	Scrub: W21a	26/07/2013	CFA13	Within Proposed Scheme
	020_PH2_082003	north-west of Twyford	SP 659 271	Semi-improved neutral grassland MG6a	26/07/2013	CFA13	Within Proposed Scheme
Chetwode Priory, Finmere Finmere Quarry	020_PH2_085001	Chetwode	SP 641 296	Semi-improved neutral grassland: MG4	12/06/2013	CFA13	Directly adjacent to the Proposed Scheme
	020_PH2_088001	south-west of Finmere	SP 628 323	Semi-natural broad leaved woodland:W10	11/06/2013	CFA14	213.4 south west of Proposed Scheme
	020_PH2_088002	south-west of Finmere	SP 627 319	Tall ruderal/ ephemeral short/perennial vegetation communities, referable to several OV types	11/06/2013	CFA14	Within Proposed Scheme
	020_PH2_089001	south-west of Finmere	SP 625 324	Mixed vegetation communities, mainly consisting of OV type communities	11/06/2013	CFA14	Within Proposed Scheme
Land north of the A4421, north of Newton Purcell	020_PH2_088003	south-west of Finmere	SP 628 313	Ephemeral/short perennial: OV22 (Only broadly conforming to the typical subcommunity as shaded/recently planted)	13/06/2013	CFA14	Within Proposed Scheme
Radstone Cottage, Radstone Helmdon SSSI	020_PH2_097001	north of Brackley	SP 586 400	Tall ruderal herb and fern: OV24 (young, newly planted woodland with a ground flora dominated by tal ruderal herbs)	02/05/2013	CFA14	Within Proposed Scheme

NVC survey site name	Ecology survey code	Location	OS Grid Reference	Habitat types included in survey	Survey date	CFA number	Distance from the Proposed Scheme (m) and orientation
	020_PH2_098001	north-east of Brackley	SP 590 395	Vegetation mosaic: W21a; and CG3	11/06/2013	CFA14	Within Proposed Scheme
	020_PH2_098002	north-east of Brackley	SP 590 397	Semi-improved calcareous grassland: CG3b	11/06/2013	CFA14	Within Proposed Scheme
	020_PH2_098003	north-east of Brackley	SP 590 394	Vegetation mosaic: tall ruderal - OV26; and swamp - S22	11/06/2013	CFA14	34.4 north east of Proposed Scheme
	020_PH2_098004	north-east of Brackley	SP 590 397	Vegetation mosaic:scrub - W21a; and calcareous grassland - CG3b	11/06/2013	CFA14	Within Proposed Scheme
	020_PH2_098005	north-east of Brackley	SP 590 396	Semi-improved neutral grassland: MG9a	11/06/2013	CFA14	Within Proposed Scheme
	020_PH2_098007	north-east of Brackley	SP 590 397	Tall ruderal vegetation:OV24a (dominant); and OV24b (subsidiary)	11/06/2013	CFA14	Within Proposed Scheme
	020_PH2_098010	north-east of Brackley	SP 590 398	Unimproved neutral grassland: MG1e	11/06/2013	CFA14	Within Proposed Scheme
	020_PH2_098011	north-east of Brackley	SP 590 398	Unimproved neutral grassland: MG1a	11/06/2013	CFA14	Within Proposed Scheme
Farmland south of Radstone village	020_PH2_098008	north-east of Brackley	SP 588 403	Swamp - approximates S22 did not fit well to any NVC sub-communities	11/06/2013	CFA14	28.9 south west of Proposed Scheme
	020_PH2_098009	north-east of Brackley	SP 588 403	Improved Grassland: MG7b (Typical community, no subcommunity)	11/06/2013	CFA14	Within Proposed Scheme
Halse Grange Farm, Halse	020_PH2_099001	south-east of Greatworth	SP 575 415	Semi-natural broad leaved woodland: W8a	01/05/2013	CFA15	Within Proposed Scheme
	020_PH2_099001	south-east of Greatworth	SP 575 415	Semi-natural broad leaved woodland: W10c	05/06/2013	CFA15	Within Proposed Scheme

NVC survey site name	Ecology survey code	Location	OS Grid Reference	Habitat types included in survey	Survey date	CFA number	Distance from the Proposed Scheme (m) and orientation
Bungalow Farm, Greatworth, Banbury	020_PH2_100001	east of Greatworth	SP 572 424	Semi-natural broad leaved woodland: W8	14/06/2013	CFA15	256.7 south west of Proposed Scheme
1 and 2 Halse Copse Farm Cottages, Halse, Brackley and land at Halse Copse Farm, Brackley	020_PH2_100002	south-east of Greatworth	SP 571 422	Semi-natural broad leaved woodland: W8 (Typical community, no subcommunity)	10/08/2012	CFA15	Directly adjacent to the Proposed Scheme
	020_PH2_100003	south-east of Greatworth	SP 574 417	Semi-natural broad leaved woodland: W8a	01/05/2013	CFA15	Within Proposed Scheme
Magpie Farm, Culworth, Banbury, Oxon	020_PH2_104001	north-east of Thorpe Mandeville	SP 543 450	Semi-improved neutral grassland: MG6 (intermediate between MG6a and MG6b)	26/06/2013	CFA15	Within Proposed Scheme
	020_PH2_104002	north-east of Thorpe Mandeville	SP 536 449	Semi-natural woodland: Species-poor W8 not attributable to a sub-community	26/06/2013	CFA15	Within Proposed Scheme
	020_PH2_104003	north-east of Thorpe Mandeville	SP 542 450	Marshy grassland with patches of swamp: marshy grassland - MG10 (dominant); and swamp -S23 (subsidiary)	26/06/2013	CFA15	15.0 south west of Proposed Scheme
	020_PH2_104004	north-east of Thorpe Mandeville	SP 536 451	Semi-improved neutral grassland: MG9	26/06/2013	CFA15	Within Proposed Scheme
Thorpe Mandeville Court, Thorpe Mandeville, Banbury	020_PH2_104007	Thorpe Mandeville	SP 534 447	Semi-natural mixed woodland: W10a	26/06/2013	CFA15	33.4 north-east of Proposed scheme
Land south of Thorpe Mandeville, between Banbury Lane and the B4525	020_PH2_104008	Thorpe Mandeville	SP 538 445	Unimproved grassland: MG5 (Typical community, no subcommunity)	12/06/2013	CFA15	70.5 north-east of Proposed scheme
	020_PH2_104009	Thorpe Mandeville	SP 536 445	Marshy grassland (tall herb fen): M27 (typical community, no subcommunity)	12/06/2013	CFA15	144.1 north of Proposed scheme
	020_PH2_104010	Thorpe Mandeville	SP 537 445	Marshy grassland: M23 (only broadly conforming to this NVC type)	12/06/2013	CFA15	50.5 north of Proposed Scheme

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NVC survey site name	Ecology survey code	Location	OS Grid Reference	Habitat types included in survey	Survey date	CFA number	Distance from the Proposed Scheme (m) and orientation
Culworth Grounds Farm, Thorpe Mandeville	020_PH2_105001	south-east of Culworth	SP 535 458	Vegetation mosaic: tall ruderal - OV24; and scrub - W21 progressing towards woodland W8	19/06/2013	CFA15	Within Proposed Scheme
Lower Farm, Thorpe Mandeville	020_PH2_105002	north-east of Banbury	SP 535 454	Poor semi-improved grassland: MG6a (Typical subcommunity)	14/06/2013	CFA15	Within Proposed Scheme
Land lying NW of Lower Thorpe Farm	020_PH2_105003	south-west of Culworth	SP 534 455	Unimproved grassland: MG5b	14/06/2013	CFA15	Within Proposed Scheme
Fox Covert, Upper Boddington	020_PH2_116001	west of Upper Boddington	SP 462 535	Semi-natural woodland: W8	02/05/2013	CFA15	Within Proposed Scheme
Land at Culworth Trafford Bridge Marsh	020_PH2_108001	north-west of Banbury	SP 516 480	Semi-improved neutral grassland: MG1c	19/06/2013	CFA15	Within Proposed Scheme
	020_PH2_108002	north-west of Banbury	SP 516 480	Marshy grassland (tall herb fen): M27b	19/06/2013	CFA15	Within Proposed Scheme
	020_PH2_108003	north-west of Banbury	SP 516 480	Swamp: S6 (no subcommunity for this stand type)	19/06/2013	CFA15	Within Proposed Scheme
	020_PH2_108004	north-west of Banbury	SP 515 480	Swamp: S6 (no subcommunity for this stand type)	19/06/2013	CFA15	Within Proposed Scheme
Land south west of Aston Le Walls	020_PH2_111001	south-west of Aston Le Walls	SP 488 504	Improved grassland: MG7b	13/06/2013	CFA15	Within Proposed Scheme

5.3 Deviations, constraints and limitations

5.3.1 There were a small number of methodological deviations from the Field Surveys Methods and Standards:

- field surveys were limited to locations where landowner permission had been obtained or areas that were accessible to the public. Certain parcels that were scoped in from desk study information were not available for field survey (Table 6 provides a list of these locations);
- in addition to the standard methodology for NVC survey, which requires quadrat sampling of vegetation stands, a species list was compiled for all sites to account for occasional species that were present but which did not fall in any of the quadrats;
- a few small vegetation stands were sampled using less than five quadrats where the variation in species composition could be adequately recorded using a small number of samples; and
- in the Mid Colne Valley Site of Special Scientific Interest (SSSI), a detailed inventory of coralroot (*Cardamine bulbifera*) was undertaken alongside the NVC survey. This did not form part of the formal NVC sampling procedure. However, the survey was commissioned as this plant species is a designation feature of the SSSI.

5.3.2 When sampling road verges and other locations where health and safety was a concern, a full NVC survey was not undertaken. A full NVC survey was also not undertaken where a site was scoped in for a survey and subsequently, the vegetation was found to be insufficient in quality to justify detailed survey (e.g. species-poor grassland which could not be confirmed as such during a winter scoping survey). In these instances, a survey of vegetation via public right of way was undertaken and the vegetation stand was identified to Phase 1 Habitat survey level, with only brief target notes taken.

5.3.3 Table 6 lists all locations where a NVC survey was deemed potentially necessary but where access was not available. Locations were identified from aerial images and OS maps combined with habitat of principal importance inventories and locations of designated sites. This list is precautionary, as without a site visit, it could not be determined whether vegetation meeting the criteria required for NVC survey was present (e.g. woodland may be present but may fail to meet habitat of principal importance or LBAP criteria).

Table 6 Summary of locations in CFA7 to 15 inclusive where requirement for NVC surveys identified but no access available for survey

Survey site name	Location	OS centroid grid reference	Description of proposed survey location	Survey site name	Distance from the Proposed Scheme (m) and orientation
Fray's Valley	east of Denham	TQ 058 868	SINC which includes areas of grassland and woodland habitat of principal importance	CFA7	Within Proposed Scheme

Survey site name	Location	OS centroid grid reference	Description of proposed survey location	Survey site name	Distance from the Proposed Scheme (m) and orientation
Land to the north of Northmoor Hill Wood	north of Denham	TQ 033 897	Grassland and woodland: potential lowland grassland and woodland habitat of principal importance	CFA7	Within Proposed Scheme
Land to the east of Great Halings Wood	north of Denham	TQ 034 899	habitat of principal importance- broad leaved woodland	CFA7	Within Proposed Scheme
Land between Great Halings Wood and Denham Lakes	north of Denham	TQ 033 897	habitat of principal importance - broad leaved woodland	CFA7	Within Proposed Scheme
Land on the North side of and lying to the North of Whielden Lane, Amersham.	south-west of Amersham	SU 949 976	LBAP woodland	CFA8	17.2 north east of the Proposed Scheme
Land to the east of Hyde Lane, Great Missenden	south-east of Great Missenden	SP 916 006	habitat of principal importance - broad leaved woodland	CFA9	Within Proposed Scheme
land on the west side of Potter Row, Great Missenden	north of Great Missenden	SP 895 028	Potential habitat of principal importance - broad leaved woodland	CFA9	Within Proposed Scheme
Farmland to the west of Potter Row	north-east of Great Missenden	SP 905 021	habitat of principal importance - broad leaved woodland site	CFA9	50 north east of the Proposed Scheme
Land to the west and south west of, Potter Row, Great Missenden	north-east of Great Missenden	SP 901 020	habitat of principal importance - broad leaved woodland site	CFA9	Within Proposed Scheme
Land on the east side of Kings Lane, The Lee, Great Missenden	south-east of Wendover	SP 894 044	Ancient woodland	CFA10	31.8 east of the Proposed Scheme
Wendover Rifle Range	Wendover	SP 876 066	Biological Notification Site (BNS)	CFA10	55.4 east of the Proposed Scheme
Residential land south of Aylesbury Park Golf Club	south-west of Aylesbury	SP 803 124	Lowland Grassland (habitat of principal importance)	CFA11	Within Proposed Scheme
Residential land on south side of Oxford Road	south-west of Aylesbury	SP 802 123	Grassland	CFA11	Within Proposed Scheme
Land to the north of Nash Lee Road	north-west of Aylesbury	SP 851 097	Lowland grassland (habitat of principal importance)	CFA11	Within Proposed Scheme
Land to the west of Finemere Wood	east of Grendon Underwood	SP 714 210	Lowland grassland, close to SSSI woodland	CFA12	Within Proposed Scheme
Farmland lying between Finemere Wood and	south-east of Edgcott	SP 712 214	Lowland grassland, close to SSSI woodland	CFA12	Within Proposed Scheme

Survey site name	Location	OS centroid grid reference	Description of proposed survey location	Survey site name	Distance from the Proposed Scheme (m) and orientation
disused railway					
Sheephouse Wood	east of Charndon	SP 702 234	SSSI/ancient woodland	CFA12	Adjacent to Proposed Scheme
Disused Railway near Calvert	east of Grendon Underwood	SP 710 205	SSSI/ancient woodland	CFA12	Within Proposed Scheme
Land to the north, east and west of Doddershall House	west of Quainton	SP 717 205	Lowland grassland habitat of principal importance / Local Wildlife Site	CFA12	Within Proposed Scheme
Land to the west of Shipton Lee	north-west of Quainton	SP 726 206	Lowland Grassland habitat of principal importance / records marsh orchid / Local Wildlife Site	CFA12	Within Proposed Scheme
Land at Chetwode Priory Estate, Buckingham	south-east of Chetwode	SP 650 285	Railway cutting LWS site.	CFA13	Within Proposed Scheme
Land at Manor Farm, Barton Hartshorn	south of Finmere	SP 636 308	SSSI / LWS	CFA13	Within Proposed Scheme
Pond Farm, Steeple Claydon	east of Charndon	SP 694 243	Lowland grassland habitat of principal importance	CFA13	Within Proposed Scheme
Turweston Manor and land	north-east of Brackley	SP 604 385	Lowland fen habitat of principal importance / LWS	CFA14	Within Proposed Scheme
Farm land at Turweston and Westbury	east of Brackley	SP 621 358	Lowland grassland - potential habitat of principal importance	CFA14	Within Proposed Scheme
Versions Farm, Brackley	east of Brackley	SP 599 382	Lowland fen / grassland / traditional orchard - potential habitat of principal importance	CFA14	Within Proposed Scheme
Land at Manor Farm	north-east of Brackley	SP 604 393	Lowland fen / grassland - potential habitat of principal importance	CFA14	Within Proposed Scheme
Pugpit Spinney	south-east of Brackley	SP 607 351	Broad leaved woodland - potential habitat of principal importance	CFA14	Within Proposed Scheme
Moat Farm, Goddington	south-east of Chetwode	SP 646 280	Grassland LWS	CFA14	Within Proposed Scheme
Greatworth Hall Farm and associated land, Greatworth	east of Greatworth	SP 566 433	Lowland grassland - potential habitat of principal importance	CFA15	Within Proposed Scheme
Calves Close Spinney	east of Chipping Warden	SP 507 490	Broad leaved woodland - potential habitat of principal importance	CFA15	Within Proposed Scheme

Survey site name	Location	OS centroid grid reference	Description of proposed survey location	Survey site name	Distance from the Proposed Scheme (m) and orientation
Two parcels of land lying to the south west side of 1 The Green, Lower Boddington	south-west of Upper Boddington	SP 477 521	Lowland grassland - potential habitat of principal importance	CFA15	Within Proposed Scheme
Land to the west of Culworth	west of Culworth	SP 525 469	Lowland grassland - potential habitat of principal importance	CFA15	Within Proposed Scheme
Manor Farm, Old House Farm, and Paradise Farm, Lower Boddington, Daventry	south of Lower Boddington	SP 482 514	Broad leaved woodland - potential habitat of principal importance	CFA15	Within Proposed Scheme

5.4 Baseline

CFA7 Colne Valley

5.4.1 Vegetation qualifying for NVC survey in the Colne Valley (CFA7) included the Mid Colne Valley SSSI and Little and Great Halings Woods. Vegetation stands potentially subject to significant effects are described below.

5.4.2 In the Mid Colne Valley SSSI the following vegetation types were recorded:

- semi-natural broad leaved woodland (020_PH2_028003, see Table 7), classified as W8 *Fraxinus excelsior-Acer campestre-Mercurialis perennis* woodland but not attributable to a sub-community. This vegetation was broadly distributed west of Tilehouse Lake South. It is species-poor, dominated by mature ash (*Fraxinus excelsior*) with a sparse shrub layer of elder (*Sambucus nigra*), hawthorn (*Crataegus monogyna*) and, locally dominant, Japanese knotweed. The presence of alder (*Alnus glutinosa*), crack willow (*Salix fragilis*) and an understorey of common nettle (*Urtica dioica*) and wild angelica (*Angelica sylvestris*) are indicative of wetter ground conditions. However, the dominance of ash with dog's mercury (*Mercurialis perennis*), which are both community constants in this stand, shows closest affinity with the W8 woodland community. A large proportion of this stand will be within the land required for the construction of the Proposed Scheme. This vegetation stand is a habitat of principal importance - lowland mixed deciduous woodland (Natural England GIS data and confirmed by field surveys), and it is also in the Mid Colne Valley SSSI.
- semi-natural broad leaved woodland (020_PH2_028002) - W8d *Fraxinus excelsior-Acer campestre-Mercurialis perennis* woodland, *Hedera helix* sub-community. This vegetation is broadly distributed west of the Unamed lake. It is species-rich, with one population of coralroot centred on TQ 041 889 and several ancient woodland indicator species, e.g. bluebell (*Hyacinthoides non-scripta*) and dog's mercury. The east margins of the stand will be within the

land required for the construction of the Proposed Scheme. This vegetation qualifies as a habitat of principal importance - lowland mixed deciduous woodland (Natural England GIS data and confirmed by field surveys) and it is also in the Mid Colne Valley SSSI;

- semi-natural broad leaved woodland (020_PH2_028001, see Table 8) - W8e *Fraxinus excelsior-Acer campestre-Mercurialis perennis* woodland, *Geranium robertianum* sub-community. This stand is dominated by a canopy of ash and occasional mature pedunculate oak with a developed shrub layer dominated by elder and hawthorn and occasional hazel (*Corylus avellana*). A small area is dominated by beech and is referable to NVC type W12 - *Fagus sylvatica* - *Mercurialis perennis* woodland. The understorey has a high diversity of ancient woodland indicator species including bluebell, dog's mercury, and moschatel (*Adoxa moschatellina*). This vegetation stand qualifies as a habitat of principal importance - lowland mixed deciduous woodland (Natural England GIS data and confirmed by field surveys) and is part of the Mid Colne Valley SSSI. A small part of the east edge of this stand will be within the land required for the construction of the Proposed Scheme;
- Mosaic woodland community (020_PH2_027001, see Table 9) consists of W21 *Crataegus monogyna-hedera helix* scrub, progressing towards two several other woodland types. In wetter locations west of the River Colne, and accounting for the majority of this stand, W21 scrub was intermixed with stands dominated by alder which are referable to W6 *Alnus glutinosa - Urtica dioica* woodland. In drier locations, W21 scrub is progressing towards W8 *Fraxinus excelsior-Acer campestre-Mercurialis perennis* woodland (where ash is frequent) or W12 *Fagus sylvatica-Mercurialis perennis* woodland (where beech is frequent). None of these NVC communities can be ascribed to sub-community level owing to the intergradation of several NVC types. The ground flora throughout is species-poor and was dominated by common nettle and dog's mercury. A population of coralroot is present in one location, centred on TQ 041 889. The whole of the stand will be within the land required for the construction of the Proposed Scheme. This vegetation stand qualifies as a habitat of principal importance - wet woodland (Natural England GIS data and confirmed by field surveys) and, it is also in the Mid Colne Valley SSSI.
- Poor semi-improved grassland with tall ruderal herbs (020_PH2_028004), referable to MG1a *Arrhenatherum elatius* grassland, *Festuca rubra* sub-community. The stand is a species poor assemblage dominated by nettles, greater willowherb, and false oat-grass. A small area of the stand will be within the land required for the construction of the Proposed Scheme. This vegetation stand is a habitat of principal importance (Natural England GIS data and confirmed by field surveys).

Table 7 Frequency table for 020_Ph2_028003

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
BARE/LITTER	1	2	3	4	1	V

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Kindbergia praelonga</i>	9	9	10	9	5	V
<i>Urtica dioica</i>	9	6	2	5	6	V
<i>Alnus glutinosa</i>	5	5	5	4	0	IV
<i>Fraxinus excelsior</i>	8	8	4	9	0	IV
<i>Mercurialis perennis</i>	0	6	10	5	10	IV
<i>Sambucus nigra</i>	6	5	4	7	0	IV
<i>Glechoma hederacea</i>	6	8	0	4	0	III
<i>Acer pseudoplatanus</i>	0	4	5	0	0	II
<i>Betula pubescens</i>	0	4	8	0	0	II
<i>Circea lutetiana</i>	2	0	0	8	0	II
<i>Crataegus monogyna</i>	0	0	0	7	5	II
<i>Dryopteris filix-mas</i>	0	0	1	4	0	II
<i>Geranium robertianum</i>	1	1	0	0	0	II
<i>Hedera helix</i>	4	4	0	0	0	II
<i>Salix fragilis</i>	0	0	0	5	5	II
<i>Silene dioica</i>	1	2	0	0	0	II
<i>Ajuga reptans</i>	0	0	0	4	0	I
<i>Angelica sylvestris</i>	1	0	0	0	0	I
<i>Arctium minus</i>	0	1	0	0	0	I
<i>Fagus sylvatica</i>	0	0	8	0	0	I
<i>Galium aparine</i>	4	0	0	0	0	I
<i>Geum urbanum</i>	0	1	0	0	0	I
<i>Myosotis laxa</i>	0	1	0	0	0	I
<i>Ranunculus repens</i>	0	1	0	0	0	I
<i>Rumex sanguineus</i>	0	2	0	0	0	I
<i>Salix cinerea</i>	4	0	0	0	0	I
<i>Veronica chamaedrys</i>	0	1	0	0	0	I

Table 8 Frequency table for o2o_PH2_o28001

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Crataegus monogyna</i>	1	5	8	7	5	V

Species	Quadrat locations					Frequency
	Q ₁	Q ₂	Q ₃	Q ₄	Q ₅	
<i>Fraxinus excelsior</i>	4	5	7	6	8	V
<i>Galium aparine</i>	4	3	7	2	6	V
<i>Mercurialis perennis</i>	2	10	8	5	9	V
<i>Moss sp. x 2</i>	7	2	2	9	9	V
<i>Hedera helix</i>	4	5	6	0	7	IV
<i>Rubus fruticosus agg</i>	8	0	10	5	7	IV
<i>Sambucus nigra</i>	1	5	0	4	4	IV
<i>Alliaria petiolata</i>	2	3	0	0	0	III
<i>Glechoma hederacea</i>	3	7	4	0	0	III
<i>Hyacinthoides non-scripta</i>	0	1	1	0	3	III
<i>Urtica dioica</i>	4	0	0	7	8	III
<i>Acer pseudoplatanus</i>	2	0	0	3	0	II
<i>Adoxa moschatellina</i>	0	6	4	0	0	II
<i>Arum maculatum</i>	1	0	1	0	0	II
<i>Anthriscus sylvestris</i>	3	0	0	0	0	I
<i>Arctium minus</i>	1	0	0	0	0	I
<i>Bromopsis ramosa</i>	3	0	0	0	0	I
<i>Cornus sanguinea</i>	1	0	0	0	0	I
<i>Corylus avellana</i>	0	0	0	0	10	I
<i>Dryopteris filix-mas</i>	0	0	0	0	1	I
<i>Geum urbanum</i>	4	0	0	0	0	I
<i>Heracleum sphondylium</i>	1	0	0	0	0	I
<i>Juncus effusus</i>	1	0	0	0	0	I
<i>Lamium album</i>	5	0	0	0	0	I
<i>Malus domestica</i>	1	0	0	0	0	I
<i>Melissa officinalis</i>	1	0	0	0	0	I
<i>Myosotis sylvatica</i>	4	0	0	0	0	I
<i>Poa nemoralis</i>	1	0	0	0	0	I
<i>Poa trivialis</i>	3	0	0	0	0	I
<i>Quercus robur</i>	0	0	0	0	7	I
<i>Ranunculus ficaria</i>	2	0	0	0	0	I
<i>Ranunculus repens</i>	1	0	0	0	0	I

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Rumex sanguineus</i>	3	0	0	0	0	I
<i>Silene dioica</i>	5	0	0	0	0	I
<i>Stellaria media</i>	4	0	0	0	0	I
<i>Tamus communis</i>	0	1	0	0	0	I
<i>Veronica chamaedrys</i>	3	0	0	0	0	I

Matching coefficients W8 (35.11), W8b (34.92), W21b (34.78), W8d (34.50), W8e (34.03), W8a (33.38), W21a (29.84), W12b (29.40), W8g (29.14), W21 (29.13)

Table 9 Frequency table for 020_PH2_027001

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Alnus glutinosa</i>	5	5	5	4	0	VI
<i>Fraxinus excelsior</i>	8	8	4	9	0	VI
<i>Mercurialis perennis</i>	0	6	10	5	10	VI
<i>Sambucus nigra</i>	6	5	4	7	0	VI
BARE/LITTER	1	2	3	4	1	V
<i>Kindbergia praelonga</i>	9	9	10	9	5	V
<i>Urtica dioica</i>	9	6	2	5	6	V
<i>Glechoma hederacea</i>	6	8	0	4	0	III
<i>Acer pseudoplatanus</i>	0	4	5	0	0	II
<i>Betula pubescens</i>	0	4	8	0	0	II
<i>Circaea lutetiana</i>	2	0	0	8	0	II
<i>Crataegus monogyna</i>	0	0	0	7	5	II
<i>Dryopteris filix-mas</i>	0	0	1	4	0	II
<i>Geranium robertianum</i>	1	1	0	0	0	II
<i>Hedera helix</i>	4	4	0	0	0	II
<i>Salix fragilis</i>	0	0	0	5	5	II
<i>Silene dioica</i>	1	2	0	0	0	II
<i>Ajuga reptans</i>	0	0	0	4	0	I
<i>Angelica sylvestris</i>	1	0	0	0	0	I
<i>Arctium minus</i>	0	1	0	0	0	I
<i>Fagus sylvatica</i>	0	0	8	0	0	I

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Galium aparine</i>	4	0	0	0	0	I
<i>Geum urbanum</i>	0	1	0	0	0	I
<i>Myosotis laxa</i>	0	1	0	0	0	I
<i>Ranunculus repens</i>	0	1	0	0	0	I
<i>Rumex sanguineus</i>	0	2	0	0	0	I
<i>Salix cinerea</i>	4	0	0	0	0	I
<i>Veronica chamaedrys</i>	0	1	0	0	0	I

Matching coefficients W21b (49.70), W6d (47.92), W6 (46.14), W8e (45.81), W12a (44.41), W12 (43.18), W21 (43.07), W21a (42.68), W6a (40.96), W8 (40.94)

CFA8 The Chalfonts and Amersham

- 5.4.3 The majority of the Chalfonts and Amersham section (CFA8) will be tunnelled and there were no habitats that were scoped in for NVC survey within the area required for the construction of the Proposed Scheme by the three vent shafts. Therefore, no habitat descriptions or NVC analysis are provided for this section.

CFA9 Central Chilterns

- 5.4.4 Vegetation qualifying for NVC survey in the Central Chilterns (CFA9) included Sibley's Coppice, Mulberry Park Hill, Mantle's Wood and Hedgemoor Wood. Habitats potentially subject to significant effects are described below.
- 5.4.5 In Sibley's Coppice semi-natural broad leaved woodland (020_PH2_046001, see Table 10 and 020_PH2_046002, see Table 11), was classified as W14 *Fagus sylvatica*-*Rubus fruticosus* woodland typical sub-community. The vegetation is dominated by a canopy of beech (*Fagus sylvatica*), with *pedunculata* oak, ash, and rowan (*Sorbus aucuparia*). The shrub layer is dominated by holly (*Ilex aquifolium*) with occasional hazel and yew (*Taxus baccata*) and an understorey limited to mosses, indicative of acidic conditions. About a third of the stand will be within the land required for the construction of the Proposed Scheme. This vegetation qualifies as a habitat of principal importance - Lowland beech and yew woodland (both Natural England GIS data and field surveys confirm this). This stand falls within a non-statutory designated site - Sibley's Coppice LWS.

Table 10 Frequency table for 020_PH2_046001

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Fagus sylvatica</i>	10	9	10	10	10	V
<i>Ilex aquifolium</i>	8	5	1	1	1	V
BARE/LITTER	10	10	10	10	10	III

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Sorbus aucuparia</i>	4	5	0	0	0	II
<i>Acer pseudoplatanus</i>	0	5	0	0	0	I
<i>Carex remota</i>	0	0	0	0	1	I
<i>Corylus avellana</i>	0	1	0	0	0	I
<i>Fraxinus excelsior</i>	4	0	0	0	0	I
<i>Hypnum cupressiforme</i>	1	0	0	0	0	I
<i>Kindbergia praelonga</i>	0	1	0	0	0	I
<i>Mnium hornum</i>	1	0	0	0	0	I
<i>Quercus robur</i>	1	0	0	0	0	I
<i>Rubus fruticosus</i> agg. (possibly <i>Rubus scaber</i>)	0	0	0	0	7	I
<i>Taxus baccata</i>	4	0	0	0	0	I
Matching coefficient W14 (41.61), W16 (29.5), W10a (28.5), W15 (27.78), W16a (27.11), W10c (26.83), W10d (25.93), W15a (24.81), W16b (23.89), W10 (23.59)						

Table 11 Frequency table for o2o_PH2_046002

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
BARE/LITTER	10	10	10	10	10	V
<i>Fagus sylvatica</i>	10	10	5	8	10	V
<i>Ilex aquifolium</i>	7	4	4	5	7	V
<i>Quercus robur</i>	0	5	5	4		III
<i>Carpinus betulus</i>	0	0	10	0	4	II
<i>Sorbus aucuparia</i>	0	5	0	5	0	II
<i>Corylus avellana</i>	0	0	0	5	0	I
<i>Hypnum cupressiforme</i>	0	0	0	0	1	I
<i>Kindbergia praelonga</i>	0	0	0	0	1	I
<i>Polytrichum formosum</i>	0	0	0	0	1	I
<i>Rubus scaber</i>	0	0	0	0	1	I
Matching coefficient W14 (36.52), W15 (27.78), W16 (24.24), W10c (24.17), W10a (23.05), W10d (23.03), W16a (21.67), W15c (21.16), W10 (20.97), W4 (20.41)						

5.4.6 Surveying at Mulberry Park Hill recorded semi-improved neutral grassland (o2o_PH2_047001 see Table 12, o2o_PH2_047002 see Table 13, o2o_PH2_047003 and o2o_PH2_047004 Table 14) - MG5 *Cynosurus cristatus*-*Centaurea nigra* grassland all of

which broadly conform to this stand type. Only 020_PH2_047001 could be attributed at a sub-community MG5a - *Lathyrus pratensis* sub-community. The grassland sward is dominated by sweet vernal grass (*Anthoxanthum odoratum*), Yorkshire fog (*Holcus lanatus*), meadow foxtail (*Alopecurus pratensis*) and common bent (*Agrostis capillaris*) with occasional crested dog's-tail (*Cynosurus cristatus*) and red fescue (*Festuca rubra*). The forb species include the community constants chalk knapweed (*Centaurea debeauxii*) and meadow buttercup (*Ranunculus acris*), with occasional yarrow (*Achillea millefolium*) and ox-eye daisy (*Leucanthemum vulgare*). In total, 5.11ha of this habitat will be inside the land required for the construction of the Proposed Scheme. The majority of the grassland is ungrazed and unmown, indicated by the presence of false oat-grass and cock's-foot with low diversity of broad leaved species. Although classified as MG5 it could be described as transitional to MG6b *Lolium perenne* - *Cynosurus cristatus* grassland, *Anthoxanthum odoratum* subcommunity, which is a less diverse agricultural grassland. This vegetation lacks sufficient cover of unimproved grassland indicator species and does not qualify as a habitat of principal importance - lowland meadow.

Table 12 Frequency table for 020_PH2_047001

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Anthoxanthum odoratum</i>	8	8	9	7	5	V
<i>Centaurea debeauxii</i>	5	5	4	1	4	V
<i>Holcus lanatus</i>	3	5	2	5	6	V
<i>Plantago lanceolata</i>	2	1	2	2	5	V
<i>Ranunculus acris</i>	4	1	2	4	5	V
<i>Taraxacum agg.</i>	2	1	1	1	1	V
<i>Alopecurus pratensis</i>	1	0	0	6	2	III
<i>Dactylis glomerata</i>	0	0	4	1	0	III
<i>Leucanthemum vulgare</i>	1	3	4	0	0	III
<i>Stellaria media</i>	1	2	1	0	0	III
<i>Achillea millefolium</i>	2	2	0	0	0	II
<i>Agrostis capillaris</i>	2	0	0	1	0	II
<i>Potentilla reptans</i>	0	0	1	0	1	II
<i>Rumex acetosa</i>	2	0	0	1	0	II
<i>Arrhenatherum elatius</i>	0	0	0	1	0	I
<i>Cerastium fontanum</i>	0	0	0	0	1	I
<i>Cynosurus cristatus</i>	0	0	2	0	0	I
<i>Festuca rubra</i>	0	0	0	4	0	I
<i>Lathyrus pratensis</i>	0	0	1	0	0	I

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Quercus sp.</i>	1	0	0	0	0	I
<i>Senecio jacobaea</i>	0	0	1	0	0	I

Matching coefficients MG6b (50.29), MG7d (49.45), MG1e (49.41), MG9 (47.89), MG6a (47.85), MG7c (46.43), MG5a (46.36), MG9b (46.15), MG7e (46.08)

Table 13 Frequency table for o2o_PH2_047002

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Agrostis capillaris</i>	2	3	4	2	3	V
<i>Anthoxanthum odoratum</i>	6	8	7	7	7	V
<i>Holcus lanatus</i>	4	5	3	5	5	V
<i>Rumex acetosa</i>	4	3	3	4	3	V
<i>Centaurea debeauxii</i>	0	5	7	6	2	IV
<i>Dactylis glomerata</i>	5	3	0	1	4	IV
<i>Festuca rubra</i>	3	0	4	3	6	IV
<i>Plantago lanceolata</i>	0	4	4	4	2	IV
<i>Ranunculus acris</i>	0	1	1	2	2	IV
<i>Rumex obtusifolius</i>	1	4	5	1	0	IV
<i>Alopecurus pratensis</i>	6	0	0	1	1	III
<i>Cerastium fontanum</i>	1	1	0	2	0	III
<i>Stellaria media</i>	0	2	2	1	0	III
<i>Cardamine pratensis</i>	0	1	0	0	1	II
<i>Poa pratensis</i>	1	0	2	0	0	II

Matching coefficients MG6b (58.45), MG7d (54.40), MC9e (51.65), MG6 (51.65), MG3 (50.97), MG3a (50.63), MG7c (50.20), MG6a (49.01), MG7 (48.87), MG9 (47.82)

Table 14 Frequency table for o2o_PH2_047004

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Agrostis capillaris</i>	3	6	6	2	4	V
<i>Anthoxanthum odoratum</i>	8	7	6	7	8	V
<i>Centaurea nigra</i>	2	1	1	2	5	V
<i>Cerastium fontanum</i>	1	1	2	2	1	V

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Holcus lanatus</i>	3	3	3	3	1	V
<i>Ranunculus acris</i>	2	2	5	4	5	V
<i>Taraxacum agg.</i>	2	1	3	3	3	V
<i>Cynosurus cristatus</i>	5	5	7	7	0	IV
<i>Festuca rubra</i>	0	2	2	1	4	IV
<i>Trifolium pratense</i>	1	1	2	1	0	IV
<i>Rumex acetosa</i>	1	0	1	1	0	III
<i>Lotus corniculatus</i>	3	0	0	0	1	II
<i>Luzula campestris</i>	2	1	0	0	0	II
<i>Plantago lanceolata</i>	1	0	0	0	1	II
<i>Trifolium dubium</i>	2	0	0	0	1	II
<i>Dactylis glomerata</i>	0	1	0	0	0	I
<i>Lolium perenne</i>	0	0	0	1	0	I
<i>Poa pratensis</i>	0	0	1	0	0	I
<i>Trifolium repens</i>	1	0	0	0	0	I

Matching coefficients MG6b (68.29), MG6 (58.73), U4b (58.28), MG6a (56.27), MG5a (55.85), MG5 (54.84), MG3 (54.17), MG5c (53.23), MG5b (51.98), MG8 (51.13)

5.4.7 Surveys of the south-eastern and north-western edges of Mantles Wood recorded semi-natural broad leaved woodland (o2o_PH2_044001 and o2o_PH2_044002, see Table 15) - W14 *Fagus sylvatica*-*Rubus fruticosus* woodland, typical community. The stand is dominated by beech and also has frequent wild cherry (*Prunus avium*) in the canopy. Several ancient woodland indicator ground flora species were present including bluebell and wood melick (*Melica uniflora*). This vegetation stand qualifies as a habitat of principal importance - lowland beech and yew woodland, is ancient woodland (Natural England data and confirmed by field surveys) and is also within Mantles Wood LWS. Access was not permitted to the south-western (which could not be surveyed) and central northern sections of Mantles Wood (where a conifer woodland type is evident in aerial images); conifer woodland is not referable to W14.

Table 15 Frequency table for o2o_PH2_044002

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Fagus sylvatica</i>	7	9	7	8	10	V
<i>Hyacinthoides non-scripta</i>	9	5	9	1	10	V
Bare	4	8	0	8	4	IV

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Carpinus betulus</i>	1	4	6	1	0	IV
<i>Rubus fruticosus</i>	7	4	8	8	0	IV
<i>Rubus idaeus</i>	3	4	0	1	1	IV
<i>Galium aparine</i>	6	0	2	0	2	III
<i>Galium odoratum</i>	0	4	0	2	2	III
<i>Milium effusum</i>	0	5	0	2	4	III
<i>Picea abies</i>	2	0	6	4	0	III
<i>Poa trivialis</i>	0	0	2	2	2	III
<i>Polytrichum formosum</i>	0	3	3	0	2	III
<i>Prunus avium</i>	7	0	7	5	0	III
<i>Brachythecium rutabulum</i>	0	3	0	4	0	II
<i>Carex sylvatica</i>	0	1	0	1	0	II
<i>Circea lutetiana</i>	0	0	0	2	2	II
<i>Dryopteris carthusiana</i>	0	0	1	2	0	II
<i>Dryopteris filix-mas</i>	9	0	0	1	0	II
<i>Geranium robertianum</i>	0	0	0	2	2	II
<i>Ilex aquifolium</i>	0	1	1	0	0	II
<i>Lamiastrum galeobdolon ssp montanum</i>	0	0	0	2	2	II
<i>Melica uniflora</i>	0	5	3	0	0	II
<i>Rumex sanguineus</i>	1	0	0	1	0	II
<i>Urtica dioica</i>	3	0	0	1	0	II
<i>Alliaria petiolata</i>	3	0	0	0	0	I
<i>Anthriscus sylvestris</i>	0	0	2	0	0	I
<i>Arctium minus</i>	0	0	0	0	2	I
<i>Arum maculatum</i>	1	0	0	0	0	I
<i>Betula pendula</i>	0	0	4	0	0	I
<i>Cardamine hirsuta</i>	0	0	3	0	0	I
<i>Conopodium majus</i>	0	4	0	0	0	I
<i>Crataegus monogyna</i>	0	1	0	0	0	I
<i>Dryopteris dilatata</i>	0	0	0	2	0	I
<i>Epilobium hirsutum</i>	1	0	0	0	0	I
<i>Euphorbia amygdaloides</i>	0	1	0	0	0	I

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Fraxinus excelsior</i> (canopy)	0	0	0	2	0	I
<i>Fraxinus excelsior</i> (seedling)	0	0	0	0	2	I
<i>Galeopsis tetrahit</i>	0	0	3	0	0	I
<i>Kindbergia praelonga</i>	0	0	2	0	0	I
<i>Lamium album</i>	1	0	0	0	0	I
<i>Luzula pilosa</i>	0	4	0	0	0	I
<i>Mycelis muralis</i>	0	1	0	0	0	I
<i>Oxalis acetosa</i>	0	0	0	0	2	I
<i>Sambucus nigra</i>	1	0	0	0	0	I
<i>Sorbus aria</i>	0	0	4	0	0	I
<i>Sorbus aucuparia</i>	0	0	1	0	0	I
<i>Stachys sylvatica</i>	1	0	0	0	0	I
<i>Viola riviniana</i>	0	4	0	0	0	I
Matching coefficients W12a (47.68), W10c (44.98), W10 (43.56), W12 (43.54), W14 (42.83), W8 (42.62), W8b (42.55), W8e (42.18), W12b (40.69), W8a (40.11)						

5.4.8 Surveying at Hedgemoor Wood recorded semi-natural broad leaved woodland (020_PH2_045001, see Table 16) - W14 *Fagus sylvatica*-*Rubus fruticosus* woodland (typical community, no subcommunity attributed). The canopy is dominated by beech with frequent wild cherry; a small area of the stand which has been replanted with Corsican pine (*Pinus nigra* ssp. *laricio*) has a good diversity of woodland ground flora species. An approximate area of 2.93ha, representing a third of the stand, will be inside the land required for the construction of the Proposed Scheme. This vegetation stand is a habitat of principal importance - lowland beech and yew woodland, and ancient woodland, supported by Natural England GIS data and confirmed by field surveys. This vegetation stand is located in Hedgemoor and Farthing Wood LWS. The majority of Farthing Wood was not accessible to survey and was not included in the NVC survey.

Table 16 Frequency table for 020_PH2_045001

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
Bare	5	5	4	8	7	V
<i>Hyacinthoides non-scripta</i>	4	7	8	4	6	V
<i>Ilex aquifolium</i>	1	5	5	1	2	V
<i>Rubus fruticosus</i> agg	7	6	8	4	8	V
<i>Dryopteris dilatata</i>	5	1	1	0	3	IV

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Prunus avium</i>	4	5	7	5	0	IV
<i>Carpinus betulus</i>	4	0	5	0	2	III
<i>Circea lutetiana</i>	4	0	7	2	0	III
<i>Dryopteris filix-mas</i>	0	1	1	0	3	III
<i>Fagus sylvatica</i>	0	8	9	7	0	III
<i>Lamium galeobdolon</i>	0	8	7	4	0	III
<i>Brachythecium rutabulum</i>	3	0	0	3	0	II
<i>Corylus avellana</i>	0	0	1	4	0	II
<i>Crataegus monogyna</i>	0	0	1	5	0	II
<i>Galium aparine</i>	2	2	0	0	0	II
<i>Hedera helix</i>	0	0	1	2	0	II
<i>Kindbergia praelonga</i>	3	0	0	3	0	II
<i>Pinus nigra</i>	8	0	0	0	9	II
<i>Betula pendula (canopy)</i>	0	4	0	0	0	I
<i>Bromopsis ramosa</i>	2	0	0	0	0	I
<i>Cardamine flexuosa</i>	2	0	0	0	0	I
<i>Carex sylvatica</i>	3	0	0	0	0	I
<i>Galium odoratum</i>	0	0	0	6	0	I
<i>Holcus lanatus</i>	2	0	0	0	0	I
<i>Lonicera periclymenum</i>	0	0	4	0	0	I
<i>Melica uniflora</i>	0	4	0	0	0	I
<i>Mercurialis perennis</i>	0	0	0	6	0	I
<i>Milium effusum</i>	0	2	0	0	0	I
<i>Mnium hornum</i>	0	0	0	0	3	I
<i>Poa trivialis</i>	2	0	0	0	0	I
<i>Pteridium aquilinum</i>	4	0	0	0	0	I
<i>Rosa arvensis</i>	0	0	0	0	1	I
<i>Rubus idaeus</i>	7	0	0	0	0	I
<i>Rumex obtusifolius</i>	2	0	0	0	0	I
<i>Sorbus aria</i>	1	0	0	0	0	I
<i>Sorbus aucuparia</i>	4	0	0	0	0	I
<i>Urtica dioica</i>	7	0	0	0	0	I

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
Matching coefficient W10c (50.86), W10 (50.69), W10a (50.34), W12a (47.37), W14 (46.36), W12 (44.23), W8b (44.01), W12 (44.23) W8b (44.01), W10e (43.46), W8d (43.07), W8 (42.36)						

CFA10 Dunsmore, Wendover and Halton

- 5.4.9 There were no habitats that qualified for an NVC survey within the Dunsmore, Wendover and Halton (CFA10). Therefore, no habitat descriptions or NVC analysis are provided for this section.

CFA11 Stoke Mandeville and Aylesbury

- 5.4.10 Vegetation qualifying for NVC survey in Stoke Mandeville and Aylesbury (CFA11) included Aylesbury Park Golf Club and Putlowes Farm. Habitats potentially subject to significant effects are described below.
- 5.4.11 The vegetation surveyed in the centre of Aylesbury Park Golf Club consists of a mature scrub community developed under a line of mature pedunculate oak trees (o2o_PH2_o63001, see Table 17) - W21b *Crataegus monogyna*-*Hedera helix* scrub, *Mercurialis perennis* sub-community. The stand is a mature scrub/ woodland comprising a dominant shrub layer of hawthorn. A number of ancient woodland indicator species were recorded including hairy brome (*Bromopsis ramosa*), field rose (*Rosa arvensis*), and three-nerved sandwort (*Moehringia trinervia*). Despite the tree cover of mature oak the stand is open enough to show close affinity to a hawthorn scrub community. Approximately a third of the stand will be within the land required for the construction of the Proposed Scheme. The presence of ancient woodland indicator species supports the classification as a mature scrub community but it does not qualify as a as a habitat of principal importance.

Table 17 Frequency table for o2o_PH2_o63001. (low species diversity resulting in two quadrats only).

Species	Quadrat locations		Frequency
	Q1	Q2	
<i>Brachypodium sylvaticum</i>	7	4	II
<i>Bromopsis ramosa</i>	3	1	II
<i>Chaerophyllum temulum</i>	8	2	II
<i>Crataegus monogyna</i>	6	4	II
<i>Fraxinus excelsior</i>	2	3	II
<i>Galium aperine</i>	3	2	II
<i>Hedera helix</i>	7	8	II
<i>Prunus spinosa</i>	1	6	II
<i>Quercus robur</i>	8	7	II
<i>Acer campestre</i>	0	1	I

Species	Quadrat locations		Frequency
	Q1	Q2	
<i>Alliaria petiolata</i>	0	2	I
<i>Anthriscus sylvestris</i>	0	4	I
<i>Arum maculatum</i>	0	1	I
<i>Malus pumila</i>	0	4	I
<i>Mohringia trinerva</i>	3	0	I
<i>Rosa arvensis</i>	2	0	I
<i>Rubus fruticosus (agg)</i>	3	0	I
<i>Rumex acetosa</i>	0	1	I
<i>Sambucus nigra</i>	4	0	I
<i>Urtica dioica</i>	3	0	I

Matching coefficients W21 (34.87), W21a (33.42), W21b (32.99), W21c (28.12), W21d (27.44), W8d (24.93), W8e (24.35), W24 (24.10), W24b (22.43), W25a (21.66)

CFA12 Waddesdon and Quainton

- 5.4.12 Vegetation qualifying for NVC survey in Waddesdon and Quainton (CFA12) included several stands at the Calvert Estate; vegetation to the north of Buckinghamshire Railway Centre; and vegetation at Woodlands Farm and surrounding land.
- 5.4.13 Surveying in the area to the north of Buckinghamshire Railway Centre identified semi-improved neutral grassland (o2o_PH2_071001, see Table 18) - MG6b *Lolium perenne*-*Cynosurus cristatus* grassland, *Anthoxanthum odoratum* sub-community. The stand is dominated by crested dog's-tail, red fescue (*Festuca rubra*), and sweet vernal-grass. The vegetation was a weak match for MG6 as it contained no perennial rye grass but the low cover of broad leaved herbs precludes it being MG5. A small proportion of the stand will be within the land required for the construction of the Proposed Scheme.

Table 18 Frequency table for o2o_PH2_071001

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Anthoxanthum odoratum</i>	3	6	5	4	1	V
<i>Cynosurus cristatus</i>	8	7	9	6	9	V
<i>Festuca ovina</i>	4	5	1	7	4	V
<i>Lolium perenne</i>	2	2	4	5	2	V
<i>Holcus lanatus</i>	0	2	1	1	1	IV
<i>Ranunculus bulbosus</i>	3	0	3	3	3	IV
<i>Agrostis capillaris</i>	5	4	0	3	0	III

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Cirsium arvense</i>	3	1	0	4	0	III
<i>Briza media</i>	1	0	0	0	1	II
<i>Luzula campestris</i>	2	0	1	0	0	II
<i>Bellis perennis</i>	1	0	0	0	0	I
<i>Carex sp.</i>	2	0	0	0	0	I
<i>Cirsium vulgare</i>	1	0	0	0	0	I
<i>Dactylis glomerata</i>	1	0	0	0	0	I
<i>Hypochaeris radicata</i>	2	0	0	0	0	I
<i>Lotus corniculatus</i>	1	0	0	0	0	I
<i>Potentilla reptans</i>	3	0	0	0	0	I
<i>Ranunculus acris</i>	0	3	0	0	0	I

Matching coefficients MG6b (51.40), Mg6 (50.59), MG6a (48.11), MG5 (40.75), U4b (40.67), MG6c (40.23), MG5a (40.07), MG5b (39.48), MG11a (38.78), MG7d (37.59)

5.4.14 Surveying at Calvert Waste Terminal recorded the following vegetation stands:

- a complex mosaic (020_PH2_076001) of grassland communities is present on the banks of a large drainage ditch, the 'mega-ditch', at the southern end of the Calvert Estate. This vegetation is a complex mosaic and so was not subject to quadrat sampling but a detailed species list and a vegetation map were collected. A variety of different grassland types were present including MG5a *Cynosurus cristatus-Centaurea nigra* grassland, *Lathyrus pratensis* sub-community; MG1a *Arrhenatherum elatius* grassland, *Festuca rubra* sub-community; and MG1 *Arrhenatherum elatius* grassland - an undescribed variety with wood small-reed (*Calamagrostis epigejos*). The top of the banks were dominated by unmanaged false oat grass grassland which was poor in broad-leaved herbs (MG1a). The bottom of the ditch had a moderately species-rich neutral grassland (MG5a) with crested dog's-tail and a variety of broad leaved herbs, e.g. bird's-foot trefoil (*Lotus corniculatus*), selfheal (*Prunella vulgaris*) and meadow buttercup. The middle and lower banks of this stand were dominated by wood small-reed (*Calamagrostis epigejos*) with frequent cock's-foot (*Dactylis glomerata*) and colt's-foot (*Tussilago farfara*) which are indicative of heavier soils but this could not be categorised to an NVC community (perhaps similar to an MG1 type grassland). The whole of the stand will be within land required for the construction of the Proposed Scheme. The vegetation is of insufficient diversity overall to qualify as a habitat of principal importance - lowland meadow;
- a wet meadow community (020_PH2_076002, see Table 19) - this vegetation is referable to MG8 *Cynosurus cristatus-Caltha palustris* grassland but it is not a

close match as it was dominated by sedges, the community constant marsh marigold (*Caltha palustris*) was absent and coarse grasses such as false oat-grass and cock's-foot are also present. The stand was dominated by glaucous sedge (*Carex flacca*) and carnation sedge (*Carex panicea*) with frequent grasses including sweet vernal-grass, Yorkshire fog and tufted-hair grass (*Deschampsia cespitosa*). Occasional poor-fen *dicotyledons* included marsh thistle (*Cirsium palustre*) and, at very low cover, ragged robin (*Lychnis flos-cuculi*); southern marsh orchid (*Dactylorhiza praetermissa*) and meadowsweet (*Filipendula ulmaria*). The community may have been altered hydrologically and drained through activities at the waste terminal. This vegetation stand would qualify as a habitat of principal importance - lowland meadow;

- semi-natural broad leaved woodland (020_PH2_076003, see Table 20) - W8 *Fraxinus excelsior* - *Acer campestre* - *Mercurialis perennis* woodland. The canopy is dominated by pedunculate oak which is not characteristic for this NVC community (ash is typical) but can occur when a woodland is managed for oak. The shrub layer is dominated by bramble, field rose, hawthorn and hazel. The ground flora is diverse and includes twelve ancient woodland indicator species including wood anemone, primrose (*Primula vulgaris*) and bluebell. The stand will be entirely within the land required for the construction of the Proposed Scheme. This vegetation stand qualifies as a habitat of principal importance - lowland mixed deciduous woodland (supported by Natural England GIS data and field survey);
- semi-natural broad leaved woodland (020_PH2_078002, see Table 21) - W8 *Fraxinus excelsior*-*Acer campestre*-*Mercurialis perennis* woodland (does not fit a defined sub-community). The canopy is dominated by pedunculate oak, ash and aspen (*Populus tremula*), the latter being an indicator of ancient woodland. The vegetation layer below the canopy is dominated by hawthorn, while the ground flora contains the ancient woodland indicator species wood anemone and bluebell. The edges of the stand will be within the land required for the construction of the Proposed Scheme. This vegetation stand qualifies as a habitat of principal importance - lowland mixed deciduous woodland (supported by Natural England GIS data and confirmed by field surveys); and
- semi-natural broad leaved woodland (020_PH2_078003) - W10a *Quercus robur*-*Pteridium aquilinum*-*Rubus fruticosus* woodland, typical sub-community. The canopy layer was dominated by pedunculate oak and ash, while the shrub layer was dominated by hawthorn. The ground flora is species poor and dominated by common nettle, though several ancient woodland indicator species are present at low abundance such as field rose. The edges of the stand will be within the land required for the construction of the Proposed Scheme. This vegetation stand qualifies as a habitat of principal importance - lowland mixed deciduous woodland (supported by Natural England GIS data and confirmed by field surveys).

Table 19 Frequency table for o2o_PH2_076002

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Anthoxanthum odoratum</i>	4	5	2	2	2	V
<i>Carex flacca</i>	4	3	7	8	8	V
<i>Potentilla reptans</i>	5	5	2	1	2	V
<i>Arrhenatherum elatius</i>	4	2	2	1	0	IV
<i>Deschampsia cespitosa</i>	2	2	0	2	2	IV
<i>Holcus lanatus</i>	4	4	0	2	1	IV
<i>Lotus corniculatus</i>	3	4	2	3	0	IV
<i>Ranunculus acris</i>	2	3	2	0	2	IV
<i>Calliergonella cuspidata</i>	5	0	5	4	0	III
<i>Carex panicea</i>	0	0	7	1	4	III
<i>Cerastium fontanum</i>	1	2	0	0	1	III
<i>Cirsium arvense</i>	2	1	1	0	0	III
<i>Cirsium palustre</i>	1	1	0	0	1	III
<i>Juncus conglomeratus</i>	4	0	0	3	2	III
<i>Kindbergia praelonga</i>	5	4	0	4	0	III
<i>Poa trivialis</i>	4	4	0	2	0	III
<i>Potentilla erecta</i>	0	0	1	3	2	III
<i>Agrostis capillaris</i>	5	6	0	0	0	II
<i>Carex hirta</i>	1	0	0	0	0	II
<i>Cynosurus cristatus</i>	2	2	0	0	0	II
<i>Hypericum tetrapterum</i>	0	0	0	2	1	II
<i>Juncus inflexus</i>	0	0	0	3	2	II
<i>Lotus pedunculatus</i>	0	0	0	2	3	II
<i>Ranunculus repens</i>	2	0	0	1	0	II
<i>Senecio erucifolius</i>	0	1	0	2	0	II
<i>Dactylis glomerata</i>	0	1	0	0	0	I
<i>Filipendula ulmaria</i>	0	0	0	1	0	I
<i>Hypericum perforatum</i>	0	0	0	0	1	I
<i>Lathyrus pratensis</i>	0	0	0	0	2	I
<i>Lepidium draba</i>	0	0	1	0	0	I
<i>Luzula campestris</i>	1	0	0	0	0	I

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Plantago lanceolata</i>	0	0	0	0	1	I
<i>Pseudoscleropodium purum</i>	0	4	0	0	0	I
<i>Rosa arvensis</i>	0	0		0	1	I
<i>Rumex acetosa</i>	0	2	0	0	0	I
<i>Scrophularia auriculata</i>	0	0	1	0	0	I
<i>Senecio squalidus</i>	0	0	0	0	1	I
<i>Trifolium pratense</i>	2	0	0	0	0	I
<i>Veronica polita</i>	0	0	0	0	1	I
<i>Vicia hirsuta</i>	1	0	0	0	0	I
<i>Anthoxanthum odoratum</i>	4	5	2	2	2	V

Matching coefficients MG9 (50.15), MG9a (49.91), MG9b (45.69), MG1c (41.56), MG5a (40.53), MG10a (40.42), M22 (39.96), MG5 (39.27), M23a (39.15)

Table 20 Frequency table for o2o_PH2_076003

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Quercus robur</i>	6	7	8	5	7	V
<i>Rosa canina</i>	4	3	1	1		V
<i>Rubus fruticosus agg.</i>	3	2	1	2	2	V
<i>Anemone nemorosa</i>	0	6	6	3	4	IV
<i>Betula pendula</i>	0	5	5	4	6	IV
<i>Corylus avellana</i>	0	5	4	4	4	IV
<i>Crataegus monogyna</i>	0	4	3	5	1	IV
<i>Myosotis sylvatica</i>	0	2	3	1	1	IV
<i>Viola riviniana</i>	0	4	3	2	2	IV
<i>Ajuga reptans</i>	0	3	0	4	2	III
<i>Anthoxanthum odoratum</i>	0	2	2	0	2	III
<i>Galium aparine</i>	3	0	3	2	0	III
<i>Lonicera periclymenum</i>	0	2	3	2	0	III
<i>Cirsium palustre</i>	1	0	1	0	0	II
<i>Fragaria vesca</i>	0	3	0	0	3	II
<i>Holcus lanatus</i>	0	2	0	2	0	II

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Ligustrum vulgare</i>	7	0	3	0	0	II
<i>Primula vulgaris</i>	0	5	0	0	1	II
<i>Prunella vulgaris</i>	0	0	0	2	1	II
<i>Prunus spinosa</i>	6	0	0	4	0	II
<i>Ranunculus repens</i>	2	0	0	2	0	II
<i>Senecio vulgaris</i>	2	0	1	0	0	II
<i>Taraxacum agg.</i>	0	2	0	0	1	II
<i>Veronica serpyllifolia</i>	0	0	1	0	1	II
<i>Brachypodium sylvaticum</i>	0	0	0	0	1	I
<i>Cardamine flexuosa</i>	3	0	0	0	0	I
<i>Carex sylvatica</i>	0	0	0	0	1	I
<i>Cirsium arvense</i>	2	0	0	0	0	I
<i>Deschampsia cespitosa</i>	0	0	0	0	2	I
<i>Geum urbanum</i>	0	0	0	3	0	I
<i>Hyacinthoides non-scripta</i>	0	0	0	0	1	I
<i>Hypericum hirsutum</i>	2	0	0	0	0	I
<i>Lolium perenne</i>	2	0	0	0	0	I
<i>Poa annua</i>	0	0	2	0	0	I
<i>Potentilla reptans</i>	2	0	0	0	0	I
<i>Rumex sanguineus</i>	3	0	0	0	0	I
<i>Senecio jacobaea</i>	0	0	0	0	1	I
<i>Stellaria holostea</i>	0	0	0	0	2	I
<i>Urtica dioica</i>	3	0	0	0	0	I
<i>Veronica chamaedrys</i>	0	0	0	0	2	I
<i>Vicia sepium</i>	0	0	0	3	0	I

Table 21 Frequency table for o2o_PH2_078002 (small stand; two quadrats sufficient).

Species	Quadrat locations		Frequency
	Q1	Q2	
<i>Anemone nemorosa</i>	7	5	II
<i>Arum maculatum</i>	2	1	II
<i>Crataegus monogyna</i>	7	5	II

Species	Quadrat locations		Frequency
	Q1	Q2	
<i>Hyacinthoides non-scripta</i>	3	5	II
<i>Lonicera periclymenum</i>	4	2	II
<i>Populus tremula</i>	2	3	II
<i>Quercus robur</i>	10	9	II
<i>Rubus fruticosus agg.</i>	5	5	II
<i>Ballota nigra</i>	1	0	I
<i>Brachypodium sylvaticum</i>	1	0	I
<i>Carex sylvatica</i>	3	0	I
<i>Corylus avellana</i>	4	0	I
<i>Fraxinus excelsior</i>	0	2	I
<i>Galium aparine</i>	1	0	I
<i>Geum urbanum</i>	2	0	I
<i>Poa trivialis</i>	1	0	I
<i>Primula vulgaris</i>	6	0	I
<i>Rosa arvensis</i>	1	0	I
<i>Rumex sanguineus</i>	5	0	I
<i>Stellaria holostea</i>	1	0	I
<i>Urtica dioica</i>	1	0	I
<i>Viola riviniana</i>	2	0	I

No computer analysis of vegetation undertaken as there were only two quadrat samples. Vegetation identified using keys in the NVC manuals³¹.

5.4.15 Surveying at Woodlands Farm identified semi-improved neutral grassland (020_PH2_074003, see Table 22) - MG5a *Cynosurus cristatus*-*Centaurea nigra* grassland, *Lathyrus pratensis* sub-community. The stand is was not a particularly species-rich example of this habitat type, but had preferential plants including bird's foot trefoil, chalk knapweed, yellow rattle (*Rhinanthus minor*), wild carrot (*Daucus carota*) and meadow vetchling (*Lathyrus pratensis*). The edges of this stand will be within the land required for the construction of the Proposed Scheme. This vegetation lacks sufficient diversity to qualify as habitat of principal importance - lowland meadow.

³¹ Rodwell, J.S. (et seq.) British plant communities. Published in five volumes. Cambridge University Press. Cambridge.

Table 22 Frequency table for o2o_PH2_074003

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Holcus lanatus</i>	5	4	6	4	3	V
<i>Agrostis stolonifera</i>	0	5	6	5	5	IV
<i>Ranunculus repens</i>	0	5	5	5	5	IV
<i>Cynosurus cristatus</i>	5	2	2	0	0	III
<i>Dactylis glomerata</i>	3	2	0	0	4	III
<i>Phelum bertonlii</i>	3	2	0	2	0	III
<i>Ranunculus acris</i>	2	2	2	0	0	III
<i>Taraxacum agg.</i>	1	1	1	0	0	III
<i>Alopecurus pratensis</i>	0	3	3	0	0	II
<i>Anisantha sterilis</i>	5	3	0	0	0	II
<i>Arrhenatherum elatius</i>	0	0	0	2	2	II
<i>Elymus repens</i>	0	0	0	2	3	II
<i>Festuca rubra</i>	0	2	0	0	4	II
<i>Lolium perenne</i>	5	0	1	0	0	II
<i>Lotus corniculatus</i>	0	5	6	0	0	II
<i>Phleum pratense</i>	0	0	0	3	3	II
<i>Potentilla reptans</i>	0	0	0	10	10	II
<i>Schedonorus pratensis</i>	0	5	3	0	0	II
<i>Torilis japonica</i>	0	0	0	3	3	II
<i>Trifolium pratense</i>	5	5	0	0	0	II
<i>Agrimonia eupatoria</i>	0	1	0	0	0	I
<i>Agrostis capillaris</i>	0	0	6	0	0	I
<i>Anthoxanthum odoratum</i>	0	0	2	0	0	I
<i>Centaurea debeauxii</i>	0	3	0	0	0	I
<i>Lysimachia nummularia</i>	0	0	0	0	2	I
<i>Plantago lanceolata</i>	0	3	0	0	0	I
<i>Poa trivialis</i>	0	0	0	0	2	I
<i>Rhinanthus minor</i>	2	0	0	0	0	I
<i>Rumex acetosa</i>	0	0	3	0	0	I
<i>Stellaria minor</i>	1	0	0	0	0	I

5.4.16 Stands surveyed at Finemere Wood BBOWT reserve identified semi-improved neutral grassland (o2o_PH2_074001 and o2o_PH2_075001, see Table 23) - MG5 *Cynosurus cristatus*-*Centaurea nigra* grassland (broadly conforms to this NVC type, and therefore does not fit a defined sub-community; possibly reverting from previous agricultural grassland). There is low species diversity over the stands which were dominated by red fescue and frequent Yorkshire fog and crested dog's-tail. A number of dicotyledonous species were present including meadow vetchling, yellow rattle and meadow buttercup. This vegetation is heavily grazed and mown, limiting the height of the sward and frequency of forb species. The edges of the stand will be within land required for the construction of the Proposed Scheme. This vegetation stand is of insufficient diversity to qualify as habitat of principal importance -lowland meadow; however, it is being restored by the Wildlife Trust so may qualify as a lowland meadow in the future.

Table 23 Frequency table for o2o_PH2_074001 AND o2o_PH2_075001

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Festuca rubra</i>	9	10	8	7	9	V
<i>Schedonorus pratensis</i>	0	4	4	4	5	IV
<i>Holcus lanatus</i>	5	0	3	8	0	III
<i>Senecio erucifolius</i>	1	1	1	0	0	III
<i>Trifolium repens</i>	5	0	2	0	4	III
<i>Carex flacca</i>	5	0	6	0	0	II
<i>Cerastium fontanum</i>	0	1	1	0	0	II
<i>Cynosurus cristatus</i>	9	0	0	2	0	II
<i>Rhinanthus minor</i>	1	1	0	0	0	II
<i>Trifolium dubium</i>	1	0	0	0	1	II
<i>Trifolium pratense</i>	4	8	0	0	0	II
<i>Agrostis capillaris</i>	0	0	0	8	0	I
<i>Arrhenatherum elatius</i>	0	0	2	0	0	I
<i>Cirsium arvense</i>	0	0	0	0	1	I
<i>Deschampsia cespitosa</i>	0	0	2	0	0	I
<i>Helminthotheca echioides</i>	0	0	0	0	1	I
<i>Hordeum secalinum</i>	0	0	1	0	0	I
<i>Lolium perenne</i>	0	0	0	4	0	I
<i>Lotus corniculatus</i>	0	1	0	0	0	I
<i>Phleum pratense</i>	0	0	1	0	0	I
<i>Plantago lanceolata</i>	0	1	0	0	0	I

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Poa pratensis</i>	0	0	0	1	0	I
<i>Potentilla reptans</i>	0	0	0	6	0	I
<i>Schedonorus arundinaceus</i>	4	0	0	0	0	I
<i>Taraxacum (agg)</i>	0	0	0	0	1	I

5.4.17 Surveys of a road verge at Oak Tree Farm track between SP 707 214 and SP 710 218 showed unimproved calcareous grassland (020_PH2_075003, see Table 24) - CG6a *Avenula pubescens* grassland, *Dactylis glomerata*-*Briza media* sub-community. The sward only broadly conformed to this NVC type as it lacked meadow oat-grass (*Avenula pratensis*), and was dominated by the grasses red fescue and common bent. However, a number of calcicole dicotyledons were present (e.g. *Viola hirta* and *Hypericum perforatum*). Only a small area will be within the land required for the construction of the Proposed Scheme. This vegetation stand contains several indicator species, but is insufficiently diverse to qualify as a habitat of principal importance - lowland calcareous grassland.

Table 24 Frequency table for 020_PH2_075003

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
Bare	1	4	4	5	1	V
<i>Agrostis capillaris</i>	0	8	8	8	8	IV
<i>Festuca rubra</i>	5	2	6	7	0	IV
<i>Trifolium pratense</i>	4	2	0	4	2	IV
<i>Viola hirta</i>	5	0	4	1	2	IV
<i>Hypericum perforatum</i>	0	2	1	1	0	III
<i>Prunella vulgaris</i>	0	1	2	2	0	III
<i>Pseudoscleopodium purum</i>	8	0	7	6	0	III
<i>Ranunculus repens</i>	0	0	4	2	2	III
<i>Schedonorus arundinaceus</i>	0	8	4	5	0	III
<i>Carex flacca</i>	0	0	6	2	0	II
<i>Crataegus monogyna (regrowth)</i>	0	0	1	1	0	II
<i>Dactylis glomerata</i>	4	0	0	2	0	II
<i>Dactylorhiza fuchsii</i>	0	1	0	1	0	II
<i>Galium verum</i>	1	0	1	0	0	II
<i>Lolium perenne</i>	6	0	0	8	0	II
<i>Lotus corniculatus</i>	0	2	2	0	0	II

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Poa pratensis agg</i>	6	0	0	2	0	II
<i>Potentilla reptans</i>	1	0	0	2	0	II
<i>Prunus spinosa (suckers)</i>	4	2	0	0	0	II
<i>Rosa sp (regrowth)</i>	0	0	1	1	0	II
<i>Senecio erucifolius</i>	0	0	2	1	0	II
<i>Urtica dioica</i>	4	0	0	0	4	II
<i>Ajuga reptans</i>	0	0	0	5	0	I
<i>Arum maculatum</i>	0	0	0	0	1	I
<i>Galium aperine</i>	3	0	0	0	0	I
<i>Glechoma hederacea</i>	0	0	0	0	1	I
<i>Heracleum sphondylium</i>	0	2	0	0	0	I
<i>Holcus lanatus</i>	0	0	0	1	0	I
<i>Hypericum maculatum</i>	0	2	0	0	0	I
<i>Lathyrus pratensis</i>	4	0	0	0	0	I
<i>Mercurialis perennis</i>	0	2	0	0	0	I
<i>Pilosella officinarum</i>	0	0	7	0	0	I
<i>Plagiomnium undulatum</i>	5	0	0	0	0	I
<i>Plantago major</i>	0	0	0	1	0	I
<i>Poa trivialis</i>	6	0	0	0	0	I
<i>Primula veris</i>	4	0	0	0	0	I
<i>Rubus fruticosus agg</i>	0	0	0	0	1	I
<i>Trifolium repens</i>	0	0	1	0	0	I
<i>Veronica chamaedrys</i>	7	0	0	0	0	I
<i>Vicia sativa</i>	1	0	0	0	0	I

CFA13 Calvert, Steeple Claydon, Twyford and Chetwode

- 5.4.18 Vegetation qualifying for NVC survey in Calvert, Steeple Claydon, Twyford and Chetwode (CFA13) included examples at Calvert Jubilee Nature Reserve, Grebe Lake, Chetwode Priory, Church View Farm, and land to the east of Calvert. Those potentially subject to significant effects are described below.
- 5.4.19 Surveying in the land to the east of Calvert identified a mosaic of grassland communities (020_PH2_078004, see Table 25) which can be described as early-successional grasslands. The vegetation was not a close match for any single NVC

type but showed affinities to several different NVC communities including: MG1d *Arrhenatherum elatius* grassland, *Pastinaca sativa* sub-community; MG1e *Arrhenatherum elatius* grassland, *Centaurea nigra* sub-community; and MG5 *Cynosurus cristatus*-*Centaurea nigra* grassland. The site was designated for damp grassland habitat, but the whole site was cleared in 2012 and now shows signs of reversion to the original grassland community. The sward is dominated by red fescue, common bent and Yorkshire fog with occasional false oat-grass, sweet vernal-grass, crested dog's-tail and quaking grass (*Briza media*). Dominant dicotyledons include bird's-foot trefoil, dandelion (*Taraxacum officinale* agg.) and more occasional species include, agrimony (*Agrimonia eupatoria*) and chalk knapweed. This vegetation stand is wholly within the land required for the construction of the Proposed Scheme. It is within a LWS. Vegetation now recolonising the site may develop towards the type for which the site was originally designated (it includes some of the species on the original designation), it does not currently qualify as a habitat of principal importance but may regain its status as such.

Table 25 Frequency table for o2o_PH2_078004

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Agrostis capillaris</i>	1	2	6	2	1	V
<i>Crataegus monogyna</i>	2	1	3	2	2	V
<i>Festuca rubra</i>	8	1	6	4	1	V
<i>Holcus lanatus</i>	5	8	6	2	1	V
<i>Lotus corniculatus</i>	4	2	2	5	3	V
<i>Taraxacum</i> agg.	1	1	1	2	1	V
<i>Cirsium palustre</i>	1	0	1	1	1	IV
<i>Poa pratensis</i> s.l.	0	5	4	1	5	IV
<i>Rosa canina</i> agg	1	1	0	1	1	IV
<i>Trifolium pratense</i>	0	1	2	1	1	IV
<i>Carex flacca</i>	0	0	1	8	5	III
<i>Carex otrubae</i>	1	1	2	0	0	III
<i>Dactylis glomerata</i>	2	4	1	0	1	III
<i>Myosotis arvensis</i>	2	1	2	0	0	III
<i>Potentilla reptans</i>	3	1	3	0	0	III
<i>Senecio viscosus</i>	0	0	1	1	2	III
<i>Agrimonia eupatoria</i>	0	0	0	1	1	II
<i>Anthoxanthum odoratum</i>	0	0	0	5	6	II
<i>Arrhenatherum elatius</i>	4	4	0	0	0	II
<i>Briza media</i>	0	0	2	3	2	II

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Cerastium fontanum</i>	1	0	2	0	0	II
<i>Epilobium montanum</i>	0	1	2	0	0	II
<i>Hypericum perforatum</i>	3	1	0	0	0	II
<i>Lathyrus nissolia</i>	0	1	1	0	0	II
<i>Lathyrus pratensis</i>	0	1	1	0	5	II
<i>Medicago lupulina</i>	5	0	2	0	0	II
<i>Quercus robur seedling</i>	0	1	0	1	0	II
<i>Ranunculus repens</i>	0	0	1	1	0	II
<i>Rubus fruticosus agg.</i>	3	2	0	0	0	II
<i>Senecio jacobaea</i>	1	1	0	0	0	II
<i>Vicia sativa</i>	1	1	0	0	0	II
<i>Bromus hordeaceus</i>	2	0	0	0	0	I
<i>Centaurea debeauxii</i>	0	0	0	0	6	I
<i>Cynosurus cristatus</i>	0	0	0	2	0	I
<i>Epilobium hirsutum</i>	0	0	1	0	0	I
<i>Fragaria vesca</i>	0	1	0	0	0	I
<i>Geranium molle</i>	1	0	0	0	0	I
<i>Glechoma hederacea</i>	0	1	0	0	0	I
<i>Luzula campestris</i>	1	0	0	0	0	I
<i>Melilotus sp.</i>	0	0	1	0	0	I
<i>Picris hieracioides</i>	0	1	0	0	0	I
<i>Plantago lanceolata</i>	0	0	0	1	0	I
<i>Pulicaria dysenterica</i>	0	0	1	0	0	I
<i>Ranunculus acris</i>	0	0	0	2	0	I
<i>Rumex crispus</i>	0	0	1	0	0	I
<i>Scrophularia nodosa</i>	0	1	0	0	0	I
<i>Veronica officinalis</i>	0	1	0	0	0	I

5.4.20 Surveying at Calvert Jubilee Nature Reserve identified the following:

- woodland mosaic (020_PH2_079001, see Table 26)- W8d *Fraxinus excelsior*-*Acer campestre*-*Mercurialis perennis* woodland *Hedera helix* sub-community and W10c *Quercus robur*-*Pteridium aquilinum*-*Rubus fruticosus* woodland

Hedera helix sub-community. The canopy is dominated by pedunculate oak but ash is locally dominant in some areas. The shrub layer is comprised of bramble, field rose and hawthorn. The ground flora layer contained woodland edge species such as greater stitchwort and black bryony. This vegetation stand is a CWS and qualifies as a habitat of principal importance - lowland mixed deciduous woodland (Natural England GIS data and confirmed by field surveys);

- dense scrub (020_PH2_079002, see Table 27) - W21a *Crataegus monogyna-Hedera helix scrub, Hedera helix-Urtica dioica* sub-community. The canopy is dominated by oak and mature ash. The shrub layer contains species indicative of shaded wood banks including greater stitchwort (*Stellaria hollostea*) and black bryony (*Tamus communis*). Some areas have a more ash dominated canopy and less species-rich shrub layer. This vegetation stand is a LWS. The stand was species-rich and would qualify as a habitat of principal importance;
- dense scrub (020_PH2_079003, see Table 28) - W21a *Crataegus monogyna-Hedera helix scrub, Hedera helix-Urtica dioica* sub-community. This habitat is primarily dominated by grey willow (*Salix cinerea*) and hawthorn of about 5 to 7 meters in height with a diverse ground flora assemblage indicative of wet conditions including wild angelica and marsh thistle;
- neutral to calcareous grassland (020_PH2_079004, see Table 29) - this vegetation was not a close match for any NVC community and not overlying limestone soils although it has affinities to several calcareous grassland NVC types, including CG2, CG3 and CG44. The vegetation was rich in broad leaved species such as birds-foot trefoil and wild strawberry and had a high cover of sedges including *glaucous* sedge. Anthills in the stand supports species such as heath speedwell (*Veronica officinalis*), blue fleabane (*Erigeron acris*) and eyebright (*Euphrasia nemorosa* agg.). Approximately a third of the stand will be within land required for the construction of the Proposed Scheme. This vegetation stand is a LWS; and

5.4.21 neutral to calcareous grassland and scrub mosaic (020_PH2_079005, see Table 30, Table 31 and Table 32) - including areas of W22a *Prunus spinosa-Rubus fruticosus scrub, Hedera helix-Silene dioica* sub-community with grassland showing affinities to MG1e *Arrhenatherum elatius* grassland, *Centaurea nigra* sub-community but it is not overlying limestone soils and it is not a good match to this NVC type. Areas of grassland referable to MG9a *Holcus lanatus-Deschampsia cespitosa* grassland, *Poa trivialis* sub-community were also present. Grassland areas are dominated by false oat-grass (*Arrhenatherum elatius*), with Yorkshire fog, and occasional yellow oat-grass, sweet vernal-grass and crested dog's-tail. There is a rich assemblage of broad leaved species some of which are indicative of calcareous, unimproved conditions, including abundant lady's bedstraw, bird's-foot trefoil, selfheal, agrimony, fairy flax (*Linum catharticum*) and common spotted orchid (*Dactylorhiza fuchsii*). A small section of this vegetation will be within land required for the construction of the Proposed Scheme. This vegetation stand is a LWS. As early-successional grassland it does not qualify as a habitat of principal importance. However, on account of its species-rich flora and naturalness, it is of comparable nature conservation value.

Table 26: Frequency table for o2o_PH2_079001 (low species diversity; 2 quadrats taken).

Species	Quadrat locations		Frequency
	Q1	Q2	
<i>Arrhenatherum elatius</i>	5	1	II
<i>Bromopsis ramosa</i>	5	2	II
<i>Chaerophyllum temulum</i>	1	2	II
<i>Crataegus monogyna</i>	5	4	II
<i>Deschampsia cespitosa</i>	4	4	II
<i>Fraxinus excelsior</i>	5	8	II
<i>Geum urbanum</i>	2	4	II
<i>Glechoma hederacea</i>	4	2	II
<i>Hedera helix</i>	6	5	II
<i>Holcus lanatus</i>	2	2	II
<i>Myosotis sylvatica</i>	4	4	II
<i>Poa trivialis</i>	3	5	II
<i>Prunus spinosa</i>	1	1	II
<i>Quercus robur</i>	9	5	II
<i>Rosa arvensis</i>	5	3	II
<i>Rubus fruticosus agg.</i>	3	3	II
<i>Stellaria holostea</i>	0	4	II
<i>Acer pseudoplatanus</i>	1	0	I
<i>Arum maculatum</i>	2	0	I
<i>Dactylorhiza fuchsii</i>	0	2	I
<i>Dryopteris filix-mas</i>	2	0	I
<i>Fragaria vesca</i>	0	4	I
<i>Galium aparine</i>	4	0	I
<i>Lonicera periclymenum</i>	1	1	I
<i>Rumex sanguineus</i>	0	3	I
<i>Sambucus nigra</i>	2	0	I
<i>Stellaria media</i>	0	1	I
<i>Tamus communis</i>	0	1	I
<i>Urtica dioica</i>	4	0	I

Table 27: Frequency table for o2o_PH2_079002 (low species diversity; 1 quadrat taken).

Species	Quadrat locations	Frequency
	Q1	
<i>Crataegus monogyna</i>	8	
<i>Poa trivialis</i>	8	
<i>Moss sp.</i>	7	
<i>Angelica sylvestris</i>	5	
<i>Rumex sanguineus</i>	5	
<i>Salix cinerea</i>	5	
<i>Urtica dioica</i>	5	
<i>Dryopteris dilatata</i>	4	
<i>Epilobium tetragonum</i>	4	
<i>Galium aparine</i>	4	
<i>Cirsium palustre</i>	3	
<i>Moehringia trinervia</i>	3	
<i>Myosotis sylvatica</i>	3	
<i>Rubus fruticosus agg.</i>	3	
<i>Veronica chamaedrys</i>	3	
<i>Arum maculatum</i>	2	
<i>Dryopteris filix-mas</i>	2	
<i>Geum urbanum</i>	2	
<i>Rosa canina</i>	2	
<i>Holcus lanatus</i>	1	

Table 28: Frequency table for o2o_PH2_079003 (low species diversity; 1 quadrat taken).

Species	Quadrat locations	Frequency
	Q1	
<i>Brachypodium sylvaticum</i>	9	
<i>Fraxinus excelsior</i>	7	
<i>Crataegus monogyna</i>	5	
<i>Arctium minus</i>	4	
<i>Arum maculatum</i>	3	
Bare	3	
<i>Epilobium montanum</i>	3	

Species	Quadrat locations		Frequency
	Q1		
<i>Fragaria vesca</i>	3		I
<i>Holcus lanatus</i>	3		I
<i>Potentilla reptans</i>	3		I
<i>Circaea lutetiana</i>	2		I
<i>Galium aparine</i>	2		I
<i>Lolium perenne</i>	2		I
<i>Moehringia trinervia</i>	2		I
<i>Prunus spinosa</i>	2		I
<i>Ranunculus repens</i>	2		I
<i>Rubus fruticosus agg.</i>	2		I
<i>Rumex sanguineus</i>	2		I
<i>Urtica dioica</i>	2		I
<i>Dactylorhiza fuchsii</i>	1		I
<i>Dryopteris filix-mas</i>	1		I
<i>Myosotis sylvatica</i>	1		I
<i>Quercus robur</i>	1		I

Table 29: Frequency table for o2o_PH2_079004

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Carex flacca</i>	7	7	7	4	7	V
<i>Crataegus monogyna</i>	4	3	4	1	4	V
<i>Lotus corniculatus</i>	8	8	7	1	7	V
<i>Prunella vulgaris</i>	5	5	4	1	4	V
<i>Pseudoscleropodium purum</i>	7	5	7	5	7	V
<i>Rosa canina</i>	1	1	1	1	1	V
Bare	4	2	0	9	1	IV
<i>Cirsium palustre</i>	1	1	1	2	0	IV
<i>Potentilla reptans</i>	7	5	0	5	4	IV
<i>Senecio jacobaea</i>	1	1	1	1	0	IV
<i>Agrostis capillaris</i>	0	0	4	9	1	III
<i>Erigeron acris</i>	1	2	1	0	0	III

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Euphrasia nemorosa</i> (agg)	2	0	0	2	1	III
<i>Leontodon hispidus</i>	1	1	1	0	0	III
<i>Rhytiadelphus squarrosus</i>	7	0	7	0	5	III
<i>Rubus fruticosus</i> (agg)	4	4	0	0	1	III
<i>Senecio erucifolius</i>	0	1	4	0	0	III
<i>Bellis perennis</i>	1	3	0	0	0	II
<i>Centaureum erythraea</i>	0	2	1	0	0	II
<i>Heiracium</i> sp.	0	1	0	0	1	II
<i>Linum catharticum</i>	1	0	2	0	0	II
<i>Plantago major</i>	1	1	0	0	0	II
<i>Veronica officinalis</i>	1	1	0	0	0	II
<i>Veronica serpyllifolia</i>	1	0	0	2	0	II
<i>Blackstonia perfoliata</i>	0	1	0	0	0	I
<i>Brachypodium sylvaticum</i>	0	1	0	0	0	I
<i>Cirsium arvense</i>	0	0	1	0	0	I
<i>Cirsium vulgare</i>	0	1	0	0	0	I
<i>Cladonia furcata</i>	0	0	4	0	0	I
<i>Fragaria vesca</i>	0	1	0	0	0	I
<i>Holcus lanatus</i>	0	0	1	0	0	I
<i>Juncus inflexus</i>	0	0	0	1	0	I
<i>Medicago lupulina</i>	0	0	4	0	0	I
<i>Pulicaria dysenterica</i>	1	0	0	0	0	I
<i>Ranunculus repens</i>	1	0	0	0	0	I
<i>Salix cinerea</i>	1	0	0	0	0	I
<i>Viola hirta</i>	0	2	0	0	0	I

Table 30: Frequency table for o20_PH2_079005

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Holcus lanatus</i>	4	5	3	4	6	V
<i>Potentilla reptans</i>	3	4	5	6	6	V
<i>Lotus corniculatus</i>	7	4	6	0	4	IV

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Plantago lanceolata</i>	2	4	7	2	0	IV
<i>Centaurea debeauxii</i>	5	6	0	5	4	IV
<i>Rubus fruticosus</i> agg. (g)	2	2	6	4	0	IV
<i>Festuca rubra</i>	4	3	3	0	5	IV
<i>Galium verum</i>	3	3	2	0	5	IV
<i>Arrhenatherum elatius</i>	0	4	1	5	5	IV
<i>Prunella vulgaris</i>	4	1	1	5	0	IV
<i>Linum catharticum</i>	3	2	1	2	0	IV
<i>Dactylorhiza fuchsii</i>	2	2	2	0	2	IV
<i>Agrimonia eupatoria</i>	2	5	0	0	1	III
<i>Carex flacca</i>	3	3	0	0	4	III
<i>Anthoxanthum odoratum</i>	2	4	0	0	1	III
<i>Senecio erucifolius</i>	3	0	0	1	2	III
<i>Dactylis glomerata</i>	2	0	1	1	0	III
<i>Daucus carota</i> ssp. <i>carota</i>	0	0	4	4	0	II
<i>Hypericum perforatum</i>	4	4	0	0	0	II
<i>Lathyrus pratensis</i>	0	0	4	0	4	II
<i>Trisetum flavescens</i>	4	3	0	0	0	II
<i>Schedonorus arundinaceus</i>	1	0	4	0	0	II
<i>Crepis capillaris</i>	0	0	2	3	0	II
<i>Trifolium repens</i>	0	3	0	0	1	II
<i>Crataegus monogyna</i> (g)	2	2	0	0	0	II
<i>Leontodon hispidus</i>	2	2	0	0	0	II
<i>Ranunculus acris</i>	1	2	0	0	0	II
<i>Leucanthemum vulgare</i>	0	0	1	1	0	II
<i>Poa trivialis</i>	0	0	0	1	1	II
<i>Primula veris</i>	5	0	0	0	0	I
<i>Cirsium vulgare</i>	0	0	0	4	0	I
<i>Fragaria vesca</i>	0	0	0	4	0	I
<i>Achillea millefolium</i>	0	3	0	0	0	I
<i>Agrostis stolonifera</i>	0	3	0	0	0	I
<i>Brachypodium sylvaticum</i>	3	0	0	0	0	I

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Bromus commutatus</i>	0	0	0	3	0	I
<i>Epilobium obscurum</i>	0	0	0	3	0	I
<i>Medicago lupulina</i>	2	0	0	0	0	I
<i>Rosa canina (g)</i>	2	0	0	0	0	I
<i>Agrostis capillaris</i>	0	0	0	0	1	I
<i>Centaurium erythraea</i>	1	0	0	0	0	I
<i>Cynosurus cristatus</i>	0	1	0	0	0	I
<i>Deschampsia cespitosa</i>	0	1	0	0	0	I
<i>Euphrasia nemorosa</i>	1	0	0	0	0	I
<i>Geranium dissectum</i>	0	0	0	1	0	I
<i>Heracleum sphondylium</i>	0	0	0	0	1	I
<i>Poa humilis</i>	0	0	1	0	0	I
<i>Ranunculus repens</i>	0	0	1	0	0	I
<i>Veronica arvensis</i>	0	0	0	1	0	I
<i>Vicia tetrasperma</i>	0	0	1	0	0	I

Matching coefficients: MG1e (56.2), MG5 (48.9), MG1 (48.1), MG5b (47.4), MG5a (47.3), MG9b (46.4), CG6 undifferentiated (46.2), MG9 (46.2), MG1a (45.9), CG4c (45.5)

Table 31: Frequency table for o2o_PH2_079005

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Deschampsia cespitosa</i>	6	9	4	4	7	V
<i>Holcus lanatus</i>	4	4	4	8	4	V
<i>Rubus fruticosus agg. (g)</i>	4	6	4	4	5	V
<i>Potentilla reptans</i>	0	2	4	6	3	IV
<i>Lathyrus pratensis</i>	3	0	2	4	2	IV
<i>Dactylorhiza fuchsii</i>	1	0	1	3	1	IV
<i>Carex flacca</i>	0	0	6	4	4	III
<i>Schedonorus arundinaceus</i>	6	4	4	0	0	III
<i>Centaurea debeauxii</i>	2	0	4	0	3	III
<i>Stellaria graminea</i>	3	2	0	1	0	III
<i>Arrhenatherum elatius</i>	5	0	8	0	0	II
<i>Juncus conglomeratus</i>	0	0	0	4	8	II

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Dactylis glomerata</i>	3	0	4	0	0	II
<i>Festuca rubra</i>	0	0	2	4	0	II
<i>Cirsium arvense</i>	4	0	0	1	0	II
<i>Anthoxanthum odoratum</i>	0	0	0	3	3	II
<i>Plantago lanceolata</i>	3	0	0	1	0	II
<i>Agrostis capillaris</i>	0	0	2	0	1	II
<i>Silaum silaus</i>	1	0	0	2	0	II
<i>Ranunculus repens</i>	1	0	0	1	0	II
<i>Poa trivialis</i>	3	0	0	0	0	I
<i>Alopecurus pratensis</i>	2	0	0	0	0	I
<i>Crataegus monogyna (g)</i>	0	0	2	0	0	I
<i>Hypericum perforatum</i>	0	2	0	0	0	I
<i>Hypericum tetrapterum</i>	0	0	0	0	2	I
<i>Vicia tetrasperma</i>	2	0	0	0	0	I
<i>Agrimonia eupatoria</i>	1	0	0	0	0	I
<i>Bromus commutatus</i>	0	1	0	0	0	I
<i>Danthonia decumbens</i>	0	0	0	0	1	I
<i>Lotus corniculatus</i>	0	0	1	0	0	I
<i>Prunella vulgaris</i>	0	0	0	0	1	I
<i>Rumex acetosa</i>	0	1	0	0	0	I
<i>Rumex crispus</i>	0	0	0	1	0	I
<i>Senecio erucifolius</i>	0	1	0	0	0	I
<i>Vicia cracca</i>	0	0	0	0	1	I

Table 32: Frequency table for o20_PH2_079005

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Arrhenatherum elatius</i>	8	4	9	4	8	V
<i>Potentilla reptans</i>	1	6	6	6	3	V
<i>Poa trivialis</i>	4	3	4	5	4	V
<i>Holcus lanatus</i>	0	8	3	9	5	IV

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Urtica dioica</i>	8	0	2	4	2	IV
<i>Veronica chamaedrys</i>	0	5	1	1	1	IV
<i>Galium aparine</i>	6	0	0	4	1	III
<i>Rubus fruticosus</i> agg. (g)	2	0	0	4	2	III
<i>Dactylis glomerata</i>	2	1	0	0	4	III
<i>Brachypodium sylvaticum</i>	0	2	0	1	3	III
<i>Cirsium vulgare</i>	0	1	1	0	2	III
<i>Galium verum</i>	0	6	0	0	5	II
<i>Trifolium repens</i>	0	1	5	0	0	II
<i>Stellaria graminea</i>	2	0	4	0	0	II
<i>Hypericum perforatum</i>	2	0	0	0	2	II
<i>Ranunculus repens</i>	1	0	0	0	1	II
<i>Hypericum hirsutum</i>	0	0	0	5	0	I
<i>Anthoxanthum odoratum</i>	0	4	0	0	0	I
<i>Crepis capillaris</i>	0	4	0	0	0	I
<i>Senecio jacobaea</i>	0	4	0	0	0	I
<i>Trisetum flavescens</i>	0	0	3	0	0	I
<i>Cirsium palustre</i>	0	0	0	0	2	I
<i>Crataegus monogyna</i> (g)	0	0	0	0	2	I
<i>Lotus corniculatus</i>	0	0	0	0	2	I
<i>Agrostis capillaris</i>	0	1	0	0	0	I
<i>Cirsium arvense</i>	1	0	0	0	0	I
<i>Epilobium montanum</i>	0	0	0	0	1	I
<i>Glechoma hederacea</i>	0	1	0	0	0	I
<i>Heracleum sphondylium</i>	0	0	0	1	0	I
<i>Myosotis arvensis</i>	1	0	0	0	0	I
<i>Torilis japonica</i>	0	0	0	0	1	I
<i>Vicia cracca</i>	0	0	0	1	0	I
<i>Viola hirta</i>	0	1	0	0	0	I
<i>Viola riviniana</i>	0	0	0	0	1	I

Matching coefficients: MG1c (52.2), MG1b (51.3), W24 (50.2), W24a (48.9), MG1 (48.9), MG1a (44.3), W24b (42.8), OV27b (41.4), SD9a (41.3), MG1e (41.3)

5.4.22

5.4.23 Surveying at Grebe Lake showed:

5.4.24 neutral to calcareous grassland (020_PH2_080002, see Table 33) which is not adequately described in the NVC. It has loose affinities with CG2 *Festuca ovina-Avenula pratensis* grassland but it is not underlying limestone soils and it is a poor fit for this NVC type. The vegetation is dominated by glaucous sedge, with abundant bird's-foot trefoil, red clover (*Trifolium pratense*) and common spotted orchid throughout. Species indicative of moist soils are also present, including hairy sedge (*Carex hirta*), hard rush (*Juncus inflexus*) and common fleabane (*Pulicaria dysenterica*). There are also patches of scattered hawthorn and bramble scrub with small ash saplings. The edges of the stand will be within the land required for the construction of the Proposed Scheme. This vegetation stand is part of the qualifying feature for the LWS designation. It does not qualify as a habitat of principal importance as it is a vegetation type not adequately described in the NVC. However, on account of its species-rich flora and naturalness, it is of comparable nature conservation value; and

5.4.25 neutral to calcareous grassland 020_PH2_080005, see Table 34 and 020_PH2_080006, see Table 35) which is not adequately described by the NVC. It has loose affinities to CG7d *Festuca ovina-Hieracium pilosella-Thymus praecox/pulegioides* grassland but it is not underlying limestone soils and it is a poor fit for this NVC type. The vegetation is dominated by broad leaved species (including many calcareous indicators), with frequent seedlings of small shrubs. Hairy violet (*Viola hirta*), wild strawberry and fairy flax are the dominant broad leaved species, with yellow-wort occurring less frequently in one of the stands. The edges of stand will be within the land required for the construction of the Proposed Scheme. This vegetation stand forms part of Calvert Brick Pits LWS. It does not qualify as a habitat of principal importance as it is a vegetation type not adequately described in the NVC. However, on account of its species-rich flora and naturalness, it is of comparable nature conservation value.

Table 33 Frequency table for 020_PH2_080002

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Carex flacca</i>	8	8	9	9	8	V
<i>Lotus corniculatus</i>	1	1	4	3	3	V
<i>Potentilla reptans</i>	4	2	1	3	4	V
<i>Carex hirta</i>	2	2	2	1	0	IV
<i>Cirsium palustre</i>	0	2	1	2	4	IV
<i>Dactylorhiza fuchsii</i>	2	1	1	0	1	IV
<i>Poa trivialis</i>	2	0	3	4	4	IV
<i>Centaurea debeauxii</i>	3	1	0	0	2	III
<i>Cynosurus cristatus</i>	2	1	0	0	2	III
<i>Glechoma hederacea</i>	1	0	2	0	1	III
<i>Juncus inflexus</i>	0	5	1	0	1	III

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Ranunculus repens</i>	1	5	3	0	0	III
<i>Trifolium repens</i>	4	4	1	0	0	III
<i>Calliergonella cuspidata</i>	0	4	1	0	0	II
<i>Cerastium fontanum</i>	0	2	0	0	1	II
<i>Crataegus monogyna</i>	0	0	1	0	2	II
<i>Festuca rubra</i>	1	0	0	0	4	II
<i>Prunella vulgaris</i>	1	0	0	0	1	II
<i>Ranunculus acris</i>	1	0	0	0	2	II
<i>Rosa sp.</i>	0	0	1	0	2	II
<i>Rubus fruticosus agg.</i>	0	0	2	2	0	II
<i>Agrimonia eupatoria</i>	0	0	0	2	0	I
<i>Anthoxanthum odoratum</i>	0	0	4	0	0	I
<i>Bellis perennis</i>	1	0	0	0	0	I
<i>Fraxinus excelsior</i>	0	0	1	0	0	I
<i>Holcus lanatus</i>	3	0	0	0	0	I
<i>Hypericum perforatum</i>	1	0	0	0	0	I
<i>Plantago lanceolata</i>	1	0	0	0	0	I
<i>Pulicaria dysenterica</i>	0	0	0	2	0	I
<i>Salix sp.</i>	0	1	0	0	0	I
<i>Senecio jacobaea</i>	1	0	0	0	0	I
<i>Small acrocarp ous moss</i>	1	0	0	0	0	I
<i>Stellaria media</i>	2	0	0	0	0	I
<i>Veronica arvensis</i>	1	0	0	0	0	I

Table 34. Frequency table for o2o_PH2_o80005

Species	Quadrat locations										Frequency
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	
<i>Lichen sp.</i>	9	5	0	7	0	0	6	7	5	0	VI
<i>Dipsacus fullonum</i>	1	1	2	1	2	2	1	1	1	1	X
<i>Erigeron acris</i>	2	3	3	2	2	2	1	1	2	5	X
<i>Fragaria vesca</i>	4	4	5	3	5	1	1	3	3	4	X
<i>Rosa sp.</i>	1	1	1	1	1	1	1	1	1	2	X

Species	Quadrat locations										Frequency
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	
<i>Viola hirta</i>	3	2	5	3	8	5	6	7	3	4	X
<i>Bellis perennis</i>	1	1	1	1	1	3	1	0	1	3	IX
<i>Crataegus monogyna</i>	1	1	1	4	2	0	1	2	2	2	IX
<i>Linum catharticus</i>	3	1	2	0	1	3	3	3	1	3	IX
<i>Lotus corniculatus</i>	2	2	1	0	2	5	6	5	3	2	IX
<i>Pleurocarpous moss</i>	0	2	5	2	4	4	1	3	2	6	IX
<i>Rubus fruticosus agg.</i>	1	2	2	1	3	0	2	1	2	2	IX
<i>Veronica arvensis</i>	1	1	2	2	1	1	1	2	0	1	IX
Bare	2	4	1	2	5	1	0	0	8	7	VIII
<i>Prunella vulgaris</i>	1	0	0	1	1	1	1	0	1	2	VII
<i>Cirsium arvense</i>	1	1	0	0	0	1	0	1	2	0	V
<i>Cirsium vulgare</i>	0	1	1	1	0	1	1	0	0	0	V
<i>Potentilla reptans</i>	0	0	0	0	4	5	1	1	0	1	V
<i>Senecio jacobaea</i>	1	1	2	1	2	3	3	2	1	2	V
<i>Centaureum erythraea</i>	2	0	0	0	1	0	0	0	1	2	IV
<i>Cirsium palustre</i>	1	0	0	0	1	0	0	1	0	1	IV
<i>Achillea millefolium</i>	0	3	3	1	0	0	0	0	0	0	III
<i>Agrimonia eupatoria</i>	0	1	1	0	0	0	0	0	1	0	III
<i>Myosotis arvensis</i>	0	0	0	2	0	2	1	0	0	0	III
<i>Ranunculus repens</i>	2	2	0	0	0	0	0	0	0	2	III
<i>Trifolium repens</i>	0	0	1	0	0	1	1	0	0	0	III
<i>Viola riviniana</i>	0	3	0	0	0	0	0	0	2	0	III
<i>Picris hieracioides</i>	0	0	1	0	1	0	0	0	0	0	II
<i>Acrocarp moss</i>	0	8	0	0	0	0	0	0	0	0	I
<i>Centaurea debeauxii</i>	0	2	0	0	0	0	0	0	0	0	I
<i>Festuca rubra</i>	0	1	0	0	0	0	0	0	0	0	I
<i>Prunus spinosa</i>	1	0	0	0	0	0	0	0	0	0	I

Table 35 Frequency table for o2o_PH2_o80006 (low species diversity; 3 quadrats taken).

Species	Quadrat locations			Frequency
	Q1	Q2	Q3	
<i>Bellis perennis</i>	2	2	2	III

Species	Quadrat locations			Frequency
	Q1	Q2	Q3	
<i>Centaureum erythraea</i>	1	1	1	III
<i>Crataegus monogyna</i>	2	1	1	III
<i>Erigeron acris</i>	5	5	5	III
<i>Fragaria vesca</i>	3	4	2	III
<i>Linum catharticum</i>	3	3	3	III
<i>Lotus corniculatus</i>	4	1	1	III
<i>Pleurocarpous moss</i>	4	5	3	III
<i>Potentilla reptans</i>	4	2	2	III
<i>Rosa sp.</i>	2	3	3	III
<i>Senecio jacobaea</i>	3	4	1	III
<i>Veronica arvensis</i>	1	3	2	III
<i>Viola hirta</i>	6	5	6	III
<i>Agrimonia eupatoria</i>	0	1	1	II
<i>Cirsium palustre</i>	1	1	0	II
<i>Glechoma hederacea</i>	2	2	0	II
<i>Myosotis arvensis</i>	1	0	2	II
<i>Rubus fruticosus agg.</i>	0	5	4	II
<i>Trifolium repens</i>	2	1	0	II
Bare	0	0	8	I
<i>Blackstonia perfoliata</i>	0	1	0	I
<i>Carex flacca</i>	3	0	0	I
<i>Centaurea nigra</i>	2	0	0	I
<i>Cirsium arvense</i>	1	0	0	I
<i>Cirsium vulgare</i>	0	1	0	I
<i>Dipsacus fullonum</i>	1	0	0	I
<i>Holcus lanatus</i>	0	1	0	I
<i>Poa annua</i>	1	0	0	I
<i>Ranunculus repens</i>	0	1	0	I

5.4.26 Surveying at Church View Farm identified:

- semi-improved neutral grassland (o2o_PH2_o82001, see Table 36) - MG1e *Arrhenatherum elatius* grassland, *Centaurea nigra* sub-community. This

unmanaged tussocky grassland is dominated by false oat-grass and cock's-foot with frequent yellow oat-grass. There is moderate species diversity including lady's bedstraw, yarrow, chalk knapweed and upright hedge parsley (*Torilis japonica*). All of this vegetation will be within the land required for the construction of the Proposed Scheme. This vegetation lack sufficient diversity to qualify as a habitat of principal importance. It is a designated feature of a Railway cutting, north of Twyford BNS site;

- scrub (o2o_PH2_o82002, see Table 37) - W21a *Crataegus monogyna*-*Hedera helix* scrub, *Hedera helix*-*Urtica dioica* sub-community. It is dominated by hawthorn, with frequent Midland hawthorn (*Crataegus laevigata*), blackthorn (*Prunus spinosa*) and field rose. There is a species-poor ground flora. The whole of the stand will be within the land required for the Proposed Scheme; and
- semi-improved neutral grassland (o2o_PH2_o82003, see Table 38) - MG6a *Lolium perenne*-*Cynosurus cristatus* grassland, typical sub-community. The vegetation is dominated by grasses, including crested dog's-tail, creeping bent (*Agrostis stolonifera*), Yorkshire fog, meadow foxtail and perennial rye grass (*Lolium perenne*). There are few broad leaved species in the stand. This vegetation stand is within the LWS (Northants data and confirmed by field surveys) but does not qualify as a habitat of principal importance.

Table 36 Frequency table for o2o_PH2_o82001

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Arrhenatherum elatius</i>	7	9	8	8	9	V
<i>Agrostis stolonifera</i>	7	4	2	0	7	IV
<i>Dactylis glomerata</i>	2	4	5	6	0	IV
<i>Plantago lanceolata</i>	1	2	2	3	0	IV
<i>Vicia cracca</i>	2	3	2	2	0	IV
<i>Achillea millefolium</i>	1	2	0	0	2	III
<i>Holcus lanatus</i>	5	3	0	0	4	III
<i>Phleum pratense</i>	1	1	0	3	4	III
<i>Ranunculus repens</i>	0	0	2	1	4	III
<i>Rubus fruticosus</i> agg. (G)	4	4	4	0	0	III
<i>Torilis japonica</i>	0	3	3	0	4	III
<i>Trisetum flavescens</i>	4	3	0	0	1	III
<i>Agrimonia eupatoria</i>	2	0	1	0	0	II
<i>Centaurea debeauxii</i>	0	0	4	4	0	II
<i>Deschampsia cespitosa</i>	0	0	4	4	0	II
<i>Galium verum</i>	4	5	0	0	0	II

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Heracleum sphondylium</i>	0	0	1	2	0	II
<i>Potentilla reptans</i>	0	0	3	3	0	II
<i>Prunus spinosa</i> (G)	0	2	0	0	2	II
<i>Rumex sanguineus</i>	0	0	3	3	0	II
<i>Veronica chamaedrys</i>	3	3	0	0	0	II
<i>Cirsium vulgare</i>	2	0	0	0	0	I
<i>Crataegus monogyna</i>	0	0	0	2	0	I
<i>Epilobium hirsutum</i>	0	0	0	1	0	I
<i>Rosa arvensis</i>	0	0	2	0	0	I
<i>Schedonorus arundinaceus</i>	0	0	0	0	3	I
<i>Stellaria graminea</i>	0	0	0	0	2	I
<i>Urtica dioica</i>	0	0	4	0	0	I

Table 37 Frequency table for o2o_PH2_o82002

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Crataegus monogyna</i>	9	9	8	7	9	V
<i>Rubus fruticosus</i> agg. (G)	5	4	4	5	7	V
<i>Arrhenatherum elatius</i>	3	0	3	3	5	IV
<i>Crataegus laevigata</i>	4	2	5	4	0	IV
<i>Prunus spinosa</i>	2	4	6	8	0	IV
<i>Cirsium vulgare</i>	2	1	0	0	2	III
<i>Dactylis glomerata</i>	2	0	1	0	5	III
<i>Rosa arvensis</i>	2	1	0	2	2	III
<i>Rosa canina</i>	0	0	0	3	4	II
<i>Urtica dioica</i>	2	0	0	0	4	II
<i>Fraxinus excelsior</i>	0	1	0	0	0	I
<i>Malus pumila</i>	0	0	0	0	1	I
<i>Quercus robur</i>	0	1	0	0	0	I
<i>Stachys sylvatica</i>	0	0	0	0	3	I
<i>Torilis japonica</i>	0	0	0	0	3	I
<i>Vicia sepium</i>	0	0	3	0	0	I

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Malus domestica</i>	0	0	0	0	1	I
<i>Rumex sanguineus</i>	0	0	0	0	2	I
<i>Sambucus nigra</i>	0	0	0	0	1	I

Table 38 Frequency table for 020_PH2_082003

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Agrostis stolonifera</i>	6	7	9	6	7	V
<i>Cynosurus cristatus</i>	6	3	2	5	8	V
<i>Holcus lanatus</i>	6	6	4	6	7	V
<i>Cirsium arvense</i>	0	3	2	2	2	IV
<i>Phleum pratense</i>	4	3	3	3	0	IV
<i>Anthoxanthum odoratum</i>	4	5	0	6	0	III
<i>Brachytecium rutabulum</i>	3	2	2	0	0	III
<i>Cerastium fontanum</i>	3	1	1	0	0	III
<i>Deschampsia cespitosa</i>	4	1	0	4	0	III
<i>Dactylis glomerata</i>	0	0	2	0	0	I
<i>Festuca rubra</i>	0	0	4	0	0	I
<i>Hypochaeris radicata</i>	0	0	0	0	3	I
<i>Lolium perenne</i>	0	0	0	0	2	I
<i>Lotus corniculatus</i>	0	0	0	0	2	I
<i>Ranunculus acris</i>	3	0	0	0	0	I
<i>Rumex acetosa</i>	0	0	0	0	1	I
<i>Trifolium repens</i>	0	0	0	0	5	I

CFA14 Newton Purcell to Brackley

5.4.27 Vegetation qualifying for an NVC survey in Newton Purcell to Brackley (CFA14) included Helmdon Disused Railway Line SSSI, farmland south of Radstone village, land at Radstone Cottage, Finmere Quarry and land at Newton Purcell station. Habitats potentially subject to significant effects are described below.

5.4.28 Surveying at Helmdon Disused Railway Line SSSI showed:

- mosaic vegetation (020_PH2_098004, see Table 39) - W21a *Crataegus monogyna*-*Hedera helix* scrub, *Hedera helix*-*Urtica dioica* sub-community and

CG3b *Bromus erectus* (*Bromopsis erectus*) grassland, *Centaurea nigra* sub-community. The grassland is dominated by upright brome (*Bromopsis erectus*) and glaucous sedge (*Carex flacca*). Hawthorn is invading the CG3 grassland from the W21a community. A small section of stand will be within the land required for the construction of the Proposed Scheme. The grassland elements qualify as a habitat of principal importance - lowland calcareous grassland (Natural England GIS data and confirmed by field surveys);

- tall ruderal vegetation (020_PH2_098007, see Table 40) - two communities were recorded: OV24a *Urtica dioica-Galium aparine* community, typical sub-community (dominant); and OV24b *Urtica dioica-Galium aparine* community, *Arrhenatherum elatius-Rubus fruticosus* agg. sub-community (subsidiary). OV24a areas are dominated by common nettle and cleavers (*Galium aparine*). Bramble is in higher abundance in the OV24b community areas. A small section of the stand will be within the land required for the construction of the Proposed Scheme. This vegetation stand is located within the Helmdon Disused Railway SSSI;
- semi-improved neutral grassland (020_PH2_098005, see Table 41) - MG9a *Holcus lanatus-Deschampsia cespitosa* grassland, *Poa trivialis* sub-community. The stand is dominated by Yorkshire fog, with tufted hair-grass, hard rush, rough meadow grass (*Poa trivialis*) and watercress (*Nasturtium officinale*) also present in smaller amounts. A small section of stand will be within the land required for the construction of the Proposed Scheme;
- unimproved calcareous grassland (020_PH2_098002, see Table 42) - CG3b *Bromus erectus* grassland, *Centaurea nigra* sub-community. The vegetation is dominated by upright brome with occasional downy oat grass (*Avenula pubescens*), yellow oat-grass and quaking grass which are indicative of calcareous soils. A high diversity of calcicole broad leaved species are present including wild carrot, wild basil (*Clinopodium vulgare*) and greater knapweed (*Centaurea scabiosa*). A small section of the stand will be within the land required for the construction of the Proposed Scheme. This vegetation stand qualifies as a habitat of principal importance - lowland calcareous grassland (confirmed by field surveys);
- scrub (020_PH2_098001) - W21a *Crataegus monogyna-Hedera helix* scrub, *Hedera helix-Urtica dioica* sub-community. The vegetation is dominated by hawthorn, although at points ash saplings begin to dominate. A small section of the stand will be within the land required for the construction of the Proposed Scheme;
- false oat-grass grasslands - throughout the SSSI, MG1 *Arrhenatherum elatius* grassland types were frequently recorded in mosaic with other vegetation communities. These include: vegetation intermediate between CG3 grassland and MG1e *Arrhenatherum elatius* grassland *Centaurea nigra* sub-community (020_PH2_098010); and vegetation intermediate between MG1b *Arrhenatherum elatius* grassland, *Urtica dioica* sub-community and OV24a *Urtica dioica-Galium aparine* typical sub-community tall ruderal vegetation

(020_PH2_098011). MG1a *Arrhenatherum elatius* grassland, *Festuca rubra* sub-community was also present around the margins of other vegetation types (020_PH2_098011); and

- swamp/tall ruderal (020_PH2_098003) - at the base of the cutting, towards the southern end of the SSSI, an area of swamp vegetation is referable to S22 *Glyceria fluitans* water-margin vegetation. It is intermixed with vegetation referable to OV26 *Epilobium hirsutum* community. This vegetation is co-dominated by floating sweet-grass (*Glyceria fluitans*) and great willowherb (*Epilobium hirsutum*). Other occasional species present include creeping buttercup and water cress.

Table 39: Frequency table for 020_PH_098004

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Bromopsis erecta</i>	4	9	7	8	8	V
<i>Carex flacca</i>	3	5	5	6	4	V
<i>Pseudosceropodium purum</i>	1	2	2	2	5	V
<i>Lathyrus pratensis</i>	4	3	3	4	2	V
<i>Leucanthemum vulgare</i>	2	3	3	4	3	V
<i>Crataegus monogyna (s)</i>	4	2	1	1	1	V
<i>Poa angustifolia</i>	1	3	4	3	1	V
<i>Festuca rubra</i>	7	1	4	2	0	IV
<i>Arrhenatherum elatius</i>	6	1	4	2	0	IV
<i>Centaurea debeauxii</i>	3	4	0	1	4	IV
<i>Lotus corniculatus</i>	2	4	0	1	2	IV
<i>Dactylis glomerata</i>	3	3	1	0	2	IV
<i>Daucus carota ssp. carota</i>	2	0	1	1	1	IV
<i>Cirsium acaule</i>	0	1	1	1	1	IV
<i>Helictotrichon pubescens</i>	2	0	2	0	4	III
<i>Vicia sativa ssp. segetalis</i>	3	0	0	1	1	III
<i>Fraxinus excelsior (g)</i>	0	1	1	0	2	III
<i>Galium verum</i>	2	1	0	0	2	III
<i>Rubus fruticosus agg.</i>	1	1	2	0	0	III
<i>Trisetum flavescens</i>	0	1	2	0	1	III
<i>Achillea millefolium</i>	1	0	1	0	1	III
<i>Briza media</i>	0	0	1	1	1	III

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Veronica chamaedrys</i>	3	0	0	0	4	II
<i>Anthoxanthum odoratum</i>	0	0	0	1	3	II
<i>Torilis japonica</i>	0	1	0	0	3	II
<i>Centaurea scabiosa</i>	1	0	0	0	2	II
<i>Heracleum sphondylium</i>	1	0	2	0	0	II
<i>Medicago lupulina</i>	0	0	0	1	2	II
<i>Myosotis arvensis</i>	0	1	2	0	0	II
<i>Poa trivialis</i>	3	0	1	0	0	II
<i>Senecio erucifolius</i>	2	1	0	0	0	II
<i>Prunus spinosa (g)</i>	1	0	1	0	0	II
<i>Hypericum maculatum</i>	3	0	0	0	0	I
<i>Potentilla reptans</i>	3	0	0	0	0	I
<i>Holcus lanatus</i>	2	0	0	0	0	I
<i>Agrimonia eupatoria</i>	2	0	0	0	0	I
<i>Acer campestre (g)</i>	0	1	0	0	0	I
<i>Anthriscus sylvestris</i>	1	0	0	0	0	I
<i>Brachythecium rutabulum</i>	1	0	0	0	0	I
<i>Cerastium fontanum</i>	1	0	0	0	0	I
<i>Cirsium arvense</i>	1	0	0	0	0	I
<i>Clinopodium vulgare</i>	1	0	0	0	0	I
<i>Crataegus monogyna (g)</i>	0	1	0	0	0	I
<i>Galium aparine</i>	0	0	1	0	0	I
<i>Knautia arvensis</i>	0	0	0	0	1	I
<i>Lathyrus latifolius</i>	0	1	0	0	0	I
<i>Luzula campestris</i>	0	0	0	0	1	I
<i>Primula veris</i>	0	1	0	0	0	I
<i>Ranunculus bulbosus</i>	0	0	0	0	1	I
<i>Rosa canina (s)</i>	0	1	0	0	0	I
<i>Senecio jacobaea</i>	0	0	0	0	1	I
<i>Tamus communis</i>	0	1	0	0	0	I

Matching coefficients : MG1e 52.5, MG1 46.6, CG3b 45.6, MG1a 44.4, CG3 44.1, CG6 41.8, CG3a 41.7, MG5a 41.2, MG5 41.2, CG3d 40.6

Table 40: Frequency table for o2o_PH2_098007

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Urtica dioica</i>	9	8	9	9	9	V
<i>Heracleum sphondylium</i>	5	6	1	1	1	V
<i>Poa trivialis</i>	3	5	3	5	4	V
<i>Galium aparine</i>	4	4	4	3	3	V
<i>Arrhenatherum elatius</i>	2	3	3	1	0	IV
<i>Anthriscus sylvestris</i>	0	0	4	5	6	III
<i>Cirsium arvense</i>	1	2	3	0	0	III
<i>Lamium album</i>	4	0	1	0	0	II
<i>Epilobium hirsutum</i>	0	2	0	0	1	II
<i>Rubus caesius</i>	1	0	1	0	0	II
<i>Rubus fruticosus</i> agg.	0	1	1	0	0	II
<i>Chamerion angustifolium</i>	0	2	0	0	0	I
<i>Calystegia sepium</i> ssp. <i>sepium</i>	0	0	1	0	0	I
<i>Cirsium vulgare</i>	1	0	0	0	0	I
<i>Elytrigia repens</i>	0	0	1	0	0	I
<i>Equisetum arvense</i>	1	0	1	0	0	I
<i>Kindbergia praelonga</i>	0	1	0	0	0	I
<i>Vicia sativa</i> ssp. <i>segetalis</i>	0	0	1	0	0	I

Matching coefficients: OV24 (61.1), MG1b (60.7), OV24b (59.4), S26b (58.0), OV24a (58.0), OV26d (53.0), OV27d (50.6), MG1c (47.4), OV26e (47.2), W24 undifferentiated (44.3)

Table 41: Frequency table for o2o_PH2_098005

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Holcus lanatus</i>	9	9	9	8	4	V
<i>Poa trivialis</i>	4	4	5	7	7	V
<i>Ranunculus repens</i>	3	4	4	3	6	V
<i>Epilobium hirsutum</i>	3	4	1	1	1	V
<i>Rumex obtusifolius</i>	3	4	1	1	1	V
<i>Deschampsia cespitosa</i>	4	-	2	2	4	IV
<i>Agrostis stolonifera</i>	1	1	-	-	7	III
<i>Juncus inflexus</i>	-	-	2	4	3	III

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Nasturtium officinale</i>	1	-	4	-	-	II
<i>Arrhenatherum elatius</i>	-	2	-	-	1	II
<i>Cirsium arvense</i>	2	1	-	-	-	II
<i>Senecio erucifolius</i>	-	-	-	1	2	II
<i>Brachythecium rutabulum</i>	-	-	-	-	1	I
<i>Cirsium vulgare</i>	-	-	-	-	1	I
<i>Rumex sanguineus</i>	-	1	-	-	-	I
<i>Trifolium repens</i>	-	-	-	-	1	I
<i>Urtica dioica</i>	-	1	-	-	-	I

Matching coefficients: MG9 (50.4), OV26a (49.1), MG9a (48.0), MG10b (47.2), MG9b (46.2), OV26 (43.8). MG10 (42.0), OV26d (41.3), OV26e (41.0), MG7b (38.6)

Table 42: Frequency table for o2o_PH2_098002

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Bromopsis erecta</i>	4	9	7	8	8	V
<i>Carex flacca</i>	3	5	5	6	4	V
<i>Pseudosceropodium purum</i>	1	2	2	2	5	V
<i>Lathyrus pratensis</i>	4	3	3	4	2	V
<i>Leucanthemum vulgare</i>	2	3	3	4	3	V
<i>Crataegus monogyna (s)</i>	4	2	1	1	1	V
<i>Poa angustifolia</i>	1	3	4	3	1	V
<i>Festuca rubra</i>	7	1	4	2	0	IV
<i>Arrhenatherum elatius</i>	6	1	4	2	0	IV
<i>Centaurea debeauxii</i>	3	4	0	1	4	IV
<i>Lotus corniculatus</i>	2	4	0	1	2	IV
<i>Dactylis glomerata</i>	3	3	1	0	2	IV
<i>Daucus carota ssp. carota</i>	2	0	1	1	1	IV
<i>Cirsium acaule</i>	0	1	1	1	1	IV
<i>Avenula pubescens</i>	2	0	2	0	4	III
<i>Vicia sativa ssp. segetalis</i>	3	0	0	1	1	III
<i>Fraxinus excelsior (g)</i>	0	1	1	0	2	III
<i>Galium verum</i>	2	1	0	0	2	III

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Rubus fruticosus</i> agg.	1	1	2	0	0	III
<i>Trisetum flavescens</i>	0	1	2	0	1	III
<i>Achillea millefolium</i>	1	0	1	0	1	III
<i>Briza media</i>	0	0	1	1	1	III
<i>Veronica chamaedrys</i>	3	0	0	0	4	II
<i>Anthoxanthum odoratum</i>	0	0	0	1	3	II
<i>Torilis japonica</i>	0	1	0	0	3	II
<i>Centaurea scabiosa</i>	1	0	0	0	2	II
<i>Heracleum sphondylium</i>	1	0	2	0	0	II
<i>Medicago lupulina</i>	0	0	0	1	2	II
<i>Myosotis arvensis</i>	0	1	2	0	0	II
<i>Poa trivialis</i>	3	0	1	0	0	II
<i>Senecio erucifolius</i>	2	1	0	0	0	II
<i>Prunus spinosa</i> (g)	1	0	1	0	0	II
<i>Hypericum maculatum</i>	3	0	0	0	0	I
<i>Potentilla reptans</i>	3	0	0	0	0	I
<i>Holcus lanatus</i>	2	0	0	0	0	I
<i>Agrimonia eupatoria</i>	2	0	0	0	0	I
<i>Acer campestre</i> (g)	0	1	0	0	0	I
<i>Anthriscus sylvestris</i>	1	0	0	0	0	I
<i>Brachythecium rutabulum</i>	1	0	0	0	0	I
<i>Cerastium fontanum</i>	1	0	0	0	0	I
<i>Cirsium arvense</i>	1	0	0	0	0	I
<i>Clinopodium vulgare</i>	1	0	0	0	0	I
<i>Crataegus monogyna</i> (g)	0	1	0	0	0	I
<i>Galium aparine</i>	0	0	1	0	0	I
<i>Knautia arvensis</i>	0	0	0	0	1	I
<i>Lathyrus latifolius</i>	0	1	0	0	0	I
<i>Luzula campestris</i>	0	0	0	0	1	I
<i>Primula veris</i>	0	1	0	0	0	I
<i>Ranunculus bulbosus</i>	0	0	0	0	1	I
<i>Rosa canina</i> (s)	0	1	0	0	0	I

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Senecio jacobaea</i>	0	0	0	0	1	I
<i>Tamus communis</i>	0	1	0	0	0	I

Matching coefficients MG1e (52.5), MG1 (46.6), CG3b (45.6), MG1a (44.4), CG3 (44.1), CG6 (41.8), CG3a (41.7), MG5a (41.2), MG5 (41.2), CG3d (40.6)

5.4.29 Surveys of farmland south of Radstone Village showed:

- swamp vegetation (020_PH2_098008) - which is referable to S22 *Glyceria fluitans water-margin* vegetation. The stand features occupies a hollow at the centre of a field, it is dominated by plicate sweet grass (*Glyceria notata*) and included species such as Yorkshire fog, marsh foxtail (*Alopecurus geniculatus*) and fool's watercress (*Apium nodiflorum*). The stand will be adjacent to the land required for the construction of the Proposed Scheme; and
- improved grassland (020_PH2_098009) - MG7b *Lolium perenne leys* and related grasslands, *Lolium perenne-Poa trivialis* leys. This stand surrounded swamp vegetation at the centre of the field. It was species-poor and dominated by perennial rye-grass. Approximately half of the stand will be within the land required for the construction of the Proposed Scheme.

5.4.30 Land at Radstone Cottage is partly comprised of newly planted woodland with a ground flora dominated by tall ruderal herbs (020_PH2_097001, see Table 43) - OV24 *Urtica dioica-Galium aparine* community. The stand is dominated by ash saplings, rough meadow grass, common nettle, and cow parsley (*Anthriscus sylvestris*). The stand was recently planted, and therefore shows closer affinity to a tall ruderal vegetation community (as defined by the NVC) than plantation woodland. Approximately half of the stand will be within the land required for the construction of the Proposed Scheme.

Table 43 Frequency table for 020_PH2_097001

Species	Quadrat locations		Frequency
	Q1	Q2	
<i>Anthriscus sylvestris</i>	4	8	II
Bare	5	4	II
<i>Fraxinus excelsior</i>	8	8	II
<i>Galium aparine</i>	5	4	II
<i>Heracleum sphondylium</i>	3	3	II
<i>Poa trivialis</i>	8	7	II
<i>Rumex</i>	3	3	II

Species	Quadrat locations		Frequency
	Q1	Q2	
<i>sanguineus</i>			
<i>Stachys sylvatica</i>	4	2	II
<i>Urtica dioica</i>	6	4	II
<i>Acer pseudoplatanus</i>	0	1	I
<i>Bromopsis ramosa</i>	0	2	I
<i>Crataegus monogyna</i>	0	2	I
<i>Dactylis glomerata</i>	3	0	I
<i>Geum urbanum</i>	0	3	I
<i>Holcus lanatus</i>	1	0	I
<i>Lapsana communis</i>	0	3	I
<i>Lolium perenne</i>	1	0	I
<i>Rosa arvensis</i>	0	2	I
<i>Rubus fruticosus agg</i>	0	3	I
<i>Taraxacum</i>	0	3	I

020_PH2_097001 in a very thin area of woodland; 2 quadrats sufficient to be representative

Surveying at Finmere Quarry identified mixed vegetation communities (020_PH2_088002, see Table 44 and 020_PH2_089001, see Table 45) with affinities to several other vegetation (OV) communities in the NVC, although this is not a close match for any one in particular. Bare earth was abundant, willow and birch species were frequent, with a mix of common ground species e.g. creeping thistle (*Cirsium arvense*), broad leaved willowherb (*Epilobium montanum*), annual meadow-grass (*Poa annua*) and colt's-foot (*Tussilago farfara*). The edges of stand will be within the land required for the construction of the Proposed Scheme.

Table 44 Frequency table for 020_PH2_088002

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Bare</i>	10	10	10	9	8	V
<i>Acrocarpus mosses</i>	0	0	0	0	5	I
<i>Cirsium arvense</i>	3	2	1	2	1	V

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Epilobium montanum</i>	2	3	3	2	1	V
<i>Myosotis arvensis</i>	1	1	2	1	1	V
<i>Poa annua</i>	2	1	2	2	3	V
<i>Vulpia bromoides</i>	0	2	3	4	4	IV
<i>Matricaria sp.</i>	3	1	2	0	0	III
<i>Senecio jacobaea</i>	0	0	1	2	1	III
<i>Taraxacum agg.</i>	1	0	0	2	1	III
<i>Aphanes sp.</i>	0	0	0	1	2	II
<i>Cerastium fontanum</i>	0	0	1	0	1	II
<i>Geranium molle</i>	0	0	0	1	1	II
<i>Plantago major</i>	1	1	0	0	0	II
<i>Rubus fruticosus agg.</i>	0	0	0	1	2	II
<i>Veronica sp.</i>	0	1	1	0	0	II
<i>Chamerion angustifolium</i>	0	0	0	0	2	I
<i>Chenopodium album</i>	0	0	1	0	0	I
<i>Galium aparine</i>	0	0	0	1	0	I
<i>Hypericum perforatum</i>	0	0	0	0	2	I
<i>Hypochaeris radicata</i>	0	0	0	2	0	I
<i>Rumex obtusifolius</i>	1	0	0	0	0	I
<i>Sagina apetala</i>	0	0	0	0	1	I
<i>Sonchus sp.</i>	0	0	1	0	0	I
<i>Tussilago farfara</i>	1	0	0	0	0	I
<i>Urtica dioica</i>	0	1	0	0	0	I

Table 45: Frequency table for o2o_PH2_o89001

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
Bare	4	4	8	9	10	V
<i>Cirsium arvense</i>	0	1	2	3	2	IV
<i>Myosotis arvensis</i>	1	2	2	2	0	IV
<i>Tussilago farfara</i>	1	6	0	4	4	IV
<i>Medicago lupulina</i>	0	8	2	4	0	III
<i>Picris hieracioides</i>	1	0	2	3	0	III

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Senecio jacobaea</i>	4	2	0	1	0	III
<i>Cerastium fontanum</i>	0	0	1	2	0	II
<i>Epilobium parviflorum</i>	0	0	3	4	0	II
<i>Epilobium sp.</i>	4	0	0	3	0	II
<i>Rumex obtusifolius</i>	1	0	0	0	4	II
<i>Veronica persica</i>	1	0	1	0	0	II
<i>Cardamine sp.</i>	4	0	0	0	0	I
<i>Equisetum arvense</i>	0	0	0	0	1	I
<i>Galium aparine</i>	0	1	0	0	0	I
<i>Geranium dissectum</i>	0	0	0	1	0	I
<i>Lotus corniculatus</i>	0	0	1	0	0	I
<i>Moss sp.</i>	8	0	0	0	0	I
<i>Prunella vulgaris</i>	3	0	0	0	0	I
<i>Ranunculus repens</i>	0	0	4	0	0	I
<i>Rosa sp.</i>	1	0	0	0	0	I
<i>Trifolium dubium</i>	1	0	0	0	0	I
<i>Trifolium repens</i>	1	0	0	0	0	I
<i>Veronica agrestis</i>	0	0	1	0	0	I
<i>Vicia sativa subsp. segetalis</i>	0	1	0	0	0	I

5.4.31 Surveying of land at Newton Purcell Station identified ephemeral/short perennial vegetation (020_PH2_088003, see Table 46) - OV22 *Poa annua*-*Taraxacum officinale* community. The stand broadly conformed to the typical subcommunity as it was heavily shaded. The vegetation includes dandelion and annual meadow-grass and a number of occasional herb species including: perforate St. John's wort (*Hypericum perforatum*), field forget-me-not (*Myosotis arvensis*) and creeping cinquefoil. The whole of stand will be within the land required for the construction of the Proposed Scheme.

Table 46: Frequency table for 020_PH2_088003

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Bare</i>	8	5	5	8	8	V
<i>Cerastium fontanum</i>	1	3	2	1	2	V
<i>Dipsacus fullonum</i>	2	4	3	2	1	V
<i>Hypericum perforatum</i>	4	6	3	5	5	V

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Myosotis arvensis</i>	3	2	5	3	3	V
<i>Plantago major</i>	1	3	2	1	1	V
<i>Potentilla reptans</i>	5	3	1	4	2	V
<i>Cerastium arvense</i>	2	4	0	2	5	IV
<i>Cirsium arvense</i>	1	1	3	2	0	IV
<i>Poa annua</i>	1	0	4	5	1	IV
<i>Rubus fruticosus agg</i>	4	1	1	0	4	IV
<i>Taraxacum agg.</i>	1	2	0	1	1	IV
<i>Veronica chamaedrys</i>	2	4	1	1	0	IV
<i>Centaurea debeauxii</i>	1	2	1	0	0	III
<i>Chamerion angustifolium</i>	2	6	0	0	5	III
<i>Poa pratensis</i>	1	4	3	0	0	III
<i>Prunella vulgaris</i>	2	0	5	0	2	III
<i>Aphanes sp.</i>	0	1	0	1	0	II
<i>Artemisia vulgaris</i>	1	0	0	0	0	II
<i>Centaureum erythraea</i>	0	0	1	3	0	II
<i>Cirsium vulgare</i>	1	1	0	0	0	II
<i>Galium aparine</i>	1	1	0	0	0	II
<i>Lotus corniculatus</i>	1	1	0	0	0	II
<i>Matricaria chamomilla</i>	1	0	0	0	4	II
<i>Melilotus sp.</i>	2	1	0	0	0	II
<i>Ranunculus repens</i>	2	0	2	0	0	II
<i>Rumex crispus</i>	1	1	0	0	0	II
<i>Scrophularia nodosa</i>	0	2	2	0	0	II
<i>Senecio jacobaea</i>	1	1	0	0	0	II
<i>Sherardia arvensis</i>	0	0	1	1	0	II
<i>Trifolium repens</i>	0	0	5	1	0	II
<i>Veronica arvensis</i>	1	1	0	0	0	II
<i>Veronica officinalis</i>	1	0	1	0	0	II
<i>Vicia sativa</i>	2	1	0	0	0	II
<i>Acer campestre</i>	0	0	2	0	0	I
<i>Chaenorhinum minus</i>	1	0	0	0	0	I

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Cirsium palustre</i>	0	1	0	0	0	1
<i>Fragaria vesca</i>	0	0	5	0	0	1
<i>Geranium robertianum</i>	1	0	0	0	0	1
<i>Leucanthemum vulgare</i>	1	0	2	0	0	1
<i>Reseda luteola</i>	3	0	0	0	0	1
<i>Sonchus oleraceus</i>	1	0	0	0	0	1
<i>Tanacetum vulgare</i>	0	2	0	0	0	1
<i>Viola hirta</i>	0	0	5	0	0	1

CFA15 Greatworth to Lower Boddington

5.4.32 Vegetation qualifying for an NVC survey at Greatworth to Lower Boddington (CFA15) included Thorpe Mandeville Court, land to the north-west of Lower Farm and surrounding land, Halse Copse, Fox Covert, Trafford Bridge Marsh, Culworth Grounds Farm, Magpie Farm, land at Aston Le Walls Manor, and land south-east of Thorpe Mandeville. Habitats potentially subject to significant effects are described below:

5.4.33 At land at Lower Thorpe Farm the following stands of vegetation were recorded:

- semi-improved neutral grassland (020_PH2_105002, see Table 47) - MG6a *Lolium perenne-Cynosurus cristatus* grassland, typical sub-community. The stand was dominated by rough meadow-grass, cock's foot, red clover and crested dog's tail and with occasional species including upright brome and meadow fescue (*Schedonorus pratensis*), covering an area of 0.17ha. The scarcity of broad leaved species suggests that this vegetation may have been heavily grazed in the past, improved with fertiliser, or oversown. This vegetation is only moderately diverse and does not meet the criteria to qualify as a habitat of principal importance. Approximately one third of the stand is within the land required for the construction of the Proposed Scheme; and
- unimproved neutral grassland (020_PH2_105003) - MG5b *Cynosurus cristatus-Centaurea nigra* grassland, *Galium verum* sub-community. The stand, covering an area of 2.59ha was dominated by crested dog's-tail and meadow foxtail, with frequent sweet vernal-grass and occasional downy oat-grass, yellow oat-grass, upright brome and meadow brome (*Bromus commutatus*). Broad leaved plant species were diverse, including red clover, meadow buttercup and ribwort plantain, with occasional yellow rattle, chalk knapweed, lady's bedstraw and pignut (*Conopodium majus*). This vegetation stand is a moderately species-rich, neutral grassland and qualifies as a habitat of principal importance - lowland meadow. It is entirely in the land required for the construction of the Proposed Scheme.

Table 47: Frequency table for o2o_PH2_105002

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Poa trivialis</i>	8	5	7	6	5	V
<i>Dactylis glomerata</i>	6	5	7	5	0	IV
<i>Lolium perenne</i>	5	4	4	5	0	IV
<i>Bromus erectus</i>	6	2	0	0	0	II
<i>Schedonurus pratensis</i>	2	2	7	0	0	III
<i>Alopecurus pratensis</i>	5	0	0	6	0	II
<i>Ranunculus bulbosus</i>	2	1	1	5	0	IV
<i>Trifolium pratense</i>	4	6	0	8	7	IV
<i>Cirsium arvense</i>	0	0	2	1	0	II
<i>Bellis perennis</i>	1	4	0	2	5	IV
<i>Festuca rubra</i>	5	7	7	0	0	III
<i>Taraxacum officinale agg.</i>	0	7	0	2	4	III
<i>Prunus spinosa</i>	0	6	0	0	0	I
<i>Cynosurus cristatus</i>	0	9	0	8	8	III
<i>Achillea millefolium</i>	0	4	0	0	0	I
<i>Potentilla reptans</i>	0	2	2	0	0	II
<i>Plantago lanceolata</i>	0	5	0	0	0	I
<i>Cerastium fontanum</i>	0	0	1	4	2	III
<i>Rumex acetosa</i>	0	0	0	1	0	I
<i>Holcus lanatus</i>	0	0	0	5	4	II
<i>Phleum pratense</i>	0	0	0	2	0	I
<i>Anthoxanthum odoratum</i>	0	0	0	0	4	I
<i>Carex hirta</i>	0	0	0	0	2	I
<i>Deschampsia cespitosa</i>	0	0	0	0	2	I

Table 48: Frequency table for o2o_PH2_105003

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Cynosurus cristatus</i>	7	5	2	7	2	V
<i>Schedonurus pratensis</i>	4	2	0	0	0	II
<i>Poa trivialis</i>	4	4	0	5	4	IV

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Trifolium pratense</i>	7	6	4	7	7	V
<i>Ranunculus acris</i>	7	6	4	7	7	V
<i>Plantago lanceolata</i>	7	6	7	8	5	V
<i>Crepis vesicaria</i>	2	0	0	1	0	II
<i>Anthoxanthum odoratum</i>	4	4	7	0	0	III
<i>Carex hirta</i>	6	0	0	0	0	I
<i>Rhinanthus minor ssp minor</i>	2	0	1	2	1	IV
<i>Bellis perennis</i>	2	0	0	1	0	II
<i>Centaurea debeauxii</i>	1	0	6	0	1	III
<i>Cerastium fontanum</i>	1	0	1	2	1	IV
<i>Alopecurus pratensis</i>	2	7	5	2	1	V
<i>Holcus lanatus</i>	2	0	2	0	1	III
<i>Dactylis glomerata</i>	0	4	3	6	4	IV
<i>Rumex acetosa</i>	0	4	5	2	1	IV
<i>Taraxacum</i>	0	4	4	2	4	IV
<i>Tragopogon pratensis</i>	0	2	0	2	1	III
<i>Conopodium majus</i>	0	0	4	0	8	II
<i>Bromus commutatus</i>	0	0	2	2	1	III
<i>Galium verum</i>	0	0	0	6	0	I
<i>Lotus corniculatus</i>	0	0	0	6	2	II
<i>Heracleum sphondylium</i>	0	0	0	1	0	I
<i>Lolium perenne</i>	0	0	0	5	1	II
<i>Bromus erectus</i>	0	0	0	5	6	II
<i>Trisetum flavescens</i>	0	0	0	1	0	I
<i>Avenula pubescens</i>	0	0	0	0	8	I

5.4.34 At Halse Copse the following vegetation stands were recorded:

- semi-natural broad leaved woodland (020_PH2_100003, see Table 5044) - W8 *Fraxinus excelsior-Acer campestre-Mercurialis perennis* woodland. The woodland, covering an area of 0.05ha, is dominated by a low canopy of ash and field maple (*Acer campestre*) with a hawthorn, hybrid hawthorn (*Crataegus x media*) and blackthorn dominated shrub layer. Ten species of ancient woodland indicator ground flora species were recorded including bluebell,

pignut, and wood sorrel (*Oxalis acetosella*). One corner of this stand is in land required for the construction of the Proposed Scheme, while the rest is adjacent to it. The stand is adjacent to another stand (020_PH2_099001, see Table 49), of 1.38ha, which was also classified as W8 *Fraxinus excelsior*-*Acer campestre*-*Mercurialis perennis* woodland. The canopy of the latter stand is dominated by pedunculate oak which is atypical for NVC type W8 but the ground flora was consistent with W8. The shrub species hybrid hawthorn and blackthorn were occasional in the shrub layer. The ground flora is less diverse and contains wood sedge and common dog violet (*Viola riviniana*). Both vegetation stands qualify as habitats of principal importance - lowland mixed deciduous woodland (Natural England GIS data and confirmed by field surveys) and is classified as ancient woodland on the Natural England inventory; and

- semi-natural broad leaved woodland (020_PH2_100002, see Table 51)- W8 *Fraxinus excelsior*-*Acer campestre*-*Mercurialis perennis* woodland; the stand is not attributable to a described sub-community in the NVC. The canopy of this vegetation stand is dominated by ash and pedunculate oak, with a hazel and hawthorn understorey. Large-leaved lime (*Tilia platyphyllos*) is co-dominant in the northern area of the stand, although this is almost certainly an introduction as the species is rare nationally. Several ancient woodland indicator species were recorded, including hairy brome and black bryony. This woodland type is located adjacent to the land required for the construction of the Proposed Scheme and is a habitat of principal importance - lowland mixed deciduous woodland (supported by Natural England GIS data and confirmed by field surveys).

Table 49: Frequency table for 020_PH2_099001

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Crataegus monogyna</i>	7	6	9	7	1(U) 9(S)	V
<i>Hedera helix</i>	1	1	1	1	1	V
<i>Quercus robur</i>	9	10	9	10	10	V
<i>Circaea lutetiana</i>	3	0	2	3	2	IV
<i>Fraxinus excelsior</i>	4	7	0	4	4	IV
<i>Galium aparine</i>	2	1	2	1	0	IV
<i>Geum urbanum</i>	3	3	4	3	0	IV
<i>Poa trivialis</i>	5	8	5	6	0	IV
<i>Carex sylvatica</i>	1	0	2	2	0	III
<i>Geranium robertianum</i>	0	4	3	5	0	III
<i>Prunus spinosa</i>	2	1	6	0	0	III
<i>Urtica dioica</i>	4	1	0	6	0	III

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Viola riviniana</i>	5	5	4	0	0	III
<i>Ballota nigra</i>	2	0	0	2	0	II
<i>Brachypodium sylvaticum</i>	6	7	0	0	0	II
<i>Bromopsis ramosa</i>	3	0	2	0	0	II
Leaf litter	4	4	0	0	0	II
<i>Lonicera periclymenum</i>	2	0	1	0	0	II
Moss spp.	2	0	0	3	0	II
<i>Rosa arvensis</i>	0	1	2	0	0	II
<i>Rumex sanguineus</i>	0	4	10	0	0	II
<i>Sambucus nigra</i>	3	0	0	3	0	II
<i>Anthriscus sylvestris</i>	0	0	2	0	0	I
<i>Arctium minus</i>	0	0	1	0	0	I
<i>Brachythecium rutabulum</i>	0	0	4	0	0	I
<i>Crataegus laevigata</i>	0	0	0	1	0	I
<i>Deschampsia cespitosa</i>	2	0	0	0	0	I
<i>Festuca gigantea</i>	0	1	0	0	0	I
<i>Galium aparine</i>	2	0	0	0	0	I
<i>Glechoma hederacea</i>	0	5	0	0	0	I
<i>Mercurialis perennis</i>	1	0	0	0	0	I
<i>Moehringia trinervia</i>	0	5	0	0	0	I
<i>Poa nemoralis</i>	3	0	0	0	0	I
<i>Ranunculus ficaria</i>	0	0	3	0	0	I
<i>Rubus fruticosus agg.</i>	3	0	0	0	0	I
<i>Stachys sylvatica</i>	0	0	3	0	0	I
<i>Rumex sanguineus</i>	0	0	1	0	0	I

Table 50 Frequency table for 020_PH2_100003

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Carex sylvatica</i>	4	2	3	4	4	V
<i>Crataegus monogyna</i>	4	5	5	4	4	V
<i>Crataegus x media</i>	4	2	1	4	4	V
<i>Fraxinus excelsior</i>	9	9	9	9	8	V

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Geum urbanum</i>	2	3	4	4	2	V
<i>Poa trivialis</i>	9	9	9	6	9	V
<i>Prunus spinosa</i>	4	5	4	1	4	V
<i>Ranunculus ficaria</i>	5	5	5	4	5	V
<i>Stachys sylvatica</i>	4	2	3	4	4	V
<i>Arum maculatum</i>	2	3	0	3	2	IV
<i>Corylus avellana</i>	4	0	4	4	5	IV
<i>Salix caprea</i>	4	7	0	5	5	IV
<i>Ajuga reptans</i>	5	1	0	4	0	III
<i>Geranium robertianum</i>	0	2	3	2	0	III
<i>Hyacinthoides non-scripta</i>	4	4	0	5	0	III
<i>Lonicera periclymenum</i>	2	3	0	4	0	III
<i>Acer campestre</i>	0	2	5	0	0	II
<i>Artrichum undulatum</i>	3	3	0	0	0	II
<i>Brachypodium sylvaticum</i>	0	5	0	5	0	II
<i>Deschampsia cespitosa</i>	2	1	0	0	0	II
<i>Galium aparine</i>	0	1	0	2	0	II
<i>Glechoma hederacea</i>	0	4	0	6	0	II
<i>Malus sylvestris</i>	0	5	0	4	0	II
<i>Rosa arvensis</i>	2	3	0	0	0	II
<i>Veronica chamaedrys</i>	4	4	0	0	0	II
<i>Arctium minus</i>	0	0	0	1	0	I
<i>Cardamine pratensis</i>	3	0	0	0	0	I
<i>Circaea lutetiana</i>	3	0	0	4	0	I
<i>Conopodium majus</i>	0	0	0	6	0	I
<i>Dactylis glomerata</i>	0	0	1	0	0	I
<i>Festuca gigantea</i>	1	0	0	0	0	I
<i>Filipendula ulmaria</i>	2	0	0	0	0	I
<i>Kindbergia praelonga</i>	0	0	0	6	0	I
<i>Moehringia trinervia</i>	0	0	0	2	0	I
<i>Orchis mascula</i>	0	0	0	1	0	I
<i>Oxalis acetosella</i>	6	0	0	0	0	I

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Rubus fruticosus</i> agg.	0	2	0	0	0	I
<i>Urtica dioica</i>	0	0	0	0	4	I

Table 51: Frequency table for o2o_PH2_100002

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
BARE/LITTER	7	9	7	8	10	V
<i>Crataegus monogyna</i>	5	9	9	7	10	V
<i>Fraxinus excelsior</i>	5	7	5	5	4	V
<i>Quercus robur</i>	10	10	10	10	10	V
<i>Circea lutetiana</i>	4	2	1	5	0	IV
<i>Corylus avellana</i>	9	4		5	2	IV
<i>Geranium robertianum</i>	3	4	7	2	0	IV
<i>Geum urbanum</i>	1	1	4	3	0	IV
<i>Hedera helix</i>	1	1	4	0	3	IV
<i>Urtica dioica</i>	4	1	1	1	0	IV
<i>Kindbergia praelonga</i>	0	4	0	3	2	III
<i>Poa trivialis</i>	8	0	4	5	0	III
<i>Rubus fruticosus</i> (agg)	1	1	0	1	0	III
<i>Brachypodium sylvaticum</i>	0	0	0	4	0	I
<i>Carex sylvatica</i>	0	1	0	0	0	I
<i>Mnium hornum</i>	1	0	0	0	0	I
<i>Polytrichum formosum</i>	0	1	0	0	0	I
<i>Prunus cerasifera</i> (suckers)	0	0	4	0	0	I
<i>Rosa canina</i>	0	0	1	0	0	I
<i>Tilia platyphyllos</i>	0	0	0	0	4	I

5.4.35 At Fox Covert a single type of semi-natural broad leaved woodland (o2o_PH2_116001, see Table 52) was recorded covering an area of 3.28ha. This was classified as W8 *Fraxinus excelsior*-*Acer campestre*-*Mercurialis perennis* woodland (closest to either *Geranium robertianum* or *Allium ursinum* sub-community, but poorly described by either in the NVC). The canopy is dominated by ash with frequent sycamore and pedunculate oak with an understorey of bramble, hawthorn and elder. The ground

flora is dominated by common nettle, rough meadow-grass and common sorrel. A number of ancient woodland indicator species are present, including wood meadow-grass (*Poa nemoralis*) and three-nerved sandwort. Approximately half of the stand is in land required for the construction of the Proposed Scheme. This vegetation stand qualifies as a habitat of principal importance - lowland mixed deciduous woodland (Natural England GIS data and confirmed by field surveys).

Table 52: Frequency table for 020_PH2_116001

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Bare</i>	5	4	4	6	5	V
<i>Crataegus monogyna</i>	7	5	7	4	4	V
<i>Fraxinus excelsior</i>	6	9	8	9	9	V
<i>Poa trivialis</i>	1	8	1	9	4	V
<i>Rubus fruticosus aggg</i>	5	6	7	5	1	V
<i>Urtica dioica</i>	8	5	2	5	4	V
<i>Brachythecium rutabulum</i>	3	5	0	4	7	IV
<i>Circea lutetiana</i>	1	1	1	0	4	IV
<i>Geum urbanum</i>	1	1	7	0	2	IV
<i>Sambucus nigra</i>	5	5	0	4	4	IV
<i>Galium aparine</i>	1	2	6	0	0	III
<i>Rumex sanguineus</i>	0	1	5	2	0	III
<i>Cardamine flexuosa</i>	0	0	0	3	1	II
<i>Ilex aquifolium (seedling)</i>	0	0	1	1	0	II
<i>Rosa arvensis</i>	0	0	1	0	1	II
<i>Stachys sylvatica</i>	1	0	1	0	0	II
<i>Atricum undulatum</i>	0	0	0	0	3	I
<i>Chaerophyllum temulum</i>	0	0	4	0	0	I
<i>Dryopteris carthusiana</i>	0	0	0	0	1	I
<i>Dryopteris dilatata</i>	0	0	0	0	1	I
<i>Epilobium montanum</i>	0	0	0	0	2	I
<i>Geranium robertianum</i>	0	0	2	0	0	I
<i>Glechoma hederacea</i>	0	2	0	0	0	I
<i>Holcus lanatus</i>	0	0	0	0	1	I
<i>Kindbergia praelonga</i>	0	0	6	0	0	I
<i>Lonicera periclymenum</i>	0	0	5	0	0	I
<i>Mohringia trinervia</i>	0	0	1	0	0	I

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Myosotis sylvatica</i>	0	0	1	0	0	I
<i>Poa nemoralis</i>	0	0	4	0	0	I
<i>Prunus avium</i> (seedling)	0	0	1	0	0	I
<i>Quercus robur</i>	5	0	0	0	0	I
<i>Salix caprea</i>	4	0	0	0	0	I
<i>Stellaria media</i>	1	0	0	0	0	I
<i>Veronica chamaedrys</i>	0	0	4	0	0	I
<i>Veronica serpyllifolia</i>	0	0	0	0	2	I

5.4.36 At Trafford Bridge Marsh LWS two areas of swamp vegetation were recorded adjacent to one another, and reflecting the topography of the site. Individually each stand would not meet the criteria for consideration as a habitat of principal importance; however, considered as a habitat mosaic, the two stands qualify as lowland fen:

- marshy grassland (020_PH2_108002, see Table 53) - M27b *Filipendula ulmaria*-*Angelica sylvestris* mire, *Urtica dioica*-*Vicia cracca* sub-community. The stand consists of meadowsweet dominated vegetation associated with wild angelica and great willowherb (*Epilobium hirsutum*). This stand, covering an area of 0.08ha, was recorded in mosaic with the swamp community recorded as 020_PH2_108003 and 020_PH2_108004 (0.16ha) (see below). Approximately one third of the stand is inside the land required for construction of the Proposed Scheme; and
- swamp (020_PH2_108003, see Table 54 and 020_PH2_108004) - S6 *Carex riparia* swamp. This stand is dominated by greater pond sedge, except for small patches where lesser pond sedge (*Carex acutiformis*) and branched bur-reed (*Sparganium erectum*) co-dominate. The majority of the stands are inside the land required for the construction of the Proposed Scheme.

Table 53: Frequency table for 020_PH2_108002

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Filipendula ulmaria</i>	9	10	9	10	10	V
<i>Galium aparine</i>	2	4	4	0	3	IV
<i>Angelica sylvestris</i>	4	1	0	0	1	III
<i>Epilobium hirsutum</i>	2	2	0	0	1	III
<i>Carex acutiformis</i>	0	1	4	0	0	II
<i>Carex riparia</i>	0	3	0	2	0	II

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Heracleum sphondylium</i>	2	0	5	0	0	II
<i>Stachys palustris</i>	0	0	1	0	1	II
<i>Urtica dioica</i>	0	0	1	0	1	II
<i>Valeriana dioica</i>	0	0	4	0	1	II
<i>Calystegia sp.</i>	2	0	0	0	0	I
<i>Cirsium arvense</i>	0	2	0	0	0	I
<i>Geum urbanum</i>	0	1	0	0	0	I
<i>Poa trivialis</i>	0	1	0	0	0	I

Table 54: Frequency table for 020_PH2_108003

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Carex riparia</i>	10	9	5	10	10	V
<i>Carex acutiformis</i>	0	1	5	0	0	II
<i>Equisetum x littorale</i>	2	1	0	0	0	II
<i>Sparganium erectum</i>	0	5	5	0	0	II
<i>Calystegia sp.</i>	1	0	0	0	0	I
<i>Epilobium hirsutum</i>	0	0	5	0	0	I
<i>Filipendula ulmaria</i>	1	0	0	0	0	I
<i>Solanum dulcamara</i>	0	1	0	0	0	I

5.4.37 Surveying of land at Aston le Walls Manor identified improved grassland (020_PH2_111001) - MG7b *Lolium perenne* leys and related grasslands, *Lolium perenne-Poa trivialis* leys. The stand, covering an area of 22.8ha, consists of a species-poor sward dominated by perennial rye grass. Approximately half of stand is inside the land required for the construction of the Proposed Scheme.

5.4.38 South-East of Thorpe Mandeville an area of unimproved neutral grassland (020_PH2_104008) was recorded upslope of two different types of marshy grassland; one characterised by tall herbs (020_PH2_104009) and one by marsh horetail (*Equisetum palustre*) and soft rush (*Juncus effusus*) (020_PH2_104010):

- unimproved grassland (020_PH2_104008, see Table 55)- MG5a *Cynosurus cristatus-Centaurea nigra* grassland, *Lathyrus pratensis* sub-community. The stand is dominated by crested dog's-tail, with frequent red fescue, sweet-vernal and Yorkshire fog. Tufted hair-grass is more dominant in wetter areas, associated with hairy sedge, marsh thistle, meadowsweet, greater bird's-foot

trefoil (*Lotus pedunculatus*) and marsh horsetail (*Equisetum palustre*). The broad leaved flora includes meadow buttercup, pignut, common bird's-foot trefoil, meadow vetchling and field wood rush (*Luzula campestre*). The majority of the stand is closely grazed, and is adjacent to the land required for the construction of the Proposed Scheme. This vegetation stand qualifies as a habitat of principal importance - lowland meadow;

- marshy grassland (020_PH2_104009, see Table 56)- M27 *Filipendula ulmaria*-*Angelica sylvestris* mire (does not fit to any described sub-community). Dominated by marsh marigold and meadowsweet, with frequent great willowherb. The stand is occasionally grazed and is adjacent to the land required for the construction of the Proposed Scheme. This vegetation qualifies as a habitat of principal importance - lowland fen; and
- marshy grassland (020_PH2_104010, see Table 57)- M23 *Juncus effusus/acuteiflorus*-*Galium palustre* rush-pasture. The stand is a poor fit for the M23 community as described in the NVC as it is dominated by marsh horsetail with a low cover of soft rush and with no marsh bedstraw (*Galium palustre*). However, it is not beyond the variation described in the literature for M23³² and contains many occasional species found in the M23 community. This vegetation stand is moderately species diverse, adjacent to the land required for the construction of the proposed scheme and meets the criteria for a habitat of principal importance - purple moor-grass and rush pasture.

Table 55: Frequency table for 020_PH2_104008

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Cynosurus cristatus</i>	7	7	9	8	9	V
<i>Holcus lanatus</i>	6	4	4	4	7	V
<i>Ranunculus acris</i>	2	0	4	8	7	IV
<i>Rhytiadelphus squarrosus</i>	2	0	4	4	4	IV
<i>Festuca rubra</i>	8	4	0	6	0	III
<i>Agrostis capillaris</i>	0	0	9	0	9	II
<i>Alopecurus pratensis</i>	8	7	0	0	0	II
<i>Anthoxanthum odoratum</i>	0	0	0	2	5	II
<i>Arrhenatherum elatius</i>	2	2	0	0	0	II
<i>Cerastium fontanum</i>	0	0	0	1	1	II
<i>Cirsium palustre</i>	0	0	0	4	1	II
<i>Conopodium majus</i>	4	2	0	0	0	II

³² Averis, B. (2013). Plants and habitats: An introduction to common plants and their habitats in Britain and Ireland. Ben Averis/Swallowtail Print. Edinburgh

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Deschampsia cespitosa</i>	4	4	0	0	0	II
<i>Galeopsis tetrahit</i>	2	2	0	0	0	II
<i>Galium aparine</i>	5	4	0	0	0	II
<i>Poa trivialis</i>	4	4	0	0	0	II
<i>Trifolium pratense</i>	0	0	0	5	7	II
Bare	0	0	0	4	0	I
<i>Cardamine pratensis</i>	0	2	0	0	0	I
<i>Carex hirta</i>	4	0	0	0	0	I
<i>Cirsium arvense</i>	0	0	0	0	1	I
<i>Equisetum arvense</i>	4	0	0	0	0	I
<i>Equisetum palustre</i>	0	3	0	0	0	I
<i>Filipendula ulmaria</i>	0	5	0	0	0	I
<i>Lathyrus pratensis</i>	0	2	0	0	0	I
<i>Lotus corniculatus</i>	0	0	0	4	0	I
<i>Lotus pedunculatus</i>	0	4	0	0	0	I
<i>Luzula campestris</i>	0	0	0	1	0	I
<i>Plantago lanceolata</i>	0	0	0	5	0	I
<i>Poa pratensis</i>	4	0	0	0	0	I
<i>Prunella vulgaris</i>	0	0	0	0	1	I
<i>Ranunculus bulbosus</i>	0	0	0	6	0	I
<i>Taraxacum</i>	0	0	0	1	0	I
<i>Veronica chamaedrys</i>	0	0	0	6	0	I

Table 56: Frequency table for o2o_PH2_104009

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Caltha palustris</i>	7	7	7	7	7	V
<i>Filipendula ulmaria</i>	7	7	7	7	7	V
<i>Epilobium hirsutum</i>	5	0	6	4	7	IV
<i>Veronica beccabunga</i>	2	0	0	1	0	II
<i>Silene flos-cuculi</i>	2	0	0	0	0	II
<i>Equisetum palustre</i>	0	0	2	0	0	II

Table 57: Frequency table for o2o_PH2_104010

Species	Quadrat locations					Frequency
	Q1	Q2	Q3	Q4	Q5	
<i>Bare</i>	4	4	4	4	4	V
<i>Carex hirta</i>	5	4	0	5	4	IV
<i>Cirsium palustre</i>	0	1	4	5	6	IV
<i>Equisetum palustre</i>	9	8	4	9	5	IV
<i>Ficaria verna</i>	5	6	4	2	0	IV
<i>Filipendula ulmaria</i>	7	8	0	4	5	IV
<i>Poa trivialis</i>	1	2	0	7	4	IV
<i>Agrostis capillaris</i>	0	0	6	4	4	III
<i>Deschampsia cespitosa</i>	0	0	7	4	2	III
<i>Festuca rubra</i>	7	0	4	4	0	III
<i>Juncus effusus</i>	0	7	1	4	0	III
<i>Mentha aquatica</i>	4	0	0	6	5	III
<i>Ranunculus acris</i>	2	0	5	4	0	III
<i>Scrophularia auriculata</i>	0	1	0	2	2	III
<i>Silene flos-cuculi</i>	0	2	0	1	6	III
<i>Trifolium pratense</i>	2	0	4	4	0	III
<i>Calliergonella cuspidata</i>	0	0	0	4	7	II
<i>Dactylorhiza fuchsii</i>	1	2	0	0	0	II
<i>Epilobium hirsutum</i>	4	4	0	0	0	II
<i>Glyceria declinata</i>	5	0	0	7	0	II
<i>Potentilla anserina</i>	5	0	0	5	0	II
<i>Stellaria graminea</i>	0	0	4	4	0	II
<i>Ajuga reptans</i>	4	0	0	0	0	I
<i>Equisetum arvense</i>	4	0	0	0	0	I
<i>Lathyrus pratensis</i>	2	0	0	0	0	I
<i>Valeriana officinalis</i>	0	6	0	0	0	I

6 River Habitat Surveys

6.1.1 This section of the appendix presents details of the River Habitat Surveys (RHS) conducted within the section of the Proposed Scheme that will pass through CFA7 to CFA15 inclusive.

6.2 Methodology

6.2.1 RHS is a method designed to characterise and assess, in broad terms, the physical structure of freshwater streams and rivers.

6.2.2 RHS is carried out along a standard 500m length of river channel. Observations are made at ten equally spaced points along the channel, whilst information on valley form and land-use in the river corridor provides additional context (Environment Agency, 2003).

6.2.3 The survey methodology is detailed within River Habitat Survey in Britain and Ireland; Field Survey Guidance Manual; Version 3 (Environment Agency, 2003).

6.2.4 Using GIS, all of the locations where the land required for the construction of the Proposed Scheme crosses watercourses were identified. A similar exercise was also carried out to identify locations where haul roads will cross watercourses.

6.2.5 The aim was to centre the survey sections on the location where land required for the construction of the Proposed Scheme would cross the watercourse but in some cases this was not possible due to access constraints. Where land required for the construction of the Proposed Scheme would cross a watercourse at multiple points, a survey was generally designed to cover all of the crossings within 500m either side of each crossing point. In some cases, the 500m sections were extended to include sections potentially affected by haul roads.

6.2.6 River Habitat Surveys were generally undertaken in the same locations and at the same time as a River Corridor Survey (See Section 9).

6.2.7 A summary of locations at which RHS was undertaken within the Country South route section is provided in Table 58.

Table 58: Summary of RHS survey locations

Summary of RCS survey locations Watercourse	Feature type	Ecology survey code	Survey date	CFA number	Approximate distance from the Proposed Scheme (m) and orientation
River Colne	Primary River	21-May-13	020-RH1-028-003	7	Within the Proposed Scheme
River Colne	Primary River	21-May-13	020-RH1-028-004	7	Within the Proposed Scheme
River Colne	Primary River	21-May-13	020-RH1-028-005	7	Within the Proposed Scheme
Misbourne	Primary River	13-Jun-13	020-RH1-037-001	8	Within the Proposed Scheme

Misbourne	Primary River	09-May-13	020-RH1-042-001	8	Within the Proposed Scheme
Stoke Brook - upper channel	Secondary River	09-May-13	020-RH1-057-001	11	Within the Proposed Scheme
Stoke Brook	Tertiary River	09-May-13	020-RH1-057-002	11	Within the Proposed Scheme
Tributary of the Stoke Brook	Primary River	20-May-13	020-RH1-058-001	11	Within the Proposed Scheme
Tributary of Sedrup Ditch	Tertiary River	13-Jun-13	020-RH1-060-001	11	Within the Proposed Scheme
Sedrup Ditch	Primary River	09-May-13	020-RH1-061-001	11	Within the Proposed Scheme
Tributary of Sedrup Ditch	Secondary River	13-Jun-13	020-RH1-061-002	11	Within the Proposed Scheme
Hartwell Ditch/Bear Brook	Primary River	31-May-13	020-RH1-062-001	11	Within the Proposed Scheme
Lower Hartwell Ditch/Bear Brook	Primary River	31-May-13	020-RH1-063-001	11	Within the Proposed Scheme
River Thames	Primary River	08-May-13	020-RH1-064-003	11	Within the Proposed Scheme
Tributary of the Thames	Secondary River	31-May-13	020-RH1-064-004	11	Within the Proposed Scheme
Tributary	Tertiary River	08-May-13	020-RH1-066-001	11	Within the Proposed Scheme
Tributary	Tertiary River	08-May-13	020-RH1-066-002	11	Within the Proposed Scheme
Fleet Marston Brook - Tributary of Thames	Tertiary River	23-May-13	020-RH1-070-001	12	Within the Proposed Scheme
Tributary of Ray	Tertiary River	22-May-13	020-RH1-075-001	12	Within the Proposed Scheme
Tributary of Ray	Tertiary River	22-May-13	020-RH1-076-001	12	Within the Proposed Scheme
Tributary of Ray	Tertiary River	22-May-13	020-RH1-076-002	12	Within the Proposed Scheme
Tributary of Padbury Brook	Tertiary River	08-May-13	020-RH1-081-001	13	Within the Proposed Scheme
Padbury Brook	Primary River	08-May-13	020-RH1-082-001	13	Within the Proposed Scheme
Tributary of Padbury Brook	Tertiary River	28-May-13	020-RH1-082-002	13	Within the Proposed Scheme
Padbury Brook	Primary River	03-Jun-13	020-RH1-084-001	13	Within the Proposed Scheme
Tributary of Padbury Brook	Tertiary	29-May-13	020-RH1-	13	Within the Proposed Scheme

	River		087-001		
Tributary of Great Ouse	Tertiary River	29-May-13	020-RH1-091-001	14	Within the Proposed Scheme
River Great Ouse	Tertiary River	04-Jun-13	020-RH1-092-001	14	Within the Proposed Scheme
Cardiham Water (Tributary of the Great Ouse)	Tertiary River	30-May-13	020-RH1-097-001	14	Within the Proposed Scheme
Tributary of the Great Ouse	Tertiary River	30-May-13	020-RH1-098-001	14	Within the Proposed Scheme
Tributary to the Great Ouse	Tertiary River	30-May-13	020-RH1-099-001	14	Within the Proposed Scheme
Tributary of the Cherwell	Secondary River	04-Jun-13	020-RH1-104-001	15	Within the Proposed Scheme
Lower Thorpe Brook - Tributary of the Cherwell	Tertiary River	07-May-13	020-RH1-105-001	15	Within the Proposed Scheme
Tributary of the Cherwell	Primary River	04-Jun-13	020-RH1-105-002	15	Within the Proposed Scheme
River Cherwell	Primary River	18-Jun-13	020-RH1-108-002	15	Within the Proposed Scheme
Highfurlong Brook	Primary River	06-Jun-13	020-RH1-113-001	15	Within the Proposed Scheme
Tributary to Canal Feeder	Tertiary River	28-Jun-13	020-RH1-113-002	15	Within the Proposed Scheme

6.3 Deviations, constraints and limitations

6.3.1 Some of the locations where the land required for the construction of the Proposed Scheme or haul road crosses a water course could not be surveyed due to access restrictions. These included, but are not limited to, four locations on the River Misbourne in CFA8 (including three potential vent water discharge locations).

Table 59: Summary of locations where requirement for RHS identified but no access available for survey

Watercourse	Crossing Point X	Crossing Point Y	Feature type	Comments	CFA number	Approximate distance from the Proposed Scheme (m) and orientation
New Years Bourne Green	505763	187747	Secondary River	HS2 Crossing	7	Within proposed scheme
Misbourne	499162	193667	Primary River	HS2 Crossing	8	Within the Proposed Scheme
Misbourne	499402	193170	Primary River	Tunnel vent discharge location	8	Within the Proposed Scheme
Misbourne	494874	197935	Primary River	Tunnel vent discharge location	8	Within the Proposed Scheme

Watercourse	Crossing Point X	Crossing Point Y	Feature type	Comments	CFA number	Approximate distance from the Proposed Scheme (m) and orientation
Misbourne	492816	198839	Primary River	Tunnel vent discharge location	8	Within the Proposed Scheme
Tributary of Stoke Brook	484340	209124	Tertiary River	HS2 Crossing	11	Within the Proposed Scheme
Stoke Brook	484305	209146	Primary River	HS2 Crossing	11	Within the Proposed Scheme
Putlowes Farm ditch	478117	215001	Secondary River	Haul Road Crossing	11	Within the Proposed Scheme
Stoke Brook - Lower channel	483939	209357	Tertiary River	Haul Road Crossing	11	Within the Proposed Scheme
Stoke Brook	484357	209143	Primary River	Haul Road Crossing	11	Within the Proposed Scheme
Tributary of Stoke Brook	484365	209138	Tertiary River	Haul Road Crossing	11	Within the Proposed Scheme
Tributary of Stoke Brook	484324	209116	Tertiary River	Haul Road Crossing	11	Within the Proposed Scheme
Tributary of Stoke Brook	484321	209114	Tertiary River	Haul Road Crossing	11	Within the Proposed Scheme
Ditch flowing to Doddershall Brook	473476	218991	Tertiary River	HS2 Crossing	12	Within the Proposed Scheme
Ditch flowing to Doddershall Brook	473434	219039	Tertiary River	HS2 Crossing	12	Within the Proposed Scheme
Doddershall Brook	472352	220370	Tertiary River	HS2 Crossing	12	Within the Proposed Scheme
River Ray	471632	221201	Primary River	HS2 Crossing	12	Within the Proposed Scheme
Drain to Doddershall Brook	472223	220565	Tertiary River	Haul Road Crossing	12	Within the Proposed Scheme
Drain from nature reserve lake (Calovert Jubilee)	468509	225217	Tertiary River	HS2 Crossing	13	Within the Proposed Scheme
Tributary of Padbury Brook	467611	226171	Tertiary River	HS2 Crossing	13	Within the Proposed Scheme
Padbury Brook	466498	226997	Primary River	HS2 Crossing	13	Within the Proposed Scheme
Tributary of Padbury Brook	466454	227027	Tertiary River	HS2 Crossing	13	Within the Proposed Scheme
Tributary of Padbury Brook	465139	228005	Tertiary River	HS2 Crossing	13	Within the Proposed Scheme
Padbury Brook	465064	228073	Primary	HS2 Crossing	13	Within the Proposed Scheme

Watercourse	Crossing Point X	Crossing Point Y	Feature type	Comments	CFA number	Approximate distance from the Proposed Scheme (m) and orientation
			River			
Padbury Brook	464842	228283	Primary River	HS2 Crossing	13	Within the Proposed Scheme
Tributary of Padbury Brook	464703	228424	Primary River	HS2 Crossing	13	Within the Proposed Scheme
Drain from nature reserve lake (Calvert Jubilee)	468503	225203	Tertiary River	Haul Road Crossing	13	Within the Proposed Scheme
Ditch adjacent to drain to Padbury Brook	468926	225753	Tertiary River	Haul Road Crossing	13	Within the Proposed Scheme
Drain to Padbury Brook	468920	225751	Primary River	Haul Road Crossing	13	Within the Proposed Scheme
Drain to Weare Street Gill	462995	231038	Tertiary River	HS2 Crossing	14	Within the Proposed Scheme
River Great Ouse	461233	235576	Tertiary River	HS2 Crossing	14	Within the Proposed Scheme
River Great Ouse	460149	238370	Primary River	HS2 Crossing	14	Within the Proposed Scheme
River Great Ouse (Mill Leat)	460132	238399	Primary River	HS2 Crossing	14	Within the Proposed Scheme
Tributary of the Cherwell (Mill Leat)	451788	247823	Tertiary River	HS2 Crossing	15	Within the Proposed Scheme
Drain to Canal Feeder	446227	253423	Tertiary River	HS2 Crossing	15	Within the Proposed Scheme

6.4 Baseline

Colne (CFA 7)

020-RH1-028-003

Figure 1: 020-RHA-028-003

RIVER HABITAT SURVEY 2003 Version Page 1

A FIELD SURVEY DETAILS

Site Number: leave blank if new site

Site Reference: 020-RH1-028-003

Spot-check 1 Grid Ref: TQ 04022 89694

Spot-check 6 Grid Ref: TQ 04094 89394

End of site Grid Ref: TQ 04077 89188

Reach Reference: BM 38771, 18!

River name: Colne

Date 21/5/2013 Time: 10.30

Surveyor name: Sarah Hodyetts

Accredited Surveyor code: FA019

Is the site part of a river or an artificial channel? River Artificial

Are adverse conditions affecting survey? No Yes

If yes, state Too deep to enter channel

Is bed of river visible? barely or not partially entirely

Is health and safety assessment form attached? Yes No

Number of photographs taken: 3

Photo references: 020-RH1-028-003 P1 210513,
020-RH1-028-003 P2 210513,
020-RH1-028-003 P3 210513

Site surveyed from: left bank right bank channel

When options shown with 'shadow boxes', tick one box only

LEFT banks determined by facing downstream **RIGHT**

B PREDOMINANT VALLEY FORM (within the horizon limit) (tick one box only)

(tick one box only)

shallow vee concave/bowl

deep vee asymmetrical valley

gorge U-shape valley

no obvious valley sides

Distinct flat valley bottom? No Yes Natural terraces? No Yes

C NUMBER OF RIFFLES, POOLS AND POINT BARS (enter total number in boxes)

Riffle(s) 0 Unvegetated point bar(s) 0

Pool(s) 0 Vegetated point bar(s) 0

D ARTIFICIAL FEATURES (indicate total number of occurrences of each category within the 500m site)

If none, tick box	Major			Intermediate			Minor			
	Major	Intermediate	Minor	Major	Intermediate	Minor	Major	Intermediate	Minor	
<input type="checkbox"/>							Outfalls/intakes			
<input type="checkbox"/>							Fords			
<input checked="" type="checkbox"/>							Deflectors/groynes/croys			
	Other - state									

Is channel obviously realigned? No Yes, <33% of site >33% of site

Is channel obviously over-deepened? No Yes, <33% of site >33% of site

Is water impounded by weir/dam? No Yes, <33% of site >33% of site

Figure 2: 020-RHA-028-003

REF: 020-RHA-028-003	RIVER HABITAT SURVEY: TEN SPOT-CHECKS										Page 2 of 4		
spot-check 1 is at: upstream end <input checked="" type="checkbox"/> downstream end <input type="checkbox"/> of site (tick one box)													
E PHYSICAL ATTRIBUTES (to be assessed across channel within 1m-wide transect)													
When boxes 'bordered', only one entry allowed	1	GPS	2	3	4	5	6	GPS	7	8	9	10	GPS
LEFT BANK													
Ring EC or SC if composed of sandy substrate													
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB	NO	NB	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
CHANNEL													
CP: ring either C or P if predominant													
Channel substrate NV, BE, BO, CO, GP, SA, SI, CL, PE, EA, AR	GP	GP	NV	GP	NV	SI	GP	GP	GP	GP	GP	NV	NV
Flow-type NV, FF, CH, BW, UW, CF, RP, UP, SM, NP, DR	SM	SM	SM	RP	RP	RP	RP	RP	RP	RP	RP	RP	RP
Channel modification(s) NK, NO, CV, RS, RI, DA, FO	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS
Channel feature(s) NV, NO, EB, RD, VR, MB, VB, MI, TR	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
For braided rivers only: number of sub-channels													
RIGHT BANK													
Ring EC or SC if composed of sandy substrate													
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV	NV
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
F BANKTOP LAND-USE AND VEGETATION STRUCTURE (to be assessed over a 10m-wide transect)													
Land-use: choose one from BL, BP, CW, CP, SH, OR, WL, MH, AW, OW, RP, IG, TH, RD, SU, TL, IL, PG, NV													
LAND-USE WITHIN 5m OF LEFT BANKTOP	SH	SH	SH	TH	SH	SH	SH	TH	TH	TH	TH	TH	TH
LEFT BANKTOP (structure within 1m) B/U/S/C/NV	S	S	S	S	S	S	S	S	S	S	S	S	S
LEFT BANK-FACE (structure) B/U/S/C/NV	S	S	S	S	S	S	S	S	S	S	S	S	S
RIGHT BANK-FACE (structure) B/U/S/C/NV	S	S	S	S	S	S	S	S	S	S	S	S	S
RIGHT BANKTOP (structure within 1m) B/U/S/C/NV	S	S	S	S	S	S	S	S	S	S	S	S	S
LAND-USE WITHIN 5m OF RIGHT BANKTOP	OW	BL	BL	BL	SH	BL	BL	TH	BL	BL	BL	BL	BL
G CHANNEL VEGETATION TYPES (to be assessed over a 10m-wide transect; use E or NV)													
None (✓) or Not Visible (NV)													
Liverworts/mosses/lichens			NV	NV	NV	NV				NV	NV	NV	NV
Emergent broad-leaved herbs			✓	✓	✓	✓	✓	✓					✓
Emergent reeds/sedges/rushes/grasses/horsetails	✓	E	✓	✓	✓	✓	✓	✓					E
Floating-leaved (rooted)		✓	✓										✓
Free-floating													
Amphibious	✓			✓									✓
Submerged broad-leaved	✓		NV	NV	NV	NV	✓	E	NV	NV	NV	NV	NV
Submerged linear-leaved			NV	NV	NV	NV		✓	NV	NV	NV	NV	NV
Submerged fine-leaved		✓	NV	NV	NV	NV			NV	NV	NV	NV	NV
Filamentous algae			NV	NV	NV	NV			NV	NV	NV	NV	NV
Use end column for overall assessment over 500m, including types not occurring in spot-checks (use ✓, E or NV)													

Figure 3: 020-RHA-028-003

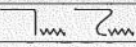
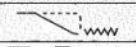
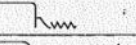

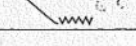
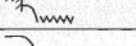
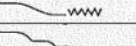
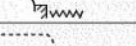




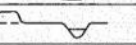

SITE REF. 020-RHA-028-003		RIVER HABITAT SURVEY : 500m SWEEP-UP				Page 3 of 3	
H LAND USE WITHIN 30m OF BANKTOP (tick one box for each land use)							
	L	R		L	R		
Broadleaf/mixed woodland (semi-natural) (BL)		E	Natural open water (OW)	E	E		
Broadleaf/mixed plantation (BP)			Rough/unimproved grassland/pasture (RP)				
Coniferous woodland (semi-natural) (CW)			Improved/semi-improved grassland (IG)				
Coniferous plantation (CP)			Tall herb/rank vegetation (TH)	✓	✓		
Scrub & shrubs (SH)	E	✓	Rock, scree or sand dunes (RD)				
Orchard (OR)			Suburban/urban development (SU)				
Wetland (e.g. bog, marsh, fen) (WL)			Tilled land (TL)				
Moorland/heath (MH)			Irrigated land (IL)				
Artificial open water (AW)			Parkland or gardens (PG)				
			Not visible (NV)				✓
I BANK PROFILES (tick one box for each profile)							
Natural/unmodified	L	R	Artificial/modified	L	R		
Vertical/undercut 	✓		Resectioned (reprofiled) 	E	E		
Vertical with toe 			Reinforced - whole 				
Steep (>45°) 	E	E	Reinforced - top only 				
Gentle 	✓	E	Reinforced - toe only 				
Composite 			Artificial two-stage 				
Natural berm 	✓		Poached bank 				
			Embanked 				
			Set-back embankment 				
J EXTENT OF TREES AND ASSOCIATED FEATURES (record even if <1%)							
TREES (tick one box per bank)				ASSOCIATED FEATURES (tick one box per feature)			
	Left	Right		None	Present	E (>33%)	
None	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Shading of channel	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Isolated/scattered	<input checked="" type="checkbox"/>	<input type="checkbox"/>	*Overhanging boughs	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Regularly spaced, single	<input type="checkbox"/>	<input type="checkbox"/>	*Exposed bankside roots	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Occasional clumps	<input type="checkbox"/>	<input type="checkbox"/>	*Underwater tree roots	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Semi-continuous	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Fallen trees	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Continuous	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Large woody debris	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
K EXTENT OF CHANNEL AND BANK FEATURES (tick one box for each feature) (record even if <1%)							
	None	Present	E (>33%)	None	Present	E (>33%)	
*Free fall flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed bedrock	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chute flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Broken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated bedrock/boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unbroken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rippled flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Vegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*Upwelling	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Mature island(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smooth flow	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Unvegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No perceptible flow	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Vegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No flow (dry)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Unvegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marginal deadwater	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Vegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eroding cliff(s)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	*Unvegetated silt deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stable cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Discrete unvegetated sand deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				*Discrete unvegetated gravel deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 4: 020-RHA-028-003

REF. 020-011-028-003 **RIVER HABITAT SURVEY : DIMENSIONS AND INFLUENCES** Page 4 of 4

CHANNEL DIMENSIONS (to be measured at one location on a straight uniform section, preferably across a riffle)

LEFT BANK		CHANNEL		RIGHT BANK	
Banktop height (m)	1.5	Bankfull width (m)	12	Banktop height (m)	1
Is banktop height also bankfull height? (Y or N)	N	Water width (m)	10	Is banktop height also bankfull height? (Y or N)	Y
Embanked height (m)	/	Water depth (m)	NK	Embanked height (m)	/

If trashline lower than banktop, indicate: height above water (m) = / width from bank to bank (m) = /

Bed material at site is: consolidated unconsolidated (loose) unknown

Location of measurements is: riffle other (state) Rippled flow (no riffle)

None Very large boulders (>1m) Backwater(s) Marsh(es)

Braided channels *Debris dam(s) Floodplain boulder deposits Flush(es)

Side channel(s) *Leafy debris Water meadow(s) Natural open water

*Natural waterfall(s) > 5m high Fringing reed-bank(s) Fen(s) Others (state)

*Natural waterfall(s) < 5m high Quaking bank(s) Bog(s)

Natural cascade(s) *Sink hole(s) Wet woodland(s)

N CHOKED CHANNEL (tick one box)

Is 33% or more of the channel choked with vegetation? No Yes

O NOTABLE NUISANCE PLANT SPECIES (Use Y or E (≥ 33% length) *record even if < 33%)

None	bankface	banktop to 50m	bankface	banktop to 50m
<input type="checkbox"/>	*Giant hogweed <input type="checkbox"/>	<input type="checkbox"/>	*Himalayan balsam <input type="checkbox"/>	<input type="checkbox"/>
	*Japanese knotweed <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	*Other (state)..... <input type="checkbox"/>	<input type="checkbox"/>

P OVERALL CHARACTERISTICS (Circle appropriate words, add others as necessary)

Major impacts: landfill - tipping - litter - sewage - pollution - drought - abstraction - mill - dam - road - rail - industry - housing mining - quarrying - overdeepening - afforestation - fisheries management - silting - waterlogging - hydroelectric power

Evidence of recent management: dredging - bank mowing - weed cutting - enhancement - river rehabilitation - gravel extraction - other (please specify) on bankside Grebe.

Animals: otter - mink - water vole - kingfisher - dipper - grey wagtail - sand martin - heron - dragonflies/damselflies

Other significant observations: if necessary use separate sheet to describe overall characteristics and relevant observations

High potential for nesting birds along river bank and roosting bats in mature trees on river banks. Broadwater Lake is on left and Denham Ski Club on right

Q ALDERS (tick one box in each of the two categories) (record even if /)

*Alders? None Present Extensive *Diseased Alders? None Present Extensive

R FIELD SURVEY QUALITY CONTROL (✓ boxes to confirm checks)

Have you taken at least two photos that illustrate the general character of the site and additional photos of any weirs/ sluices and major/intermediate structures across the channel?

Have you completed all ten spot-checks and made entries in all boxes in E & F on page 2?

Have you completed column 11 of section G (and E if appropriate) on page 2?

Have you recorded in section C the number of riffles, pools and point bars (even if 0) on page 1?

Have you given an accurate (alphanumeric) grid reference for spot-checks 1, 6 and end of site (page 1)?

Have you stated whether spot-check 1 is at the upstream or downstream end of the site (top of page 2)?

Have you cross-checked your spot-check and sweep-up responses with the channel modification indicators given on page 2 of the spot-check key?

020-RH1-028-004

Figure 5: 020-RH1-028-004

RIVER HABITAT SURVEY 2003 Version Page 1 of 4

A FIELD SURVEY DETAILS

Site Number: leave blank if new site

Site Reference: 020-RH1-028-004

Spot-check 1 Grid Ref: TQ 04077 891 88

Spot-check 6 Grid Ref: TQ 04168 88993

End of site Grid Ref: TQ 04293 88794

Reach Reference: BM 38 271
Crossing 18.2.

River name: Cohne

Date 21/05/2013 Time:

Surveyor name: Sarah Hodgkiss

Accredited Surveyor code: FA019

Is the site part of a river or an artificial channel? River Artificial

Are adverse conditions affecting survey? No Yes

If yes, state

Is bed of river visible? barely or not partially ± entirely

Is health and safety assessment form attached? Yes No

Number of photographs taken: 5 020-RH1-028-004 P1 210513,
020-RH1-028-004 P2 210513,
020-RH1-028-004 P4 210513,
020-RH1-028-004 P5 210513.

Photo references: 020-RH1-028-004 P1 210513,
020-RH1-028-004 P2 210513,
020-RH1-028-004 P4 210513,
020-RH1-028-004 P5 210513.

Site surveyed from: left bank right bank channel

When options shown with 'shadow boxes', tick one box only

LEFT banks determined by facing downstream **RIGHT**

B PREDOMINANT VALLEY FORM (within the horizon limit) (tick one box only)

(tick one box only)

shallow vee concave/bowl

deep vee asymmetrical valley

gorge U-shape valley

no obvious valley sides

Distinct flat valley bottom? No Yes Natural terraces? No Yes

C NUMBER OF RIFFLES, POOLS AND POINT BARS (enter total number in boxes)

Riffle(s) 0 Unvegetated point bar(s) 0

Pool(s) 0 Vegetated point bar(s) 1

D ARTIFICIAL FEATURES (indicate total number of occurrences of each category within the 500m site)

If none, tick box	Major			Intermediate			Minor			
	Major	Intermediate	Minor	Major	Intermediate	Minor	Major	Intermediate	Minor	
<input type="checkbox"/>	Weirs/sluices						Outfalls/intakes			
<input checked="" type="checkbox"/>	Culverts						Fords			
<input type="checkbox"/>	Bridges						Deflectors/groynes/croys			
<input type="checkbox"/>	Other - state									

Is channel obviously realigned? No Yes, <33% of site ≥33% of site

Is channel obviously over-deepened? No Yes, <33% of site ≥33% of site

Is water impounded by weir/dam? No Yes, <33% of site ≥33% of site

Figure 6: 020-RH1-028-004

SITE REF: 020-RH1-028-004		RIVER HABITAT SURVEY: TEN SPOT-CHECKS										Page 2 of 4			
Spot-check 1 is at: upstream end <input checked="" type="checkbox"/>		downstream end <input type="checkbox"/>		of site (tick one box)											
E. PHYSICAL ATTRIBUTES (to be assessed across channel within 10m wide transect)															
When boxes 'bordered', only one entry allowed		1 GPS	2	3	4	5	6 GPS	7	8	9	10	GPS			
LEFT BANK		Ring EC or SC if composed of sandy substrate													
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI		EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA			
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM		RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS			
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB		NB	NO	NO	NO	NO	NV	NO	NO	NO	NO	NO			
CHANNEL		GP ring either G or R if predominant													
Channel substrate NV, BE, BO, CO, GP, SA, SI, CL, PE, EA, AR		NV	NV	NV	SI	SI	NV	NV	NV	NV	NV	NV			
Flow-type NV, FF, CH, BW, UW, CF, RP, UP, SM, NP, DR		RP	SM	RP	SM	SM	SM	SM	SM	SM	SM	SM			
Channel modification(s) NK, NO, CV, RS, RI, DA, FO		RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS			
Channel feature(s) NV, NO, EB, RO, VR, MB, VB, MI, TR		NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO			
For braided rivers only: number of sub-channels		/	/	/	/	/	/	/	/	/	/	/			
RIGHT BANK		Ring EC or SC if composed of sandy substrate													
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI		EA	NV	NV	NV	EA	NV	NV	NV	NV	NV	NV			
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM		RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS			
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB		NO	VP	NO	NO	NO	NO	NO	NO	NO	NO	NO			
F. BANKTOP LAND USE AND VEGETATION STRUCTURE (to be assessed over a 10m wide transect)															
Land-use: choose one from BL, BP, CW, CP, SH, OR, WL, MH, AW, OW, RP, IG, TH, RD, SU, TL, IL, PG, NV															
LAND-USE WITHIN 5m OF LEFT BANKTOP		SH	SH	TH	TH	TH	TH	TH	TH	TH	TH	TH			
LEFT BANKTOP (structure within 1m) B/U/S/C/NV		S	S	S	S	S	S	S	S	S	S	S			
LEFT BANK-FACE (structure) B/U/S/C/NV		S	S	S	S	S	S	S	S	S	S	S			
RIGHT BANK-FACE (structure) B/U/S/C/NV		S	S	S	S	S	S	S	S	S	S	S			
RIGHT BANKTOP (structure within 1m) B/U/S/C/NV		S	S	S	S	S	S	S	S	S	S	S			
LAND-USE WITHIN 5m OF RIGHT BANKTOP		BL	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL			
G. CHANNEL VEGETATION TYPES (to be assessed over a 10m wide transect, use E (100% area) / or NV (not visible))															
None (✓) or Not Visible (NV)							NV								
Liverworts/mosses/lichens		NV	NV	NV	NV	NV		NV	NV	NV	NV	NV			
Emergent broad-leaved herbs		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓			
Emergent reeds/sedges/rushes/grasses/horsetails		E	✓	✓	✓	✓		E	✓	✓	✓	✓			
Floating-leaved (rooted)										✓	✓	✓			
Free-floating															
Amphibious					✓			E	✓	E	✓	✓			
Submerged broad-leaved		NV	NV	NV	NV	NV		NV	NV	NV	NV	NV			
Submerged linear-leaved		NV	NV	NV	NV	NV		NV	NV	NV	NV	NV			
Submerged fine-leaved		NV	NV	NV	NV	NV		NV	NV	NV	NV	NV			
Filamentous algae		NV	NV	NV	NV	NV		NV	NV	NV	NV	NV			
Use end column for overall assessment over 500m, including types not occurring in spot-checks (use ✓, E or NV)															

↑ Enter channel substrate(s) not occurring as predominant in spot-checks but present in > 1% of whole site.

Figure 7: 020-RH1-028-004

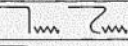
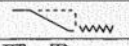
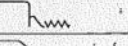
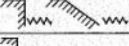
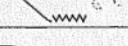
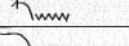
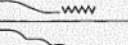
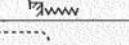

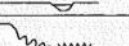
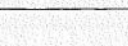

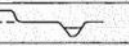

SITE REF. <u>020-RH1-028-004</u>		RIVER HABITAT SURVEY : 500m SWEEP-UP				Page 3 of 4	
I. LAND USE WITHIN 50m OF BANKTOP (Use <input type="checkbox"/> (present) or E (<input checked="" type="checkbox"/> 33% bank length))							
	L	R		L	R		
Broadleaf/mixed woodland (semi-natural) (BL)		E	Natural open water (OW)		E		
Broadleaf/mixed plantation (BP)			Rough/unimproved grassland/pasture (RP)				
Coniferous woodland (semi-natural) (CW)			Improved/semi-improved grassland (IG)				
Coniferous plantation (CP)			Tall herb/rank vegetation (TH)		E		
Scrub & shrubs (SH)	E		Rock, scree or sand dunes (RD)				
Orchard (OR)			Suburban/urban development (SU)				
Wetland (e.g. bog, marsh, fen) (WL)			Tilled land (TL)				
Moorland/heath (MH)			Irrigated land (IL)				
Artificial open water (AW)			Parkland or gardens (PG)				
			Not visible (NV)				
J. BANK PROFILES (Use <input type="checkbox"/> (present) or E (<input checked="" type="checkbox"/> 33% bank length))							
Natural/unmodified	L	R	Artificial/modified	L	R		
Vertical/undercut 			Resectioned (reprofiled) 	E	E		
Vertical with toe 			Reinforced - whole 				
Steep (>45°) 	E	E	Reinforced - top only 				
Gentle 	E	✓	Reinforced - toe only 				
Composite 		✓	Artificial two-stage 				
Natural berm 			Poached bank 				
			Embanked 				
			Set-back embankment 				
K. EXTENT OF TREES AND ASSOCIATED FEATURES (record even if <1%)							
TREES (tick one box per bank)				ASSOCIATED FEATURES (tick one box per feature)			
	Left	Right		None	Present	E (>33%)	
None	<input type="checkbox"/>	<input type="checkbox"/>	Shading of channel	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Isolated/scattered	<input checked="" type="checkbox"/>	<input type="checkbox"/>	*Overhanging boughs	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Regularly spaced, single	<input type="checkbox"/>	<input type="checkbox"/>	*Exposed bankside roots	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Occasional clumps	<input type="checkbox"/>	<input type="checkbox"/>	*Underwater tree roots	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Semi-continuous	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Fallen trees	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Continuous	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Large woody debris	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
L. EXTENT OF CHANNEL AND BANK FEATURES (tick one box for each feature) (record even if <1%)							
	None	Present	E (>33%)	None	Present	E (>33%)	
*Free fall flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed bedrock	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chute flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Broken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated bedrock/boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unbroken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rippled flow	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Vegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*Upwelling	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Mature island(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smooth flow	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Unvegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No perceptible flow	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Vegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No flow (dry)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Unvegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marginal deadwater	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Vegetated point bar(s)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Eroding cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Unvegetated silt deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stable cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Discrete unvegetated sand deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				*Discrete unvegetated gravel deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 8: 020-RH1-028-004

SITE REF. <u>020-RH1-028-004</u>		RIVER HABITAT SURVEY : DIMENSIONS AND INFLUENCES		Page 4 of 4																									
I CHANNEL DIMENSIONS (to be measured at one location on a straight uniform section, preferably across a riffle)																													
LEFT BANK		CHANNEL		RIGHT BANK																									
Banktop height (m)	<u>1</u>	Bankfull width (m)	<u>18</u>	Banktop height (m)	<u>1</u>																								
Is banktop height also bankfull height? (Y or N)	<u>Y</u>	Water width (m)	<u>15</u>	Is banktop height also bankfull height? (Y or N)	<u>N</u>																								
Embanked height (m)	<u>/</u>	Water depth (m)	<u>NK</u>	Embanked height (m)	<u>/</u>																								
If trashline lower than banktop, indicate: height above water (m) = <u>/</u> width from bank to bank (m) = <u>/</u>																													
Bed material at site is: consolidated <input type="checkbox"/> unconsolidated (loose) <input checked="" type="checkbox"/> unknown <input type="checkbox"/>																													
Location of measurements is: riffle <input type="checkbox"/> other <input checked="" type="checkbox"/> (state) <u>Smooth flow</u>																													
<table border="0"> <tr> <td>None <input type="checkbox"/></td> <td>Very large boulders (>1m) <input type="checkbox"/></td> <td>Backwater(s) <input type="checkbox"/></td> <td>Marsh(es) <input type="checkbox"/></td> </tr> <tr> <td>Braided channels <input type="checkbox"/></td> <td>*Debris dam(s) <input type="checkbox"/></td> <td>Floodplain boulder deposits <input type="checkbox"/></td> <td>Flush(es) <input type="checkbox"/></td> </tr> <tr> <td>Side channel(s) <input type="checkbox"/></td> <td>*Leafy debris <input type="checkbox"/></td> <td>Water meadow(s) <input type="checkbox"/></td> <td>Natural open water <input checked="" type="checkbox"/></td> </tr> <tr> <td>*Natural waterfall(s) > 5m high <input type="checkbox"/></td> <td>Fringing reed-bank(s) <input type="checkbox"/></td> <td>Fen(s) <input type="checkbox"/></td> <td>Others (state) <input type="checkbox"/></td> </tr> <tr> <td>*Natural waterfall(s) < 5m high <input type="checkbox"/></td> <td>Quaking bank(s) <input type="checkbox"/></td> <td>Bog(s) <input type="checkbox"/></td> <td></td> </tr> <tr> <td>Natural cascade(s) <input type="checkbox"/></td> <td>*Sink hole(s) <input type="checkbox"/></td> <td>Wet woodland(s) <input type="checkbox"/></td> <td></td> </tr> </table>						None <input type="checkbox"/>	Very large boulders (>1m) <input type="checkbox"/>	Backwater(s) <input type="checkbox"/>	Marsh(es) <input type="checkbox"/>	Braided channels <input type="checkbox"/>	*Debris dam(s) <input type="checkbox"/>	Floodplain boulder deposits <input type="checkbox"/>	Flush(es) <input type="checkbox"/>	Side channel(s) <input type="checkbox"/>	*Leafy debris <input type="checkbox"/>	Water meadow(s) <input type="checkbox"/>	Natural open water <input checked="" type="checkbox"/>	*Natural waterfall(s) > 5m high <input type="checkbox"/>	Fringing reed-bank(s) <input type="checkbox"/>	Fen(s) <input type="checkbox"/>	Others (state) <input type="checkbox"/>	*Natural waterfall(s) < 5m high <input type="checkbox"/>	Quaking bank(s) <input type="checkbox"/>	Bog(s) <input type="checkbox"/>		Natural cascade(s) <input type="checkbox"/>	*Sink hole(s) <input type="checkbox"/>	Wet woodland(s) <input type="checkbox"/>	
None <input type="checkbox"/>	Very large boulders (>1m) <input type="checkbox"/>	Backwater(s) <input type="checkbox"/>	Marsh(es) <input type="checkbox"/>																										
Braided channels <input type="checkbox"/>	*Debris dam(s) <input type="checkbox"/>	Floodplain boulder deposits <input type="checkbox"/>	Flush(es) <input type="checkbox"/>																										
Side channel(s) <input type="checkbox"/>	*Leafy debris <input type="checkbox"/>	Water meadow(s) <input type="checkbox"/>	Natural open water <input checked="" type="checkbox"/>																										
*Natural waterfall(s) > 5m high <input type="checkbox"/>	Fringing reed-bank(s) <input type="checkbox"/>	Fen(s) <input type="checkbox"/>	Others (state) <input type="checkbox"/>																										
*Natural waterfall(s) < 5m high <input type="checkbox"/>	Quaking bank(s) <input type="checkbox"/>	Bog(s) <input type="checkbox"/>																											
Natural cascade(s) <input type="checkbox"/>	*Sink hole(s) <input type="checkbox"/>	Wet woodland(s) <input type="checkbox"/>																											
N CHOKED CHANNEL (tick one box)																													
Is 33% or more of the channel choked with vegetation? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>																													
O NOTABLE NUISANCE PLANT SPECIES Use Y or F (> 33% length) *record even if <1%																													
<table border="0"> <tr> <td>None <input checked="" type="checkbox"/></td> <td>bankface</td> <td>banktop to 50m</td> <td>bankface</td> <td>banktop to 50m</td> </tr> <tr> <td>*Giant hogweed <input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>*Himalayan balsam <input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>*Japanese knotweed <input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>*Other (state)..... <input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>						None <input checked="" type="checkbox"/>	bankface	banktop to 50m	bankface	banktop to 50m	*Giant hogweed <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Himalayan balsam <input type="checkbox"/>	<input type="checkbox"/>	*Japanese knotweed <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Other (state)..... <input type="checkbox"/>	<input type="checkbox"/>									
None <input checked="" type="checkbox"/>	bankface	banktop to 50m	bankface	banktop to 50m																									
*Giant hogweed <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Himalayan balsam <input type="checkbox"/>	<input type="checkbox"/>																									
*Japanese knotweed <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Other (state)..... <input type="checkbox"/>	<input type="checkbox"/>																									
P OVERALL CHARACTERISTICS (Circle appropriate words, add others as necessary)																													
<p>Major impacts: landfill - tipping - litter - sewage - pollution - drought - abstraction - mill - dam - road - rail - industry - housing mining - quarrying - overdeepening - afforestation - fisheries management - silting - waterlogging - hydroelectric power</p> <p>Evidence of recent management: dredging - bank mowing - weed cutting - enhancement - river rehabilitation - gravel extraction - other (please specify)</p> <p>Animals: otter - mink - water vole - kingfisher - dipper - grey wagtail - sand martin - heron - dragonflies/damselflies</p> <p>Other significant observations: if necessary use separate sheet to describe overall characteristics and relevant observations</p>																													
Q ALDERS (tick one box in each of the two categories) *record even if <1%																													
*Alders? None <input type="checkbox"/> Present <input checked="" type="checkbox"/> Extensive <input type="checkbox"/>			*Diseased Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>																										
R FIELD SURVEY QUALITY CONTROL (✓ boxes to confirm checks)																													
<p>Have you taken at least two photos that illustrate the general character of the site and additional photos of any weirs/ sluices and major/intermediate structures across the channel? <input checked="" type="checkbox"/></p> <p>Have you completed all ten spot-checks and made entries in all boxes in E & F on page 2? <input checked="" type="checkbox"/></p> <p>Have you completed column 11 of section G (and E if appropriate) on page 2? <input checked="" type="checkbox"/></p> <p>Have you recorded in section C the number of riffles, pools and point bars (even if 0) on page 1? <input checked="" type="checkbox"/></p> <p>Have you given an accurate (alphanumeric) grid reference for spot-checks 1, 6 and end of site (page 1)? <input checked="" type="checkbox"/></p> <p>Have you stated whether spot-check 1 is at the upstream or downstream end of the site (top of page 2)? <input checked="" type="checkbox"/></p> <p>Have you cross-checked your spot-check and sweep-up responses with the channel modification indicators given on page 2 of the spot-check key? <input checked="" type="checkbox"/></p>																													

020-RH1-028-005

Figure 9: 020-RH1-028-005

RIVER HABITAT SURVEY 2003 Version				Page 1 of 4					
A FIELD SURVEY DETAILS									
Site Number: <small>leave blank if new site</small> Site Reference: 020-RH1-028-005 Spot-check 1 Grid Ref: 920929388794 Spot-check 6 Grid Ref: TQ0435088593 End of site Grid Ref: TQ04464882947 Reach Reference: BM 38271 Crossing 183 River name: Calne Date: 21/05/2013 Time: 15.30 Surveyor name: Sarah Hodgatts Accredited Surveyor code: FA0109		Is the site part of a river or an artificial channel? River <input checked="" type="checkbox"/> Artificial <input type="checkbox"/> Are adverse conditions affecting survey? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> If yes, state Is bed of river visible? barely or not <input checked="" type="checkbox"/> partially <input type="checkbox"/> ± entirely <input type="checkbox"/> Is health and safety assessment form attached? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Number of photographs taken: 5 020-RH1-028-005 P1 210513, 020-RH1-028-005 P2 210513, 020-RH1-028-005 P3 210513, 020-RH1-028-005 P4 210513, 020-RH1-028-005 P5 210513. Photo references: Site surveyed from: left bank <input checked="" type="checkbox"/> right bank <input type="checkbox"/> channel <input type="checkbox"/>							
<input type="checkbox"/> When options shown with 'shadow boxes', tick one box only									
LEFT				RIGHT					
B PREDOMINANT VALLEY FORM (within the horizon limit) (tick one box only)									
(tick one box only) <table style="width:100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> <input type="checkbox"/> shallow vee <input type="checkbox"/> deep vee <input type="checkbox"/> gorge </td> <td style="width: 50%; vertical-align: top;"> <input type="checkbox"/> concave/bowl <input type="checkbox"/> asymmetrical valley <input type="checkbox"/> U-shape valley <input checked="" type="checkbox"/> no obvious valley sides </td> </tr> </table>								<input type="checkbox"/> shallow vee <input type="checkbox"/> deep vee <input type="checkbox"/> gorge	<input type="checkbox"/> concave/bowl <input type="checkbox"/> asymmetrical valley <input type="checkbox"/> U-shape valley <input checked="" type="checkbox"/> no obvious valley sides
<input type="checkbox"/> shallow vee <input type="checkbox"/> deep vee <input type="checkbox"/> gorge	<input type="checkbox"/> concave/bowl <input type="checkbox"/> asymmetrical valley <input type="checkbox"/> U-shape valley <input checked="" type="checkbox"/> no obvious valley sides								
Distinct flat valley bottom? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>				Natural terraces? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>					
C NUMBER OF RIFFLES, POOLS AND POINT BARS (enter total number in boxes)									
Riffle(s) 0		Unvegetated point bar(s) 0		Pool(s) 0		Vegetated point bar(s) 0			
D ARTIFICIAL FEATURES (indicate total number of occurrences of each category within the 500m site)									
If none, tick box <input type="checkbox"/>	Major	Intermediate	Minor	Major	Intermediate	Minor			
	Weirs/slucices			Outfalls/intakes					
	Culverts			Fords					
	Bridges			Deflectors/groynes/croys					
	Other - state								
Is channel obviously realigned? No <input type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input checked="" type="checkbox"/> Is channel obviously over-deepened? No <input checked="" type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input checked="" type="checkbox"/> Is water impounded by weir/dam? No <input checked="" type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input type="checkbox"/>									

Figure 10: 020-RH1-028-005

SITE REF. 020-RH1-028-005		RIVER HABITAT SURVEY: TEN SPOT-CHECKS										Page 2 of 4	
Spot-check 1 is at: upstream end <input checked="" type="checkbox"/>		downstream end <input type="checkbox"/>		of site (tick one box)									
E PHYSICAL ATTRIBUTES (to be assessed across channel within 1m wide transect)													
When boxes 'bordered', only one entry allowed		1 GPS	2	3	4	5	6 GPS	7	8	9	10	GPS	
LEFT BANK		Ring EC or SC if composed of sandy substrate											
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI		EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM		RS	RS	NK	NO	NO	NO	NO	NO	NO	NO	NO	
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB		NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
CHANNEL		GP: ring either G or P if predominant											
Channel substrate NV, BE, BO, CO, GP, SA, SI, CL, PE, EA, AR		SI	SI	SI	GP	SI	GP	GP	GP	GP	GP	GP	
Flow-type NV, FF, CH, BW, UW, CF, RP, UP, SM, NP, DR		SM	SM	SM	SM	SM	RP	RP	RP	RP	RP	RP	
Channel modification(s) NK, NO, CV, RS, RI, DA, FO		NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
Channel feature(s) NV, NO, EB, RO, VR, MB, VB, MI, TR		NO	NO	NO	NO	VB	TR	NV	NO	NO	NO	NO	
For braided rivers only: number of sub-channels													
RIGHT BANK		Ring EC or SC if composed of sandy substrate											
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI		EA	EA	EA	EA	CC	NV	NV	EA	EA	EA	EA	
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM		RS	RS	NK	NO	RI	NK	NK	NO	NO	NO	NO	
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB		NO	NO	NO	NO	NO	NV	NV	NO	NO	NO	NO	
F BANKTOP LAND-USE AND VEGETATION STRUCTURE (to be assessed over a 10m wide transect)													
Land-use: choose one from BL, BP, CW, CP, SH, OR, WL, MH, AW, OW, RP, IG, TH, RD, SU, TL, IL, PG, NV													
LAND-USE WITHIN 5m OF LEFT BANKTOP		TH	TH	BL	TH	BL	BL	BL	BL	BL	BL	BL	
LEFT BANKTOP (structure within 1m) B/U/S/C/NV		S	S	S	S	S	S	S	S	S	S	S	
LEFT BANK-FACE (structure) B/U/S/C/NV		S	S	S	S	S	S	S	S	S	S	S	
RIGHT BANK-FACE (structure) B/U/S/C/NV		S	S	S	S	B	NV	NV	S	S	S	S	
RIGHT BANKTOP (structure within 1m) B/U/S/C/NV		S	S	S	S	U	NV	NV	S	S	S	S	
LAND-USE WITHIN 5m OF RIGHT BANKTOP		BL	BL	BL	BL	PG	NV	NV	BL	BL	BL	BL	
G CHANNEL VEGETATION TYPES (to be assessed over a 10m wide transect: use E (>5% area), ✓ (present) or NV (not visible))													
None (✓) or Not Visible (NV)													
Liverworts/mosses/lichens		NV		NV									
Emergent broad-leaved herbs				✓	✓	✓	✓	✓	✓	✓	✓	✓	
Emergent reeds/sedges/rushes/grasses/horsetails		✓	✓	✓		✓	✓	✓	✓		✓	✓	
Floating-leaved (rooted)		✓	✓	✓		✓		✓		✓	✓	✓	
Free-floating													
Amphibious		✓			✓	E	E	E		✓	✓	E	
Submerged broad-leaved		NV	✓	NV	E	E						✓	
Submerged linear-leaved		NV		NV									
Submerged fine-leaved		NV		NV									
Filamentous algae		NV		NV									
Use end column for overall assessment over 500m, including types not occurring in spot-checks (use ✓, E or NV)													

↑ Enter channel substrate(s) not occurring as predominant in spot-checks but present in >1% of whole site.

Figure 11: 020-RH1-028-005

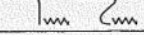


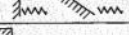
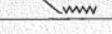







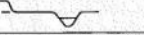

SITE REF. 020-RH1-028-005		RIVER HABITAT SURVEY : 500m SWEEP-UP				Page 3 of 4	
II LAND USE WITHIN 50m OF BANKTOP *record even if <1%							
	L	R		L	R		
Broadleaf/mixed woodland (semi-natural) (BL)	E	E	Natural open water (OW)	✓			
Broadleaf/mixed plantation (BP)			Rough/unimproved grassland/pasture (RP)				
Coniferous woodland (semi-natural) (CW)			Improved/semi-improved grassland (IG)				
Coniferous plantation (CP)	✓		Tall herb/rank vegetation (TH)				
Scrub & shrubs (SH)			Rock, scree or sand dunes (RD)				
Orchard (OR)			Suburban/urban development (SU)				
Wetland (e.g. bog, marsh, fen) (WL)			Tilled land (TL)				
Moorland/heath (MH)			Irrigated land (IL)				
Artificial open water (AW)			Parkland or gardens (PG)				✓
			Not visible (NV)				✓
I BANK PROFILES *record even if <1% bank height							
Natural/unmodified	L	R	Artificial/modified	L	R		
Vertical/undercut 			Resectioned (reprofiled) 	✓	✓		
Vertical with toe 			Reinforced - whole 		✓		
Steep (>45°) 	✓	✓	Reinforced - top only 				
Gentle 	E	E	Reinforced - toe only 				
Composite 			Artificial two-stage 				
Natural berm 			Poached bank 				
			Embanked 				
			Set-back embankment 				
J EXTENT OF TREES AND ASSOCIATED FEATURES *record even if <1%							
TREES (tick one box per bank)				ASSOCIATED FEATURES (tick one box per feature)			
	Left	Right		None	Present	E (≥33%)	
None	<input type="checkbox"/>	<input type="checkbox"/>	Shading of channel	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Isolated/scattered	<input type="checkbox"/>	<input type="checkbox"/>	*Overhanging boughs	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Regularly spaced, single	<input type="checkbox"/>	<input type="checkbox"/>	*Exposed bankside roots	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Occasional clumps	<input type="checkbox"/>	<input checked="" type="checkbox"/>	*Underwater tree roots	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Semi-continuous	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Fallen trees	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Continuous	<input type="checkbox"/>	<input type="checkbox"/>	Large woody debris	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
K EXTENT OF CHANNEL AND BANK FEATURES (tick one box for each feature) *record even if <1%							
	None	Present	E (≥33%)	None	Present	E (≥33%)	
*Free fall flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed bedrock	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chute flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Broken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated bedrock/boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unbroken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated mid-channel bar(s)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Rippled flow	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Vegetated mid-channel bar(s)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*Upwelling	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Mature island(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smooth flow	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Unvegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No perceptible flow	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Vegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No flow (dry)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marginal deadwater	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Vegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eroding cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Unvegetated silt deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stable cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Discrete unvegetated sand deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				*Discrete unvegetated gravel deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 12: 020-RH1-028-005

SITE REF. 020-RH1-028-005		RIVER HABITAT SURVEY : DIMENSIONS AND INFLUENCES		Page 4 of 4	
L CHANNEL DIMENSIONS (to be measured at one location on a straight uniform section, preferably across a riffle)					
LEFT BANK		CHANNEL		RIGHT BANK	
Banktop height (m)	1	Bankfull width (m)	21	Banktop height (m)	1
Is banktop height also bankfull height? (Y or N)	Y	Water width (m)	20	Is banktop height also bankfull height? (Y or N)	Y
Embanked height (m)	/	Water depth (m)	1	Embanked height (m)	/
If trashline lower than banktop, indicate: height above water (m) = / width from bank to bank (m) = /					
Bed material at site is: consolidated <input type="checkbox"/> unconsolidated (loose) <input checked="" type="checkbox"/> unknown <input type="checkbox"/>					
Location of measurements is: riffle <input type="checkbox"/> other <input checked="" type="checkbox"/> (state) <u>Rippled flow</u>					
None <input type="checkbox"/> Very large boulders (>1m) <input type="checkbox"/> Backwater(s) <input type="checkbox"/> Marsh(es) <input type="checkbox"/> Braided channels <input type="checkbox"/> *Debris dam(s) <input type="checkbox"/> Floodplain boulder deposits <input type="checkbox"/> Flush(es) <input type="checkbox"/> Side channel(s) <input type="checkbox"/> *Leafy debris <input type="checkbox"/> Water meadow(s) <input type="checkbox"/> Natural open water <input checked="" type="checkbox"/> *Natural waterfall(s) > 5m high <input type="checkbox"/> Fringing reed-bank(s) <input type="checkbox"/> Fen(s) <input type="checkbox"/> Others (state) <input type="checkbox"/> *Natural waterfall(s) < 5m high <input type="checkbox"/> Quaking bank(s) <input type="checkbox"/> Bog(s) <input type="checkbox"/> Natural cascade(s) <input type="checkbox"/> *Sink hole(s) <input type="checkbox"/> Wet woodland(s) <input type="checkbox"/>					
N CHOKED CHANNEL (tick one box)					
Is 33% or more of the channel choked with vegetation? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>					
O NOTABLE NUISANCE PLANT SPECIES (Use V or E (> 33% length) *record even if < 1%)					
None <input type="checkbox"/> bankface banktop to 50m bankface banktop to 50m *Giant hogweed <input type="checkbox"/> *Himalayan balsam <input type="checkbox"/> *Japanese knotweed <input checked="" type="checkbox"/> *Other (state) <u>Flamingo myrtle - channel</u>					
P OVERALL CHARACTERISTICS (Circle appropriate words, add others as necessary)					
Major impacts: landfill - tipping - litter - <u>sewage</u> - pollution - drought - <u>abstraction</u> - mill - dam - road - rail - industry - housing mining - quarrying - overdeepening - afforestation - fisheries management - silting - waterlogging - hydroelectric power Evidence of recent management: dredging - bank mowing - weed cutting - enhancement - river rehabilitation - gravel extraction - other (please specify) <u>Rebentol (span)</u> Animals: otter - mink - <u>water vole</u> - kingfisher - dipper - grey wagtail - sand martin - heron - dragonflies/damselflies Other significant observations: if necessary use separate sheet to describe overall characteristics and relevant observations					
Q ALDERS (tick one box in each of the two categories) *record even if < 1%					
*Alders? None <input type="checkbox"/> Present <input checked="" type="checkbox"/> Extensive <input type="checkbox"/> *Diseased Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>					
R FIELD SURVEY QUALITY CONTROL (/ boxes to confirm checks)					
Have you taken at least two photos that illustrate the general character of the site and additional photos of any weirs/ sluices and major/intermediate structures across the channel? <input checked="" type="checkbox"/> Have you completed all ten spot-checks and made entries in all boxes in E & F on page 2? <input checked="" type="checkbox"/> Have you completed column 11 of section G (and E if appropriate) on page 2? <input checked="" type="checkbox"/> Have you recorded in section C the number of riffles, pools and point bars (even if 0) on page 1? <input checked="" type="checkbox"/> Have you given an accurate (alphanumeric) grid reference for spot-checks 1, 6 and end of site (page 1)? <input checked="" type="checkbox"/> Have you stated whether spot-check 1 is at the upstream or downstream end of the site (top of page 2)? <input checked="" type="checkbox"/> Have you cross-checked your spot-check and sweep-up responses with the channel modification indicators given on page 2 of the spot-check key? <input checked="" type="checkbox"/>					

Colne - summary

6.4.1 The following summarises the findings at the Colne:

- Predominant Valley Form: No obvious valley sides.
- Number of Riffles, Pools and Point Bars: One vegetated point bar.
- Artificial Features: One minor bridge. Channel is obviously re-aligned and over-deepened.
- Physical Attributes: The banks are predominantly earth, the flow is mainly smooth or rippled, and the banks and channels have evidence of re-sectioning but are also naturalising in places.
- Channel Vegetation: Submerged vegetation was not visible. The other vegetation structures were all present apart from 'free-floating'.
- Land Use: The left hand bank is mainly tall herbs with some shrubs. The right hand bank is mainly broadleaved woodland. Open water is also present within 500m (the Mid Colne Lakes).
- Bank Profiles: Various bank profiles are present including re-sectioned, steep and gentle.
- Tree Cover: There is continuous tree cover on the right hand bank. The channel is extensively shaded throughout the three 500m sections.
- Extent of Channel and Bank Features: Flow is mainly smooth or rippled. There are few channel features although one vegetated point bar and one vegetated mid-channel bar were recorded.
- Channel Dimensions: The channel is between 10-20m wide and the bank height approximately 1m.
- Special Features: Natural open water was recorded as although the Mid Colne lakes are not natural, as they were formed from gravel extraction, they are now naturalised and provide important habitat.
- Invasive species: Japanese knotweed and floating pennywort are present.
- Overall characteristics: Much of the flow of the river at this location comes from the sewage works upstream. Water is abstraction from groundwater in the area which may affect the river. The river has potential for otters, water voles and kingfishers.
- Alders: Alders are present but no diseased trees were noted.

Misbourne (CFA 8)

020-RH1-037-001

Figure 13: 020-RH1-037-001








RIVER HABITAT SURVEY 2003 Version		Page 1 of 4				
A FIELD SURVEY DETAILS						
Site Number: Site Reference: 020-RH1-037-001 Spot-check 1 Grid Ref: SU98279 9342S Spot-check 6 Grid Ref: S098477 93276 End of site Grid Ref: SU98582 9311S Reach Reference: BM240917 River name: <i>Mitbaene</i> Date: <i>13/16/2013</i> Time: <i>14:30</i> Surveyor name: <i>Sarah Hodsette</i> Accredited Surveyor code: <i>FA019</i>	Is the site part of a river or an artificial channel? River <input checked="" type="checkbox"/> Artificial <input type="checkbox"/> Are adverse conditions affecting survey? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> If yes, state Is bed of river visible? barely or not <input type="checkbox"/> partially <input type="checkbox"/> ±entirely <input checked="" type="checkbox"/> Is health and safety assessment form attached? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Number of photographs taken: <i>4</i> 020-RH1-037-001 P1 <i>130613,</i> 020-RH1-037-001 P2 <i>130613,</i> Photo references: 020-RH1-037-001 P3 <i>130613,</i> 020-RH1-037-001 P4 <i>130613.</i> Site surveyed from: left bank <input checked="" type="checkbox"/> right bank <input type="checkbox"/> channel <input checked="" type="checkbox"/>					
<input type="checkbox"/> When options shown with 'shadow boxes', tick one box only LEFT banks determined by facing downstream RIGHT						
B PREDOMINANT VALLEY FORM (within the horizon limit) (tick one box only)						
(tick one box only) <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <input type="checkbox"/> shallow vee </div> <div style="text-align: center;">  <input checked="" type="checkbox"/> concave/bowl </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;">  <input type="checkbox"/> deep vee </div> <div style="text-align: center;">  <input type="checkbox"/> asymmetrical valley </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;">  <input type="checkbox"/> gorge </div> <div style="text-align: center;">  <input type="checkbox"/> U-shape valley </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;">  <input type="checkbox"/> no obvious valley sides </div> </div>						
Distinct flat valley bottom? No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> Natural terraces? No <input type="checkbox"/> Yes <input type="checkbox"/>						
C NUMBER OF RIFFLES, POOLS AND POINT BARS (enter total number in boxes)						
Riffle(s)	<input type="text" value="1"/>	Unvegetated point bar(s)	<input type="text" value="0"/>			
Pool(s)	<input type="text" value="1"/>	Vegetated point bar(s)	<input type="text" value="6"/>			
D ARTIFICIAL FEATURES (indicate total number of occurrences of each category within the 500m site)						
If none, tick box <input type="checkbox"/>	Major	Intermediate	Minor	Major	Intermediate	Minor
	Weirs/slucices			Outfalls/intakes		
	Culverts			Fords		
	Bridges			Deflectors/roynes/croys		
	Other - state					
Is channel obviously realigned? No <input checked="" type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input type="checkbox"/> Is channel obviously over-deepened? No <input checked="" type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input type="checkbox"/> Is water impounded by weir/dam? No <input checked="" type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input type="checkbox"/>						

Figure 14: 020-RH1-037-001

SITE REF. 020-RH1-037-001		RIVER HABITAT SURVEY: TEN SPOT-CHECKS										Page 2 of 4
Spot-check 1 is at: upstream end <input checked="" type="checkbox"/> downstream end <input type="checkbox"/> of site (tick one box)												
E. PHYSICAL ATTRIBUTES (to be assessed across channel within 1m wide transect)												
When boxes 'bordered', only one entry allowed		1 GPS	2	3	4	5	6 GPS	7	8	9	10	GPS
LEFT BANK		Ring FC or SC if composed of sandy substrate										
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI	EA	CC	EA	EA	EA	EA	EA	EA	EA	EA	EA	
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM	NO	RI	NO	NO	NO	NO	NO	NO	NO	NO	NO	
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
CHANNEL	GP- ring either G or P if predominant											
Channel substrate NV, BE, BO, CO, GP, SA, SI, CL, PE, EA, AR	GP	NV	GP	GP	GP	GP	GP	GP	GP	GP	GP	
Flow-type NV, FF, CH, BW, UW, CF, RP, UP, SM, NP, DR	VN	NV	RP	SM	SM	SM	SM	SM	SM	SM	SM	
Channel modification(s) NK, NO, CV, RS, RI, DA, FO	NO	CV	NO	NO	RP	NO	NO	NO	NO	NO	NO	
Channel feature(s) NV, NO, EB, RO, VR, MB, VB, MI, TR	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
For braided rivers only: number of sub-channels												
RIGHT BANK		Ring EC or SC if composed of sandy substrate										↑ Enter channel substrate(s) not occurring as predominant in spot-checks but present in >1% of whole site.
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI	EA	CC	SA	EA	SA	EA	EA	EA	EA	EA	EA	
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM	NO	RI	NO	NO	NO	NO	NO	NO	NO	NO	NO	
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
F. BANKTOP LAND USE AND VEGETATION STRUCTURE (to be assessed over a 10m wide transect)	Land-use: choose one from BL, BP, CW, CP, SH, OR, WL, MH, AW, OW, RP, IG, TH, RD, SU, TL, IL, PG, NV											
LAND-USE WITHIN 5m OF LEFT BANKTOP	IG	IG	IG	IG	TH	TH	IG	IG	TH	TH		
LEFT BANKTOP (structure within 1m) B/U/S/C/NV	U	NV	S	S	S	S	S	S	S	S	S	
LEFT BANK-FACE (structure) B/U/S/C/NV	S	NV	S	S	S	S	S	S	S	S	S	
RIGHT BANK-FACE (structure) B/U/S/C/NV	S	NV	S	S	S	S	S	S	S	S	S	
RIGHT BANKTOP (structure within 1m) B/U/S/C/NV	S	NV	S	S	S	S	S	S	S	S	S	
LAND-USE WITHIN 5m OF RIGHT BANKTOP	IG	IG	IG	IG	TH	IG	IG	IG	BL	SH		
G. CHANNEL VEGETATION TYPES (to be assessed over a 10m wide transect; one E (≥ 13% area) (present) or NV (not visible))												
None (✓) or Not Visible (NV)		NV										
Liverworts/mosses/lichens	✓	✓									✓	
Emergent broad-leaved herbs	✓	✓	✓	✓	✓	E	E	✓	✓	E	E	
Emergent reeds/sedges/rushes/grasses/horsetails		✓	E	E	E	E	E	✓	✓	E	E	
Floating-leaved (rooted)												
Free-floating												
Amphibious						E	E		✓	✓		
Submerged broad-leaved												
Submerged linear-leaved					✓						✓	
Submerged fine-leaved												
Filamentous algae												
Use end column for overall assessment over 500m, including types not occurring in spot-checks (use ✓, E or NV)												

Figure 15: 020-RH1-037-001

SITE REF. 020-RH1-037-001		RIVER HABITAT SURVEY : 500m SWEEP-UP				Page 3 of 4	
H LAND-USE WITHIN 50m OF BANKTOP Use ✓ (present) or E, G (≥33% banklength)							
	L	R		L	R		
Broadleaf/mixed woodland (semi-natural) (BL)		✓	Natural open water (OW)				
Broadleaf/mixed plantation (BP)			Rough/unimproved grassland/pasture (RP)				
Coniferous woodland (semi-natural) (CW)			Improved/semi-improved grassland (IG)	E	E		
Coniferous plantation (CP)			Tall herb/rank vegetation (TH)	✓	✓		
Scrub & shrubs (SH)	E	E	Rock, scree or sand dunes (RD)				
Orchard (OR)			Suburban/urban development (SU)				
Wetland (e.g. bog, marsh, fen) (WL)		✓	Tilled land (TL)				
Moorland/heath (MH)			Irrigated land (IL)				
Artificial open water (AW)			Parkland or gardens (PG)				
			Not visible (NV)				
I BANK PROFILES Use ✓ (present) or E, G (≥33% banklength)							
Natural/unmodified		L	R	Artificial/modified		L	R
Vertical/undercut				Resectioned (reprofiled)			
Vertical with toe				Reinforced - whole		✓	✓
Steep (>45°)				Reinforced - top only			
Gentle		E	E	Reinforced - toe only			
Composite				Artificial two-stage			
Natural berm				Poached bank			
				Embanked			
				Set-back embankment			
J EXTENT OF TREES AND ASSOCIATED FEATURES *Record even if <1%							
TREES (tick one box per bank)				ASSOCIATED FEATURES (tick one box per feature)			
	Left	Right		None	Present	E (≥33%)	
None	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Shading of channel	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Isolated/scattered	<input type="checkbox"/>	<input type="checkbox"/>		*Overhanging boughs	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Regularly spaced, single	<input type="checkbox"/>	<input checked="" type="checkbox"/>		*Exposed bankside roots	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Occasional clumps	<input type="checkbox"/>	<input type="checkbox"/>		*Underwater tree roots	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Semi-continuous	<input type="checkbox"/>	<input type="checkbox"/>		Fallen trees	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Continuous	<input type="checkbox"/>	<input type="checkbox"/>		Large woody debris	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
K EXTENT OF CHANNEL AND BANK FEATURES (tick one box for each feature) *Record even if <1%							
	None	Present	E (≥33%)	None	Present	E (≥33%)	
*Free fall flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed bedrock	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chute flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Broken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated bedrock/boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unbroken standing waves	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Unvegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rippled flow	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Vegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*Upwelling	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Mature island(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smooth flow	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Unvegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No perceptible flow	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Vegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No flow (dry)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marginal deadwater	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eroding cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Unvegetated silt deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stable cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Discrete unvegetated sand deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				*Discrete unvegetated gravel deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2.7

River Habitat Survey Manual: 2003 version

Figure 16: 020-RH1-037-001

SITE REF: 020-RH1-037-001		RIVER HABITAT SURVEY : DIMENSIONS AND INFLUENCES		Page 4 of 4	
L CHANNEL DIMENSIONS (to be measured at one location on a straight uniform section, preferably across a riffle)					
LEFT BANK		CHANNEL		RIGHT BANK	
Banktop height (m)	0.25	Bankfull width (m)	6	Banktop height (m)	0.5
Is banktop height also bankfull height? (Y or N)	Y	Water width (m)	3.5	Is banktop height also bankfull height? (Y or N)	Y
Embanked height (m)	/	Water depth (m)	0.2	Embanked height (m)	/
If trashline lower than banktop, indicate: height above water (m) = / width from bank to bank (m) = /					
Bed material at site is: consolidated <input type="checkbox"/> unconsolidated (loose) <input checked="" type="checkbox"/> unknown <input type="checkbox"/>					
Location of measurements is: riffle <input checked="" type="checkbox"/> other <input type="checkbox"/> (state)					
M FEATURES OF SPECIAL INTEREST (Use Y or E (> 33% length) *record even if <1%)					
None	<input type="checkbox"/>	Very large boulders (>1m)	<input type="checkbox"/>	Backwater(s)	<input type="checkbox"/>
Braided channels	<input type="checkbox"/>	*Debris dam(s)	<input type="checkbox"/>	Floodplain boulder deposits	<input type="checkbox"/>
Side channel(s)	<input type="checkbox"/>	*Leafy debris	<input type="checkbox"/>	Water meadow(s)	<input type="checkbox"/>
*Natural waterfall(s) > 5m high	<input type="checkbox"/>	Fringing reed-bank(s)	<input type="checkbox"/>	Fen(s)	<input type="checkbox"/>
*Natural waterfall(s) < 5m high	<input type="checkbox"/>	Quaking bank(s)	<input type="checkbox"/>	Bog(s)	<input type="checkbox"/>
Natural cascade(s)	<input type="checkbox"/>	*Sink hole(s)	<input type="checkbox"/>	Wet woodland(s)	<input checked="" type="checkbox"/>
				Marsh(es)	<input type="checkbox"/>
				Flush(es)	<input type="checkbox"/>
				Natural open water	<input type="checkbox"/>
				Others (state)	<input type="checkbox"/>
N CHOKED CHANNEL (tick one box)					
Is 33% or more of the channel choked with vegetation? No <input type="checkbox"/> Yes <input checked="" type="checkbox"/>					
O NOTABLE NUISANCE PLANT SPECIES (Use Y or E (> 33% length) *record even if <1%)					
None	<input checked="" type="checkbox"/>	bankface	banktop to 50m	bankface	banktop to 50m
*Giant hogweed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Himalayan balsam	<input type="checkbox"/>
*Japanese knotweed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Other (state).....	<input type="checkbox"/>
P OVERALL CHARACTERISTICS (Circle appropriate words, add others as necessary)					
Major impacts: landfill - tipping - litter - sewage - pollution - drought - abstraction - mill - dam - road - rail - industry - housing mining - quarrying - overdeepening - afforestation - fisheries management - silting - waterlogging - hydroelectric power					
Evidence of recent management: dredging - bank mowing - weed cutting - enhancement - river rehabilitation - gravel extraction - other (please specify)					
Animals: otter - mink - water vole - <u>kingfisher</u> - dipper - grey wagtail - sand martin - heron - dragonflies/damselflies					
Other significant observations: if necessary use separate sheet to describe overall characteristics and relevant observations					
wet woodland with alder, elder, elm? + crab willow					
Q ALDERS (tick one box in each of the two categories) *record even if <1%					
*Alders? None <input type="checkbox"/> Present <input checked="" type="checkbox"/> Extensive <input type="checkbox"/>		*Diseased Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>			
R FIELD SURVEY QUALITY CONTROL (✓ boxes to confirm checks)					
Have you taken at least two photos that illustrate the general character of the site and additional photos of any weirs/ sluices and major/intermediate structures across the channel? <input checked="" type="checkbox"/>					
Have you completed all ten spot-checks and made entries in all boxes in E & F on page 2? <input checked="" type="checkbox"/>					
Have you completed column 11 of section G (and E if appropriate) on page 2? <input checked="" type="checkbox"/>					
Have you recorded in section C the number of riffles, pools and point bars (even if 0) on page 1? <input checked="" type="checkbox"/>					
Have you given an accurate (alphanumeric) grid reference for spot-checks 1, 6 and end of site (page 1)? <input checked="" type="checkbox"/>					
Have you stated whether spot-check 1 is at the upstream or downstream end of the site (top of page 2)? <input checked="" type="checkbox"/>					
Have you cross-checked your spot-check and sweep-up responses with the channel modification indicators given on page 2 of the spot-check key? <input checked="" type="checkbox"/>					

020-RH1-042-001

Figure 17: 020-RH1-042-001








RIVER HABITAT SURVEY 2003 Version		Page 1 of 4																																							
A FIELD SURVEY DETAILS																																									
Site Number: <input type="text" value=""/> <small>leave blank if new site</small> Site Reference: 020-RH1-042-001 Spot-check 1 Grid Ref: SU 93438 98447 Spot-check 6 Grid Ref: SU 93647 98394 End of site Grid Ref: SU 93830 98270 Reach Reference: River name: MISBOURNE Date 9/15/2013 Time: 9:00 Surveyor name: ZOE TRENT Accredited Surveyor code: LT061	Is the site part of a river or an artificial channel? River <input checked="" type="checkbox"/> Artificial <input type="checkbox"/> Are adverse conditions affecting survey? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> If yes, state Is bed of river visible? barely or not <input type="checkbox"/> partially <input type="checkbox"/> ±entirely <input checked="" type="checkbox"/> Is health and safety assessment form attached? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Number of photographs taken: <input type="text" value="3"/> Photo references: P1, P2, P3 Site surveyed from: left bank <input type="checkbox"/> right bank <input checked="" type="checkbox"/> channel <input type="checkbox"/> <input type="checkbox"/> When options shown with 'shadow boxes', tick one box only																																								
<input type="checkbox"/> LEFT banks determined by facing downstream RIGHT																																									
B PREDOMINANT VALLEY FORM (within the horizon limits) (tick one box only)																																									
(tick one box only)																																									
 <input checked="" type="checkbox"/> shallow vee	 <input type="checkbox"/> concave/bowl																																								
 <input type="checkbox"/> deep vee	 <input type="checkbox"/> asymmetrical valley																																								
 <input type="checkbox"/> gorge	 <input type="checkbox"/> U-shape valley																																								
 <input type="checkbox"/> no obvious valley sides																																									
Distinct flat valley bottom? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>		Natural terraces? No <input type="checkbox"/> Yes <input type="checkbox"/>																																							
C NUMBER OF RIFFLES, POOLS AND POINT BARS (enter total number in boxes)																																									
Riffle(s) <input type="text" value="1"/>	Unvegetated point bar(s) <input type="text" value="0"/>																																								
Pool(s) <input type="text" value="0"/>	Vegetated point bar(s) <input type="text" value="0"/>																																								
D ARTIFICIAL FEATURES (indicate total number of occurrences of each category with number in box)																																									
If none, tick box <input checked="" type="checkbox"/>	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>Major</th> <th>Intermediate</th> <th>Minor</th> <th></th> <th>Major</th> <th>Intermediate</th> <th>Minor</th> </tr> </thead> <tbody> <tr> <td>Weirs/slucices</td> <td></td> <td></td> <td></td> <td>Outfalls/intakes</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Culverts</td> <td></td> <td></td> <td></td> <td>Fords</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Bridges</td> <td></td> <td></td> <td></td> <td>Deflectors/groynes/croys</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Other - state</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		Major	Intermediate	Minor		Major	Intermediate	Minor	Weirs/slucices				Outfalls/intakes				Culverts				Fords				Bridges				Deflectors/groynes/croys				Other - state							
	Major	Intermediate	Minor		Major	Intermediate	Minor																																		
Weirs/slucices				Outfalls/intakes																																					
Culverts				Fords																																					
Bridges				Deflectors/groynes/croys																																					
Other - state																																									
Is channel obviously realigned? No <input checked="" type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input type="checkbox"/>		Is channel obviously over-deepened? No <input checked="" type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input type="checkbox"/>																																							
Is water impounded by weir/dam? No <input checked="" type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input type="checkbox"/>		Is water impounded by weir/dam? No <input checked="" type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input type="checkbox"/>																																							

Figure 18: 020-RH1-042-001

SITE REF. 020-241-042-001		RIVER HABITAT SURVEY: TEN SPOT-CHECKS										Page 2 of 4
Spot-check 1 is at: upstream end <input checked="" type="checkbox"/> downstream end <input type="checkbox"/> of site (tick one box)												
E. PHYSICAL ATTRIBUTES (to be assessed across channel within 1m wide transect)												
When boxes 'bordered', only one entry allowed		1 GPS	2	3	4	5	6 GPS	7	8	9	10	GPS
LEFT BANK		Ring EC or SC if composed of sandy substrate										
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI		EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM		NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB		NO	SC	NO	NO	NO	NO	NO	NO	NO	NO	NO
CHANNEL		GP ring either G or P if predominant										
Channel substrate NV, BE, BO, CO, GP, SA, SI, CL, PE, EA, AR		G(P)	G	P	SI	SI	SI	SI	SI	SI	SI	SA
Flow-type NV, FF, CH, BW, UW, CF, RP, UP, SM, NP, DR		UW	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM
Channel modification(s) NK, NO, CV, RS, RI, DA, FO		NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Channel feature(s) NV, NO, EB, RO, VR, MB, VB, MI, TR		NO	NO	MT	NO	NO	NO	NO	NO	NO	NO	NO
For braided rivers only: number of sub-channels		✓										
RIGHT BANK		Ring EC or SC if composed of sandy substrate										
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI		EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM		NO	PC	NO	NO	NO	NO	NO	NO	PC	NO	NO
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB		NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
F. BANKTOP LAND-USE AND VEGETATION STRUCTURE (to be assessed over a 10m wide transect)												
Land-use: choose one from BL, BP, CW, CP, SH, OR, WL, MH, AW, OW, RP, IG, TH, RD, SU, TL, IL, PG, NV												
LAND-USE WITHIN 5m OF LEFT BANKTOP		BL	BL	BL	BL	BL	BL	BL	IG	IG	IG	IG
LEFT BANKTOP (structure within 1m) B/U/S/C/NV		C	S	S	C	C	C	C	S	S	S	S
LEFT BANK-FACE (structure) B/U/S/C/NV		C	S	S	C	C	C	C	C	C	C	C
RIGHT BANK-FACE (structure) B/U/S/C/NV		S	S	S	C	C	C	C	C	C	C	C
RIGHT BANKTOP (structure within 1m) B/U/S/C/NV		S	S	S	S	S	S	S	S	S	S	S
LAND-USE WITHIN 5m OF RIGHT BANKTOP		TH	IG	IG	IG	IG	IG	IG	IG	IG	IG	IG
G. CHANNEL VEGETATION TYPES (to be assessed over a 10m wide transect; use E (> 30% area) ✓ (presence) or NV (not visible))												
None (✓) or Not Visible (NV)												
Liverworts/mosses/lichens					✓							
Emergent broad-leaved herbs		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Emergent reeds/sedges/rushes/grasses/horsetails		✓	✓	✓	E	E	E	E	✓	✓	E	E
Floating-leaved (rooted)												
Free-floating									✓			✓
Amphibious				✓	✓					✓		✓
Submerged broad-leaved			✓	✓	E	✓	✓	✓			✓	✓
Submerged linear-leaved		E	✓	✓	✓	✓	✓	✓	✓	✓	✓	E
Submerged fine-leaved		✓				✓			E	✓		✓
Filamentous algae		✓		✓						✓		✓
Use end column for overall assessment over 500m, including types not occurring in spot-checks (use ✓, E or NV)												

↑ Enter channel substrate(s) not occurring as predominant in spot-checks but present in >1% of whole site.

Figure 19: 020-RH1-042-001

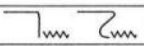
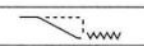




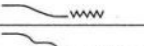
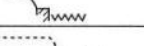


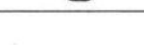

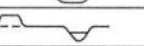







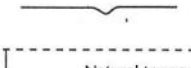
SITE REF. 020-RH1-042-001		RIVER HABITAT SURVEY : 500m SWEEP-UP				Page 3 of 4	
H LAND-USE WITHIN 50m OF BANKTOP (Use ✓ (present) or E (>33% banklength))							
	L	R		L	R		
Broadleaf/mixed woodland (semi-natural) (BL)	E	E	Natural open water (OW)				
Broadleaf/mixed plantation (BP)			Rough/unimproved grassland/pasture (RP)				
Coniferous woodland (semi-natural) (CW)			Improved/semi-improved grassland (IG)	E	E		
Coniferous plantation (CP)			Tall herb/rank vegetation (TH)				
Scrub & shrubs (SH)	✓	✓	Rock, scree or sand dunes (RD)				
Orchard (OR)			Suburban/urban development (SU)				
Wetland (e.g. bog, marsh, fen) (WL)	✓	E	Tilled land (TL)				
Moorland/heath (MH)			Irrigated land (IL)				
Artificial open water (AW)			Parkland or gardens (PG)				
			Not visible (NV)				
I BANK PROFILES (Use ✓ (present) or E (>33% banklength))							
Natural/unmodified	L	R	Artificial/modified	L	R		
Vertical/undercut 			Resectioned (reprofiled) 				
Vertical with toe 			Reinforced - whole 				
Steep (>45°) 			Reinforced - top only 				
Gentle 	E	E	Reinforced - toe only 				
Composite 			Artificial two-stage 				
Natural berm 			Poached bank 				
			Embanked 				
			Set-back embankment 				
J EXTENT OF TREES AND ASSOCIATED FEATURES (tick one box per feature)							
TREES (tick one box per bank)			ASSOCIATED FEATURES (tick one box per feature)				
	Left	Right	None	Present	E (>33%)		
None	<input type="checkbox"/>	<input type="checkbox"/>	Shading of channel	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Isolated/scattered	<input type="checkbox"/>	<input type="checkbox"/>	*Overhanging boughs	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Regularly spaced, single	<input type="checkbox"/>	<input type="checkbox"/>	*Exposed bankside roots	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Occasional clumps	<input type="checkbox"/>	<input type="checkbox"/>	*Underwater tree roots	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Semi-continuous	<input type="checkbox"/>	<input type="checkbox"/>	Fallen trees	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Continuous	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Large woody debris	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
K EXTENT OF CHANNEL AND BANK FEATURES (tick one box for each feature)							
	None	Present	E (>33%)	None	Present	E (>33%)	
*Free fall flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed bedrock	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chute flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Broken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated bedrock/boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unbroken standing waves	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Unvegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rippled flow	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Vegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*Upwelling	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Mature island(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smooth flow	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Unvegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No perceptible flow	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Vegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No flow (dry)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marginal deadwater	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eroding cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Unvegetated silt deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stable cliff(s)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	*Discrete unvegetated sand deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				*Discrete unvegetated gravel deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 20: 020-RH1-042-001

SITE REF. 020-211-042-001		RIVER HABITAT SURVEY : DIMENSIONS AND INFLUENCES				Page 4 of 4
L CHANNEL DIMENSIONS (to be measured at one location on a straight/uniform section, preferably across a riffle)						
LEFT BANK		CHANNEL		RIGHT BANK		
Banktop height (m)	1	Bankfull width (m)	30	Banktop height (m)	1	
Is banktop height also bankfull height? (Y or N)	Y	Water width (m)	6	Is banktop height also bankfull height? (Y or N)	Y	
Embanked height (m)	N/A	Water depth (m)	0.75	Embanked height (m)	N/A	
If trashline lower than banktop, indicate: height above water (m) = / width from bank to bank (m) = /						
Bed material at site is: consolidated <input type="checkbox"/> unconsolidated (loose) <input checked="" type="checkbox"/> unknown <input type="checkbox"/>						
Location of measurements is: riffle <input type="checkbox"/> other <input checked="" type="checkbox"/> (state) <i>bars & g</i> <small>did not do at riffle as not representative of reach</small>						
M FEATURES OF SPECIAL INTEREST (Use Y or E (> 33% length) record even if <1%)						
None <input type="checkbox"/>	Very large boulders (>1m) <input type="checkbox"/>	Backwater(s) <input type="checkbox"/>	Marsh(es) <input checked="" type="checkbox"/>			
Braided channels <input type="checkbox"/>	*Debris dam(s) <input type="checkbox"/>	Floodplain boulder deposits <input type="checkbox"/>	Flush(es) <input type="checkbox"/>			
Side channel(s) <input type="checkbox"/>	*Leafy debris <input type="checkbox"/>	Water meadow(s) <input type="checkbox"/>	Natural open water <input type="checkbox"/>			
*Natural waterfall(s) > 5m high <input type="checkbox"/>	Fringing reed-bank(s) <input type="checkbox"/>	Fen(s) <input type="checkbox"/>	Others (state) <input type="checkbox"/>			
*Natural waterfall(s) < 5m high <input type="checkbox"/>	Quaking bank(s) <input type="checkbox"/>	Bog(s) <input type="checkbox"/>				
Natural cascade(s) <input type="checkbox"/>	*Sink hole(s) <input type="checkbox"/>	Wet woodland(s) <input checked="" type="checkbox"/>				
N CHOKED CHANNEL (tick one box)						
Is 33% or more of the channel choked with vegetation? No <input type="checkbox"/> Yes <input checked="" type="checkbox"/>						
O NOTABLE NUISANCE PLANT SPECIES (Use Y or E (> 33% length) record even if <1%)						
None <input checked="" type="checkbox"/>	bankface banktop to 50m		bankface banktop to 50m			
*Giant hogweed <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Himalayan balsam <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
*Japanese knotweed <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Other (state)..... <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
P OVERALL CHARACTERISTICS (Circle appropriate words, add others as necessary)						
Major impacts: landfill - tipping - litter - sewage - pollution - drought - abstraction - mill - dam - road - rail - industry - housing mining - quarrying - overdeepening - afforestation - fisheries management - silting - waterlogging - hydroelectric power						
Evidence of recent management: dredging - bank mowing - weed cutting - enhancement - river rehabilitation - gravel extraction - other (please specify)						
Animals: otter - mink - water vole - kingfisher - dipper - grey wagtail - sand martin - heron - dragonflies/damselflies						
Other significant observations: if necessary use separate sheet to describe overall characteristics and relevant observations <i>River spreads out from its main channel through part of the reach and then is fringed with Glyceria maxima and wet woodland. (Salix sp.)</i>						
Q ALDERS (tick one box in each of the two categories) (record even if <1%)						
*Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>		*Diseased Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>				
R FIELD SURVEY QUALITY CONTROL (/ boxes to confirm checks)						
Have you taken at least two photos that illustrate the general character of the site and additional photos of any weirs/ sluices and major/intermediate structures across the channel? <input checked="" type="checkbox"/>						
Have you completed all ten spot-checks and made entries in all boxes in E & F on page 2? <input checked="" type="checkbox"/>						
Have you completed column 11 of section G (and E if appropriate) on page 2? <input checked="" type="checkbox"/>						
Have you recorded in section C the number of riffles, pools and point bars (even if 0) on page 1? <input checked="" type="checkbox"/>						
Have you given an accurate (alphanumeric) grid reference for spot-checks 1, 6 and end of site (page 1)? <input checked="" type="checkbox"/>						
Have you stated whether spot-check 1 is at the upstream or downstream end of the site (top of page 2)? <input checked="" type="checkbox"/>						
Have you cross-checked your spot-check and sweep-up responses with the channel modification indicators given on page 2 of the spot-check key? <input checked="" type="checkbox"/>						


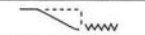
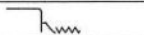



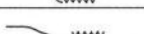
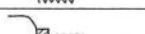
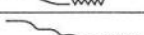
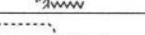


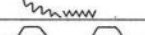

Stoke Brook (CFA 11)
020-RH1-057-001

Figure 21: 020-RH1-057-001

RIVER HABITAT SURVEY 2003 Version		Page 1 of 4					
A FIELD SURVEY DETAILS							
Site Number: <input type="text" value=""/>	Is the site part of a river or an artificial channel? River <input checked="" type="checkbox"/> Artificial <input type="checkbox"/>						
Site Reference: 020-RH1-057-001	Are adverse conditions affecting survey? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>						
Spot-check 1 Grid Ref: SP8427309168	If yes, state						
Spot-check 6 Grid Ref: SP8404809279	Is bed of river visible? barely or not <input type="checkbox"/> partially <input type="checkbox"/> ± entirely <input checked="" type="checkbox"/>						
End of site Grid Ref: SP8389809470	Is health and safety assessment form attached? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>						
Reach Reference:	Number of photographs taken: <input type="text" value="4"/>						
River name: Stoke Brook-upper channel	Photo references: P1, P2, P3, P4						
Date 9/5/2013 Time: 11:40	Site surveyed from: left bank <input type="checkbox"/> right bank <input checked="" type="checkbox"/> channel <input type="checkbox"/>						
Surveyor name: Zoë Trent	<input type="checkbox"/> When options shown with 'shadow boxes', tick one box only						
Accredited Surveyor code: LT061	LEFT banks determined by facing downstream RIGHT						
B PREDOMINANT VALLEY FORM (within the horizon limit) (tick one box only)							
(tick one box only)							
 <input checked="" type="checkbox"/> shallow vee	 <input type="checkbox"/> concave/bowl						
 <input type="checkbox"/> deep vee	 <input type="checkbox"/> asymmetrical valley						
 <input type="checkbox"/> gorge	 <input type="checkbox"/> U-shape valley						
	 <input type="checkbox"/> no obvious valley sides						
Distinct flat valley bottom? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>	Natural terraces? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>						
C NUMBER OF RIFFLES, POOLS AND POINT BARS (enter total number in boxes)							
Riffle(s) <input type="text" value="0"/>	Unvegetated point bar(s) <input type="text" value="0"/>						
Pool(s) <input type="text" value="0"/>	Vegetated point bar(s) <input type="text" value="0"/>						
D ARTIFICIAL FEATURES (indicate total number of occurrences of each category within the 500m site)							
If none, tick box <input checked="" type="checkbox"/>	Major	Intermediate	Minor	Outfalls/intakes	Major	Intermediate	Minor
	Weirs/slucices						
	Culverts				Fords		
	Bridges				Deflectors/groynes/croys		
	Other - state						
Is channel obviously realigned? No <input type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input checked="" type="checkbox"/>		Is channel obviously over-deepened? No <input type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input checked="" type="checkbox"/>		Is water impounded by weir/dam? No <input checked="" type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input type="checkbox"/>			

former mill loot

Figure 22: 020-RH1-057-001

SITE REF. <u>020-R111-057-001</u>	RIVER HABITAT SURVEY : 500m SWEEP-UP	Page 3 of 4			
H LAND USE WITHIN 50m OF BANKTOP (Site > 300m or E < 33% banklength)					
	L	R		L	R
Broadleaf/mixed woodland (semi-natural) (BL)		<input checked="" type="checkbox"/>	Natural open water (OW)		
Broadleaf/mixed plantation (BP)	<input checked="" type="checkbox"/>		Rough/unimproved grassland/pasture (RP)		
Coniferous woodland (semi-natural) (CW)			Improved/semi-improved grassland (IG)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Coniferous plantation (CP)			Tall herb/rank vegetation (TH)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Scrub & shrubs (SH)			Rock, scree or sand dunes (RD)		
Orchard (OR)			Suburban/urban development (SU)		
Wetland (e.g. bog, marsh, fen) (WL)			Tilled land (TL)	E	E
Moorland/heath (MH)			Irrigated land (IL)		
Artificial open water (AW)			Parkland or gardens (PG)		
			Not visible (NV)		
I BANK PROFILES (Site > 300m or E < 33% banklength)					
Natural/unmodified	L	R	Artificial/modified	L	R
Vertical/undercut 			Resectioned (reprofiled) 	E	E
Vertical with toe 			Reinforced - whole 		
Steep (>45°) 		<input checked="" type="checkbox"/>	Reinforced - top only 		
Gentle 	<input checked="" type="checkbox"/>		Reinforced - toe only 		
Composite 			Artificial two-stage 		
Natural berm 			Poached bank 		
			Embanked 		
			Set-back embankment 		
J EXTENT OF TREES AND ASSOCIATED FEATURES (Record every 10m)					
TREES (tick one box per bank)			ASSOCIATED FEATURES (tick one box per feature)		
	Left	Right		None	Present
None	<input type="checkbox"/>	<input type="checkbox"/>	Shading of channel	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Isolated/scattered	<input type="checkbox"/>	<input type="checkbox"/>	*Overhanging boughs	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Regularly spaced, single	<input type="checkbox"/>	<input type="checkbox"/>	*Exposed bankside roots	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Occasional clumps	<input type="checkbox"/>	<input type="checkbox"/>	*Underwater tree roots	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Semi-continuous	<input type="checkbox"/>	<input type="checkbox"/>	Fallen trees	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Continuous	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Large woody debris	<input checked="" type="checkbox"/>	<input type="checkbox"/>
K EXTENT OF CHANNEL AND BANK FEATURES (tick one box for each feature) (Record every 10m)					
	None	Present	E(≥33%)		None
*Free fall flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed bedrock	<input checked="" type="checkbox"/>
Chute flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed boulders	<input checked="" type="checkbox"/>
Broken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated bedrock/boulders	<input checked="" type="checkbox"/>
Unbroken standing waves	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Unvegetated mid-channel bar(s)	<input checked="" type="checkbox"/>
Rippled flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated mid-channel bar(s)	<input checked="" type="checkbox"/>
*Upwelling	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Mature island(s)	<input checked="" type="checkbox"/>
Smooth flow	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Unvegetated side bar(s)	<input checked="" type="checkbox"/>
No perceptible flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated side bar(s)	<input checked="" type="checkbox"/>
No flow (dry)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated point bar(s)	<input checked="" type="checkbox"/>
Marginal deadwater	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated point bar(s)	<input type="checkbox"/>
Eroding cliff(s)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	*Unvegetated silt deposit(s)	<input checked="" type="checkbox"/>
Stable cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Discrete unvegetated sand deposit(s)	<input checked="" type="checkbox"/>
				*Discrete unvegetated gravel deposit(s)	<input checked="" type="checkbox"/>

(Buffer strip along filled sand)

Figure 23: 020-RH1-057-001

SITE REF. 020-RH1-057-001		RIVER HABITAT SURVEY : DIMENSIONS AND INFLUENCES		Page 4 of 4	
L CHANNEL DIMENSIONS (to be measured at one location on a straight (uniform) section, preferably across a riffle)					
LEFT BANK		CHANNEL		RIGHT BANK	
Banktop height (m)	1	Bankfull width (m)	3	Banktop height (m)	2.5
Is banktop height also bankfull height? (Y or N)	Y	Water width (m)	0.75	Is banktop height also bankfull height? (Y or N)	N
Embanked height (m)	/	Water depth (m)	0.05	Embanked height (m)	/
If trashline lower than banktop, indicate: height above water (m) = width from bank to bank (m) =					
Bed material at site is: consolidated <input type="checkbox"/> unconsolidated (loose) <input checked="" type="checkbox"/> unknown <input type="checkbox"/>					
Location of measurements is: riffle <input type="checkbox"/> other <input checked="" type="checkbox"/> (state) Sc 11					
M FEATURES OF SPECIAL INTEREST (Use Y or N (> 33% length), record even if < 1%)					
None	<input checked="" type="checkbox"/>	Very large boulders (>1m)	<input type="checkbox"/>	Backwater(s)	<input type="checkbox"/>
Braided channels	<input type="checkbox"/>	*Debris dam(s)	<input type="checkbox"/>	Floodplain boulder deposits	<input type="checkbox"/>
Side channel(s)	<input type="checkbox"/>	*Leafy debris	<input type="checkbox"/>	Water meadow(s)	<input type="checkbox"/>
*Natural waterfall(s) > 5m high	<input type="checkbox"/>	Fringing reed-bank(s)	<input type="checkbox"/>	Fen(s)	<input type="checkbox"/>
*Natural waterfall(s) < 5m high	<input type="checkbox"/>	Quaking bank(s)	<input type="checkbox"/>	Bog(s)	<input type="checkbox"/>
Natural cascade(s)	<input type="checkbox"/>	*Sink hole(s)	<input type="checkbox"/>	Wet woodland(s)	<input type="checkbox"/>
Marsh(es)	<input type="checkbox"/>	Flush(es)	<input type="checkbox"/>	Natural open water	<input type="checkbox"/>
Others (state)	<input type="checkbox"/>				
N CHOKED CHANNEL (tick one box)					
Is 33% or more of the channel choked with vegetation? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>					
O NOTABLE NUISANCE PLANT SPECIES (Use Y or N (> 33% length), record even if < 1%)					
None	<input checked="" type="checkbox"/>	bankface	banktop to 50m	bankface	banktop to 50m
*Giant hogweed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Himalayan balsam	<input type="checkbox"/>
*Japanese knotweed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Other (state).....	<input type="checkbox"/>
P OVERALL CHARACTERISTICS (Circle appropriate words, add others as necessary)					
Major impacts: landfill - tipping - litter - sewage - pollution - drought - abstraction - mill - dam - road - rail - industry - housing mining - quarrying - <u>overdeepening</u> - afforestation - fisheries management - silting - waterlogging - hydroelectric power					
Evidence of recent management: dredging - bank mowing - weed cutting - enhancement - river rehabilitation - gravel extraction - other (please specify)					
Animals: otter - mink - water vole - kingfisher - dipper - grey wagtail - sand martin - heron - dragonflies/damselflies					
Other significant observations: if necessary use separate sheet to describe overall characteristics and relevant observations Channel obviously overdeepened and re-aligned but naturalised in places. Scrub and trees quite suitable on both banks. Arable land has buffer strips. Also lots of nettles indicating nutrient enrichment					
Q ALDERS (tick one box in each of the two categories) (record even if 1%)					
*Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>		*Diseased Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>			
R FIELD SURVEY QUALITY CONTROL (✓ boxes to confirm checks)					
Have you taken at least two photos that illustrate the general character of the site and additional photos of any weirs/ sluices and major/intermediate structures across the channel?					<input checked="" type="checkbox"/>
Have you completed all ten spot-checks and made entries in all boxes in E & F on page 2?					<input checked="" type="checkbox"/>
Have you completed column 11 of section G (and E if appropriate) on page 2?					<input checked="" type="checkbox"/>
Have you recorded in section C the number of riffles, pools and point bars (even if 0) on page 1?					<input checked="" type="checkbox"/>
Have you given an accurate (alphanumeric) grid reference for spot-checks 1, 6 and end of site (page 1)?					<input checked="" type="checkbox"/>
Have you stated whether spot-check 1 is at the upstream or downstream end of the site (top of page 2)?					<input checked="" type="checkbox"/>
Have you cross-checked your spot-check and sweep-up responses with the channel modification indicators given on page 2 of the spot-check key?					<input checked="" type="checkbox"/>

020-RH1-057-002

Figure 24: 020-RH1-057-002

RIVER HABITAT SURVEY 2003 Version		Page 1 of 4					
A FIELD SURVEY DETAILS							
Site Number: Site Reference: 020-RH1-057-002 Spot-check 1 Grid Ref: SP83903 09406 Spot-check 6 Grid Ref: SP83717 09494 End of site Grid Ref: SP83631 09653 Reach Reference: River name: Stoke Brook Date 9/5/2013 Time: 12:40 Surveyor name: ZOE TRENT Accredited Surveyor code: L7061	Is the site part of a river or an artificial channel? River <input checked="" type="checkbox"/> Artificial <input type="checkbox"/> Are adverse conditions affecting survey? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> If yes, state Is bed of river visible? barely or not <input type="checkbox"/> partially <input type="checkbox"/> ± entirely <input checked="" type="checkbox"/> Is health and safety assessment form attached? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Number of photographs taken: 4 Photo references: P1, P2, P3, P4 Site surveyed from: left bank <input type="checkbox"/> right bank <input checked="" type="checkbox"/> channel <input type="checkbox"/> <input type="checkbox"/> When options shown with 'shadow boxes', tick one box only						
B PREDOMINANT VALLEY FORM (within the horizon limit) (tick one box only)							
(tick one box only) <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <input checked="" type="checkbox"/> shallow vee </div> <div style="text-align: center;"> <input type="checkbox"/> concave/bowl </div> </div> <div style="display: flex; justify-content: space-around; align-items: flex-start; margin-top: 10px;"> <div style="text-align: center;"> <input type="checkbox"/> deep vee </div> <div style="text-align: center;"> <input type="checkbox"/> asymmetrical valley </div> </div> <div style="display: flex; justify-content: space-around; align-items: flex-start; margin-top: 10px;"> <div style="text-align: center;"> <input type="checkbox"/> gorge </div> <div style="text-align: center;"> <input type="checkbox"/> U-shape valley </div> </div> <div style="display: flex; justify-content: space-around; align-items: flex-start; margin-top: 10px;"> <div style="text-align: center;"> <input type="checkbox"/> no obvious valley sides </div> </div>							
Distinct flat valley bottom? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> Natural terraces? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>							
C NUMBER OF RIPPLES, POOLS AND POINT BARS (enter total number in boxes)							
Riffle(s)	0	Unvegetated point bar(s)					
Pool(s)	0	Vegetated point bar(s)					
D ARTIFICIAL FEATURES (indicate total number of occurrences of each category within the 500m site)							
If none, tick box <input type="checkbox"/>							
	Major	Intermediate	Minor	Major	Intermediate	Minor	Minor
Weirs/slucices	0	0	0	0	0	0	0
Culverts	1	0	0	0	0	0	0
Bridges	0	0	1	0	0	0	0
Other - state							
	Outfalls/intakes			Major	Intermediate	Minor	
	Fords			Major	Intermediate	Minor	
	Deflectors/groynes/croys			Major	Intermediate	Minor	
Is channel obviously realigned? No <input type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input checked="" type="checkbox"/> Is channel obviously over-deepened? No <input type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input checked="" type="checkbox"/> Is water impounded by weir/dam? No <input checked="" type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input type="checkbox"/>							

Both foot bridges was one in a pipe

Figure 25: 020-RH1-057-002

SITE REF. 020-RH1-057-002		RIVER HABITAT SURVEY: TEN SPOT-CHECKS										Page 2 of 4
Spot-check 1 is at:		upstream end <input checked="" type="checkbox"/>		downstream end <input type="checkbox"/>		of site (tick one box)						
E. PHYSICAL ATTRIBUTES (to be assessed across channel within 1m wide transect)												
When boxes 'bordered', only one entry allowed		1 GPS	2	3	4	5	6 GPS	7	8	9	10	GPS
LEFT BANK		Ring EC or SC if composed of sandy substrate										
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI		EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM		RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB		NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
CHANNEL		GP ring either C or B if predominant										
Channel substrate NV, BE, BO, CO, GP, SA, SI, CL, PE, EA, AR		GP	SI	SI	SI	GP	GP	SI	SI	SI	GP	
Flow-type NV, FF, CH, BW, UW, CF, RP, UP, SM, NP, DR		SM	SM	SM	SM	SM	SM	SM	SM	RP	SM	
Channel modification(s) NK, NO, CV, RS, RI, DA, FO		RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	
Channel feature(s) NV, NO, EB, RO, VR, MB, VB, MI, TR		NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
For braided rivers only: number of sub-channels		/	/	/	/	/	/	/	/	/	/	
RIGHT BANK		Ring EC or SC if composed of sandy substrate										
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI		EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM		RS	RS	RS	RS	RS	RS	RS	RS	NO	NO	
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB		NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
F. BANKTOP LAND-USE AND VEGETATION STRUCTURE (to be assessed over a 10m wide transect)												
Land-use: choose one from BL, BP, CW, CP, SH, OR, WL, MH, AW, OW, RP, IG, TH, RD, SU, TL, IL, PG, NV												
LAND-USE WITHIN 5m OF LEFT BANKTOP		IG	IG	IG	IG	IG	TH	IG	IG	IG	IG	
LEFT BANKTOP (structure within 1m) B/U/S/C/NV		S	S	S	S	S	S	S	S	S	S	
LEFT BANK-FACE (structure) B/U/S/C/NV		S	C	S	S	S	S	S	S	S	S	
RIGHT BANK-FACE (structure) B/U/S/C/NV		S	S	C	S	S	S	S	S	S	S	
RIGHT BANKTOP (structure within 1m) B/U/S/C/NV		S	C	S	S	S	S	S	S	S	S	
LAND-USE WITHIN 5m OF RIGHT BANKTOP		TH	BP	TH	IG	IG	IG	IG	IG	IG	IG	
G. CHANNEL VEGETATION TYPES (to be assessed over a 10m wide transect and EC & SC area) (✓ = present or NV (not visible))												
None (✓) or Not Visible (NV)			✓	✓								
Liverworts/mosses/lichens												
Emergent broad-leaved herbs		✓			✓	✓	✓			E	✓	✓
Emergent reeds/sedges/rushes/grasses/horsetails		✓					✓	✓	✓	✓	✓	✓
Floating-leaved (rooted)												
Free-floating												
Amphibious									✓		✓	✓
Submerged broad-leaved					✓							✓
Submerged linear-leaved								✓	✓			✓
Submerged fine-leaved												
Filamentous algae												
Use end column for overall assessment over 500m, including types not occurring in spot-checks (use ✓, E or NV) —————>												

Enter channel substrate(s) not occurring as predominant in spot-checks but present in >1% of whole site.

Figure 26: 020-RH1-057-002



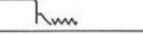

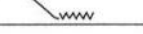

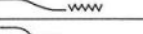
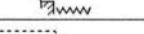
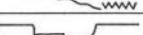
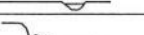

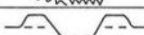
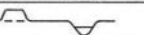

SITE REF. 020-RH1-057-002		RIVER HABITAT SURVEY : 500m SWEEP-UP				Page 3 of 4	
H. LAND-USE WITHIN 50m OF BANKTOP Use (present) or E (>33% banklength)							
	L	R		L	R		
Broadleaf/mixed woodland (semi-natural) (BL)	✓	✓	Natural open water (OW)				
Broadleaf/mixed plantation (BP)			Rough/unimproved grassland/pasture (RP)				
Coniferous woodland (semi-natural) (CW)			Improved/semi-improved grassland (IG)	E	E		
Coniferous plantation (CP)			Tall herb/rank vegetation (TH)	✓	✓		
Scrub & shrubs (SH)	✓	✓	Rock, scree or sand dunes (RD)				
Orchard (OR)			Suburban/urban development (SU)				
Wetland (e.g. bog, marsh, fen) (WL)			Tilled land (TL)				
Moorland/heath (MH)			Irrigated land (IL)				
Artificial open water (AW)			Parkland or gardens (PG)				
			Not visible (NV)				
I. BANK PROFILES Use (present) or E (>33% banklength)							
Natural/unmodified	L	R	Artificial/modified	L	R		
Vertical/undercut 			Resectioned (reprofiled) 	E	E		
Vertical with toe 			Reinforced - whole 				
Steep (>45°) 	✓		Reinforced - top only 				
Gentle 	✓		Reinforced - toe only 	✓			
Composite 			Artificial two-stage 				
Natural berm 			Poached bank 				
			Embanked 				
			Set-back embankment 				
J. EXTENT OF TREES AND ASSOCIATED FEATURES (tick one box per bank)							
TREES (tick one box per bank)				ASSOCIATED FEATURES (tick one box per feature)			
	Left	Right		None	Present	E (>33%)	
None	<input type="checkbox"/>	<input type="checkbox"/>	Shading of channel	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Isolated/scattered	<input checked="" type="checkbox"/>	<input type="checkbox"/>	*Overhanging boughs	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Regularly spaced, single	<input type="checkbox"/>	<input type="checkbox"/>	*Exposed bankside roots	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Occasional clumps	<input type="checkbox"/>	<input checked="" type="checkbox"/>	*Underwater tree roots	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Semi-continuous	<input type="checkbox"/>	<input type="checkbox"/>	Fallen trees	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Continuous	<input type="checkbox"/>	<input type="checkbox"/>	Large woody debris	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
K. EXTENT OF CHANNEL AND BANK FEATURES (tick one box for each feature)							
	None	Present	E (>33%)	None	Present	E (>33%)	
*Free fall flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed bedrock	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chute flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Broken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated bedrock/boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unbroken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rippled flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*Upwelling	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Mature island(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smooth flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Unvegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No perceptible flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No flow (dry)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marginal deadwater	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eroding cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Unvegetated silt deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stable cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Discrete unvegetated sand deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				*Discrete unvegetated gravel deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 27: 020-RH1-057-002

SITE REF. <i>020-RH1-057-002</i>		RIVER HABITAT SURVEY : DIMENSIONS AND INFLUENCES		Page 4 of 4	
L CHANNEL DIMENSIONS (to be measured at one location on a straight/uniform section, preferably across a riffle)					
LEFT BANK		CHANNEL		RIGHT BANK	
Banktop height (m)	<i>3</i>	Bankfull width (m)	<i>5</i>	Banktop height (m)	<i>3</i>
Is banktop height also bankfull height? (Y or N)	<i>Y</i>	Water width (m)	<i>0.5</i>	Is banktop height also bankfull height? (Y or N)	<i>Y</i>
Embanked height (m)		Water depth (m)	<i>0.01</i>	Embanked height (m)	
If trashline lower than banktop, indicate: height above water (m) = <i>0.75</i> width from bank to bank (m) = <i>1.5</i>					
Bed material at site is: consolidated <input type="checkbox"/> unconsolidated (loose) <input checked="" type="checkbox"/> unknown <input type="checkbox"/>					
Location of measurements is: riffle <input type="checkbox"/> other <input checked="" type="checkbox"/> (state) <i>SC6</i>					
M FEATURES OF SPECIAL INTEREST Use Y/or E (> 33% length) *record even if < 1%					
None	<input checked="" type="checkbox"/>	Very large boulders (>1m)	<input type="checkbox"/>	Backwater(s)	<input type="checkbox"/>
Braided channels	<input type="checkbox"/>	*Debris dam(s)	<input type="checkbox"/>	Floodplain boulder deposits	<input type="checkbox"/>
Side channel(s)	<input type="checkbox"/>	*Leafy debris	<input type="checkbox"/>	Water meadow(s)	<input type="checkbox"/>
*Natural waterfall(s) > 5m high	<input type="checkbox"/>	Fringing reed-bank(s)	<input type="checkbox"/>	Fen(s)	<input type="checkbox"/>
*Natural waterfall(s) < 5m high	<input type="checkbox"/>	Quaking bank(s)	<input type="checkbox"/>	Bog(s)	<input type="checkbox"/>
Natural cascade(s)	<input type="checkbox"/>	*Sink hole(s)	<input type="checkbox"/>	Wet woodland(s)	<input type="checkbox"/>
				Marsh(es)	<input type="checkbox"/>
				Flush(es)	<input type="checkbox"/>
				Natural open water	<input type="checkbox"/>
				Others (state)	<input type="checkbox"/>
N CHOKED CHANNEL (tick one box)					
Is 33% or more of the channel choked with vegetation? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>					
O NOTABLE NUISANCE PLANT SPECIES Use Y/or E (> 33% length) *record even if < 1%					
None	<input checked="" type="checkbox"/>	*Giant hogweed	<input type="checkbox"/>	*Himalayan balsam	<input type="checkbox"/>
		*Japanese knotweed	<input type="checkbox"/>	*Other (state).....	<input type="checkbox"/>
P OVERALL CHARACTERISTICS (Circle appropriate words, add others as necessary)					
Major impacts: landfill - tipping - litter - sewage - pollution - drought - abstraction - mill - dam - road - rail - industry - housing mining - quarrying - <u>overdeepening</u> - afforestation - fisheries management - silting - waterlogging - hydroelectric power					
Evidence of recent management: dredging - bank mowing - weed cutting - enhancement - river rehabilitation - gravel extraction - other (please specify)					
Animals: otter - mink - water vole - kingfisher - dipper - grey wagtail - sand martin - heron - dragonflies/damselflies					
Other significant observations: if necessary use separate sheet to describe overall characteristics and relevant observations <i>Overdeepened but would be good site for restoration as not hemmed in and could be easily re-connected with floodplain. See RCS.</i>					
Q ALDERS (tick one box in each of the two categories) *record even if < 1%					
*Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>			*Diseased Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>		
R FIELD SURVEY QUALITY CONTROL (✓ boxes to confirm checks)					
Have you taken at least two photos that illustrate the general character of the site and additional photos of any weirs/ sluices and major/intermediate structures across the channel? <input checked="" type="checkbox"/>					
Have you completed all ten spot-checks and made entries in all boxes in E & F on page 2? <input checked="" type="checkbox"/>					
Have you completed column 11 of section G (and E if appropriate) on page 2? <input checked="" type="checkbox"/>					
Have you recorded in section C the number of riffles, pools and point bars (even if 0) on page 1? <input checked="" type="checkbox"/>					
Have you given an accurate (alphanumeric) grid reference for spot-checks 1, 6 and end of site (page 1)? <input checked="" type="checkbox"/>					
Have you stated whether spot-check 1 is at the upstream or downstream end of the site (top of page 2)? <input checked="" type="checkbox"/>					
Have you cross-checked your spot-check and sweep-up responses with the channel modification indicators given on page 2 of the spot-check key? <input checked="" type="checkbox"/>					

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Figure 28: 020-RH1-058-001

RIVER HABITAT SURVEY 2003 Version		Page 1 of 4						
A FIELD SURVEY DETAILS								
Site Number: <u>Unreg - Mason</u> Site Reference: <u>41-92-Access rd</u> <u>020-RH1-058-001</u> Spot-check 1 Grid Ref: <u>SP8326 10057</u> Spot-check 6 Grid Ref: <u>SP83038 10207</u> End of site Grid Ref: <u>SP82871 10317</u> Reach Reference: <u>Unreg - Mason</u> River name: <u>Stream</u> Date <u>20/5/2013</u> Time: <u>15.00</u> Surveyor name: <u>Sarah Hodggett</u> Accredited Surveyor code: <u>FA019</u>	Is the site part of a river or an artificial channel? River <input checked="" type="checkbox"/> Artificial <input type="checkbox"/> Are adverse conditions affecting survey? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> If yes, state Is bed of river visible? barely or not <input type="checkbox"/> partially <input type="checkbox"/> ± entirely <input checked="" type="checkbox"/> Is health and safety assessment form attached? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Number of photographs taken: <u>4</u> <u>020-RH1-058-001 P1 200513,</u> <u>020-RH1-058-001 P2 200513,</u> Photo references: <u>020-RH1-058-001 P3 200513,</u> <u>020-RH1-058-001 P4 200513.</u> Site surveyed from: left bank <input type="checkbox"/> right bank <input checked="" type="checkbox"/> channel <input type="checkbox"/> <input type="checkbox"/> When options shown with 'shadow boxes', tick one box only LEFT banks determined by facing downstream RIGHT							
B PREDOMINANT VALLEY FORM (within the horizon limit) (tick one box only)								
(tick one box only) <input type="checkbox"/> shallow vee <input type="checkbox"/> deep vee <input type="checkbox"/> gorge		<input checked="" type="checkbox"/> concave/bowl <input type="checkbox"/> asymmetrical valley <input type="checkbox"/> U-shape valley <input type="checkbox"/> no obvious valley sides						
Distinct flat valley bottom? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> Natural terraces? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>								
C NUMBER OF RIFFLES, POOLS AND POINT BARS (enter total number in boxes)								
Riffle(s) <input type="text" value="5"/>	Unvegetated point bar(s) <input type="text" value="0"/>							
Pool(s) <input type="text" value="3"/>	Vegetated point bar(s) <input type="text" value="0"/>							
D ARTIFICIAL FEATURES (indicate total number of occurrences of each category within the 500m site)								
If none, tick box <input type="checkbox"/>	Weirs/slucices	Major	Intermediate	Minor	Outfalls/intakes	Major	Intermediate	Minor
	Culverts	<u>one</u>			Fords			
	Bridges	<u>1 (one)</u>		<u>1 (one)</u>	Deflectors/groynes/croys			
	Other - state							
Is channel obviously realigned? No <input type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input checked="" type="checkbox"/> Is channel obviously over-deepened? No <input checked="" type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input checked="" type="checkbox"/> Is water impounded by weir/dam? No <input checked="" type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input type="checkbox"/>								

Figure 29: 020-RH1-058-001

SITE REF. 020-RH1-058-001		RIVER HABITAT SURVEY: TEN SPOT-CHECKS										Page 2 of 4	
Spot-check 1 is at: upstream end <input checked="" type="checkbox"/>		downstream end <input type="checkbox"/>		of site (tick one box)									
E PHYSICAL ATTRIBUTES (to be assessed across channel within 1m wide transect)													
When boxes 'bordered', only one entry allowed		1 GPS	2	3	4	5	6 GPS	7	8	9	10	GPS	
LEFT BANK		Ring EC or SC if composed of sandy substrate											
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI		EA	EA	EA	EA	EA	NV	CA	EA	EA	EA	EA	
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM		NO	NO	NO	NO	NO	NV	RS	RS	RS	RS	RS	
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB		NO	NO	EC	NO	NO	NV	NO	NO	EC	NO	NO	
CHANNEL		GP: ring either G or P if predominant											
Channel substrate NV, BE, BO, CO, GP, SA, SI, CL, PE, EA, AR		GP	SI	GP	GP	GP	NV	GP	GP	GP	GP	NV	
Flow-type NV, FF, CH, BW, UW, CF, RP, UP, SM, NP, DR		RP	SM	SM	UW	SM	NV	RP	SM	RP	RP	NV	
Channel modification(s) NK, NO, CV, RS, RI, DA, FO		NO	NO	NO	NO	NO	NV	RS	RS	RS	RS	NV	
Channel feature(s) NV, NO, EB, RO, VR, MB, VB, MI, TR		NO	NO	NO	NO	NV	NV	NO	NO	TR	NV	NV	
For braided rivers only: number of sub-channels													
RIGHT BANK		Ring EC or SC if composed of sandy substrate											
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI		EA	EA	EA	EA	EA	NV	EA	EA	EA	EA	EA	
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM		NO	PC	PC	NO	NO	NV	RS	RS	RS	RS	RS	
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB		NO	NO	NO	NO	NO	NV	NO	NO	NO	NO	NO	
F BANKTOP LAND-USE AND VEGETATION STRUCTURE (to be assessed over a 10m wide transect)													
Land-use: choose one from BL, BP, CW, CP, SH, OR, WL, MH, AW, OW, RP, IG, TH, RD, SU, TL, IL, PG, NV													
LAND-USE WITHIN 5m OF LEFT BANKTOP		BP					PG	NV	TL	TL	TL	TL	
LEFT BANKTOP (structure within 1m) B/U/S/C/NV		U	U	S	U	S			S	U	S	S	
LEFT BANK-FACE (structure) B/U/S/C/NV		B	S	S	S	S			S	S	S	S	
RIGHT BANK-FACE (structure) B/U/S/C/NV		S	S	S	S	S			S	S	S	S	
RIGHT BANKTOP (structure within 1m) B/U/S/C/NV		U	U	U	U	U			S	S	U	S	
LAND-USE WITHIN 5m OF RIGHT BANKTOP		BP							TL	TL	TL	TL	
G CHANNEL VEGETATION TYPES (to be assessed over a 10m wide transect: use E if > 25% area, ✓ (present) or NV (not visible))													
None (✓) or Not Visible (NV)			✓				NV					NV	
Liverworts/mosses/lichens		✓		✓	✓	✓		✓	✓	E		E	
Emergent broad-leaved herbs				✓	✓	✓			✓	✓		✓	
Emergent reeds/sedges/rushes/grasses/horsetails						✓							✓
Floating-leaved (rooted)													
Free-floating													
Amphibious		✓											✓
Submerged broad-leaved													
Submerged linear-leaved													
Submerged fine-leaved													
Filamentous algae													✓
Use end column for overall assessment over 500m, including types not occurring in spot-checks (use ✓, E or NV)													

↑ Enter channel substrate(s) not occurring as predominant in spot-checks but present in >1% of whole site.

Figure 30: 020-RH1-058-001

SITE REF. 020-RH1-058-001		RIVER HABITAT SURVEY : 500m SWEEP-UP				Page 3 of 4	
H LAND-USE WITHIN 50m OF BANKTOP Use ✓ (present) or E (>33% banklength)							
	L	R		L	R		
Broadleaf/mixed woodland (semi-natural) (BL)	✓	✓	Natural open water (OW)				
Broadleaf/mixed plantation (BP)			Rough/unimproved grassland/pasture (RP)				
Coniferous woodland (semi-natural) (CW)			Improved/semi-improved grassland (IG)	E	E		
Coniferous plantation (CP)			Tall herb/rank vegetation (TH)	E	E		
Scrub & shrubs (SH)	✓	✓	Rock, scree or sand dunes (RD)				
Orchard (OR)			Suburban/urban development (SU)	✓			
Wetland (e.g. bog, marsh, fen) (WL)			Tilled land (TL)	E	E		
Moorland/heath (MH)			Irrigated land (IL)				
Artificial open water (AW)			Parkland or gardens (PG)	✓			
			Not visible (NV)				
I BANK PROFILES Use ✓ (present) or E (>33% banklength)							
Natural/unmodified		L	R	Artificial/modified		L	R
Vertical/undercut		✓		Resectioned (reprofiled)		E	E
Vertical with toe				Reinforced - whole		✓	
Steep (>45°)		E	E	Reinforced - top only			
Gentle		E	E	Reinforced - toe only			
Composite				Artificial two-stage			
Natural berm		✓		Poached bank		✓	✓
				Embanked			
				Set-back embankment			
J EXTENT OF TREES AND ASSOCIATED FEATURES *record even if <1%							
TREES (tick one box per bank)				ASSOCIATED FEATURES (tick one box per feature)			
	Left	Right		None	Present	E (>33%)	
None	<input type="checkbox"/>	<input type="checkbox"/>	Shading of channel	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Isolated/scattered	<input type="checkbox"/>	<input type="checkbox"/>	*Overhanging boughs	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Regularly spaced, single	<input type="checkbox"/>	<input type="checkbox"/>	*Exposed bankside roots	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Occasional clumps	<input type="checkbox"/>	<input type="checkbox"/>	*Underwater tree roots	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Semi-continuous	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Fallen trees	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Continuous	<input type="checkbox"/>	<input type="checkbox"/>	Large woody debris	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
K EXTENT OF CHANNEL AND BANK FEATURES (tick one box for each feature) *record even if <1%							
	None	Present	E (>33%)	None	Present	E (>33%)	
*Free fall flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed bedrock	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chute flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Broken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated bedrock/boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unbroken standing waves	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Unvegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rippled flow	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Vegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*Upwelling	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Mature island(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smooth flow	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Unvegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No perceptible flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No flow (dry)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marginal deadwater	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Vegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eroding cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Unvegetated silt deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stable cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Discrete unvegetated sand deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				*Discrete unvegetated gravel deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 31: 020-RH1-058-001

SITE REF. <u>020-RH1-058-001</u>		RIVER HABITAT SURVEY : DIMENSIONS AND INFLUENCES Page 4 of 4	
L CHANNEL DIMENSIONS (to be measured at one location on a straight uniform section, preferably across a riffle)			
LEFT BANK		CHANNEL	RIGHT BANK
Banktop height (m)	<u>1 m</u>	Bankfull width (m)	<u>6 m</u>
Is banktop height also bankfull height? (Y or N)	<u>Y</u>	Water width (m)	<u>1.5 m</u>
Embanked height (m)	<u>—</u>	Water depth (m)	<u>0.25</u>
If trashline lower than banktop, indicate: height above water (m) =		width from bank to bank (m) =	
Bed material at site is: consolidated <input type="checkbox"/> unconsolidated (loose) <input checked="" type="checkbox"/> unknown <input type="checkbox"/>			
Location of measurements is: riffle <input checked="" type="checkbox"/> other <input type="checkbox"/> (state)			
M FEATURES OF SPECIAL INTEREST (Use Y or E (> 33% length); *record even if < 1%)			
None <input checked="" type="checkbox"/>	Very large boulders (>1m) <input type="checkbox"/>	Backwater(s) <input type="checkbox"/>	Marsh(es) <input type="checkbox"/>
Braided channels <input type="checkbox"/>	*Debris dam(s) <input type="checkbox"/>	Floodplain boulder deposits <input type="checkbox"/>	Flush(es) <input type="checkbox"/>
Side channel(s) <input type="checkbox"/>	*Leafy debris <input type="checkbox"/>	Water meadow(s) <input type="checkbox"/>	Natural open water <input type="checkbox"/>
*Natural waterfall(s) > 5m high <input type="checkbox"/>	Fringing reed-bank(s) <input type="checkbox"/>	Fen(s) <input type="checkbox"/>	Others (state) <input type="checkbox"/>
*Natural waterfall(s) < 5m high <input type="checkbox"/>	Quaking bank(s) <input type="checkbox"/>	Bog(s) <input type="checkbox"/>	
Natural cascade(s) <input type="checkbox"/>	*Sink hole(s) <input type="checkbox"/>	Wet woodland(s) <input type="checkbox"/>	
N CHOKED CHANNEL (tick one box)			
Is 33% or more of the channel choked with vegetation? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>			
O NOTABLE NUISANCE PLANT SPECIES (Use Y or E (> 33% length); *record even if < 1%)			
None <input checked="" type="checkbox"/>	*Giant hogweed <input type="checkbox"/>	*Himalayan balsam <input type="checkbox"/>	
	*Japanese knotweed <input type="checkbox"/>	*Other (state)..... <input type="checkbox"/>	
P OVERALL CHARACTERISTICS (Circle appropriate words, add others as necessary)			
Major impacts: landfill - tipping - litter - sewage - pollution - drought - abstraction - mill - dam (road) rail - industry - housing mining - quarrying - overdeepening - afforestation - fisheries management - silting - waterlogging - hydroelectric power Evidence of recent management: dredging - bank mowing - weed cutting - enhancement - river rehabilitation - gravel extraction - other (please specify) - <u>Downstream half over-deepened + straightened</u> Animals: otter - mink - <u>water vole</u> - kingfisher - dipper - grey wagtail - sand martin - heron - dragonflies/damselflies Other significant observations: if necessary use separate sheet to describe overall characteristics and relevant observations			
Q ALDERS (tick one box in each of the two categories) *record even if < 1%			
*Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>		*Diseased Alders? None <input type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>	
R FIELD SURVEY QUALITY CONTROL (✓ boxes to confirm checks)			
Have you taken at least two photos that illustrate the general character of the site and additional photos of any weirs/ sluices and major/intermediate structures across the channel? <input checked="" type="checkbox"/>			
Have you completed all ten spot-checks and made entries in all boxes in E & F on page 2? <input checked="" type="checkbox"/>			
Have you completed column 11 of section G (and E if appropriate) on page 2? <input checked="" type="checkbox"/>			
Have you recorded in section C the number of riffles, pools and point bars (even if 0) on page 1? <input checked="" type="checkbox"/>			
Have you given an accurate (alphanumeric) grid reference for spot-checks 1, 6 and end of site (page 1)? <input type="checkbox"/>			
Have you stated whether spot-check 1 is at the upstream or downstream end of the site (top of page 2)? <input checked="" type="checkbox"/>			
Have you cross-checked your spot-check and sweep-up responses with the channel modification indicators given on page 2 of the spot-check key? <input type="checkbox"/>			

Downstream half over-deepened + straightened (riparian landscape)

Sedrup Ditch (CFA 11)

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Figure 32: 020-RH1-060-001

RIVER HABITAT SURVEY 2003 Version Page 1 of 4

A FIELD SURVEY DETAILS

Site Number: 020-RH1-060-001 leave blank if new site

Site Reference: 020-RH1-060-001

Spot-check 1 Grid Ref: SP80652 11238

Spot-check 6 Grid Ref: SP80846 11363

End of site Grid Ref: SP81091 11510

Reach Reference: BM 320993, crossing 27.

River name: DHEL

Date: 13/6/2013 Time: 10:00

Surveyor name: Sarah Hodgkins

Accredited Surveyor code: FA019

Is the site part of a river or an artificial channel? River Artificial 2

Are adverse conditions affecting survey? No Yes

If yes, state

Is bed of river visible? barely or not partially entirely

Is health and safety assessment form attached? Yes No

Number of photographs taken: 4 020-RH1-060-001 P1 130613,
020-RH1-060-001 P2 130613,
020-RH1-060-001 P3 130613,
020-RH1-060-001 P4 130613.

Photo references: 020-RH1-060-001 P4 130613.

Site surveyed from: left bank right bank channel

When options shown with 'shadow boxes', tick one box only

LEFT banks determined by facing downstream **RIGHT**

B PREDOMINANT VALLEY FORM (within the horizon limit) (tick one box only)

(tick one box only)

<p><input type="checkbox"/> shallow vee</p> <p><input type="checkbox"/> deep vee</p> <p><input type="checkbox"/> gorge</p>	<p><input type="checkbox"/> concave/bowl</p> <p><input type="checkbox"/> asymmetrical valley</p> <p><input type="checkbox"/> U-shape valley</p> <p><input checked="" type="checkbox"/> no obvious valley sides</p>
--	--

Distinct flat valley bottom? No Yes Natural terraces? No Yes

C NUMBER OF RIFFLES, POOLS AND POINT BARS (enter total number in boxes)

Riffle(s) 0	Unvegetated point bar(s) 0
Pool(s) 0	Vegetated point bar(s) 0

D ARTIFICIAL FEATURES (Indicate total number of occurrences of each category within the 500m site)

If none, tick box	Major			Intermediate			Minor		
<input type="checkbox"/>	Weirs/sluices				Outfalls/intakes				
<input type="checkbox"/>	Culverts				Fords				
<input type="checkbox"/>	Bridges				Deflectors/groynes/croys				
<input type="checkbox"/>	Other - state								

Is channel obviously realigned? No Yes, <33% of site ≥33% of site

Is channel obviously over-deepened? No Yes, <33% of site ≥33% of site

Is water impounded by weir/dam? No Yes, <33% of site ≥33% of site

Figure 33: 020-RH1-060-001

to be only road check

SITE REF. 020-RH1-060-001	RIVER HABITAT SURVEY: TEN SPOT-CHECKS	Page 2 of 4									
Spot-check 1 is at: upstream end <input type="checkbox"/> downstream end <input checked="" type="checkbox"/> of site (tick one box)											
E PHYSICAL ATTRIBUTES (to be assessed across channel within 1m wide transect)											
When boxes 'bordered', only one entry allowed	1 GPS	2	3	4	5	6 GPS	7	8	9	10	GPS
LEFT BANK	Ring EC or SC if composed of sandy substrate										
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI	CA	EA	CB								
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM	RS	RS	NO								
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB	NO	NO	NO								
CHANNEL	GP: ring either G or P if predominant										
Channel substrate NV, BE, BO, CO, GP, SA, SI, CL, PE, EA, AR	SI	SI	CA								
Flow-type NV, FF, CH, BW, UW, CF, RP, UP, SM, NP, DR	SM	SM	DR								
Channel modification(s) NK, NO, CV, RS, RI, DA, FO	RS	RS	NO								
Channel feature(s) NV, NO, EB, RO, VR, MB, VB, MI, TR	NO	NO	NO								
For braided rivers only: number of sub-channels											
RIGHT BANK	Ring EC or SC if composed of sandy substrate										
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI	CA	EA	CA								
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM	RS	RS	NO								
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB	NO	NO	NO								
F BANKTOP LAND-USE AND VEGETATION STRUCTURE (to be assessed over a 10m wide transect)											
Land-use: choose one from BL, BP, CW, CP, SH, OR, WL, MH, AW, OW, RP, IG, TH, RD, SU, TL, IL, PG, NV											
LAND-USE WITHIN 5m OF LEFT BANKTOP	TL	SH	SH								
LEFT BANKTOP (structure within 1m) B/U/S/C/NV	U	S	?								
LEFT BANK-FACE (structure) B/U/S/C/NV	B	S	S								
RIGHT BANK-FACE (structure) B/U/S/C/NV	S	S	S								
RIGHT BANKTOP (structure within 1m) B/U/S/C/NV	S	S	S								
LAND-USE WITHIN 5m OF RIGHT BANKTOP	SH	SH	SH								
G CHANNEL VEGETATION TYPES (to be assessed over a 10m wide transect: use E if > 13% area) ✓ (present) or NV (not visible)											
None (✓) or Not Visible (NV)		✓	✓								
Liverworts/mosses/lichens											
Emergent broad-leaved herbs	✓										
Emergent reeds/sedges/rushes/grasses/horsetails	✓										
Floating-leaved (rooted)											
Free-floating											
Amphibious											
Submerged broad-leaved											
Submerged linear-leaved											
Submerged fine-leaved											
Filamentous algae											
Use end column for overall assessment over 500m, including types not occurring in spot-checks (use ✓, E or NV)											

↑ Enter channel substrate(s) not occurring as predominant in spot-checks but present in >1% of whole site.

Figure 34: 020-RH1-060-001

SITE REF. 020-RH1-060-001		RIVER HABITAT SURVEY : 500m SWEEP-UP				Page 3 of 4	
H LAND-USE WITHIN 50m OF BANKTOP Use ✓ (present) or E (≥ 33% banklength)							
	L	R		L	R		
Broadleaf/mixed woodland (semi-natural) (BL)			Natural open water (OW)				
Broadleaf/mixed plantation (BP)			Rough/unimproved grassland/pasture (RP)				
Coniferous woodland (semi-natural) (CW)			Improved/semi-improved grassland (IG)				
Coniferous plantation (CP)			Tall herb/rank vegetation (TH)	✓	✓		
Scrub & shrubs (SH)	✓	E	Rock, scree or sand dunes (RD)				
Orchard (OR)			Suburban/urban development (SU)				
Wetland (e.g. bog, marsh, fen) (WL)			Tilled land (TL)	E	E		
Moorland/heath (MH)			Irrigated land (IL)				
Artificial open water (AW)			Parkland or gardens (PG)				
			Not visible (NV)				
I BANK PROFILES Use ✓ (present) or E (≥ 33% banklength)							
Natural/unmodified		L	R	Artificial/modified		L	R
Vertical/undercut				Resectioned (reprofiled)		E	E
Vertical with toe				Reinforced - whole			
Steep (>45°)		E	E	Reinforced - top only			
Gentle				Reinforced - toe only			
Composite				Artificial two-stage			
Natural berm				Poached bank			
				Embanked			
				Set-back embankment			
J EXTENT OF TREES AND ASSOCIATED FEATURES *record even if <1%							
TREES (tick one box per bank)				ASSOCIATED FEATURES (tick one box per feature)			
	Left	Right		None	Present	E (≥33%)	
None	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Shading of channel	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Isolated/scattered	<input checked="" type="checkbox"/>	<input type="checkbox"/>		*Overhanging boughs	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Regularly spaced, single	<input type="checkbox"/>	<input type="checkbox"/>		*Exposed bankside roots	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Occasional clumps	<input type="checkbox"/>	<input type="checkbox"/>		*Underwater tree roots	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Semi-continuous	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Fallen trees	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Continuous	<input type="checkbox"/>	<input type="checkbox"/>		Large woody debris	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
K EXTENT OF CHANNEL AND BANK FEATURES (tick one box for each feature) *record even if <1%							
	None	Present	E(≥33%)	None	Present	E(≥33%)	
*Free fall flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed bedrock	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chute flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Broken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated bedrock/boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unbroken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rippled flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*Upwelling	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Mature island(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smooth flow	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Unvegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No perceptible flow	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Vegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No flow (dry)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Unvegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marginal deadwater	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eroding cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Unvegetated silt deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stable cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Discrete unvegetated sand deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				*Discrete unvegetated gravel deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 35: 020-RH1-060-001

SITE REF. 020-RH1-060-001		RIVER HABITAT SURVEY : DIMENSIONS AND INFLUENCES		Page 4 of 4	
L CHANNEL DIMENSIONS (to be measured at one location on a straight uniform section, preferably across a riffle)					
LEFT BANK		CHANNEL		RIGHT BANK	
Banktop height (m)	1.5	Bankfull width (m)	2	Banktop height (m)	1.5
Is banktop height also bankfull height? (Y or N)	N	Water width (m)	0.1	Is banktop height also bankfull height? (Y or N)	N
Embanked height (m)	/	Water depth (m)	0.05	Embanked height (m)	/
If trashline lower than banktop, indicate: height above water (m) = width from bank to bank (m) =					
Bed material at site is: consolidated <input type="checkbox"/> unconsolidated (loose) <input checked="" type="checkbox"/> unknown <input type="checkbox"/>					
Location of measurements is: riffle <input type="checkbox"/> other <input checked="" type="checkbox"/> (state) EC 2					
M FEATURES OF SPECIAL INTEREST (Use Y or E (> 33% length) *record even if <1%)					
None	<input checked="" type="checkbox"/>	Very large boulders (>1m)	<input type="checkbox"/>	Backwater(s)	<input type="checkbox"/>
Braided channels	<input type="checkbox"/>	*Debris dam(s)	<input type="checkbox"/>	Floodplain boulder deposits	<input type="checkbox"/>
Side channel(s)	<input type="checkbox"/>	*Leafy debris	<input type="checkbox"/>	Water meadow(s)	<input type="checkbox"/>
*Natural waterfall(s) > 5m high	<input type="checkbox"/>	Fringing reed-bank(s)	<input type="checkbox"/>	Fen(s)	<input type="checkbox"/>
*Natural waterfall(s) < 5m high	<input type="checkbox"/>	Quaking bank(s)	<input type="checkbox"/>	Bog(s)	<input type="checkbox"/>
Natural cascade(s)	<input type="checkbox"/>	*Sink hole(s)	<input type="checkbox"/>	Wet woodland(s)	<input type="checkbox"/>
Marsh(es) <input type="checkbox"/>					
Flush(es) <input type="checkbox"/>					
Natural open water <input type="checkbox"/>					
Others (state) <input type="checkbox"/>					
N CHOKED CHANNEL (tick one box)					
Is 33% or more of the channel choked with vegetation? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>					
O NOTABLE NUISANCE PLANT SPECIES (Use Y or E (> 33% length) *record even if <1%)					
None	<input checked="" type="checkbox"/>	*Giant hogweed	<input type="checkbox"/>	*Himalayan balsam	<input type="checkbox"/>
		*Japanese knotweed	<input type="checkbox"/>	*Other (state).....	<input type="checkbox"/>
P OVERALL CHARACTERISTICS (Circle appropriate words, add others as necessary)					
<p>Major impacts: landfill - tipping - litter - sewage - pollution - drought - abstraction - mill - dam - road - rail - industry - housing mining - quarrying - overdeepening - afforestation - fisheries management - silting - waterlogging - hydroelectric power</p> <p>Evidence of recent management: dredging - bank mowing - weed cutting - enhancement - river rehabilitation - gravel extraction - other (please specify)</p> <p>Animals: otter - mink - water vole - kingfisher - dipper - grey wagtail - sand martin - heron - dragonflies/damselflies</p> <p>Other significant observations: if necessary use separate sheet to describe overall characteristics and relevant observations</p> <p>Only first 350m of reach was a ditch - disappe</p>					
Q ALDERS (tick one box in each of the two categories) *record even if <1%					
*Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>			*Diseased Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>		
R FIELD SURVEY QUALITY CONTROL (✓ boxes to confirm checks)					
Have you taken at least two photos that illustrate the general character of the site and additional photos of any weirs/ sluices and major/intermediate structures across the channel? <input checked="" type="checkbox"/>					
Have you completed all ten spot-checks and made entries in all boxes in E & F on page 2? <input checked="" type="checkbox"/>					
Have you completed column 11 of section G (and E if appropriate) on page 2? <input checked="" type="checkbox"/>					
Have you recorded in section C the number of riffles, pools and point bars (even if 0) on page 1? <input checked="" type="checkbox"/>					
Have you given an accurate (alphanumeric) grid reference for spot-checks 1, 6 and end of site (page 1)? <input checked="" type="checkbox"/>					
Have you stated whether spot-check 1 is at the upstream or downstream end of the site (top of page 2)? <input checked="" type="checkbox"/>					
Have you cross-checked your spot-check and sweep-up responses with the channel modification indicators given on page 2 of the spot-check key? <input type="checkbox"/>					

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Figure 36: 020-RH1-061-001






















RIVER HABITAT SURVEY 2003 Version		Page 1 of 4																
A FIELD SURVEY DETAILS																		
Site Number: <input type="text" value="leave blank if new site"/> Site Reference: <u>020-RH1-061-001</u> Spot-check 1 Grid Ref: <u>SP80596 11487</u> Spot-check 6 Grid Ref: <u>SP80688 11701</u> End of site Grid Ref: <u>SP80680 11950</u> Reach Reference: River name: <u>SEDRUP DITCH</u> Date: <u>9/5/2013</u> Time: <u>15:20</u> Surveyor name: <u>ZOE TRENT</u> Accredited Surveyor code: <u>L7061</u>	Is the site part of a river or an artificial channel? River <input checked="" type="checkbox"/> Artificial <input type="checkbox"/> Are adverse conditions affecting survey? No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> If yes, state <u>Very overgrown</u> Is bed of river visible? barely or not <input checked="" type="checkbox"/> partially <input type="checkbox"/> ± entirely <input type="checkbox"/> Is health and safety assessment form attached? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Number of photographs taken: <input type="text" value="4"/> Photo references: <u>P1, P2, P3, P4</u> Site surveyed from: left bank <input type="checkbox"/> right bank <input checked="" type="checkbox"/> channel <input type="checkbox"/> <input type="checkbox"/> When options shown with 'shadow boxes', tick one box only																	
B PREDOMINANT VALLEY FORM (within the horizon limit) (tick one box only)																		
(tick one box only) <table style="width:100%; border: none;"> <tr> <td style="text-align: center;"></td> <td style="text-align: center;"><input type="checkbox"/> shallow vee</td> <td style="text-align: center;"></td> <td style="text-align: center;"><input type="checkbox"/> concave/bowl</td> </tr> <tr> <td style="text-align: center;"></td> <td style="text-align: center;"><input type="checkbox"/> deep vee</td> <td style="text-align: center;"></td> <td style="text-align: center;"><input type="checkbox"/> asymmetrical valley</td> </tr> <tr> <td style="text-align: center;"></td> <td style="text-align: center;"><input type="checkbox"/> gorge</td> <td style="text-align: center;"></td> <td style="text-align: center;"><input type="checkbox"/> U-shape valley</td> </tr> <tr> <td colspan="2"></td> <td style="text-align: center;"></td> <td style="text-align: center;"><input checked="" type="checkbox"/> no obvious valley sides</td> </tr> </table>				<input type="checkbox"/> shallow vee		<input type="checkbox"/> concave/bowl		<input type="checkbox"/> deep vee		<input type="checkbox"/> asymmetrical valley		<input type="checkbox"/> gorge		<input type="checkbox"/> U-shape valley				<input checked="" type="checkbox"/> no obvious valley sides
	<input type="checkbox"/> shallow vee		<input type="checkbox"/> concave/bowl															
	<input type="checkbox"/> deep vee		<input type="checkbox"/> asymmetrical valley															
	<input type="checkbox"/> gorge		<input type="checkbox"/> U-shape valley															
			<input checked="" type="checkbox"/> no obvious valley sides															
Distinct flat valley bottom? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> Natural terraces? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>																		
C NUMBER OF RIFFLES, POOLS AND POINT BARS (enter total number in boxes)																		
Riffle(s) <input type="text" value="0"/> Pool(s) <input type="text" value="0"/>		Unvegetated point bar(s) <input type="text" value="5"/> Vegetated point bar(s) <input type="text" value="0"/>																
D ARTIFICIAL FEATURES (indicate total number of occurrences of each category within the 50m site)																		
If none, tick box <input checked="" type="checkbox"/>																		
	Major	Intermediate	Minor		Major	Intermediate	Minor											
Weirs/sluiques				Outfalls/intakes														
Culverts				Fords														
Bridges				Deflectors/groynes/croys														
Other - state																		
Is channel obviously realigned? No <input type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input checked="" type="checkbox"/> Is channel obviously over-deepened? No <input type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input checked="" type="checkbox"/> Is water impounded by weir/dam? No <input checked="" type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input type="checkbox"/>																		

Figure 37: 020-RH1-061-001

SITE REF: 020-RH1-061-001	RIVER HABITAT SURVEY: TEN SPOT-CHECKS										Page 2 of 4	
Spot-check 1 is at: upstream end <input checked="" type="checkbox"/> downstream end <input type="checkbox"/> of site (tick one box)												
E. PHYSICAL ATTRIBUTES (to be assessed across channel within 1m wide transect)												
When boxes 'bordered', only one entry allowed	1 GPS	2	3	4	5	6 GPS	7	8	9	10	GPS	
LEFT BANK	Ring EC or SC if composed of sandy substrate											
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
CHANNEL	GP: ring either G or P if predominant											
Channel substrate NV, BE, BO, CO, GP, SA, SI, CL, PE, EA, AR	SI	SI	SI	SI	SI	SI	SI	SI	SI	SI	SI	
Flow-type NV, FF, CH, BW, UW, CF, RP, UP, SM, NP, DR	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	
Channel modification(s) NK, NO, CV, RS, RI, DA, FO	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	
Channel feature(s) NV, NO, EB, RO, VR, MB, VB, MI, TR	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
For braided rivers only: number of sub-channels	/	/	/	/	/	/	/	/	/	/	/	
RIGHT BANK	Ring EC or SC if composed of sandy substrate											
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
F. BANKTOP LAND-USE AND VEGETATION STRUCTURE (to be assessed over a 10m wide transect)												
Land-use: choose one from BL, BP, CW, CP, SH, OR, WL, MH, AW, OW, RP, IG, TH, RD, SU, TL, IL, PG, NV												
LAND-USE WITHIN 5m OF LEFT BANKTOP	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL	
LEFT BANKTOP (structure within 1m) B/U/S/C/NV	C	C	C	C	C	C	C	C	C	C	C	
LEFT BANK-FACE (structure) B/U/S/C/NV	C	C	C	C	C	C	C	C	C	C	C	
RIGHT BANK-FACE (structure) B/U/S/C/NV	S	S	S	S	S	S	S	S	S	S	S	
RIGHT BANKTOP (structure within 1m) B/U/S/C/NV	S	U	U	U	U	U	U	U	U	U	S	
LAND-USE WITHIN 5m OF RIGHT BANKTOP	TH	IG	IG	IG	IG	IG	IG	IG	IG	IG	TH	
G. CHANNEL VEGETATION TYPES (to be assessed over a 10m wide transect; use E/C/S if present, or NV if not visible)												
None (✓) or Not Visible (NV)	✓										✓	
Liverworts/mosses/lichens												
Emergent broad-leaved herbs		✓	✓	✓	✓		✓	✓			✓	
Emergent reeds/sedges/rushes/grasses/horsetails								✓			✓	
Floating-leaved (rooted)												
Free-floating												
Amphibious											✓	
Submerged broad-leaved			✓	✓	✓	✓	✓	✓	✓		✓	
Submerged linear-leaved												
Submerged fine-leaved												
Filamentous algae			✓	✓	✓	✓	✓	✓			✓	
Use end column for overall assessment over 500m, including types not occurring in spot-checks (use ✓, E or NV)												

↑ Enter channel substrate(s) not occurring as predominant in spot-checks but present in >1% of whole site.

Figure 38: 020-RH1-061-001


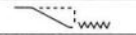
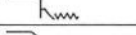
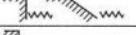
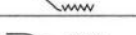
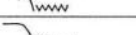
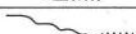
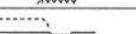





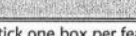
SITE REF. 020-RH1-061-001		RIVER HABITAT SURVEY : 500m SWEEP-UP				Page 3 of 4	
H LAND USE WITHIN 50m OF BANKTOP Use ✓ (present) or E (>33% banklength)							
	L	R		L	R		
Broadleaf/mixed woodland (semi-natural) (BL)	E		Natural open water (OW)				
Broadleaf/mixed plantation (BP)			Rough/unimproved grassland/pasture (RP)				
Coniferous woodland (semi-natural) (CW)			Improved/semi-improved grassland (IG)	✓	✓		
Coniferous plantation (CP)			Tall herb/rank vegetation (TH)				
Scrub & shrubs (SH)		✓	Rock, scree or sand dunes (RD)				
Orchard (OR)			Suburban/urban development (SU)				
Wetland (e.g. bog, marsh, fen) (WL)			Tilled land (TL)		E		
Moorland/heath (MH)			Irrigated land (IL)				
Artificial open water (AW)			Parkland or gardens (PG)				
			Not visible (NV)				
I BANK PROFILES Use ✓ (present) or E (>33% banklength)							
Natural/unmodified		L	R	Artificial/modified		L	R
Vertical/undercut 				Resectioned (reprofiled) 			E
Vertical with toe 				Reinforced - whole 			
Steep (>45°) 		✓		Reinforced - top only 			
Gentle 		✓		Reinforced - toe only 			
Composite 				Artificial two-stage 			
Natural berm 				Poached bank 			
				Embanked 			
				Set-back embankment 			
J EXTENT OF TREES AND ASSOCIATED FEATURES (record overall >33%)							
TREES (tick one box per bank)				ASSOCIATED FEATURES (tick one box per feature)			
	Left	Right		None	Present	E (>33%)	
None	<input type="checkbox"/>	<input type="checkbox"/>		Shading of channel	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Isolated/scattered	<input type="checkbox"/>	<input type="checkbox"/>		*Overhanging boughs	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Regularly spaced, single	<input type="checkbox"/>	<input type="checkbox"/>		*Exposed bankside roots	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Occasional clumps	<input type="checkbox"/>	<input checked="" type="checkbox"/>		*Underwater tree roots	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Semi-continuous	<input type="checkbox"/>	<input type="checkbox"/>		Fallen trees	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Continuous	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Large woody debris	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
K EXTENT OF CHANNEL AND BANK FEATURES (tick one box for each feature) (record overall >33%)							
	None	Present	E (>33%)	None	Present	E (>33%)	
*Free fall flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed bedrock	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chute flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Broken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated bedrock/boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unbroken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rippled flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*Upwelling	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Mature island(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smooth flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Unvegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No perceptible flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No flow (dry)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marginal deadwater	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eroding cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Unvegetated silt deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stable cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Discrete unvegetated sand deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				*Discrete unvegetated gravel deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 39: 020-RH1-061-001

SITE REF. 020-RH1-061-001		RIVER HABITAT SURVEY : DIMENSIONS AND INFLUENCES		Page 4 of 4	
L. CHANNEL DIMENSIONS (to be measured at one location on a straight uniform section, preferably across a riffle)					
LEFT BANK		CHANNEL		RIGHT BANK	
Banktop height (m)	0.75	Bankfull width (m)	3.00	Banktop height (m)	1.5
Is banktop height also bankfull height? (Y or N)	Y	Water width (m)	0.75	Is banktop height also bankfull height? (Y or N)	N
Embanked height (m)	/	Water depth (m)	0.05	Embanked height (m)	/
If trashline lower than banktop, indicate: height above water (m) = / width from bank to bank (m) = /					
Bed material at site is: consolidated <input type="checkbox"/> unconsolidated (loose) <input checked="" type="checkbox"/> unknown <input type="checkbox"/>					
Location of measurements is: riffle <input type="checkbox"/> other <input checked="" type="checkbox"/> (state) SC 9					
M. FEATURES OF SPECIAL INTEREST (Use Y or F (> 33% length) *record even if <1%)					
None	<input checked="" type="checkbox"/>	Very large boulders (>1m)	<input type="checkbox"/>	Backwater(s)	<input type="checkbox"/>
Braided channels	<input type="checkbox"/>	*Debris dam(s)	<input type="checkbox"/>	Floodplain boulder deposits	<input type="checkbox"/>
Side channel(s)	<input type="checkbox"/>	*Leafy debris	<input type="checkbox"/>	Water meadow(s)	<input type="checkbox"/>
*Natural waterfall(s) > 5m high	<input type="checkbox"/>	Fringing reed-bank(s)	<input type="checkbox"/>	Fen(s)	<input type="checkbox"/>
*Natural waterfall(s) < 5m high	<input type="checkbox"/>	Quaking bank(s)	<input type="checkbox"/>	Bog(s)	<input type="checkbox"/>
Natural cascade(s)	<input type="checkbox"/>	*Sink hole(s)	<input type="checkbox"/>	Wet woodland(s)	<input type="checkbox"/>
				Marsh(es)	<input type="checkbox"/>
				Flush(es)	<input type="checkbox"/>
				Natural open water	<input type="checkbox"/>
				Others (state)	<input type="checkbox"/>
N. CHOKED CHANNEL (tick one box)					
Is 33% or more of the channel choked with vegetation? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>					
O. NOTABLE NUISANCE PLANT SPECIES (Use Y or F (> 33% length) *record even if <1%)					
None	<input checked="" type="checkbox"/>	*Giant hogweed	<input type="checkbox"/>	*Himalayan balsam	<input type="checkbox"/>
		*Japanese knotweed	<input type="checkbox"/>	*Other (state).....	<input type="checkbox"/>
P. OVERALL CHARACTERISTICS (Circle appropriate words, add others as necessary)					
Major impacts: landfill - tipping - litter - sewage - pollution - drought - abstraction - mill - dam - road - rail - industry - housing mining - quarrying - <u>overdeepening</u> - afforestation - fisheries management - silting - waterlogging - hydroelectric power					
Evidence of recent management: dredging - bank mowing - weed cutting - enhancement - river rehabilitation - gravel extraction - other (please specify)					
Animals: otter - mink - water vole - kingfisher - dipper - grey wagtail - sand martin - heron - dragonflies/damselflies					
Other significant observations: if necessary use separate sheet to describe overall characteristics and relevant observations <i>Channel re-aligned but this is woodland - likely resectored in the past but now naturalised. RHB more recently resectored but parts still very overgrown.</i>					
Q. ALDERS (tick one box in each of the two categories) *record even if <1%					
*Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>			*Diseased Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>		
R. FIELD SURVEY QUALITY CONTROL (v. boxes to confirm checks)					
Have you taken at least two photos that illustrate the general character of the site and additional photos of any weirs/ sluices and major/intermediate structures across the channel? <input type="checkbox"/>					
Have you completed all ten spot-checks and made entries in all boxes in E & F on page 2? <input checked="" type="checkbox"/>					
Have you completed column 11 of section G (and E if appropriate) on page 2? <input checked="" type="checkbox"/>					
Have you recorded in section C the number of riffles, pools and point bars (even if 0) on page 1? <input checked="" type="checkbox"/>					
Have you given an accurate (alphanumeric) grid reference for spot-checks 1, 6 and end of site (page 1)? <input checked="" type="checkbox"/>					
Have you stated whether spot-check 1 is at the upstream or downstream end of the site (top of page 2)? <input type="checkbox"/>					
Have you cross-checked your spot-check and sweep-up responses with the channel modification indicators given on page 2 of the spot-check key? <input checked="" type="checkbox"/>					

Hartwell Ditches (CFA 11)

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Figure 40: 020-RH1-062-001

RIVER HABITAT SURVEY 2003 Version				Page 1 of 4				
A FIELD SURVEY DETAILS								
Site Number: <input type="text"/> <small>leave blank if new site</small> Site Reference: 020-RH1-062-001 Spot-check 1 Grid Ref: SP 79773 1281088 Spot-check 6 Grid Ref: SP 79788 12936 End of site Grid Ref: SP 79773 12810 Reach Reference: BM 340518, crossing 291. River name: Bear Brook Date: 31/10/2013 Time: 9:00 Surveyor name: Sarah Hodgsett Accredited Surveyor code: FA019.				Is the site part of a river or an artificial channel? River <input checked="" type="checkbox"/> Artificial <input type="checkbox"/> Are adverse conditions affecting survey? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> If yes, state Is bed of river visible? barely or not <input type="checkbox"/> partially <input type="checkbox"/> entirely <input checked="" type="checkbox"/> Is health and safety assessment form attached? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Number of photographs taken: <input checked="" type="checkbox"/> 020-RH1-062-001 P1 310513, <input checked="" type="checkbox"/> 020-RH1-062-001 P2 310513, <input checked="" type="checkbox"/> 020-RH1-062-001 P3 310513, <input checked="" type="checkbox"/> 020-RH1-062-001 P4 310513, <input checked="" type="checkbox"/> 020-RH1-062-001 P5 310513, <input checked="" type="checkbox"/> 020-RH1-062-001 P6 310513 Photo references: 020-RH1-062-001 P4 310513, 020-RH1-062-001 P5 310513, 020-RH1-062-001 P6 310513 Site surveyed from: left bank <input type="checkbox"/> right bank <input checked="" type="checkbox"/> channel <input checked="" type="checkbox"/>				
<input type="checkbox"/> When options shown with 'shadow boxes', tick one box only								
<input checked="" type="checkbox"/> LEFT banks determined by facing downstream <input checked="" type="checkbox"/> RIGHT								
B PREDOMINANT VALLEY FORM (within the horizon limit) (tick one box only)								
(tick one box only)								
<input type="checkbox"/> shallow vee		<input type="checkbox"/> concave/bowl		<input type="checkbox"/> deep vee		<input type="checkbox"/> asymmetrical valley		
<input type="checkbox"/> gorge		<input type="checkbox"/> U-shape valley		<input checked="" type="checkbox"/> no obvious valley sides				
Distinct flat valley bottom? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>				Natural terraces? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>				
C NUMBER OF RIFFLES, POOLS AND POINT BARS (enter total number in boxes)								
Riffle(s) <input type="text"/>		Unvegetated point bar(s) <input type="text"/>		Pool(s) <input type="text"/>		Vegetated point bar(s) <input type="text"/>		
D ARTIFICIAL FEATURES (indicate total number of occurrences of each category within the 500m site)								
If none, tick box <input type="checkbox"/>	Weirs/sluices	Major	Intermediate	Minor	Outfalls/intakes	Major	Intermediate	Minor
	Culverts	11 (two)			Fords			1
	Bridges			11 (two)	Deflectors/groyne/croys			
	Other - state							
Is channel obviously realigned?		No <input type="checkbox"/>	Yes, <33% of site <input checked="" type="checkbox"/>		Yes, <33% of site <input checked="" type="checkbox"/>		≥33% of site <input checked="" type="checkbox"/>	
Is channel obviously over-deepened?		No <input type="checkbox"/>	Yes, <33% of site <input checked="" type="checkbox"/>		Yes, <33% of site <input checked="" type="checkbox"/>		≥33% of site <input checked="" type="checkbox"/>	
Is water impounded by weir/dam?		No <input type="checkbox"/>	Yes, <33% of site <input checked="" type="checkbox"/>		Yes, <33% of site <input checked="" type="checkbox"/>		≥33% of site <input checked="" type="checkbox"/>	

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Figure 41: 020-RH1-062-001

SITE REF. 020-RH1-062-001		RIVER HABITAT SURVEY: TEN SPOT-CHECKS										Page 2 of 4
Spot-check 1 is at: upstream end <input type="checkbox"/>		downstream end <input checked="" type="checkbox"/>										of site (tick one box)
E PHYSICAL ATTRIBUTES (to be assessed across channel within 1m wide transect)												
When boxes 'bordered', only one entry allowed												
1 GPS 2 3 4 5 6 GPS 7 8 9 10 GPS												
LEFT BANK												
Ring EC or SC if composed of sandy substrate												
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM	RS	RS	RS	RS	RI	RS	RS	NO	NO	NO	NO	NO
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
CHANNEL												
GP: ring either C or P if predominant												
Channel substrate NV, BE, BO, CO, GP, SA, SI, CL, PE, EA, AR	NV	SI	SI	SI	NV	SI	SI	GP	GP	GP	GP	GP
Flow-type NV, FF, CH, BW, UW, CF, RP, UP, SM, NP, DR	NV	SM	SM	SM	NV	SM	SM	RP	SM	SM	SM	SM
Channel modification(s) NK, NO, CV, RS, RI, DA, FO	RS	RS	RS	RS	CV	RS	RS	NO	NO	NO	NO	NO
Channel feature(s) NV, NO, EB, RO, VR, MB, VB, MI, TR	NO	NO	NO	NO	NV	NO	NO	NO	NO	NO	NO	NO
For braided rivers only: number of sub-channels												
RIGHT BANK												
Ring EC or SC if composed of sandy substrate												
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM	RS	RS	RS	RS	RI	RS	RS	NO	NO	NO	NO	NO
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
F BANKTOP LAND-USE AND VEGETATION STRUCTURE (to be assessed over a 10m wide transect)												
Land-use: choose one from BL, BP, CW, CP, SH, OR, WL, MH, AW, OW, RP, IG, TH, RD, SU, TL, IL, PG, NV												
LAND-USE WITHIN 5m OF LEFT BANKTOP	PG	PG	PG	PG	PG	PG	PG	PG	BL	BL	BL	BL
LEFT BANKTOP (structure within 1m) B/U/S/C/NV	S	S	S	S	S	S	S	S	S	S	S	S
LEFT BANK-FACE (structure) B/U/S/C/NV	S	S	S	S	S	S	S	S	S	S	S	S
RIGHT BANK-FACE (structure) B/U/S/C/NV	S	S	S	S	S	S	S	S	S	S	S	S
RIGHT BANKTOP (structure within 1m) B/U/S/C/NV	S	S	S	S	S	S	S	S	S	S	S	S
LAND-USE WITHIN 5m OF RIGHT BANKTOP	PG	PG	PG	PG	PG	PG	SH	SH	BL	BL	BL	BL
G CHANNEL VEGETATION TYPES (to be assessed over a 10m wide transect; use E (≥ 33% area) ✓ (present) or NV (not visible))												
None (✓) or Not Visible (NV)	NV			NV	NV		✓					
Liverworts/mosses/lichens												
Emergent broad-leaved herbs		✓	✓			✓			✓	✓	✓	✓
Emergent reeds/sedges/rushes/grasses/horsetails			✓						✓	✓	✓	✓
Floating-leaved (rooted)									✓			
Free-floating												
Amphibious		✓	✓			✓			✓	✓	✓	✓
Submerged broad-leaved												
Submerged linear-leaved												
Submerged fine-leaved												
Filamentous algae												
Use end column for overall assessment over 500m, including types not occurring in spot-checks (use ✓, E or NV)												

↑ Enter channel substrate(s) not occurring as predominant in spot-checks but present in >1% of whole site.

Figure 42: 020-RH1-062-001

SITE REF: 020-RH1-062-001		RIVER HABITAT SURVEY : 500m SWEEP-UP				Page 3 of 4	
H LAND-USE WITHIN 50m OF BANKTOP Use ✓ (present) or E (≥ 33% banklength)							
	L	R		L	R		
Broadleaf/mixed woodland (semi-natural) (BL)	✓	✓	Natural open water (OW)		✓		
Broadleaf/mixed plantation (BP)		✓	Rough/unimproved grassland/pasture (RP)				
Coniferous woodland (semi-natural) (CW)			Improved/semi-improved grassland (IG)				
Coniferous plantation (CP)			Tall herb/rank vegetation (TH)	✓	✓		
Scrub & shrubs (SH)	✓	✓	Rock, scree or sand dunes (RD)				
Orchard (OR)			Suburban/urban development (SU)		✓		
Wetland (e.g. bog, marsh, fen) (WL)			Tilled land (TL)				
Moorland/heath (MH)			Irrigated land (IL)				
Artificial open water (AW)			Parkland or gardens (PG)	E	E		
			Not visible (NV)				
I BANK PROFILES Use ✓ (present) or E (≥ 33% banklength)							
Natural/unmodified		L	R	Artificial/modified		L	R
Vertical/undercut				Resectioned (reprofiled)		✓	✓
Vertical with toe				Reinforced - whole		✓	✓
Steep (>45°)		E	E	Reinforced - top only			
Gentle		E	E	Reinforced - toe only			
Composite				Artificial two-stage			
Natural berm				Poached bank			
				Embanked			
				Set-back embankment			
J EXTENT OF TREES AND ASSOCIATED FEATURES *record even if <1%							
TREES (tick one box per bank)				ASSOCIATED FEATURES (tick one box per feature)			
	Left	Right		None	Present	E (≥33%)	
*None	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Shading of channel	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Isolated/scattered	<input type="checkbox"/>	<input checked="" type="checkbox"/>		*Overhanging boughs	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Regularly spaced, single	<input type="checkbox"/>	<input type="checkbox"/>		*Exposed bankside roots	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Occasional clumps	<input type="checkbox"/>	<input type="checkbox"/>		*Underwater tree roots	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Semi-continuous	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Fallen trees	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Continuous	<input type="checkbox"/>	<input type="checkbox"/>		Large woody debris	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
K EXTENT OF CHANNEL AND BANK FEATURES (tick one box for each feature) *record even if <1%							
	None	Present	E (≥33%)	None	Present	E (≥33%)	
*Free fall flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed bedrock	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chute flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Broken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated bedrock/boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unbroken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rippled flow	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Vegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*Upwelling	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Mature island(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smooth flow	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Unvegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No perceptible flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No flow (dry)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marginal deadwater	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eroding cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Unvegetated silt deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stable cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Discrete unvegetated sand deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				*Discrete unvegetated gravel deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 43: 020-RH1-062-001

SITE REF. 020-RH1-062-001		RIVER HABITAT SURVEY : DIMENSIONS AND INFLUENCES		Page 4 of 4	
L CHANNEL DIMENSIONS (to be measured at one location on a straight uniform section, preferably across a riffle)					
LEFT BANK		CHANNEL		RIGHT BANK	
Banktop height (m)	1	Bankfull width (m)	1.5	Banktop height (m)	1
Is banktop height also bankfull height? (Y or N)	Y	Water width (m)	0.9	Is banktop height also bankfull height? (Y or N)	✓
Embanked height (m)	/	Water depth (m)	0.2	Embanked height (m)	/
If trashline lower than banktop, indicate: height above water (m) = / width from bank to bank (m) = /					
Bed material at site is: consolidated <input type="checkbox"/> unconsolidated (loose) <input checked="" type="checkbox"/> unknown <input type="checkbox"/>					
Location of measurements is: riffle <input type="checkbox"/> other <input checked="" type="checkbox"/> (state) <u>No riffle - mid point</u>					
M FEATURES OF SPECIAL INTEREST (Use Y or F (> 33% length) *record even if <1%)					
None <input type="checkbox"/>	Very large boulders (>1m) <input type="checkbox"/>	Backwater(s) <input type="checkbox"/>	Marsh(es) <input type="checkbox"/>		
Braided channels <input type="checkbox"/>	*Debris dam(s) <input type="checkbox"/>	Floodplain boulder deposits <input type="checkbox"/>	Flush(es) <input type="checkbox"/>		
Side channel(s) <input type="checkbox"/>	*Leafy debris <input type="checkbox"/>	Water meadow(s) <input type="checkbox"/>	Natural open water <input checked="" type="checkbox"/>		
*Natural waterfall(s) > 5m high <input type="checkbox"/>	Fringing reed-bank(s) <input type="checkbox"/>	Fen(s) <input type="checkbox"/>	Others (state) <input type="checkbox"/>		
*Natural waterfall(s) < 5m high <input type="checkbox"/>	Quaking bank(s) <input type="checkbox"/>	Bog(s) <input type="checkbox"/>			
Natural cascade(s) <input type="checkbox"/>	*Sink hole(s) <input type="checkbox"/>	Wet woodland(s) <input type="checkbox"/>			
N CHOKED CHANNEL (tick one box)					
Is 33% or more of the channel choked with vegetation? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>					
O NOTABLE NUISANCE PLANT SPECIES (Use ✓ or F (> 33% length) *record even if <1%)					
bankface		banktop to 50m		bankface	
None <input checked="" type="checkbox"/>	*Giant hogweed <input type="checkbox"/>	<input type="checkbox"/>	*Himalayan balsam <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	*Japanese knotweed <input type="checkbox"/>	<input type="checkbox"/>	*Other (state)..... <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P OVERALL CHARACTERISTICS (Circle appropriate words, add others as necessary)					
Major impacts: landfill - tipping - litter - sewage - pollution - drought - abstraction - mill - dam - road - rail - industry - housing mining - quarrying - overdeepening - afforestation - fisheries management - silting - waterlogging - hydroelectric power					
Evidence of recent management: dredging - bank mowing - weed cutting - enhancement - river rehabilitation - gravel extraction - other (please specify)					
Animals: otter - mink - water vole - kingfisher - dipper - grey wagtail - sand martin - heron - dragonflies/damselflies					
Other significant observations: if necessary use separate sheet to describe overall characteristics and relevant observations					
Q ALDERS (tick one box in each of the two categories) *record even if <1%					
*Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>		*Diseased Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>			
R FIELD SURVEY QUALITY CONTROL (✓ boxes to confirm checks)					
Have you taken at least two photos that illustrate the general character of the site and additional photos of any weirs/ sluices and major/intermediate structures across the channel? <input checked="" type="checkbox"/>					
Have you completed all ten spot-checks and made entries in all boxes in E & F on page 2? <input checked="" type="checkbox"/>					
Have you completed column 11 of section G (and E if appropriate) on page 2? <input checked="" type="checkbox"/>					
Have you recorded in section C the number of riffles, pools and point bars (even if 0) on page 1? <input checked="" type="checkbox"/>					
Have you given an accurate (alphanumeric) grid reference for spot-checks 1, 6 and end of site (page 1)? <input checked="" type="checkbox"/>					
Have you stated whether spot-check 1 is at the upstream or downstream end of the site (top of page 2)? <input checked="" type="checkbox"/>					
Have you cross-checked your spot-check and sweep-up responses with the channel modification indicators given on page 2 of the spot-check key? <input checked="" type="checkbox"/>					

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Figure 44: 020-RH1-063-001

RIVER HABITAT SURVEY 2003 Version				Page 1 of 4																			
A FIELD SURVEY DETAILS																							
Site Number: <input type="text"/> <small>leave blank if new site</small> Site Reference: 020-RH1-063-001 Spot-check 1 Grid Ref: SP29987 13278 Spot-check 6 Grid Ref: SP29987 13117 End of site Grid Ref: SP 79616 12992 Reach Reference: BM 63090, crossing 30. River name: Bear Brook Date: 31 10 / 2013 Time: 10:30 Surveyor name: Sarah Hodggett Accredited Surveyor code: FA019				Is the site part of a river or an artificial channel? River <input checked="" type="checkbox"/> Artificial <input type="checkbox"/> Are adverse conditions affecting survey? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> If yes, state Is bed of river visible? barely or not <input type="checkbox"/> partially <input type="checkbox"/> ± entirely <input checked="" type="checkbox"/> Is health and safety assessment form attached? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Number of photographs taken: 10 Photo references: 020-RH1-063-001 P1 310513, 020-RH1-063-001 P2 310513, 020-RH1-063-001 P3 310513, 020-RH1-063-001 P4 310513, 020-RH1-063-001 P5 310513, 020-RH1-063-001 P6 310513 Site surveyed from: left bank <input checked="" type="checkbox"/> right bank <input type="checkbox"/> channel <input type="checkbox"/>																			
<input type="checkbox"/> When options shown with 'shadow boxes', tick one box only																							
LEFT				RIGHT																			
B PREDOMINANT VALLEY FORM (within the horizon limit) (tick one box only)																							
(tick one box only) <table style="width:100%; border:none;"> <tr> <td style="text-align:center;"></td> <td><input type="checkbox"/> shallow vee</td> <td style="text-align:center;"></td> <td><input type="checkbox"/> concave/bowl</td> </tr> <tr> <td style="text-align:center;"></td> <td><input type="checkbox"/> deep vee</td> <td style="text-align:center;"></td> <td><input type="checkbox"/> asymmetrical valley</td> </tr> <tr> <td style="text-align:center;"></td> <td><input type="checkbox"/> gorge</td> <td style="text-align:center;"></td> <td><input type="checkbox"/> U-shape valley</td> </tr> <tr> <td colspan="2"></td> <td style="text-align:center;"></td> <td><input checked="" type="checkbox"/> no obvious valley sides</td> </tr> </table>									<input type="checkbox"/> shallow vee		<input type="checkbox"/> concave/bowl		<input type="checkbox"/> deep vee		<input type="checkbox"/> asymmetrical valley		<input type="checkbox"/> gorge		<input type="checkbox"/> U-shape valley				<input checked="" type="checkbox"/> no obvious valley sides
	<input type="checkbox"/> shallow vee		<input type="checkbox"/> concave/bowl																				
	<input type="checkbox"/> deep vee		<input type="checkbox"/> asymmetrical valley																				
	<input type="checkbox"/> gorge		<input type="checkbox"/> U-shape valley																				
			<input checked="" type="checkbox"/> no obvious valley sides																				
Distinct flat valley bottom? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>				Natural terraces? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>																			
C NUMBER OF RIFFLES, POOLS AND POINT BARS (enter total number in boxes)																							
Riffle(s) <input type="text"/>		Unvegetated point bar(s) <input type="text"/>		Riffle(s) <input type="text"/>		Unvegetated point bar(s) <input type="text"/>																	
Pool(s) <input type="text"/>		Vegetated point bar(s) <input type="text"/>		Pool(s) <input type="text"/>		Vegetated point bar(s) <input type="text"/>																	
D ARTIFICIAL FEATURES (indicate total number of occurrences of each category within the 500m site)																							
If none, tick box <input type="checkbox"/>	Major		Intermediate	Minor	Major		Intermediate	Minor															
	Weirs/sluices				Outfalls/intakes			11 (two)															
	Culverts				Fords																		
	Bridges			1 (Fire)	Deflectors/groynes/croys																		
	Other - state																						
Is channel obviously realigned? No <input type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input checked="" type="checkbox"/>				Is channel obviously over-deepened? No <input checked="" type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input checked="" type="checkbox"/>																			
Is water impounded by weir/dam? No <input checked="" type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input type="checkbox"/>																							

* 020-RH1-063-001 P7 310513, 020-RH1-063-001 P8 310513, 020-RH1-063-001 P9 310513, 020-RH1-063-001 P10 310513,

Figure 45: 020-RH1-063-001

SITE REF. 020-RH1-063-001		RIVER HABITAT SURVEY: TEN SPOT-CHECKS										Page 2 of 4
Spot-check 1 is at:		upstream end <input type="checkbox"/>	downstream end <input checked="" type="checkbox"/>	of site (tick one box)								
E PHYSICAL ATTRIBUTES (to be assessed across channel within 1m wide transect)												
When boxes 'bordered', only one entry allowed		1 GPS	2	3	4	5	6 GPS	7	8	9	10	GPS
LEFT BANK		Ring EC or SC if composed of sandy substrate										
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI		EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM		RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB		NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
CHANNEL		GP: ring either G or P if predominant										
Channel substrate NV, BE, BO, CO, GP, SA, SI, CL, PE, EA, AR		SI	SI	SI	SI	SI	SI	SI	SI	SI	SI	GP
Flow-type NV, FF, CH, BW, UW, CF, RP, UP, SM, NP, DR		SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM
Channel modification(s) NK, NO, CV, RS, RI, DA, FO		RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS
Channel feature(s) NV, NO, EB, RO, VR, MB, VB, MI, TR		NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
For braided rivers only: number of sub-channels												
RIGHT BANK		Ring EC or SC if composed of sandy substrate										
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI		EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM		RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB		NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
F BANKTOP LAND USE AND VEGETATION STRUCTURE (to be assessed over a 10m wide transect)												
Land-use: choose one from BL, BP, CW, CP, SH, OR, WL, MH, AW, OW, RP, IG, TH, RD, SU, TL, IL, PG, NV												
LAND-USE WITHIN 5m OF LEFT BANKTOP		PG	PG	PG	PG	PG	PG	PG	PG	PG	PG	SH
LEFT BANKTOP (structure within 1m) B/U/S/C/NV		S	S	S	S	S	S	S	S	S	S	S
LEFT BANK-FACE (structure) B/U/S/C/NV		S	S	S	S	S	S	S	S	S	S	S
RIGHT BANK-FACE (structure) B/U/S/C/NV		S	S	S	S	S	S	S	S	S	S	S
RIGHT BANKTOP (structure within 1m) B/U/S/C/NV		S	S	S	S	S	S	S	S	S	S	S
LAND-USE WITHIN 5m OF RIGHT BANKTOP		SU	PG	PG	PG	PG	PG	PG	PG	PG	PG	PG
C CHANNEL VEGETATION TYPES (to be assessed over a 10m wide transect; use EC > 33% area, ✓ present) or NV (not visible)												
None (✓) or Not Visible (NV)					✓	✓				✓	✓	
Liverworts/mosses/lichens												
Emergent broad-leaved herbs		✓	E	✓			E	✓				✓
Emergent reeds/sedges/rushes/grasses/horsetails								✓			✓	✓
Floating-leaved (rooted)												
Free-floating												
Amphibious			✓									✓
Submerged broad-leaved												
Submerged linear-leaved												
Submerged fine-leaved												
Filamentous algae												
Use end column for overall assessment over 500m, including types not occurring in spot-checks (use ✓, E or NV)												

Change



↑ Enter channel substrate(s) not occurring as predominant in spot-checks but present in >1% of whole site.

Figure 46: 020-RH1-063-001


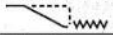


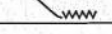



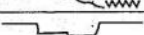





SITE REF: 020-RH1-063-001		RIVER HABITAT SURVEY :.500m SWEEP-UP				Page 3 of 4	
H LAND-USE WITHIN 50m OF BANKTOP Use ✓ (present) or E (>33% banklength)							
	L	R		L	R		
Broadleaf/mixed woodland (semi-natural) (BL)	✓		Natural open water (OW)				
Broadleaf/mixed plantation (BP)			Rough/unimproved grassland/pasture (RP)				
Coniferous woodland (semi-natural) (CW)			Improved/semi-improved grassland (IG)	✓	✓		
Coniferous plantation (CP)			Tall herb/rank vegetation (TH)	✓	✓		
Scrub & shrubs (SH)	✓	✓	Rock, scree or sand dunes (RD)				
Orchard (OR)			Suburban/urban development (SU)				
Wetland (e.g. bog, marsh, fen) (WL)			Tilled land (TL)				
Moorland/heath (MH)			Irrigated land (IL)				
Artificial open water (AW)			Parkland or gardens (PG)	E	E		
			Not visible (NV)				
I BANK PROFILES Use ✓ (present) or E (>33% banklength)							
Natural/unmodified	L	R	Artificial/modified	L	R		
Vertical/undercut 			Resectioned (reprofiled) 	E	E		
Vertical with toe 			Reinforced - whole 	✓	✓		
Steep (>45°) 	E	E	Reinforced - top only 				
Gentle 	✓	✓	Reinforced - toe only 				
Composite 			Artificial two-stage 				
Natural berm 			Poached bank 				
			Embanked 				
			Set-back embankment 				
J EXTENT OF TREES AND ASSOCIATED FEATURES *record even if <1%							
TREES (tick one box per bank)				ASSOCIATED FEATURES (tick one box per feature)			
	Left	Right		None	Present	E (>33%)	
None	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Shading of channel	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Isolated/scattered	<input checked="" type="checkbox"/>	<input type="checkbox"/>	*Overhanging boughs	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Regularly spaced, single	<input type="checkbox"/>	<input checked="" type="checkbox"/>	*Exposed bankside roots	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Occasional clumps	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	*Underwater tree roots	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Semi-continuous	<input type="checkbox"/>	<input type="checkbox"/>	Fallen trees	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Continuous	<input type="checkbox"/>	<input type="checkbox"/>	Large woody debris	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
K EXTENT OF CHANNEL AND BANK FEATURES (tick one box for each feature) *record even if <1%							
	None	Present	E (>33%)	None	Present	E (>33%)	
*Free fall flow	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Exposed bedrock	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chute flow	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Exposed boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Broken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated bedrock/boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unbroken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rippled flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*Upwelling	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Mature island(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smooth flow	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Unvegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No perceptible flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No flow (dry)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marginal deadwater	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eroding cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Unvegetated silt deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stable cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Discrete unvegetated sand deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				*Discrete unvegetated gravel deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 47: 020-RH1-063-001

SITE REF. 020-RH1-063-001		RIVER HABITAT SURVEY : DIMENSIONS AND INFLUENCES				Page 4 of 4
L CHANNEL DIMENSIONS (to be measured at one location on a straight uniform section, preferably across a riffle)						
LEFT BANK		CHANNEL		RIGHT BANK		
Banktop height (m)	1.5	Bankfull width (m)	6	Banktop height (m)	1.5	
Is banktop height also bankfull height? (Y or N)	N	Water width (m)	1.5	Is banktop height also bankfull height? (Y or N)	N	
Embanked height (m)	/	Water depth (m)	0.2	Embanked height (m)	/	
If trashline lower than banktop, indicate: height above water (m) = / width from bank to bank (m) = /						
Bed material at site is: consolidated <input type="checkbox"/> unconsolidated (loose) <input checked="" type="checkbox"/> unknown <input type="checkbox"/>						
Location of measurements is: riffle <input type="checkbox"/> other <input checked="" type="checkbox"/> (state) <i>End point</i>						
M FEATURES OF SPECIAL INTEREST (Use Y or E (> 33% length) *record even if <1%)						
None <input checked="" type="checkbox"/>	Very large boulders (>1m) <input type="checkbox"/>	Backwater(s) <input type="checkbox"/>	Marsh(es) <input type="checkbox"/>			
Braided channels <input type="checkbox"/>	*Debris dam(s) <input type="checkbox"/>	Floodplain boulder deposits <input type="checkbox"/>	Flush(es) <input type="checkbox"/>			
Side channel(s) <input type="checkbox"/>	*Leafy debris <input type="checkbox"/>	Water meadow(s) <input type="checkbox"/>	Natural open water <input type="checkbox"/>			
*Natural waterfall(s) > 5m high <input type="checkbox"/>	Fringing reed-bank(s) <input type="checkbox"/>	Fen(s) <input type="checkbox"/>	Others (state) <input type="checkbox"/>			
*Natural waterfall(s) < 5m high <input type="checkbox"/>	Quaking bank(s) <input type="checkbox"/>	Bog(s) <input type="checkbox"/>				
Natural cascade(s) <input type="checkbox"/>	*Sink hole(s) <input type="checkbox"/>	Wet woodland(s) <input type="checkbox"/>				
N CHOKED CHANNEL (tick one box)						
Is 33% or more of the channel choked with vegetation? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>						
O NOTABLE NUISANCE PLANT SPECIES (Use Y or E (> 33% length) *record even if <1%)						
None <input checked="" type="checkbox"/>	bankface banktop to 50m		bankface banktop to 50m			
*Giant hogweed <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Himalayan balsam <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
*Japanese knotweed <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Other (state)..... <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
P OVERALL CHARACTERISTICS (Circle appropriate words, add others as necessary)						
Major impacts: landfill - tipping - litter - sewage - pollution - drought - abstraction - mill - dam - road - rail - industry - housing mining - quarrying - overdeepening - afforestation - fisheries management - silting - waterlogging - hydroelectric power						
Evidence of recent management: dredging - bank mowing - weed cutting - enhancement - river rehabilitation - gravel extraction - other (please specify)						
Animals: otter - mink - water vole - kingfisher - dipper - grey wagtail - sand martin - heron - dragonflies/damselflies						
Other significant observations: if necessary use separate sheet to describe overall characteristics and relevant observations						
<i>overdeepened + straightened stream running through golf course</i>						
Q ALDERS (tick one box in each of the two categories) *record even if <1%						
*Alders? None <input type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>		*Diseased Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>				
R FIELD SURVEY QUALITY CONTROL (/ boxes to confirm checks)						
Have you taken at least two photos that illustrate the general character of the site and additional photos of any weirs/ sluices and major/intermediate structures across the channel? <input checked="" type="checkbox"/>						
Have you completed all ten spot-checks and made entries in all boxes in E & F on page 2? <input checked="" type="checkbox"/>						
Have you completed column 11 of section G (and E if appropriate) on page 2? <input checked="" type="checkbox"/>						
Have you recorded in section C the number of riffles, pools and point bars (even if 0) on page 1? <input checked="" type="checkbox"/>						
Have you given an accurate (alphanumeric) grid reference for spot-checks 1, 6 and end of site (page 1)? <input checked="" type="checkbox"/>						
Have you stated whether spot-check 1 is at the upstream or downstream end of the site (top of page 2)? <input checked="" type="checkbox"/>						
Have you cross-checked your spot-check and sweep-up responses with the channel modification indicators given on page 2 of the spot-check key? <input checked="" type="checkbox"/>						

Thame (CFA 11)
020-RH1-064-003

Figure 48: 020-RH1-064-003

RIVER HABITAT SURVEY 2003 Version		Page 1 of 4					
A FIELD SURVEY DETAILS							
Site Number: <input type="text" value="leave blank if new site"/> Site Reference: 020-RH1-064-003 Spot-check 1 Grid Ref: SP78452 14567 Spot-check 6 Grid Ref: SP78373 14394 End of site Grid Ref: SP78421 14275 Reach Reference: River name: River Thame Date: 8/15/2013 Time: 15:50 Surveyor name: ZOE TRENT Accredited Surveyor code: LTOGI	Is the site part of a river or an artificial channel? River <input checked="" type="checkbox"/> Artificial <input type="checkbox"/> Are adverse conditions affecting survey? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> If yes, state Is bed of river visible? barely or not <input type="checkbox"/> partially <input checked="" type="checkbox"/> ± entirely <input type="checkbox"/> Is health and safety assessment form attached? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Number of photographs taken: <input type="text" value="3"/> Photo references: P1, P2, P3 Site surveyed from: left bank <input type="checkbox"/> right bank <input checked="" type="checkbox"/> channel <input type="checkbox"/>						
<input type="checkbox"/> When options shown with 'shadow boxes', tick one box only LEFT banks determined by facing downstream RIGHT							
B PREDOMINANT VALLEY FORM (within the horizon limit) (tick one box only)							
(tick one box only) <input checked="" type="checkbox"/> shallow vee <input type="checkbox"/> deep vee <input type="checkbox"/> gorge	<input type="checkbox"/> concave/bowl <input type="checkbox"/> asymmetrical valley <input type="checkbox"/> U-shape valley <input type="checkbox"/> no obvious valley sides						
Distinct flat valley bottom? No <input type="checkbox"/> Yes <input checked="" type="checkbox"/>		Natural terraces? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>					
C NUMBER OF RIFFLES, POOLS AND POINT BARS (enter total number in boxes)							
Riffle(s) <input type="text" value="1"/>	Unvegetated point bar(s) <input type="text" value="0"/>						
Pool(s) <input type="text" value="0"/>	Vegetated point bar(s) <input type="text" value="1"/>						
D ARTIFICIAL FEATURES (indicate total number of occurrences of each category within the 500m site)							
If none, tick box <input checked="" type="checkbox"/>	Major	Intermediate	Minor	Outfalls/intakes	Major	Intermediate	Minor
	Weirs/sluices						
	Culverts				Fords		
	Bridges				Deflectors/groynes/croys		
	Other - state						
Is channel obviously realigned? No <input checked="" type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input checked="" type="checkbox"/>		Is channel obviously over-deepened? No <input type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input checked="" type="checkbox"/>		Is water impounded by weir/dam? No <input checked="" type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input type="checkbox"/>			

Figure 49: 020-RH1-064-003

SITE REF. <u>020-RH1-064-003</u>	RIVER HABITAT SURVEY: TEN SPOT-CHECKS										Page 2 of 4
Spot-check 1 is at: upstream end <input checked="" type="checkbox"/> downstream end <input type="checkbox"/> of site (tick one box)											
E. PHYSICAL ATTRIBUTES (to be assessed across channel within 1m wide transect)											
When boxes 'bordered', only one entry allowed	1 GPS	2	3	4	5	6 GPS	7	8	9	10	GPS
LEFT BANK	Ring EC or SC if composed of sandy substrate										
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM	RS	NO	NO	NO	NO	RS	RS	NO	RS	RS	
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB	NO	EC	NO	NO	EC	NO	NO	NB	NO	NO	
CHANNEL	GP: ring either G or P if predominant										
Channel substrate NV, BE, BO, CO, GP, SA, SI, CL, PE, EA, AR	SI	SI	SI	SI	SC	SI	SI	SI	SI	SI	✓
Flow-type NV, FF, CH, BW, UW, CF, RP, UP, SM, NP, DR	SM	SM	UW	SM	SM	SM	SM	SM	SM	SM	
Channel modification(s) NK, NO, CV, RS, RI, DA, FO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
Channel feature(s) NV, NO, EB, RO, VR, MB, VB, MI, TR	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
For braided rivers only: number of sub-channels	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
RIGHT BANK	Ring EC or SC if composed of sandy substrate										
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM	RS	NO	NO	NO	NO	RS	NO	RS	NO	RS	
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB	NO	VP	NO	SB	NO	NO	NB	NO	NO	VS	
F. BANKTOP LAND USE AND VEGETATION STRUCTURE (to be assessed over a 10m wide transect)											
Land-use: choose one from BL, BP, CW, CP, SH, OR, WL, MH, AW, OW, RP, IG, TH, RD, SU, TL, IL, PG, NV											
LAND-USE WITHIN 5m OF LEFT BANKTOP	IG	IG	IG	IG	IG	IG	IG	IG	IG	IG	IG
LEFT BANKTOP (structure within 1m) B/U/S/C/NV	S	S	S	S	S	S	S	S	S	S	S
LEFT BANK-FACE (structure) B/U/S/C/NV	S	S	S	S	S	S	S	S	S	S	S
RIGHT BANK-FACE (structure) B/U/S/C/NV	S	S	S	S	S	S	S	S	S	S	S
RIGHT BANKTOP (structure within 1m) B/U/S/C/NV	S	S	S	S	S	S	S	S	S	S	S
LAND-USE WITHIN 5m OF RIGHT BANKTOP	IG	IG	IG	IG	IG	IG	IG	IG	IG	IG	IG
G. CHANNEL VEGETATION TYPES (to be assessed over a 10m wide transect and EC (2.5m broad), C (1m) and/or NV (1m) width)											
None (✓) or Not Visible (NV)											
Liverworts/mosses/lichens											
Emergent broad-leaved herbs		✓								✓	✓
Emergent reeds/sedges/rushes/grasses/horsetails	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Floating-leaved (rooted)				✓	✓						✓
Free-floating											
Amphibious											
Submerged broad-leaved	✓	NV	NV	✓	✓	✓	✓	✓	✓	✓	✓
Submerged linear-leaved		NV	NV						✓	✓	✓
Submerged fine-leaved		NV	NV								
Filamentous algae											
Use end column for overall assessment over 500m, including types not occurring in spot-checks (use ✓, E or NV) ————— ↑											

Enter channel substrate(s) not occurring as predominant in spot-checks but present in >1% of whole site.

Figure 50: 020-RH1-064-003


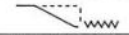


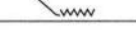

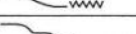
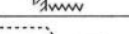
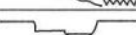


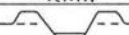


SITE REF: 020-241-064-003		RIVER HABITAT SURVEY : 500m SWEEP-UP				Page 3 of 4	
H. LAND USE WITHIN 50m OF BANKTOP (Use <input checked="" type="checkbox"/> (present) or E ($\geq 33\%$ bank length))							
	L	R		L	R		
Broadleaf/mixed woodland (semi-natural) (BL)			Natural open water (OW)				
Broadleaf/mixed plantation (BP)			Rough/unimproved grassland/pasture (RP)				
Coniferous woodland (semi-natural) (CW)			Improved/semi-improved grassland (IG)	E	E		
Coniferous plantation (CP)			Tall herb/rank vegetation (TH)				
Scrub & shrubs (SH)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Rock, scree or sand dunes (RD)				
Orchard (OR)			Suburban/urban development (SU)				
Wetland (e.g. bog, marsh, fen) (WL)			Tilled land (TL)				
Moorland/heath (MH)			Irrigated land (IL)				
Artificial open water (AW)			Parkland or gardens (PG)				
			Not visible (NV)				
I. BANK PROFILES (Use <input checked="" type="checkbox"/> (present) or E ($\geq 33\%$ bank length))							
Natural/unmodified	L	R	Artificial/modified	L	R		
Vertical/undercut 	<input checked="" type="checkbox"/>		Resectioned (reprofiled) 	E	<input checked="" type="checkbox"/>		
Vertical with toe 			Reinforced - whole 				
Steep (>45°) 	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Reinforced - top only 				
Gentle 	<input checked="" type="checkbox"/>		Reinforced - toe only 				
Composite 			Artificial two-stage 				
Natural berm 			Poached bank 				
			Embanked 				
			Set-back embankment 				
J. EXTENT OF TREES AND ASSOCIATED FEATURES (tick one box per feature)							
TREES (tick one box per bank)				ASSOCIATED FEATURES (tick one box per feature)			
	Left	Right		None	Present	E ($\geq 33\%$)	
None	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Shading of channel	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Isolated/scattered	<input checked="" type="checkbox"/>	<input type="checkbox"/>	*Overhanging boughs	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Regularly spaced, single	<input type="checkbox"/>	<input type="checkbox"/>	*Exposed bankside roots	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Occasional clumps	<input type="checkbox"/>	<input type="checkbox"/>	*Underwater tree roots	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Semi-continuous	<input type="checkbox"/>	<input type="checkbox"/>	Fallen trees	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Continuous	<input type="checkbox"/>	<input type="checkbox"/>	Large woody debris	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
K. EXTENT OF CHANNEL AND BANK FEATURES (tick one box for each feature)							
	None	Present	E ($\geq 33\%$)	None	Present	E ($\geq 33\%$)	
*Free fall flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed bedrock	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chute flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Broken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated bedrock/boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unbroken standing waves	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Unvegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rippled flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*Upwelling	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Mature island(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smooth flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Unvegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No perceptible flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No flow (dry)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marginal deadwater	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eroding cliff(s)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	*Unvegetated silt deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stable cliff(s)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	*Discrete unvegetated sand deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				*Discrete unvegetated gravel deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 51: 020-RH1-064-003

SITE REF. <i>020-1241</i> <i>064-003</i>		RIVER HABITAT SURVEY : DIMENSIONS AND INFLUENCES		Page 4 of 4	
E CHANNEL DIMENSIONS (to be measured at one location on a straight uniform section, preferably across a riffle)					
LEFT BANK		CHANNEL		RIGHT BANK	
Banktop height (m)	<i>1.75</i>	Bankfull width (m)	<i>10 m</i>	Banktop height (m)	<i>1.75</i>
Is banktop height also bankfull height? (Y or N)	<i>Y</i>	Water width (m)	<i>7m</i>	Is banktop height also bankfull height? (Y or N)	<i>Y</i>
Embanked height (m)	<i>/</i>	Water depth (m)	<i>>2m</i>	Embanked height (m)	<i>/</i>
If trashline lower than banktop, indicate: height above water (m) = <i>/</i> width from bank to bank (m) = <i>/</i>					
Bed material at site is: consolidated <input type="checkbox"/> unconsolidated (loose) <input checked="" type="checkbox"/> unknown <input type="checkbox"/>					
Location of measurements is: riffle <input checked="" type="checkbox"/> other <input type="checkbox"/> (state)					
M FEATURES OF SPECIAL INTEREST (Use Y or E (> 33% length) *record even if <1%)					
None	<input checked="" type="checkbox"/>	Very large boulders (>1m)	<input type="checkbox"/>	Backwater(s)	<input type="checkbox"/>
Braided channels	<input type="checkbox"/>	*Debris dam(s)	<input type="checkbox"/>	Floodplain boulder deposits	<input type="checkbox"/>
Side channel(s)	<input type="checkbox"/>	*Leafy debris	<input type="checkbox"/>	Water meadow(s)	<input type="checkbox"/>
*Natural waterfall(s) > 5m high	<input type="checkbox"/>	Fringing reed-bank(s)	<input type="checkbox"/>	Fen(s)	<input type="checkbox"/>
*Natural waterfall(s) < 5m high	<input type="checkbox"/>	Quaking bank(s)	<input type="checkbox"/>	Bog(s)	<input type="checkbox"/>
Natural cascade(s)	<input type="checkbox"/>	*Sink hole(s)	<input type="checkbox"/>	Wet woodland(s)	<input type="checkbox"/>
Marsh(es)	<input type="checkbox"/>	Flush(es)	<input type="checkbox"/>	Natural open water	<input type="checkbox"/>
Others (state)	<input type="checkbox"/>				
N CHOKED CHANNEL (tick one box)					
Is 33% or more of the channel choked with vegetation? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>					
O NOTABLE NUISANCE PLANT SPECIES (Use Y or E (> 33% length) *record even if <1%)					
None	<input checked="" type="checkbox"/>	*Giant hogweed	<input type="checkbox"/>	*Himalayan balsam	<input type="checkbox"/>
		*Japanese knotweed	<input type="checkbox"/>	*Other (state).....	<input type="checkbox"/>
P OVERALL CHARACTERISTICS (Circle appropriate words, add others as necessary)					
Major impacts: landfill - tipping - litter - sewage - pollution - drought - abstraction - mill - dam - road - rail - industry - housing mining - quarrying - <u>overdeepening</u> - afforestation - fisheries management - silting - waterlogging - hydroelectric power					
Evidence of recent management: dredging - bank mowing - weed cutting - enhancement - river rehabilitation - gravel extraction - other (please specify)					
Animals: otter - <u>mink</u> - water vole - kingfisher - dipper - grey wagtail - sand martin - heron - dragonflies/damselflies					
Other significant observations: if necessary use separate sheet to describe overall characteristics and relevant observations <i>Channel definitely looks re-sequenced overall but has naturalised. It's obviously overdeepened as there's not enough water to have carved out channel. However river does not really seem connected to it's floodplain, although in places there are gentle bank. Signal crayfish present</i>					
Q ALDERS (tick one box in each of the two categories) *record even if <1%					
*Alders? None <input type="checkbox"/> Present <input checked="" type="checkbox"/> Extensive <input type="checkbox"/>			*Diseased Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>		
R FIELD SURVEY QUALITY CONTROL (✓ boxes to confirm checks)					
Have you taken at least two photos that illustrate the general character of the site and additional photos of any weirs/ sluices and major/intermediate structures across the channel? <input checked="" type="checkbox"/>					
Have you completed all ten spot-checks and made entries in all boxes in E & F on page 2? <input checked="" type="checkbox"/>					
Have you completed column 11 of section G (and E if appropriate) on page 2? <input checked="" type="checkbox"/>					
Have you recorded in section C the number of riffles, pools and point bars (even if 0) on page 1? <input checked="" type="checkbox"/>					
Have you given an accurate (alphanumeric) grid reference for spot-checks 1, 6 and end of site (page 1)? <input checked="" type="checkbox"/>					
Have you stated whether spot-check 1 is at the upstream or downstream end of the site (top of page 2)? <input checked="" type="checkbox"/>					
Have you cross-checked your spot-check and sweep-up responses with the channel modification indicators given on page 2 of the spot-check key? <input checked="" type="checkbox"/>					

020-RH1-064-004

Figure 52: 020-RH1-064-004

RIVER HABITAT SURVEY 2003 Version		Page 1 of 4				
A FIELD SURVEY DETAILS						
Site Number: <input type="text"/> <small>leave blank if new site</small> Site Reference: 020-RH1-064-004 Spot-check 1 Grid Ref: SP7961812989 Spot-check 6 Grid Ref: SP7860314204 End of site Grid Ref: SP7886414164 Reach Reference: BM163696, Crossing 32 River name: Tributary to River Thames Date: 31/5/2013 Time: 19:00 Surveyor name: Sarah Hodggett Accredited Surveyor code: FA019	Is the site part of a river or an artificial channel? River <input checked="" type="checkbox"/> Artificial <input type="checkbox"/> Are adverse conditions affecting survey? No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> If yes, state Is bed of river visible? barely or not <input type="checkbox"/> partially <input type="checkbox"/> entirely <input checked="" type="checkbox"/> Is health and safety assessment form attached? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Number of photographs taken: 6 Photo references: 020-RH1-064-001 P1 210513, 020-RH1-064-001 P2 210513, 020-RH1-064-001 P3 210513, 020-RH1-064-001 P4 210513, 020-RH1-064-001 P5 210513, 020-RH1-064-001 P6 210513 Site surveyed from: left bank <input checked="" type="checkbox"/> right bank <input type="checkbox"/> channel <input type="checkbox"/>					
<input type="checkbox"/> When options shown with 'shadow boxes', tick one box only LEFT banks determined by facing downstream RIGHT						
B PREDOMINANT VALLEY FORM (within the horizon limit) (tick one box only)						
(tick one box only) shallow vee <input type="checkbox"/> deep vee <input type="checkbox"/> gorge <input type="checkbox"/> concave/bowl <input checked="" type="checkbox"/> asymmetrical valley <input type="checkbox"/> U-shape valley <input type="checkbox"/> no obvious valley sides <input type="checkbox"/>						
Distinct flat valley bottom? No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> Natural terraces? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>						
C NUMBER OF RIFFLES, POOLS AND POINT BARS (enter total number in boxes)						
Riffle(s)	<input type="text" value="0"/>	Unvegetated point bar(s) <input type="text" value="0"/>				
Pool(s)	<input type="text" value="0"/>	Vegetated point bar(s) <input type="text" value="0"/>				
D ARTIFICIAL FEATURES (indicate total number of occurrences of each category within the 500m site)						
If none, tick box	Major	Intermediate	Minor	Major	Intermediate	Minor
	Weirs/sluices			Outfalls/intakes		
<input type="checkbox"/>	Culverts	1 (ONE)		Fords		
	Bridges	1 (ONE)		Deflectors/groynes/croys		
	Other - state: Culvert and bridge (Major bridge includes culvert)					
Is channel obviously realigned? No <input type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input checked="" type="checkbox"/> Is channel obviously over-deepened? No <input type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input checked="" type="checkbox"/> Is water impounded by weir/dam? No <input type="checkbox"/> Yes, <33% of site <input checked="" type="checkbox"/> ≥33% of site <input type="checkbox"/>			underground culvert? at end			

Figure 53: 020-RH1-064-004

SITE REF: 020-RH1-064	RIVER HABITAT SURVEY: TEN SPOT-CHECKS										Page 2 of 4
Spot-check 1 is at: upstream end <input type="checkbox"/>	downstream end <input checked="" type="checkbox"/>										of site (tick one box)
E PHYSICAL ATTRIBUTES (to be assessed across channel within 1m wide transect)											
When boxes 'bordered', only one entry allowed	1 GPS	2	3	4	5	6 GPS	7	8	9	10	GPS
LEFT BANK	Ring EC or SC if composed of sandy substrate										
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM	RS	RS	RS	RS	RS	NO	NO	NO	NO	NO	NO
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
CHANNEL	GP: ring either G or P if predominant										
Channel substrate NV, BE, BO, CO, GP, SA, SI, CL, PE, EA, AR	NV	NV	NV	NV	NV	SI	SI	SI	SI	SI	SI
Flow-type NV, FF, CH, BW, UW, CF, RP, UP, SM, NP, DR	NP	NP	SM	SM	SM	NP	NP	SM	NP	NP	NP
Channel modification(s) NK, NO, CV, RS, RI, DA, FO	RS	RS	RS	RS	RS	NO	NO	NO	NO	NO	NO
Channel feature(s) NV, NO, EB, RO, VR, MB, VB, MI, TR	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
For braided rivers only: number of sub-channels											
RIGHT BANK	Ring EC or SC if composed of sandy substrate										
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI	NV	EA	EA	EA	EA	NV	EA	EA	EA	EA	EA
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM	RS	RS	RS	RS	RS	NO	NO	NO	NO	NO	NO
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB	NV	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
F BANKTOP LAND-USE AND VEGETATION STRUCTURE (to be assessed over a 10m wide transect)											
Land-use: choose one from BL, BP, CW, CP, SH, OR, WL, MH, AW, OW, RP, IG, TH, RD, SU, TL, IL, PG, NV											
LAND-USE WITHIN 5m OF LEFT BANKTOP	IG	IG	IG	IG	IG	WL	WL	WL	IG	IG	IG
LEFT BANKTOP (structure within 1m) B/U/S/C/NV	S	S	S	S	S	S	S	S	S	S	S
LEFT BANK-FACE (structure) B/U/S/C/NV	S	S	S	S	S	S	S	S	S	S	S
RIGHT BANK-FACE (structure) B/U/S/C/NV	NV	S	S	S	S	S	S	S	S	S	S
RIGHT BANKTOP (structure within 1m) B/U/S/C/NV	NV	S	S	S	S	S	S	S	S	S	S
LAND-USE WITHIN 5m OF RIGHT BANKTOP	IG	IG	IG	IG	NV	WL	WL	WL	IG	IG	IG
G CHANNEL VEGETATION TYPES (to be assessed over a 10m wide transect): Use E (≥ 33% area), ✓ (present) or NV (not visible)											
None (✓) or Not Visible (NV)											
Liverworts/mosses/lichens											
Emergent broad-leaved herbs	✓		✓	✓	✓	E	✓	✓	✓	✓	E
Emergent reeds/sedges/rushes/grasses/horsetails	E		✓	✓	E	E	E	E	F	E	E
Floating-leaved (rooted)						✓					✓
Free-floating				✓							✓
Amphibious		✓				E	E	E	✓		E
Submerged broad-leaved							E		✓		✓
Submerged linear-leaved	✓		E				✓	✓	✓		✓
Submerged fine-leaved							E	✓			✓
Filamentous algae							E	✓			✓
Use end column for overall assessment over 500m, including types not occurring in spot-checks (use ✓, E or NV)											

↑ Enter channel substrate(s) not occurring as predominant in spot-checks but present in >1% of whole site.

Figure 54: 020-RH1-064-004

Wet
canal

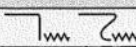
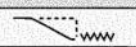
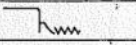

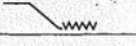
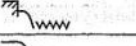
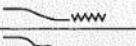
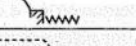
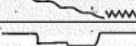
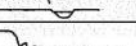



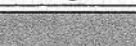
SITE REF. 020-RH1-064-004		RIVER HABITAT SURVEY : 500m SWEEP-UP				Page 3 of 4	
H LAND-USE WITHIN 50m OF BANKTOP Use ✓ (present) or E (≥33% banklength)							
	L	R		L	R		
Broadleaf/mixed woodland (semi-natural) (BL)	✓	✓	Natural open water (OW)				
Broadleaf/mixed plantation (BP)			Rough/unimproved grassland/pasture (RP)				
Coniferous woodland (semi-natural) (CW)			Improved/semi-improved grassland (IG)	E	E		
Coniferous plantation (CP)			Tall herb/rank vegetation (TH)				
Scrub & shrubs (SH)	✓	✓	Rock, scree or sand dunes (RD)				
Orchard (OR)			Suburban/urban development (SU)				
Wetland (e.g. bog, marsh, fen) (WL)	E	E	Tilled land (TL)	E	E		
Moorland/heath (MH)			Irrigated land (IL)				
Artificial open water (AW)			Parkland or gardens (PG)				
			Not visible (NV)				
I BANK PROFILES Use ✓ (present) or E (≥33% banklength)							
Natural/unmodified	L	R	Artificial/modified	L	R		
Vertical/undercut 			Resectioned (reprofiled) 	E	E		
Vertical with toe 			Reinforced - whole 				
Steep (>45°) 	E	E	Reinforced - top only 				
Gentle 	E	E	Reinforced - toe only 				✓
Composite 			Artificial two-stage 				
Natural berm 			Poached bank 				
			Embanked 				
			Set-back embankment 				
J EXTENT OF TREES AND ASSOCIATED FEATURES *record even if <1%							
TREES (tick one box per bank)				ASSOCIATED FEATURES (tick one box per feature)			
	Left	Right		None	Present	E (≥33%)	
None	<input type="checkbox"/>	<input type="checkbox"/>	Shading of channel	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Isolated/scattered	<input type="checkbox"/>	<input type="checkbox"/>	*Overhanging boughs	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Regularly spaced, single	<input type="checkbox"/>	<input type="checkbox"/>	*Exposed bankside roots	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Occasional clumps	<input type="checkbox"/>	<input type="checkbox"/>	*Underwater tree roots	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Semi-continuous	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Fallen trees	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Continuous	<input type="checkbox"/>	<input type="checkbox"/>	Large woody debris	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
K EXTENT OF CHANNEL AND BANK FEATURES (tick one box for each feature) *record even if <1%							
	None	Present	E (≥33%)	None	Present	E (≥33%)	
*Free fall flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed bedrock	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chute flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Broken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated bedrock/boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unbroken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rippled flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*Upwelling	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Mature island(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smooth flow	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Unvegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No perceptible flow	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Vegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No flow (dry)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Unvegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marginal deadwater	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Vegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eroding cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Unvegetated silt deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stable cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Discrete unvegetated sand deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				*Discrete unvegetated gravel deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 55: 020-RH1-064-004

SITE REF. 020-RH1-064-004		RIVER HABITAT SURVEY : DIMENSIONS AND INFLUENCES		Page 4 of 4	
L CHANNEL DIMENSIONS (to be measured at one location on a straight uniform section, preferably across a riffle)					
LEFT BANK		CHANNEL		RIGHT BANK	
Banktop height (m)	0.4	Bankfull width (m)	5	Banktop height (m)	0.4
Is banktop height also bankfull height? (Y or N)	Y	Water width (m)	4	Is banktop height also bankfull height? (Y or N)	Y
Embanked height (m)		Water depth (m)	0.4	Embanked height (m)	
If trashline lower than banktop, indicate: height above water (m) = / width from bank to bank (m) = /					
Bed material at site is: consolidated <input type="checkbox"/> unconsolidated (loose) <input checked="" type="checkbox"/> unknown <input type="checkbox"/>					
Location of measurements is: riffle <input type="checkbox"/> other <input checked="" type="checkbox"/> (state) <i>End Point</i>					
M FEATURES OF SPECIAL INTEREST Use / or E (> 33% length) *record even if <1%					
None <input type="checkbox"/>	Very large boulders (>1m) <input type="checkbox"/>	Backwater(s) <input checked="" type="checkbox"/>	Marsh(es) <input checked="" type="checkbox"/>		
Braided channels <input type="checkbox"/>	*Debris dam(s) <input type="checkbox"/>	Floodplain boulder deposits <input type="checkbox"/>	Flush(es) <input type="checkbox"/>		
Side channel(s) <input type="checkbox"/>	*Leafy debris <input type="checkbox"/>	Water meadow(s) <input checked="" type="checkbox"/>	Natural open water <input checked="" type="checkbox"/>		
*Natural waterfall(s) > 5m high <input type="checkbox"/>	Fringing reed-bank(s) <input type="checkbox"/>	Fen(s) <input type="checkbox"/>	Others (state) <input type="checkbox"/>		
*Natural waterfall(s) < 5m high <input type="checkbox"/>	Quaking bank(s) <input type="checkbox"/>	Bog(s) <input type="checkbox"/>			
Natural cascade(s) <input type="checkbox"/>	*Sink hole(s) <input type="checkbox"/>	Wet woodland(s) <input checked="" type="checkbox"/>			
N CHOKED CHANNEL (tick one box)					
Is 33% or more of the channel choked with vegetation? No <input type="checkbox"/> Yes <input checked="" type="checkbox"/>					
O NOTABLE NUISANCE PLANT SPECIES Use / or E (> 33% length) *record even if <1%					
None <input checked="" type="checkbox"/>	bankface banktop to 50m		bankface banktop to 50m		
*Giant hogweed <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Himalayan balsam <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*Japanese knotweed <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Other (state)..... <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P OVERALL CHARACTERISTICS (Circle appropriate words, add others as necessary)					
Major impacts: landfill - tipping - litter - sewage - pollution - drought - abstraction - mill - dam - road - rail - industry - housing mining - quarrying - overdeepening - afforestation - fisheries management - silting - waterlogging - hydroelectric power					
Evidence of recent management: dredging - bank mowing - weed cutting - enhancement - river rehabilitation - gravel extraction - other (please specify) <i>go waders sp. heron, reed bed</i>					
Animals: otter - mink - water vole - kingfisher - dipper - grey wagtail - sand martin - heron - dragonflies/damselflies					
Other significant observations: if necessary use separate sheet to describe overall characteristics and relevant observations					
Q ALDERS (tick one box in each of the two categories) *record even if <1%					
*Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>			*Diseased Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>		
R FIELD SURVEY QUALITY CONTROL (✓ boxes to confirm checks)					
Have you taken at least two photos that illustrate the general character of the site and additional photos of any weirs/ sluices and major/intermediate structures across the channel? <input checked="" type="checkbox"/>					
Have you completed all ten spot-checks and made entries in all boxes in E & F on page 2? <input checked="" type="checkbox"/>					
Have you completed column 11 of section G (and E if appropriate) on page 2? <input checked="" type="checkbox"/>					
Have you recorded in section C the number of riffles, pools and point bars (even if 0) on page 1? <input checked="" type="checkbox"/>					
Have you given an accurate (alphanumeric) grid reference for spot-checks 1, 6 and end of site (page 1)? <input checked="" type="checkbox"/>					
Have you stated whether spot-check 1 is at the upstream or downstream end of the site (top of page 2)? <input checked="" type="checkbox"/>					
Have you cross-checked your spot-check and sweep-up responses with the channel modification indicators given on page 2 of the spot-check key? <input checked="" type="checkbox"/>					

020-RH1-066-001

Figure 56: 020-RH1-066-001

RIVER HABITAT SURVEY 2003 Version				Page 1 of 4				
A FIELD SURVEY DETAILS								
Site Number: <input type="text"/> <small>leave blank if new site</small> Site Reference: 020-R51-066-001 Spot-check 1 Grid Ref: SP77130 16326 Spot-check 6 Grid Ref: SP77140 16097 End of site Grid Ref: SP77171 15869 Reach Reference: River name: Unnamed ditch Date: 8/5/2013 Time: 13:40 Surveyor name: ZOE TRENT Accredited Surveyor code: L7061		Is the site part of a river or an artificial channel? River <input checked="" type="checkbox"/> Artificial <input type="checkbox"/> Are adverse conditions affecting survey? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> If yes, state Is bed of river visible? barely or not <input type="checkbox"/> partially <input type="checkbox"/> ±entirely <input checked="" type="checkbox"/> Is health and safety assessment form attached? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Number of photographs taken: 3 Photo references: P1, P2, P3 Site surveyed from: left bank <input checked="" type="checkbox"/> right bank <input type="checkbox"/> channel <input type="checkbox"/> <input type="checkbox"/> When options shown with 'shadow boxes', tick one box only						
		LEFT		RIGHT				
B PREDOMINANT VALLEY FORM (within the horizon limit) (tick one box only)								
(tick one box only) <input checked="" type="checkbox"/> shallow vee <input type="checkbox"/> deep vee <input type="checkbox"/> gorge		<input type="checkbox"/> concave/bowl <input type="checkbox"/> asymmetrical valley <input type="checkbox"/> U-shape valley <input type="checkbox"/> no obvious valley sides						
Distinct flat valley bottom? No <input type="checkbox"/> Yes <input checked="" type="checkbox"/>				Natural terraces? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>				
C NUMBER OF RIFFLES, POOLS AND POINT BARS (enter total number in boxes)								
Riffle(s) <input type="text" value="0"/>		Unvegetated point bar(s) <input type="text" value="0"/>		Pool(s) <input type="text" value="0"/>		Vegetated point bar(s) <input type="text" value="0"/>		
D ARTIFICIAL FEATURES (tick the total number of occurrences of each category within the subunit)								
If none, tick box <input type="checkbox"/>		Major	Intermediate	Minor		Major	Intermediate	Minor
	Weirs/sluices				Outfalls/intakes			
	Culverts				Fords			
	Bridges			1*	Deflectors/droynes/croys			
Other - state								
Is channel obviously realigned? No <input type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input checked="" type="checkbox"/>		Is channel obviously over-deepened? No <input type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input checked="" type="checkbox"/>		Is water impounded by weir/dam? No <input checked="" type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input type="checkbox"/>				

* foot bridge

Figure 57: 020-RH1-066-001

SITE REF. <u>55</u>		RIVER HABITAT SURVEY: TEN SPOT-CHECKS										Page 2 of 4	
Spot-check 1 is at: upstream end <input type="checkbox"/>		downstream end <input checked="" type="checkbox"/>		of site (tick one box)									
E. PHYSICAL ATTRIBUTES (to be assessed across channel within a 1m wide transect)													
When boxes 'bordered', only one entry allowed													
1 GPS 2 3 4 5 6 GPS 7 8 9 10 GPS													
LEFT BANK													
Ring EC or SC if composed of sandy substrate													
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA		
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS		
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO		
CHANNEL													
GP: ring either G or P if predominant													
Channel substrate NV, BE, BO, CO, GP, SA, SI, CL, PE, EA, AR	SI	SI	SI	SI	SI	SI	SI	SI	SI	SI	SI		
Flow-type NV, FF, CH, BW, UW, CF, RP, UP, SM, NP, DR	NP	SM	SM	SM	SM	SM	SM	SM	SM	SM	NP		
Channel modification(s) NK, NO, CV, RS, RI, DA, FO	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS		
Channel feature(s) NV, NO, EB, RO, VR, MB, VB, MI, TR	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO		
For braided rivers only: number of sub-channels	/	/	/	/	/	/	/	/	/	/	/		
RIGHT BANK													
Ring EC or SC if composed of sandy substrate													
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA		
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS		
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO		
F. BANKTOP LAND-USE AND VEGETATION STRUCTURE (to be assessed over a 10m wide transect)													
Land-use: choose one from BL, BP, CW, CP, SH, OR, WL, MH, AW, OW, RP, IG, TH, RD, SU, TL, IL, PG, NV													
LAND-USE WITHIN 5m OF LEFT BANKTOP													
LEFT BANKTOP (structure within 1m) B/U/S/C/NV	S	S	S	S	S	S	S	S	S	S	S		
LEFT BANK-FACE (structure) B/U/S/C/NV	S	S	S	S	S	S	S	S	S	S	S		
RIGHT BANK-FACE (structure) B/U/S/C/NV	S	C	C	C	C	C	C	C	C	C	C		
RIGHT BANKTOP (structure within 1m) B/U/S/C/NV	S	C	C	C	C	C	C	C	C	S	S		
LAND-USE WITHIN 5m OF RIGHT BANKTOP													
	SP	BP	BP	BP	BP	BP	BP	BP	BP	IG	IG		
G. CHANNEL VEGETATION TYPES (to be assessed over a 10m wide transect; use E (5-15% area), ✓ (present) or NV (not visible))													
None (✓) or Not Visible (NV)													
Liverworts/mosses/lichens													
Emergent broad-leaved herbs	E	E	E	✓	E	✓	E	✓	✓	✓	E		
Emergent reeds/sedges/rushes/grasses/horsetails			✓		✓		✓	✓	✓	E	✓		
Floating-leaved (rooted)													
Free-floating											✓		
Amphibious								✓	✓		✓		
Submerged broad-leaved	✓	✓	✓	✓	✓	✓	✓	✓	✓		E		
Submerged linear-leaved													
Submerged fine-leaved													
Filamentous algae													
Use end column for overall assessment over 500m, including types not occurring in spot-checks (use ✓, E or NV)													

Enter channel substrate(s) not occurring as predominant in spot-checks but present in > 1% of whole site.

Figure 58: 020-RH1-066-001

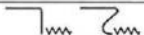
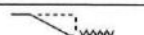


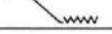



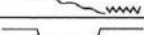


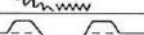


SITE REF. <u>35</u>		RIVER HABITAT SURVEY : 500m SWEEP-UP				Page 3 of 4	
H LAND USE WITHIN 50m OF BANKTOP (Use ✓ (present) or E (≥33% banklength))							
	L	R		L	R		
Broadleaf/mixed woodland (semi-natural) (BL)			Natural open water (OW)				
Broadleaf/mixed plantation (BP)		✓	Rough/unimproved grassland/pasture (RP)				
Coniferous woodland (semi-natural) (CW)			Improved/semi-improved grassland (IG)	✓	✓		
Coniferous plantation (CP)			Tall herb/rank vegetation (TH)		✓		
Scrub & shrubs (SH)			Rock, scree or sand dunes (RD)				
Orchard (OR)			Suburban/urban development (SU)				
Wetland (e.g. bog, marsh, fen) (WL)			Tilled land (TL)	E	E		
Moorland/heath (MH)			Irrigated land (IL)				
Artificial open water (AW)			Parkland or gardens (PG)				
			Not visible (NV)				
I BANK PROFILES (Use ✓ (present) or E (≥33% banklength))							
Natural/unmodified	L	R	Artificial/modified	L	R		
Vertical/undercut 			Resectioned (reprofiled) 	E	E		
Vertical with toe 			Reinforced - whole 				
Steep (>45°) 			Reinforced - top only 				
Gentle 			Reinforced - toe only 				
Composite 			Artificial two-stage 				
Natural berm 			Poached bank 				
			Embanked 				
			Set-back embankment 				
J EXTENT OF TREES AND ASSOCIATED FEATURES (record even if 0%)							
TREES (tick one box per bank)				ASSOCIATED FEATURES (tick one box per feature)			
	Left	Right		None	Present	E (≥33%)	
None	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Shading of channel	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Isolated/scattered	<input type="checkbox"/>	<input type="checkbox"/>	*Overhanging boughs	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Regularly spaced, single	<input type="checkbox"/>	<input type="checkbox"/>	*Exposed bankside roots	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Occasional clumps	<input type="checkbox"/>	<input type="checkbox"/>	*Underwater tree roots	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Semi-continuous	<input type="checkbox"/>	<input type="checkbox"/>	Fallen trees	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Continuous	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Large woody debris	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
K EXTENT OF CHANNEL AND BANK FEATURES (tick one box for each feature) (record even if 0%)							
	None	Present	E (≥33%)	None	Present	E (≥33%)	
*Free fall flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed bedrock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chute flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Broken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated bedrock/boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unbroken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rippled flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*Upwelling	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Mature island(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smooth flow	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Unvegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No perceptible flow	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Vegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No flow (dry)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marginal deadwater	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eroding cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Unvegetated silt deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stable cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Discrete unvegetated sand deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				*Discrete unvegetated gravel deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 59: 020-RH1-066-001

SITE REF. 35		RIVER HABITAT SURVEY : DIMENSIONS AND INFLUENCES Page 4 of 4			
L. CHANNEL DIMENSIONS (to be measured at one location on a straight uniform section, preferably across a riffle)					
LEFT BANK		CHANNEL ^{Top}		RIGHT BANK	
Banktop height (m)	3	Bankfull width (m)	4	Banktop height (m)	3
Is banktop height also bankfull height? (Y or N)	N	Water width (m)	0.5	Is banktop height also bankfull height? (Y or N)	N
Embanked height (m)	0	Water depth (m)	0.25	Embanked height (m)	0
If trashline lower than banktop, indicate: height above water (m) = 0.5 width from bank to bank (m) = 0.75					
Bed material at site is: consolidated <input type="checkbox"/> unconsolidated (loose) <input checked="" type="checkbox"/> unknown <input type="checkbox"/>					
Location of measurements is: riffle <input type="checkbox"/> other <input checked="" type="checkbox"/> (state)					
M. FEATURES OF SPECIAL INTEREST (Use ✓ or E (> 33% length) *record even if <1%)					
None	<input checked="" type="checkbox"/>	Very large boulders (>1m)	<input type="checkbox"/>	Backwater(s)	<input type="checkbox"/>
Braided channels	<input type="checkbox"/>	*Debris dam(s)	<input type="checkbox"/>	Floodplain boulder deposits	<input type="checkbox"/>
Side channel(s)	<input type="checkbox"/>	*Leafy debris	<input type="checkbox"/>	Water meadow(s)	<input type="checkbox"/>
*Natural waterfall(s) > 5m high	<input type="checkbox"/>	Fringing reed-bank(s)	<input type="checkbox"/>	Fen(s)	<input type="checkbox"/>
*Natural waterfall(s) < 5m high	<input type="checkbox"/>	Quaking bank(s)	<input type="checkbox"/>	Bog(s)	<input type="checkbox"/>
Natural cascade(s)	<input type="checkbox"/>	*Sink hole(s)	<input type="checkbox"/>	Wet woodland(s)	<input type="checkbox"/>
				Marsh(es)	<input type="checkbox"/>
				Flush(es)	<input type="checkbox"/>
				Natural open water	<input type="checkbox"/>
				Others (state)	<input type="checkbox"/>
N. CHOKED CHANNEL (tick one box)					
Is 33% or more of the channel choked with vegetation? No <input type="checkbox"/> Yes <input checked="" type="checkbox"/>					
O. NOTABLE NUISANCE PLANT SPECIES (Use ✓ or E (> 33% length) *record even if <1%)					
None	<input checked="" type="checkbox"/>	*Giant hogweed	<input type="checkbox"/>	*Himalayan balsam	<input type="checkbox"/>
		*Japanese knotweed	<input type="checkbox"/>	*Other (state).....	<input type="checkbox"/>
P. OVERALL CHARACTERISTICS (Circle appropriate words, add others as necessary)					
Major impacts: landfill - tipping - litter - sewage - pollution - drought - abstraction - mill - dam - road - rail - industry - housing mining - quarrying - <u>overdeepening</u> - afforestation - fisheries management - silting - waterlogging - hydroelectric power					
Evidence of recent management: dredging - bank mowing - weed cutting - enhancement - river rehabilitation - gravel extraction - other (please specify)					
Animals: otter - mink - water vole - kingfisher - dipper - grey wagtail - sand martin - heron - dragonflies/damselflies					
Other significant observations: if necessary use separate sheet to describe overall characteristics and relevant observations					
Q. ALDERS (tick one box in each of the two categories) *record even if <1%					
*Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>			*Diseased Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>		
R. FIELD SURVEY QUALITY CONTROL (✓ boxes to confirm checks)					
Have you taken at least two photos that illustrate the general character of the site and additional photos of any weirs/ sluices and major/intermediate structures across the channel? <input checked="" type="checkbox"/>					
Have you completed all ten spot-checks and made entries in all boxes in E & F on page 2? <input checked="" type="checkbox"/>					
Have you completed column 11 of section G (and E if appropriate) on page 2? <input checked="" type="checkbox"/>					
Have you recorded in section C the number of riffles, pools and point bars (even if 0) on page 1? <input checked="" type="checkbox"/>					
Have you given an accurate (alphanumeric) grid reference for spot-checks 1, 6 and end of site (page 1)? <input checked="" type="checkbox"/>					
Have you stated whether spot-check 1 is at the upstream or downstream end of the site (top of page 2)? <input checked="" type="checkbox"/>					
Have you cross-checked your spot-check and sweep-up responses with the channel modification indicators given on page 2 of the spot-check key? <input checked="" type="checkbox"/>					

over deepened

020-RH1-066-002

Figure 60: 020-RH1-066-002

RIVER HABITAT SURVEY 2003 Version				Page 1 of 4			
A FIELD SURVEY DETAILS							
Site Number: <input type="text" value=""/> <small>leave blank if new site</small> Site Reference: 020-RH1-066-002 Spot-check 1 Grid Ref: SP7712616009 Spot-check 6 Grid Ref: SP7694215883 End of site Grid Ref: SP76755 15738 Reach Reference: River name: Unnamed Date: 8/5/2013 Time: 12:30 Surveyor name: Zoë TRENT Accredited Surveyor code: LTO61		Is the site part of a river or an artificial channel? River <input checked="" type="checkbox"/> Artificial <input type="checkbox"/> Are adverse conditions affecting survey? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> If yes, state Is bed of river visible? barely or not <input type="checkbox"/> partially <input type="checkbox"/> ±entirely <input checked="" type="checkbox"/> Is health and safety assessment form attached? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Number of photographs taken: 1 Photo references: P1 (looking ups from SCI) Site surveyed from: left bank <input type="checkbox"/> right bank <input checked="" type="checkbox"/> channel <input type="checkbox"/> <input type="checkbox"/> When options shown with 'shadow boxes', tick one box only					
B PREDOMINANT VALLEY FORM (within the horizon limit) (tick one box only)							
(tick one box only) <input checked="" type="checkbox"/> shallow vee <input type="checkbox"/> deep vee <input type="checkbox"/> gorge		<input type="checkbox"/> concave/bowl <input type="checkbox"/> asymmetrical valley <input type="checkbox"/> U-shape valley <input type="checkbox"/> no obvious valley sides					
Distinct flat valley bottom? No <input type="checkbox"/> Yes <input checked="" type="checkbox"/>				Natural terraces? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>			
C NUMBER OF RIFFLES, POOLS AND POINT BARS (enter total number in boxes)							
Riffle(s) <input type="text" value="0"/> Pool(s) <input type="text" value="0"/>		Unvegetated point bar(s) <input type="text" value="0"/> Vegetated point bar(s) <input type="text" value="0"/>					
D ARTIFICIAL FEATURES (indicate total number of occurrences of each category within the 500m site)							
If none, tick box <input type="checkbox"/>	Major	Intermediate	Minor	Major	Intermediate	Minor	
	Weirs/sluiques			Outfalls/intakes			
	Culverts			Fords			
	Bridges		1*	Deflectors/groynes/croys			
	Other - state						
Is channel obviously realigned? No <input type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input checked="" type="checkbox"/>		Is channel obviously over-deepened? No <input type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input checked="" type="checkbox"/>		Is water impounded by weir/dam? No <input checked="" type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input type="checkbox"/>			

*foot bridge

Figure 61: 020-RH1-066-002

SITE REF. 020-RH1-066-002		RIVER HABITAT SURVEY: TEN SPOT-CHECKS										Page 2 of 4	
Spot-check 1 is at: upstream end <input type="checkbox"/>		downstream end <input checked="" type="checkbox"/>		of site (tick one box)									
E. PHYSICAL ATTRIBUTES (to be assessed across channel within 10m wide transect)													
When boxes 'bordered', only one entry allowed		1 GPS	2	3	4	5	6 GPS	7	8	9	10	GPS	
LEFT BANK		River EC or SC if composed of sandy substrate											
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI		EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM		RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB		NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
CHANNEL		Channel EC or SC if predominant											
Channel substrate NV, BE, BO, CO, GP, SA, SI, CL, PE, EA, AR		SI	SI	SI	SI	SI	SI	SI	SI	SI	SI	SI	
Flow-type NV, FF, CH, BW, UW, CF, RP, UP, SM, NP, DR		SM	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	
Channel modification(s) NK, NO, CV, RS, RI, DA, FO		RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	
Channel feature(s) NV, NO, EB, RO, VR, MB, VB, MI, TR		NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
For braided rivers only: number of sub-channels		/	/	/	/	/	/	/	/	/	/	/	
RIGHT BANK		River EC or SC if composed of sandy substrate											
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI		EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM		RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB		NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
F. BANKTOP LAND USE AND VEGETATION STRUCTURE (to be assessed over a 10m wide transect)													
Land-use: choose one from BL, BP, CW, CP, SH, OR, WL, MH, AW, OW, RP, IG, TH, RD, SU, TL, IL, PG, NV													
LAND-USE WITHIN 5m OF LEFT BANKTOP		IG	IG	TL	TL	TL	TL	IG	IG	IG	IG	IG	
LEFT BANKTOP (structure within 1m) B/U/S/C/NV		S	S	B	B	B	B	S	S	S	S	S	
LEFT BANK-FACE (structure) B/U/S/C/NV		S	S	S	S	S	S	S	S	S	S	S	
RIGHT BANK-FACE (structure) B/U/S/C/NV		S	S	S	S	S	S	S	S	S	S	S	
RIGHT BANKTOP (structure within 1m) B/U/S/C/NV		S	S	S	S	S	S	S	S	S	S	S	
LAND-USE WITHIN 5m OF RIGHT BANKTOP		IG	IG	IG	IG	IG	IG	IG	IG	IG	IG	IG	
G. CHANNEL VEGETATION TYPES (to be assessed over a 10m wide transect; use E = (present) or NV (not visible))													
None (✓) or Not Visible (NV)													
Liverworts/mosses/lichens													
Emergent broad-leaved herbs		✓		E	E	E	✓	E	E	✓	E	E	
Emergent reeds/sedges/rushes/grasses/horsetails			E				E					✓	
Floating-leaved (rooted)													
Free-floating													
Amphibious													
Submerged broad-leaved				✓	✓	✓						✓	
Submerged linear-leaved							✓					✓	
Submerged fine-leaved													
Filamentous algae													
Use end column for overall assessment over 500m, including types not occurring in spot-checks (use ✓, E or NV) —————>													

Figure 62: 020-RH1-066-002

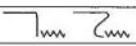
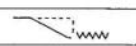


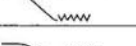

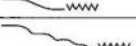
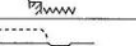
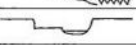
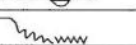


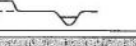
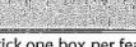
SITE REF. 020-RH1-066-002		RIVER HABITAT SURVEY : 500m SWEEP-UP				Page 3 of 4	
LAND USE WITHIN 50m OF BANKTOP							
	L	R		L	R		
Broadleaf/mixed woodland (semi-natural) (BL)			Natural open water (OW)				
Broadleaf/mixed plantation (BP)			Rough/unimproved grassland/pasture (RP)				
Coniferous woodland (semi-natural) (CW)			Improved/semi-improved grassland (IG)	✓	✓		
Coniferous plantation (CP)			Tall herb/rank vegetation (TH)				
Scrub & shrubs (SH)	✓		Rock, scree or sand dunes (RD)				
Orchard (OR)			Suburban/urban development (SU)				
Wetland (e.g. bog, marsh, fen) (WL)			Tilled land (TL)	E	E		
Moorland/heath (MH)			Irrigated land (IL)				
Artificial open water (AW)			Parkland or gardens (PG)				
			Not visible (NV)				
BANK PROFILES							
Natural/unmodified	L	R	Artificial/modified	L	R		
Vertical/undercut 			Resectioned (reprofiled) 	E	E		
Vertical with toe 			Reinforced - whole 				
Steep (>45°) 			Reinforced - top only 				
Gentle 			Reinforced - toe only 				
Composite 			Artificial two-stage 				
Natural berm 			Poached bank 				
			Embanked 				
			Set-back embankment 				
EXTENT OF TREES AND ASSOCIATED FEATURES							
TREES (tick one box per bank)				ASSOCIATED FEATURES (tick one box per feature)			
	Left	Right		None	Present	E (≥33%)	
None	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Shading of channel	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Isolated/scattered	<input checked="" type="checkbox"/>	<input type="checkbox"/>	*Overhanging boughs	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Regularly spaced, single	<input type="checkbox"/>	<input type="checkbox"/>	*Exposed bankside roots	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Occasional clumps	<input type="checkbox"/>	<input type="checkbox"/>	*Underwater tree roots	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Semi-continuous	<input type="checkbox"/>	<input type="checkbox"/>	Fallen trees	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Continuous	<input type="checkbox"/>	<input type="checkbox"/>	Large woody debris	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
EXTENT OF CHANNEL AND BANK FEATURES							
	None	Present	E (≥33%)	None	Present	E (≥33%)	
*Free fall flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed bedrock	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chute flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Broken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated bedrock/boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unbroken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rippled flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*Upwelling	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Mature island(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smooth flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No perceptible flow	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Vegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No flow (dry)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marginal deadwater	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eroding cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Unvegetated silt deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stable cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Discrete unvegetated sand deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				*Discrete unvegetated gravel deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 63: 020-RH1-066-002

SITE REF. 020-RH1-066-002		RIVER HABITAT SURVEY : DIMENSIONS AND INFLUENCES				Page 4 of 4
L CHANNEL DIMENSIONS (to be measured at one location on a straight uniform section, preferably across a riffle)						
LEFT BANK		CHANNEL		RIGHT BANK		
Banktop height (m)	2.5	Bankfull width (m)	3	Banktop height (m)	2.5	
Is banktop height also bankfull height? (Y or N)	N	Water width (m)	0.5	Is banktop height also bankfull height? (Y or N)	N	
Embanked height (m)	0	Water depth (m)	0.1	Embanked height (m)	0	
If trashline lower than banktop, indicate: height above water (m) = 0.5 width from bank to bank (m) = 0.75						
Bed material at site is: consolidated <input type="checkbox"/> unconsolidated (loose) <input checked="" type="checkbox"/> unknown <input type="checkbox"/>						
Location of measurements is: riffle <input type="checkbox"/> other <input checked="" type="checkbox"/> (state) SC 11						
M CHANNEL CHARACTERISTICS (tick one box)						
None <input checked="" type="checkbox"/>	Very large boulders (>1m) <input type="checkbox"/>	Backwater(s) <input type="checkbox"/>	Marsh(es) <input type="checkbox"/>			
Braided channels <input type="checkbox"/>	*Debris dam(s) <input type="checkbox"/>	Floodplain boulder deposits <input type="checkbox"/>	Flush(es) <input type="checkbox"/>			
Side channel(s) <input type="checkbox"/>	*Leafy debris <input type="checkbox"/>	Water meadow(s) <input type="checkbox"/>	Natural open water <input type="checkbox"/>			
*Natural waterfall(s) > 5m high <input type="checkbox"/>	Fringing reed-bank(s) <input type="checkbox"/>	Fen(s) <input type="checkbox"/>	Others (state) <input type="checkbox"/>			
*Natural waterfall(s) < 5m high <input type="checkbox"/>	Quaking bank(s) <input type="checkbox"/>	Bog(s) <input type="checkbox"/>				
Natural cascade(s) <input type="checkbox"/>	*Sink hole(s) <input type="checkbox"/>	Wet woodland(s) <input type="checkbox"/>				
N CHOKED CHANNEL (tick one box)						
Is 33% or more of the channel choked with vegetation? No <input type="checkbox"/> Yes <input checked="" type="checkbox"/>						
O NOTABLE NUISANCE PLANT SPECIES (Use ✓ or E (> 33% length) *Record even if < 1%)						
None <input checked="" type="checkbox"/>	bankface banktop to 50m		bankface banktop to 50m			
*Giant hogweed <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Himalayan balsam <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
*Japanese knotweed <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Other (state)..... <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
P OVERALL CHARACTERISTICS (Circle appropriate words, add others as necessary)						
Major impacts: landfill - tipping - litter - sewage - pollution - drought - abstraction - mill - dam - road - rail - industry - housing - mining - quarrying - overdeepening - afforestation - fisheries management - silting - waterlogging - hydroelectric power						
Evidence of recent management: dredging - bank mowing - weed cutting - enhancement - river rehabilitation - gravel extraction - other (please specify)						
Animals: otter - mink - water vole - kingfisher - dipper - grey wagtail - sand martin - heron - dragonflies/damselflies						
Other significant observations: if necessary use separate sheet to describe overall characteristics and relevant observations						
Q ALDERS (tick one box in each of the two categories) *Record even if < 1%						
*Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>		*Diseased Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>				
R FIELD SURVEY QUALITY CONTROL (✓ boxes to confirm checks)						
Have you taken at least two photos that illustrate the general character of the site and additional photos of any weirs/ sluices and major/intermediate structures across the channel? <input checked="" type="checkbox"/>						
Have you completed all ten spot-checks and made entries in all boxes in E & F on page 2? <input checked="" type="checkbox"/>						
Have you completed column 11 of section G (and E if appropriate) on page 2? <input checked="" type="checkbox"/>						
Have you recorded in section C the number of riffles, pools and point bars (even if 0) on page 1? <input checked="" type="checkbox"/>						
Have you given an accurate (alphanumeric) grid reference for spot-checks 1, 6 and end of site (page 1)? <input checked="" type="checkbox"/>						
Have you stated whether spot-check 1 is at the upstream or downstream end of the site (top of page 2)? <input checked="" type="checkbox"/>						
Have you cross-checked your spot-check and sweep-up responses with the channel modification indicators given on page 2 of the spot-check key? <input checked="" type="checkbox"/>						

Fleet Marston Brook - Tributary to Thame (CFA 12)

020-RH1-070-001

Figure 64: 020-RH1-070-001

RIVER HABITAT SURVEY 2003 Version				Page 1 of 4																
A FIELD SURVEY DETAILS																				
Site Number: Site Reference: 020-RH1-070-001 Spot-check 1 Grid Ref: SP7399118282 Spot-check 6 Grid Ref: SP74205 18355 End of site Grid Ref: SP74353 18496 Reach Reference: N18, River name: Crossing 36 Date 23/5/2013 Time: 9:30 Surveyor name: CENA ABJUNA Accredited Surveyor code: LT60	Is the site part of a river or an artificial channel? River <input checked="" type="checkbox"/> Artificial <input type="checkbox"/> Are adverse conditions affecting survey? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> If yes, state Is bed of river visible? barely or not <input type="checkbox"/> partially <input checked="" type="checkbox"/> ± entirely <input type="checkbox"/> Is health and safety assessment form attached? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Number of photographs taken: 5 020-RH1-070-001 P1 230513, 020-RH1-070-001 P2 230513, 020-RH1-070-001 P3 230513, 020-RH1-070-001 P4 230513, 020-RH1-070-001 P5 230513. Photo references: Site surveyed from: left bank <input type="checkbox"/> right bank <input checked="" type="checkbox"/> channel <input type="checkbox"/>																			
<input type="checkbox"/> When options shown with 'shadow boxes', tick one box only																				
LEFT		RIGHT																		
B PREDOMINANT VALLEY FORM (within the horizon limit) (tick one box only)																				
(tick one box only) <table style="width: 100%; border: none;"> <tr> <td style="text-align: center;"></td> <td><input checked="" type="checkbox"/> shallow vee</td> <td style="text-align: center;"></td> <td><input type="checkbox"/> concave/bowl</td> </tr> <tr> <td style="text-align: center;"></td> <td><input type="checkbox"/> deep vee</td> <td style="text-align: center;"></td> <td><input type="checkbox"/> asymmetrical valley</td> </tr> <tr> <td style="text-align: center;"></td> <td><input type="checkbox"/> gorge</td> <td style="text-align: center;"></td> <td><input type="checkbox"/> U-shape valley</td> </tr> <tr> <td colspan="2"></td> <td style="text-align: center;"></td> <td><input type="checkbox"/> no obvious valley sides</td> </tr> </table>						<input checked="" type="checkbox"/> shallow vee		<input type="checkbox"/> concave/bowl		<input type="checkbox"/> deep vee		<input type="checkbox"/> asymmetrical valley		<input type="checkbox"/> gorge		<input type="checkbox"/> U-shape valley				<input type="checkbox"/> no obvious valley sides
	<input checked="" type="checkbox"/> shallow vee		<input type="checkbox"/> concave/bowl																	
	<input type="checkbox"/> deep vee		<input type="checkbox"/> asymmetrical valley																	
	<input type="checkbox"/> gorge		<input type="checkbox"/> U-shape valley																	
			<input type="checkbox"/> no obvious valley sides																	
Distinct flat valley bottom? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>		Natural terraces? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>																		
C NUMBER OF RIFFLES, POOLS AND POINT BARS (enter total number in boxes)																				
Riffle(s)	<input type="text" value="0"/>	Unvegetated point bar(s)	<input type="text" value="0"/>																	
Pool(s)	<input type="text" value="0"/>	Vegetated point bar(s)	<input type="text" value="0"/>																	
D ARTIFICIAL FEATURES (indicate total number of occurrences of each category within the 500m site)																				
If none, tick box		Major	Intermediate	Minor		Major	Intermediate	Minor												
	Weirs/slucices				Outfalls/intakes															
	Culverts				Fords															
<input checked="" type="checkbox"/>	Bridges				Deflectors/roynes/croys															
	Other - state																			
Is channel obviously realigned?		No <input type="checkbox"/>	Yes, <33% of site <input type="checkbox"/>		≥33% of site <input checked="" type="checkbox"/>															
Is channel obviously over-deepened?		No <input type="checkbox"/>	Yes, <33% of site <input checked="" type="checkbox"/>		≥33% of site <input type="checkbox"/>															
Is water impounded by weir/dam?		No <input checked="" type="checkbox"/>	Yes, <33% of site <input type="checkbox"/>		≥33% of site <input type="checkbox"/>															

Figure 65: 020-RH1-070-001

SITE REF. <u>020-RH1-070-001</u>		RIVER HABITAT SURVEY: TEN SPOT-CHECKS										Page 2 of 4
Spot-check 1 is at: upstream end <input checked="" type="checkbox"/> downstream end, <input type="checkbox"/> of site (tick one box)												
E PHYSICAL ATTRIBUTES (to be assessed across channel within 1m wide transect)												
When boxes 'bordered', only one entry allowed		1 GPS	2	3	4	5	6 GPS	7	8	9	10	GPS
LEFT BANK		Ring EC or SC if composed of sandy substrate										
Material NV, BE, BO, CO, GS, EA, FE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI		EA	NV	EA	NV	EA	NV	NV	EA	EA	EA	
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM		AS	NV	AS	NV	AS	NV	NV	AS	AS	AS	
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB		NO	NV	NO	NV	NO	NV	NV	NO	NO	NO	
CHANNEL		GP: ring either G or P if predominant										
Channel substrate NV, BE, BO, CO, GP, SA, SI, CL, PE, EA, AR		SI	NV	SI	NV	SI	NV	NV	SI	SI	SI	
Flow-type NV, FF, CH, BW, UW, CF, RP, UP, SM, NP, DR		NP	NV	NP	NV	NP	NV	NV	NP	NP	NP	
Channel modification(s) NK, NO, CV, RS, RI, DA, FO		AS	NV	AS	NV	AS	NV	NV	AS	AS	AS	
Channel feature(s) NV, NO, EB, RO, VR, MB, VB, MI, TR		NO	NV	NO	NV	NO	NV	NV	NO	NO	NO	
For braided rivers only: number of sub-channels												
RIGHT BANK		Ring EC or SC if composed of sandy substrate										
Material NV, BE, BO, CO, GS, EA, FE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI		EA	EA	EA	NV	EA	NV	NV	EA	EA	EA	
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM		AS	AS	AS	NV	NO	NV	NV	AS	AS	AS	
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB		NO	NO	NO	NV	NO	NV	NV	NO	NO	NO	
F BANKTOP LAND-USE AND VEGETATION STRUCTURE (to be assessed over a 10m wide transect)												
Land-use: choose one from BL, BP, CW, CP, SH, OR, WL, MH, AW, OW, RP, IG, TH, RD, SU, TL, IL, PG, NV												
LAND-USE WITHIN 5m OF LEFT BANKTOP		SH	TL	TL	TL	TL	TL	TL	TL	TL	TL	
LEFT BANKTOP (structure within 1m) B/U/S/C/NV		C	S	S	S	U	NV	NV	U	U	U	
LEFT BANK-FACE (structure) B/U/S/C/NV		C	NV	S	NV	U	NV	NV	S	S	U	
RIGHT BANK-FACE (structure) B/U/S/C/NV		C	NV	C	NV	S	NV	NV	C	C	C	
RIGHT BANKTOP (structure within 1m) B/U/S/C/NV		C	C	C	C	C	C	C	C	C	C	
LAND-USE WITHIN 5m OF RIGHT BANKTOP		SA	TL	TL	SH	TL	SH	SH	TL	TL	TL	
G CHANNEL VEGETATION TYPES (to be assessed over a 10m wide transect: use F (> 33% area), ✓ (present) or NV (not visible))												
None (✓) or Not Visible (NV)		✓	NV	✓	NV	✓	NV	NV	✓	✓	✓	✓
Liverworts/mosses/lichens												
Emergent broad-leaved herbs												
Emergent reeds/sedges/rushes/grasses/horsetails												
Floating-leaved (rooted)												
Free-floating												
Amphibious												
Submerged broad-leaved												
Submerged linear-leaved												
Submerged fine-leaved												
Filamentous algae												
Use end column for overall assessment over 500m, including types not occurring in spot-checks (use ✓, E or NV)												

Enter channel substrate(s) not occurring as predominant in spot-checks but present in >1% of whole site.

Figure 66: 020-RH1-070-001

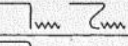
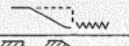
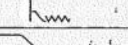

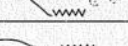
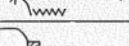

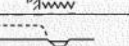
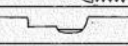
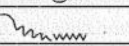


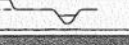
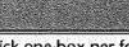
SITE REF. 020-RH1-070-001		RIVER HABITAT SURVEY : 500m SWEEP-UP				Page 3 of 4	
H LAND-USE WITHIN 50m OF BANKTOP Use ✓ (present) or E (> 33% banklength)							
	L	R		L	R		
Broadleaf/mixed woodland (semi-natural) (BL)			Natural open water (OW)				
Broadleaf/mixed plantation (BP)			Rough/unimproved grassland/pasture (RP)				
Coniferous woodland (semi-natural) (CW)			Improved/semi-improved grassland (IG)				
Coniferous plantation (CP)			Tall herb/rank vegetation (TH)				
Scrub & shrubs (SH)	✓	E	Rock, scree or sand dunes (RD)				
Orchard (OR)			Suburban/urban development (SU)				
Wetland (e.g. bog, marsh, fen) (WL)			Tilled land (TL)	E	E		
Moorland/heath (MH)			Irrigated land (IL)				
Artificial open water (AW)			Parkland or gardens (PG)				
			Not visible (NV)				
I BANK PROFILES Use ✓ (present) or E (> 33% banklength)							
Natural/unmodified	L	R	Artificial/modified	L	R		
Vertical/undercut 			Resectioned (reprofiled) 	E	E		
Vertical with toe 			Reinforced - whole 				
Steep (>45°) 			Reinforced - top only 				
Gentle 			Reinforced - toe only 				
Composite 			Artificial two-stage 				
Natural berm 			Poached bank 				
			Embanked 				
			Set-back embankment 				
J EXTENT OF TREES AND ASSOCIATED FEATURES *record even if <1%							
TREES (tick one box per bank)				ASSOCIATED FEATURES (tick one box per feature)			
	Left	Right		None	Present	E (>33%)	
None	<input type="checkbox"/>	<input type="checkbox"/>	Shading of channel	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Isolated/scattered	<input checked="" type="checkbox"/>	<input type="checkbox"/>	*Overhanging boughs	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Regularly spaced, single	<input type="checkbox"/>	<input type="checkbox"/>	*Exposed bankside roots	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Occasional clumps	<input type="checkbox"/>	<input type="checkbox"/>	*Underwater tree roots	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Semi-continuous	<input type="checkbox"/>	<input type="checkbox"/>	Fallen trees	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Continuous	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Large woody debris	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
K EXTENT OF CHANNEL AND BANK FEATURES (tick one box for each feature) *record even if <1%							
	None	Present	E (>33%)	None	Present	E (>33%)	
*Free fall flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed bedrock	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chute flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Broken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated bedrock/boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unbroken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rippled flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*Upwelling	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Mature island(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smooth flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No perceptible flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Vegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No flow (dry)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marginal deadwater	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eroding cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Unvegetated silt deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stable cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Discrete unvegetated sand deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				*Discrete unvegetated gravel deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 67: 020-RH1-070-001

SITE REF. <i>020-RH1-070-001</i>		RIVER HABITAT SURVEY : DIMENSIONS AND INFLUENCES		Page 4 of 4	
L CHANNEL DIMENSIONS (to be measured at one location on a straight uniform section, preferably across a riffle)					
LEFT BANK		CHANNEL		RIGHT BANK	
Banktop height (m)	<i>1.5</i>	Bankfull width (m)	<i>3</i>	Banktop height (m)	<i>1.5</i>
Is banktop height also bankfull height? (Y or N)	<input checked="" type="checkbox"/>	Water width (m)	<i>0.5</i>	Is banktop height also bankfull height? (Y or N)	<input checked="" type="checkbox"/>
Embanked height (m)	<i>-</i>	Water depth (m)	<i>5m</i>	Embanked height (m)	<i>-</i>
If trashline lower than banktop, indicate: height above water (m) = <i>-</i> width from bank to bank (m) = <i>-</i>					
Bed material at site is: consolidated <input type="checkbox"/> unconsolidated (loose) <input checked="" type="checkbox"/> unknown <input type="checkbox"/>					
Location of measurements is: riffle <input type="checkbox"/> other <input checked="" type="checkbox"/> (state) <i>SØ8</i>					
M FEATURES OF SPECIAL INTEREST Use ✓ or E (> 33% length) *record even if <1%					
None	<input checked="" type="checkbox"/>	Very large boulders (>1m)	<input type="checkbox"/>	Backwater(s)	<input type="checkbox"/>
Braided channels	<input type="checkbox"/>	*Debris dam(s)	<input type="checkbox"/>	Floodplain boulder deposits	<input type="checkbox"/>
Side channel(s)	<input type="checkbox"/>	*Leafy debris	<input type="checkbox"/>	Water meadow(s)	<input type="checkbox"/>
*Natural waterfall(s) > 5m high	<input type="checkbox"/>	Fringing reed-bank(s)	<input type="checkbox"/>	Fen(s)	<input type="checkbox"/>
*Natural waterfall(s) < 5m high	<input type="checkbox"/>	Quaking bank(s)	<input type="checkbox"/>	Bog(s)	<input type="checkbox"/>
Natural cascade(s)	<input type="checkbox"/>	*Sink hole(s)	<input type="checkbox"/>	Wet woodland(s)	<input type="checkbox"/>
Marsh(es)	<input type="checkbox"/>	Flush(es)	<input type="checkbox"/>	Natural open water	<input type="checkbox"/>
Others (state)	<input type="checkbox"/>				
N CHOKED CHANNEL (tick one box)					
Is 33% or more of the channel choked with vegetation? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>					
O NOTABLE NUISANCE PLANT SPECIES Use ✓ or E (> 33% length) *record even if <1%					
None	<input checked="" type="checkbox"/>	bankface	banktop to 50m	bankface	banktop to 50m
*Giant hogweed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Himalayan balsam	<input type="checkbox"/>
*Japanese knotweed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Other (state).....	<input type="checkbox"/>
P OVERALL CHARACTERISTICS (Circle appropriate words, add others as necessary)					
Major impacts: landfill - tipping - litter - sewage - pollution - drought - abstraction - mill - dam - <u>road</u> - rail - industry - housing mining - quarrying - <u>overdeepening</u> - afforestation - fisheries management - silting - waterlogging - hydroelectric power					
Evidence of recent management: dredging - bank mowing - weed cutting - enhancement - river rehabilitation - gravel extraction - other (please specify)					
Animals: otter - mink - water vole - kingfisher - dipper - grey wagtail - sand martin - heron - dragonflies/damselflies					
Other significant observations: if necessary use separate sheet to describe overall characteristics and relevant observations <i>A few spot checks were not visible due to thick vegetation on right bank (no access to left bank). However it is fair to assume the uniform character of the ditch throughout.</i>					
Q ALDERS (tick one box in each of the two categories) *record even if <1%					
*Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>			*Diseased Alders? None <input type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>		
R FIELD SURVEY QUALITY CONTROL (✓ boxes to confirm checks)					
Have you taken at least two photos that illustrate the general character of the site and additional photos of any weirs/ sluices and major/intermediate structures across the channel? <input checked="" type="checkbox"/>					
Have you completed all ten spot-checks and made entries in all boxes in E & F on page 2? <input checked="" type="checkbox"/>					
Have you completed column 11 of section G (and E if appropriate) on page 2? <input checked="" type="checkbox"/>					
Have you recorded in section C the number of riffles, pools and point bars (even if 0) on page 1? <input checked="" type="checkbox"/>					
Have you given an accurate (alphanumeric) grid reference for spot-checks 1, 6 and end of site (page 1)? <input checked="" type="checkbox"/>					
Have you stated whether spot-check 1 is at the upstream or downstream end of the site (top of page 2)? <input checked="" type="checkbox"/>					
Have you cross-checked your spot-check and sweep-up responses with the channel modification indicators given on page 2 of the spot-check key? <input checked="" type="checkbox"/>					

Tributary to the River Ray (CFA 12)

020-RH1-075-001

Figure 68: 020-RH1-070-001

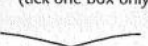




RIVER HABITAT SURVEY 2003 Version				Page 1 of 4				
A FIELD SURVEY DETAILS								
Site Number: <input type="text" value="leave blank if new site"/>		Is the site part of a river or an artificial channel? River <input checked="" type="checkbox"/> Artificial <input type="checkbox"/>						
Site Reference: 020-RH1-075-001		Are adverse conditions affecting survey? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>						
Spot-check 1 Grid Ref: SP 70868 22125		If yes, state						
Spot-check 6 Grid Ref: SP 70681 22029		Is bed of river visible? barely or not <input type="checkbox"/> partially <input checked="" type="checkbox"/> entirely <input type="checkbox"/>						
End of site Grid Ref: SP 70469 21767.		Is health and safety assessment form attached? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>						
Reach Reference: BM 232086.		Number of photographs taken: 6. 020-RH1-075-001 P1 220313, 020-RH1-075-001 P2 220313, 020-RH1-075-001 P3 220313, 020-RH1-075-001 P4 220313, 020-RH1-075-001 P5 220313, 020-RH1-075-001 P6 220313.						
River name: Crossing 43a.		Site surveyed from: left bank <input type="checkbox"/> right bank <input checked="" type="checkbox"/> channel <input checked="" type="checkbox"/>						
Date 22/05/2013 Time: 13:40		<input type="checkbox"/> When options shown with 'shadow boxes', tick one box only						
Surveyor name: Sarah Hodgett		LEFT banks determined by facing downstream RIGHT						
Accredited Surveyor code: FA 019								
B PREDOMINANT VALLEY FORM (within the horizon limit) (tick one box only)								
(tick one box only)								
<input type="checkbox"/> shallow vee				<input type="checkbox"/> concave/bowl				
<input type="checkbox"/> deep vee				<input type="checkbox"/> asymmetrical valley				
<input type="checkbox"/> gorge				<input type="checkbox"/> U-shape valley		<input checked="" type="checkbox"/> no obvious valley sides		
Distinct flat valley bottom? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>				Natural terraces? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>				
C NUMBER OF RIFFLES, POOLS AND POINT BARS (enter total number in boxes)								
Riffle(s) <input type="text" value="0"/>		Unvegetated point bar(s) <input type="text" value="0"/>		Pool(s) <input type="text" value="0"/>		Vegetated point bar(s) <input type="text" value="0"/>		
D ARTIFICIAL FEATURES (indicate total number of occurrences of each category within the 500m site)								
If none, tick box <input type="checkbox"/>		Major	Intermediate	Minor		Major	Intermediate	Minor
	Weirs/slucices				Outfalls/intakes			
	Culverts				Fords			
	Bridges				Deflectors/groynes/crocs			
	Other - state							
Is channel obviously realigned? No <input checked="" type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input type="checkbox"/>		Is channel obviously over-deepened? No <input checked="" type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input checked="" type="checkbox"/>		Is water impounded by weir/dam? No <input checked="" type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input type="checkbox"/>				

Figure 69: 020-RH1-070-001

SITE REF. 020-RH1-070-001	RIVER HABITAT SURVEY: TEN SPOT-CHECKS										Page 2 of 4
Spot-check 1 is at: upstream end <input checked="" type="checkbox"/> NO flow downstream end <input type="checkbox"/> of site (tick one box)											
E PHYSICAL ATTRIBUTES (to be assessed over a 500m wide transect, including embankments)											
When boxes 'bordered', only one entry allowed	1 GPS	2	3	4	5	6 GPS	7	8	9	10	GPS
LEFT BANK	Ring EC or SC if composed of sandy substrate										
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI	BR	EA	EA	EA	EA	CL	EA	EA	EA	EA	
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM	RI	NO	NO	NO	NO	NO	NO	NO	RS	RS	
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
CHANNEL	GP: ring either Q or P if predominant										
Channel substrate NV, BE, BO, CO, GP, SA, SI, CL, PE, EA, AR	SI	NP	SI	SI	SI	CL	SI	SI	SI	SI	
Flow-type NV, FF, CH, BW, UW, CF, RP, UP, SM, NP, DR	DR	NP	NP	NP	NP	NP	NP	NP	NP	NP	
Channel modification(s) NK, NO, CV, RS, RI, DA, FO	NO	NO	NO	NO	NO	NO	NO	NO	RS	RS	
Channel feature(s) NV, NO, EB, RO, VR, MB, VB, MI, TR	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
For braided rivers only: number of sub-channels							1				
RIGHT BANK	Ring EC or SC if composed of sandy substrate										
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI	BR	EA	EA	EA	EA	CL	EA	EA	EA	EA	
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM	RI	NO	NO	NO	NO	NO	NO	NO	RS	RS	
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
F BANKTOP LAND USE AND VEGETATION STRUCTURE (to be assessed over a 10m wide transect)											
Land-use: choose one from BL, BP, CW, CP, SH, OR, WL, MH, AW, OW, RP, IG, TH, RD, SU, TL, IL, PG, NV											
LAND-USE WITHIN 5m OF LEFT BANKTOP	BL	SH	SH	SH	SH	SH	BL	BL	BL	BL	
LEFT BANKTOP (structure within 1m) B/U/S/C/NV	S	S	S	S	S	S	S	S	S	S	
LEFT BANK-FACE (structure) B/U/S/C/NV	B	B	S	S	S	B	B	S	S	S	
RIGHT BANK-FACE (structure) B/U/S/C/NV	B	S	S	S	S	B	B	S	S	S	
RIGHT BANKTOP (structure within 1m) B/U/S/C/NV	S	B	S	S	S	S	S	S	S	S	
LAND-USE WITHIN 5m OF RIGHT BANKTOP	BL	SH	SH	SH	SH	SH	BL	BL	BL	BL	
G CHANNEL VEGETATION TYPES (to be assessed over a 10m wide transect, plus L (33% wide) (present) or NV (not visible))											
None (✓) or Not Visible (NV)	✓	NV	✓	✓		✓	✓	✓			
Liverworts/mosses/lichens											
Emergent broad-leaved herbs											
Emergent reeds/sedges/rushes/grasses/horsetails											
Floating-leaved (rooted)											
Free-floating											
Amphibious			✓		✓				✓	✓	✓
Submerged broad-leaved											
Submerged linear-leaved											
Submerged fine-leaved											
Filamentous algae											
Use end column for overall assessment over 500m, including types not occurring in spot-checks (use ✓, E or NV)											↑

↑ Enter channel substrate(s) not occurring as predominant in spot-checks but present in >1% of whole site.

Figure 70: 020-RH1-070-001

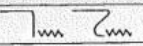
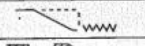
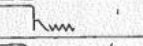

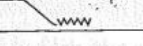
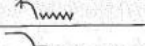
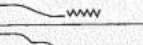
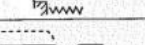


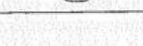

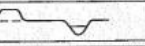

SITE REF. 020-RH1-070-001		RIVER HABITAT SURVEY : 500m SWEEP-UP				Page 3 of 4	
II LAND-USE WITHIN 50m OF BANKTOP (tick one box per bank)							
	L	R		L	R		
Broadleaf/mixed woodland (semi-natural) (BL)	E	E	Natural open water (OW)				
Broadleaf/mixed plantation (BP)			Rough/unimproved grassland/pasture (RP)				
Coniferous woodland (semi-natural) (CW)			Improved/semi-improved grassland (IG)				
Coniferous plantation (CP)			Tall herb/rank vegetation (TH)				
Scrub & shrubs (SH)	E	E	Rock, scree or sand dunes (RD)				
Orchard (OR)			Suburban/urban development (SU)				
Wetland (e.g. bog, marsh, fen) (WL)			Tilled land (TL)			E	E
Moorland/heath (MH)			Irrigated land (IL)				
Artificial open water (AW)			Parkland or gardens (PG)				
			Not visible (NV)				
III BANK PROFILES (tick one box per bank)							
Natural/unmodified	L	R	Artificial/modified	L	R		
Vertical/undercut 	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Resectioned (reprofiled) 	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
Vertical with toe 			Reinforced - whole 				
Steep (>45°) 	E	E	Reinforced - top only 				
Gentle 	E	E	Reinforced - toe only 				
Composite 			Artificial two-stage 				
Natural berm 			Poached bank 				
			Embanked 				
			Set-back embankment 				
IV EXTENT OF TREES AND ASSOCIATED FEATURES (tick one box per bank)							
TREES (tick one box per bank)				ASSOCIATED FEATURES (tick one box per feature)			
	Left	Right		None	Present	E (>33%)	
None	<input type="checkbox"/>	<input type="checkbox"/>	Shading of channel	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Isolated/scattered	<input type="checkbox"/>	<input type="checkbox"/>	*Overhanging boughs	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Regularly spaced, single	<input type="checkbox"/>	<input type="checkbox"/>	*Exposed bankside roots	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Occasional clumps	<input type="checkbox"/>	<input checked="" type="checkbox"/>	*Underwater tree roots	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Semi-continuous	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Fallen trees	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Continuous	<input type="checkbox"/>	<input type="checkbox"/>	Large woody debris	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
V EXTENT OF CHANNEL AND BANK FEATURES (tick one box for each feature)							
	None	Present	E (>33%)	None	Present	E (>33%)	
*Free fall flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed bedrock	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chute flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Broken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated bedrock/boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unbroken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rippled flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*Upwelling	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Mature island(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smooth flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No perceptible flow	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Vegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No flow (dry)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Unvegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marginal deadwater	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eroding cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Unvegetated silt deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stable cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Discrete unvegetated sand deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				*Discrete unvegetated gravel deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 71: 020-RH1-070-001

LEFT BANK		CHANNEL		RIGHT BANK	
Banktop height (m)	1.5	Bankfull width (m)	2	Banktop height (m)	1.5
Is banktop height also bankfull height? (Y or N)	N	Water width (m)	0	Is banktop height also bankfull height? (Y or N)	N
Embanked height (m)	/	Water depth (m)	0	Embanked height (m)	/
If trashline lower than banktop, indicate: height above water (m) = / width from bank to bank (m) = /					
Bed material at site is: consolidated <input type="checkbox"/> unconsolidated (loose) <input checked="" type="checkbox"/> unknown <input type="checkbox"/>					
Location of measurements is: riffle <input type="checkbox"/> other <input checked="" type="checkbox"/> (state) <u>Middle</u>					

None <input checked="" type="checkbox"/>	Very large boulders (>1m) <input type="checkbox"/>	Backwater(s) <input type="checkbox"/>	Marsh(es) <input type="checkbox"/>
Braided channels <input type="checkbox"/>	*Debris dam(s) <input type="checkbox"/>	Floodplain boulder deposits <input type="checkbox"/>	Flush(es) <input type="checkbox"/>
Side channel(s) <input type="checkbox"/>	*Leafy debris <input type="checkbox"/>	Water meadow(s) <input type="checkbox"/>	Natural open water <input type="checkbox"/>
*Natural waterfall(s) > 5m high <input type="checkbox"/>	Fringing reed-bank(s) <input type="checkbox"/>	Fen(s) <input type="checkbox"/>	Others (state) <input type="checkbox"/>
*Natural waterfall(s) < 5m high <input type="checkbox"/>	Quaking bank(s) <input type="checkbox"/>	Bog(s) <input type="checkbox"/>	
Natural cascade(s) <input type="checkbox"/>	*Sink hole(s) <input type="checkbox"/>	Wet woodland(s) <input type="checkbox"/>	

N CHOKED CHANNEL (tick one box)

Is 33% or more of the channel choked with vegetation? No Yes

O NOTABLE NUISANCE PLANT SPECIES (Use ✓ or F for 50% length; * record even if <1%)

	bankface	banktop to 50m	bankface	banktop to 50m
None <input checked="" type="checkbox"/>				
*Giant hogweed <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Himalayan balsam <input type="checkbox"/>	<input type="checkbox"/>
*Japanese knotweed <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Other (state)..... <input type="checkbox"/>	<input type="checkbox"/>

P OVERALL CHARACTERISTICS (Circle appropriate words, add others as necessary)

Major impacts: landfill - tipping - litter - sewage - pollution - drought - abstraction - mill - dam - road - rail - industry - housing - mining - quarrying - overdeepening - afforestation - fisheries management - silting - waterlogging - hydroelectric power

Evidence of recent management: dredging - bank mowing - weed cutting - enhancement - river rehabilitation - gravel extraction - other (please specify)

Animals: otter - mink - water vole - kingfisher - dipper - grey wagtail - sand martin - heron - dragonflies/damselflies

Other significant observations: if necessary use separate sheet to describe overall characteristics and relevant observations

Dirch under scrub, little flow.

Q ALDERS (tick one box in each of the two categories) (record even if <1%)

*Alders? None Present Extensive *Diseased Alders? None Present Extensive

R FIELD SURVEY QUALITY CONTROL (✓ boxes to confirm checks)

- Have you taken at least two photos that illustrate the general character of the site and additional photos of any weirs/ sluices and major/intermediate structures across the channel?
- Have you completed all ten spot-checks and made entries in all boxes in E & F on page 2?
- Have you completed column 11 of section G (and E if appropriate) on page 2?
- Have you recorded in section C the number of riffles, pools and point bars (even if 0) on page 1?
- Have you given an accurate (alphanumeric) grid reference for spot-checks 1, 6 and end of site (page 1)?
- Have you stated whether spot-check 1 is at the upstream or downstream end of the site (top of page 2)?
- Have you cross-checked your spot-check and sweep-up responses with the channel modification indicators given on page 2 of the spot-check key?

020-RH1-076-001

Figure 72: 020-RH1-076-001

RIVER HABITAT SURVEY 2003 Version Page 1 of 4

A. FIELD SURVEY DETAILS

Site Number: leave blank if new site

Site Reference: 020-RH1-076-001

Spot-check 1 Grid Ref: 025P 70623 23067

Spot-check 6 Grid Ref: 5P 70136 22808

End of site Grid Ref: 3P69935 22563

Reach Reference: BM 232086

River name: Crossing 4A

Date: 22/10/2013 Time: 9:15

Surveyor name: Sarah Hodggett

Accredited Surveyor code: FA019

Is the site part of a river or an artificial channel? River Artificial

Are adverse conditions affecting survey? No Yes

If yes, state

Is bed of river visible? barely or not partially ± entirely

Is health and safety assessment form attached? Yes No

Number of photographs taken: 8 020-RH1-076-001 P1 220513,
020-RH1-076-001 P2 220513,
020-RH1-076-001 P3 220513,
020-RH1-076-001 P4 220513,
020-RH1-076-001 P5 220513,
020-RH1-076-001 P6 220513

Photo references: 020-RH1-076-001 P1 220513,
020-RH1-076-001 P2 220513,
020-RH1-076-001 P3 220513,
020-RH1-076-001 P4 220513,
020-RH1-076-001 P5 220513,
020-RH1-076-001 P6 220513

Site surveyed from: left bank right bank channel

When options shown with 'shadow boxes', tick one box only

B. PREDOMINANT VALLEY FORM (within the horizon limit) (tick one box only)

shallow vee deep vee gorge concave/bowl asymmetrical valley U-shape valley no obvious valley sides

Distinct flat valley bottom? No Yes Natural terraces? No Yes

C. NUMBER OF RIFFLES, POOLS AND POINT BARS (enter total number in boxes)

Riffle(s) 0 Unvegetated point bar(s) 0

Pool(s) 0 Vegetated point bar(s) 0

D. ARTIFICIAL FEATURES (indicate total number of occurrences of each category within the 500m site)

If none, tick box	Major			Intermediate			Minor		
	Major	Intermediate	Minor	Major	Intermediate	Minor	Major	Intermediate	Minor
<input type="checkbox"/> Weirs/sluices									
<input type="checkbox"/> Culverts	11	Three							
<input type="checkbox"/> Bridges									
<input type="checkbox"/> Other - state									

Outfalls/intakes Fords Deflectors/groynes/croys

Is channel obviously realigned? No Yes, <33% of site ≥33% of site

Is channel obviously over-deepened? No Yes, <33% of site ≥33% of site

Is water impounded by weir/dam? No Yes, <33% of site ≥33% of site

* 020-RH1-076-001 P7 220513, 020-RH1-076-001 P8 220513.

Figure 73: 020-RH1-076-001

SITE REF. <u>020-RH1-076-001</u>	RIVER HABITAT SURVEY: TEN SPOT-CHECKS										Page 2 of 4
Spot-check 1 is at: upstream end <input checked="" type="checkbox"/> downstream end <input type="checkbox"/> of site (tick one box)											
E. PHYSICAL ATTRIBUTES (to be assessed across channel within 7m wide transect)											
When boxes 'bordered', only one entry allowed	1 GPS	2	3	4	5	6 GPS	7	8	9	10	GPS
LEFT BANK	Ring EC or SC if composed of sandy substrate										
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI	EA	EA	EA	EA	EA	NV	EA	EA	EA	EA	
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM	NO	NO	NO	NO	RS	NK	RS	RS	RS	RS	
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB	NO	NO	NO	NO	NO	NV	NO	NO	NO	NO	
CHANNEL	GP: ring either S or P if predominant										
Channel substrate NV, BE, BO, CO, GP, SA, SI, CL, PE, EA, AR	SI	SI	SI	SI	SI	NV	SI	SI	SI	SI	
Flow-type NV, FF, CH, BW, UW, CF, RP, UP, SM, NP, DR	NF	SM	SM	SM	SM	NV	NP	SM	NP	NP	
Channel modification(s) NK, NO, CV, RS, RI, DA, FO	NO	NO	NO	NO	RS	CV	RS	RS	RS	RS	
Channel feature(s) NV, NO, EB, RO, VR, MB, VB, MI, TR	NO	NO	NO	NO	NO	NV	NO	NO	NO	NO	
For braided rivers only: number of sub-channels											
RIGHT BANK	Ring EC or SC if composed of sandy substrate										
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI	EA	EA	EA	EA	EA	NV	EA	EA	EA	EA	
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM	NO	NO	NO	NO	RS	NK	RS	RS	RS	RS	
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB	NO	NO	NO	NO	NO	NV	NO	NV	NO	NO	
F. BANKTOP LAND-USE AND VEGETATION STRUCTURE (to be assessed over a 70m wide transect)											
Land-use: choose one from BL, BP, CW, CP, SH, OR, WL, MH, AW, OW, RP, IG, TH, RD, SU, TL, IL, PG, NV											
LAND-USE WITHIN 5m OF LEFT BANKTOP	BL	BL	BL	BL	BL	SH	TH	TH	SH	SH	
LEFT BANKTOP (structure within 1m) B/U/S/C/NV	S	S	S	S	S	NV	S	NV	S	S	
LEFT BANK-FACE (structure) B/U/S/C/NV	S	S	S	S	S	NV	S	NV	S	S	
RIGHT BANK-FACE (structure) B/U/S/C/NV	S	S	S	S	S	NV	S	NV	S	S	
RIGHT BANKTOP (structure within 1m) B/U/S/C/NV	S	S	S	S	U	NV	S	S	S	S	
LAND-USE WITHIN 5m OF RIGHT BANKTOP	BL	BL	BL	BL	AW	RO	SH	SH	TH	IG	
G. CHANNEL VEGETATION TYPES (to be assessed over a 10m wide transect; use E if > 20% area, ✓ if present or NV (not visible))											
None (✓) or Not Visible (NV)	✓	✓	✓	✓		NV					
Liverworts/mosses/lichens											
Emergent broad-leaved herbs					E	✓	✓	E	E	E	
Emergent reeds/sedges/rushes/grasses/horsetails					✓	✓	✓	✓	✓	✓	E
Floating-leaved (rooted)											
Free-floating											
Amphibious								✓	✓	✓	
Submerged broad-leaved											
Submerged linear-leaved											
Submerged fine-leaved											
Filamentous algae											
Use end column for overall assessment over 500m, including types not occurring in spot-checks (use ✓, E or NV)											

↑ Enter channel substrate(s) not occurring as predominant in spot-checks but present in >1% of whole site.

Figure 74: 020-RH1-076-001

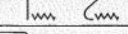
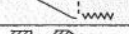
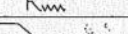
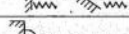
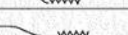
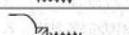



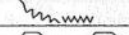

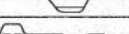

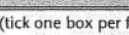
020-RH1-076-001 SITE REF. 076 - 001		RIVER HABITAT SURVEY : 500m SWEEP-UP				Page 3 of 4	
H LAND-USE WITHIN 50m OF BANKTOP Use 2 (present) or E (>33% banktop)							
	L	R		L	R		
Broadleaf/mixed woodland (semi-natural) (BL)	E	E	Natural open water (OW)				
Broadleaf/mixed plantation (BP)			Rough/unimproved grassland/pasture (RP)				
Coniferous woodland (semi-natural) (CW)			Improved/semi-improved grassland (IG)				
Coniferous plantation (CP)			Tall herb/rank vegetation (TH)		✓	✓	
Scrub & shrubs (SH)	E	E	Rock, scree or sand dunes (RD)				
Orchard (OR)			Suburban/urban development (SU)				
Wetland (e.g. bog, marsh, fen) (WL)			Tilled land (TL)				
Moorland/heath (MH)			Irrigated land (IL)				
Artificial open water (AW)		E	Parkland or gardens (PG)				
			Not visible (NV)				
I BANK PROFILES Use 2 (present) or E (>33% banklength)							
Natural/unmodified	L	R	Artificial/modified	L	R		
Vertical/undercut 	E	E	Resectioned (reprofiled) 	E	E		
Vertical with toe 	✓		Reinforced - whole 	✓	✓		
Steep (>45°) 	E	E	Reinforced - top only 				
Gentle 			Reinforced - toe only 				
Composite 			Artificial two-stage 				
Natural berm 			Poached bank 				
			Embanked 				✓
			Set-back embankment 				
J EXTENT OF TREES AND ASSOCIATED FEATURES *record even if <1%							
TREES (tick one box per bank)				ASSOCIATED FEATURES (tick one box per feature)			
	Left	Right		None	Present	E (>33%)	
None	<input type="checkbox"/>	<input type="checkbox"/>	Shading of channel	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Isolated/scattered	<input type="checkbox"/>	<input type="checkbox"/>	*Overhanging boughs	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Regularly spaced, single	<input type="checkbox"/>	<input type="checkbox"/>	*Exposed bankside roots	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Occasional clumps	<input type="checkbox"/>	<input checked="" type="checkbox"/>	*Underwater tree roots	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Semi-continuous	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Fallen trees	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Continuous	<input type="checkbox"/>	<input type="checkbox"/>	Large woody debris	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
K EXTENT OF CHANNEL AND BANK FEATURES (tick one box for each feature) *record even if <1%							
	None	Present	E (>33%)	None	Present	E (>33%)	
*Free fall flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed bedrock	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chute flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Broken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated bedrock/boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unbroken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rippled flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*Upwelling	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Mature island(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smooth flow	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Unvegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No perceptible flow	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No flow (dry)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Unvegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marginal deadwater	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Vegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eroding cliff(s)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	*Unvegetated silt deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stable cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Discrete unvegetated sand deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				*Discrete unvegetated gravel deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 75: 020-RH1-076-001

LEFT BANK		CHANNEL		RIGHT BANK																																																	
Banktop height (m)	0.4	Bankfull width (m)	1	Banktop height (m)	0.4																																																
Is banktop height also bankfull height? (Y or N)	Y	Water width (m)	1	Is banktop height also bankfull height? (Y or N)	Y																																																
Embanked height (m)	/	Water depth (m)	0.05	Embanked height (m)	/																																																
If trashline lower than banktop, indicate: height above water (m) = / width from bank to bank (m) = /																																																					
Bed material at site is: consolidated <input type="checkbox"/> unconsolidated (loose) <input checked="" type="checkbox"/> unknown <input type="checkbox"/>																																																					
Location of measurements is: riffle <input type="checkbox"/> other <input checked="" type="checkbox"/> (state) <i>In most natural part running through woodland</i>																																																					
<table border="0"> <tr> <td>None</td><td><input checked="" type="checkbox"/></td> <td>Very large boulders (>1m)</td><td><input type="checkbox"/></td> <td>Backwater(s)</td><td><input type="checkbox"/></td> <td>Marsh(es)</td><td><input type="checkbox"/></td> </tr> <tr> <td>Braided channels</td><td><input type="checkbox"/></td> <td>*Debris dam(s)</td><td><input type="checkbox"/></td> <td>Floodplain boulder deposits</td><td><input type="checkbox"/></td> <td>Flush(es)</td><td><input type="checkbox"/></td> </tr> <tr> <td>Side channel(s)</td><td><input type="checkbox"/></td> <td>*Leafy debris</td><td><input type="checkbox"/></td> <td>Water meadow(s)</td><td><input type="checkbox"/></td> <td>Natural open water</td><td><input type="checkbox"/></td> </tr> <tr> <td>*Natural waterfall(s) > 5m high</td><td><input type="checkbox"/></td> <td>Fringing reed-bank(s)</td><td><input type="checkbox"/></td> <td>Fen(s)</td><td><input type="checkbox"/></td> <td>Others (state)</td><td><input type="checkbox"/></td> </tr> <tr> <td>*Natural waterfall(s) < 5m high</td><td><input type="checkbox"/></td> <td>Quaking bank(s)</td><td><input type="checkbox"/></td> <td>Bog(s)</td><td><input type="checkbox"/></td> <td></td><td></td> </tr> <tr> <td>Natural cascade(s)</td><td><input type="checkbox"/></td> <td>*Sink hole(s)</td><td><input type="checkbox"/></td> <td>Wet woodland(s)</td><td><input type="checkbox"/></td> <td></td><td></td> </tr> </table>						None	<input checked="" type="checkbox"/>	Very large boulders (>1m)	<input type="checkbox"/>	Backwater(s)	<input type="checkbox"/>	Marsh(es)	<input type="checkbox"/>	Braided channels	<input type="checkbox"/>	*Debris dam(s)	<input type="checkbox"/>	Floodplain boulder deposits	<input type="checkbox"/>	Flush(es)	<input type="checkbox"/>	Side channel(s)	<input type="checkbox"/>	*Leafy debris	<input type="checkbox"/>	Water meadow(s)	<input type="checkbox"/>	Natural open water	<input type="checkbox"/>	*Natural waterfall(s) > 5m high	<input type="checkbox"/>	Fringing reed-bank(s)	<input type="checkbox"/>	Fen(s)	<input type="checkbox"/>	Others (state)	<input type="checkbox"/>	*Natural waterfall(s) < 5m high	<input type="checkbox"/>	Quaking bank(s)	<input type="checkbox"/>	Bog(s)	<input type="checkbox"/>			Natural cascade(s)	<input type="checkbox"/>	*Sink hole(s)	<input type="checkbox"/>	Wet woodland(s)	<input type="checkbox"/>		
None	<input checked="" type="checkbox"/>	Very large boulders (>1m)	<input type="checkbox"/>	Backwater(s)	<input type="checkbox"/>	Marsh(es)	<input type="checkbox"/>																																														
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*Natural waterfall(s) > 5m high	<input type="checkbox"/>	Fringing reed-bank(s)	<input type="checkbox"/>	Fen(s)	<input type="checkbox"/>	Others (state)	<input type="checkbox"/>																																														
*Natural waterfall(s) < 5m high	<input type="checkbox"/>	Quaking bank(s)	<input type="checkbox"/>	Bog(s)	<input type="checkbox"/>																																																
Natural cascade(s)	<input type="checkbox"/>	*Sink hole(s)	<input type="checkbox"/>	Wet woodland(s)	<input type="checkbox"/>																																																
N CHOKED CHANNEL (tick one box)																																																					
Is 33% or more of the channel choked with vegetation? No <input type="checkbox"/> Yes <input checked="" type="checkbox"/>																																																					
O NOTABLE NUISANCE PLANT SPECIES (Use ✓ or E (≥ 33% length) *record even if <1%)																																																					
<table border="0"> <tr> <td>None</td><td><input checked="" type="checkbox"/></td> <td>bankface</td><td>banktop to 50m</td> <td>bankface</td><td>banktop to 50m</td> </tr> <tr> <td>*Giant hogweed</td><td><input type="checkbox"/></td> <td><input type="checkbox"/></td><td><input type="checkbox"/></td> <td>*Himalayan balsam</td><td><input type="checkbox"/></td> </tr> <tr> <td>*Japanese knotweed</td><td><input type="checkbox"/></td> <td><input type="checkbox"/></td><td><input type="checkbox"/></td> <td>*Other (state).....</td><td><input type="checkbox"/></td> </tr> </table>						None	<input checked="" type="checkbox"/>	bankface	banktop to 50m	bankface	banktop to 50m	*Giant hogweed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Himalayan balsam	<input type="checkbox"/>	*Japanese knotweed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Other (state).....	<input type="checkbox"/>																														
None	<input checked="" type="checkbox"/>	bankface	banktop to 50m	bankface	banktop to 50m																																																
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*Japanese knotweed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Other (state).....	<input type="checkbox"/>																																																
P OVERALL CHARACTERISTICS (Circle appropriate words, add others as necessary)																																																					
<p>Major impacts: <u>landfill</u> <u>tipping</u> <u>litter</u> <u>sewage</u> - pollution - drought - abstraction - mill - dam - road - <u>rail</u> - industry - housing - mining - quarrying - overdeepening - afforestation - fisheries management - silting - waterlogging - hydroelectric power</p> <p>Evidence of recent management: <u>gridding</u> - bank mowing - weed cutting - enhancement - river rehabilitation - gravel extraction - other (please specify)</p> <p>Animals: otter - mink - water vole - kingfisher - dipper - grey wagtail - sand martin - heron - dragonflies/damselflies <i>breed large - eared owl, screech, ch. owls.</i></p> <p>Other significant observations: if necessary use separate sheet to describe overall characteristics and relevant observations <i>H2O to cross stream/ditch at existing culverts under existing railway.</i></p>																																																					
Q ALDERS (tick one box in each of the two categories) *record even if <1%																																																					
<table border="0"> <tr> <td>*Alders? None</td><td><input checked="" type="checkbox"/></td> <td>Present</td><td><input type="checkbox"/></td> <td>Extensive</td><td><input type="checkbox"/></td> </tr> <tr> <td>*Diseased Alders? None</td><td><input checked="" type="checkbox"/></td> <td>Present</td><td><input type="checkbox"/></td> <td>Extensive</td><td><input type="checkbox"/></td> </tr> </table>						*Alders? None	<input checked="" type="checkbox"/>	Present	<input type="checkbox"/>	Extensive	<input type="checkbox"/>	*Diseased Alders? None	<input checked="" type="checkbox"/>	Present	<input type="checkbox"/>	Extensive	<input type="checkbox"/>																																				
*Alders? None	<input checked="" type="checkbox"/>	Present	<input type="checkbox"/>	Extensive	<input type="checkbox"/>																																																
*Diseased Alders? None	<input checked="" type="checkbox"/>	Present	<input type="checkbox"/>	Extensive	<input type="checkbox"/>																																																
R FIELD SURVEY QUALITY CONTROL (✓ boxes to confirm checks)																																																					
<p>Have you taken at least two photos that illustrate the general character of the site and additional photos of any weirs/ sluices and major/intermediate structures across the channel? <input checked="" type="checkbox"/></p> <p>Have you completed all ten spot-checks and made entries in all boxes in E & F on page 2? <input checked="" type="checkbox"/></p> <p>Have you completed column 11 of section G (and E if appropriate) on page 2? <input checked="" type="checkbox"/></p> <p>Have you recorded in section C the number of riffles, pools and point bars (even if 0) on page 1? <input checked="" type="checkbox"/></p> <p>Have you given an accurate (alphanumeric) grid reference for spot-checks 1, 6 and end of site (page 1)? <input type="checkbox"/></p> <p>Have you stated whether spot-check 1 is at the upstream or downstream end of the site (top of page 2)? <input checked="" type="checkbox"/></p> <p>Have you cross-checked your spot-check and sweep-up responses with the channel modification indicators given on page 2 of the spot-check key? <input checked="" type="checkbox"/></p>																																																					

020-RH1-076-002

Figure 76: 020-RH1-076-002

RIVER HABITAT SURVEY 2003 Version Page 1 of 4

A. SITE INFORMATION

Site Number: leave blank if new site

Site Reference: 020-RH1-076-002

Spot-check 1 Grid Ref: SP70191 22845

Spot-check 6 Grid Ref: SP70333 22658

End of site Grid Ref: SP70571 22413

Reach Reference: BM 222086, crossing #5.

River name: DAL.

Date: 22/05/2013 Time: 11:40

Surveyor name: Sarah Hodggets

Accredited Surveyor code: FA019

Is the site part of a river or an artificial channel? River Artificial

Are adverse conditions affecting survey? No Yes

If yes, state

Is bed of river visible? barely or not partially ±entirely

Is health and safety assessment form attached? Yes No

Number of photographs taken: 4 020-RH1-076-002 P1 220513,
020-RH1-076-002 P2 220513,
020-RH1-076-002 P3 220513,
020-RH1-076-002 P4 220513.

Photo references: 020-RH1-076-002 P3 220513,
020-RH1-076-002 P4 220513.

Site surveyed from: left bank right bank channel

When options shown with 'shadow boxes', tick one box only

LEFT banks determined by facing downstream **RIGHT**

B. PREDOMINANT VALLEY FORM (within the horizon limit) (tick one box only)

(tick one box only)

shallow vee concave/bowl

deep vee asymmetrical valley

gorge U-shape valley

no obvious valley sides

Distinct flat valley bottom? No Yes Natural terraces? No Yes

C. NUMBER OF RIFFLES, POOLS AND POINT BARS (enter total number in boxes)

Riffle(s) 0 Unvegetated point bar(s) 0

Pool(s) 0 Vegetated point bar(s) 0

D. ARTIFICIAL FEATURES (indicate total number of occurrences of each category within the 500m site)

If none, tick box <input type="checkbox"/>	Major			Intermediate			Minor			
	Major	Intermediate	Minor	Major	Intermediate	Minor	Major	Intermediate	Minor	
Weirs/sluiques							Outfalls/intakes			
Culverts							Fords			
Bridges							Deflectors/groynes/croys			
Other - state										

Is channel obviously realigned? No Yes, <33% of site ≥33% of site

Is channel obviously over-deepened? No Yes, <33% of site ≥33% of site

Is water impounded by weir/dam? No Yes, <33% of site ≥33% of site

Figure 77: 020-RH1-076-002

SITE REF. 020-RH1-076-002		RIVER HABITAT SURVEY: TEN SPOT-CHECKS										Page 2 of 4	
Spot-check 1 is at: upstream end <input checked="" type="checkbox"/>		downstream end <input type="checkbox"/>		of site (tick one box)									
E. PHYSICAL ATTRIBUTES (to be assessed across a 10m wide transect)													
When boxes 'bordered', only one entry allowed		1	2	3	4	5	6	7	8	9	10	GPS	
LEFT BANK		Ring EC or SC if composed of sandy substrate											
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM	RS	RS	RS	RS	RS	RS	RS	NO	NO	NO	NO	NO	
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
CHANNEL		GP: ring either C or P if predominant											
Channel substrate NV, BE, BO, CO, GP, SA, SI, CL, PE, EA, AR	SI	SI	EA	EA	NV	NV	SI	SI	SI	SI	SI	SI	
Flow-type NV, FF, CH, BW, UW, CF, RP, UP, SM, NP, DR	OR	OR	OR	OR	NV	NV	OR	OR	OR	OR	OR	OR	
Channel modification(s) NK, NO, CV, RS, RI, DA, FO	RS	RS	RS	RS	RS	RS	RS	NO	NO	NO	NO	NO	
Channel feature(s) NV, NO, EB, RO, VR, MB, VB, MI, TR	NO	NO	NO	NO	NV	NO	NO	NO	NO	NO	NO	NO	
For braided rivers only: number of sub-channels	/	/	/	/	/	/	/	/	/	/	/	/	
RIGHT BANK		Ring EC or SC if composed of sandy substrate											
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM	RS	RS	RS	RS	RS	RS	RS	NO	NO	NO	NO	NO	
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
F. BANKTOP LAND-USE AND VEGETATION STRUCTURE (to be assessed over a 10m wide transect)													
Land-use: choose one from BL, BP, CW, CP, SH, OR, WL, MH, AW, OW, RP, IG, TH, RD, SU, TL, IL, PG, NV													
LAND-USE WITHIN 5m OF LEFT BANKTOP	BL	BL	BL	BL	BL	SU	SU	SU	SU	SU	SU	SU	
LEFT BANKTOP (structure within 1m) B/U/S/C/NV	S	S	S	S	S	S	S	S	S	S	S	S	
LEFT BANK-FACE (structure) B/U/S/C/NV	S	S	S	S	S	S	S	S	S	S	S	S	
RIGHT BANK-FACE (structure) B/U/S/C/NV	S	S	S	S	S	S	S	S	S	S	S	S	
RIGHT BANKTOP (structure within 1m) B/U/S/C/NV	S	S	S	S	S	S	S	S	S	S	S	S	
LAND-USE WITHIN 5m OF RIGHT BANKTOP	SH	TH	TH	TH	BL	IG	IG	IG	IG	IG	IG	IG	
G. CHANNEL VEGETATION TYPES (to be assessed over a 10m wide transect; use E (> 33% area), ✓ (present) or NV (not visible))													
None (✓) or Not Visible (NV)					NV		✓	✓	✓	✓	✓	✓	
Liverworts/mosses/lichens													
Emergent broad-leaved herbs	E	✓		✓		E	✓					E	
Emergent reeds/sedges/rushes/grasses/horsetails						E						✓	
Floating-leaved (rooted)													
Free-floating													
Amphibious	E	E	E			✓						✓	
Submerged broad-leaved													
Submerged linear-leaved													
Submerged fine-leaved													
Filamentous algae													
Use end column for overall assessment over 500m, including types not occurring in spot-checks (use ✓, E or NV)													

↑ Enter channel substrate(s) not occurring as predominant in spot-checks but present in >1% of whole site.

Figure 78: 020-RH1-076-002

SITE REF. 020-RH1-076-002		RIVER HABITAT SURVEY : 500m SWEEP-UP				Page 3 of 4	
F LAND USE WITHIN 50m OF BANKTOP (tick one box per feature) *record even if < 33%							
	L	R		L	R		
Broadleaf/mixed woodland (semi-natural) (BL)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Natural open water (OW)				
Broadleaf/mixed plantation (BP)			Rough/unimproved grassland/pasture (RP)				
Coniferous woodland (semi-natural) (CW)			Improved/semi-improved grassland (IG)			<input checked="" type="checkbox"/>	
Coniferous plantation (CP)			Tall herb/rank vegetation (TH)				
Scrub & shrubs (SH)		<input checked="" type="checkbox"/>	Rock, scree or sand dunes (RD)				
Orchard (OR)			Suburban/urban development (SU)	<input checked="" type="checkbox"/>			
Wetland (e.g. bog, marsh, fen) (WL)			Tilled land (TL)				
Moorland/heath (MH)			Irrigated land (IL)				
Artificial open water (AW)			Parkland or gardens (PG)				
			Not visible (NV)				
G BANK PROFILES (tick one box per feature) *record even if < 33%							
Natural/unmodified		L	R	Artificial/modified		L	R
Vertical/undercut				Resectioned (reprofiled)		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Vertical with toe				Reinforced - whole			
Steep (>45°)		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Reinforced - top only			
Gentle		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Reinforced - toe only			
Composite				Artificial two-stage			
Natural berm				Poached bank			
				Embanked		<input checked="" type="checkbox"/>	
				Set-back embankment			
H EXTENT OF TREES AND ASSOCIATED FEATURES (tick one box per feature) *record even if < 33%							
TREES (tick one box per bank)				ASSOCIATED FEATURES (tick one box per feature)			
	Left	Right		None	Present	E (>33%)	
None	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Shading of channel	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Isolated/scattered	<input type="checkbox"/>	<input checked="" type="checkbox"/>	*Overhanging boughs	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Regularly spaced, single	<input type="checkbox"/>	<input type="checkbox"/>	*Exposed bankside roots	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Occasional clumps	<input type="checkbox"/>	<input type="checkbox"/>	*Underwater tree roots	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Semi-continuous	<input type="checkbox"/>	<input type="checkbox"/>	Fallen trees	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Continuous	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Large woody debris	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
I EXTENT OF CHANNEL AND BANK FEATURES (tick one box for each feature) *record even if < 33%							
	None	Present	E (>33%)	None	Present	E (>33%)	
*Free fall flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed bedrock	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chute flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Broken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated bedrock/boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unbroken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rippled flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*Upwelling	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Mature island(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smooth flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No perceptible flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No flow (dry)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Unvegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marginal deadwater	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eroding cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Unvegetated silt deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stable cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Discrete unvegetated sand deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				*Discrete unvegetated gravel deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 79: 020-RH1-076-002

SITE REF. 020 - RH1 - 076 - 002		RIVER HABITAT SURVEY : DIMENSIONS AND INFLUENCES		Page 4 of 4	
I. CHANNEL DIMENSIONS (to be measured at one location, on a straight, uniform section, preferably across a riffle)					
LEFT BANK		CHANNEL		RIGHT BANK	
Banktop height (m)	3	Bankfull width (m)	6	Banktop height (m)	3
Is banktop height also bankfull height? (Y or N)	N	Water width (m)	/	Is banktop height also bankfull height? (Y or N)	N
Embanked height (m)	/	Water depth (m)	0	Embanked height (m)	/
If trashline lower than banktop, indicate: height above water (m) = / width from bank to bank (m) = /					
Bed material at site is: consolidated <input checked="" type="checkbox"/> unconsolidated (loose) <input checked="" type="checkbox"/> unknown <input type="checkbox"/>					
Location of measurements is: riffle <input type="checkbox"/> other <input checked="" type="checkbox"/> (state) Middle					
None <input checked="" type="checkbox"/> Very large boulders (>1m) <input type="checkbox"/> Backwater(s) <input type="checkbox"/> Marsh(es) <input type="checkbox"/> Braided channels <input type="checkbox"/> *Debris dam(s) <input type="checkbox"/> Floodplain boulder deposits <input type="checkbox"/> Flush(es) <input type="checkbox"/> Side channel(s) <input type="checkbox"/> *Leafy debris <input type="checkbox"/> Water meadow(s) <input type="checkbox"/> Natural open water <input type="checkbox"/> *Natural waterfall(s) > 5m high <input type="checkbox"/> Fringing reed-bank(s) <input type="checkbox"/> Fen(s) <input type="checkbox"/> Others (state) <input type="checkbox"/> *Natural waterfall(s) < 5m high <input type="checkbox"/> Quaking bank(s) <input type="checkbox"/> Bog(s) <input type="checkbox"/> Natural cascade(s) <input type="checkbox"/> *Sink hole(s) <input type="checkbox"/> Wet woodland(s) <input type="checkbox"/>					
N. CHOKED CHANNEL (tick one box)					
Is 33% or more of the channel choked with vegetation? No <input type="checkbox"/> Yes <input checked="" type="checkbox"/>					
O. NOTABLE NUISANCE PLANT SPECIES (Use ✓ or E (≥ 33% length) *record even if < 1%)					
None <input checked="" type="checkbox"/> *Giant hogweed <input type="checkbox"/> bankface <input type="checkbox"/> banktop to 50m <input type="checkbox"/> *Himalayan balsam <input type="checkbox"/> bankface <input type="checkbox"/> banktop to 50m <input type="checkbox"/> *Japanese knotweed <input type="checkbox"/> bankface <input type="checkbox"/> banktop to 50m <input type="checkbox"/> *Other (state)..... <input type="checkbox"/> bankface <input type="checkbox"/> banktop to 50m <input type="checkbox"/>					
P. OVERALL CHARACTERISTICS (Circle appropriate words; add others as necessary)					
Major impacts: landfill - tipping - litter - sewage - pollution - drought - abstraction - mill - dam - road - <u>rail</u> - industry - housing - mining - quarrying - overdeepening - afforestation - fisheries management - silting - waterlogging - hydroelectric power Evidence of recent management: dredging - bank mowing - weed cutting - enhancement - river rehabilitation - gravel extraction - other (please specify) <i>daw worm 1 female 2 juvenile</i> Animals: otter - mink - water vole - kingfisher - dipper - grey wagtail - sand martin - heron - dragonflies/damselflies Other significant observations: if necessary use separate sheet to describe overall characteristics and relevant observations <i>Runs alongside existing railway</i>					
Q. ALDERS (tick one box in each of the two categories) *record even if < 1%					
*Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>			*Diseased Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>		
R. FIELD SURVEY QUALITY CONTROL (✓ boxes to confirm checks)					
Have you taken at least two photos that illustrate the general character of the site and additional photos of any weirs/ sluices and major/intermediate structures across the channel? <input checked="" type="checkbox"/>					
Have you completed all ten spot-checks and made entries in all boxes in E & F on page 2? <input checked="" type="checkbox"/>					
Have you completed column 11 of section G (and E if appropriate) on page 2? <input checked="" type="checkbox"/>					
Have you recorded in section C the number of riffles, pools and point bars (even if 0) on page 1? <input checked="" type="checkbox"/>					
Have you given an accurate (alphanumeric) grid reference for spot-checks 1, 6 and end of site (page 1)? <input checked="" type="checkbox"/>					
Have you stated whether spot-check 1 is at the upstream or downstream end of the site (top of page 2)? <input checked="" type="checkbox"/>					
Have you cross-checked your spot-check and sweep-up responses with the channel modification indicators given on page 2 of the spot-check key? <input checked="" type="checkbox"/>					

Padbury Brook (CFA 13)

020-RH1-081-001

Figure 80: 020-RH1-081-001

RIVER HABITAT SURVEY 2003 Version		Page 1 of 4																																					
A FIELD SURVEY DETAILS																																							
<p>Site Number: <input type="text" value="020-RH1-081-001"/> <small>leave blank if new site</small></p> <p>Site Reference: 020-RH1-081-001</p> <p>Spot-check 1 Grid Ref: SP66737 26615</p> <p>Spot-check 6 Grid Ref: SP66982 26671</p> <p>End of site Grid Ref: SP67185 26737</p> <p>Reach Reference:</p> <p>River name: Trib. of Padbury Brook</p> <p>Date: 8/5/2013 Time: 9:00</p> <p>Surveyor name: ZOE TRENT</p> <p>Accredited Surveyor code: LT061</p>	<p>Is the site part of a river or an artificial channel? River <input checked="" type="checkbox"/> Artificial <input type="checkbox"/></p> <p>Are adverse conditions affecting survey? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/></p> <p>If yes, state</p> <p>Is bed of river visible? barely or not <input type="checkbox"/> partially <input type="checkbox"/> ± entirely <input checked="" type="checkbox"/></p> <p>Is health and safety assessment form attached? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p> <p>Number of photographs taken: <input type="text" value="5"/></p> <p>Photo references: P1, P2, P3, P4, P5</p> <p>Site surveyed from: left bank <input checked="" type="checkbox"/> right bank <input type="checkbox"/> channel <input type="checkbox"/></p> <p><input type="checkbox"/> When options shown with 'shadow boxes', tick one box only</p> <p>LEFT banks determined by facing downstream RIGHT</p>																																						
B PREDOMINANT VALLEY FORM (within the horizon limit) (tick one box only)																																							
<p>(tick one box only)</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p><input type="checkbox"/> shallow vee</p> <p><input type="checkbox"/> deep vee</p> <p><input type="checkbox"/> gorge</p> </div> <div style="width: 45%;"> <p><input type="checkbox"/> concave/bowl</p> <p><input type="checkbox"/> asymmetrical valley</p> <p><input type="checkbox"/> U-shape valley</p> <p><input checked="" type="checkbox"/> no obvious valley sides</p> </div> </div> <p>Distinct flat valley bottom? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> Natural terraces? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/></p>																																							
C NUMBER OF RIFFLES, POOLS AND POINT BARS (enter total number in boxes)																																							
Riffle(s) <input type="text" value="0"/>	Unvegetated point bar(s) <input type="text" value="0"/>																																						
Pool(s) <input type="text" value="0"/>	Vegetated point bar(s) <input type="text" value="0"/>																																						
D ARTIFICIAL FEATURES (Indicate total number of occurrences of each category within the 500m site)																																							
If none, tick box <input type="checkbox"/>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>Major</th> <th>Intermediate</th> <th>Minor</th> </tr> </thead> <tbody> <tr> <td>Weirs/slucices</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Culverts</td> <td>1</td> <td></td> <td></td> </tr> <tr> <td>Bridges</td> <td></td> <td></td> <td>1</td> </tr> <tr> <td>Other - state</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		Major	Intermediate	Minor	Weirs/slucices				Culverts	1			Bridges			1	Other - state				<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>Major</th> <th>Intermediate</th> <th>Minor</th> </tr> </thead> <tbody> <tr> <td>Outfalls/intakes</td> <td></td> <td></td> <td>1</td> </tr> <tr> <td>Fords</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Deflectors/groynes/croys</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		Major	Intermediate	Minor	Outfalls/intakes			1	Fords				Deflectors/groynes/croys				
	Major	Intermediate	Minor																																				
Weirs/slucices																																							
Culverts	1																																						
Bridges			1																																				
Other - state																																							
	Major	Intermediate	Minor																																				
Outfalls/intakes			1																																				
Fords																																							
Deflectors/groynes/croys																																							
<p>Is channel obviously realigned? No <input type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input checked="" type="checkbox"/></p> <p>Is channel obviously over-deepened? No <input type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input checked="" type="checkbox"/></p> <p>Is water impounded by weir/dam? No <input checked="" type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input type="checkbox"/></p>																																							

Figure 81: 020-RH1-081-001

SITE REF. 020-RH1-081-001		RIVER HABITAT SURVEY: TEN SPOT-CHECKS										Page 2 of 4	
Spot-check 1 is at: upstream end <input checked="" type="checkbox"/>		downstream end <input type="checkbox"/>		of site (tick one box)									
E PHYSICAL ATTRIBUTES (to be assessed across channel within 10m wide transect)													
When boxes 'bordered', only one entry allowed		1 GPS	2	3	4	5	6 GPS	7	8	9	10	GPS	
LEFT BANK		Ring EC or SC if composed of sandy substrate											
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI		EA	CC	EA	EA	EA	EA	EA	EA	EA	EA	EA	
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM		NO	RS	NO	RS	RS	RS	RS	RS	RS	RS	RS	
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB		NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
CHANNEL		Channel either G or P if predominant											
Channel substrate NV, BE, BO, CO, GP, SA, SI, CL, PE, EA, AR		G	P	G	P	G	P	G	P	G	P	G	
Flow-type NV, FF, CH, BW, UW, CF, RP, UP, SM, NP, DR		NP	SM	SM	SM	NV	NP	SM	SM	SM	SM	SM	
Channel modification(s) NK, NO, CV, RS, RI, DA, FO		RS	CV	RS	NO	RS	RS	RS	RS	RS	RS	RS	
Channel feature(s) NV, NO, EB, RO, VR, MB, VB, MI, TR		NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
For braided rivers only: number of sub-channels		/	/	/	/	/	/	/	/	/	/	/	
RIGHT BANK		Ring EC or SC if composed of sandy substrate											
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI		EA	CC	EA	EA	EA	EA	EA	EA	EA	EA	EA	
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM		RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB		NO	NO	NO	SB	NV	NO	SB	NO	SB	NO	NO	
F BANKTOP LAND-USE AND VEGETATION STRUCTURE (to be assessed over a 10m wide transect)													
Land-use: choose one from BL, BP, CW, CP, SH, OR, WL, MH, AW, OW, RP, IG, TH, RD, SU, TL, IL, PG, NV													
LAND-USE WITHIN 5m OF LEFT BANKTOP		RP	RP	IG	IG	IG	IG	IG	IG	IG	IG	IG	
LEFT BANKTOP (structure within 1m) B/U/S/C/NV		S	S	S	S	S	S	S	S	S	S	S	
LEFT BANK-FACE (structure) B/U/S/C/NV		C	B	U	U	C	C	S	S	S	S	S	
RIGHT BANK-FACE (structure) B/U/S/C/NV		S	B	U	S	S	S	S	S	C	S	S	
RIGHT BANKTOP (structure within 1m) B/U/S/C/NV		B	S	U	S	S	S	S	S	B	B	B	
LAND-USE WITHIN 5m OF RIGHT BANKTOP		IG	IG	IG	IG	IG	IG	IG	RP	TL	TL	TL	
G CHANNEL VEGETATION TYPES (to be assessed over a 10m wide transect; use E (>30% area) or NV (not visible))													
None (✓) or Not Visible (NV)		✓	✓	✓			✓		✓			✓	
Liverworts/mosses/lichens						NV							
Emergent broad-leaved herbs						NV							
Emergent reeds/sedges/rushes/grasses/horsetails				✓		NV		✓				✓	
Floating-leaved (rooted)						NV							
Free-floating						NV			✓	✓		✓	
Amphibious				✓		NV						✓	
Submerged broad-leaved						NV							
Submerged linear-leaved						NV							
Submerged fine-leaved						NV							
Filamentous algae						NV							
Use end column for overall assessment over 500m, including types not occurring in spot-checks (use ✓, E or NV)													

↑ Enter channel substrate(s) not occurring as predominant in spot-checks but present in >1% of whole site.

Figure 82: 020-RH1-081-001

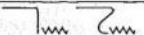

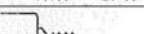
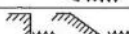
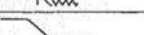
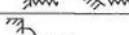
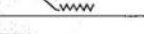
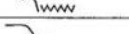
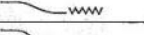
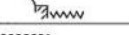

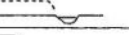
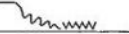

SITE REF: 020-RH1-081-001		RIVER HABITAT SURVEY : 500m SWEEP-UP				Page 3 of 4	
LAND USE WITHIN 50m OF BANKTOP (Use ✓ if present or E (≥33% bank length))							
	L	R		L	R		
Broadleaf/mixed woodland (semi-natural) (BL)			Natural open water (OW)				
Broadleaf/mixed plantation (BP)			Rough/unimproved grassland/pasture (RP)	✓	✓		
Coniferous woodland (semi-natural) (CW)			Improved/semi-improved grassland (IG)	E	E		
Coniferous plantation (CP)			Tall herb/rank vegetation (TH)				
Scrub & shrubs (SH)	✓	✓	Rock, scree or sand dunes (RD)				
Orchard (OR)			Suburban/urban development (SU)				
Wetland (e.g. bog, marsh, fen) (WL)			Tilled land (TL)			E	
Moorland/heath (MH)			Irrigated land (IL)				
Artificial open water (AW)			Parkland or gardens (PG)				
			Not visible (NV)				
BANK PROFILES (Use ✓ if present or E (≥33% bank length))							
Natural/unmodified	L	R	Artificial/modified	L	R		
Vertical/undercut 			Resectioned (reprofiled) 	E	E		
Vertical with toe 			Reinforced - whole 	✓	✓		Culvert + outlet on r/b.
Steep (>45°) 	✓		Reinforced - top only 				
Gentle 			Reinforced - toe only 				
Composite 			Artificial two-stage 				
Natural berm 			Poached bank 				
			Embanked 				
			Set-back embankment 				
EXTENT OF TREES AND ASSOCIATED FEATURES (record over 10m)							
TREES (tick one box per bank)				ASSOCIATED FEATURES (tick one box per feature)			
	Left	Right		None	Present	E (≥33%)	
None	<input type="checkbox"/>	<input type="checkbox"/>	Shading of channel	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Isolated/scattered	<input type="checkbox"/>	<input checked="" type="checkbox"/>	*Overhanging boughs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Regularly spaced, single	<input type="checkbox"/>	<input type="checkbox"/>	*Exposed bankside roots	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Occasional clumps	<input checked="" type="checkbox"/>	<input type="checkbox"/>	*Underwater tree roots	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Semi-continuous	<input type="checkbox"/>	<input type="checkbox"/>	Fallen trees	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Continuous	<input type="checkbox"/>	<input type="checkbox"/>	Large woody debris	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
EXTENT OF CHANNEL AND BANK FEATURES (tick one box per feature)							
	None	Present	E (≥33%)	None	Present	E (≥33%)	
*Free fall flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed bedrock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chute flow	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed boulders	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Broken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated bedrock/boulders	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unbroken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rippled flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated mid-channel bar(s)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*Upwelling	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Mature island(s)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smooth flow	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Unvegetated side bar(s)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
No perceptible flow	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Vegetated side bar(s)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No flow (dry)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated point bar(s)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marginal deadwater	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eroding cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Unvegetated silt deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stable cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Discrete unvegetated sand deposit(s)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				*Discrete unvegetated gravel deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 83: 020-RH1-081-001

SITE REF. <i>020-RH1-081-001</i>		RIVER HABITAT SURVEY : DIMENSIONS AND INFLUENCES		Page 4 of 4	
L CHANNEL DIMENSIONS (to be measured at one location on a straight uniform section, preferably across a riffle)					
LEFT BANK		CHANNEL		RIGHT BANK	
Banktop height (m)	<i>2</i>	Bankfull width (m)	<i>2.5</i>	Banktop height (m)	<i>2</i>
Is banktop height also bankfull height? (Y or N)	<i>N</i>	Water width (m)	<i>0.5</i>	Is banktop height also bankfull height? (Y or N)	<i>N</i>
Embanked height (m)	<i>0</i>	Water depth (m)	<i>0.2</i>	Embanked height (m)	<i>0</i>
If trashline lower than banktop, indicate: height above water (m) = <i>0.3</i> width from bank to bank (m) = <i>.2</i>					
Bed material at site is: consolidated <input type="checkbox"/> unconsolidated (loose) <input checked="" type="checkbox"/> unknown <input type="checkbox"/>					
Location of measurements is: riffle <input type="checkbox"/> other <input checked="" type="checkbox"/> (state) <i>between C10 + C11</i>					
M HABITAT HABITATS AND CHANNEL FEATURES (tick one box in each of the two categories) (record even if 0)					
None <input checked="" type="checkbox"/>	Very large boulders (>1m) <input type="checkbox"/>	Backwater(s) <input type="checkbox"/>	Marsh(es) <input type="checkbox"/>		
Braided channels <input type="checkbox"/>	*Debris dam(s) <input type="checkbox"/>	Floodplain boulder deposits <input type="checkbox"/>	Flush(es) <input type="checkbox"/>		
Side channel(s) <input type="checkbox"/>	*Leafy debris <input type="checkbox"/>	Water meadow(s) <input type="checkbox"/>	Natural open water <input type="checkbox"/>		
*Natural waterfall(s) > 5m high <input type="checkbox"/>	Fringing reed-bank(s) <input type="checkbox"/>	Fen(s) <input type="checkbox"/>	Others (state) <input type="checkbox"/>		
*Natural waterfall(s) < 5m high <input type="checkbox"/>	Quaking bank(s) <input type="checkbox"/>	Bog(s) <input type="checkbox"/>			
Natural cascade(s) <input type="checkbox"/>	*Sink hole(s) <input type="checkbox"/>	Wet woodland(s) <input type="checkbox"/>			
N CHOKED CHANNEL (tick one box)					
Is 33% or more of the channel choked with vegetation? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>					
O NOTABLE NUISANCE PLANT SPECIES Use ✓ or E (> 33% length) *record even if <1%					
bankface		banktop to 50m		bankface	
banktop to 50m		bankface		banktop to 50m	
None <input checked="" type="checkbox"/>	*Giant hogweed <input type="checkbox"/>	<input type="checkbox"/>	*Himalayan balsam <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	*Japanese knotweed <input type="checkbox"/>	<input type="checkbox"/>	*Other (state)..... <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
P OVERALL CHARACTERISTICS (Circle appropriate words, add others as necessary)					
Major impacts: landfill - tipping - litter - <u>sewage</u> - pollution - drought - abstraction - mill - dam - road - rail - industry - housing mining - quarrying - overdeepening - afforestation - fisheries management - silting - waterlogging - hydroelectric power					
Evidence of recent management: dredging - bank mowing - weed cutting - enhancement - river rehabilitation - gravel extraction - other (please specify)					
Animals: otter - mink - water vole - kingfisher - dipper - grey wagtail - sand martin - heron - dragonflies/damselflies					
Other significant observations: if necessary use separate sheet to describe overall characteristics and relevant observations <i>overdeepened straightened channel partly fed by sewage work</i>					
Q ALDERS (tick one box in each of the two categories) (record even if 0)					
*Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>			*Diseased Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>		
R FIELD SURVEY QUALITY CONTROL (✓ boxes to confirm checks)					
Have you taken at least two photos that illustrate the general character of the site and additional photos of any weirs/ sluices and major/intermediate structures across the channel? <input checked="" type="checkbox"/>					
Have you completed all ten spot-checks and made entries in all boxes in E & F on page 2? <input checked="" type="checkbox"/>					
Have you completed column 11 of section G (and E if appropriate) on page 2? <input checked="" type="checkbox"/>					
Have you recorded in section C the number of riffles, pools and point bars (even if 0) on page 1? <input checked="" type="checkbox"/>					
Have you given an accurate (alphanumeric) grid reference for spot-checks 1, 6 and end of site (page 1)? <input checked="" type="checkbox"/>					
Have you stated whether spot-check 1 is at the upstream or downstream end of the site (top of page 2)? <input checked="" type="checkbox"/>					
Have you cross-checked your spot-check and sweep-up responses with the channel modification indicators given on page 2 of the spot-check key? <input checked="" type="checkbox"/>					

overdeepened channel

020-RH1-082-001

Figure 84: 020-RH1-082-001

RIVER HABITAT SURVEY 2003 Version		Page 1 of 4				
A FIELD SURVEY DETAILS						
Site Number: <input type="text" value="leave blank if new site"/> Site Reference: 020-RH1-082-001 Spot-check 1 Grid Ref: SP67162 26882 Spot-check 6 Grid Ref: SP66989 27032 End of site Grid Ref: SP66823 27000 Reach Reference: River name: Padbury brook Date 8/5/2013 Time: 10:30 Surveyor name: ZOE TRENT Accredited Surveyor code: LT061	Is the site part of a river or an artificial channel? River <input checked="" type="checkbox"/> Artificial <input type="checkbox"/> Are adverse conditions affecting survey? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> If yes, state Is bed of river visible? barely or not <input type="checkbox"/> partially <input type="checkbox"/> ±entirely <input checked="" type="checkbox"/> Is health and safety assessment form attached? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Number of photographs taken: 3 Photo references: P1, P2, P3 Site surveyed from: left bank <input checked="" type="checkbox"/> right bank <input type="checkbox"/> channel <input type="checkbox"/>					
<input type="checkbox"/> When options shown with 'shadow boxes', tick one box only						
LEFT banks determined by facing downstream RIGHT						
B PREDOMINANT VALLEY FORM (within the horizon limit) (tick one box only)						
(tick one box only) <input type="checkbox"/> shallow vee <input type="checkbox"/> deep vee <input type="checkbox"/> gorge	<input type="checkbox"/> concave/bowl <input type="checkbox"/> asymmetrical valley <input type="checkbox"/> U-shape valley <input checked="" type="checkbox"/> no obvious valley sides					
Distinct flat valley bottom? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>		Natural terraces? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>				
C NUMBER OF RIFFLES, POOLS AND POINT BARS (enter total in the appropriate boxes)						
Riffle(s) <input type="text" value="0"/>	Unvegetated point bar(s) <input type="text" value="0"/>					
Pool(s) <input type="text" value="0"/>	Vegetated point bar(s) <input type="text" value="1"/>					
D ARTIFICIAL FEATURES (indicate total number of occurrences of each category within the 300m site)						
If none, tick box <input checked="" type="checkbox"/>	Major	Intermediate	Minor	Major	Intermediate	Minor
	Weirs/sluiques			Outfalls/intakes		
	Culverts			Fords		
	Bridges			Deflectors/groynes/croys		
	Other - state					
Is channel obviously realigned? No <input type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input checked="" type="checkbox"/>		Is channel obviously over-deepened? No <input checked="" type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input type="checkbox"/>		Is water impounded by weir/dam? No <input checked="" type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input type="checkbox"/>		

Figure 85: 020-RH1-082-001

SITE REF: 020-RH1-082-001	RIVER HABITAT SURVEY: TEN SPOT-CHECKS										Page 2 of 4
Spot-check 1 is at: upstream end <input checked="" type="checkbox"/> downstream end <input type="checkbox"/> of site (tick one box)											
E PHYSICAL ATTRIBUTES (to be assessed across channel within 1m wide transect)											
When boxes 'bordered', only one entry allowed	1 GPS	2	3	4	5	6 GPS	7	8	9	10	GPS
LEFT BANK	Ring EC or SC if composed of sandy substrate										
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM	EM	PC/EM	EM	EM	EM	NO	EM	NO	NO	NO	NO
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
CHANNEL	GP: ring either G or P if predominant										
Channel substrate NV, BE, BO, CO, GP, SA, SI, CL, PE, EA, AR	SI	SI	SI	SI	SI	SI	SI	SI	SI	SI	SI
Flow-type NV, FF, CH, BW, UW, CF, RP, UP, SM, NP, DR	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM
Channel modification(s) NK, NO, CV, RS, RI, DA, FO	RS	RS	RS	RS	RS	RS	RS	RS	NO	NO	NO
Channel feature(s) NV, NO, EB, RO, VR, MB, VB, MI, TR	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
For braided rivers only: number of sub-channels	/	/	/	/	/	/	/	/	/	/	/
RIGHT BANK	Ring EC or SC if composed of sandy substrate										
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM	RS	RS	RS	RS	NO	RS	RS	NO	NO	NO	NO
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	PB
F BANKTOP LAND-USE AND VEGETATION STRUCTURE (to be assessed over a 10m wide transect)											
Land-use: choose one from BL, BP, CW, CP, SH, OR, WL, MH, AW, OW, RP, IG, TH, RD, SU, TL, IL, PG, NV											
LAND-USE WITHIN 5m OF LEFT BANKTOP	TH	IG	IG	IG	IG	IG	IG	IG	IG	IG	IG
LEFT BANKTOP (structure within 1m) B/U/S/C/NV	S	S	S	S	S	S	S	S	S	S	S
LEFT BANK-FACE (structure) B/U/S/C/NV	S	S	S	S	S	S	S	S	S	S	S
RIGHT BANK-FACE (structure) B/U/S/C/NV	C	S	S	S	S	S	S	S	S	S	S
RIGHT BANKTOP (structure within 1m) B/U/S/C/NV	C	U	U	U	S	S	S	S	S	S	S
LAND-USE WITHIN 5m OF RIGHT BANKTOP	SH	IG	IG	IG	IG	IG	IG	IG	IG	IG	IG
G CHANNEL VEGETATION TYPES (to be assessed over a 10m wide bank or EC/SC 30% area) (✓ present or NV (not visible))											
None (✓) or Not Visible (NV)											
Liverworts/mosses/lichens											
Emergent broad-leaved herbs		✓	✓			✓	✓	✓			✓
Emergent reeds/sedges/rushes/grasses/horsetails	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Floating-leaved (rooted)		✓								✓	✓
Free-floating					✓						✓
Amphibious											✓
Submerged broad-leaved		✓				✓	✓				✓
Submerged linear-leaved											
Submerged fine-leaved											
Filamentous algae											
Use end column for overall assessment over 500m, including types not occurring in spot-checks (use ✓, E or NV) ————— ↑											

Enter channel substrate(s) not occurring as predominant in spot-checks but present in >1% of whole site.

Figure 86: 020-RH1-082-001

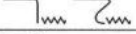
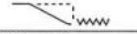
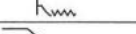

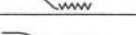
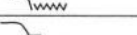
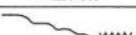
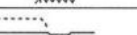





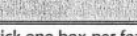
SITE REF. <i>020-RH1-082-001</i>		RIVER HABITAT SURVEY : 500m SWEEP-UP				Page 3 of 4	
H LAND-USE WITHIN 50m OF BANKTOP (Use <input checked="" type="checkbox"/> for present or E ($\geq 33\%$) banklength)							
	L	R		L	R		
Broadleaf/mixed woodland (semi-natural) (BL)			Natural open water (OW)				
Broadleaf/mixed plantation (BP)			Rough/unimproved grassland/pasture (RP)				
Coniferous woodland (semi-natural) (CW)			Improved/semi-improved grassland (IG)	E	E		
Coniferous plantation (CP)			Tall herb/rank vegetation (TH)	<input checked="" type="checkbox"/>			
Scrub & shrubs (SH)		<input checked="" type="checkbox"/>	Rock, scree or sand dunes (RD)				
Orchard (OR)			Suburban/urban development (SU)				
Wetland (e.g. bog, marsh, fen) (WL)			Tilled land (TL)				
Moorland/heath (MH)			Irrigated land (IL)				
Artificial open water (AW)			Parkland or gardens (PG)				
			Not visible (NV)				
I BANK PROFILES (Use <input checked="" type="checkbox"/> for present or E ($\geq 33\%$) banklength)							
Natural/unmodified	L	R	Artificial/modified	L	R		
Vertical/undercut 			Resectioned (reprofiled) 	E	E		
Vertical with toe 			Reinforced - whole 				
Steep (>45°) 			Reinforced - top only 				
Gentle 	<input checked="" type="checkbox"/>		Reinforced - toe only 				
Composite 			Artificial two-stage 				
Natural berm 			Poached bank 				
			Embanked 	E			
			Set-back embankment 				
K EXTENT OF TREES AND ASSOCIATED FEATURES (tick one box per bank/feature) (Record every 10m)							
TREES (tick one box per bank)				ASSOCIATED FEATURES (tick one box per feature)			
	Left	Right		None	Present	E ($\geq 33\%$)	
None	<input type="checkbox"/>	<input type="checkbox"/>	Shading of channel	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Isolated/scattered	<input checked="" type="checkbox"/>	<input type="checkbox"/>	*Overhanging boughs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Regularly spaced, single	<input type="checkbox"/>	<input type="checkbox"/>	*Exposed bankside roots	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Occasional clumps	<input type="checkbox"/>	<input checked="" type="checkbox"/>	*Underwater tree roots	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Semi-continuous	<input type="checkbox"/>	<input type="checkbox"/>	Fallen trees	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Continuous	<input type="checkbox"/>	<input type="checkbox"/>	Large woody debris	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
L EXTENT OF CHANNEL AND BANK FEATURES (tick one box for each feature) (Record every 10m)							
	None	Present	E ($\geq 33\%$)	None	Present	E ($\geq 33\%$)	
*Free fall flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed bedrock	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chute flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Broken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated bedrock/boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unbroken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rippled flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*Upwelling	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Mature island(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smooth flow	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Unvegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No perceptible flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No flow (dry)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marginal deadwater	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eroding cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Unvegetated silt deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stable cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Discrete unvegetated sand deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				*Discrete unvegetated gravel deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 87: 020-RH1-082-001

SITE REF. <i>020-RH1-082-001</i>		RIVER HABITAT SURVEY : DIMENSIONS AND INFLUENCES		Page 4 of 4	
E CHANNEL DIMENSIONS (to be measured at one location on a straight uniform section, preferably across a riffle)					
LEFT BANK		CHANNEL		RIGHT BANK	
Banktop height (m)	<i>0.50</i>	Bankfull width (m)	<i>5</i>	Banktop height (m)	<i>0.50</i>
Is banktop height also bankfull height? (Y or N)	<i>Y</i>	Water width (m)	<i>3.5</i>	Is banktop height also bankfull height? (Y or N)	<i>Y</i>
Embanked height (m)	<i>0.75</i>	Water depth (m)	<i>1.5</i>	Embanked height (m)	<i>0</i>
If trashline lower than banktop, indicate: height above water (m) = <i>/</i> width from bank to bank (m) = <i>/</i>					
Bed material at site is: consolidated <input type="checkbox"/> unconsolidated (loose) <input checked="" type="checkbox"/> unknown <input type="checkbox"/>					
Location of measurements is: riffle <input type="checkbox"/> other <input checked="" type="checkbox"/> (state) <i>btw s10 + 11</i>					
M FEATURES OF SPECIAL INTEREST (Use ✓ or E (> 33% length) *record even if <1%)					
None	<input checked="" type="checkbox"/>	Very large boulders (>1m)	<input type="checkbox"/>	Backwater(s)	<input type="checkbox"/>
Braided channels	<input type="checkbox"/>	*Debris dam(s)	<input type="checkbox"/>	Floodplain boulder deposits	<input type="checkbox"/>
Side channel(s)	<input type="checkbox"/>	*Leafy debris	<input type="checkbox"/>	Water meadow(s)	<input type="checkbox"/>
*Natural waterfall(s) > 5m high	<input type="checkbox"/>	Fringing reed-bank(s)	<input type="checkbox"/>	Fen(s)	<input type="checkbox"/>
*Natural waterfall(s) < 5m high	<input type="checkbox"/>	Quaking bank(s)	<input type="checkbox"/>	Bog(s)	<input type="checkbox"/>
Natural cascade(s)	<input type="checkbox"/>	*Sink hole(s)	<input type="checkbox"/>	Wet woodland(s)	<input type="checkbox"/>
				Marsh(es)	<input type="checkbox"/>
				Flush(es)	<input type="checkbox"/>
				Natural open water	<input type="checkbox"/>
				Others (state)	<input type="checkbox"/>
N CHOKED CHANNEL (tick one box)					
Is 33% or more of the channel choked with vegetation? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>					
O NOTABLE NUISANCE PLANT SPECIES (Use ✓ or E (> 33% length) *record even if <1%)					
None	<input checked="" type="checkbox"/>	bankface	banktop to 50m	bankface	banktop to 50m
*Giant hogweed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Himalayan balsam	<input type="checkbox"/>
*Japanese knotweed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Other (state).....	<input type="checkbox"/>
P OVERALL CHARACTERISTICS (Circle appropriate words, add others as necessary)					
Major impacts: landfill - tipping - litter - sewage - pollution - drought - abstraction - mill - dam - road - rail - industry - housing mining - quarrying - overdeepening - afforestation - fisheries management - silting - waterlogging - hydroelectric power					
Evidence of recent management: dredging - bank mowing - weed cutting - enhancement - river rehabilitation - gravel extraction - other (please specify)					
Animals: <u>otter</u> - mink - water vole - kingfisher - dipper - grey wagtail - sand martin - heron - dragonflies/damselflies					
Other significant observations: if necessary use separate sheet to describe overall characteristics and relevant observations <i>Pair swans - nest every year according to land owner</i>					
Q ALDERS (tick one box in each of the two categories) *record even if <1%					
*Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>			*Diseased Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>		
R FIELD SURVEY QUALITY CONTROL (✓ boxes to confirm checks)					
Have you taken at least two photos that illustrate the general character of the site and additional photos of any weirs/ sluices and major/intermediate structures across the channel? <input checked="" type="checkbox"/>					
Have you completed all ten spot-checks and made entries in all boxes in E & F on page 2? <input checked="" type="checkbox"/>					
Have you completed column 11 of section G (and E if appropriate) on page 2? <input checked="" type="checkbox"/>					
Have you recorded in section C the number of riffles, pools and point bars (even if 0) on page 1? <input checked="" type="checkbox"/>					
Have you given an accurate (alphanumeric) grid reference for spot-checks 1, 6 and end of site (page 1)? <input checked="" type="checkbox"/>					
Have you stated whether spot-check 1 is at the upstream or downstream end of the site (top of page 2)? <input checked="" type="checkbox"/>					
Have you cross-checked your spot-check and sweep-up responses with the channel modification indicators given on page 2 of the spot-check key? <input checked="" type="checkbox"/>					

020-RH1-082-002

Figure 88: 020-RH1-082-002

RIVER HABITAT SURVEY 2003 Version				Page 1 of 4																			
A FIELD SURVEY DETAILS																							
Site Number: <small>leave blank if new site</small> Site Reference: 020-RH1-082-002 Spot-check 1 Grid Ref: SP66282 27598 Spot-check 6 Grid Ref: SP66383 27303 End of site Grid Ref: SP66371 27091 Reach Reference: R26-1 River name: Don Date 28/5/2013 Time: 12:00 Surveyor name: Sarah Hodgetts Accredited Surveyor code: FA019		Is the site part of a river or an artificial channel? River <input checked="" type="checkbox"/> Artificial <input type="checkbox"/> Are adverse conditions affecting survey? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> If yes; state Is bed of river visible? barely or not <input type="checkbox"/> partially <input checked="" type="checkbox"/> ± entirely <input type="checkbox"/> Is health and safety assessment form attached? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Number of photographs taken: 5 <small>020-RH1-082-002 P1 280313, 020-RH1-082-002 P2 280313, 020-RH1-082-002 P3 280313, 020-RH1-082-002 P4 280313, 020-RH1-082-002 P5 280313</small> Photo references: Site surveyed from: left bank <input type="checkbox"/> right bank <input checked="" type="checkbox"/> channel <input type="checkbox"/>																					
<input type="checkbox"/> When options shown with 'shadow boxes', tick one box only																							
LEFT				RIGHT																			
B PREDOMINANT VALLEY FORM (within the horizon limit) (tick one box only)																							
(tick one box only) <table style="width:100%; border: none;"> <tr> <td style="text-align: center;"></td> <td style="text-align: center;"><input type="checkbox"/> shallow vee</td> <td style="text-align: center;"></td> <td style="text-align: center;"><input type="checkbox"/> concave/bowl</td> </tr> <tr> <td style="text-align: center;"></td> <td style="text-align: center;"><input type="checkbox"/> deep vee</td> <td style="text-align: center;"></td> <td style="text-align: center;"><input type="checkbox"/> asymmetrical valley</td> </tr> <tr> <td style="text-align: center;"></td> <td style="text-align: center;"><input type="checkbox"/> gorge</td> <td style="text-align: center;"></td> <td style="text-align: center;"><input type="checkbox"/> U-shape valley</td> </tr> <tr> <td colspan="2"></td> <td style="text-align: center;"></td> <td style="text-align: center;"><input checked="" type="checkbox"/> no obvious valley sides</td> </tr> </table>									<input type="checkbox"/> shallow vee		<input type="checkbox"/> concave/bowl		<input type="checkbox"/> deep vee		<input type="checkbox"/> asymmetrical valley		<input type="checkbox"/> gorge		<input type="checkbox"/> U-shape valley				<input checked="" type="checkbox"/> no obvious valley sides
	<input type="checkbox"/> shallow vee		<input type="checkbox"/> concave/bowl																				
	<input type="checkbox"/> deep vee		<input type="checkbox"/> asymmetrical valley																				
	<input type="checkbox"/> gorge		<input type="checkbox"/> U-shape valley																				
			<input checked="" type="checkbox"/> no obvious valley sides																				
Distinct flat valley bottom? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>				Natural terraces? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>																			
C NUMBER OF RIFFLES, POOLS AND POINT BARS (enter total number in boxes)																							
Riffle(s) 0		Unvegetated point bar(s) 0		Pool(s) 0		Vegetated point bar(s) 0																	
D ARTIFICIAL FEATURES (indicate total number of occurrences of each category within the 500m site)																							
If none, tick box <input type="checkbox"/>	Major	Intermediate	Minor	Major	Intermediate	Minor																	
	Weirs/sluiques			Outfalls/intakes																			
	Culverts			Fords																			
	Bridges			Deflectors/groynes/croys																			
	Other - state																						
Is channel obviously realigned? No <input type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input checked="" type="checkbox"/>		Is channel obviously over-deepened? No <input checked="" type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input checked="" type="checkbox"/>		Is water impounded by weir/dam? No <input checked="" type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input type="checkbox"/>																			

Figure 89: 020-RH1-082-002

SITE REF. 020-RH1-082-002		RIVER HABITAT SURVEY: TEN SPOT-CHECKS										Page 2 of 4
Spot-check 1 is at: upstream end <input checked="" type="checkbox"/> downstream end <input type="checkbox"/> of site (tick one box)												
E PHYSICAL ATTRIBUTES (to be assessed across channel within 1m wide transect)												
When boxes 'bordered', only one entry allowed		1 GPS	2	3	4	5	6 GPS	7	8	9	10	GPS
LEFT BANK		Ring EC or SC if composed of sandy substrate										
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI		EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM		RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB		NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
CHANNEL		GP: ring either C or P if predominant										
Channel substrate NV, BE, BO, CO, GP, SA, SI, CL, PE, EA, AR		SI	SI	SI	SI	SI	SI	SI	SI	SI	SI	SI
Flow-type NV, FF, CH, BW, UW, CF, RP, UP, SM, NP, DR		SM	SM	SM	SM	NV	JM	RP	RP	SM	SM	
Channel modification(s) NK, NO, CV, RS, RI, DA, FD		RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS
Channel feature(s) NV, NO, EB, RO, VR, MB, VB, MI, TR		NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
For braided rivers only: number of sub-channels												
RIGHT BANK		Ring EC or SC if composed of sandy substrate										
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI		EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM		RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB		NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
F BANKTOP LAND USE AND VEGETATION STRUCTURE (to be assessed over a 10m wide transect)												
Land-use: choose one from BL, BP, CW, CP, SH, OR, WL, MH, AW, OW, RP, IG, TH, RD, SU, TL, IL, PG, NV												
LAND-USE WITHIN 5m OF LEFT BANKTOP		IG	IG	IG	IG	IG	IG	IG	IG	IG	IG	IG
LEFT BANKTOP (structure within 1m) B/U/S/C/NV		U	U	U	U	U	B	S	S	S	S	S
LEFT BANK-FACE (structure) B/U/S/C/NV		S	S	S	S	S	S	S	S	S	S	S
RIGHT BANK-FACE (structure) B/U/S/C/NV		S	S	S	S	S	S	S	S	S	S	S
RIGHT BANKTOP (structure within 1m) B/U/S/C/NV		S	S	S	S	S	S	S	S	S	S	S
LAND-USE WITHIN 5m OF RIGHT BANKTOP		BL	BL	BL	BL	BL	TH	TH	TH	TH	TH	TH
G CHANNEL VEGETATION TYPES (to be assessed over a 10m wide transect; use E if > 33% area, ✓ (prevail) or NV (not visible))												
None (✓) or Not Visible (NV)				✓	✓	NV						
Liverworts/mosses/lichens												
Emergent broad-leaved herbs			✓					E	E	E	E	E
Emergent reeds/sedges/rushes/grasses/horsetails		✓								✓		✓
Floating-leaved (rooted)												
Free-floating												
Amphibious		✓	✓			✓	✓	✓	✓	✓	✓	✓
Submerged broad-leaved												
Submerged linear-leaved												
Submerged fine-leaved												
Filamentous algae												
Use end column for overall assessment over 500m, including types not occurring in spot-checks (use ✓, E or NV)												

↑ Enter channel substrate(s) not occurring as predominant in spot-checks but present in >1% of whole site.

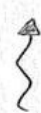


Figure 90: 020-RH1-082-002

SITE REF. <u>020-RH1-082-002</u>		RIVER HABITAT SURVEY : 500m SWEEP-UP				Page 3 of 4	
H LAND-USE WITHIN 50m OF BANKTOP Use ✓ (present) or E (≥ 33% banklength)							
	L	R		L	R		
Broadleaf/mixed woodland (semi-natural) (BL)		✓	Natural open water (OW)		✓		
Broadleaf/mixed plantation (BP)			Rough/unimproved grassland/pasture (RP)	E			
Coniferous woodland (semi-natural) (CW)			Improved/semi-improved grassland (IG)		✓		
Coniferous plantation (CP)			Tall herb/rank vegetation (TH)	E	E		
Scrub & shrubs (SH)	E	E	Rock, scree or sand dunes (RD)				
Orchard (OR)			Suburban/urban development (SU)				
Wetland (e.g. bog, marsh, fen) (WL)			Tilled land (TL)	E	E		
Moorland/heath (MH)			Irrigated land (IL)				
Artificial open water (AW)			Parkland or gardens (PG)				
			Not visible (NV)				
I BANK PROFILES Use ✓ (present) or E (≥ 33% banklength)							
Natural/unmodified		L	R	Artificial/modified		L	R
Vertical/undercut				Resectioned (reprofiled)		E	E
Vertical with toe				Reinforced - whole			
Steep (>45°)		E	E	Reinforced - top only			
Gentle				Reinforced - toe only			
Composite				Artificial two-stage			
Natural berm				Poached bank			
				Embanked			
				Set-back embankment			
J EXTENT OF TREES AND ASSOCIATED FEATURES *record even if <1%							
TREES (tick one box per bank)				ASSOCIATED FEATURES (tick one box per feature)			
	Left	Right		None	Present	E (≥33%)	
None	<input type="checkbox"/>	<input type="checkbox"/>		Shading of channel	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Isolated/scattered	<input type="checkbox"/>	<input type="checkbox"/>		*Overhanging boughs	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Regularly spaced, single	<input type="checkbox"/>	<input type="checkbox"/>		*Exposed bankside roots	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Occasional clumps	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		*Underwater tree roots	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Semi-continuous	<input type="checkbox"/>	<input type="checkbox"/>		Fallen trees	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Continuous	<input type="checkbox"/>	<input type="checkbox"/>		Large woody debris	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
K EXTENT OF CHANNEL AND BANK FEATURES (tick one box for each feature) *record even if <1%							
	None	Present	E (≥33%)	None	Present	E (≥33%)	
*Free fall flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed bedrock	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chute flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Broken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated bedrock/boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unbroken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rippled flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*Upwelling	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Mature island(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smooth flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Unvegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No perceptible flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No flow (dry)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marginal deadwater	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eroding cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Unvegetated silt deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stable cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Discrete unvegetated sand deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				*Discrete unvegetated gravel deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 91: 020-RH1-082-002

SITE REF. 020-RH1-082-002		RIVER HABITAT SURVEY : DIMENSIONS AND INFLUENCES		Page 4 of 4	
L CHANNEL DIMENSIONS (to be measured at one location on a straight uniform section, preferably across a riffle)					
LEFT BANK		CHANNEL		RIGHT BANK	
Banktop height (m)	1.50	Bankfull width (m)	3	Banktop height (m)	1.5
Is banktop height also bankfull height? (Y or N)	No	Water width (m)	0.4	Is banktop height also bankfull height? (Y or N)	No
Embanked height (m)	/	Water depth (m)	0.5	Embanked height (m)	/
If trashline lower than banktop, indicate: height above water (m) = / width from bank to bank (m) = /					
Bed material at site is: consolidated <input type="checkbox"/> unconsolidated (loose) <input checked="" type="checkbox"/> unknown <input type="checkbox"/>					
Location of measurements is: riffle <input type="checkbox"/> other <input checked="" type="checkbox"/> (state)					
M FEATURES OF SPECIAL INTEREST (Use Y or E (> 33% length) *record even if <1%)					
None <input type="checkbox"/>	Very large boulders (>1m) <input type="checkbox"/>	Backwater(s) <input type="checkbox"/>	Marsh(es) <input type="checkbox"/>		
Braided channels <input type="checkbox"/>	*Debris dam(s) <input type="checkbox"/>	Floodplain boulder deposits <input type="checkbox"/>	Flush(es) <input type="checkbox"/>		
Side channel(s) <input type="checkbox"/>	*Leafy debris <input type="checkbox"/>	Water meadow(s) <input type="checkbox"/>	Natural open water <input checked="" type="checkbox"/>		
*Natural waterfall(s) > 5m high <input type="checkbox"/>	Fringing reed-bank(s) <input type="checkbox"/>	Fen(s) <input type="checkbox"/>	Others (state) <input type="checkbox"/>		
*Natural waterfall(s) < 5m high <input type="checkbox"/>	Quaking bank(s) <input type="checkbox"/>	Bog(s) <input type="checkbox"/>			
Natural cascade(s) <input type="checkbox"/>	*Sink hole(s) <input type="checkbox"/>	Wet woodland(s) <input type="checkbox"/>			
N CHOKED CHANNEL (tick one box)					
Is 33% or more of the channel choked with vegetation? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>					
O NOTABLE NUISANCE PLANT SPECIES (Use Y or E (> 33% length) *record even if <1%)					
None <input checked="" type="checkbox"/>	*Giant hogweed <input type="checkbox"/>	bankface <input type="checkbox"/>	banktop to 50m <input type="checkbox"/>	*Himalayan balsam <input type="checkbox"/>	bankface <input type="checkbox"/>
	*Japanese knotweed <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Other (state)..... <input type="checkbox"/>	<input type="checkbox"/>
P OVERALL CHARACTERISTICS (Circle appropriate words, add others as necessary)					
Major impacts: landfill - tipping - litter - sewage - pollution - drought - abstraction - mill - dam - road - rail - industry - housing mining - quarrying - overdeepening - afforestation - fisheries management - silting - waterlogging - hydroelectric power					
Evidence of recent management: dredging - bank mowing - weed cutting - enhancement - river rehabilitation - gravel extraction - other (please specify)					
Animals: otter - mink - water vole - kingfisher - dipper - grey wagtail - sand martin - heron - dragonflies/damselflies					
Other significant observations: if necessary use separate sheet to describe overall characteristics and relevant observations					
Q ALDERS (tick one box in each of the two categories) *record even if <1%					
*Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>			*Diseased Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>		
R FIELD SURVEY QUALITY CONTROL (✓ boxes to confirm checks)					
Have you taken at least two photos that illustrate the general character of the site and additional photos of any weirs/ sluices and major/intermediate structures across the channel? <input checked="" type="checkbox"/>					
Have you completed all ten spot-checks and made entries in all boxes in E & F on page 2? <input checked="" type="checkbox"/>					
Have you completed column 11 of section G (and E if appropriate) on page 2? <input checked="" type="checkbox"/>					
Have you recorded in section C the number of riffles, pools and point bars (even if 0) on page 1? <input checked="" type="checkbox"/>					
Have you given an accurate (alphanumeric) grid reference for spot-checks 1, 6 and end of site (page 1)? <input checked="" type="checkbox"/>					
Have you stated whether spot-check 1 is at the upstream or downstream end of the site (top of page 2)? <input checked="" type="checkbox"/>					
Have you cross-checked your spot-check and sweep-up responses with the channel modification indicators given on page 2 of the spot-check key? <input checked="" type="checkbox"/>					

020-RH1-084-001

Figure 92: 020-RH1-084-001

RIVER HABITAT SURVEY 2003 Version				Page 1 of 4																									
A FIELD SURVEY DETAILS																													
Site Number: Site Reference: 020-RH1-084-001 Spot-check 1 Grid Ref: SP65053 27987 Spot-check 6 Grid Ref: SP64942 27817 End of site Grid Ref: SP64786 27707 Reach Reference: Crossing Sla River name: Padbury Brood. Date: 3/6/2013 Time: 14:00 Surveyor name: Sarah Hodgkiss Accredited Surveyor code: EA019	Is the site part of a river or an artificial channel? River <input checked="" type="checkbox"/> Artificial <input type="checkbox"/> Are adverse conditions affecting survey? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> If yes, state Is bed of river visible? barely or not <input type="checkbox"/> partially <input type="checkbox"/> ±entirely <input checked="" type="checkbox"/> Is health and safety assessment form attached? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Number of photographs taken: 11 Photo references: 020-RH1-084-001 P1 030613, 020-RH1-084-001 P2 030613, 020-RH1-084-001 P3 030613, 020-RH1-084-001 P4 030613, 020-RH1-084-001 P5 030613, 020-RH1-084-001 P6 030613 Site surveyed from: left bank <input checked="" type="checkbox"/> right bank <input type="checkbox"/> channel <input type="checkbox"/>																												
<input type="checkbox"/> When options shown with 'shadow boxes', tick one box only																													
LEFT			RIGHT																										
B PREDOMINANT VALLEY FORM (within the horizon limit) (tick one box only)																													
(tick one box only) <table style="width:100%; border: none;"> <tr> <td style="text-align: center;"></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: left;">shallow vee</td> <td style="text-align: center;"></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td style="text-align: left;">concave/bowl</td> </tr> <tr> <td style="text-align: center;"></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: left;">deep vee</td> <td style="text-align: center;"></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: left;">asymmetrical valley</td> </tr> <tr> <td style="text-align: center;"></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: left;">gorge</td> <td style="text-align: center;"></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: left;">U-shape valley</td> </tr> <tr> <td colspan="3"></td> <td style="text-align: center;"></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: left;">no obvious valley sides</td> </tr> </table>							<input type="checkbox"/>	shallow vee		<input checked="" type="checkbox"/>	concave/bowl		<input type="checkbox"/>	deep vee		<input type="checkbox"/>	asymmetrical valley		<input type="checkbox"/>	gorge		<input type="checkbox"/>	U-shape valley					<input type="checkbox"/>	no obvious valley sides
	<input type="checkbox"/>	shallow vee		<input checked="" type="checkbox"/>	concave/bowl																								
	<input type="checkbox"/>	deep vee		<input type="checkbox"/>	asymmetrical valley																								
	<input type="checkbox"/>	gorge		<input type="checkbox"/>	U-shape valley																								
				<input type="checkbox"/>	no obvious valley sides																								
Distinct flat valley bottom? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>			Natural terraces? No <input type="checkbox"/> Yes <input type="checkbox"/>																										
C NUMBER OF RIFFLES, POOLS AND POINT BARS (enter total number in boxes)																													
Riffle(s) 0		Unvegetated point bar(s) 0																											
Pool(s) 2		Vegetated point bar(s) 1																											
D ARTIFICIAL FEATURES (indicate total number of occurrences of each category within the 500m site)																													
If none, tick box <input type="checkbox"/>	Major	Intermediate	Minor	Major	Intermediate	Minor																							
	Weirs/sluices	1		Outfalls/intakes																									
	Culverts			Fords																									
	Bridges			Deflectors/groynes/croys																									
	Other - state																												
Is channel obviously realigned? No <input checked="" type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input type="checkbox"/> Is channel obviously over-deepened? No <input checked="" type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input checked="" type="checkbox"/> Is water impounded by weir/dam? No <input checked="" type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input type="checkbox"/>																													

001 out to 5' per available details

* 020-RH1-084-001 P7 030613, 020-RH1-084-001 P8 030613,
 020-RH1-084-001 P9 030613, 020-RH1-084-001 P10 030613,
 020-RH1-084-001 P11 030613,

Figure 93: 020-RH1-084-001

SITE REF.	RIVER HABITAT SURVEY: TEN SPOT-CHECKS										Page 2 of 4
Spot-check 1 is at: upstream end <input checked="" type="checkbox"/>	downstream end <input type="checkbox"/>	of site (tick one box)									
E PHYSICAL ATTRIBUTES (to be assessed across channel within 1m wide transect)											
When boxes 'bordered', only one entry allowed	1 GPS	2	3	4	5	6 GPS	7	8	9	10	GPS
LEFT BANK	Ring EC or SC if composed of sandy substrate										
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB	NO	NO	VP	NO	NO	NO	NO	NB	NO	NO	NO
CHANNEL	GP - ring either G or P if predominant										
Channel substrate NV, BE, BO, CO, GP, SA, SI, CL, PE, EA, AR	NV	NV	SI	SI	NV	NV	GP	GP	SI	SI	BO
Flow-type NV, FF, CH, BW, UW, CF, RP, UP, SM, NP, DR	RP	RP	SM	SM	SM	SM	RP	RP	SM	SM	SM
Channel modification(s) NK, NO, CV, RS, RI, DA, FO	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS
Channel feature(s) NV, NO, EB, RO, VR, MB, VB, MI, TR	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
For braided rivers only: number of sub-channels											
RIGHT BANK	Ring EC or SC if composed of sandy substrate										
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB	NO	NO	NO	NO	NO	NO	NB	NO	NO	NO	NO
F BANKTOP LAND-USE AND VEGETATION STRUCTURE (to be assessed over a 10m wide transect)											
Land-use: choose one from BL, BP, CW, CP, SH, OR, WL, MH, AW, OW, RP, IG, TH, RD, SU, TL, IL, PG, NV											
LAND-USE WITHIN 5m OF LEFT BANKTOP	SH	TH	TH	TH	TH	TH	TH	TH	TH	TH	TH
LEFT BANKTOP (structure within 1m) B/U/S/C/NV	S	S	S	S	S	S	S	S	S	S	S
LEFT BANK-FACE (structure) B/U/S/C/NV	S	S	S	S	S	S	B	S	S	S	S
RIGHT BANK-FACE (structure) B/U/S/C/NV	S	S	S	S	S	S	S	S	S	S	S
RIGHT BANKTOP (structure within 1m) B/U/S/C/NV	S	S	S	S	S	S	S	S	S	S	S
LAND-USE WITHIN 5m OF RIGHT BANKTOP	TH	TH	TH	TH	TH	SH	TH	TH	TH	TH	TH
G CHANNEL VEGETATION TYPES (to be assessed over a 10m wide transect: use E (≥ 33% area), ✓ (present) or NV (not visible))											
None (✓) or Not Visible (NV)											
Liverworts/mosses/lichens								✓			✓
Emergent broad-leaved herbs		✓	✓	✓	✓	✓		✓	✓	✓	✓
Emergent reeds/sedges/rushes/grasses/horsetails	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
Floating-leaved (rooted)											
Free-floating											
Amphibious											
Submerged broad-leaved											
Submerged linear-leaved		✓	✓			✓	✓	✓	✓	✓	✓
Submerged fine-leaved											
Filamentous algae											
Use end column for overall assessment over 500m, including types not occurring in spot-checks (use ✓, E or NV)											

↑ Enter channel substrate(s) not occurring as predominant in spot-checks but present in >1% of whole site.

Figure 94: 020-RH1-084-001

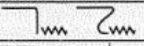
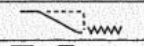
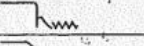

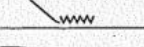

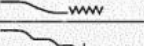
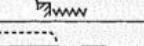

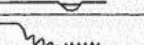
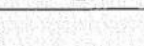

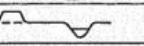

SITE REF.		RIVER HABITAT SURVEY : 500m SWEEP-UP				Page 3 of 4	
H LAND-USE WITHIN 50m OF BANKTOP Use ✓ (present) or E (≥33% banklength)							
	L	R		L	R		
Broadleaf/mixed woodland (semi-natural) (BL)	✓		Natural open water (OW)				
Broadleaf/mixed plantation (BP)			Rough/unimproved grassland/pasture (RP)				
Coniferous woodland (semi-natural) (CW)			Improved/semi-improved grassland (IG)				
Coniferous plantation (CP)			Tall herb/rank vegetation (TH)	E	E		
Scrub & shrubs (SH)	✓	✓	Rock, scree or sand dunes (RD)				
Orchard (OR)			Suburban/urban development (SU)	✓	✓		
Wetland (e.g. bog, marsh, fen) (WL)			Tilled land (TL)	E	E		
Moorland/heath (MH)			Irrigated land (IL)				
Artificial open water (AW)			Parkland or gardens (PG)				
			Not visible (NV)				
I BANK PROFILES Use ✓ (present) or E (≥33% banklength)							
Natural/unmodified	L	R	Artificial/modified	L	R		
Vertical/undercut 	✓	✓	Resectioned (reprofiled) 	E	E		
Vertical with toe 	✓	✓	Reinforced - whole 				
Steep (>45°) 	E	E	Reinforced - top only 				
Gentle 			Reinforced - toe only 				
Composite 			Artificial two-stage 				
Natural berm 	✓	✓	Poached bank 				
			Embanked 				
			Set-back embankment 				
J EXTENT OF TREES AND ASSOCIATED FEATURES *record even if <1%							
TREES (tick one box per bank)				ASSOCIATED FEATURES (tick one box per feature)			
	Left	Right		None	Present	E (≥33%)	
None	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Shading of channel	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Isolated/scattered	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	*Overhanging boughs	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Regularly spaced, single	<input type="checkbox"/>	<input type="checkbox"/>	*Exposed bankside roots	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Occasional clumps	<input type="checkbox"/>	<input type="checkbox"/>	*Underwater tree roots	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Semi-continuous	<input type="checkbox"/>	<input type="checkbox"/>	Fallen trees	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Continuous	<input type="checkbox"/>	<input type="checkbox"/>	Large woody debris	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
K EXTENT OF CHANNEL AND BANK FEATURES (tick one box for each feature) *record even if <1%							
	None	Present	E (≥33%)	None	Present	E (≥33%)	
*Free fall flow	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Exposed bedrock	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chute flow	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Exposed boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Broken standing waves	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Vegetated bedrock/boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unbroken standing waves	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Unvegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rippled flow	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Vegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*Upwelling	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Mature island(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smooth flow	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Unvegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No perceptible flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No flow (dry)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marginal deadwater	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Vegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eroding cliff(s)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	*Unvegetated silt deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stable cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Discrete unvegetated sand deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				*Discrete unvegetated gravel deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 95: 020-RH1-084-001

SITE REF.		RIVER HABITAT SURVEY: DIMENSIONS AND INFLUENCES				Page 4 of 4
L CHANNEL DIMENSIONS (to be measured at one location on a straight uniform section, preferably across a riffle)						
LEFT BANK		CHANNEL		RIGHT BANK		
Banktop height (m)	2	Bankfull width (m)	10	Banktop height (m)	2	
Is banktop height also bankfull height? (Y or N)	N	Water width (m)	8	Is banktop height also bankfull height? (Y or N)	N	
Embanked height (m)	/	Water depth (m)	1.5+	Embanked height (m)	/	
If trashline lower than banktop, indicate: height above water (m) = / width from bank to bank (m) = /						
Bed material at site is: consolidated <input type="checkbox"/> unconsolidated (loose) <input checked="" type="checkbox"/> unknown <input type="checkbox"/>						
Location of measurements is: riffle <input type="checkbox"/> other <input checked="" type="checkbox"/> (state) <u>WATER SPATCHADO</u>						
M FEATURES OF SPECIAL INTEREST (Use Y or E (> 33% length) *record even if < 1%)						
None <input checked="" type="checkbox"/>	Very large boulders (>1m) <input type="checkbox"/>	Backwater(s) <input type="checkbox"/>	Marsh(es) <input type="checkbox"/>			
Braided channels <input type="checkbox"/>	*Debris dam(s) <input type="checkbox"/>	Floodplain boulder deposits <input type="checkbox"/>	Flush(es) <input type="checkbox"/>			
Side channel(s) <input type="checkbox"/>	*Leafy debris <input type="checkbox"/>	Water meadow(s) <input type="checkbox"/>	Natural open water <input type="checkbox"/>			
*Natural waterfall(s) > 5m high <input type="checkbox"/>	Fringing reed-bank(s) <input type="checkbox"/>	Fen(s) <input type="checkbox"/>	Others (state) <input type="checkbox"/>			
*Natural waterfall(s) < 5m high <input type="checkbox"/>	Quaking bank(s) <input type="checkbox"/>	Bog(s) <input type="checkbox"/>				
Natural cascade(s) <input type="checkbox"/>	*Sink hole(s) <input type="checkbox"/>	Wet woodland(s) <input type="checkbox"/>				
N CHOKED CHANNEL (tick one box)						
Is 33% or more of the channel choked with vegetation? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>						
O NOTABLE NUISANCE PLANT SPECIES (Use Y or E (> 33% length) *record even if < 1%)						
None <input checked="" type="checkbox"/>	bankface <input type="checkbox"/>	banktop to 50m <input type="checkbox"/>	bankface <input type="checkbox"/>	banktop to 50m <input type="checkbox"/>		
*Giant hogweed <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Himalayan balsam <input type="checkbox"/>	<input type="checkbox"/>		
*Japanese knotweed <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Other (state)..... <input type="checkbox"/>	<input type="checkbox"/>		
P OVERALL CHARACTERISTICS (Circle appropriate words, add others as necessary)						
Major impacts: landfill - tipping - litter - sewage - pollution - drought - abstraction - mill - dam - road - <u>rail</u> - industry - housing - mining - quarrying - overdeepening - afforestation - fisheries management - silting - waterlogging - hydroelectric power Evidence of recent management: dredging - bank mowing - weed cutting - enhancement - <u>river rehabilitation</u> - gravel extraction - other (please specify) <u>P. potential w/ exposed dregs - bars</u> Animals: otter - mink - <u>water vole</u> - <u>kingfisher</u> - dipper - grey wagtail - sand martin - heron - dragonflies/damselflies Other significant observations: if necessary use separate sheet to describe overall characteristics and relevant observations <u>Previously notified river - it has been over-deepened, but not straightened (it has meanders) - shows signs of recovery + naturalization</u>						
Q ALDERS (tick one box in each of the two categories) *record even if < 1%						
*Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>		*Diseased Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>				
R FIELD SURVEY QUALITY CONTROL (✓ boxes to confirm checks)						
Have you taken at least two photos that illustrate the general character of the site and additional photos of any weirs/ sluices and major/intermediate structures across the channel? <input checked="" type="checkbox"/>						
Have you completed all ten spot-checks and made entries in all boxes in E & F on page 2? <input checked="" type="checkbox"/>						
Have you completed column 11 of section G (and E if appropriate) on page 2? <input checked="" type="checkbox"/>						
Have you recorded in section C the number of riffles, pools and point bars (even if 0) on page 1? <input checked="" type="checkbox"/>						
Have you given an accurate (alphanumeric) grid reference for spot-checks 1, 6 and end of site (page 1)? <input checked="" type="checkbox"/>						
Have you stated whether spot-check 1 is at the upstream or downstream end of the site (top of page 2)? <input checked="" type="checkbox"/>						
Have you cross-checked your spot-check and sweep-up responses with the channel modification indicators given on page 2 of the spot-check key? <input checked="" type="checkbox"/>						

* recovery bars + minor weir may have been introduced to help adversely flow regime. Railway bridge + road weirs both encourage pools + erosion downstream.

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Figure 96: 020-RH1-087-001

RIVER HABITAT SURVEY 2003 Version Page 1 of 4

A FIELD SURVEY DETAILS

Site Number: leave blank if new site

Site Reference: 020-RH1-087-001

Spot-check 1 Grid Ref: SP63239 30367

Spot-check 6 Grid Ref: SP63074 30147

End of site Grid Ref: SP62926 29893

Reach Reference: BM167813, crossing SA.

River name: BM167813 crossing SA

Date: 19/5/2013 Time: 10.30

Surveyor name: Sarah Hodgetts

Accredited Surveyor code: FA0191

Is the site part of a river or an artificial channel? River Artificial

Are adverse conditions affecting survey? No Yes

If yes, state

Is bed of river visible? barely or not partially ± entirely

Is health and safety assessment form attached? Yes No

Number of photographs taken: 4 020-RH1-087-001 P1 290513,
020-RH1-087-001 P2 290513,
020-RH1-087-001 P3 290512,
020-RH1-087-001 P4 290513,
020-RH1-087-001 P5 290513.

Photo references: ~~020-RH1-087-001 P5 290513.~~

Site surveyed from: left bank right bank channel

When options shown with 'shadow boxes', tick one box only

LEFT banks determined by facing downstream **RIGHT**

B PREDOMINANT VALLEY FORM (within the horizon limit) (tick one box only)

(tick one box only)

shallow vee concave/bowl

deep vee asymmetrical valley

gorge U-shape valley

no obvious valley sides

Distinct flat valley bottom? No Yes Natural terraces? No Yes

C NUMBER OF RIFFLES, POOLS AND POINT BARS (enter total number in boxes)

Riffle(s) 0 Unvegetated point bar(s) 0

Pool(s) 0 Vegetated point bar(s) 0

D ARTIFICIAL FEATURES (indicate total number of occurrences of each category within the 500m site)

if none, tick box	Major			Intermediate			Minor		
	Major	Intermediate	Minor	Major	Intermediate	Minor	Major	Intermediate	Minor
<input type="checkbox"/> Weirs/sluices		1							
<input type="checkbox"/> Culverts									
<input type="checkbox"/> Bridges			1						
<input type="checkbox"/> Other - state									

Outfalls/intakes

Fords

Deflectors/groynes/croys

Is channel obviously realigned? No Yes, <33% of site ≥33% of site

Is channel obviously over-deepened? No Yes, <33% of site ≥33% of site

Is water impounded by weir/dam? No Yes, <33% of site ≥33% of site

Road, stone, water - going through.

Figure 97: 020-RH1-087-001

SITE REF. 020-RH1-087-001		RIVER HABITAT SURVEY: TEN SPOT-CHECKS										Page 2 of 4
Spot-check 1 is at: upstream end <input checked="" type="checkbox"/> downstream end <input type="checkbox"/> of site (tick one box)												
E PHYSICAL ATTRIBUTES (to be assessed across channel within 1m wide transect)												
When boxes 'bordered', only one entry allowed		1 GPS	2	3	4	5	6 GPS	7	8	9	10	GPS
LEFT BANK		Ring EC or SC if composed of sandy substrate										
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI		EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM		RS	NK	NK	RS	RS	RS	RS	RS	RS	RS	RS
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB		NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
CHANNEL		GP - ring either G or P if predominant										
Channel substrate NV, BE, BO, CO, GP, SA, SI, CL, PE, EA, AR		SI	SI	SI	SI	SI	SI	SI	SI	SI	SI	SI
Flow-type NV, FF, CH, BW, UW, CF, RP, UP, SM, NP, DR		SM	SM	SM	RP	SM	SM	SM	SM	SM	SM	SM
Channel modification(s) NK, NO, CV, RS, RI, DA, FO		RS	NK	NK	RS	RS	RS	RS	NO	RS	RS	RS
Channel feature(s) NV, NO, EB, RO, VR, MB, VB, MI, TR		NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
For braided rivers only: number of sub-channels												
RIGHT BANK		Ring EC or SC if composed of sandy substrate										
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI		EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM		RS	NK	NK	RS	RS	RS	RS	NO	RS	RS	RS
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB		NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
F BANKTOP LAND USE AND VEGETATION STRUCTURE (to be assessed over a 10m wide transect)												
Land-use: choose one from BL, BP, CW, CP, SH, OR, WL, MH, AW, OW, RP, IG, TH, RD, SU, TL, IL, PG, NV												
LAND-USE WITHIN 5m OF LEFT BANKTOP		OR	OW	IG	IG	IG	IG	IG	IG	TL	TL	TL
LEFT BANKTOP (structure within 1m) B/U/S/C/NV		S	S	S	S	S	S	S	S	S	S	S
LEFT BANK-FACE (structure) B/U/S/C/NV		S	S	S	S	S	S	S	S	S	S	S
RIGHT BANK-FACE (structure) B/U/S/C/NV		S	S	S	S	S	S	S	S	S	S	S
RIGHT BANKTOP (structure within 1m) B/U/S/C/NV		S	S	S	S	S	S	S	S	S	S	S
LAND-USE WITHIN 5m OF RIGHT BANKTOP		IG	IG	IG	BP	BP	BL	IG	IG	IG	IG	IG
G CHANNEL VEGETATION TYPES (to be assessed over a 10m wide transect - use E (> 33m area) ✓ (present) or NV (not visible))												
None (✓) or Not Visible (NV)		✓	NV		NV	✓	✓		✓	✓		
Liverworts/mosses/lichens												
Emergent broad-leaved herbs								✓				
Emergent reeds/sedges/rushes/grasses/horsetails				✓								✓
Floating-leaved (rooted)												
Free-floating												
Amphibious		✓										✓
Submerged broad-leaved												
Submerged linear-leaved												
Submerged fine-leaved												
Filamentous algae												
Use end column for overall assessment over 500m, including types not occurring in spot-checks (use ✓, E or NV) →												

↑ Enter channel substrate(s) not occurring as predominant in spot-checks but present in > 1% of whole site.

Figure g8: 020-RH1-087-001

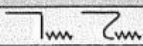
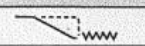
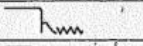

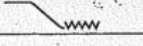
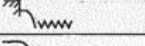
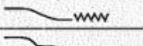
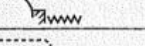
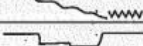
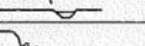

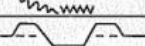

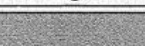
SITE REF. 020-RH1-087-001		RIVER HABITAT SURVEY : 500m SWEEP-UP				Page 3 of 4	
H LAND-USE WITHIN 50m OF BANKTOP Use ✓ (present) or E (≥ 33% banklength)							
	L	R		L	R		
Broadleaf/mixed woodland (semi-natural) (BL)		✓	Natural open water (OW)	✓	✓		
Broadleaf/mixed plantation (BP)		✓	Rough/unimproved grassland/pasture (RP)				
Coniferous woodland (semi-natural) (CW)			Improved/semi-improved grassland (IG)	E	E		
Coniferous plantation (CP)			Tall herb/rank vegetation (TH)	✓	E		
Scrub & shrubs (SH)	✓	✓	Rock, scree or sand dunes (RD)				
Orchard (OR)			Suburban/urban development (SU)				
Wetland (e.g. bog, marsh, fen) (WL)			Tilled land (TL)	✓			
Moorland/heath (MH)			Irrigated land (IL)				
Artificial open water (AW)			Parkland or gardens (PG)				
			Not visible (NV)				
I BANK PROFILES Use ✓ (present) or E (≥ 33% banklength)							
Natural/unmodified	L	R	Artificial/modified	L	R		
Vertical/undercut 	E	E	Resectioned (reprofiled) 	E	E		
Vertical with toe 			Reinforced - whole 				
Steep (>45°) 	E	E	Reinforced - top only 				
Gentle 		✓	Reinforced - toe only 	✓			
Composite 			Artificial two-stage 				
Natural berm 			Poached bank 				
			Embanked 				
			Set-back embankment 				
J EXTENT OF TREES AND ASSOCIATED FEATURES *record even if <1%							
TREES (tick one box per bank)				ASSOCIATED FEATURES (tick one box per feature)			
	Left	Right		None	Present	E (≥33%)	
None	<input type="checkbox"/>	<input type="checkbox"/>	Shading of channel	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Isolated/scattered	<input type="checkbox"/>	<input type="checkbox"/>	*Overhanging boughs	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Regularly spaced, single	<input type="checkbox"/>	<input checked="" type="checkbox"/>	*Exposed bankside roots	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Occasional clumps	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	*Underwater tree roots	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Semi-continuous	<input type="checkbox"/>	<input type="checkbox"/>	Fallen trees	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Continuous	<input type="checkbox"/>	<input type="checkbox"/>	Large woody debris	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
K EXTENT OF CHANNEL AND BANK FEATURES (tick one box for each feature) *record even if <1%							
	None	Present	E (≥33%)	None	Present	E (≥33%)	
*Free fall flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed bedrock	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chute flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Broken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated bedrock/boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unbroken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rippled flow	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Vegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*Upwelling	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Mature island(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smooth flow	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Unvegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No perceptible flow	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Vegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No flow (dry)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marginal deadwater	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eroding cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Unvegetated silt deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stable cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Discrete unvegetated sand deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				*Discrete unvegetated gravel deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 99: 020-RH1-087-001

SITE REF: 020-RH1-087-001		RIVER HABITAT SURVEY: DIMENSIONS AND INFLUENCES				Page 4 of 4
L CHANNEL DIMENSIONS (to be measured at one location on a straight uniform section, preferably across a riffle)						
LEFT BANK		CHANNEL		RIGHT BANK		
Banktop height (m)	1.5	Bankfull width (m)	4.5	Banktop height (m)	1.5	
Is banktop height also bankfull height? (Y or N)	N	Water width (m)	1.5	Is banktop height also bankfull height? (Y or N)	N	
Embanked height (m)	/	Water depth (m)	0.4	Embanked height (m)	/	
If trashline lower than banktop, indicate: height above water (m) = 0.7 width from bank to bank (m) = 1.5						
Bed material at site is: consolidated <input type="checkbox"/> unconsolidated (loose) <input checked="" type="checkbox"/> unknown <input type="checkbox"/>						
Location of measurements is: riffle <input type="checkbox"/> other <input checked="" type="checkbox"/> (state)						
M FEATURES OF SPECIAL INTEREST Use ✓ or E (> 33% length) *record even if <1%						
None <input type="checkbox"/>	Very large boulders (>1m) <input type="checkbox"/>	Backwater(s) <input type="checkbox"/>	Marsh(es) <input type="checkbox"/>			
Braided channels <input type="checkbox"/>	*Debris dam(s) <input type="checkbox"/>	Floodplain boulder deposits <input type="checkbox"/>	Flush(es) <input type="checkbox"/>			
Side channel(s) <input type="checkbox"/>	*Leafy debris <input type="checkbox"/>	Water meadow(s) <input type="checkbox"/>	Natural open water <input checked="" type="checkbox"/>			
*Natural waterfall(s) > 5m high <input type="checkbox"/>	Fringing reed-bank(s) <input type="checkbox"/>	Fen(s) <input type="checkbox"/>	Others (state) <input type="checkbox"/>			
*Natural waterfall(s) < 5m high <input type="checkbox"/>	Quaking bank(s) <input type="checkbox"/>	Bog(s) <input type="checkbox"/>				
Natural cascade(s) <input type="checkbox"/>	*Sink hole(s) <input type="checkbox"/>	Wet woodland(s) <input type="checkbox"/>				
N CHOKED CHANNEL (tick one box)						
Is 33% or more of the channel choked with vegetation? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>						
O NOTABLE NUISANCE PLANT SPECIES Use ✓ or E (> 33% length) *record even if <1%						
None <input checked="" type="checkbox"/>	bankface	banktop to 50m	bankface	banktop to 50m		
*Giant hogweed <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Himalayan balsam <input type="checkbox"/>	<input type="checkbox"/>		
*Japanese knotweed <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Other (state)..... <input type="checkbox"/>	<input type="checkbox"/>		
P OVERALL CHARACTERISTICS (Circle appropriate words, add others as necessary)						
Major impacts: landfill - tipping - litter - sewage - pollution - drought - abstraction - mill - dam - road - rail - industry - housing mining - quarrying - overdeepening - afforestation - fisheries management - silting - waterlogging - hydroelectric power						
Evidence of recent management: dredging - bank mowing - weed cutting - enhancement - river rehabilitation - gravel extraction - other (please specify) <i>Over-deepened in the past. V. uniform shape</i>						
Animals: otter - mink - water vole - kingfisher - dipper - grey wagtail - sand martin - heron - dragonflies/damselflies						
Other significant observations: if necessary use separate sheet to describe overall characteristics and relevant observations						
Q ALDERS (tick one box in each of the two categories) *record even if <1%						
*Alders? None <input type="checkbox"/> Present <input checked="" type="checkbox"/> Extensive <input type="checkbox"/>		*Diseased Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>				
R FIELD SURVEY QUALITY CONTROL (✓ boxes to confirm checks)						
Have you taken at least two photos that illustrate the general character of the site and additional photos of any weirs/ sluices and major/intermediate structures across the channel? <input checked="" type="checkbox"/>						
Have you completed all ten spot-checks and made entries in all boxes in E & F on page 27? <input checked="" type="checkbox"/>						
Have you completed column 11 of section G (and E if appropriate) on page 27? <input checked="" type="checkbox"/>						
Have you recorded in section C the number of riffles, pools and point bars (even if 0) on page 17? <input checked="" type="checkbox"/>						
Have you given an accurate (alphanumeric) grid reference for spot-checks 1, 6 and end of site (page 1)? <input checked="" type="checkbox"/>						
Have you stated whether spot-check 1 is at the upstream or downstream end of the site (top of page 2)? <input checked="" type="checkbox"/>						
Have you cross-checked your spot-check and sweep-up responses with the channel modification indicators given on page 2 of the spot-check key? <input checked="" type="checkbox"/>						

Great Ouse (CFA 14)

020-RH1-091-001

Figure 100: 020-RH1-091-001

RIVER HABITAT SURVEY 2003 Version				Page 1 of 4																			
A FIELD SURVEY DETAILS																							
Site Number: leave blank if new site Site Reference: 020-RH1-091-001 Spot-check 1 Grid Ref: SP61388 34396 Spot-check 6 Grid Ref: SP61579 34437 End of site Grid Ref: SP61819 34519 Reach Reference: ON109572 Crossing 67. River name: Drain. Date: 29/5/2013 Time: 1.30pm Surveyor name: Sarah Hodggett Accredited Surveyor code: FA019		Is the site part of a river or an artificial channel? River <input checked="" type="checkbox"/> Artificial <input type="checkbox"/> Are adverse conditions affecting survey? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> If yes, state Is bed of river visible? barely or not <input type="checkbox"/> partially <input type="checkbox"/> ± entirely <input checked="" type="checkbox"/> Is health and safety assessment form attached? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Number of photographs taken: 8 Photo references: 020-RH1-091-001 P1 290513, 020-RH1-091-001 P2 290513, 020-RH1-091-001 P4 290513, 020-RH1-091-001 P5 290513, 020-RH1-091-001 P6 290513, Site surveyed from: left bank <input type="checkbox"/> right bank <input checked="" type="checkbox"/> channel <input checked="" type="checkbox"/>																					
<input type="checkbox"/> When options shown with 'shadow boxes', tick one box only																							
LEFT				RIGHT																			
B PREDOMINANT VALLEY FORM (within the horizon limit) (tick one box only)																							
(tick one box only) <table style="width:100%; border: none;"> <tr> <td style="text-align: center;"></td> <td style="text-align: center;"><input type="checkbox"/> shallow vee</td> <td style="text-align: center;"></td> <td style="text-align: center;"><input checked="" type="checkbox"/> concave/bowl</td> </tr> <tr> <td style="text-align: center;"></td> <td style="text-align: center;"><input type="checkbox"/> deep vee</td> <td style="text-align: center;"></td> <td style="text-align: center;"><input type="checkbox"/> asymmetrical valley</td> </tr> <tr> <td style="text-align: center;"></td> <td style="text-align: center;"><input type="checkbox"/> gorge</td> <td style="text-align: center;"></td> <td style="text-align: center;"><input type="checkbox"/> U-shape valley</td> </tr> <tr> <td colspan="2"></td> <td style="text-align: center;"></td> <td style="text-align: center;"><input type="checkbox"/> no obvious valley sides</td> </tr> </table>									<input type="checkbox"/> shallow vee		<input checked="" type="checkbox"/> concave/bowl		<input type="checkbox"/> deep vee		<input type="checkbox"/> asymmetrical valley		<input type="checkbox"/> gorge		<input type="checkbox"/> U-shape valley				<input type="checkbox"/> no obvious valley sides
	<input type="checkbox"/> shallow vee		<input checked="" type="checkbox"/> concave/bowl																				
	<input type="checkbox"/> deep vee		<input type="checkbox"/> asymmetrical valley																				
	<input type="checkbox"/> gorge		<input type="checkbox"/> U-shape valley																				
			<input type="checkbox"/> no obvious valley sides																				
Distinct flat valley bottom? No <input type="checkbox"/> Yes <input checked="" type="checkbox"/>				Natural terraces? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>																			
C NUMBER OF RIFFLES, POOLS AND POINT BARS (enter total number in boxes)																							
Riffle(s) 0		Unvegetated point bar(s) 0		Pool(s) 0		Vegetated point bar(s) 0																	
D ARTIFICIAL FEATURES (indicate total number of occurrences of each category within the 500m site)																							
If none, tick box <input type="checkbox"/>	Major	Intermediate	Minor	Major	Intermediate	Minor																	
	Weirs/sluices			Outfalls/intakes																			
	Culverts	11	(xw6)	Fords																			
	Bridges			Deflectors/groynes/croys																			
	Other - state																						
Is channel obviously realigned? No <input type="checkbox"/> Yes, <33% of site <input checked="" type="checkbox"/> ≥33% of site <input checked="" type="checkbox"/> Is channel obviously over-deepened? No <input type="checkbox"/> Yes, <33% of site <input checked="" type="checkbox"/> ≥33% of site <input type="checkbox"/> Is water impounded by weir/dam? No <input checked="" type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input type="checkbox"/>																							

* 020-RH1-091-001 P7 290513, 020-RH1-091-001 P8 290513

Figure 101: 020-RH1-091-001

RIVER HABITAT SURVEY: TEN SPOT-CHECKS											Page 2 of 4														
Spot-check 1 is at: upstream end <input checked="" type="checkbox"/> downstream end <input type="checkbox"/> of site (tick one box)																									
E PHYSICAL ATTRIBUTES (to be assessed across channel within 1m wide transect)																									
When boxes 'bordered', only one entry allowed											1 GPS	2	3	4	5	6 GPS	7	8	9	10	GPS				
LEFT BANK											Ring EC or SC if composed of sandy substrate														
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI											NV	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM											RI	NO	NO	NO	NO	NO	RS	RS	NO	NO					
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB											NV	NO	NO	NO	NO	NO	NO	NO	NO	NO					
CHANNEL											GP - ring either G or P if predominant														
Channel substrate NV, BE, BO, CO, GP, SA, SI, CL, PE, EA, AR											NV	SI	SI	SI	SI	SI	SI	SI	SI	SI	SI	SI	SI	SI	SI
Flow-type NV, FF, CH, BW, UW, CF, RP, UP, SM, NP, DR											NV	SM	NP	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR
Channel modification(s) NK, NO, CV, RS, RI, DA, FO											CV	NO	NO	NO	NO	NO	RS	RS	RS	NO					
Channel feature(s) NV, NO, EB, RO, VR, MB, VB, MI, TR											NV	VB	NO	NO	NO	NO	NO	NO	NO	NO					
For braided rivers only: number of sub-channels																									
RIGHT BANK											Ring EC or SC if composed of sandy substrate														
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI											NV	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM											RS	NO	NO	NO	NO	NO	RS	RS	RS	RS					
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB											NV	NO	NO	NO	NO	NO	NO	NO	NO	NO					
F BANKTOP LAND-USE AND VEGETATION STRUCTURE (to be assessed over a 10m wide transect)																									
Land-use: choose one from BL, BP, CW, CP, SH, OR, WL, MH, AW, OW, RP, IG, TH, RD, SU, TL, IL, PG, NV																									
LAND-USE WITHIN 5m OF LEFT BANKTOP											BL	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL				
LEFT BANKTOP (structure within 1m) B/U/S/C/NV											NV	S	S	S	S	S	S	S	S	S	S				
LEFT BANK-FACE (structure) B/U/S/C/NV											NV	S	S	S	S	S	S	S	S	S	S				
RIGHT BANK-FACE (structure) B/U/S/C/NV											NV	S	S	S	S	S	S	S	S	S	S				
RIGHT BANKTOP (structure within 1m) B/U/S/C/NV											NV	S	S	S	S	S	S	S	S	S	S				
LAND-USE WITHIN 5m OF RIGHT BANKTOP											BL	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL				
G CHANNEL VEGETATION TYPES (to be assessed over a 10m wide transect; use E if > 25% area, ✓ (presence) or NV (not visible))																									
None (✓) or Not Visible (NV)											NV		✓		✓	✓	✓	✓	✓	✓	✓				
Liverworts/mosses/lichens																									
Emergent broad-leaved herbs												✓													
Emergent reeds/sedges/rushes/grasses/horsetails												E													
Floating-leaved (rooted)																									
Free-floating																									
Amphibious													✓	✓											
Submerged broad-leaved																									
Submerged linear-leaved																									
Submerged fine-leaved																									
Filamentous algae																									
Use end column for overall assessment over 500m, including types not occurring in spot-checks (use ✓, E or NV)																									

↑ Enter channel substrate(s) not occurring as predominant in spot-checks but present in >1% of whole site.

Figure 102: 020-RH1-091-001

SITE REF. 020-RH1-091-001		RIVER HABITAT SURVEY > 500m SWEEP-UP				Page 3 of 4	
H LAND-USE WITHIN 50m OF BANKTOP Use ✓ (present) or E (>33% banklength)							
	L	R		L	R		
Broadleaf/mixed woodland (semi-natural) (BL)	E	E	Natural open water (OW)				✓
Broadleaf/mixed plantation (BP)			Rough/unimproved grassland/pasture (RP)				
Coniferous woodland (semi-natural) (CW)			Improved/semi-improved grassland (IG)				
Coniferous plantation (CP)			Tall herb/rank vegetation (TH)				
Scrub & shrubs (SH)			Rock, scree or sand dunes (RD)				
Orchard (OR)			Suburban/urban development (SU)				
Wetland (e.g. bog, marsh, fen) (WL)			Tilled land (TL)				
Moorland/heath (MH)			Irrigated land (IL)				
Artificial open water (AW)			Parkland or gardens (PG)				
			Not visible (NV)				
I BANK PROFILES Use ✓ (present) or E (>33% banklength)							
Natural/unmodified		L	R	Artificial/modified		L	R
Vertical/undercut				Resectioned (reprofiled)		✓	✓
Vertical with toe				Reinforced - whole		✓	✓
Steep (>45°)		✓	✓	Reinforced - top only			
Gentle		E	E	Reinforced - toe only			
Composite		✓	✓	Artificial two-stage			
Natural berm				Poached bank			
				Embanked		✓	
				Set-back embankment			
J EXTENT OF TREES AND ASSOCIATED FEATURES *record even if <1%							
TREES (tick one box per bank)				ASSOCIATED FEATURES (tick one box per feature)			
	Left	Right		None	Present	E (>33%)	
None	<input type="checkbox"/>	<input type="checkbox"/>	Shading of channel	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Isolated/scattered	<input type="checkbox"/>	<input type="checkbox"/>	*Overhanging boughs	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Regularly spaced, single	<input type="checkbox"/>	<input type="checkbox"/>	*Exposed bankside roots	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Occasional clumps	<input type="checkbox"/>	<input type="checkbox"/>	*Underwater tree roots	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Semi-continuous	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Fallen trees	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Continuous	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Large woody debris	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
K EXTENT OF CHANNEL AND BANK FEATURES (tick one box for each feature) *record even if <1%							
	None	Present	E (>33%)	None	Present	E (>33%)	
*Free fall flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed bedrock	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chute flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Broken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated bedrock/boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unbroken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rippled flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*Upwelling	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Mature island(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smooth flow	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Unvegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No perceptible flow	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Vegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No flow (dry)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Unvegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marginal deadwater	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eroding cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Unvegetated silt deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stable cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Discrete unvegetated sand deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				*Discrete unvegetated gravel deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 103: 020-RH1-091-001

SITE REF. <u>020-RH1-091-001</u>		RIVER HABITAT SURVEY : DIMENSIONS AND INFLUENCES		Page 4 of 4	
L CHANNEL DIMENSIONS (to be measured at one location on a straight uniform section, preferably across a riffle)					
LEFT BANK		CHANNEL		RIGHT BANK	
Banktop height (m)	0.4	Bankfull width (m)	0.5	Banktop height (m)	0.4
Is banktop height also bankfull height? (Y or N)	Y	Water width (m)	0.5	Is banktop height also bankfull height? (Y or N)	Y
Embanked height (m)	/	Water depth (m)	0.05	Embanked height (m)	/
If trashline lower than banktop, indicate: height above water (m) = / width from bank to bank (m) = /					
Bed material at site is: consolidated <input type="checkbox"/> unconsolidated (loose) <input checked="" type="checkbox"/> unknown <input type="checkbox"/>					
Location of measurements is: riffle <input type="checkbox"/> other <input checked="" type="checkbox"/> (state)					
M FEATURES OF SPECIAL INTEREST Use / or E (> 33% length) *record even if < 1%					
None <input type="checkbox"/>	Very large boulders (>1m) <input type="checkbox"/>	Backwater(s) <input type="checkbox"/>	Marsh(es) <input type="checkbox"/>		
Braided channels <input type="checkbox"/>	*Debris dam(s) <input type="checkbox"/>	Floodplain boulder deposits <input type="checkbox"/>	Flush(es) <input type="checkbox"/>		
Side channel(s) <input type="checkbox"/>	*Leafy debris <input type="checkbox"/>	Water meadow(s) <input type="checkbox"/>	Natural open water <input checked="" type="checkbox"/>		
*Natural waterfall(s) > 5m high <input type="checkbox"/>	Fringing reed-bank(s) <input type="checkbox"/>	Fen(s) <input type="checkbox"/>	Others (state) <input type="checkbox"/>		
*Natural waterfall(s) < 5m high <input type="checkbox"/>	Quaking bank(s) <input type="checkbox"/>	Bog(s) <input type="checkbox"/>			
Natural cascade(s) <input type="checkbox"/>	*Sink hole(s) <input type="checkbox"/>	Wet woodland(s) <input checked="" type="checkbox"/>			
N CHOKED CHANNEL (tick one box)					
Is 33% or more of the channel choked with vegetation? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>					
O NOTABLE NUISANCE PLANT SPECIES Use / or E (> 33% length) *record even if < 1%					
None <input checked="" type="checkbox"/>	bankface	banktop to 50m	bankface	banktop to 50m	
*Giant hogweed <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Himalayan balsam <input type="checkbox"/>	<input type="checkbox"/>	
*Japanese knotweed <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Other (state)..... <input type="checkbox"/>	<input type="checkbox"/>	
P OVERALL CHARACTERISTICS (Circle appropriate words, add others as necessary)					
Major impacts: landfill - tipping - litter - sewage - pollution - drought - abstraction - mill - dam - road - rail - industry - housing mining - quarrying - overdeepening - afforestation - fisheries management - silting - waterlogging - hydroelectric power					
Evidence of recent management: dredging - bank mowing - weed cutting - enhancement - river rehabilitation - gravel extraction - other (please specify)					
Animals: otter - mink - water vole - kingfisher - dipper - grey wagtail - sand martin - heron - dragonflies/damselflies					
Other significant observations: if necessary use separate sheet to describe overall characteristics and relevant observations					
Q ALDERS (tick one box in each of the two categories) *record even if < 1%					
*Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>			*Diseased Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>		
R FIELD SURVEY QUALITY CONTROL (/ boxes to confirm checks)					
Have you taken at least two photos that illustrate the general character of the site and additional photos of any weirs/ sluices and major/intermediate structures across the channel? <input checked="" type="checkbox"/>					
Have you completed all ten spot-checks and made entries in all boxes in E & F on page 2? <input checked="" type="checkbox"/>					
Have you completed column 11 of section G (and E if appropriate) on page 2? <input checked="" type="checkbox"/>					
Have you recorded in section C the number of riffles, pools and point bars (even if 0) on page 1? <input checked="" type="checkbox"/>					
Have you given an accurate (alphanumeric) grid reference for spot-checks 1, 6 and end of site (page 1)? <input checked="" type="checkbox"/>					
Have you stated whether spot-check 1 is at the upstream or downstream end of the site (top of page 2)? <input checked="" type="checkbox"/>					
Have you cross-checked your spot-check and sweep-up responses with the channel modification indicators given on page 2 of the spot-check key? <input checked="" type="checkbox"/>					

020-RH1-092-001

Figure 104: 020-RH1-092-001

RIVER HABITAT SURVEY 2003 Version		Page 1 of 4				
A FIELD SURVEY DETAILS						
Site Number: <input type="text"/> <small>leave blank if new site</small> Site Reference: 020-RH1-092-001 Crossing 38a, ON236318 Spot-check 1 Grid Ref: SP6 169335258 Spot-check 6 Grid Ref: SP6 1893 35313 End of site Grid Ref: SP6 2056 35985 Reach Reference: 020-RH1-092-001 Crossing 38a, ON236318 River name: Great Ouzé Date: 4-16/2013 Time: 9:00 Surveyor name: Sarah Hudgetts Accredited Surveyor code: FA019	Is the site part of a river or an artificial channel? River <input checked="" type="checkbox"/> Artificial <input type="checkbox"/> Are adverse conditions affecting survey? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> If yes, state Is bed of river visible? barely or not <input type="checkbox"/> partially <input type="checkbox"/> ± entirely <input checked="" type="checkbox"/> Is health and safety assessment form attached? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Number of photographs taken: 8 Photo references: 020-RH1-092-001 P1 040613, 020-RH1-092-001 P2 040613, 020-RH1-092-001 P3 040613, 020-RH1-092-001 P4 040613, 020-RH1-092-001 P5 040613, 020-RH1-092-001 P6 040613, Site surveyed from: left bank <input type="checkbox"/> right bank <input checked="" type="checkbox"/> channel <input type="checkbox"/>					
<input type="checkbox"/> When options shown with 'shadow boxes', tick one box only LEFT banks determined by facing downstream RIGHT						
B PREDOMINANT VALLEY FORM (within the horizon limit) (tick one box only)						
(tick one box only) <input type="checkbox"/> shallow vee <input type="checkbox"/> deep vee <input type="checkbox"/> gorge	<input checked="" type="checkbox"/> concave/bowl <input type="checkbox"/> asymmetrical valley <input type="checkbox"/> U-shape valley <input type="checkbox"/> no obvious valley sides					
Distinct flat valley bottom? No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> Natural terraces? No <input type="checkbox"/> Yes <input checked="" type="checkbox"/>						
C NUMBER OF RIFFLES, POOLS AND POINT BARS (enter total number in boxes)						
Riffle(s) <input type="text" value="6"/>	Unvegetated point bar(s) <input type="text" value="0"/>					
Pool(s) <input type="text" value="1"/>	Vegetated point bar(s) <input type="text" value="1"/>					
D ARTIFICIAL FEATURES (indicate total number of occurrences of each category within the 500m site)						
If none, tick box <input type="checkbox"/>	Major	Intermediate	Minor	Major	Intermediate	Minor
	Weirs/slucices			Outfalls/intakes		
	Culverts			Fords		
	Bridges			Deflectors/groynes/croys		
	Other - state	Cattle drink				1
Is channel obviously realigned? No <input checked="" type="checkbox"/> Yes, <33% of site <input checked="" type="checkbox"/> ≥33% of site <input type="checkbox"/> Is channel obviously over-deepened? No <input checked="" type="checkbox"/> Yes, <33% of site <input checked="" type="checkbox"/> ≥33% of site <input type="checkbox"/> Is water impounded by weir/dam? No <input checked="" type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input type="checkbox"/>						

* 020-RH1-092-001 P7 040613, 020-RH1-092-001 P8 040613;

Figure 105: 020-RH1-092-001

SITE REF.		RIVER HABITAT SURVEY: TEN SPOT-CHECKS										Page 2 of 4	
Spot-check 1 is at: upstream end <input checked="" type="checkbox"/>		downstream end <input type="checkbox"/>		of site (tick one box)									
E PHYSICAL ATTRIBUTES (to be assessed across channel within 1m wide transect)													
When boxes 'bordered', only one entry allowed													
1 GPS 2 3 4 5 6 GPS 7 8 9 10 GPS													
LEFT BANK													
Ring EC or SC if composed of sandy substrate													
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA		
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM	RS	NK	NO	NK	NK	NO	NK	RS	NK	NK			
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB	NO	EC	NO	EC	EC	NO	EC	SC	SC	NO			
CHANNEL													
GP ring either G or P if predominant													
Channel substrate NV, BE, BO, CO, GP, SA, SI, CL, PE, EA, AR	S1	GP	GP	NV	NV	S1	S1	S1	GP	S1			
Flow-type NV, FF, CH, BW, UW, CF, RP, UP, SM, NP, DR	RP	RP	RP	RP	RP	SM	SM	SM	SM	SM			
Channel modification(s) NK, NO, CV, RS, RI, DA, FO	NK	NK	NO	NK	NK	NO	NK	NO	NK	NK			
Channel feature(s) NV, NO, EB, RO, VR, MB, VB, MI, TR	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO			
For braided rivers only: number of sub-channels													
RIGHT BANK													
Ring EC or SC if composed of sandy substrate													
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA		
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO		
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB	NO	NO	NO	NO	EC	SC	NO	NO	NO	NO	NO		
F BANKTOP LAND-USE AND VEGETATION STRUCTURE (to be assessed over a 10m wide transect)													
Land-use: choose one from BL, BP, CW, CP, SH, OR, WL, MH, AW, OW, RP, IG, TH, RD, SU, TL, IL, PG, NV													
LAND-USE WITHIN 5m OF LEFT BANKTOP													
LEFT BANKTOP (structure within 1m) B/U/S/C/NV	?	S	S	S	B	S	B	S	S	S	S		
LEFT BANK-FACE (structure) B/U/S/C/NV	S	S	S	S	S	S	S	S	S	S	S		
RIGHT BANK-FACE (structure) B/U/S/C/NV	S	S	S	S	B	B	S	S	S	S	S		
RIGHT BANKTOP (structure within 1m) B/U/S/C/NV	S	S	S	S	S	S	S	S	S	S	S		
LAND-USE WITHIN 5m OF RIGHT BANKTOP													
IG IG IG IG IG IG IG IG IG IG IG IG													
G CHANNEL VEGETATION TYPES (to be assessed over a 40m wide transect: use E (> 33% area) ✓ (present) or NV (not visible))													
None (✓) or Not Visible (NV)			✓	✓			✓	✓		✓	✓		
Liverworts/mosses/lichens										✓	✓		
Emergent broad-leaved herbs											✓		
Emergent reeds/sedges/rushes/grasses/horsetails	✓	✓								✓	✓		
Floating-leaved (rooted)													
Free-floating													
Amphibious	✓				✓	✓					✓		
Submerged broad-leaved											✓		
Submerged linear-leaved					✓					✓	✓		
Submerged fine-leaved											✓		
Filamentous algae											✓		
Use end column for overall assessment over 500m, including types not occurring in spot-checks (use ✓, E or NV)													

Enter channel substrate(s) not occurring as predominant in spot-checks but present in >1% of whole site.

Figure 106: 020-RH1-092-001

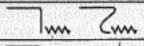
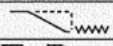
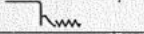



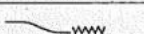
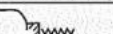
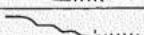
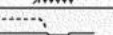


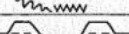

SITE REF.		RIVER HABITAT SURVEY : 500m SWEEP-UP				Page 3 of 4	
H LAND-USE WITHIN 50m OF BANKTOP Use ✓ (present) or E (>33% banklength)							
	L	R		L	R		
Broadleaf/mixed woodland (semi-natural) (BL)		✓	Natural open water (OW)				
Broadleaf/mixed plantation (BP)			Rough/unimproved grassland/pasture (RP)				
Coniferous woodland (semi-natural) (CW)			Improved/semi-improved grassland (IG)	E	E		
Coniferous plantation (CP)			Tall herb/rank vegetation (TH)	✓	✓		
Scrub & shrubs (SH)	✓	✓	Rock, scree or sand dunes (RD)				
Orchard (OR)			Suburban/urban development (SU)	✓			
Wetland (e.g. bog, marsh, fen) (WL)		✓	Tilled land (TL)				
Moorland/heath (MH)			Irrigated land (IL)				
Artificial open water (AW)			Parkland or gardens (PG)	E			
			Not visible (NV)				
I BANK PROFILES Use ✓ (present) or E (>33% banklength)							
Natural/unmodified	L	R	Artificial/modified	L	R		
Vertical/undercut 	✓	✓	Resectioned (reprofiled) 	✓	✓		
Vertical with toe 		✓	Reinforced - whole 				
Steep (>45°) 	✓	E	Reinforced - top only 				
Gentle 			Reinforced - toe only 				
Composite 		✓	Artificial two-stage 				
Natural berm 		✓	Poached bank 				
			Embanked 				
			Set-back embankment 				
J EXTENT OF TREES AND ASSOCIATED FEATURES *record even if <1%							
TREES (tick one box per bank)				ASSOCIATED FEATURES (tick one box per feature)			
	Left	Right		None	Present	E (>33%)	
None	<input type="checkbox"/>	<input type="checkbox"/>	Shading of channel	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Isolated/scattered	<input checked="" type="checkbox"/>	<input type="checkbox"/>	*Overhanging boughs	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Regularly spaced, single	<input type="checkbox"/>	<input checked="" type="checkbox"/>	*Exposed bankside roots	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Occasional clumps	<input type="checkbox"/>	<input type="checkbox"/>	*Underwater tree roots	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Semi-continuous	<input type="checkbox"/>	<input type="checkbox"/>	Fallen trees	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Continuous	<input type="checkbox"/>	<input type="checkbox"/>	Large woody debris	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
K EXTENT OF CHANNEL AND BANK FEATURES (tick one box for each feature) *record even if <1%							
	None	Present	E (>33%)	None	Present	E (>33%)	
*Free fall flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed bedrock	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chute flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Broken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated bedrock/boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unbroken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rippled flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*Upwelling	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Mature island(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smooth flow	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated side bar(s)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
No perceptible flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No flow (dry)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marginal deadwater	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eroding cliff(s)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	*Unvegetated silt deposit(s)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stable cliff(s)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	*Discrete unvegetated sand deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				*Discrete unvegetated gravel deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 107: 020-RH1-092-001

SITE REF.		RIVER HABITAT SURVEY : DIMENSIONS AND INFLUENCES Page 4 of 4			
L CHANNEL DIMENSIONS (to be measured at one location on a straight uniform section, preferably across a riffle)					
LEFT BANK		CHANNEL		RIGHT BANK	
Banktop height (m)	1.3	Bankfull width (m)	7	Banktop height (m)	1.3
Is banktop height also bankfull height? (Y or N)	N	Water width (m)	6	Is banktop height also bankfull height? (Y or N)	N
Embanked height (m)	/	Water depth (m)	0.7	Embanked height (m)	/
If trashline lower than banktop, indicate: height above water (m) = / width from bank to bank (m) = /					
Bed material at site is: consolidated <input type="checkbox"/> unconsolidated (loose) <input checked="" type="checkbox"/> unknown <input type="checkbox"/>					
Location of measurements is: riffle <input type="checkbox"/> other <input checked="" type="checkbox"/> (state) <u>spotcheck 8</u>					
M FEATURES OF SPECIAL INTEREST Use Y or E (> 33% length) *record even if <1%					
None <input type="checkbox"/>	Very large boulders (>1m) <input type="checkbox"/>	Backwater(s) <input type="checkbox"/>	Marsh(es) <input checked="" type="checkbox"/>		
Braided channels <input type="checkbox"/>	*Debris dam(s) <input type="checkbox"/>	Floodplain boulder deposits <input type="checkbox"/>	Flush(es) <input type="checkbox"/>		
Side channel(s) <input type="checkbox"/>	*Leafy debris <input type="checkbox"/>	Water meadow(s) <input type="checkbox"/>	Natural open water <input type="checkbox"/>		
*Natural waterfall(s) > 5m high <input type="checkbox"/>	Fringing reed-bank(s) <input type="checkbox"/>	Fen(s) <input type="checkbox"/>	Others (state) <input type="checkbox"/>		
*Natural waterfall(s) < 5m high <input type="checkbox"/>	Quaking bank(s) <input type="checkbox"/>	Bog(s) <input type="checkbox"/>			
Natural cascade(s) <input type="checkbox"/>	*Sink hole(s) <input type="checkbox"/>	Wet woodland(s) <input type="checkbox"/>			
N CHOKED CHANNEL (tick one box)					
Is 33% or more of the channel choked with vegetation? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>					
O NOTABLE NUISANCE PLANT SPECIES Use Y or E (> 33% length) *record even if <1%					
None <input checked="" type="checkbox"/>	bankface	banktop to 50m	bankface	banktop to 50m	
*Giant hogweed <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Himalayan balsam <input type="checkbox"/>	<input type="checkbox"/>	
*Japanese knotweed <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Other (state)..... <input type="checkbox"/>	<input type="checkbox"/>	
P OVERALL CHARACTERISTICS (Circle appropriate words, add others as necessary)					
Major impacts: landfill - tipping - litter - sewage - pollution - drought - abstraction - mill - dam - road - rail - industry - housing mining - quarrying - overdeepening - afforestation - fisheries management - silting - waterlogging - hydroelectric power					
Evidence of recent management: dredging - bank mowing - weed cutting - enhancement - river rehabilitation - gravel extraction - other (please specify) <u>seen. Potential P. Adonis!</u>					
Animals: otter - mink - <u>water vole</u> - <u>kingfisher</u> - dipper - grey wagtail - sand martin - heron - dragonflies/damselflies					
Other significant observations: if necessary use separate sheet to describe overall characteristics and relevant observations <u>River may have been modified (deepened) in the past - left bank is steeper & more unnatural (fewer trees, urban land use - school) than right, which has stop</u>					
Q ALDERS (tick one box in each of the two categories) *record even if <1%					
*Alders? None <input type="checkbox"/> Present <input checked="" type="checkbox"/> Extensive <input type="checkbox"/>		*Diseased Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>			
R FIELD SURVEY QUALITY CONTROL (✓ boxes to confirm checks)					
Have you taken at least two photos that illustrate the general character of the site and additional photos of any weirs/ sluices and major/intermediate structures across the channel? <input checked="" type="checkbox"/>					
Have you completed all ten spot-checks and made entries in all boxes in E & F on page 2? <input checked="" type="checkbox"/>					
Have you completed column 11 of section G (and E if appropriate) on page 2? <input checked="" type="checkbox"/>					
Have you recorded in section C the number of riffles, pools and point bars (even if 0) on page 1? <input checked="" type="checkbox"/>					
Have you given an accurate (alphanumeric) grid reference for spot-checks 1, 6 and end of site (page 1)? <input checked="" type="checkbox"/>					
Have you stated whether spot-check 1 is at the upstream or downstream end of the site (top of page 2)? <input checked="" type="checkbox"/>					
Have you cross-checked your spot-check and sweep-up responses with the channel modification indicators given on page 2 of the spot-check key? <input checked="" type="checkbox"/>					

Many whole river may have been modified in the past to stop the flow

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Figure 108: 020-RH1-097-001

RIVER HABITAT SURVEY 2003 Version		Page 1 of 4																
A FIELD SURVEY DETAILS																		
Site Number: Site Reference: 020 RH1 097 001 Spot-check 1 Grid Ref: SP5900540306 Spot-check 6 Grid Ref: SP5879140225 End of site Grid Ref: SP5857940097 Reach Reference: River name: CANNONHAM WATER Date 30/5/2013 Time: 9:00 Surveyor name: CAM KILGIBRY Accredited Surveyor code: LT064	Is the site part of a river or an artificial channel? River <input checked="" type="checkbox"/> Artificial <input type="checkbox"/> Are adverse conditions affecting survey? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> If yes, state Is bed of river visible? barely or not <input type="checkbox"/> partially <input checked="" type="checkbox"/> ± entirely <input type="checkbox"/> Is health and safety assessment form attached? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Number of photographs taken: 5 Photo references: P1/P2/P3/P4/P5 Site surveyed from: left bank <input type="checkbox"/> right bank <input checked="" type="checkbox"/> channel <input type="checkbox"/> <input type="checkbox"/> When options shown with 'shadow boxes', tick one box only																	
B PREDOMINANT VALLEY FORM (within the horizon limit) (tick one box only)																		
(tick one box only) <table style="width:100%; border: none;"> <tr> <td style="text-align: center;"></td> <td style="text-align: center;"><input checked="" type="checkbox"/> shallow vee</td> <td style="text-align: center;"></td> <td style="text-align: center;"><input type="checkbox"/> concave/bowl</td> </tr> <tr> <td style="text-align: center;"></td> <td style="text-align: center;"><input type="checkbox"/> deep vee</td> <td style="text-align: center;"></td> <td style="text-align: center;"><input type="checkbox"/> asymmetrical valley</td> </tr> <tr> <td style="text-align: center;"></td> <td style="text-align: center;"><input type="checkbox"/> gorge</td> <td style="text-align: center;"></td> <td style="text-align: center;"><input type="checkbox"/> U-shape valley</td> </tr> <tr> <td colspan="2"></td> <td style="text-align: center;"></td> <td style="text-align: center;"><input type="checkbox"/> no obvious valley sides</td> </tr> </table>				<input checked="" type="checkbox"/> shallow vee		<input type="checkbox"/> concave/bowl		<input type="checkbox"/> deep vee		<input type="checkbox"/> asymmetrical valley		<input type="checkbox"/> gorge		<input type="checkbox"/> U-shape valley				<input type="checkbox"/> no obvious valley sides
	<input checked="" type="checkbox"/> shallow vee		<input type="checkbox"/> concave/bowl															
	<input type="checkbox"/> deep vee		<input type="checkbox"/> asymmetrical valley															
	<input type="checkbox"/> gorge		<input type="checkbox"/> U-shape valley															
			<input type="checkbox"/> no obvious valley sides															
Distinct flat valley bottom? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>		Natural terraces? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>																
C NUMBER OF RIFFLES, POOLS AND POINT BARS (enter total number in boxes)																		
Riffle(s)	<input type="text" value="1"/>	Unvegetated point bar(s)	<input type="text" value="0"/>															
Pool(s)	<input type="text" value="0"/>	Vegetated point bar(s)	<input type="text" value="0"/>															
D ARTIFICIAL FEATURES (indicate total number of occurrences of each category within the 500m site)																		
If none, tick box <input type="checkbox"/>																		
	Major	Intermediate	Minor	Major	Intermediate	Minor												
Weirs/sluices	(1)		(2)	Outfalls/intakes		1												
Culverts	(1)			Fords														
Bridges			(1)	Deflectors/groynes/croys	(1)	(2)												
Other - state																		
Is channel obviously realigned?		No <input type="checkbox"/>	Yes, <33% of site <input type="checkbox"/>	≥33% of site <input checked="" type="checkbox"/>														
Is channel obviously over-deepened?		No <input type="checkbox"/>	Yes, <33% of site <input type="checkbox"/>	≥33% of site <input checked="" type="checkbox"/>														
Is water impounded by weir/dam?		No <input checked="" type="checkbox"/>	Yes, <33% of site <input type="checkbox"/>	≥33% of site <input type="checkbox"/>														

Figure 109: 020-RH1-097-001

SITE REF. <u>020-RH1-097-001</u>	RIVER HABITAT SURVEY: TEN SPOT-CHECKS										Page 2 of 4
Spot-check 1 is at: upstream end <input type="checkbox"/> downstream end <input checked="" type="checkbox"/>	of site (tick one box)										
E PHYSICAL ATTRIBUTES (to be assessed across channel within 1m wide transect)											
When boxes 'bordered', only one entry allowed	1 GPS	2	3	4	5	6 GPS	7	8	9	10	GPS
LEFT BANK	Ring EC or SC if composed of sandy substrate										
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI	EA	EA	EA	EA	EA	EA	EA	NV	NV	EA	
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM	RS	RS	RS	RS	RS	RS	RS	NV	NV	RS	
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB	NO	NO	NO	NO	NO	NO	NO	NV	NV	NO	
CHANNEL	GP: ring either G or P if predominant										
Channel substrate NV, BE, BO, CO, GP, SA, SI, CL, PE, EA, AR	SI	SI	NV	SA	SA	SI	SA	NV	NV	SI	
Flow-type NV, FF, CH, BW, UW, CF, RP, UP, SM, NP, DR	SM	SM	NV	SM	SM	SM	SM	NV	NV	SM	
Channel modification(s) NK, NO, CV, RS, RI, DA, FO	RS	RS	RS	RS	RS	RS	RS	RS	NV	RS	
Channel feature(s) NV, NO, EB, RO, VR, MB, VB, MI, TR	NO	NO	NO	NO	NO	NO	NO	NV	NV	NO	
For braided rivers only: number of sub-channels											
RIGHT BANK	Ring EC or SC if composed of sandy substrate										
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI	EA	EA	EA	EA	EA	EA	EA	NV	NV	EA	
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM	RS	RS	RS	RS	RS	RS	RS	NV	NV	RS	
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB	NO	NO	NO	NO	NO	VS	NO	NV	NV	NO	
F BANKTOP LAND-USE AND VEGETATION STRUCTURE (to be assessed over a 10m wide transect)											
Land-use: choose one from BL, BP, CW, CP, SH, OR, WL, MH, AW, OW, RP, IG, TH, RD, SU, TL, IL, PG, NV											
LAND-USE WITHIN 5m OF LEFT BANKTOP	IG	IG	IG	IG	IG	IG	IG	IG	IG	IG	TL
LEFT BANKTOP (structure within 1m) B/U/S/C/NV	S	C	U	U	C	C	U	NV	NV	S	
LEFT BANK-FACE (structure) B/U/S/C/NV	U	U	U	U	C	C	U	NV	NV	S	
RIGHT BANK-FACE (structure) B/U/S/C/NV	U	U	U	U	U	U	C	NV	NV	S	
RIGHT BANKTOP (structure within 1m) B/U/S/C/NV	U	U	U	U	U	U	U	C	C	S	
LAND-USE WITHIN 5m OF RIGHT BANKTOP	TL	TL	TL	TL	TL	TL	TL	TL	TL	TL	DL
G CHANNEL VEGETATION TYPES (to be assessed over a 10m wide transect: use E (> 33% area), ✓ (present) or NV (not visible))											
None (✓) or Not Visible (NV)	✓	✓		✓		✓		NV	NV	NO	
Liverworts/mosses/lichens											
Emergent broad-leaved herbs			E	✓		✓					✓
Emergent reeds/sedges/rushes/grasses/horsetails											
Floating-leaved (rooted)											
Free-floating											
Amphibious											
Submerged broad-leaved											
Submerged linear-leaved											
Submerged fine-leaved											
Filamentous algae											
Use end column for overall assessment over 500m, including types not occurring in spot-checks (use ✓, E or NV)											

Enter channel substrate(s) not occurring as predominant in spot-checks but present in >1% of whole site.

Figure 110: 020-RH1-097-001

SITE REF 020-RH1-097-001		RIVER HABITAT SURVEY : 500m SWEEP-UP				Page 3 of 4	
H LAND-USE WITHIN 50m OF BANKTOP Use ✓ (present) or E (> 33% banklength)							
	L	R		L	R		
Broadleaf/mixed woodland (semi-natural) (BL)			Natural open water (OW)				
Broadleaf/mixed plantation (BP)			Rough/unimproved grassland/pasture (RP)				
Coniferous woodland (semi-natural) (CW)			Improved/semi-improved grassland (IG)	E			
Coniferous plantation (CP)			Tall herb/rank vegetation (TH)				
Scrub & shrubs (SH)			Rock, scree or sand dunes (RD)				
Orchard (OR)			Suburban/urban development (SU)	✓	✓		
Wetland (e.g. bog, marsh, fen) (WL)			Tilled land (TL)			E	
Moorland/heath (MH)			Irrigated land (IL)				
Artificial open water (AW)			Parkland or gardens (PG)				
			Not visible (NV)				
I BANK PROFILES Use ✓ (present) or E (> 33% banklength)							
Natural/unmodified	L	R	Artificial/modified	L	R		
Vertical/undercut			Resectioned (reprofiled)	E	E		
Vertical with toe			Reinforced - whole	✓	✓		
Steep (>45°)			Reinforced - top only				
Gentle			Reinforced - toe only				
Composite			Artificial two-stage				
Natural berm			Poached bank	✓			
			Embanked				
			Set-back embankment				
J EXTENT OF TREES AND ASSOCIATED FEATURES *record even if <1%							
TREES (tick one box per bank)				ASSOCIATED FEATURES (tick one box per feature)			
	Left	Right		None	Present	E (>33%)	
None	<input type="checkbox"/>	<input type="checkbox"/>	Shading of channel	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Isolated/scattered	<input type="checkbox"/>	<input type="checkbox"/>	*Overhanging boughs	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Regularly spaced, single	<input type="checkbox"/>	<input type="checkbox"/>	*Exposed bankside roots	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Occasional clumps	<input type="checkbox"/>	<input type="checkbox"/>	*Underwater tree roots	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Semi-continuous	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Fallen trees	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Continuous	<input type="checkbox"/>	<input type="checkbox"/>	Large woody debris	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
K EXTENT OF CHANNEL AND BANK FEATURES (tick one box for each feature) *record even if <1%							
	None	Present	E (>33%)	None	Present	E (>33%)	
*Free fall flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed bedrock	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chute flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Broken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated bedrock/boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unbroken standing waves	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Unvegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rippled flow	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Vegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*Upwelling	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Mature island(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smooth flow	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Unvegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No perceptible flow	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Vegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No flow (dry)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Unvegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marginal deadwater	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eroding cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Unvegetated silt deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stable cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Discrete unvegetated sand deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				*Discrete unvegetated gravel deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 111: 020-RH1-097-001

SITE REF 020-RH1-097-001		RIVER HABITAT SURVEY : DIMENSIONS AND INFLUENCES		Page 4 of 4	
L CHANNEL DIMENSIONS (to be measured at one location on a straight uniform section, preferably across a riffle)					
LEFT BANK		CHANNEL		RIGHT BANK	
Banktop height (m)	2	Bankfull width (m)	5	Banktop height (m)	2.5
Is banktop height also bankfull height? (Y or N)	Y	Water width (m)	2.5	Is banktop height also bankfull height? (Y or N)	N
Embanked height (m)	-	Water depth (m)	0.25	Embanked height (m)	-
If trashline lower than banktop, indicate: height above water (m) = _____ width from bank to bank (m) = _____					
Bed material at site is: consolidated <input type="checkbox"/> unconsolidated (loose) <input checked="" type="checkbox"/> unknown <input type="checkbox"/>					
Location of measurements is: riffle <input type="checkbox"/> other <input checked="" type="checkbox"/> (state)					
M FEATURES OF SPECIAL INTEREST Use ✓ or E (> 33% length) *record even if <1%					
None	<input checked="" type="checkbox"/>	Very large boulders (>1m)	<input type="checkbox"/>	Backwater(s)	<input type="checkbox"/>
Braided channels	<input type="checkbox"/>	*Debris dam(s)	<input type="checkbox"/>	Floodplain boulder deposits	<input type="checkbox"/>
Side channel(s)	<input type="checkbox"/>	*Leafy debris	<input type="checkbox"/>	Water meadow(s)	<input type="checkbox"/>
*Natural waterfall(s) > 5m high	<input type="checkbox"/>	Fringing reed-bank(s)	<input type="checkbox"/>	Fen(s)	<input type="checkbox"/>
*Natural waterfall(s) < 5m high	<input type="checkbox"/>	Quaking bank(s)	<input type="checkbox"/>	Bog(s)	<input type="checkbox"/>
Natural cascade(s)	<input type="checkbox"/>	*Sink hole(s)	<input type="checkbox"/>	Wet woodland(s)	<input type="checkbox"/>
Marsh(es)	<input type="checkbox"/>	Flush(es)	<input type="checkbox"/>	Natural open water	<input type="checkbox"/>
Others (state)	<input type="checkbox"/>				
N CHOKED CHANNEL (tick one box)					
Is 33% or more of the channel choked with vegetation? No <input type="checkbox"/> Yes <input checked="" type="checkbox"/>					
O NOTABLE NUISANCE PLANT SPECIES Use ✓ or E (> 33% length) *record even if <1%					
None	<input checked="" type="checkbox"/>	*Giant hogweed	<input type="checkbox"/>	*Himalayan balsam	<input type="checkbox"/>
		*Japanese knotweed	<input type="checkbox"/>	*Other (state).....	<input type="checkbox"/>
P OVERALL CHARACTERISTICS (Circle appropriate words, add others as necessary)					
Major impacts: landfill - tipping - litter - sewage - pollution - drought - abstraction - mill - dam - road - rail - industry - housing mining - quarrying - overdeepening - afforestation - fisheries management - silting - waterlogging - hydroelectric power					
Evidence of recent management: dredging - bank mowing - weed cutting - enhancement - river rehabilitation - gravel extraction - other (please specify)					
Animals: otter - mink - water vole - kingfisher - dipper - grey wagtail - sand martin - heron - dragonflies/damselflies					
Other significant observations: if necessary use separate sheet to describe overall characteristics and relevant observations					
A few defectors present resulting from the accumulation of wood debris. no photo take as it is would not be clear due to shadows.					
Q ALDERS (tick one box in each of the two categories) *record even if <1%					
*Alders? None <input type="checkbox"/> Present <input checked="" type="checkbox"/> Extensive <input type="checkbox"/>			*Diseased Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>		
R FIELD SURVEY QUALITY CONTROL (✓ boxes to confirm checks)					
Have you taken at least two photos that illustrate the general character of the site and additional photos of any weirs/ sluices and major/intermediate structures across the channel? <input checked="" type="checkbox"/>					
Have you completed all ten spot-checks and made entries in all boxes in E & F on page 2? <input checked="" type="checkbox"/>					
Have you completed column 11 of section G (and E if appropriate) on page 2? <input checked="" type="checkbox"/>					
Have you recorded in section C the number of riffles, pools and point bars (even if 0) on page 1? <input checked="" type="checkbox"/>					
Have you given an accurate (alphanumeric) grid reference for spot-checks 1, 6 and end of site (page 1)? <input checked="" type="checkbox"/>					
Have you stated whether spot-check 1 is at the upstream or downstream end of the site (top of page 2)? <input checked="" type="checkbox"/>					
Have you cross-checked your spot-check and sweep-up responses with the channel modification indicators given on page 2 of the spot-check key? <input checked="" type="checkbox"/>					

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Figure 112: 020-RH1-098-001

RIVER HABITAT SURVEY 2003 Version				Page 1 of 4																
A FIELD SURVEY DETAILS																				
Site Number: leave blank if new site Site Reference: 020-RH1-098-001 Spot-check 1 Grid Ref: SP5833940571 Spot-check 6 Grid Ref: SP5842740541 End of site Grid Ref: SP5843740534 Reach Reference: River name: Date 30/5/2013 Time: 12:45 Surveyor name: CELIA FINEIRA Accredited Surveyor code: L706A	Is the site part of a river or an artificial channel? River <input type="checkbox"/> Artificial <input type="checkbox"/> Are adverse conditions affecting survey? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> If yes, state Is bed of river visible? barely or not <input type="checkbox"/> partially <input checked="" type="checkbox"/> ± entirely <input type="checkbox"/> Is health and safety assessment form attached? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Number of photographs taken: 3 Photo references: P1, P2, P3 Site surveyed from: left bank <input type="checkbox"/> right bank <input checked="" type="checkbox"/> channel <input type="checkbox"/> <input type="checkbox"/> When options shown with 'shadow boxes', tick one box only																			
B PREDOMINANT VALLEY FORM (within the horizon limit) (tick one box only)																				
(tick one box only) <table style="width:100%; border: none;"> <tr> <td style="text-align: center;"></td> <td><input checked="" type="checkbox"/> shallow vee</td> <td style="text-align: center;"></td> <td><input type="checkbox"/> concave/bowl</td> </tr> <tr> <td style="text-align: center;"></td> <td><input type="checkbox"/> deep vee</td> <td style="text-align: center;"></td> <td><input type="checkbox"/> asymmetrical valley</td> </tr> <tr> <td style="text-align: center;"></td> <td><input type="checkbox"/> gorge</td> <td style="text-align: center;"></td> <td><input type="checkbox"/> U-shape valley</td> </tr> <tr> <td colspan="2"></td> <td style="text-align: center;"></td> <td><input type="checkbox"/> no obvious valley sides</td> </tr> </table>						<input checked="" type="checkbox"/> shallow vee		<input type="checkbox"/> concave/bowl		<input type="checkbox"/> deep vee		<input type="checkbox"/> asymmetrical valley		<input type="checkbox"/> gorge		<input type="checkbox"/> U-shape valley				<input type="checkbox"/> no obvious valley sides
	<input checked="" type="checkbox"/> shallow vee		<input type="checkbox"/> concave/bowl																	
	<input type="checkbox"/> deep vee		<input type="checkbox"/> asymmetrical valley																	
	<input type="checkbox"/> gorge		<input type="checkbox"/> U-shape valley																	
			<input type="checkbox"/> no obvious valley sides																	
Distinct flat valley bottom? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>		Natural terraces? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>																		
C NUMBER OF RIFFLES, POOLS AND POINT BARS (enter total number in boxes)																				
Riffle(s)	<input type="text" value="0"/>	Unvegetated point bar(s)	<input type="text" value="0"/>																	
Pool(s)	<input type="text" value="0"/>	Vegetated point bar(s)	<input type="text" value="0"/>																	
D ARTIFICIAL FEATURES (indicate total number of occurrences of each category within the 500m site)																				
If none, tick box <input type="checkbox"/>	Major	Intermediate	Minor	Major	Intermediate	Minor														
	Weirs/slucices			Outfalls/intakes		112														
	Culverts	1		Fords																
	Bridges			Deflectors/groynes/crocs																
	Other - state																			
Is channel obviously realigned? No <input type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input checked="" type="checkbox"/>		Is channel obviously over-deepened? No <input type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input type="checkbox"/>		Is water impounded by weir/dam? No <input checked="" type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input type="checkbox"/>																

Figure 113: 020-RH1-098-001

SITE REF: 020-RH1-098-001	RIVER HABITAT SURVEY: TEN SPOT-CHECKS										Page 2 of 4
Spot-check 1 is at: upstream end <input checked="" type="checkbox"/>	downstream end <input type="checkbox"/>	of site (tick one box)									
E PHYSICAL ATTRIBUTES (to be assessed across channel within 1m wide transect)											
When boxes 'bordered', only one entry allowed	1 GPS	2	3	4	5	6 GPS	7	8	9	10	GPS
LEFT BANK	Ring EC or SC if composed of sandy substrate										
Material NV, BE, BO, CO, GS, EA, FE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
CHANNEL	GP: ring either G or P if predominant										
Channel substrate NV, BE, BO, CO, GP, SA, SI, CL, PE, EA, AR	EA	EA	EA	EA	GP	SI	NV	NV	SI	SI	SA
Flow-type NV, FF, CH, BW, UW, CF, RP, UP, SM, NP, DR	UW	UW	UW	UW	UW	UW	UW	UW	UW	UW	UW
Channel modification(s) NK, NO, CV, RS, RI, DA, FO	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS
Channel feature(s) NV, NO, EB, RO, VR, MB, VB, MI, TR	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
For braided rivers only: number of sub-channels											
RIGHT BANK	Ring EC or SC if composed of sandy substrate										
Material NV, BE, BO, CO, GS, EA, FE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
F BANKTOP LAND-USE AND VEGETATION STRUCTURE (to be assessed over a 10m wide transect)											
Land-use: choose one from BL, BP, CW, CP, SH, OR, WL, MH, AW, OW, RP, IG, TH, RD, SU, TL, IL, PG, NV											
LAND-USE WITHIN 5m OF LEFT BANKTOP	TL	TL	TL	TL	TL	TL	TL	TL	TL	TL	TL
LEFT BANKTOP (structure within 1m) B/U/S/C/NV	U	U	S	S	S	S	S	S	S	S	S
LEFT BANK-FACE (structure) B/U/S/C/NV	U	C	S	S	S	S	U	U	U	U	U
RIGHT BANK-FACE (structure) B/U/S/C/NV	U	U	U	U	U	U	U	U	U	U	U
RIGHT BANKTOP (structure within 1m) B/U/S/C/NV	U	U	U	U	U	U	U	U	U	U	U
LAND-USE WITHIN 5m OF RIGHT BANKTOP	TL	TL	TL	TL	TL	TL	TL	TL	TL	TL	TL
G CHANNEL VEGETATION TYPES (to be assessed over a 10m wide transect: use E (> 33% area), ✓ (present) or NV (not visible))											
None (✓) or Not Visible (NV)	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Liverworts/mosses/lchens											
Emergent broad-leaved herbs				✓		✓					✓
Emergent reeds/sedges/rushes/grasses/horsetails											
Floating-leaved (rooted)											
Free-floating											
Amphibious											
Submerged broad-leaved											
Submerged linear-leaved											
Submerged fine-leaved											
Filamentous algae											
Use end column for overall assessment over 500m, including types not occurring in spot-checks (use ✓, E or NV)											

↑ Enter channel substrate(s) not occurring as predominant in spot-checks but present in >1% of whole site.

Figure 114: 020-RH1-098-001

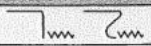
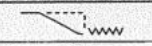
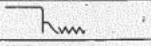

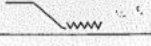
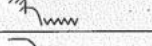
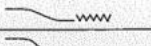
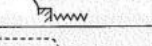

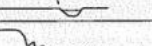
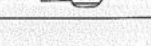



SITE REF.		RIVER HABITAT SURVEY : 500m SWEEP-UP				Page 3 of 4	
H LAND-USE WITHIN 50m OF BANKTOP Use ✓ (present) or E (> 33% banklength)							
	L	R		L	R		
Broadleaf/mixed woodland (semi-natural) (BL)			Natural open water (OW)				
Broadleaf/mixed plantation (BP)			Rough/unimproved grassland/pasture (RP)				
Coniferous woodland (semi-natural) (CW)			Improved/semi-improved grassland (IG)				
Coniferous plantation (CP)			Tall herb/rank vegetation (TH)				
Scrub & shrubs (SH)			Rock, scree or sand dunes (RD)				
Orchard (OR)			Suburban/urban development (SU)				
Wetland (e.g. bog, marsh, fen) (WL)			Tilled land (TL)			E	E
Moorland/heath (MH)			Irrigated land (IL)				
Artificial open water (AW)			Parkland or gardens (PG)				
			Not visible (NV)				
I BANK PROFILES Use ✓ (present) or E (> 33% banklength)							
Natural/unmodified		L	R	Artificial/modified		L	R
Vertical/undercut 				Resectioned (reprofiled) 		E	E
Vertical with toe 				Reinforced - whole 		✓	✓
Steep (>45°) 				Reinforced - top only 			
Gentle 				Reinforced - toe only 			
Composite 				Artificial two-stage 			
Natural berm 				Poached bank 			
				Embanked 			
				Set-back embankment 			
J EXTENT OF TREES AND ASSOCIATED FEATURES *record even if <1%							
TREES (tick one box per bank)				ASSOCIATED FEATURES (tick one box per feature)			
	Left	Right		None	Present	E (>33%)	
None	<input type="checkbox"/>	<input checked="" type="checkbox"/>		Shading of channel	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Isolated/scattered	<input type="checkbox"/>	<input type="checkbox"/>		*Overhanging boughs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Regularly spaced, single	<input type="checkbox"/>	<input type="checkbox"/>		*Exposed bankside roots	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Occasional clumps	<input type="checkbox"/>	<input type="checkbox"/>		*Underwater tree roots	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Semi-continuous	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Fallen trees	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Continuous	<input type="checkbox"/>	<input type="checkbox"/>		Large woody debris	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
K EXTENT OF CHANNEL AND BANK FEATURES (tick one box for each feature) *record even if <1%							
	None	Present	E (>33%)	None	Present	E (>33%)	
*Free fall flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed bedrock	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chute flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Broken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated bedrock/boulders	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unbroken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated mid-channel bar(s)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rippled flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated mid-channel bar(s)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*Upwelling	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Mature island(s)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smooth flow	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Unvegetated side bar(s)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No perceptible flow	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Vegetated side bar(s)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No flow (dry)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Unvegetated point bar(s)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marginal deadwater	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated point bar(s)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eroding cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Unvegetated silt deposit(s)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stable cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Discrete unvegetated sand deposit(s)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				*Discrete unvegetated gravel deposit(s)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 115: 020-RH1-098-001

SITE REF.		RIVER HABITAT SURVEY : DIMENSIONS AND INFLUENCES Page 4 of 4			
L CHANNEL DIMENSIONS (to be measured at one location on a straight uniform section, preferably across a riffle)					
LEFT BANK		CHANNEL		RIGHT BANK	
Banktop height (m)	2	Bankfull width (m)	2	Banktop height (m)	3
Is banktop height also bankfull height? (Y or N)	Y	Water width (m)	0.30	Is banktop height also bankfull height? (Y or N)	N
Embanked height (m)		Water depth (m)	0.10	Embanked height (m)	
If trashline lower than banktop, indicate: height above water (m) = width from bank to bank (m) =					
Bed material at site is: consolidated <input type="checkbox"/> unconsolidated (loose) <input checked="" type="checkbox"/> unknown <input type="checkbox"/>					
Location of measurements is: riffle <input type="checkbox"/> other <input checked="" type="checkbox"/> (state) <u>SL6</u>					
M FEATURES OF SPECIAL INTEREST Use ✓ or E (> 33% length) *record even if <1%					
None	<input checked="" type="checkbox"/>	Very large boulders (>1m)	<input type="checkbox"/>	Backwater(s)	<input type="checkbox"/>
Braided channels	<input type="checkbox"/>	*Debris dam(s)	<input type="checkbox"/>	Floodplain boulder deposits	<input type="checkbox"/>
Side channel(s)	<input type="checkbox"/>	*Leafy debris	<input type="checkbox"/>	Water meadow(s)	<input type="checkbox"/>
*Natural waterfall(s) > 5m high	<input type="checkbox"/>	Fringing reed-bank(s)	<input type="checkbox"/>	Fen(s)	<input type="checkbox"/>
*Natural waterfall(s) < 5m high	<input type="checkbox"/>	Quaking bank(s)	<input type="checkbox"/>	Bog(s)	<input type="checkbox"/>
Natural cascade(s)	<input type="checkbox"/>	*Sink hole(s)	<input type="checkbox"/>	Wet woodland(s)	<input type="checkbox"/>
				Marsh(es)	<input type="checkbox"/>
				Flush(es)	<input type="checkbox"/>
				Natural open water	<input type="checkbox"/>
				Others (state)	<input type="checkbox"/>
N CHOKED CHANNEL (tick one box)					
Is 33% or more of the channel choked with vegetation? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>					
O NOTABLE NUISANCE PLANT SPECIES Use ✓ or E (> 33% length) *record even if <1%					
None	<input checked="" type="checkbox"/>	*Giant hogweed	<input type="checkbox"/>	*Himalayan balsam	<input type="checkbox"/>
		*Japanese knotweed	<input type="checkbox"/>	*Other (state).....	<input type="checkbox"/>
P OVERALL CHARACTERISTICS (Circle appropriate words, add others as necessary)					
Major impacts: landfill - tipping - litter - sewage - pollution - drought - abstraction - mill - dam - road - rail - industry - housing mining - quarrying - overdeepening - afforestation - fisheries management - silting - waterlogging - hydroelectric power					
Evidence of recent management: dredging - bank mowing - weed cutting - enhancement - river rehabilitation - gravel extraction - other (please specify)					
Animals: otter - mink - water vole - kingfisher - dipper - grey wagtail - sand martin - heron - dragonflies/damselflies					
Other significant observations: if necessary use separate sheet to describe overall characteristics and relevant observations					
<i>A grassland ditch with semicontinuous hedgerow on the left bank.</i>					
Q ALDERS (tick one box in each of the two categories) *record even if <1%					
*Alders? None <input type="checkbox"/> Present <input checked="" type="checkbox"/> Extensive <input type="checkbox"/>			*Diseased Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>		
R FIELD SURVEY QUALITY CONTROL (✓ boxes to confirm checks)					
Have you taken at least two photos that illustrate the general character of the site and additional photos of any weirs/ sluices and major/intermediate structures across the channel?					<input checked="" type="checkbox"/>
Have you completed all ten spot-checks and made entries in all boxes in E & F on page 2?					<input checked="" type="checkbox"/>
Have you completed column 11 of section G (and E if appropriate) on page 2?					<input checked="" type="checkbox"/>
Have you recorded in section C the number of riffles, pools and point bars (even if 0) on page 1?					<input checked="" type="checkbox"/>
Have you given an accurate (alphanumeric) grid reference for spot-checks 1, 6 and end of site (page 1)?					<input checked="" type="checkbox"/>
Have you stated whether spot-check 1 is at the upstream or downstream end of the site (top of page 2)?					<input checked="" type="checkbox"/>
Have you cross-checked your spot-check and sweep-up responses with the channel modification indicators given on page 2 of the spot-check key?					<input checked="" type="checkbox"/>

020-RH1-099-001

Figure 116: 020-RH1-099-001





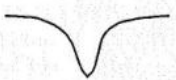






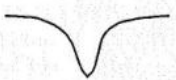






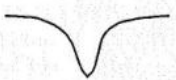


RIVER HABITAT SURVEY 2003 Version				Page 1 of 4																								
A FIELD SURVEY DETAILS																												
Site Number: leave blank if new site Site Reference: 020 RH1 099 001 Spot-check 1 Grid Ref: SP 57524 41148 Spot-check 6 Grid Ref: SP 57729 41275 End of site Grid Ref: SP 57845 41344 Reach Reference: River name: Date 20 / 5 / 2013 Time: 14:00 Surveyor name: CELIA FIGUEIRA Accredited Surveyor code: LT067	Is the site part of a river or an artificial channel? River <input checked="" type="checkbox"/> Artificial <input type="checkbox"/> Are adverse conditions affecting survey? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> If yes, state Is bed of river visible? barely or not <input type="checkbox"/> partially <input type="checkbox"/> ± entirely <input checked="" type="checkbox"/> Is health and safety assessment form attached? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Number of photographs taken: 3 Photo references: P1/P2/P3 Site surveyed from: left bank <input type="checkbox"/> right bank <input checked="" type="checkbox"/> channel <input type="checkbox"/> <input type="checkbox"/> When options shown with 'shadow boxes', tick one box only																											
B PREDOMINANT VALLEY FORM (within the horizon limit) (tick one box only)																												
(tick one box only) <table style="width:100%; border: none;"> <tr> <td style="width: 20%; text-align: center;"></td> <td style="width: 10%; text-align: center;"><input checked="" type="checkbox"/></td> <td style="width: 30%;">shallow vee</td> <td style="width: 20%; text-align: center;"></td> <td style="width: 10%; text-align: center;"><input type="checkbox"/></td> <td style="width: 10%;">concave/bowl</td> </tr> <tr> <td style="text-align: center;"></td> <td style="text-align: center;"><input type="checkbox"/></td> <td>deep vee</td> <td style="text-align: center;"></td> <td style="text-align: center;"><input type="checkbox"/></td> <td>asymmetrical valley</td> </tr> <tr> <td style="text-align: center;"></td> <td style="text-align: center;"><input type="checkbox"/></td> <td>gorge</td> <td style="text-align: center;"></td> <td style="text-align: center;"><input type="checkbox"/></td> <td>U-shape valley</td> </tr> <tr> <td colspan="3"></td> <td style="text-align: center;"></td> <td style="text-align: center;"><input type="checkbox"/></td> <td>no obvious valley sides</td> </tr> </table>						<input checked="" type="checkbox"/>	shallow vee		<input type="checkbox"/>	concave/bowl		<input type="checkbox"/>	deep vee		<input type="checkbox"/>	asymmetrical valley		<input type="checkbox"/>	gorge		<input type="checkbox"/>	U-shape valley					<input type="checkbox"/>	no obvious valley sides
	<input checked="" type="checkbox"/>	shallow vee		<input type="checkbox"/>	concave/bowl																							
	<input type="checkbox"/>	deep vee		<input type="checkbox"/>	asymmetrical valley																							
	<input type="checkbox"/>	gorge		<input type="checkbox"/>	U-shape valley																							
				<input type="checkbox"/>	no obvious valley sides																							
Distinct flat valley bottom? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> Natural terraces? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>																												
C NUMBER OF RIFFLES, POOLS AND POINT BARS (enter total number in boxes)																												
Riffle(s)	0	Unvegetated point bar(s)	0																									
Pool(s)	0	Vegetated point bar(s)	0																									
D ARTIFICIAL FEATURES (indicate total number of occurrences of each category within the 500m site)																												
If none, tick box <input type="checkbox"/>		Major	Intermediate	Minor		Major	Intermediate	Minor																				
	Weirs/slucices			(4)	Outfalls/intakes																							
	Culverts	(2)			Fords																							
	Bridges				Deflectors/groynes/croys			(2)																				
	Other - state																											
Is channel obviously realigned? No <input type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input checked="" type="checkbox"/>					Is channel obviously over-deepened? No <input type="checkbox"/> Yes, <33% of site <input checked="" type="checkbox"/> ≥33% of site <input type="checkbox"/>																							
Is water impounded by weir/dam? No <input type="checkbox"/> Yes, <33% of site <input checked="" type="checkbox"/> ≥33% of site <input type="checkbox"/>																												

Figure 117: 020-RH1-099-001

SITE REF: <u>020-RH1-099-001</u>		RIVER HABITAT SURVEY: TEN SPOT-CHECKS										Page 2 of 4	
Spot-check 1 is at: upstream end <input checked="" type="checkbox"/>		downstream end <input type="checkbox"/>		of site (tick one box)									
E PHYSICAL ATTRIBUTES (to be assessed across channel within 1m wide transect)													
When boxes 'bordered', only one entry allowed													
												1 GPS	
												2	
												3	
												4	
												5	
												6 GPS	
												7	
												8	
												9	
												10	
												GPS	
LEFT BANK												Ring EC or SC if composed of sandy substrate	
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI												EA	
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM												AS	
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB												NO	
CHANNEL												GP - ring either G or P if predominant	
Channel substrate NV, BE, BO, CO, GP, SA, SI, CL, PE, EA, AR												SA	
Flow-type NV, FF, CH, BW, UW, CF, RP, UP, SM, NP, DR												SM	
Channel modification(s) NK, NO, CV, RS, RI, DA, FO												AS	
Channel feature(s) NV, NO, EB, RO, VR, MB, VB, MI, TR												NO	
For braided rivers only: number of sub-channels													
RIGHT BANK												Ring EC or SC if composed of sandy substrate	
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI												EA	
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM												AS	
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB												NO	
F BANKTOP LAND USE AND VEGETATION STRUCTURE (to be assessed over a 10m wide transect)													
Land-use: choose one from BL, BP, CW, CP, SH, OR, WL, MH, AW, OW, RP, IG, TH, RD, SU, TL, IL, PG, NV													
LAND-USE WITHIN 5m OF LEFT BANKTOP												BL	
LEFT BANKTOP (structure within 1m) B/U/S/C/NV												C	
LEFT BANK-FACE (structure) B/U/S/C/NV												S	
RIGHT BANK-FACE (structure) B/U/S/C/NV												S	
RIGHT BANKTOP (structure within 1m) B/U/S/C/NV												S	
LAND-USE WITHIN 5m OF RIGHT BANKTOP												BL	
G CHANNEL VEGETATION TYPES (to be assessed over a 10m wide transect; use F (> 33% area), ✓ (present) or NV (not visible))													
None (✓) or Not Visible (NV)												✓	
Liverworts/mosses/lichens													
Emergent broad-leaved herbs													
Emergent reeds/sedges/rushes/grasses/horsetails													
Floating-leaved (rooted)													
Free-floating													
Amphibious													
Submerged broad-leaved													
Submerged linear-leaved													
Submerged fine-leaved													
Filamentous algae													
Use end column for overall assessment over 500m, including types not occurring in spot-checks (use ✓, E or NV)												↑	

↑ Enter channel substrate(s) not occurring as predominant in spot-checks but present in >1% of whole site.

Figure 118: 020-RH1-099-001


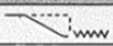


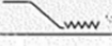

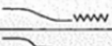







SITE REF.		RIVER HABITAT SURVEY : 500m SWEEP-UP				Page 3 of 4	
H LAND-USE WITHIN 50m OF BANKTOP Use ✓ (present) or E (> 33% banklength)							
	L	R		L	R		
Broadleaf/mixed woodland (semi-natural) (BL)	✓	✓	Natural open water (OW)				
Broadleaf/mixed plantation (BP)			Rough/unimproved grassland/pasture (RP)				
Coniferous woodland (semi-natural) (CW)			Improved/semi-improved grassland (IG)	E			
Coniferous plantation (CP)			Tall herb/rank vegetation (TH)				
Scrub & shrubs (SH)			Rock, scree or sand dunes (RD)				
Orchard (OR)			Suburban/urban development (SU)				
Wetland (e.g. bog, marsh, fen) (WL)			Tilled land (TL)				E
Moorland/heath (MH)			Irrigated land (IL)				
Artificial open water (AW)			Parkland or gardens (PG)				
			Not visible (NV)				
I BANK PROFILES Use ✓ (present) or E (> 33% banklength)							
Natural/unmodified		L	R	Artificial/modified		L	R
Vertical/undercut 				Resectioned (reprofiled) 	E	E	
Vertical with toe 				Reinforced - whole 			
Steep (>45°) 				Reinforced - top only 			
Gentle 		✓		Reinforced - toe only 			
Composite 				Artificial two-stage 			
Natural berm 		✓		Poached bank 			
				Embanked 			
				Set-back embankment 			
J EXTENT OF TREES AND ASSOCIATED FEATURES *record even if <1%							
TREES (tick one box per bank)				ASSOCIATED FEATURES (tick one box per feature)			
	Left	Right		None	Present	E (>33%)	
None	<input type="checkbox"/>	<input type="checkbox"/>	Shading of channel	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Isolated/scattered	<input type="checkbox"/>	<input type="checkbox"/>	*Overhanging boughs	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Regularly spaced, single	<input type="checkbox"/>	<input type="checkbox"/>	*Exposed bankside roots	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Occasional clumps	<input type="checkbox"/>	<input type="checkbox"/>	*Underwater tree roots	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Semi-continuous	<input type="checkbox"/>	<input type="checkbox"/>	Fallen trees	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Continuous	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Large woody debris	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
K EXTENT OF CHANNEL AND BANK FEATURES (tick one box for each feature) *record even if <1%							
	None	Present	E (>33%)	None	Present	E (>33%)	
*Free fall flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed bedrock	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chute flow	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Exposed boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Broken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated bedrock/boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unbroken standing waves	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Unvegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rippled flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*Upwelling	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Mature island(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smooth flow	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Unvegetated side bar(s)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
No perceptible flow	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Vegetated side bar(s)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No flow (dry)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marginal deadwater	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eroding cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Unvegetated silt deposit(s)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Stable cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Discrete unvegetated sand deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				*Discrete unvegetated gravel deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 119: 020-RH1-099-001

SITE REF.		RIVER HABITAT SURVEY : DIMENSIONS AND INFLUENCES Page 4 of 4			
L CHANNEL DIMENSIONS (to be measured at one location on a straight uniform section, preferably across a riffle)					
LEFT BANK		CHANNEL		RIGHT BANK	
Banktop height (m)	0.5	Bankfull width (m)	6	Banktop height (m)	2
Is banktop height also bankfull height? (Y or N)	N	Water width (m)	1	Is banktop height also bankfull height? (Y or N)	Y
Embanked height (m)		Water depth (m)	0.30	Embanked height (m)	
If trashline lower than banktop, indicate: height above water (m) = _____ width from bank to bank (m) = _____					
Bed material at site is: consolidated <input type="checkbox"/> unconsolidated (loose) <input checked="" type="checkbox"/> unknown <input type="checkbox"/>					
Location of measurements is: riffle <input type="checkbox"/> other <input checked="" type="checkbox"/> (state) SC 10					
M FEATURES OF SPECIAL INTEREST Use ✓ or E (> 33% length) *record even if < 1%					
None	<input checked="" type="checkbox"/>	Very large boulders (>1m)	<input type="checkbox"/>	Backwater(s)	<input type="checkbox"/>
Braided channels	<input type="checkbox"/>	*Debris dam(s)	<input type="checkbox"/>	Floodplain boulder deposits	<input type="checkbox"/>
Side channel(s)	<input type="checkbox"/>	*Leafy debris	<input type="checkbox"/>	Water meadow(s)	<input type="checkbox"/>
*Natural waterfall(s) > 5m high	<input type="checkbox"/>	Fringing reed-bank(s)	<input type="checkbox"/>	Fen(s)	<input type="checkbox"/>
*Natural waterfall(s) < 5m high	<input type="checkbox"/>	Quaking bank(s)	<input type="checkbox"/>	Bog(s)	<input type="checkbox"/>
Natural cascade(s)	<input type="checkbox"/>	*Sink hole(s)	<input type="checkbox"/>	Wet woodland(s)	<input type="checkbox"/>
				Marsh(es)	<input type="checkbox"/>
				Flush(es)	<input type="checkbox"/>
				Natural open water	<input type="checkbox"/>
				Others (state)	<input type="checkbox"/>
N CHOKED CHANNEL (tick one box)					
Is 33% or more of the channel choked with vegetation? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>					
O NOTABLE NUISANCE PLANT SPECIES Use ✓ or E (> 33% length) *record even if < 1%					
None	<input checked="" type="checkbox"/>	*Giant hogweed	<input type="checkbox"/>	*Himalayan balsam	<input type="checkbox"/>
		*Japanese knotweed	<input type="checkbox"/>	*Other (state).....	<input type="checkbox"/>
P OVERALL CHARACTERISTICS (Circle appropriate words, add others as necessary)					
Major impacts: landfill - tipping - litter - sewage - pollution - drought - abstraction - mill - dam - road - rail - industry - housing mining - quarrying - overdeepening - afforestation - fisheries management - silting - waterlogging - hydroelectric power					
Evidence of recent management: dredging - bank mowing - weed cutting - enhancement - river rehabilitation - gravel extraction - other (please specify)					
Animals: otter - mink - water vole - kingfisher - dipper - grey wagtail - sand martin - heron - dragonflies/damselflies					
Other significant observations: if necessary use separate sheet to describe overall characteristics and relevant observations					
Small weir just before sc2. Near est of woody debris and vegetation. 20 meters of the river was paved. Site and weirs are situated on a ridge					
Q ALDERS (tick one box in each of the two categories) *record even if < 1%					
*Alders? None <input type="checkbox"/> Present <input type="checkbox"/> Extensive <input checked="" type="checkbox"/>			*Diseased Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>		
R FIELD SURVEY QUALITY CONTROL (✓ boxes to confirm checks)					
Have you taken at least two photos that illustrate the general character of the site and additional photos of any weirs/ sluices and major/intermediate structures across the channel? <input checked="" type="checkbox"/>					
Have you completed all ten spot-checks and made entries in all boxes in E & F on page 2? <input checked="" type="checkbox"/>					
Have you completed column 11 of section G (and E if appropriate) on page 2? <input checked="" type="checkbox"/>					
Have you recorded in section C the number of riffles, pools and point bars (even if 0) on page 1? <input checked="" type="checkbox"/>					
Have you given an accurate (alphanumeric) grid reference for spot-checks 1, 6 and end of site (page 1)? <input checked="" type="checkbox"/>					
Have you stated whether spot-check 1 is at the upstream or downstream end of the site (top of page 2)? <input checked="" type="checkbox"/>					
Have you cross-checked your spot-check and sweep-up responses with the channel modification indicators given on page 2 of the spot-check key? <input checked="" type="checkbox"/>					

Cherwell (CFA 15)

020-RH1-104-001

Figure 120: 020-RH1-104-001

RIVER HABITAT SURVEY 2003 Version				Page 1 of 4			
A FIELD SURVEY DETAILS							
Site Number: leave blank if new site Site Reference: 020-RH1-104-001 Spot-check 1 Grid Ref: SP54342 44606 Spot-check 6 Grid Ref: SP53116 44707 End of site Grid Ref: SP53856 44700 Reach Reference: Crossing 64, R36-2 River name: Stream/ditch Date: 4/15/2013 Time: 11:00 Surveyor name: Sarah Modyett Accredited Surveyor code: FA019	Is the site part of a river or an artificial channel? River <input type="checkbox"/> Artificial <input checked="" type="checkbox"/> Are adverse conditions affecting survey? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> If yes, state Is bed of river visible? barely or not <input type="checkbox"/> partially <input type="checkbox"/> ± entirely <input checked="" type="checkbox"/> Is health and safety assessment form attached? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Number of photographs taken: 7 Photo references: 020-RH1-104-001 P1 040613, 020-RH1-104-001 P2 040613, 020-RH1-104-001 P4 040613, 020-RH1-104-001 P6 040613, 020-RH1-104-001 P8 040613, Site surveyed from: left bank <input checked="" type="checkbox"/> right bank <input type="checkbox"/> channel <input type="checkbox"/>						
B PREDOMINANT VALLEY FORM (within the horizon limit) (tick one box only)							
(tick one box only) <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <input checked="" type="checkbox"/> shallow vee </div> <div style="text-align: center;"> <input type="checkbox"/> concave/bowl </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;"> <input type="checkbox"/> deep vee </div> <div style="text-align: center;"> <input type="checkbox"/> asymmetrical valley </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;"> <input type="checkbox"/> gorge </div> <div style="text-align: center;"> <input type="checkbox"/> U-shape valley </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;"> <input type="checkbox"/> no obvious valley sides </div> </div>							
Distinct flat valley bottom? No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> Natural terraces? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>							
C NUMBER OF RIFFLES, POOLS AND POINT BARS (enter total number in boxes)							
Riffle(s) 0 Pool(s) 0	Unvegetated point bar(s) 0 Vegetated point bar(s) 0						
D ARTIFICIAL FEATURES (indicate total number of occurrences of each category within the 500m site)							
If none, tick box <input type="checkbox"/>							
	Major	Intermediate	Minor	Major	Intermediate	Minor	
Weirs/slucices				Outfalls/intakes			
Culverts				Fords			
Bridges				Deflectors/groynes/crocs			
Other - state							
Is channel obviously realigned? No <input type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input checked="" type="checkbox"/> Is channel obviously over-deepened? No <input checked="" type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input checked="" type="checkbox"/> Is water impounded by weir/dam? No <input checked="" type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input type="checkbox"/>							

* 020-RH1-104-001 P7 040613 ,

Figure 121: 020-RH1-104-001

SITE REF.	RIVER HABITAT SURVEY: TEN SPOT-CHECKS										Page 2 of 4
Spot-check 1 is at: upstream end <input checked="" type="checkbox"/> downstream end <input type="checkbox"/> of site (tick one box)											
E PHYSICAL ATTRIBUTES (to be assessed across channel within 1m wide transect)											
When boxes 'bordered', only one entry allowed	1 GPS	2	3	4	5	6 GPS	7	8	9	10	GPS
LEFT BANK	Ring EC or SC if composed of sandy substrate										
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM	ER	ER	NO	NV	RS	RS	NC	NC	NK	RS	
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB	NO	NO	NO	NV	NO	NO	NO	NO	NO	NO	NO
CHANNEL	GP: ring either G or P if predominant										
Channel substrate NV, BE, BO, CO, GP, SA, SI, CL, PE, EA, AR	SI	SI	SI	NV	SI	SI	SI	SI	SI	SI	SI
Flow-type NV, FF, CH, BW, UW, CF, RP, UP, SM, NP, DR	NP	NP	RP	NV	NP	NP	NP	NP	NP	NP	SM
Channel modification(s) NK, NO, CV, RS, RI, DA, FO	RS	RS	NO	NV	RS	RS	NC	NC	NK	RS	
Channel feature(s) NV, NO, EB, RO, VR, MB, VB, MI, TR	NO	NO	NO	NV	NO	NO	NO	NO	NO	NO	NO
For braided rivers only: number of sub-channels											
RIGHT BANK	Ring EC or SC if composed of sandy substrate										
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI	EA	EA	EA	NV	EA	EA	ER	EA	EA	EA	EA
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM	RS	RS	NO	NV	RS	RS	NC	NC	NK	RS	
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB	NO	NO	NO	NV	NO	NO	NO	NO	NO	NO	NO
F BANKTOP LAND-USE AND VEGETATION STRUCTURE (to be assessed over a 10m wide transect)											
Land-use: choose one from BL, BP, CW, CP, SH, OR, WL, MH, AW, OW, RP, IG, TH, RD, SU, TL, IL, PG, NV											
LAND-USE WITHIN 5m OF LEFT BANKTOP	BL	BL	BL	SH	SH	TH	TH	TH	SH	TH	
LEFT BANKTOP (structure within 1m) B/U/S/C/NV	S	S	S	S	S	S	S	S	S	S	S
LEFT BANK-FACE (structure) B/U/S/C/NV	S	S	S	S	S	S	S	S	S	S	S
RIGHT BANK-FACE (structure) B/U/S/C/NV	S	S	S	S	S	S	S	S	S	S	S
RIGHT BANKTOP (structure within 1m) B/U/S/C/NV	S	S	S	S	S	S	S	S	S	S	S
LAND-USE WITHIN 5m OF RIGHT BANKTOP	BL	TH	BL	SH	TH	SH	SH	SH	SH	SH	SH
G CHANNEL VEGETATION TYPES (to be assessed over a 10m wide transect; use E (> 1% area), ✓ (present) or NV (not visible))											
None (✓) or Not Visible (NV)	✓	✓	NV						✓		
Liverworts/mosses/lichens											
Emergent broad-leaved herbs					E	E	E	✓		E	✓
Emergent reeds/sedges/rushes/grasses/horsetails										E	✓
Floating-leaved (rooted)											
Free-floating											
Amphibious			✓	✓	✓	✓	✓	✓	✓	✓	✓
Submerged broad-leaved											
Submerged linear-leaved											
Submerged fine-leaved											
Filamentous algae											
Use end column for overall assessment over 500m, including types not occurring in spot-checks (use ✓, E or NV)											↑

Enter channel substrate(s) not occurring as predominant in spot-checks but present in >1% of whole site.

Figure 122: 020-RH1-104-001

SITE REF.		RIVER HABITAT SURVEY : 500m SWEEP-UP				Page 3 of 4	
H LAND-USE WITHIN 50m OF BANKTOP Use ✓ (present) or E (≥ 33% banklength)							
	L	R		L	R		
Broadleaf/mixed woodland (semi-natural) (BL)	E	E	Natural open water (OW)				
Broadleaf/mixed plantation (BP)			Rough/unimproved grassland/pasture (RP)				
Coniferous woodland (semi-natural) (CW)			Improved/semi-improved grassland (IG)				
Coniferous plantation (CP)			Tall herb/rank vegetation (TH)	E	✓		
Scrub & shrubs (SH)	✓	E	Rock, scree or sand dunes (RD)				
Orchard (OR)			Suburban/urban development (SU)				
Wetland (e.g. bog, marsh, fen) (WL)	✓		Tilled land (TL)	E	E		
Moorland/heath (MH)			Irrigated land (IL)				
Artificial open water (AW)			Parkland or gardens (PG)				
			Not visible (NV)				
I BANK PROFILES Use ✓ (present) or E (≥ 33% banklength)							
Natural/unmodified		L	R	Artificial/modified		L	R
Vertical/undercut				Resectioned (reprofiled)		E	E
Vertical with toe				Reinforced - whole		✓	✓
Steep (>45°)		E	E	Reinforced - top only			
Gentle		✓	✓	Reinforced - toe only			
Composite				Artificial two-stage			
Natural berm				Poached bank			
				Embanked		✓	
				Set-back embankment			
J EXTENT OF TREES AND ASSOCIATED FEATURES *record even if <1%							
TREES (tick one box per bank)				ASSOCIATED FEATURES (tick one box per feature)			
	Left	Right		None	Present	E (≥33%)	
None	<input type="checkbox"/>	<input type="checkbox"/>	Shading of channel	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Isolated/scattered	<input type="checkbox"/>	<input type="checkbox"/>	*Overhanging boughs	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Regularly spaced, single	<input type="checkbox"/>	<input checked="" type="checkbox"/>	*Exposed bankside roots	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Occasional clumps	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	*Underwater tree roots	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Semi-continuous	<input type="checkbox"/>	<input type="checkbox"/>	Fallen trees	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Continuous	<input type="checkbox"/>	<input type="checkbox"/>	Large woody debris	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
K EXTENT OF CHANNEL AND BANK FEATURES (tick one box for each feature) *record even if <1%							
	None	Present	E (≥33%)	None	Present	E (≥33%)	
*Free fall flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed bedrock	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chute flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Broken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated bedrock/boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unbroken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rippled flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*Upwelling	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Mature island(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smooth flow	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Unvegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No perceptible flow	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Vegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No flow (dry)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Unvegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marginal deadwater	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eroding cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Unvegetated silt deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stable cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Discrete unvegetated sand deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				*Discrete unvegetated gravel deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 123: 020-RH1-104-001

SITE REF.		RIVER HABITAT SURVEY : DIMENSIONS AND INFLUENCES				Page 4 of 4
L CHANNEL DIMENSIONS (to be measured at one location on a straight uniform section, preferably across a riffle)						
LEFT BANK		CHANNEL		RIGHT BANK		
Banktop height (m)	2.5	Bankfull width (m)	10	Banktop height (m)	2.5	
Is banktop height also bankfull height? (Y or N)	N	Water width (m)	0.4	Is banktop height also bankfull height? (Y or N)	N	
Embanked height (m)	/	Water depth (m)	0.05	Embanked height (m)	/	
If trashline lower than banktop, indicate: height above water (m) = / width from bank to bank (m) = /						
Bed material at site is: consolidated <input type="checkbox"/> unconsolidated (loose) <input checked="" type="checkbox"/> unknown <input type="checkbox"/>						
Location of measurements is: riffle <input type="checkbox"/> other <input checked="" type="checkbox"/> (state) <i>Spotcheck 10</i>						
M FEATURES OF SPECIAL INTEREST Use / or E (> 33% length) *record even if <1%						
None <input type="checkbox"/>	Very large boulders (>1m) <input type="checkbox"/>	Backwater(s) <input type="checkbox"/>	Marsh(es) <input checked="" type="checkbox"/>			
Braided channels <input type="checkbox"/>	*Debris dam(s) <input type="checkbox"/>	Floodplain boulder deposits <input type="checkbox"/>	Flush(es) <input type="checkbox"/>			
Side channel(s) <input type="checkbox"/>	*Leafy debris <input type="checkbox"/>	Water meadow(s) <input type="checkbox"/>	Natural open water <input type="checkbox"/>			
*Natural waterfall(s) > 5m high <input type="checkbox"/>	Fringing reed-bank(s) <input type="checkbox"/>	Fen(s) <input type="checkbox"/>	Others (state) <input type="checkbox"/>			
*Natural waterfall(s) < 5m high <input type="checkbox"/>	Quaking bank(s) <input type="checkbox"/>	Bog(s) <input type="checkbox"/>				
Natural cascade(s) <input type="checkbox"/>	*Sink hole(s) <input type="checkbox"/>	Wet woodland(s) <input type="checkbox"/>				
N CHOKED CHANNEL (tick one box)						
Is 33% or more of the channel choked with vegetation? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>						
O NOTABLE NUISANCE PLANT SPECIES Use / or E (> 33% length) *record even if <1%						
None <input checked="" type="checkbox"/>	bankface banktop to 50m		bankface banktop to 50m			
*Giant hogweed <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Himalayan balsam <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
*Japanese knotweed <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Other (state)..... <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
P OVERALL CHARACTERISTICS (Circle appropriate words, add others as necessary)						
Major impacts: landfill - tipping - litter - sewage - pollution - drought - abstraction - mill - dam - road - rail - industry - housing mining - quarrying - overdeepening - afforestation - fisheries management - silting - waterlogging - hydroelectric power						
Evidence of recent management: dredging - bank mowing - weed cutting - enhancement - river rehabilitation - gravel extraction - other (please specify)						
Animals: otter - mink - water vole - kingfisher - dipper - grey wagtail - sand martin - heron - dragonflies/damselflies						
Other significant observations: if necessary use separate sheet to describe overall characteristics and relevant observations						
<i>Straight damage / erod bankway ditch, deepened.</i>						
<i>Early-purple orchid (Orchis mascula)</i>						
Q ALDERS (tick one box in each of the two categories) *record even if <1%						
*Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/>		Extensive <input type="checkbox"/>		*Diseased Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/>		
			Extensive <input type="checkbox"/>			
R FIELD SURVEY QUALITY CONTROL (/ boxes to confirm checks)						
Have you taken at least two photos that illustrate the general character of the site and additional photos of any weirs/ sluices and major/intermediate structures across the channel? <input checked="" type="checkbox"/>						
Have you completed all ten spot-checks and made entries in all boxes in E & F on page 2? <input checked="" type="checkbox"/>						
Have you completed column 11 of section G (and E if appropriate) on page 2? <input checked="" type="checkbox"/>						
Have you recorded in section C the number of riffles, pools and point bars (even if 0) on page 1? <input checked="" type="checkbox"/>						
Have you given an accurate (alphanumeric) grid reference for spot-checks 1, 6 and end of site (page 1)? <input checked="" type="checkbox"/>						
Have you stated whether spot-check 1 is at the upstream or downstream end of the site (top of page 2)? <input checked="" type="checkbox"/>						
Have you cross-checked your spot-check and sweep-up responses with the channel modification indicators given on page 2 of the spot-check key? <input checked="" type="checkbox"/>						

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Figure 124: 020-RH1-105-001

RIVER HABITAT SURVEY 2003 Version		Page 1 of 4																
A FIELD SURVEY DETAILS																		
Site Number: leave blank if new site Site Reference: 020-RH1-105-001 Spot-check 1 Grid Ref: SP53742 45185 Spot-check 6 Grid Ref: SP53616 45332 End of site Grid Ref: SP53528 45509 Reach Reference: River name: Lower Thorpe Brook Date: 7/5/2013 Time: 14:30 Surveyor name: Zoë TRENT Accredited Surveyor code: LT061	Is the site part of a river or an artificial channel? River <input checked="" type="checkbox"/> Artificial <input type="checkbox"/> Are adverse conditions affecting survey? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> If yes, state Is bed of river visible? barely or not <input type="checkbox"/> partially <input type="checkbox"/> ± entirely <input checked="" type="checkbox"/> Is health and safety assessment form attached? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Number of photographs taken: 5 Photo references: P1, P2, P3, P4, P6 Site surveyed from: left bank <input type="checkbox"/> right bank <input checked="" type="checkbox"/> channel <input type="checkbox"/> <input type="checkbox"/> When options shown with 'shadow boxes', tick one box only																	
B PREDOMINANT VALLEY FORM (within the horizon limit) (tick one box only)																		
(tick one box only) <table style="width:100%; border: none;"> <tr> <td style="width: 33%; text-align: center;"></td> <td style="width: 33%;"><input checked="" type="checkbox"/> shallow vee</td> <td style="width: 33%; text-align: center;"></td> <td><input type="checkbox"/> concave/bowl</td> </tr> <tr> <td style="text-align: center;"></td> <td><input type="checkbox"/> deep vee</td> <td style="text-align: center;"></td> <td><input type="checkbox"/> asymmetrical valley</td> </tr> <tr> <td style="text-align: center;"></td> <td><input type="checkbox"/> gorge</td> <td style="text-align: center;"></td> <td><input type="checkbox"/> U-shape valley</td> </tr> <tr> <td colspan="2"></td> <td style="text-align: center;"></td> <td><input type="checkbox"/> no obvious valley sides</td> </tr> </table>				<input checked="" type="checkbox"/> shallow vee		<input type="checkbox"/> concave/bowl		<input type="checkbox"/> deep vee		<input type="checkbox"/> asymmetrical valley		<input type="checkbox"/> gorge		<input type="checkbox"/> U-shape valley				<input type="checkbox"/> no obvious valley sides
	<input checked="" type="checkbox"/> shallow vee		<input type="checkbox"/> concave/bowl															
	<input type="checkbox"/> deep vee		<input type="checkbox"/> asymmetrical valley															
	<input type="checkbox"/> gorge		<input type="checkbox"/> U-shape valley															
			<input type="checkbox"/> no obvious valley sides															
Distinct flat valley bottom? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> Natural terraces? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>																		
C NUMBER OF RIFFLES, POOLS AND POINT BARS (enter total number in boxes)																		
Riffle(s)	<input type="text" value="0"/>	Unvegetated point bar(s)	<input type="text" value="0"/>															
Pool(s)	<input type="text" value="0"/>	Vegetated point bar(s)	<input type="text" value="0"/>															
D ARTIFICIAL FEATURES (indicate total number of occurrences of each category within the 500m site)																		
if none, tick box <input type="checkbox"/>		Major	Intermediate	Minor		Major	Intermediate	Minor										
	Weirs/sluiques				Outfalls/intakes													
	Culverts				Fords													
	Bridges				Deflectors/groynes/croys													
	Other - state																	
		Is channel obviously realigned? No <input type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input checked="" type="checkbox"/>																
		Is channel obviously over-deepened? No <input type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input checked="" type="checkbox"/>																
		Is water impounded by weir/dam? No <input checked="" type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input type="checkbox"/>																

Photo 46 culvert

Figure 125: 020-RH1-105-001

SITE REF. 020-RH1-105-001		RIVER HABITAT SURVEY: TEN SPOT-CHECKS										Page 2 of 4		
Spot-check 1 is at:		upstream end <input checked="" type="checkbox"/>		downstream end <input type="checkbox"/>		of site (tick one box)								
E PHYSICAL ATTRIBUTES (to be assessed across channel within 1m wide transect)														
When boxes 'bordered', only one entry allowed		1	GPS	2	3	4	5	6	GPS	7	8	9	10	GPS
LEFT BANK		Ring EC or SC if composed of sandy substrate												
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI		EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	CC
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM		NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	RS/RI
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB		NO	NO	SC	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
CHANNEL		GP: Ring either C or P if predominant												
Channel substrate NV, BE, BO, CO, GP, SA, SI, CL, PE, EA, AR		SI	SI	CO	SI	SI	SI	SI	SI	SI	SI	SI	SI	NV
Flow-type NV, FF, CH, BW, UW, CF, RP, UP, SM, NP, DR		RP	SM	RP	SM	SM	SM	SM	SM	SM	SM	RP	NP	NV
Channel modification(s) NK, NO, CV, RS, RI, DA, FO		RS	RS	RS	RS	RS	NO	NO	NO	NO	NO	NO	NO	CV
Channel feature(s) NV, NO, EB, RO, VR, MB, VB, MI, TR		NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
For braided rivers only: number of sub-channels		/	/	/	/	/	/	/	/	/	/	/	/	/
RIGHT BANK		Ring EC or SC if composed of sandy substrate												
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI		EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	CC
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM		NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	RS/RI
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB		NO	NO	SC	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
F BANKTOP LAND USE AND VEGETATION STRUCTURE (to be assessed over a 10m wide transect)														
Land-use: choose one from BL, BP, CW, CP, SH, OR, WL, MH, AW, OW, RP, IG, TH, RD, SU, TL, IL, PG, NV														
LAND-USE WITHIN 5m OF LEFT BANKTOP		IG	IG	IG	IG	IG	IG	IG	IG	IG	IG	IG	IG	SU
LEFT BANKTOP (structure within 1m) B/U/S/C/NV		S	C	S	S	S	S	S	S	S	S	S	S	B
LEFT BANK-FACE (structure) B/U/S/C/NV		B	S	C	C	S	C	S	S	S	S	S	S	B
RIGHT BANK-FACE (structure) B/U/S/C/NV		B	S	S	C	S	S	S	S	S	S	C	B	B
RIGHT BANKTOP (structure within 1m) B/U/S/C/NV		S	S	S	S	S	S	S	S	S	S	S	S	B
LAND-USE WITHIN 5m OF RIGHT BANKTOP		WL	WL	IG	IG	IG	IG	OW	OW	OW	OW	OW	OW	SU
G CHANNEL VEGETATION TYPES (to be assessed over a 10m wide transect) (use EC > 33% area) (✓ present, (NV) not visible)														
None (✓) or Not Visible (NV)							✓	✓	✓	✓	✓	✓	✓	✓
Liverworts/mosses/lichens														
Emergent broad-leaved herbs				✓	✓	✓								✓
Emergent reeds/sedges/rushes/grasses/horsetails			✓	✓		✓					✓			✓
Floating-leaved (rooted)														
Free-floating														
Amphibious														
Submerged broad-leaved		✓												✓
Submerged linear-leaved			✓											✓
Submerged fine-leaved														
Filamentous algae														
Use end column for overall assessment over 500m, including types not occurring in spot-checks (use ✓, E or NV)														

↑ Enter channel substrate(s) not occurring as predominant in spot-checks but present in >1% of whole site.

plants 42 plants 43

Figure 126: 020-RH1-105-001


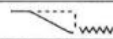






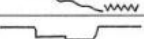





SITE REF. 020-RH1-105-001		RIVER HABITAT SURVEY : 500m SWEEP-UP				Page 3 of 4	
H LAND-USE WITHIN 50m OF BANKTOP Use ✓ (present) or E (≥ 33% banklength)							
	L	R		L	R		
Broadleaf/mixed woodland (semi-natural) (BL)		✓	Natural open water (OW)				
Broadleaf/mixed plantation (BP)			Rough/unimproved grassland/pasture (RP)				
Coniferous woodland (semi-natural) (CW)			Improved/semi-improved grassland (IG)	E	E		
Coniferous plantation (CP)			Tall herb/rank vegetation (TH)				
Scrub & shrubs (SH)	✓	✓	Rock, scree or sand dunes (RD)				
Orchard (OR)			Suburban/urban development (SU)				
Wetland (e.g. bog, marsh, fen) (WL)			Tilled land (TL)				
Moorland/heath (MH)			Irrigated land (IL)				
Artificial open water (AW)		E	Parkland or gardens (PG)				E
			Not visible (NV)				
I BANK PROFILES Use ✓ (present) or E (≥ 33% banklength)							
Natural/unmodified	L	R	Artificial/modified	L	R		
Vertical/undercut 			Resectioned (reprofiled) 		✓		
Vertical with toe 			Reinforced - whole 				
Steep (>45°) 	E	E	Reinforced - top only 				
Gentle 	✓		Reinforced - toe only 				
Composite 			Artificial two-stage 				
Natural berm 			Poached bank 				
			Embanked 				
			Set-back embankment 				
J EXTENT OF TREES AND ASSOCIATED FEATURES (tick one box per feature)							
TREES (tick one box per bank)				ASSOCIATED FEATURES (tick one box per feature)			
	Left	Right		None	Present	E (≥33%)	
None	<input type="checkbox"/>	<input type="checkbox"/>	Shading of channel	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Isolated/scattered	<input type="checkbox"/>	<input type="checkbox"/>	*Overhanging boughs	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Regularly spaced, single	<input type="checkbox"/>	<input type="checkbox"/>	*Exposed bankside roots	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Occasional clumps	<input type="checkbox"/>	<input type="checkbox"/>	*Underwater tree roots	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Semi-continuous	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Fallen trees	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Continuous	<input type="checkbox"/>	<input type="checkbox"/>	Large woody debris	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
K EXTENT OF CHANNEL AND BANK FEATURES (tick one box for each feature)							
	None	Present	E(≥33%)	None	Present	E(≥33%)	
*Free fall flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed bedrock	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chute flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Broken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated bedrock/boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unbroken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rippled flow	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Vegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*Upwelling	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Mature island(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smooth flow	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Unvegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No perceptible flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No flow (dry)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marginal deadwater	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eroding cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Unvegetated silt deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stable cliff(s)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	*Discrete unvegetated sand deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				*Discrete unvegetated gravel deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 127: 020-RH1-105-001

SITE REF. <i>020-RH1-105-001</i>		RIVER HABITAT SURVEY : DIMENSIONS AND INFLUENCES		Page 4 of 4	
L CHANNEL DIMENSIONS (to be measured at one location on a straight uniform section, preferably across a riffle)					
LEFT BANK		CHANNEL		RIGHT BANK	
Banktop height (m)	<i>0.30</i>	Bankfull width (m)	<i>1</i>	Banktop height (m)	<i>2.00</i>
Is banktop height also bankfull height? (Y or N)	<i>Y</i>	Water width (m)	<i>0.50</i>	Is banktop height also bankfull height? (Y or N)	<i>N</i>
Embanked height (m)	<i>N/A</i>	Water depth (m)	<i>0.05</i>	Embanked height (m)	<i>NA</i>
If trashline lower than banktop, indicate: height above water (m) = <i>/</i> width from bank to bank (m) = <i>/</i>					
Bed material at site is: consolidated <input type="checkbox"/> unconsolidated (loose) <input checked="" type="checkbox"/> unknown <input type="checkbox"/>					
Location of measurements is: riffle <input type="checkbox"/> other <input checked="" type="checkbox"/> (state) <i>In btw SC 8+9</i>					
M FEATURES OF SPECIAL INTEREST (Use Y or E (> 33% length), *record even if <1%)					
None <input type="checkbox"/>	Very large boulders (>1m) <input type="checkbox"/>	Backwater(s) <input type="checkbox"/>	Marsh(es) <input type="checkbox"/>		
Braided channels <input type="checkbox"/>	*Debris dam(s) <input type="checkbox"/>	Floodplain boulder deposits <input type="checkbox"/>	Flush(es) <input type="checkbox"/>		
Side channel(s) <input type="checkbox"/>	*Leafy debris <input type="checkbox"/>	Water meadow(s) <input type="checkbox"/>	Natural open water <input checked="" type="checkbox"/>		
*Natural waterfall(s) > 5m high <input type="checkbox"/>	Fringing reed-bank(s) <input type="checkbox"/>	Fen(s) <input type="checkbox"/>	Others (state) <input type="checkbox"/>		
*Natural waterfall(s) < 5m high <input type="checkbox"/>	Quaking bank(s) <input type="checkbox"/>	Bog(s) <input type="checkbox"/>			
Natural cascade(s) <input type="checkbox"/>	*Sink hole(s) <input type="checkbox"/>	Wet woodland(s) <input type="checkbox"/>			
N CHOKED CHANNEL (tick one box)					
Is 33% or more of the channel choked with vegetation? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>					
O NOTABLE NUISANCE PLANT SPECIES (Use Y or E (> 33% length), *record even if <1%)					
None <input checked="" type="checkbox"/>	bankface banktop to 50m		bankface banktop to 50m		
*Giant hogweed <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Himalayan balsam <input type="checkbox"/>	<input type="checkbox"/>	
*Japanese knotweed <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Other (state)..... <input type="checkbox"/>	<input type="checkbox"/>	
P OVERALL CHARACTERISTICS (Circle appropriate words, add others as necessary)					
Major impacts: landfill - tipping - litter - sewage - pollution - drought - abstraction - mill - dam - road - rail - industry - housing mining - quarrying - overdeepening - afforestation - fisheries management - silting - waterlogging - hydroelectric power					
Evidence of recent management: dredging - bank mowing - weed cutting - enhancement - river rehabilitation - gravel extraction - other (please specify)					
Animals: otter - mink - water vole - kingfisher - dipper - grey wagtail - sand martin - heron - dragonflies/damselflies					
Other significant observations: if necessary use separate sheet to describe overall characteristics and relevant observations <i>Small stream altered in Medieval times. Upper stream fills Medieval ponds which drain into this stream. NB: Recorded as natural open water although created in medieval times.</i>					
Q ALDERS (tick one box in each of the two categories) (*record even if <1%)					
*Alders? None <input type="checkbox"/> Present <input checked="" type="checkbox"/> Extensive <input type="checkbox"/>			*Diseased Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>		
R FIELD SURVEY QUALITY CONTROL (✓ boxes to confirm checks)					
Have you taken at least two photos that illustrate the general character of the site and additional photos of any weirs/ sluices and major/intermediate structures across the channel? <input checked="" type="checkbox"/>					
Have you completed all ten spot-checks and made entries in all boxes in E & F on page 2? <input checked="" type="checkbox"/>					
Have you completed column 11 of section G (and E if appropriate) on page 2? <input checked="" type="checkbox"/>					
Have you recorded in section C the number of riffles, pools and point bars (even if 0) on page 1? <input checked="" type="checkbox"/>					
Have you given an accurate (alphanumeric) grid reference for spot-checks 1, 6 and end of site (page 1)? <input checked="" type="checkbox"/>					
Have you stated whether spot-check 1 is at the upstream or downstream end of the site (top of page 2)? <input checked="" type="checkbox"/>					
Have you cross-checked your spot-check and sweep-up responses with the channel modification indicators given on page 2 of the spot-check key? <input checked="" type="checkbox"/>					

020-RH1-105-002

Figure 128: 020-RH1-105-002

RIVER HABITAT SURVEY 2003 Version Page 1 of 4

A FIELD SURVEY DETAILS

Site Number: leave blank if new site

Site Reference: 020-RH1-105-002
 NN272059, Crossing 676
 Spot-check 1 Grid Ref: SP52789 45812

Spot-check 6 Grid Ref: SP5303045879

End of site Grid Ref: SP53319 45849

Reach Reference: NN272059,
 Crossing 676.

River name: Ditch.

Date 4/6/2013 Time: 15:00

Surveyor name: Sarah Rodgett

Accredited Surveyor code: FA19

Is the site part of a river or an artificial channel? River Artificial

Are adverse conditions affecting survey? No Yes

If yes, state

Is bed of river visible? barely or not partially ±entirely

Is health and safety assessment form attached? Yes No

Number of photographs taken: 10

Photo references: 020-RH1-105-002 P1 040613
 020-RH1-105-002 P2 040613
 020-RH1-105-002 P3 040613 *

Site surveyed from: left bank right bank channel

When options shown with 'shadow boxes', tick one box only

LEFT banks determined by facing downstream **RIGHT**

B PREDOMINANT VALLEY FORM (within the horizon limit) (tick one box only)

(tick one box only)

shallow vee concave/bowl

deep vee asymmetrical valley

gorge U-shape valley

no obvious valley sides

Distinct flat valley bottom? No Yes Natural terraces? No Yes

C NUMBER OF RIFFLES, POOLS AND POINT BARS (enter total number in boxes)

Riffle(s) Unvegetated point bar(s)

Pool(s) Vegetated point bar(s)

D ARTIFICIAL FEATURES (indicate total number of occurrences of each category within the 500m site)

If none, tick box	Major			Intermediate			Minor			
	Major	Intermediate	Minor	Major	Intermediate	Minor	Major	Intermediate	Minor	
<input type="checkbox"/>	Weirs/sluices	(one)				(one)	Outfalls/intakes			(one)
<input type="checkbox"/>	Culverts						Fords			
<input type="checkbox"/>	Bridges						Deflectors/groynes/croys			
<input type="checkbox"/>	Other - state.									

Is channel obviously realigned? No Yes, <33% of site ≥33% of site

Is channel obviously over-deepened? No Yes, <33% of site ≥33% of site

Is water impounded by weir/dam? No Yes, <33% of site ≥33% of site

* 020-RH1-105-002 P4 040613, 020-RH1-105-002 PS 040613,
 020-RH1-105-002 P6 040613, 020-RH1-105-002 P7 040613,
 020-RH1-105-002 P8 040613, 020-RH1-105-002 P9 040613,
 2.5 020-RH1-105-002 P10 040613

River Habitat Survey Manual: 2003 version

Figure 129: 020-RH1-105-002

SITE REF.	RIVER HABITAT SURVEY: TEN SPOT-CHECKS										Page 2 of 4	
Spot-check 1 is at: upstream end <input checked="" type="checkbox"/>	downstream end <input type="checkbox"/>										of site (tick one box)	
E PHYSICAL ATTRIBUTES (to be assessed across channel within 1m wide transect)												
When boxes 'bordered', only one entry allowed	1 GPS	2	3	4	5	6 GPS	7	8	9	10	GPS	
LEFT BANK	Ring EC or SC if composed of sandy substrate											
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI	EA	EA	EA	EA	EA	EA	EA	EA	EA	NV	EA	
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM	RS	RS	RS	RS	RS	RS	RS	RS	RS	RI	NO	
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB	NO	NO	NO	NO	NO	NO	NO	NO	NO	NV	NO	
CHANNEL	GP: ring either G or P if predominant											
Channel substrate NV, BE, BO, CO, GP, SA, SI, CL, PE, EA, AR	SI	SI	SI	SI	SI	SI	SI	SI	SI	NV	SI	CO
Flow-type NV, FF, CH, BW, UW, CF, RP, UP, SM, NP, DR	NP	NP	NP	NP	NP	NP	NP	SM	NV	SM		
Channel modification(s) NK, NO, CV, RS, RI, DA, FO	RS	RS	RS	RS	RS	RS	RS	RS	CV	NO		
Channel feature(s) NV, NO, EB, RO, VR, MB, VB, MI, TR	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
For braided rivers only: number of sub-channels												
RIGHT BANK	Ring EC or SC if composed of sandy substrate											
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI	EA	EA	EA	EA	EA	EA	EA	EA	EA	NV	EA	
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM	RS	RS	RS	RS	RS	RS	RS	RS	RI	NO		
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB	NO	NO	NO	NO	NO	NO	NO	NO	NO	NV	NO	
F BANKTOP LAND-USE AND VEGETATION STRUCTURE (to be assessed over a 10m wide transect)												
Land-use: choose one from BL, BP, CW, CP, SH, OR, WL, MH, AW, OW, RP, IG, TH, RD, SU, TL, IL, PG, NV												
LAND-USE WITHIN 5m OF LEFT BANKTOP	IG	IG	IG	IG	TH	IG	IG	TH	NV	TH		
LEFT BANKTOP (structure within 1m) B/U/S/C/NV	B	S	B	B	B	B	B	B	NV	S		
LEFT BANK-FACE (structure) B/U/S/C/NV	S	S	S	S	S	S	S	S	NV	S		
RIGHT BANK-FACE (structure) B/U/S/C/NV	S	S	S	S	S	S	S	S	NV	S		
RIGHT BANKTOP (structure within 1m) B/U/S/C/NV	S	S	S	S	S	S	S	S	NV	S		
LAND-USE WITHIN 5m OF RIGHT BANKTOP	SH	SH	SH	SH	SH	SH	SH	SH	NV	SH		
G CHANNEL VEGETATION TYPES (to be assessed over a 10m wide transect) use E (≥ 33% area), ✓ (present) or NV (not visible)												
None (✓) or Not Visible (NV)									✓	NV	✓	
Liverworts/mosses/lichens												
Emergent broad-leaved herbs		✓	✓	✓								✓
Emergent reeds/sedges/rushes/grasses/horsetails				✓								✓
Floating-leaved (rooted)					✓	✓						✓
Free-floating												
Amphibious	✓	✓	✓		✓	✓	✓					✓
Submerged broad-leaved												
Submerged linear-leaved												
Submerged fine-leaved												
Filamentous algae												
Use end column for overall assessment over 500m, including types not occurring in spot-checks (use ✓, E or NV)												

↑ Enter channel substrate(s) not occurring as predominant in spot-checks but present in > 1% of whole site.

Figure 130: 020-RH1-105-002

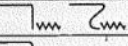
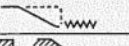
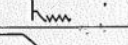

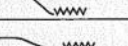
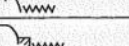
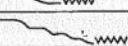
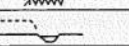
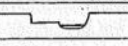
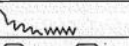



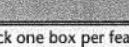
SITE REF.		RIVER HABITAT SURVEY : 500m SWEEP-UP				Page 3 of 4	
H LAND-USE WITHIN 50m OF BANKTOP <small>Use ✓ (present) or E (≥ 33% banklength)</small>							
	L	R		L	R		
Broadleaf/mixed woodland (semi-natural) (BL)			Natural open water (OW)	✓	✓		
Broadleaf/mixed plantation (BP)			Rough/unimproved grassland/pasture (RP)				
Coniferous woodland (semi-natural) (CW)			Improved/semi-improved grassland (IG)	E			
Coniferous plantation (CP)			Tall herb/rank vegetation (TH)	✓	✓		
Scrub & shrubs (SH)	✓	E	Rock, scree or sand dunes (RD)				
Orchard (OR)			Suburban/urban development (SU)				
Wetland (e.g. bog, marsh, fen) (WL)			Tilled land (TL)	E	E		
Moorland/heath (MH)			Irrigated land (IL)				
Artificial open water (AW)			Parkland or gardens (PG)				
			Not visible (NV)				
I BANK PROFILES <small>Use ✓ (present) or E (≥ 33% banklength)</small>							
Natural/unmodified	L	R	Artificial/modified	L	R		
Vertical/undercut 			Resectioned (reprofiled) 	E	E		
Vertical with toe 			Reinforced - whole 	✓	✓		
Steep (>45°) 	E	E	Reinforced - top only 				
Gentle 			Reinforced - toe only 				
Composite 			Artificial two-stage 				
Natural berm 			Poached bank 				
			Embanked 				
			Set-back embankment 				
J EXTENT OF TREES AND ASSOCIATED FEATURES <small>*record even if <1%</small>							
TREES (tick one box per bank)				ASSOCIATED FEATURES (tick one box per feature)			
	Left	Right		None	Present	E (≥33%)	
None	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Shading of channel	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Isolated/scattered	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	*Overhanging boughs	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Regularly spaced, single	<input type="checkbox"/>	<input type="checkbox"/>	*Exposed bankside roots	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Occasional clumps	<input type="checkbox"/>	<input type="checkbox"/>	*Underwater tree roots	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Semi-continuous	<input type="checkbox"/>	<input type="checkbox"/>	Fallen trees	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Continuous	<input type="checkbox"/>	<input type="checkbox"/>	Large woody debris	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
K EXTENT OF CHANNEL AND BANK FEATURES <small>(tick one box for each feature) *record even if <1%</small>							
	None	Present	E (≥33%)	None	Present	E (≥33%)	
*Free fall flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed bedrock	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chute flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Broken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated bedrock/boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unbroken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rippled flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*Upwelling	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Mature island(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smooth flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No perceptible flow	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Vegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No flow (dry)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Unvegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marginal deadwater	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eroding cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Unvegetated silt deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stable cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Discrete unvegetated sand deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				*Discrete unvegetated gravel deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 131: 020-RH1-105-002

SITE REF.		RIVER HABITAT SURVEY : DIMENSIONS AND INFLUENCES				Page 4 of 4
L CHANNEL DIMENSIONS (to be measured at one location on a straight uniform section, preferably across a riffle)						
LEFT BANK		CHANNEL		RIGHT BANK		
Banktop height (m)	3	Bankfull width (m)	3	Banktop height (m)	3	
Is banktop height also bankfull height? (Y or N)	N	Water width (m)	0.2	Is banktop height also bankfull height? (Y or N)	N	
Embanked height (m)	/	Water depth (m)	0.01	Embanked height (m)	/	
If trashline lower than banktop, indicate: height above water (m) = / width from bank to bank (m) = /						
Bed material at site is: consolidated <input type="checkbox"/> unconsolidated (loose) <input checked="" type="checkbox"/> unknown <input type="checkbox"/>						
Location of measurements is: riffle <input type="checkbox"/> other <input checked="" type="checkbox"/> (state) <i>Spadhead - mid</i>						
M FEATURES OF SPECIAL INTEREST (Use Y or E (> 33% length) *record even if <1%)						
None <input type="checkbox"/>	Very large boulders (>1m) <input type="checkbox"/>	Backwater(s) <input type="checkbox"/>	Marsh(es) <input type="checkbox"/>			
Braided channels <input type="checkbox"/>	*Debris dam(s) <input type="checkbox"/>	Floodplain boulder deposits <input type="checkbox"/>	Flush(es) <input type="checkbox"/>			
Side channel(s) <input type="checkbox"/>	*Leafy debris <input type="checkbox"/>	Water meadow(s) <input type="checkbox"/>	Natural open water <input checked="" type="checkbox"/>			
*Natural waterfall(s) > 5m high <input type="checkbox"/>	Fringing reed-bank(s) <input type="checkbox"/>	Fen(s) <input type="checkbox"/>	Others (state) <input type="checkbox"/>			
*Natural waterfall(s) < 5m high <input type="checkbox"/>	Quaking bank(s) <input type="checkbox"/>	Bog(s) <input type="checkbox"/>				
Natural cascade(s) <input type="checkbox"/>	*Sink hole(s) <input type="checkbox"/>	Wet woodland(s) <input type="checkbox"/>				
N CHOKED CHANNEL (tick one box)						
Is 33% or more of the channel choked with vegetation? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>						
O NOTABLE NUISANCE PLANT SPECIES (Use Y or E (> 33% length) *record even if <1%)						
None <input checked="" type="checkbox"/>	bankface	banktop to 50m	bankface	banktop to 50m		
*Giant hogweed <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Himalayan balsam <input type="checkbox"/>	<input type="checkbox"/>		
*Japanese knotweed <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Other (state)..... <input type="checkbox"/>	<input type="checkbox"/>		
P OVERALL CHARACTERISTICS (Circle appropriate words, add others as necessary)						
Major impacts: landfill - tipping - litter - sewage - pollution - drought - abstraction - mill - dam - road - rail - industry - housing - mining - quarrying - overdeepening - afforestation - fisheries management - silting - waterlogging - hydroelectric power						
Evidence of recent management: dredging - bank mowing - weed cutting - enhancement - river rehabilitation - gravel extraction - other (please specify)						
Animals: otter - mink - water vole - kingfisher - dipper - grey wagtail - sand martin - heron - dragonflies/damselflies						
Other significant observations: if necessary use separate sheet to describe overall characteristics and relevant observations						
<i>heavily modified.</i>						
Q ALDERS (tick one box in each of the two categories) *record even if <1%						
*Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>		*Diseased Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>				
R FIELD SURVEY QUALITY CONTROL (/ boxes to confirm checks)						
Have you taken at least two photos that illustrate the general character of the site and additional photos of any weirs/ sluices and major/intermediate structures across the channel? <input checked="" type="checkbox"/>						
Have you completed all ten spot-checks and made entries in all boxes in E & F on page 2? <input checked="" type="checkbox"/>						
Have you completed column 11 of section G (and E if appropriate) on page 2? <input checked="" type="checkbox"/>						
Have you recorded in section C the number of riffles, pools and point bars (even if 0) on page 1? <input checked="" type="checkbox"/>						
Have you given an accurate (alphanumeric) grid reference for spot-checks 1, 6 and end of site (page 1)? <input checked="" type="checkbox"/>						
Have you stated whether spot-check 1 is at the upstream or downstream end of the site (top of page 2)? <input checked="" type="checkbox"/>						
Have you cross-checked your spot-check and sweep-up responses with the channel modification indicators given on page 2 of the spot-check key? <input checked="" type="checkbox"/>						

020-RH1-108-002

Figure 132: 020-RH1-108-002




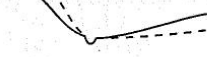



RIVER HABITAT SURVEY 2003 Version				Page 1 of 4			
A FIELD SURVEY DETAILS							
Site Number: <input type="text"/> <small>leave blank if new site</small> Site Reference: 020-RH1-108-002 Spot-check 1 Grid Ref: SP880447894 Spot-check 6 Grid Ref: SP5166947970 End of site Grid Ref: SP515254894 Reach Reference: NN251195 River name: Cherwell Date: 16/20/13 Time: 10:00 Surveyor name: Sarah Hedges Accredited Surveyor code: F819				Is the site part of a river or an artificial channel? River <input checked="" type="checkbox"/> Artificial <input type="checkbox"/> Are adverse conditions affecting survey? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> If yes, state Is bed of river visible? barely or not <input type="checkbox"/> partially <input type="checkbox"/> ±entirely <input checked="" type="checkbox"/> Is health and safety assessment form attached? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Number of photographs taken: 6 Photo references: 020-RH1-108-002 P1 180613, 020-RH1-108-002 P2 180613, 020-RH1-108-002 P3 180613, 020-RH1-108-002 P4 180613, 020-RH1-108-002 P5 180613, 020-RH1-108-002 P6 180613. Site surveyed from: left bank <input type="checkbox"/> right bank <input checked="" type="checkbox"/> channel <input type="checkbox"/>			
<input type="checkbox"/> When options shown with 'shadow boxes', tick one box only LEFT banks determined by facing downstream RIGHT							
B PREDOMINANT VALLEY FORM (within the horizon limit) (tick one box only)							
(tick one box only) <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <input type="checkbox"/> shallow vee  </div> <div style="text-align: center;"> <input checked="" type="checkbox"/> concave/bowl  </div> </div> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <input type="checkbox"/> deep vee  </div> <div style="text-align: center;"> <input type="checkbox"/> asymmetrical valley  </div> </div> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <input type="checkbox"/> gorge  </div> <div style="text-align: center;"> <input type="checkbox"/> U-shape valley  </div> <div style="text-align: center;"> <input type="checkbox"/> no obvious valley sides  </div> </div>							
Distinct flat valley bottom? No <input type="checkbox"/> Yes <input checked="" type="checkbox"/>				Natural terraces? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>			
C NUMBER OF RIFFLES, POOLS AND POINT BARS (enter total number in boxes)							
Riffle(s) <input type="text" value="0"/>		Unvegetated point bar(s) <input type="text" value="0"/>		Pool(s) <input type="text" value="0"/>		Vegetated point bar(s) <input type="text" value="0"/>	
D ARTIFICIAL FEATURES (Indicate total number of occurrences of each category within the 500m site)							
If none, tick box <input type="checkbox"/>	Major	Intermediate	Minor	Major	Intermediate	Minor	
	Weirs/slucices			Outfalls/intakes			
	Culverts			Fords			
	Bridges			Deflectors/groynes/croys			
	Other - state						
Is channel obviously realigned? No <input checked="" type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input type="checkbox"/>				Is channel obviously over-deepened? No <input checked="" type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input type="checkbox"/>			
Is water impounded by weir/dam? No <input checked="" type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input type="checkbox"/>							

Figure 133: 020-RH1-108-002

SITE REF. 020-RH1-108-002		RIVER HABITAT SURVEY: TEN SPOT-CHECKS										Page 2 of 4	
Spot-check 1 is at: upstream end <input checked="" type="checkbox"/> downstream end <input type="checkbox"/> of site (tick one box)													
E PHYSICAL ATTRIBUTES (to be assessed across channel within 1m wide transect)													
When boxes 'bordered', only one entry allowed													
	1	GPS	2	3	4	5	6	GPS	7	8	9	10	GPS
LEFT BANK													
Ring EC or SC if composed of sandy substrate													
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB	NO	SC	NO	NS	NO	NO	NO	NO	NO	NO	NO	NO	NO
CHANNEL													
GP- ring either G or P if predominant													
Channel substrate NV, BE, BO, CO, GP, SA, SI, CL, PE, EA, AR	SI	SI	SI	SI	SI	SI	SI	SI	SI	SI	SI	SI	SI
Flow-type NV, FF, CH, BW, UW, CF, RP, UP, SM, NP, DR	SM	SM	SM	SM	SM	SM	NP	NP	NP	NP	NP	SM	SM
Channel modification(s) NK, NO, CV, RS, RI, DA, FO	NK	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS
Channel feature(s) NV, NO, EB, RO, VR, MB, VB, MI, TR	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
For braided rivers only: number of sub-channels													
RIGHT BANK													
Ring EC or SC if composed of sandy substrate													
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
F BANKTOP LAND USE AND VEGETATION STRUCTURE (to be assessed over a 10m wide transect)													
Land-use: choose one from BL, BP, CW, CP, SH, OR, WL, MH, AW, OW, RP, IG, TH, RD, SU, TL, IL, PG, NV													
LAND-USE WITHIN 5m OF LEFT BANKTOP	SU	IG	IG	IG	IG	IG	TH	TH	TH	TH	TH	TH	TH
LEFT BANKTOP (structure within 1m) B/U/S/C/NV	S	S	S	S	S	S	S	S	S	S	S	S	S
LEFT BANK-FACE (structure) B/U/S/C/NV	S	S	S	S	S	S	S	S	S	S	S	S	S
RIGHT BANK-FACE (structure) B/U/S/C/NV	S	S	S	S	S	S	S	S	S	S	S	S	S
RIGHT BANKTOP (structure within 1m) B/U/S/C/NV	S	S	S	S	S	S	S	S	S	S	S	S	S
LAND-USE WITHIN 5m OF RIGHT BANKTOP	IG	IG	IG	IG	IG	IG	TH	TH	TH	TH	TH	TH	TH
G CHANNEL VEGETATION TYPES (to be assessed over a 10m wide transect; use E (> 13% area), ✓ (present) or NV (not visible))													
None (✓) or Not Visible (NV)													
Liverworts/mosses/lichens													
Emergent broad-leaved herbs				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Emergent reeds/sedges/rushes/grasses/horsetails	E	✓	E	✓	E	✓	✓	✓	✓	✓	✓	✓	E
Floating-leaved (rooted)	✓		✓										✓
Free-floating													
Amphibious			✓						✓				✓
Submerged broad-leaved													
Submerged linear-leaved													
Submerged fine-leaved													
Filamentous algae													
Use end column for overall assessment over 500m, including types not occurring in spot-checks (use ✓, E or NV)													

Enter channel substrate(s) not occurring as predominant in spot-checks but present in >1% of whole site.

Figure 134: 020-RH1-108-002

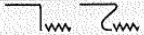

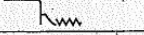
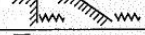

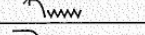
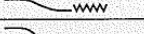
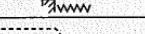


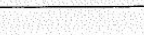

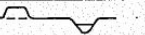

SITE REF: 020-RH1-108-002		RIVER HABITAT SURVEY : 500m SWEEP-UP				Page 3 of 4	
H LAND-USE WITHIN 50m OF BANKTOP Use ✓ (present) or E (> 33% banklength)							
	L	R		L	R		
Broadleaf/mixed woodland (semi-natural) (BL)	✓	E	Natural open water (OW)				
Broadleaf/mixed plantation (BP)			Rough/unimproved grassland/pasture (RP)				
Coniferous woodland (semi-natural) (CW)			Improved/semi-improved grassland (IG)	E	E		
Coniferous plantation (CP)			Tall herb/rank vegetation (TH)	E	E		
Scrub & shrubs (SH)	✓	✓	Rock, scree or sand dunes (RD)				
Orchard (OR)			Suburban/urban development (SU)				
Wetland (e.g. bog, marsh, fen) (WL)		E	Tilled land (TL)		✓		
Moorland/heath (MH)			Irrigated land (IL)				
Artificial open water (AW)			Parkland or gardens (PG)				
			Not visible (NV)				
I BANK PROFILES Use ✓ (present) or E (> 33% banklength)							
Natural/unmodified	L	R	Artificial/modified	L	R		
Vertical/undercut 	E		Resectioned (reprofiled) 	E	E		
Vertical with toe 			Reinforced - whole 	✓			
Steep (>45°) 	E	E	Reinforced - top only 				
Gentle 			Reinforced - toe only 				
Composite 			Artificial two-stage 				
Natural berm 			Poached bank 				
			Embanked 				
			Set-back embankment 				
J EXTENT OF TREES AND ASSOCIATED FEATURES *record even if <1%							
TREES (tick one box per bank)				ASSOCIATED FEATURES (tick one box per feature)			
	Left	Right		None	Present	E (>33%)	
None	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Shading of channel	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Isolated/scattered	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	*Overhanging boughs	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Regularly spaced, single	<input type="checkbox"/>	<input type="checkbox"/>	*Exposed bankside roots	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Occasional clumps	<input type="checkbox"/>	<input type="checkbox"/>	*Underwater tree roots	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Semi-continuous	<input type="checkbox"/>	<input type="checkbox"/>	Fallen trees	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Continuous	<input type="checkbox"/>	<input type="checkbox"/>	Large woody debris	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
K EXTENT OF CHANNEL AND BANK FEATURES (tick one box for each feature) *record even if <1%							
	None	Present	E (>33%)	None	Present	E (>33%)	
*Free fall flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed bedrock	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chute flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Broken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated bedrock/boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unbroken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rippled flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*Upwelling	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Mature island(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smooth flow	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Unvegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No perceptible flow	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Vegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No flow (dry)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marginal deadwater	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eroding cliff(s)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	*Unvegetated silt deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stable cliff(s)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	*Discrete unvegetated sand deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				*Discrete unvegetated gravel deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 135: 020-RH1-108-002

SITE REF. <u>020-RH1</u> <u>-108-002</u>		RIVER HABITAT SURVEY : DIMENSIONS AND INFLUENCES		Page 4 of 4			
L CHANNEL DIMENSIONS (to be measured at one location on a straight uniform section, preferably across a riffle)							
LEFT BANK		CHANNEL		RIGHT BANK			
Banktop height (m)	<u>2</u>	Bankfull width (m)	<u>10</u>	Banktop height (m)	<u>2</u>		
Is banktop height also bankfull height? (Y or N)	<u>N</u>	Water width (m)	<u>9</u>	Is banktop height also bankfull height? (Y or N)	<u>N</u>		
Embanked height (m)	<u>/</u>	Water depth (m)	<u>1.5</u>	Embanked height (m)	<u>/</u>		
If trashline lower than banktop, indicate: height above water (m) = <u>/</u> width from bank to bank (m) = <u>/</u>							
Bed material at site is: consolidated <input type="checkbox"/> unconsolidated (loose) <input checked="" type="checkbox"/> unknown <input type="checkbox"/>							
Location of measurements is: riffle <input type="checkbox"/> other <input checked="" type="checkbox"/> (state) <u>sc 11</u>							
M FEATURES OF SPECIAL INTEREST Use / or E (> 33% length) *record even if <1%							
None <input type="checkbox"/>	Very large boulders (>1m) <input type="checkbox"/>	Backwater(s) <input type="checkbox"/>	Marsh(es) <input checked="" type="checkbox"/>	<i>Spring + flood plain</i>			
Braided channels <input type="checkbox"/>	*Debris dam(s) <input type="checkbox"/>	Floodplain boulder deposits <input type="checkbox"/>	Flush(es) <input type="checkbox"/>				
Side channel(s) <input type="checkbox"/>	*Leafy debris <input type="checkbox"/>	Water meadow(s) <input type="checkbox"/>	Natural open water <input type="checkbox"/>				
*Natural waterfall(s) > 5m high <input type="checkbox"/>	Fringing reed-bank(s) <input type="checkbox"/>	Fen(s) <input type="checkbox"/>	Others (state) <input type="checkbox"/>				
*Natural waterfall(s) < 5m high <input type="checkbox"/>	Quaking bank(s) <input type="checkbox"/>	Bog(s) <input type="checkbox"/>					
Natural cascade(s) <input type="checkbox"/>	*Sink hole(s) <input type="checkbox"/>	Wet woodland(s) <input checked="" type="checkbox"/>					
N CHOKED CHANNEL (tick one box)							
Is 33% or more of the channel choked with vegetation?						No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>	
O NOTABLE NUISANCE PLANT SPECIES Use / or E (> 33% length) *record even if <1%							
None <input checked="" type="checkbox"/>	bankface	banktop to 50m	bankface	banktop to 50m			
*Giant hogweed <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Himalayan balsam <input type="checkbox"/>	<input type="checkbox"/>			
*Japanese knotweed <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Other (state)..... <input type="checkbox"/>	<input type="checkbox"/>			
P OVERALL CHARACTERISTICS (Circle appropriate words, add others as necessary)							
Major impacts: landfill - tipping - litter - sewage - pollution - drought - abstraction - mill - dam - <u>road</u> - rail - industry - housing mining - quarrying - overdeepening - afforestation - fisheries management - silting - waterlogging - hydroelectric power							
Evidence of recent management: dredging - bank mowing - weed cutting - enhancement - river rehabilitation - gravel extraction - other (please specify) <u>deepening</u>							
Animals: <u>otter</u> - mink - <u>water vole</u> - kingfisher - dipper - grey wagtail - sand martin - heron - <u>dragonflies/damselflies</u> <i>lots of tall reeds</i>							
Other significant observations: if necessary use separate sheet to describe overall characteristics and relevant observations <i>potential</i>							
Q ALDERS (tick one box in each of the two categories) *record even if <1%							
*Alders? None <input type="checkbox"/> Present <input type="checkbox"/> Extensive <input checked="" type="checkbox"/>			*Diseased Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>				
R FIELD SURVEY QUALITY CONTROL (✓ boxes to confirm checks)							
Have you taken at least two photos that illustrate the general character of the site and additional photos of any weirs/ sluices and major/intermediate structures across the channel? <input checked="" type="checkbox"/>							
Have you completed all ten spot-checks and made entries in all boxes in E & F on page 2? <input checked="" type="checkbox"/>							
Have you completed column 11 of section G (and E if appropriate) on page 2? <input checked="" type="checkbox"/>							
Have you recorded in section C the number of riffles, pools and point bars (even if 0) on page 1? <input checked="" type="checkbox"/>							
Have you given an accurate (alphanumeric) grid reference for spot-checks 1, 6 and end of site (page 1)? <input checked="" type="checkbox"/>							
Have you stated whether spot-check 1 is at the upstream or downstream end of the site (top of page 2)? <input checked="" type="checkbox"/>							
Have you cross-checked your spot-check and sweep-up responses with the channel modification indicators given on page 2 of the spot-check key? <input checked="" type="checkbox"/>							

Highfurlong Brook (CFA 15)

020-RH1-113-001

Figure 136: 020-RH1-113-001

RIVER HABITAT SURVEY 2003 Version		Page 1 of 4				
A FIELD SURVEY DETAILS						
Site Number: <input type="text"/> <small>leave blank if new site</small> Site Reference: 020-RH1-113-001 Spot-check 1 Grid Ref: SP4836451068 Spot-check 6 Grid Ref: SP4854251136 End of site Grid Ref: SP4860451217 Reach Reference: River name: Highfurlong Date 6/6/2013 Time: 9:00 Surveyor name: CELIA FIOREIRA Accredited Surveyor code: L1067	Is the site part of a river or an artificial channel? River <input checked="" type="checkbox"/> Artificial <input type="checkbox"/> Are adverse conditions affecting survey? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> If yes, state Is bed of river visible? barely or not <input type="checkbox"/> partially <input checked="" type="checkbox"/> entirely <input type="checkbox"/> Is health and safety assessment form attached? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Number of photographs taken: 5 Photo references: 020-RH1-113-001 P1 / 020-RH1-113-001 P2 / 020-RH1-113-001 P3 / 020-RH1-113-001 P4 / 020-RH1-113-001 P5 Site surveyed from: left bank <input type="checkbox"/> right bank <input checked="" type="checkbox"/> channel <input type="checkbox"/>					
<input type="checkbox"/> When options shown with 'shadow boxes', tick one box only LEFT banks determined by facing downstream RIGHT						
B PREDOMINANT VALLEY FORM (within the horizon limit) (tick one box only)						
<input type="checkbox"/> shallow vee <input type="checkbox"/> deep vee <input type="checkbox"/> gorge	<input type="checkbox"/> concave/bowl <input type="checkbox"/> asymmetrical valley <input type="checkbox"/> U-shape valley <input checked="" type="checkbox"/> no obvious valley sides					
Distinct flat valley bottom? No <input type="checkbox"/> Yes <input checked="" type="checkbox"/>		Natural terraces? No <input type="checkbox"/> Yes <input checked="" type="checkbox"/>				
C NUMBER OF RIFFLES, POOLS AND POINT BARS (enter total number in boxes)						
Riffle(s) <input type="text"/>	Unvegetated point bar(s) <input type="text"/>	<input type="text"/>				
Pool(s) <input type="text"/>	Vegetated point bar(s) <input type="text"/>	<input type="text"/>				
D ARTIFICIAL FEATURES (indicate total number of occurrences of each category within the 500m site)						
If none, tick box <input type="checkbox"/>	Major	Intermediate	Minor	Major	Intermediate	Minor
	Weirs/sluices			Outfalls/intakes		
	Culverts			Fords		1 2
	Bridges		1	Deflectors/groynes/croys		
	Other - state					
Is channel obviously realigned? No <input type="checkbox"/>		Yes, <33% of site <input type="checkbox"/>		≥33% of site <input checked="" type="checkbox"/>		
Is channel obviously over-deepened? No <input type="checkbox"/>		Yes, <33% of site <input checked="" type="checkbox"/>		≥33% of site <input type="checkbox"/>		
Is water impounded by weir/dam? No <input checked="" type="checkbox"/>		Yes, <33% of site <input type="checkbox"/>		≥33% of site <input type="checkbox"/>		

Figure 137: 020-RH1-113-001

SITE REF.	RIVER HABITAT SURVEY: TEN SPOT-CHECKS										Page 2 of 4
Spot-check 1 is at: upstream end <input checked="" type="checkbox"/> downstream end <input type="checkbox"/> of site (tick one box)											
E PHYSICAL ATTRIBUTES (to be assessed across channel within 1m wide transect)											
When boxes 'bordered', only one entry allowed	1 GPS	2	3	4	5	6 GPS	7	8	9	10	GPS
LEFT BANK											
Ring EC or SC if composed of sandy substrate											
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB	PB	NO	VB	NO	NO	NO	NO	NO	NO	NO	NO
CHANNEL											
GP- ring either G or P if predominant											
Channel substrate NV, BE, BO, CO, GP, SA, SI, CL, PE, EA, AR	SC	SC	SC	SI	SI	SI	SI	SI	SI	SI	SI
Flow-type NV, FF, CH, BW, UW, CF, RP, UP, SM, NP, DR	SH	RP	NP	NP	NP	SH	RP	NP	NP	NP	NP
Channel modification(s) NK, NO, CV, RS, RI, DA, FO	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS
Channel feature(s) NV, NO, EB, RO, VR, MB, VB, MI, TR	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
For braided rivers only: number of sub-channels											
RIGHT BANK											
Ring EC or SC if composed of sandy substrate											
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB	NO	NO	NO	NO	NO	SB	NO	NO	NO	NO	NO
F BANKTOP LAND-USE AND VEGETATION STRUCTURE (to be assessed over a 10m wide transect)											
Land-use: choose one from BL, BP, CW, CP, SH, OR, WL, MH, AW, OW, RP, IG, TH, RD, SU, TL, IL, PG, NV											
LAND-USE WITHIN 5m OF LEFT BANKTOP	BL	BL	BL	IG	IG	IG	BL	PG	BL	BL	BL
LEFT BANKTOP (structure within 1m) B/U/S/C/NV	U	C	C	C	S	C	C	S	C	C	C
LEFT BANK-FACE (structure) B/U/S/C/NV	U	B	U	C	U	C	C	B	C	C	C
RIGHT BANK-FACE (structure) B/U/S/C/NV	B	B	B	B	C	U	B	B	S	C	C
RIGHT BANKTOP (structure within 1m) B/U/S/C/NV	U	U	S	U	U	S	S	C	S	C	C
LAND-USE WITHIN 5m OF RIGHT BANKTOP	TL	TL	TL	TL	TL	TL	TL	BL	BL	TL	TL
G CHANNEL VEGETATION TYPES (to be assessed over a 10m wide transect; use EC > 33% area) ✓ (present) or NV (not visible)											
None (✓) or Not Visible: (NV)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Liverworts/mosses/lichens											
Emergent broad-leaved herbs											
Emergent reeds/sedges/rushes/grasses/horsetails											✓
Floating-leaved (rooted)											
Free-floating											
Amphibious											
Submerged broad-leaved											
Submerged linear-leaved											
Submerged fine-leaved											
Filamentous algae	✓										✓
Use end column for overall assessment over 500m, including types not occurring in spot-checks (use ✓, E or NV)											

Enter channel substrate(s) not occurring as predominant in spot-checks but present in >1% of whole site.

Figure 138: 020-RH1-113-001

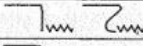

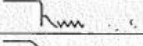

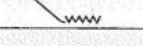
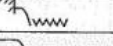
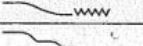
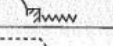

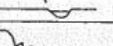
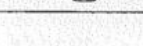
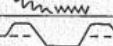

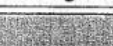
SITE REF.		RIVER HABITAT SURVEY : 500m SWEEP-UP				Page 3 of 4	
H LAND-USE WITHIN 50m OF BANKTOP Use ✓ (present) or E (>33% banklength)							
	L	R		L	R		
Broadleaf/mixed woodland (semi-natural) (BL)	E	✓	Natural open water (OW)				
Broadleaf/mixed plantation (BP)			Rough/unimproved grassland/pasture (RP)				
Coniferous woodland (semi-natural) (CW)			Improved/semi-improved grassland (IG)		✓		
Coniferous plantation (CP)			Tall herb/rank vegetation (TH)				
Scrub & shrubs (SH)			Rock, scree or sand dunes (RD)				
Orchard (OR)			Suburban/urban development (SU)				
Wetland (e.g. bog, marsh, fen) (WL)			Tilled land (TL)				E
Moorland/heath (MH)			Irrigated land (IL)				
Artificial open water (AW)			Parkland or gardens (PG)		✓		
			Not visible (NV)				
I BANK PROFILES Use ✓ (present) or E (>33% banklength)							
Natural/unmodified	L	R	Artificial/modified	L	R		
Vertical/undercut 			Resectioned (reprofiled) 	E	E		
Vertical with toe 			Reinforced - whole 				
Steep (>45°) 			Reinforced - top only 				
Gentle 			Reinforced - toe only 				
Composite 			Artificial two-stage 				
Natural berm 			Poached bank 				
			Embanked 				
			Set-back embankment 				
J EXTENT OF TREES AND ASSOCIATED FEATURES (tick one box per feature)							
TREES (tick one box per bank)				ASSOCIATED FEATURES (tick one box per feature)			
	Left	Right		None	Present	E (>33%)	
None	<input type="checkbox"/>	<input type="checkbox"/>	Shading of channel	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Isolated/scattered	<input type="checkbox"/>	<input type="checkbox"/>	*Overhanging boughs	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Regularly spaced, single	<input type="checkbox"/>	<input type="checkbox"/>	*Exposed bankside roots	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Occasional clumps	<input type="checkbox"/>	<input type="checkbox"/>	*Underwater tree roots	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Semi-continuous	<input type="checkbox"/>	<input type="checkbox"/>	Fallen trees	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Continuous	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Large woody debris	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
K EXTENT OF CHANNEL AND BANK FEATURES (tick one box per feature)							
	None	Present	E (>33%)	None	Present	E (>33%)	
*Free fall flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed bedrock	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chute flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Broken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated bedrock/boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unbroken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rippled flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*Upwelling	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Mature island(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smooth flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No perceptible flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No flow (dry)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marginal deadwater	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eroding cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Unvegetated silt deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stable cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Discrete unvegetated sand deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				*Discrete unvegetated gravel deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 139: 020-RH1-113-001

SITE REF.		RIVER HABITAT SURVEY : DIMENSIONS AND INFLUENCES				Page 4 of 4	
L CHANNEL DIMENSIONS (to be measured at one location on a straight uniform section, preferably across a riffle)							
LEFT BANK		CHANNEL		RIGHT BANK			
Banktop height (m)	1.5	Bankfull width (m)	7	Banktop height (m)	2.5		
Is banktop height also bankfull height? (Y or N)	Y	Water width (m)	2	Is banktop height also bankfull height? (Y or N)	N		
Embanked height (m)		Water depth (m)	0.30	Embanked height (m)			
If trashline lower than banktop, indicate: height above water (m) = width from bank to bank (m) =							
Bed material at site is: consolidated <input type="checkbox"/> unconsolidated (loose) <input checked="" type="checkbox"/> unknown <input type="checkbox"/>							
Location of measurements is: riffle <input type="checkbox"/> other <input type="checkbox"/> (state) <u>SC8</u>							
M FEATURES OF SPECIAL INTEREST Use ✓ or E (> 33% length) *record even if <1%							
None	<input checked="" type="checkbox"/>	Very large boulders (>1m)	<input type="checkbox"/>	Backwater(s)	<input type="checkbox"/>	Marsh(es)	<input type="checkbox"/>
Braided channels	<input type="checkbox"/>	*Debris dam(s)	<input type="checkbox"/>	Floodplain boulder deposits	<input type="checkbox"/>	Flush(es)	<input type="checkbox"/>
Side channel(s)	<input type="checkbox"/>	*Leafy debris	<input type="checkbox"/>	Water meadow(s)	<input type="checkbox"/>	Natural open water	<input type="checkbox"/>
*Natural waterfall(s) > 5m high	<input type="checkbox"/>	Fringing reed-bank(s)	<input type="checkbox"/>	Fen(s)	<input type="checkbox"/>	Others (state)	<input type="checkbox"/>
*Natural waterfall(s) < 5m high	<input type="checkbox"/>	Quaking bank(s)	<input type="checkbox"/>	Bog(s)	<input type="checkbox"/>		
Natural cascade(s)	<input type="checkbox"/>	*Sink hole(s)	<input type="checkbox"/>	Wet woodland(s)	<input type="checkbox"/>		
N CHOKED CHANNEL (tick one box)							
Is 33% or more of the channel choked with vegetation? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>							
O NOTABLE NUISANCE PLANT SPECIES Use ✓ or E (> 33% length) *record even if <1%							
None	<input checked="" type="checkbox"/>	*Giant hogweed	<input type="checkbox"/>	*Himalayan balsam	<input type="checkbox"/>		
		*Japanese knotweed	<input type="checkbox"/>	*Other (state).....	<input type="checkbox"/>		
P OVERALL CHARACTERISTICS (Circle appropriate words, add others as necessary)							
<p>Major impacts: landfill - tipping - litter - sewage - pollution - drought - abstraction - mill - dam - road - rail - industry - housing mining - quarrying - overdeepening - afforestation - fisheries management - silting - waterlogging - hydroelectric power</p> <p>Evidence of recent management: dredging - bank mowing - weed cutting - enhancement - river rehabilitation - gravel extraction - other (please specify)</p> <p>Animals: otter - mink - water vole - kingfisher - dipper - grey wagtail - sand martin - heron - dragonflies/damselflies</p> <p>Other significant observations: if necessary use separate sheet to describe overall characteristics and relevant observations</p> <p><i>Presence of holes in the banks possible from water voles(?)</i></p>							
Q ALDERS (tick one box in each of the two categories) *record even if <1%							
*Alders? None <input type="checkbox"/> Present <input checked="" type="checkbox"/> Extensive <input type="checkbox"/>		*Diseased Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>					
R FIELD SURVEY QUALITY CONTROL (✓ boxes to confirm checks)							
Have you taken at least two photos that illustrate the general character of the site and additional photos of any weirs/ sluices and major/intermediate structures across the channel? <input checked="" type="checkbox"/>							
Have you completed all ten spot-checks and made entries in all boxes in E & F on page 2? <input checked="" type="checkbox"/>							
Have you completed column 11 of section G (and E if appropriate) on page 2? <input checked="" type="checkbox"/>							
Have you recorded in section C the number of riffles, pools and point bars (even if 0) on page 1? <input checked="" type="checkbox"/>							
Have you given an accurate (alphanumeric) grid reference for spot-checks 1, 6 and end of site (page 1)? <input checked="" type="checkbox"/>							
Have you stated whether spot-check 1 is at the upstream or downstream end of the site (top of page 2)? <input checked="" type="checkbox"/>							
Have you cross-checked your spot-check and sweep-up responses with the channel modification indicators given on page 2 of the spot-check key? <input checked="" type="checkbox"/>							

Canal Feeder (CFA 15)

020-RH1-113-002

Figure 140: 020-RH1-113-002

RIVER HABITAT SURVEY 2003 Version				Page 1 of 4																			
A FIELD SURVEY DETAILS																							
Site Number: leave blank if new site Site Reference: <u>020-RH1-113-002</u> Spot-check 1 Grid Ref: <u>SP4793151911</u> Spot-check 6 Grid Ref: <u>SP4782451687</u> End of site Grid Ref: <u>SP4771651459</u> Reach Reference: River name: <u>UNNAMED-TRIB. OF CANAL FEEDER</u> Date: <u>28/06/2013</u> Time: <u>9:00am</u> Surveyor name: <u>ZOE TRENT</u> Accredited Surveyor code: <u>LT061</u>				Is the site part of a river or an artificial channel? River <input type="checkbox"/> Artificial <input checked="" type="checkbox"/> D17C+1 Are adverse conditions affecting survey? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> If yes, state Is bed of river visible? barely or not <input type="checkbox"/> partially <input checked="" type="checkbox"/> entirely <input type="checkbox"/> Is health and safety assessment form attached? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Number of photographs taken: 3 Photo references: <u>P1, P2, P3</u> Site surveyed from: left bank <input type="checkbox"/> right bank <input checked="" type="checkbox"/> channel <input type="checkbox"/> <input type="checkbox"/> When options shown with 'shadow boxes', tick one box only LEFT banks determined by facing downstream RIGHT																			
B PREDOMINANT VALLEY FORM (within the horizon limit) (tick one box only)																							
(tick one box only) <table style="width: 100%; border: none;"> <tr> <td style="text-align: center;"></td> <td><input type="checkbox"/> shallow vee</td> <td style="text-align: center;"></td> <td><input type="checkbox"/> concave/bowl</td> </tr> <tr> <td style="text-align: center;"></td> <td><input type="checkbox"/> deep vee</td> <td style="text-align: center;"></td> <td><input type="checkbox"/> asymmetrical valley</td> </tr> <tr> <td style="text-align: center;"></td> <td><input type="checkbox"/> gorge</td> <td style="text-align: center;"></td> <td><input type="checkbox"/> U-shape valley</td> </tr> <tr> <td colspan="2"></td> <td style="text-align: center;"></td> <td><input checked="" type="checkbox"/> no obvious valley sides</td> </tr> </table>									<input type="checkbox"/> shallow vee		<input type="checkbox"/> concave/bowl		<input type="checkbox"/> deep vee		<input type="checkbox"/> asymmetrical valley		<input type="checkbox"/> gorge		<input type="checkbox"/> U-shape valley				<input checked="" type="checkbox"/> no obvious valley sides
	<input type="checkbox"/> shallow vee		<input type="checkbox"/> concave/bowl																				
	<input type="checkbox"/> deep vee		<input type="checkbox"/> asymmetrical valley																				
	<input type="checkbox"/> gorge		<input type="checkbox"/> U-shape valley																				
			<input checked="" type="checkbox"/> no obvious valley sides																				
Distinct flat valley bottom? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>				Natural terraces? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>																			
C NUMBER OF RIFFLES, POOLS AND POINT BARS (enter total number in boxes)																							
Riffle(s) 0		Unvegetated point bar(s) 0		Pool(s) 0		Vegetated point bar(s) 0																	
D ARTIFICIAL FEATURES (indicate total number of occurrences of each category within the 500m site)																							
If none, tick box <input type="checkbox"/>	Major	Intermediate	Minor	Major	Intermediate	Minor																	
	Weirs/slucices			Outfalls/intakes																			
	Culverts	(2)		Fords																			
	Bridges			Deflectors/groynes/croys																			
	Other - state																						
Is channel obviously realigned? No <input type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input checked="" type="checkbox"/> Is channel obviously over-deepened? No <input type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input checked="" type="checkbox"/> Is water impounded by weir/dam? No <input checked="" type="checkbox"/> Yes, <33% of site <input type="checkbox"/> ≥33% of site <input type="checkbox"/>																							

Figure 141: 020-RH1-113-002

SITE REF. 020-RH1-113-002		RIVER HABITAT SURVEY: TEN SPOT-CHECKS										Page 2 of 4	
Spot-check 1 is at: upstream end <input checked="" type="checkbox"/>		downstream end <input type="checkbox"/>		of site (tick one box)									
E PHYSICAL ATTRIBUTES (to be assessed across channel within 1m wide transect)													
When boxes 'bordered', only one entry allowed		1	2	3	4	5	6	7	8	9	10	GPS	
LEFT BANK		Ring EC or SC if composed of sandy substrate										↑ Enter channel substrate(s) not occurring as predominant in spot-checks but present in >1% of whole site.	
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA		
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS		
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO		
CHANNEL		GPS ring either G or P if predominant											
Channel substrate NV, BE, BO, CO, GP, SA, SI, CL, PE, EA, AR	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA		
Flow-type NV, FF, CH, BW, UW, CF, RP, UP, SM, NP, DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR	DR		
Channel modification(s) NK, NO, CV, RS, RI, DA, FO	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS		
Channel feature(s) NV, NO, EB, RO, VR, MB, VB, MI, TR	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO		
For braided rivers only: number of sub-channels	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
RIGHT BANK		Ring EC or SC if composed of sandy substrate											
Material NV, BE, BO, CO, GS, EA, PE, CL, CC, SP, WP, GA, BR, RR, TD, FA, BI	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA		
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS	RS		
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO		
F BANKTOP LAND USE AND VEGETATION STRUCTURE (to be assessed over a 10m wide transect)													
Land-use: choose one from BL, BP, CW, CP, SH, OR, WL, MH, AW, OW, RP, IG, TH, RD, SU, TL, IL, PG, NV													
LAND-USE WITHIN 5m OF LEFT BANKTOP	IG	IG	IG	IG	IG	IG	IG	IG	IG	IG	IG		
LEFT BANKTOP (structure within 1m) B/U/S/C/NV	C	S	S	S	S	S	S	S	S	S	S		
LEFT BANK-FACE (structure) B/U/S/C/NV	S	S	S	S	S	S	S	S	S	S	S		
RIGHT BANK-FACE (structure) B/U/S/C/NV	S	S	S	S	S	S	S	S	S	S	S		
RIGHT BANKTOP (structure within 1m) B/U/S/C/NV	S	S	S	S	S	S	S	S	S	S	S		
LAND-USE WITHIN 5m OF RIGHT BANKTOP	TH	TH	TH	TH	TH	IG	IG	IG	IG	IG	IG		
G CHANNEL VEGETATION TYPES (to be assessed over a 10m wide transect: use E (>33% area), ✓ (present) or NV (not visible))													
None (✓) or Not Visible (NV)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Liverworts/mosses/lichens													
Emergent broad-leaved herbs													
Emergent reeds/sedges/rushes/grasses/horsetails													
Floating-leaved (rooted)													
Free-floating													
Amphibious													
Submerged broad-leaved													
Submerged linear-leaved													
Submerged fine-leaved													
Filamentous algae													
Use end column for overall assessment over 500m, including types not occurring in spot-checks (use ✓, E or NV) ————— ↑													

Figure 142: 020-RH1-113-002


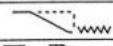
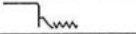


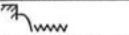
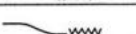

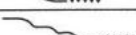
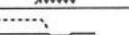
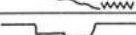
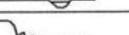
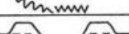

SITE REF. 020-111-113-002		RIVER HABITAT SURVEY : 500m SWEEP-UP				Page 3 of 4	
H LAND-USE WITHIN 50m OF BANKTOP Use ✓ (present) or E (>33% banklength)							
	L	R		L	R		
Broadleaf/mixed woodland (semi-natural) (BL)			Natural open water (OW)				
Broadleaf/mixed plantation (BP)			Rough/unimproved grassland/pasture (RP)				
Coniferous woodland (semi-natural) (CW)			Improved/semi-improved grassland (IG)	E	✓		
Coniferous plantation (CP)			Tall herb/rank vegetation (TH)	✓	✓		
Scrub & shrubs (SH)	✓	✓	Rock, scree or sand dunes (RD)				
Orchard (OR)			Suburban/urban development (SU)			✓	
Wetland (e.g. bog, marsh, fen) (WL)			Tilled land (TL)			E	
Moorland/heath (MH)			Irrigated land (IL)				
Artificial open water (AW)			Parkland or gardens (PG)				
			Not visible (NV)				
I BANK PROFILES Use ✓ (present) or E (>33% banklength)							
Natural/unmodified	L	R	Artificial/modified	L	R		
Vertical/undercut 			Resectioned (reprofiled) 	E	E		
Vertical with toe 			Reinforced - whole 				
Steep (>45°) 			Reinforced - top only 				
Gentle 			Reinforced - toe only 				
Composite 			Artificial two-stage 				
Natural berm 			Poached bank 				
			Embanked 				
			Set-back embankment 				
J EXTENT OF TREES AND ASSOCIATED FEATURES *record even if <1%							
TREES (tick one box per bank)				ASSOCIATED FEATURES (tick one box per feature)			
	Left	Right		None	Present	E (>33%)	
None	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Shading of channel	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Isolated/scattered	<input type="checkbox"/>	<input type="checkbox"/>	*Overhanging boughs	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Regularly spaced, single	<input type="checkbox"/>	<input type="checkbox"/>	*Exposed bankside roots	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Occasional clumps	<input checked="" type="checkbox"/>	<input type="checkbox"/>	*Underwater tree roots	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Semi-continuous	<input type="checkbox"/>	<input type="checkbox"/>	Fallen trees	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Continuous	<input type="checkbox"/>	<input type="checkbox"/>	Large woody debris	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
K EXTENT OF CHANNEL AND BANK FEATURES (tick one box for each feature) *record even if <1%							
	None	Present	E (>33%)	None	Present	E (>33%)	
*Free fall flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed bedrock	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chute flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exposed boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Broken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated bedrock/boulders	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unbroken standing waves	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rippled flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated mid-channel bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*Upwelling	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Mature island(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Smooth flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Unvegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No perceptible flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated side bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No flow (dry)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Unvegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marginal deadwater	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetated point bar(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Eroding cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Unvegetated silt deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stable cliff(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	*Discrete unvegetated sand deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				*Discrete unvegetated gravel deposit(s)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 143: 020-RH1-113-002

SITE REF. 020-RH1-113-002		RIVER HABITAT SURVEY : DIMENSIONS AND INFLUENCES		Page 4 of 4	
L CHANNEL DIMENSIONS (to be measured at one location on a straight uniform section, preferably across a riffle)					
LEFT BANK		CHANNEL		RIGHT BANK	
Banktop height (m)	1.5	Bankfull width (m)	0.75	Banktop height (m)	1.5
Is banktop height also bankfull height? (Y or N)	Y	Water width (m)	N/A	Is banktop height also bankfull height? (Y or N)	Y
Embanked height (m)	/	Water depth (m)	N/A	Embanked height (m)	/
If trashline lower than banktop, indicate: height above water (m) = / width from bank to bank (m) = /					
Bed material at site is: consolidated <input type="checkbox"/> unconsolidated (loose) <input checked="" type="checkbox"/> unknown <input type="checkbox"/>					
Location of measurements is: riffle <input type="checkbox"/> other <input checked="" type="checkbox"/> (state) S C 4					
M FEATURES OF SPECIAL INTEREST Use ✓ or E (> 33% length) *record even if <1%					
None	<input checked="" type="checkbox"/>	Very large boulders (>1m)	<input type="checkbox"/>	Backwater(s)	<input type="checkbox"/>
Braided channels	<input type="checkbox"/>	*Debris dam(s)	<input type="checkbox"/>	Floodplain boulder deposits	<input type="checkbox"/>
Side channel(s)	<input type="checkbox"/>	*Leafy debris	<input type="checkbox"/>	Water meadow(s)	<input type="checkbox"/>
*Natural waterfall(s) > 5m high	<input type="checkbox"/>	Fringing reed-bank(s)	<input type="checkbox"/>	Fen(s)	<input type="checkbox"/>
*Natural waterfall(s) < 5m high	<input type="checkbox"/>	Quaking bank(s)	<input type="checkbox"/>	Bog(s)	<input type="checkbox"/>
Natural cascade(s)	<input type="checkbox"/>	*Sink hole(s)	<input type="checkbox"/>	Wet woodland(s)	<input type="checkbox"/>
Marsh(es)	<input type="checkbox"/>				
Flush(es)	<input type="checkbox"/>				
Natural open water	<input type="checkbox"/>				
Others (state)	<input type="checkbox"/>				
N CHOKED CHANNEL (tick one box)					
Is 33% or more of the channel choked with vegetation? No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> TERRESTRIA					
O NOTABLE NUISANCE PLANT SPECIES Use ✓ or E (> 33% length) *record even if <1%					
None	<input checked="" type="checkbox"/>	*Giant hogweed	<input type="checkbox"/>	*Himalayan balsam	<input type="checkbox"/>
		*Japanese knotweed	<input type="checkbox"/>	*Other (state).....	<input type="checkbox"/>
P OVERALL CHARACTERISTICS (Circle appropriate words, add others as necessary)					
Major impacts: landfill - tipping - litter - sewage - pollution - drought - abstraction - mill - dam - road - rail - industry - housing mining - quarrying - overdeepening - afforestation - fisheries management - silting - waterlogging - hydroelectric power					
Evidence of recent management: dredging - bank mowing - weed cutting - enhancement - river rehabilitation - gravel extraction - other (please specify)					
Animals: otter - mink - water vole - kingfisher - dipper - grey wagtail - sand martin - heron - dragonflies/damselflies					
Other significant observations: if necessary use separate sheet to describe overall characteristics and relevant observations NO WATER. LANDOWNEL SAYS FLOWS IN THE WINTER					
Q ALDERS (tick one box in each of the two categories) *record even if <1%					
*Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>			*Diseased Alders? None <input checked="" type="checkbox"/> Present <input type="checkbox"/> Extensive <input type="checkbox"/>		
R FIELD SURVEY QUALITY CONTROL (✓ boxes to confirm checks)					
Have you taken at least two photos that illustrate the general character of the site and additional photos of any weirs/ sluices and major/intermediate structures across the channel? <input checked="" type="checkbox"/>					
Have you completed all ten spot-checks and made entries in all boxes in E & F on page 2? <input checked="" type="checkbox"/>					
Have you completed column 11 of section G (and E if appropriate) on page 2? <input checked="" type="checkbox"/>					
Have you recorded in section C the number of riffles, pools and point bars (even if 0) on page 1? <input checked="" type="checkbox"/>					
Have you given an accurate (alphanumeric) grid reference for spot-checks 1, 6 and end of site (page 1)? <input checked="" type="checkbox"/>					
Have you stated whether spot-check 1 is at the upstream or downstream end of the site (top of page 2)? <input checked="" type="checkbox"/>					
Have you cross-checked your spot-check and sweep-up responses with the channel modification indicators given on page 2 of the spot-check key? <input checked="" type="checkbox"/>					

7 River corridor survey

7.1 Introduction

7.1.1 This section of the appendix presents details of the river corridor survey (RCS) data for the section of the Proposed Scheme that will pass through CFA 7 to 15 inclusive.

7.2 Methodology

7.2.1 Details of the standard methodology utilised for RCS surveys are provided in the Scope and Methodology Report Addendum (Volume 5: Appendix CT-001-000/2).

7.2.2 Where possible, survey sections were centred on the location where land required for the construction of the Proposed Scheme would cross a watercourse, but in some cases this was not possible owing to access constraints. Where the Proposed Scheme would cross a watercourse at multiple points, in general the survey was designed to include all the crossings within 500m either side of the crossing point. In some cases, the 500m lengths were extended to include additional areas potentially affected by haul roads that would be built for the Proposed Scheme.

7.2.3 River Corridor Surveys were undertaken in the same locations and at the same time as a River Habitat Survey (RHS), which is described in the relevant section of this Appendix.

7.2.4 A summary of locations at which RCS was undertaken within the sections of the Proposed Scheme that will pass through CFA 7 to 15 inclusive is provided in Table 6o. Additional locations suitable for RCS were present but not accessible, and these are described in Deviations, Constraints and Limitations, below.

Table 6o Summary of RCS survey locations

Watercourse	Feature type	Survey Date	Ecology Survey Code	CFA number	Distance from the Proposed Scheme (m) and orientation
Colne	Primary River	12-Oct-12	020-RS1-027-001	7	Within the Proposed Scheme
Colne	Primary River	12-Oct-12	020-RS1-028-001	7	Within the Proposed Scheme
Colne	Primary River	12-Oct-12	020-RS1-028-002	7	Within the Proposed Scheme
Colne	Primary River	21-May--13	020-RS1-028-003	7	Within the Proposed Scheme
Colne	Primary River	21-May--13	020-RS1-028-004	7	Within the Proposed Scheme
Colne	Primary River	21-May-13	020-RS1-028-005	7	Within the Proposed Scheme
Misbourne	Primary River	13-Jun-13	020-RS1-037-001	8	Within the Proposed Scheme
Misbourne	Primary River	09-May-	020-RS1-042-	8	Within the Proposed Scheme

Watercourse	Feature type	Survey Date	Ecology Survey Code	CFA number	Distance from the Proposed Scheme (m) and orientation
		13	001		
Stoke Brook - upper channel	Secondary River	09-May-13	020-RS1-057-001	11	Within the Proposed Scheme
Stoke Brook	Tertiary River	09-May-13	020-RS1-057-002	11	Within the Proposed Scheme
Unnamed	Primary River	20-May-13	020-RS1-058-001	11	Within the Proposed Scheme
Trib to Sedrup Ditch	Tertiary River	13-Jun-13	020-RS1-060-001	11	Within the Proposed Scheme
Sedrup Ditch	Primary River	09-May-13	020-RS1-061-001	11	Within the Proposed Scheme
Hartwell Ditch/Bear Brook	Primary River	31-May-13	020-RS1-062-001	11	Within the Proposed Scheme
Lower Hartwell Ditch/Bear Brook	Primary River	31-May-13	020-RS1-063-001	11	Within the Proposed Scheme
Thame and tributary	Primary River	11-Oct-12	020-RS1-064-001	11	Within the Proposed Scheme
Thame and tributary	Primary River	11-Oct-12	020-RS1-064-002	11	Within the Proposed Scheme
Thame	Primary River	08-May-13	020-RS1-064-003	11	Within the Proposed Scheme
Tributary to Thame	Secondary River	31-May-13	020-RS1-064-004	11	Within the Proposed Scheme
Thame and tributary	Primary River	11-Oct-12	020-RS1-065-001	11	Within the Proposed Scheme
Unnamed	Tertiary River	08-May-13	020-RS1-066-001	11	Within the Proposed Scheme
Unnamed	Tertiary River	08-May-13	020-RS1-066-002	11	Within the Proposed Scheme
Fleet Marston Brook - Tributary to Thame	Tertiary River	23-May-13	020-RS1-070-001	12	Within the Proposed Scheme
Tributary of Ray	Tertiary River	22-May-13	020-RS1-075-001	12	Within the Proposed Scheme
Tributary of Ray	Tertiary River	22-May-13	020-RS1-076-001	12	Within the Proposed Scheme
Tributary of Ray	Tertiary River	22-May-13	020-RS1-076-002	12	Within the Proposed Scheme
Tributary of Padbury Brook	Tertiary River	08-May-13	020-RS1-081-001	13	Within the Proposed Scheme
Padbury Brook	Primary River	08-May-13	020-RS1-082-001	13	Within the Proposed Scheme

Watercourse	Feature type	Survey Date	Ecology Survey Code	CFA number	Distance from the Proposed Scheme (m) and orientation
Tributary of Padbury Brook	Tertiary River	28-May-13	020-RS1-082-002	13	Within the Proposed Scheme
Padbury Brook	Primary River	03-Jun-13	020-RS1-084-001	13	Within the Proposed Scheme
Tributary of Padbury Brook	Tertiary River	29-May-13	020-RS1-087-001	13	Within the Proposed Scheme
Tributary of Great Ouse	Tertiary River	29-May-13	020-RS1-091-001	14	Within the Proposed Scheme
Great Ouse	Tertiary River	04-Jun-13	020-RS1-092-001	14	Within the Proposed Scheme
Cardiham Water - Tributary to Great Ouse	Tertiary River	30-May-13	020-RS1-097-001	14	Within the Proposed Scheme
Tributary to Great Ouse	Tertiary River	30-May-13	020-RS1-098-001	14	Within the Proposed Scheme
Tributary to Great Ouse	Tertiary River	30-May-13	020-RS1-099-001	14	Within the Proposed Scheme
Tributary of Cherwell	Secondary River	04-Jun-13	020-RS1-104-001	15	Within the Proposed Scheme
Lower Thorpe Brook - Tributary of Cherwell	Tertiary River	07-May-13	020-RS1-105-001	15	Within the Proposed Scheme
Tributary of Cherwell	Primary River	04-Jun-13	020-RS1-105-002	15	Within the Proposed Scheme
Tributary of Cherwell	Tertiary River	18-Jun-13	020-RS1-108-001	15	Within the Proposed Scheme
Cherwell	Primary River	18-Jun-13	020-RS1-108-002	15	Within the Proposed Scheme
Highfurlong Brook	Primary River	06-Jun-13	020-RS1-113-001	15	Within the Proposed Scheme
Tributary to Canal Feeder	Tertiary River	28-Jun-13	020-RS1-113-002	15	Within the Proposed Scheme
Canal Feeder	Secondary River	06-Jun-13	020-RS1-114-001	15	Within the Proposed Scheme

7.3 Deviations, constraints and limitations

7.3.1 Some of the locations where the Proposed Scheme or haul road would cross a water course could not be surveyed owing to access restrictions. Furthermore, three locations on the River Misbourne in CFA8 (potential vent shaft discharge locations) could not be surveyed owing to access restrictions. Table 61 lists those locations where surveys could not be carried out.

Table 61 Summary of inaccessible locations where requirement for RCS was identified

Watercourse	Crossing Point X	Crossing Point Y	Feature type	Comments	CFA number	Distance from the Proposed Scheme (m) and orientation
New Years Bourne Green	505763	187747	Secondary River	HS2 Crossing	7	Within the Proposed Scheme
Misbourne	499162	193667	Primary River	HS2 Crossing	8	Within the Proposed Scheme
Misbourne	499402	193170	Primary River	Tunnel vent discharge location	8	Within the Proposed Scheme
Misbourne	494874	197935	Primary River	Tunnel vent discharge location	8	Within the Proposed Scheme
Misbourne	492816	198839	Primary River	Tunnel vent discharge location	8	Within the Proposed Scheme
Tributary of Stoke Brook	484340	209124	Tertiary River	HS2 Crossing	11	Within the Proposed Scheme
Stoke Brook	484305	209146	Primary River	HS2 Crossing	11	Within the Proposed Scheme
Putlowes Farm ditch	478117	215001	Secondary River	Haul Road Crossing	11	Within the Proposed Scheme
Stoke Brook - Lower channel	483939	209357	Tertiary River	Haul Road Crossing	11	Within the Proposed Scheme
Stoke Brook	484357	209143	Primary River	Haul Road Crossing	11	Within the Proposed Scheme
Tributary of Stoke Brook	484365	209138	Tertiary River	Haul Road Crossing	11	Within the Proposed Scheme
Tributary of Stoke Brook	484324	209116	Tertiary River	Haul Road Crossing	11	Within the Proposed Scheme
Tributary of Stoke Brook	484321	209114	Tertiary River	Haul Road Crossing	11	Within the Proposed Scheme
Ditch flowing to Diddershall Brook	473476	218991	Tertiary River	HS2 Crossing	12	Within the Proposed Scheme
Ditch to Diddershall Brook	473434	219039	Tertiary River	HS2 Crossing	12	Within the Proposed Scheme
Diddershall Brook	472352	220370	Tertiary River	HS2 Crossing	12	Within the Proposed Scheme
Ray	471632	221201	Primary River	HS2 Crossing	12	Within the Proposed Scheme
Drain to Diddershall Brook	472223	220565	Tertiary River	Haul Road Crossing	12	Within the Proposed Scheme
Drain from nature reserve lake (Calvert	468509	225217	Tertiary	HS2 Crossing	13	Within the Proposed

Watercourse	Crossing Point X	Crossing Point Y	Feature type	Comments	CFA number	Distance from the Proposed Scheme (m) and orientation
Jubilee).			River			Scheme
Tributary of Padbury Brook	467611	226171	Tertiary River	HS2 Crossing	13	Within the Proposed Scheme
Padbury Brook	466498	226997	Primary River	HS2 Crossing	13	Within the Proposed Scheme
Tributary of Padbury Brook	466454	227027	Tertiary River	HS2 Crossing	13	Within the Proposed Scheme
Tributary of Padbury Brook	465139	228005	Tertiary River	HS2 Crossing	13	Within the Proposed Scheme
Padbury Brook	465064	228073	Primary River	HS2 Crossing	13	Within the Proposed Scheme
Padbury Brook	464842	228283	Primary River	HS2 Crossing	13	Within the Proposed Scheme
Tributary of Padbury Brook	464703	228424	Primary River	HS2 Crossing	13	Within the Proposed Scheme
Drain from nature reserve lake (Calvert Jubilee)	468503	225203	Tertiary River	Haul Road Crossing	13	Within the Proposed Scheme
Ditch adjacent to drain to Padbury Brook	468926	225753	Tertiary River	Haul Road Crossing	13	Within the Proposed Scheme
Drain to Padbury Brook	468920	225751	Primary River	Haul Road Crossing	13	Within the Proposed Scheme
Drain to Weare Street Gill	462995	231038	Tertiary River	HS2 Crossing	14	Within the Proposed Scheme
Great Ouse	461233	235576	Tertiary River	HS2 Crossing	14	Within the Proposed Scheme
Great Ouse	460149	238370	Primary River	HS2 Crossing	14	Within the Proposed Scheme
Great Ouse (Mill Leat)	460132	238399	Primary River	HS2 Crossing	14	Within the Proposed Scheme
Tributary of the Cherwell (Mill Leat)	451788	247823	Tertiary River	HS2 Crossing	15	Within the Proposed Scheme
Drain to Canal Feeder	446227	253423	Tertiary River	HS2 Crossing	15	Within the Proposed Scheme

7.4 Baseline Colne (CFA 7)

Figure 144: Survey Site 020-RS1-027-001 (CFA 7)

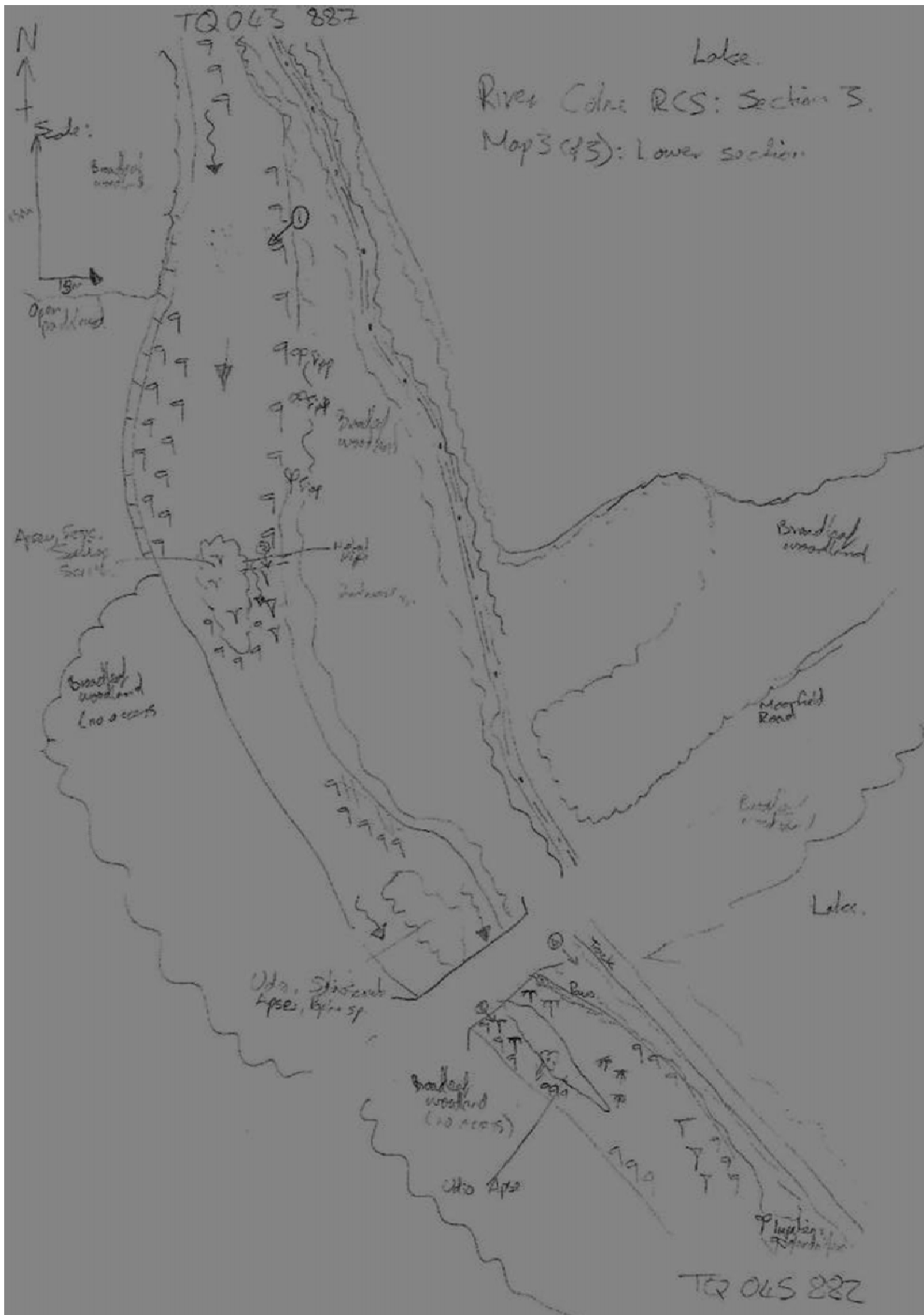


Table 62 RCS results for Survey Site 020-RS1-027-001 (CFA 7)

Ecology survey code	020-RS1-027-001		
Name of watercourse	Colne		
Surveyor(s)	MR and PR	Date	12.10.12
Survey start (24 hr clock)	09:00	Survey Finish (24 hr clock)	15:00
Weather conditions (description)	30% cloud, cold at survey but quickly warming up. No rain. Low wind.		
OS Grid Ref (8 digit)	Start Section	TQ 04327 88708	
	End Section	TQ 04736 88075	
Photo Ref(s)	020-RC-027001-P1-121012, 020-RC-027001-P2-121012, 020-RC-027001-P3-121012, 020-RC-027001-P4-121012		
Average width (m)	20m		
Average depth (m)	0.5m		
Brief description of channel	The channel gets progressively wider heading south, narrows briefly and widens out again. The channel becomes shallower and the substrate turns to cobble in these wider sections. There are three islands in the channel, each with mature trees. Riffles on the surface of the river are most evident around these islands. A road bridge passes over the river in the south of this section.		
Base substrate	Sand and mud to the north of the section moving towards cobbles and mud as the river widens in the south of the section.		
Bank type (include height, angle and extent of erosion)	LB	Very similar in structure to the opposite bank although without the reinforced section.	
	RB	Low steep banks no more than 0.5m in height above the water level at an angle of roughly 60-70 degree angle. Low levels of erosion. There is an artificial reinforced bank adjacent to the open parkland.	
Notable channel features	LB	No notable channel features.	
	RB	A section of reinforced bank next to the open parkland.	
Marginal vegetation (Description)	LB	Large patches of floating pennywort (<i>Hydrocotyle ranunculoides</i>).	
	RB	Large patches of floating pennywort.	
Bank zone habitats (Description)	LB	Broadleaved woodland and beyond it a recreational fishing lake.	
	RB	Private open parkland to the north and broadleaved woodland to the south.	
Adjacent land use	LB	Recreational fishing lake.	
	RB	Broadleaved woodland to the north and south with open parkland in between.	
Fauna of interest (State LB or RB if specific to single bank)	Fish (species not identified).		
Recreation features	None on the river itself but the adjacent lake and footpath have recreational fishing and dog walking respectively.		
Existing management	No obvious management.		
Observed or potential threats to conservation value (e.g. crop spraying,	Floating pennywort is a significant threat to the biodiversity of the river. Japanese knotweed (<i>Fallopia japonica</i>) and Indian balsam (<i>Impatiens glandulifera</i>) also have the		

Table 63 RCS results for Survey Site 020-RS1-028-001 (CFA 7)

Ecology survey code	020-RS1-028-001		
Name of watercourse	Colne		
Surveyor(s)	MR and PR	Date	12.10.12
Survey start (24 hr clock)	09:00	Survey Finish (24 hr clock)	15:00
Weather conditions (description)	30% cloud, cold at survey but quickly warming up. No rain. Light wind.		
OS Grid Ref (8 digit)	Start Section	TQ 0408 9700 (N)	
	End Section	TQ 04087 89306 (S)	
Photo Ref(s)	020-RC-028001-P1-121012, 020-RC-028001-P2-121012		
Average width (m)	12m		
Average depth (m)	1.5m		
Brief description of channel	10-15m wide channel with steep banks to the west and tiered banks to the east. The tiered banks comprise a low-lying vegetated mud shelf and the top of the bank. In places, the occasional tree has fallen into the channel.		
Base substrate	Sand and mud.		
Bank type (include height, angle and extent of erosion)	LB	A tiered bank comprising low-lying vegetated mud shelves with a steeper, upper bank.	
	RB	Vertical bank into water at approximately 70 degree angle. Erosion of the stable-earth bank is minimal.	
Notable channel features	LB	None	
	RB	None	
Marginal vegetation (Description)	LB	Extensive common reed (<i>Phragmites australis</i>) with occasional bulrush (<i>Typha latifolia</i>). Localised patches of water mint (<i>Mentha aquatica</i>), water forget-me-not (<i>Myosotis scorpioides</i>), gypsywort (<i>Lycopus europaeus</i>), yellow iris (<i>Iris pseudacorus</i>) and floating pennywort.	
	RB	In the north of this section common reed is the dominant marginal species. In the southern half of this section dogwood (<i>Cornus sanguinea</i>) is dominant, extending out into the channel.	
Bank zone habitats (Description)	LB	Adjacent footpath of semi-improved grassland (max. width of 15m) then lake.	
	RB	Woodland to a maximum distance of 70m then lake (old gravel pit). Species include bramble (<i>Rubus fruticosus agg.</i>), ash (<i>Fraxinus excelsior</i>), osier (<i>Salix viminalis</i>), silver birch (<i>Betula pendula</i>) and pedunculate oak (<i>Quercus robur</i>).	
Adjacent land use	LB	Recreational lake	
	RB	Recreational lake	
Fauna of interest (State LB or RB if specific to single bank)	None noted.		
Recreation features	Fishing on the adjacent lake but nothing in the river.		
Existing management	Some removal of floating pennywort by Environment Agency (EA) but generally low levels of management.		

<p>Observed or potential threats to conservation value (e.g. crop spraying, scrub invasion etc)</p>	<p>Extensive floating pennywort is a significant threat to the river and its conservation status. Japanese knotweed also poses a significant threat although not as immediate as that posed by floating pennywort.</p>
<p>Suggestions for habitat improvement</p>	<p>Removal of highly invasive plant species, namely floating pennywort and Japanese knotweed.</p>

Figure 146: Survey Site 020-RS1-028-002 (CFA 7)

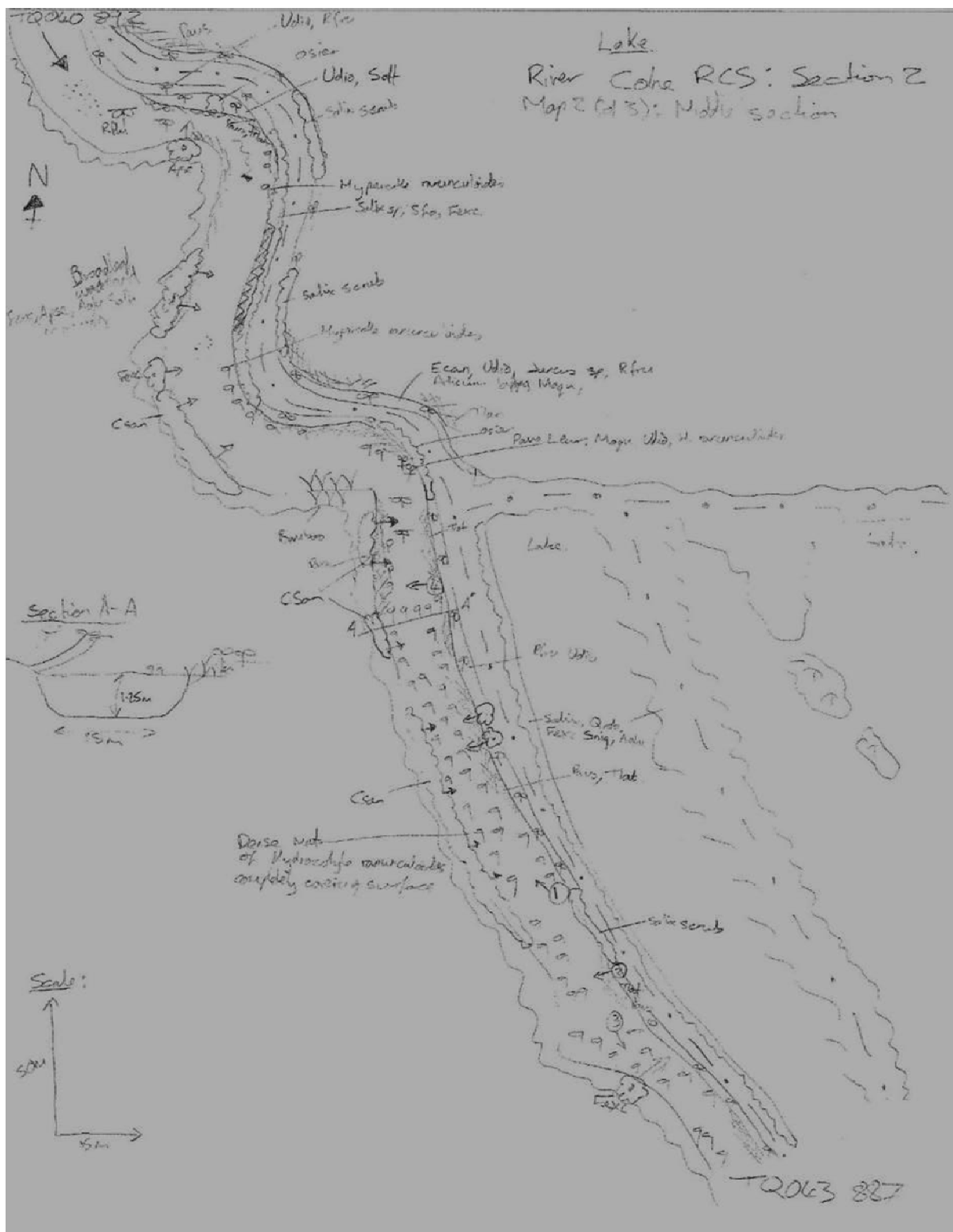



Table 64 RCS results for Survey Site 020-RS1-028-002 (CFA 7)

Ecology survey code	020-RS1-028-002		
Name of watercourse	Colne		
Surveyor(s)	MW and PR	Date	12.10.12
Survey start (24 hr clock)	09:00	Survey Finish (24 hr clock)	15:00
Weather conditions (description)	30% cloud, cold at survey but quickly warming up. No rain. Light wind.		
OS Grid Ref (8 digit)	Start Section	TQ 04087 89306	
	End Section	TQ 04232 88870	
Photo Ref(s)	020-RC-028002-P1-121012, 020-RC-028002-P2-121012, 020-RC-028002-P3-121012, 020-RC-028002-P4-121012		
Average width (m)	10m		
Average depth (m)	1.5m		
Brief description of channel	A wide channel with steep, low banks. Floating pennywort dominates the flora and entirely blocks the channel in places.		
Base substrate	Sand and mud.		
Bank type (include height, angle and extent of erosion)	LB	East Bank - very similar in overall structure to the left (west) bank.	
	RB	West Bank - a low bank approximately 0.5m above the water surface at a reasonably steep angle of approximately 60-70 degree angle.	
Notable channel features	LB	No notable channel features.	
	RB	Significant dogwood that excluded visibility to large stretches of this bank.	
Marginal vegetation (Description)	LB	Significant stretches of common reed and floating pennywort, the latter being particularly dominant in the south of the section. Other marginal vegetation with a patchy abundance included gypsywort, water mint and water forget-me-not.	
	RB	Significant stretches of dogwood that extend into the channel dominate the marginal vegetation. Common reed has a patchy distribution along the edge of the bank and floating pennywort is locally dominant. A patch of bamboo (species unknown) was also noted.	
Bank zone habitats (Description)	LB	Patches of willow (<i>Salix sp.</i>) scrub with dense common nettle (<i>Urtica dioica</i>) and bramble vegetation between.	
	RB	Dogwood and broadleaved woodland comprising species such as ash, alder (<i>Alnus glutinosa</i>) and willow (<i>Salix spp.</i>).	
Adjacent land use	LB	Fishing Lake and boating in the lake to the north and gravel/sand extraction in the lake to the south.	
	RB	Broadleaved woodland with no obvious land use.	
Fauna of interest (State LB or RB if specific to single bank)	None noted		
Recreation features	No recreational features other than the occasional dog walker or fisherman on the adjacent path and lake respectively.		
Existing management	No obvious management with exception to footpath maintenance.		
Observed or potential threats to	Floating pennywort poses a significant threat to the biodiversity of the River Colne. In		

conservation value (e.g. crop spraying, scrub invasion etc)	some stretches within this section floating pennywort formed a dense mat covering 100% of the river surface.
Suggestions for habitat improvement	Removal of highly invasive plant species, namely floating pennywort.

Surveyor(s)	EH and SH		Date	21.05.13
Survey start (24 hr clock)	10:00		Survey Finish (24 hr clock)	13:00
Weather conditions (description)	Overcast			
OS Grid Ref (8 digit)	Start Section		TQ04022 89654	
	End Section		TQ04077 89188	
Photo Ref(s)	020-RS1-028-003 P1 210513, 020-RS1-028-003 P2 210513, 020-RS1-028-003 P3 210513			
Average width (m)	10			
Average depth (m)	2			
Brief description of channel	Slow flow with uniform width and depth. Evidence of re-sectioning. Frequent marginal vegetation. Overhanging trees frequent also.			
Base substrate	Gravel			
Bank type (include height, angle and extent of erosion)	LB	Steep earth, 4m, 45 degree angle. Scrub and tall ruderal, no evidence of erosion.		
	RB	Mix of gentle and steep earth, 2-4m, 30-45 degree angle, mostly wooded		
Notable channel features	LB	Recovery berms present		
	RB	Much overhanging crack-willow (<i>Salix fragilis</i>).		
Marginal vegetation (Description)	LB	Mostly common reed.		
	RB	Mostly common reed.		
Bank zone habitats (Description)	LB	Tall ruderals and tall grass and herbs. Small areas of woodland. Patches of scrub.		
	RB	Woodland and dense scrub.		
Adjacent land use	LB	Footpath then lake		
	RB	Woodland		
Fauna of interest (State LB or RB if specific to single bank)	Great crested grebe (<i>Podiceps cristatus</i>). Potential for water vole (<i>Arvicola amphibius</i>), otter (<i>Lutra lutra</i>), kingfisher (<i>Alcedo atthis</i>).			
Recreation features	Footpath, bird hide, wildlife site.			
Existing management	Has been re-sectioned in the past (looks uniform depth, width etc.), but not recently. Floating pennywort control.			
Observed or potential threats to conservation value (e.g. crop spraying, scrub invasion etc)	Japanese knotweed. Floating pennywort present here last year (see surveys 020-RS1-027-001, 020-RS1-028-001, 020-RS1-028-002).			
Suggestions for habitat improvement	Floating pennywort management has been carried out here in the past, but it is still present, as is Japanese knotweed. There may be some scope to restore floodplain as the channel runs through woodland towards the road bridge. There is evidence that this part of the river is already more naturalised than other sections upstream.			

Figure 14.8: Survey Site 020-RS1-028-004 (CFA 7)

Reference Number: 020-RS1-028-004	NGR: U/S TQ 040 7789188 D/S TQ 04293 88794	 Mott MacDonald
River Name: Colne	Date: 21.05.2013	

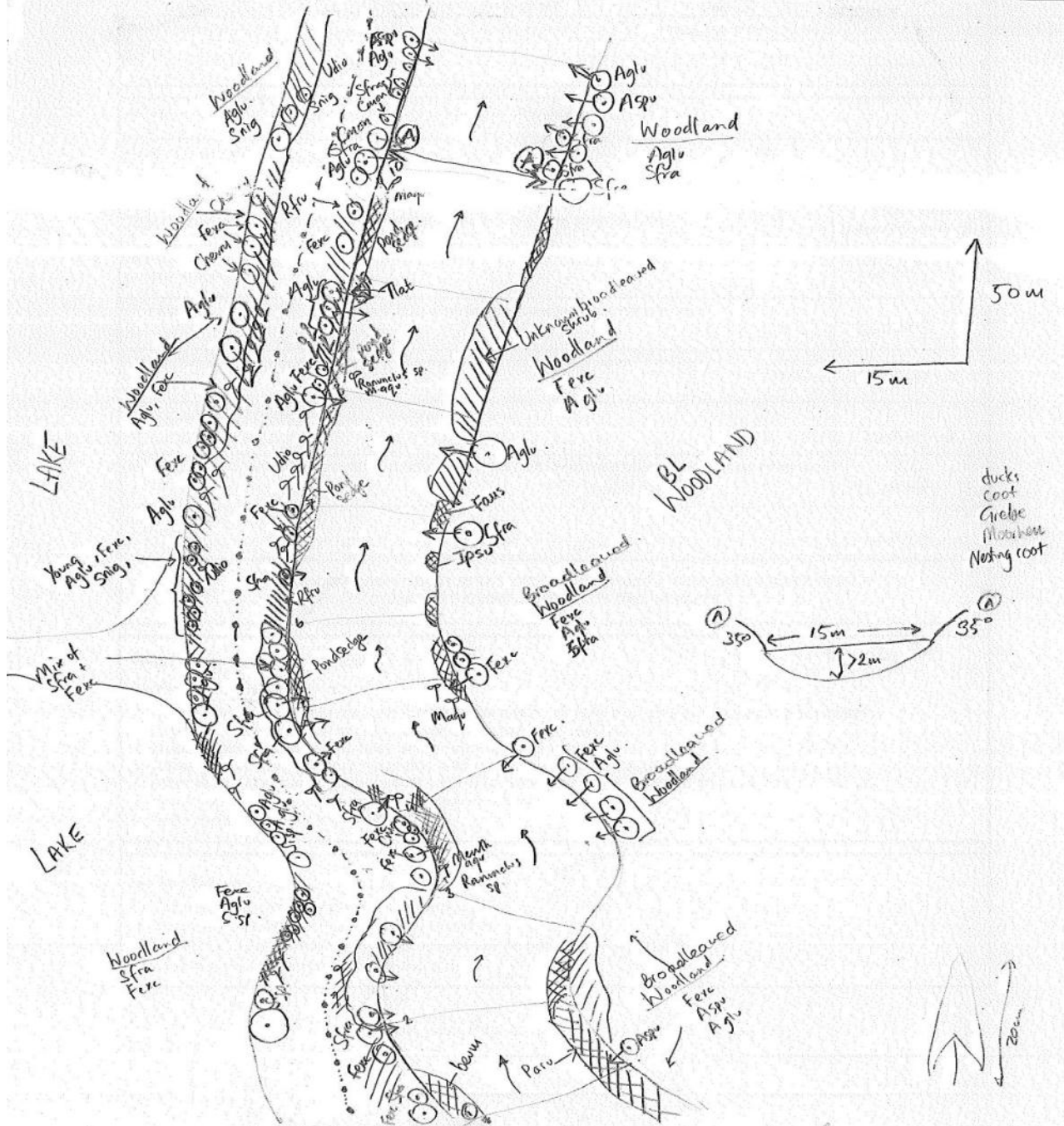


Table 66 RCS results for Survey Site 020-RS1-028-004 (CFA 7)


Ecology survey code	020-RS1-028-004		
Name of watercourse	Colne		
Surveyor(s)	EH and SH	Date	21.05.13
Survey start (24 hr clock)	14:00	Survey Finish (24 hr clock)	15:15
Weather conditions (description)	Overcast		
OS Grid Ref (8 digit)	Start Section	TQ04077 89188	
	End Section	TQ04293 88794	
Photo Ref(s)	020-RS1-028-004 P1 210513, 020-RS1-028-004 P2 210513, 020-RS1-028-004 P3 210513, 020-RS1-028-004 P4 210513, 020-RS1-028-004 P5 210513		
Average width (m)	15		
Average depth (m)	2		
Brief description of channel	Slow flow, deep probably realigned at some point. Very similar along its length.		
Base substrate	Gravel/unknown		
Bank type (include height, angle and extent of erosion)	LB	1m, gentle steep slope, tree lined. 35 degree angle	
	RB	Gentle, 1m, 35 degree angle	
Notable channel features	LB	None	
	RB	None	
Marginal vegetation (Description)	LB	Greater pond sedge (<i>Carex riparia</i>) and water mint, bulrush occasional.	
	RB	Little marginal vegetation, overhanging scrub.	
Bank zone habitats (Description)	LB	Scrub, with herbs and trees/patches of woodland.	
	RB	Broadleaved semi-natural woodland.	
Adjacent land use	LB	Lake on far side of footpath.	
	RB	Mature broadleaved woodland.	
Fauna of interest (State LB or RB if specific to single bank)	Coot (<i>Fulica atra</i>), moorhen (<i>Gallinula chloropus</i>), great crested grebes.		
Recreation features	Footpath, information board, wildlife site.		
Existing management	Has been re-sectioned in the past (looks uniform depth, width etc), but not recently.		
Observed or potential threats to conservation value (e.g. crop spraying, scrub invasion etc)	Japanese knotweed upstream on right bank. Floating pennywort seen here last year (see surveys 020-RS1-027-001, 020-RS1-028-001, 020-RS1-028-002).		
Suggestions for habitat improvement	Management of invasive species. The water flow is currently slow and low energy, and diverse flow and substrate types could be introduced by creating areas of riffle and pool. There is little opportunity to restore the natural floodplain as the river channel is contained between natural water on the left bank, although it might be possible on the right bank, where the bank is covered in woodland.		

Table 67 RCS results for Survey Site 020-RS1-028-005 (CFA 7)

Ecology survey code	020-RS1-028-005		
Name of watercourse	Colne		
Surveyor(s)	EH and SH	Date	21.05.13
Survey start (24 hr clock)	15:30	Survey Finish (24 hr clock)	17:30
Weather conditions (description)	Overcast		
OS Grid Ref (8 digit)	Start Section	TQ04293 88794	
	End Section	TQ04464 88297	
Photo Ref(s)	020-RS1-028-005 P1 210513, 020-RS1-028-005 P2 210513, 020-RS1-028-005 P3 210513, 020-RS1-028-005 P4 210513, 020-RS1-028-005 P5 210513		
Average width (m)	12		
Average depth (m)	2		
Brief description of channel	Slow flow, uniform width and depth. Evidence of re-sectioning. Frequent marginal vegetation and overhanging trees.		
Base substrate	Gravel/silt		
Bank type (include height, angle and extent of erosion)	LB	Shallow Earth bank, 15 degree angle, 0.5m	
	RB	Medium slope, 35 degree angle, 1.5m.	
Notable channel features	LB	Much overhanging crack-willow and alder.	
	RB	As LB	
Marginal vegetation (Description)	LB	Reed canary-grass (<i>Phalaris arundinacea</i>), plus occasional water mint and the invasive floating pennywort.	
	RB	RB rarely visible due to overhanging trees.	
Bank zone habitats (Description)	LB	Woodland and dense scrub	
	RB	Mostly woodland, some amenity grassland/lawn.	
Adjacent land use	LB	Lake and woodland. Wildlife site with footpath/track.	
	RB	Woodland and amenity grass.	
Fauna of interest (State LB or RB if specific to single bank)	Coot, pied wagtail (<i>Motacilla alba</i>).		
Recreation features	Wildlife site and footpath		
Existing management	Has been re-sectioned in the past.		
Observed or potential threats to conservation value (e.g. crop spraying, scrub invasion etc)	Japanese knotweed upstream on edge. Floating pennywort present in river.		
Suggestions for habitat improvement	Management of invasive species. Increase diversity of flows by creating meadows or creating riffle and pool flows. River currently runs through suburban area and next to open water, so opportunities for restoring the natural floodplain are minimal.		

Misbourne (CFA 8)

Figure 150: Survey Site 020-RS1-037-001 (CFA 8)

Reference: 020-RS1-037-001	NGR: U/S 5098279 95425 D/S 5098582 93115	 Mott MacDonald Surveyor: C. B. + S. H.
River Name: Misbourne.	Date: 13.6.13	

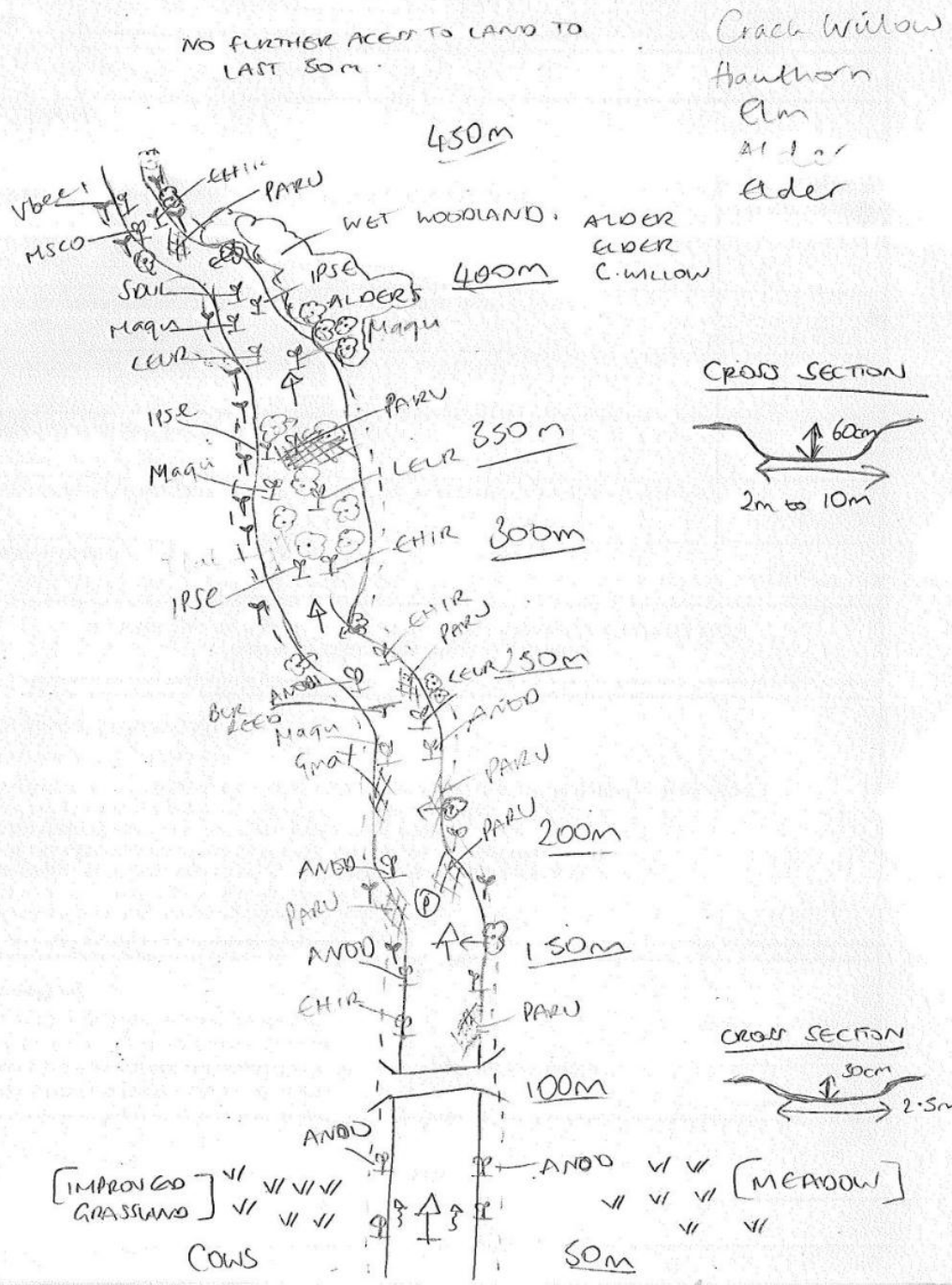


Table 68 RCS results for Survey Site 020-RS1-037-001 (CFA 8)

Ecology survey code	020-RS1-037-001		
Name of watercourse	Misbourne		
Surveyor(s)	SH and CB	Date	13.06.13
Survey start (24 hr clock)	13:45	Survey Finish (24 hr clock)	14:30
Weather conditions (description)	Breezy, drizzly but mild.		
OS Grid Ref (8 digit)	Start Section	SU98279 95425	
	End Section	SU98582 95115	
Photo Ref(s)	020-RS1-037-001 P1 130613, 020-RS1-037-001 P2 130613, 020-RS1-037-001 P3 130613, 020-RS1-037-001 P4 130613.		
Average width (m)	2-10		
Average depth (m)	0.20-0.70		
Brief description of channel	Natural river channel with areas of riffle and pool. Choked in places with vegetation, including reed canary-grass, fool's-water-cress (<i>Apium nodiflorum</i>), great willowherb (<i>Epilobium hirsutum</i>) and water mint. There is a wide section near to wet woodland, where the channel is 10m or more in width.		
Base substrate	Gravel and silt		
Bank type (include height, angle and extent of erosion)	LB	Gentle earth, 0.6m in height, less than 30 degree angle, no evidence of erosion.	
	RB	Gentle earth, 0.6m in height, less than 30 degree angle, no evidence of erosion.	
Notable channel features	LB	None	
	RB	None	
Marginal vegetation (Description)	LB	Frequent fringing vegetation, with reed canary-grass and fool's-water-cress abundant. Occasional species include water mint, great willowherb, gypsywort, bittersweet and water forget-me-not.	
	RB	As for RB	
Bank zone habitats (Description)	LB	All tall ruderals, mainly common nettle with occasional shrubs, such as elder (<i>Sambucus nigra</i>).	
	RB	Tall ruderals, predominantly common nettle, and frequent crack-willow, with an area of wet woodland downstream with alder, crack-willow and elder.	
Adjacent land use	LB	Improved grassland/grazing pasture.	
	RB	Improved grassland/grazing pasture.	
Fauna of interest (State LB or RB if specific to single bank)	Alder /wet woodland habitat. Potential for kingfisher along the length (but not nesting), and potential for fish (fish trapping occurring at the same time as survey).		
Recreation features	None. Private land.		
Existing management	Vegetation clearance by road bridge by Chilterns Society Misbourne Group.		

<p>Observed or potential threats to conservation value (e.g. crop spraying, scrub invasion etc)</p>	<p>Cattle poaching in upstream end.</p>
<p>Suggestions for habitat improvement</p>	<p>Increase diversity of flows in channel as the water is generally slow flowing and deep downstream of the road bridge. Upstream of the road bridge, the river appears more naturalised. Floodplain could be restored as the river runs through meadow and grazing pasture.</p>

Figure 151: Survey Site 020-RS1-042-001 (CFA 8)

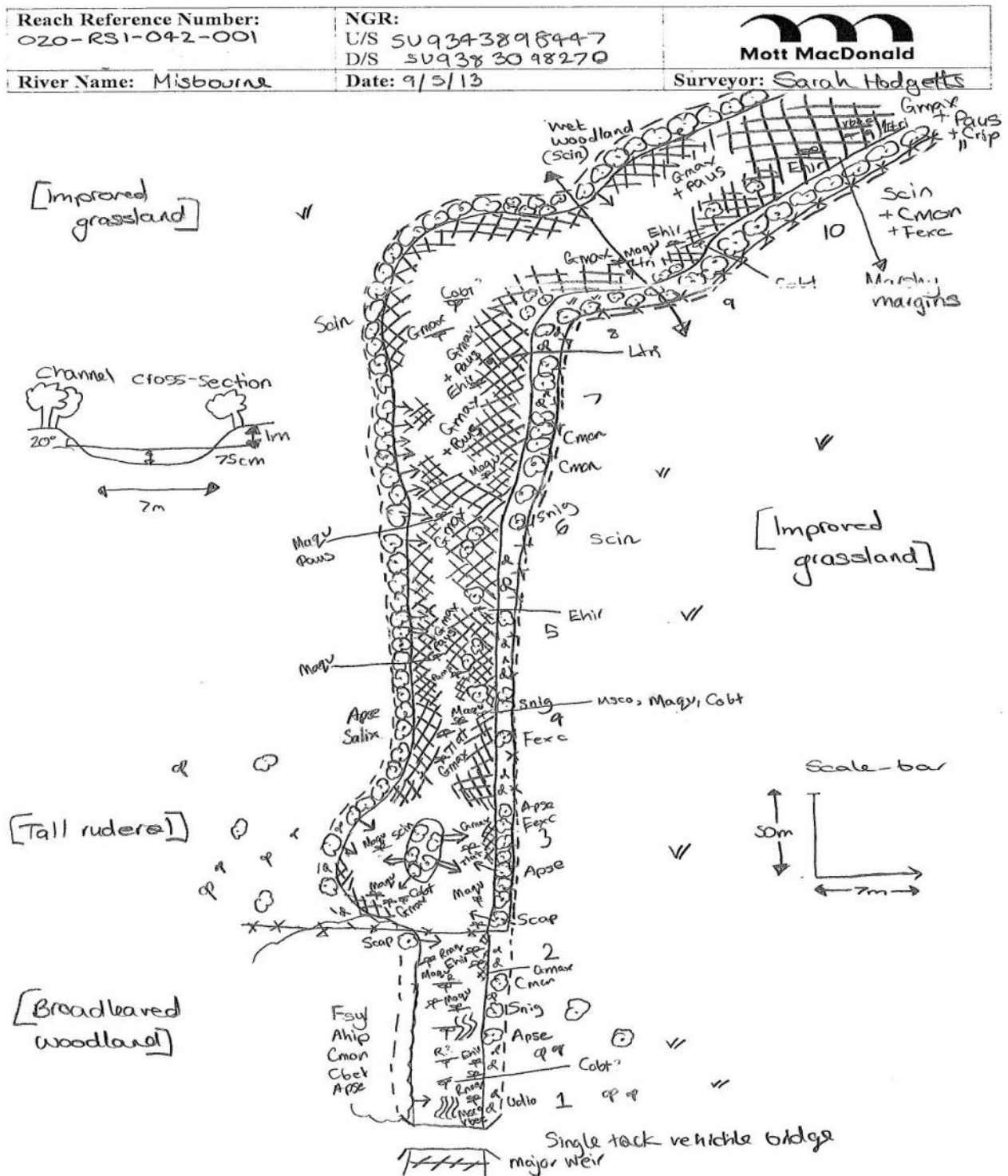


Table 69 RCS results for Survey Site 020-RS1-042-001 (CFA 8)


Ecology survey code	020-RS1-042-001		
Name of watercourse	Misbourne		
Surveyor(s)	SH and ZT	Date	09.05.13

Survey start (24 hr clock)	09:00	Survey Finish (24 hr clock)	11:00
Weather conditions (description)	Bright but cloudy, dry		
OS Grid Ref (8 digit)	Start Section	SU9343898447	
	End Section	SU9383098270	
Photo Ref(s)	020-RS1-042-001 P1 090513, 020-RS1-042-001 P2 090513, 020-RS1-042-001 P3 090513		
Average width (m)	7		
Average depth (m)	0.75		
Brief description of channel	Naturalised river (may have been straightened in the past), with marshy margins on both banks and wet woodland (particularly on left bank and downstream). Surveyed entirely from right bank and channel. Channel deep and silty in places. The channel is mostly choked downstream with reed sweet-grass (<i>Glyceria maxima</i>), and includes scattered patches of water mint, American willowherb (<i>Epilobium ciliatum</i>) and duckweed (<i>Lemna</i> sp.).		
Base substrate	Silt, chalk and gravel.		
Bank type (include height, angle and extent of erosion)	LB	Shallow-sloping earth bank, 1m in height, 20 degree angle, no evidence of erosion.	
	RB	Shallow-sloping earth bank, 1.75m in height, 20 degree angle, no evidence of erosion.	
Notable channel features	LB	A weir before the single-track vehicle bridge creates riffle habitat just downstream of the bridge. There is a vegetated island in the first third of the reach section.	
	RB	As above	
Marginal vegetation (Description)	LB	Abundant marginal vegetation, with mostly reed sweet-grass, as well as common reed. Overhanging trees creating areas of shade. There are frequent patches of water mint, water crowfoot (<i>Ranunculus</i> sp.), water-cress (<i>Nasturtium officinale</i>), American willowherb and ivy-leaved duckweed (<i>Lemna trisulca</i>).	
	RB	Abundant marginal vegetation, with mostly reed sweet-grass, with common reed occasional. There are some overhanging trees and willow trees growing in the marshy/marginal areas, as well as frequent patches of water mint, water-cress, American willowherb and ivy-leaved duckweed.	
Bank zone habitats (Description)	LB	Broadleaved woodland (as below), with many overhanging branches.	
	RB	Tall ruderal (mainly common nettle) and lines of trees - elder, sycamore (<i>Acer pseudoplatanus</i>), ash, grey willow (<i>Salix cinerea</i>) and hawthorn (<i>Crataegus monogyna</i>). There are willow trees growing in the marshy/marginal areas.	
Adjacent land use	LB	Broadleaved woodland - with beech (<i>Fagus sylvatica</i>), horse-chestnut (<i>Aesculus hippocastanum</i>), hawthorn, hornbeam (<i>Carpinus betulus</i>) and sycamore, tall ruderal and short grassland (improved grassland).	
	RB	Improved grassland.	
Fauna of interest (State LB or RB if specific to single bank)	Potentially suitable for water vole. Also for amphibians - the meander in the upstream half that goes around a mature island is very slow moving with suitable marginal plants such as water mint.		
Recreation features	None		
Existing management	Previously managed, but allowed to naturalise.		

Observed or potential threats to conservation value (e.g. crop spraying, scrub invasion etc)	None
Suggestions for habitat improvement	This section of the River Misbourne is largely natural and achieved good ecological potential. The river already has a natural floodplain with marshy areas to the side of the channel, and there is scope to introduce further wetland areas, such as scrapes, reedbed pools and ponds, as the land on either bank is improved grassland and could be used as part of the floodplain.

Stoke Brook (CFA 11)

Figure 152: Survey Site 020-RS1-057-001 (CFA 11)

Reach Reference Number: 020-RS1-057-001	NGR: U/S SP8427309168 D/S SP8589809470	 Mott MacDonald
River Name:	Date: 9/5/13	Surveyor: Sarah Hedgetts

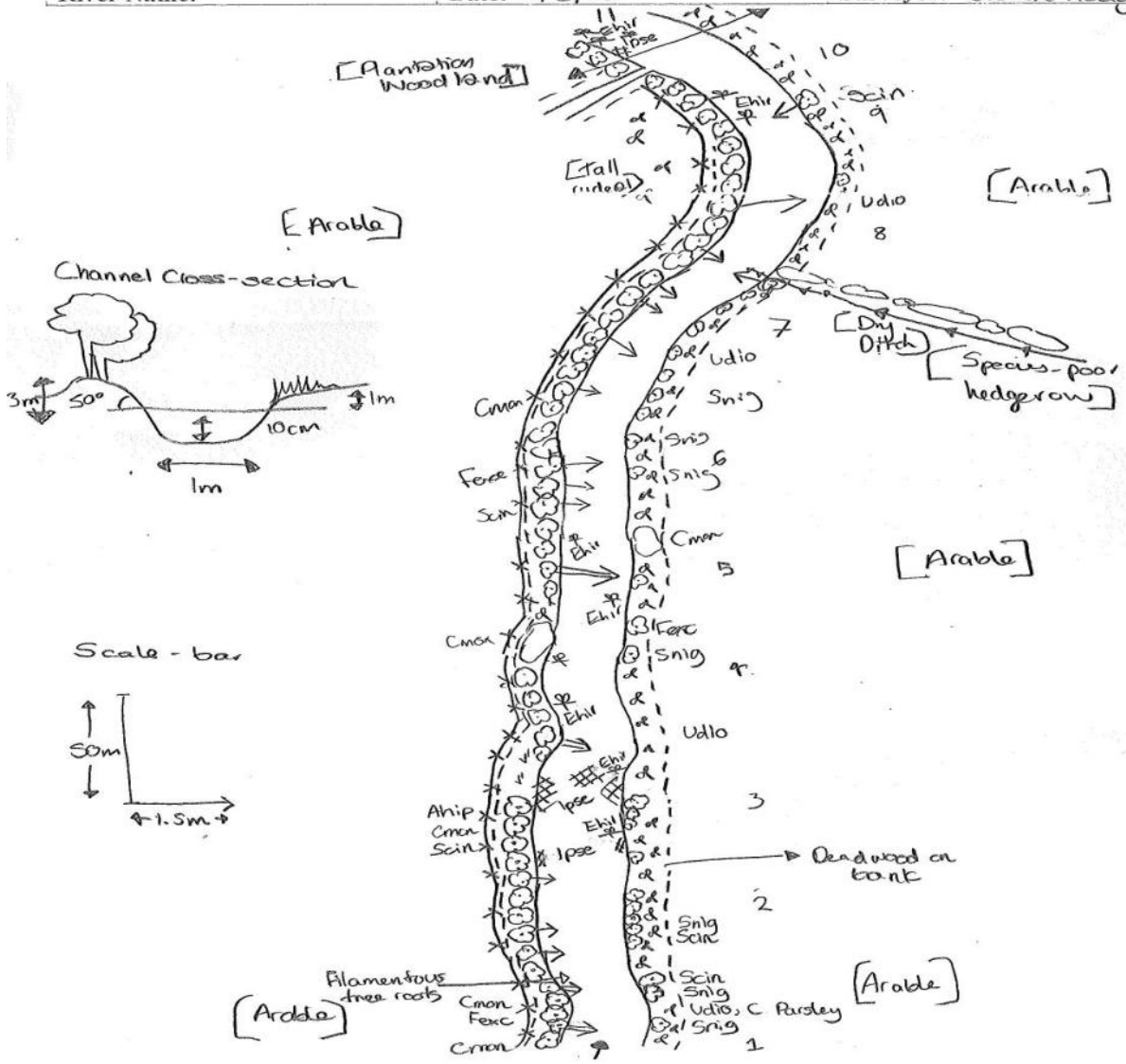


Table 70 RCS results for Survey Site 020-RS1-057-001 (CFA 11)

Ecology survey code	020-RS1-057-001		
Name of watercourse	Stoke Brook - upper channel		
Surveyor(s)	SH and ZT	Date	09.05.13
Survey start (24 hr clock)	14:00	Survey Finish (24 hr clock)	14:30
Weather conditions (description)	Cloudy, overcast and blustery, dry.		
OS Grid Ref (8 digit)	Start Section	SP8427309168	
	End Section	SP8389809470	
Photo Ref(s)	020-RS1-057-001 P1 090513, 020-RS1-057-001 P2 090513, 020-RS1-057-001 P3 090513, 020-RS1-057-001 P4 090513		
Average width (m)	1		
Average depth (m)	0.1		
Brief description of channel	Previously modified channel that has been over-deepened and straightened, but shows signs of recovering with shallow and deeper areas, gravel substrate in places, and mature trees and dense shrubs on banks. Surveyed from right embanked bank entirely, as banks very steep, though water is shallow throughout.		
Base substrate	Silt and gravel, with areas of sand.		
Bank type (include height, angle and extent of erosion)	LB	Steep, 50° bank generally 3m in height, some erosion evident.	
	RB	Steep, 50° bank generally 3m in height, some erosion evident.	
Notable channel features	LB	Overhanging and fallen trees.	
	RB	None	
Marginal vegetation (Description)	LB	Minimal marginal vegetation as the channel is shaded by over-hanging trees, but some patches of American willowherb and yellow iris.	
	RB	Infrequent patches of American willowherb and yellow iris.	
Bank zone habitats (Description)	LB	Continuous trees, including hawthorn, grey willow, ash and horse chestnut.	
	RB	Tall ruderals with common nettle dominant, with scattered, occasional trees - grey willow, ash and elder.	
Adjacent land use	LB	Arable	
	RB	Arable	
Fauna of interest (State LB or RB if specific to single bank)	Filamentous underwater tree roots suitable for fish. Bullfinch (<i>Pyrrhula pyrrhula</i>) heard.		
Recreation features	None		
Existing management	No recent management obvious, but has been modified in the past (over-deepened and straightened).		
Observed or potential threats to conservation value (e.g. crop spraying, scrub invasion etc)	None		
Suggestions for habitat	Could recreate different energy systems within the watercourse as it is very uniform at present (including creating riffles and pools). Adding field margins would also protect the		

improvement	channel from pesticides and other pollution from the arable fields.
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Surveyor(s)	SH band ZT	Date	09.05.13
Survey start (24 hr clock)	14:30	Survey Finish (24 hr clock)	16:00
Weather conditions (description)	Overcast and blustery, dry.		
OS Grid Ref (8 digit)	Start Section	SP8390309406	
	End Section	SP8363109653	
Photo Ref(s)	020-RS1-057-002 P1 090513, 020-RS1-057-002 P2 090513, 020-RS1-057-002 P3 090513, 020-RS1-057-002 P4 090513.		
Average width (m)	0.5		
Average depth (m)	0.01		
Brief description of channel	Highly modified river that has been straightened and over-deepened, with very few trees in the downstream half. Meanders are present in the downstream half, but the same over-deepening and re-sectioning is evident. Surveyed entirely from the right bank, and channel accessed sporadically due to very steep banks. Sparse channel vegetation, with a few places with marginal vegetation of choking reed sweet-grass, and occasional fool's-water-cress, watercress and water mint.		
Base substrate	Silt and gravel.		
Bank type (include height, angle and extent of erosion)	LB	Steep 50° banks about 3m high, some erosion evident.	
	RB	Steep 50° banks about 3m high some erosion evident.	
Notable channel features	LB	Un-vegetated side bars. Overhanging trees.	
	RB	None	
Marginal vegetation (Description)	LB	Several marginal patches of reed sweet-grass.	
	RB	Frequent marginal patches of reed sweet-grass.	
Bank zone habitats (Description)	LB	Predominantly tall ruderal, common nettle dominant with scattered trees of hawthorn, white willow (<i>Salix alba</i>) and ash and areas of short, improved grassland downstream.	
	RB	Predominantly tall ruderal with common nettle dominant, with scattered trees of elder, grey willow, hawthorn, ash and sycamore.	
Adjacent land use	LB	Grazing pasture (improved grassland)	
	RB	Grazing pasture (improved grassland)	
Fauna of interest (State LB or RB if specific to single bank)	None		
Recreation features	Footpath/bridleway crosses watercourse.		
Existing management	Heavily modified river that has been straightened and deepened.		
Observed or potential threats to conservation value (e.g. crop spraying, scrub invasion etc)	None		
Suggestions for habitat improvement	Downstream end could be restored to a natural watercourse as it runs through grazed pasture with few trees, with enough space for the river to erode and meander. There is little cover for birds and other animals on the banks, particularly on the left bank, so additional planting might improve the available habitat.		

OS Grid Ref (8 digit)	Start Section	SP8321610037
	End Section	SP8287110317
Photo Ref(s)	020-RS1-058-001 P1 200513, 020-RS1-058-001 P2 200513, 020-RS1-058-001 P3 200513, 020-RS1-058-001 P4 200513	
Average width (m)	1.5	
Average depth (m)	0.2	
Brief description of channel	Obviously re-sectioned stream in downstream half (over-deepened and straightened) but less obvious in upstream half where there are more natural features (riffles and pools, meanders, eroding banks, trees on both banks). Channel vegetation occasional; water mint, water forget-me-not, water figwort (<i>Scrophularia auriculata</i>), yellow iris and brooklime (<i>Veronica beccabunga</i>).	
Base substrate	Gravel/pebble	
Bank type (include height, angle and extent of erosion)	LB	Gentle upstream half, steep in downstream half.
	RB	Gentle upstream half, steep in downstream half.
Notable channel features	LB	None
	RB	Vegetated side bar.
Marginal vegetation (Description)	LB	Occasional to sparse
	RB	Occasional to sparse
Bank zone habitats (Description)	LB	Predominantly tree-lined with poplar sp., hawthorn, field maple (<i>Acer campestre</i>), white willow, alder and ash.
	RB	Predominantly tree-lined with poplar sp. (<i>Populus</i> sp.), hawthorn, field maple, white willow, alder and ash.
Adjacent land use	LB	Mostly tree lined. Arable (downstream half) with improved field margin. Improved grassland (grazed) upstream half.
	RB	Arable (downstream half). Improved grassland (grazed) upstream half.
Fauna of interest (State LB or RB if specific to single bank)	Water vole (land owner has seen one)	
Recreation features	Footpath	
Existing management	Has been re-sectioned in the past. Most obviously downstream section that runs through arable fields and fewer trees on right bank.	
Observed or potential threats to conservation value (e.g. crop spraying, scrub invasion etc)	Crop spraying as no field margin on the right.	
Suggestions for habitat improvement	Avoid impacts, particularly on upstream half that appears more naturalised. Ensure fencing is kept in good condition to prevent livestock poaching the bank. In the upstream half ensure the field margins are maintained, and reduce shading in the channel to encourage macrophyte growth.	

Sedrup Ditch (CFA 11)

Figure 155: Survey Site 020-RS1-060-001 (CFA 11)

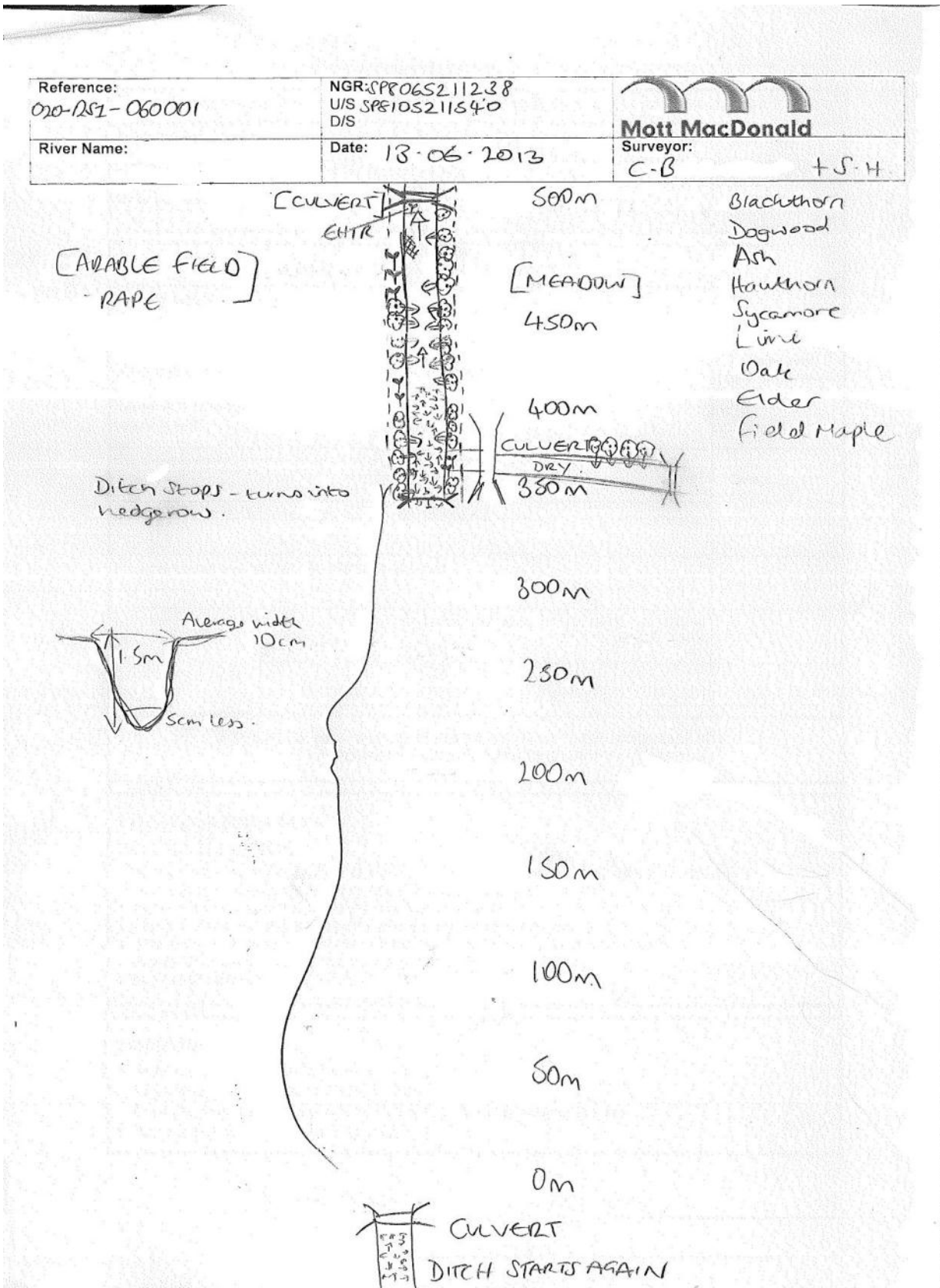



Table 73 RCS results for Survey Site 020-RS1-060-001 (CFA 11)

Ecology survey code	020-RS1-060-001		
Name of watercourse	Tributary to Sedrup Ditch		
Surveyor(s)	CB and SH	Date	13.06.13
Survey start (24 hr clock)	10:00	Survey Finish (24 hr clock)	11:30
Weather conditions (description)	Windy, drizzly but mild.		
OS Grid Ref (8 digit)	Start Section	SP8065211238	
	End Section	SP8105211540	
Photo Ref(s)	020-RS1-060-001 P1 130613, 020-RS1-060-001 P2 130613, 020-RS1-060-001 P3 130613, 020-RS1-060-001 P4 130613.		
Average width (m)	0.1		
Average depth (m)	0.05		
Brief description of channel	Possibly entirely artificial ditch that is straight and deep. Little water present and slow flow. Ditch 150m in length culminating in a hedgerow with mound. It is possibly fed by second ditch that runs at right angles.		
Base substrate	Silt.		
Bank type (include height, angle and extent of erosion)	LB	Steep earth bank, 1.5m high, 80 degree angle.	
	RB	Steep earth bank, 1.5m high, 80 degree angle.	
Notable channel features	LB	None	
	RB	None	
Marginal vegetation (Description)	LB	Limited marginal vegetation. Horsetail sp. (<i>Equisetum</i> sp.), greater willowherb.	
	RB	As for RB.	
Bank zone habitats (Description)	LB	Tall ruderals including common nettle and cleavers (<i>Galium aparine</i>), few trees.	
	RB	Shrub and trees, including spindle (<i>Euonymus europaeus</i>), ash, sycamore, hawthorn, pedunculate oak, lime sp. (<i>Tilia</i> sp.), dogwood and blackthorn (<i>Prunus spinosa</i>).	
Adjacent land use	LB	Meadow (semi-improved/improved grassland)	
	RB	Arable fields (oilseed rape).	
Fauna of interest (State LB or RB if specific to single bank)	None		
Recreation features	Public footpath across meadow.		
Existing management	None		
Observed or potential threats to conservation value (e.g. crop spraying, scrub invasion etc)	None		
Suggestions for habitat improvement	Not applicable. Drainage ditch for 150m, and dry/no ditch for remainder.		

Figure 156: Survey Site 020-RS1-061-001 (CFA 11)

Reach Reference Number: 020-RS1-061-001	NGR: U/S SP8059611487 D/S SP8068011950	 Mott MacDonald
River Name:	Date: 9/5/13	Surveyor: Sarah Hodgetts

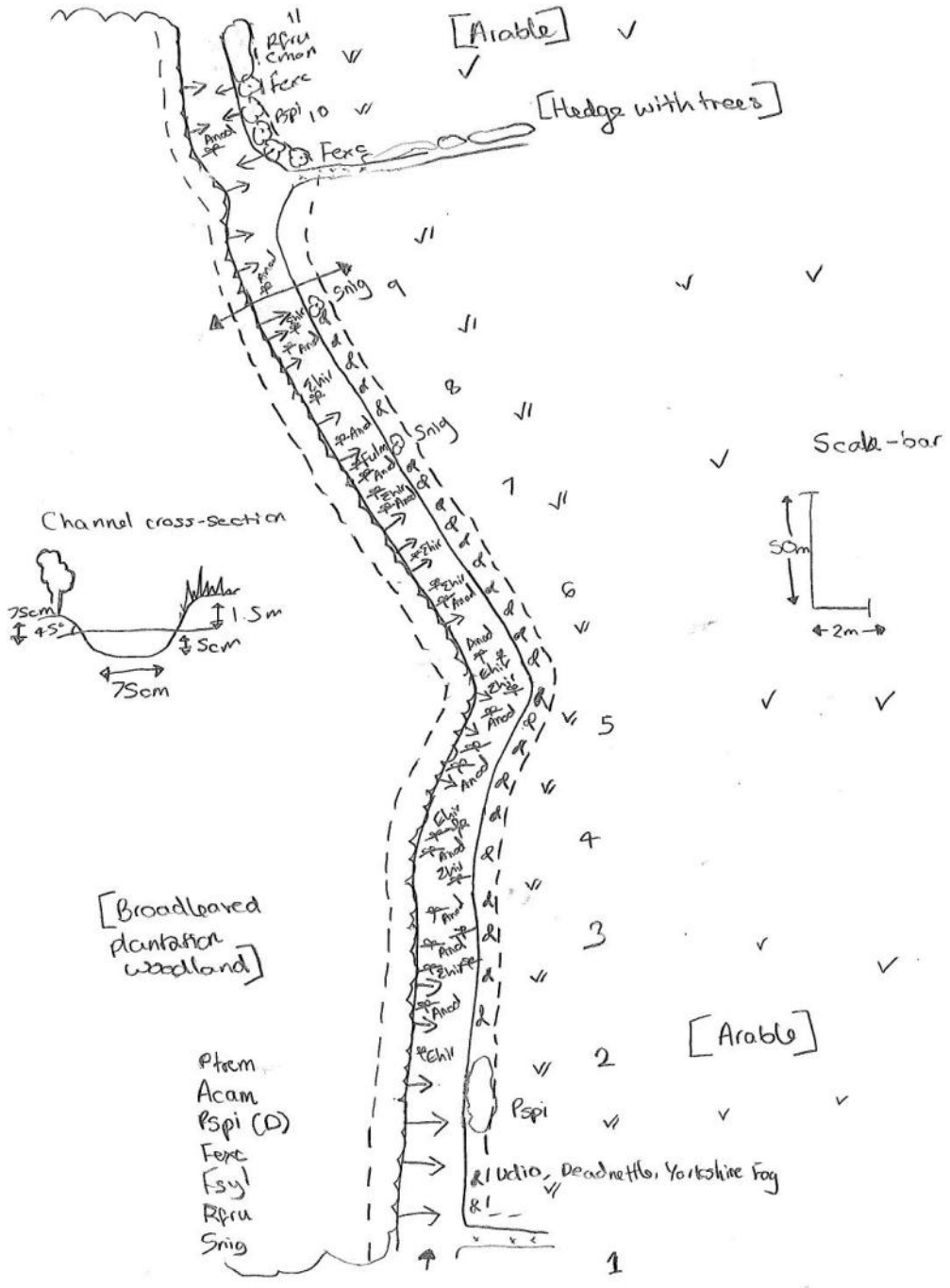
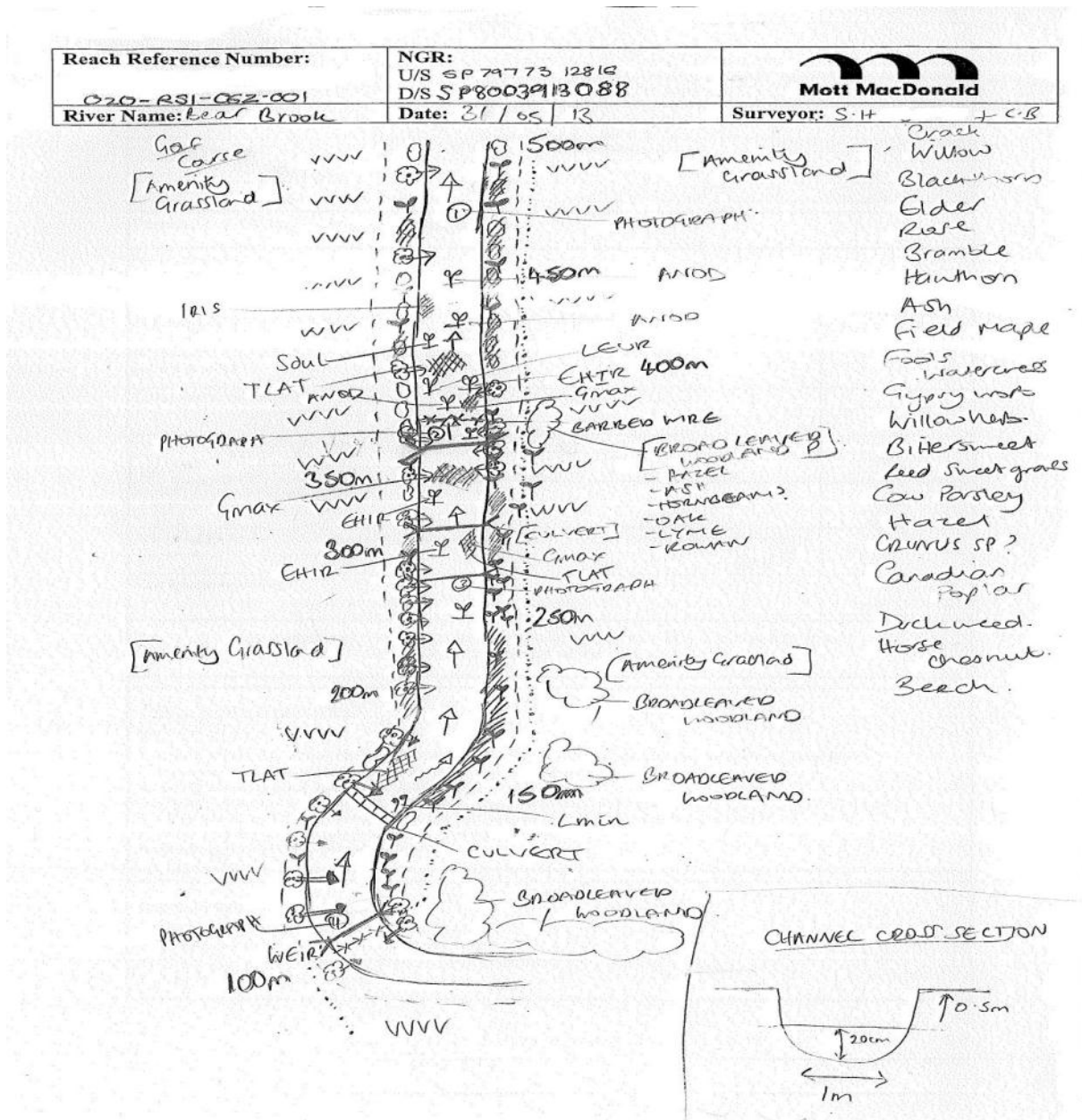


Table 74 RCS results for Survey Site 020-RS1-061-001 (CFA 11)

Ecology survey code	020-RS1-061-001		
Name of watercourse	Sedrup Ditch		
Surveyor(s)	SH and ZT	Date	09.05.2013
Survey start (24 hr clock)	15:00	Survey Finish (24 hr clock)	17:00
Weather conditions (description)	Cloudy, overcast and blustery, dry.		
OS Grid Ref (8 digit)	Start Section	SP8059611487	
	End Section	SP8068011950	
Photo Ref(s)	020-RS1-061-001 P1 090513, 020-RS1-061-001 P2 090513, 020-RS1-061-001 P3 090513, 020-RS1-061-001 P4 090513.		
Average width (m)	0.75		
Average depth (m)	0.05		
Brief description of channel	Heavily modified (straightened and re-sectioned) watercourse with plantation left and arable fields on right, with grassy margin between arable field and watercourse. Channel is a very silty ditch, not accessible, and surveyed entirely from right bank.		
Base substrate	Silt.		
Bank type (include height, angle and extent of erosion)	LB	Generally about 45 degree angle steep banks and 75cm high, covered entirely by plantation woodland, and not much evidence of erosion.	
	RB	Steep bank greater than 45 degree angle with evidence of erosion in places, and covered mostly with tall ruderal vegetation.	
Notable channel features	LB	Overhanging trees, creating a lot of shade.	
	RB	None	
Marginal vegetation (Description)	LB	Minimal marginal vegetation as the trees create a lot of shade.	
	RB	Scattered marginal vegetation including American willowherb, fool's-water-cress and meadowsweet (<i>Filipendula ulmaria</i>).	
Bank zone habitats (Description)	LB	Broadleaved plantation woodland with aspen (<i>Populus tremula</i>), field maple, blackthorn (dominant), ash, beech and elder.	
	RB	Tall ruderals dominated by common nettle, with dead nettle and Yorkshire fog (<i>Holcus lanatus</i>). The last 50m downstream included a line of ash and blackthorn trees, and dense scrub of bramble and hawthorn.	
Adjacent land use	LB	Broadleaved plantation woodland with aspen, field maple, blackthorn (dominant), ash, beech and elder.	
	RB	Arable field with grass field margin providing buffer strip between arable field and pesticides and watercourse.	
Fauna of interest (State LB or RB if specific to single bank)	Mammal paths.		
Recreation features	None		
Existing management	Modified in the past and maintained (right side has no scrub or large vegetation).		
Observed or potential threats to conservation value (e.g. crop	A grassland field margin helps protect the watercourse from crop spraying. The left bank is		

spraying, scrub invasion etc)	very shaded with few macrophytes growing in the left side of the channel.
Suggestions for habitat improvement	There is scope for river restoration as the right bank is adjacent to a field margin, which means some natural meanders could be incorporated. The field margin should be maintained and could be managed more effectively for wildlife.

Figure 157: Survey Site 020-RS1-062-001 (CFA 11)



Hartwell Ditches (CFA 11)

Table 75 RCS results for Survey Site 020-RS1-062-001 (CFA 11)

Ecology survey code	020-RS1-062-001		
Name of watercourse	Hartwell Ditch (flowing to Bear Brook)		
Surveyor(s)	SH and CB	Date	31.05.13
Survey start (24 hr clock)	09:00	Survey Finish (24 hr clock)	10:30
Weather conditions (description)	Bright and dry		
OS Grid Ref (8 digit)	Start Section	SP8003913088	

	End Section	SP7977312816
Photo Ref(s)	020-RS1-062-001 P1 310513, 020-RS1-062-001 P2 310513, 020-RS1-062-001 P3 310513, 020-RS1-062-001 P4 310513, 020-RS1-062-001 P5 310513, 020-RS1-062-001 P6 310513, 020-RS1-062-001 P7 310513.	
Average width (m)	0.4	
Average depth (m)	0.2	
Brief description of channel	Straightened length of brook, no evidence of deepening. Channel very shaded with overhanging trees and shrubs.	
Base substrate	Silt/gravel.	
Bank type (include height, angle and extent of erosion)	LB	Steep and gentle earth (majority steep), 0.75m high.
	RB	As for LB
Notable channel features	LB	None
	RB	None
Marginal vegetation (Description)	LB	Occasional reed sweet-grass, bulrush and yellow iris, with fool's-water-cress, gypsywort, great willowherb and bittersweet.
	RB	As for LB
Bank zone habitats (Description)	LB	Mostly tree-lined (overhanging), occasional shrub - hawthorn, blackthorn, ash, field maple and willow.
	RB	Mostly bramble scrub, elder and hazel (<i>Corylus avellana</i>), tall ruderal (common nettle) and woodland.
Adjacent land use	LB	Golf course -amenity grassland.
	RB	Golf course, playing fields and broadleaved woodland.
Fauna of interest (State LB or RB if specific to single bank)	None	
Recreation features	Footpath along right bank.	
Existing management	None evident.	
Observed or potential threats to conservation value (e.g. crop spraying, scrub invasion etc)	None	
Suggestions for habitat improvement	Re-introduce meanders and erosion processes in channel. Land either side of the channel is amenity grassland (the left bank is the golf course and the right is playing fields) - this could be used to restore the floodplain.	

Figure 158: Survey Site 020-RS1-063-001 (CFA 11)

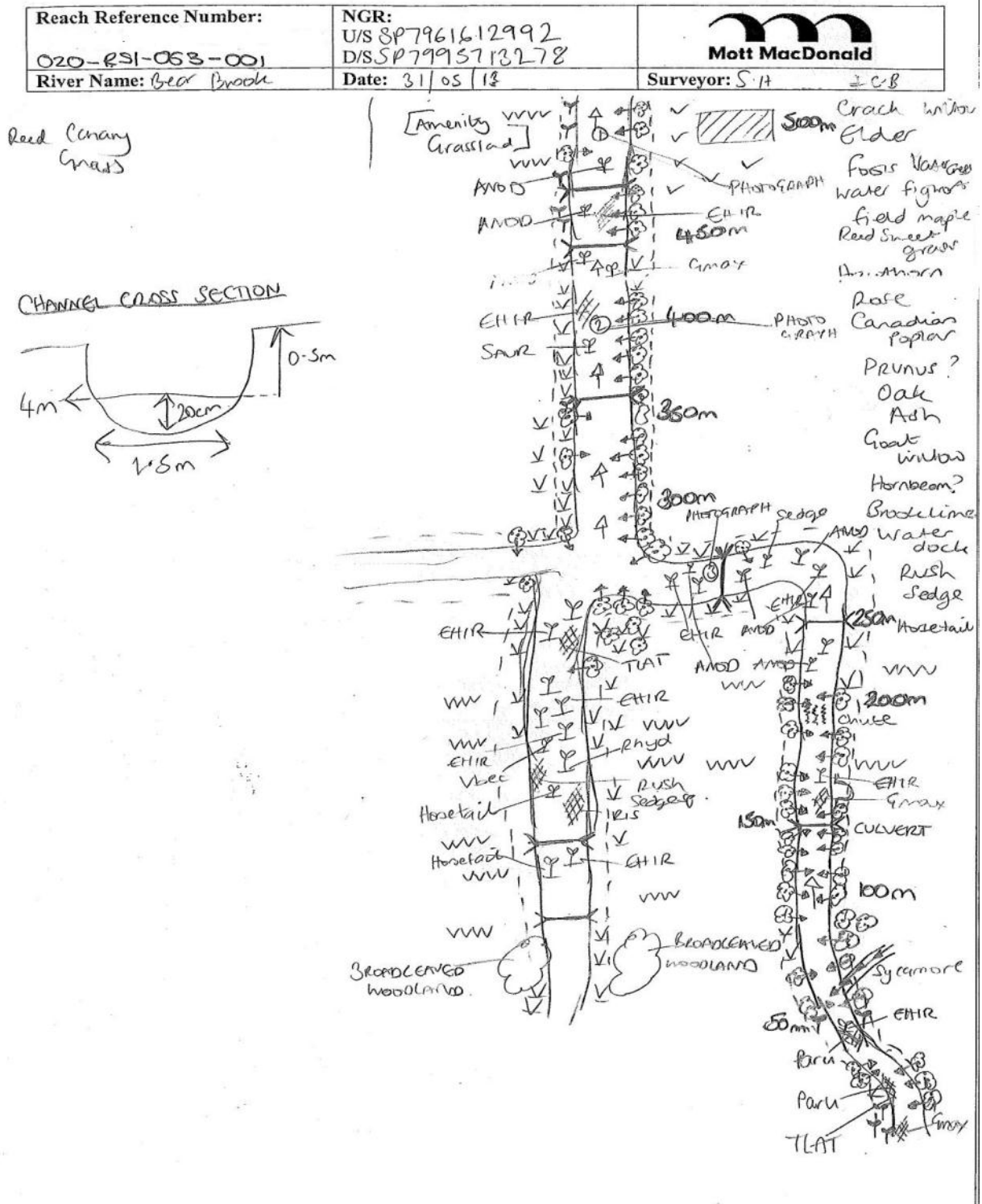


Table 76 RCS results for Survey Site 020-RS1-063-001 (CFA 11)

Ecology survey code	020-RS1-063-001
Name of watercourse	Lower Hartwell Ditch and tributary (flowing to Bear Brook)

Surveyor(s)	SH and CB		Date	31.05.13
Survey start (24 hr clock)	10:30		Survey Finish (24 hr clock)	12:00
Weather conditions (description)	Dry and bright			
OS Grid Ref (8 digit)	Start Section		SP7995713278	
	End Section		SP7961612992	
Photo Ref(s)	020-RS1-063-001 P1 310513, 020-RS1-063-001 P2 310513, 020-RS1-063-001 P3 310513, 020-RS1-063-001 P4 310513, 020-RS1-063-001 P5 310513, 020-RS1-063-001 P6 310513, 020-RS1-063-001 P7 310513, 020-RS1-063-001 P8 310513, 020-RS1-063-001 P9 310513, 020-RS1-063-001 P10 310513.			
Average width (m)	0.3			
Average depth (m)	Straightened and deepened river section with semi-continuous trees and shrubs on right bank and shrubs on left bank extensively over-shading channel. Channel choked in places with reed sweet-grass and fool's-water-cress. One area of chute flow. Tributary was straight and over deepened, narrow (0.3m) and shallow (0.1m).			
Brief description of channel	Silt.			
Base substrate	0.3			
Bank type (include height, angle and extent of erosion)	LB	Steep earth banks. 0.7m high		
	RB	As for LB		
Notable channel features	LB	None		
	RB	None		
Marginal vegetation (Description)	LB	Occasional reed sweet-grass and fool's-water-cress, with reed canary-grass, bulrush and brooklime. Tributary has horsetail sp., reed sweet-grass and brooklime.		
	RB	As for LB		
Bank zone habitats (Description)	LB	Main channel has hawthorn and elder and tall ruderals, with an area of broadleaved woodland. The tributary has shrub and trees - willow and oak in area of young plantation.		
	RB	Main channel is mainly tree-lined with hawthorn, elder and willow sp.. The tributary has mainly shrubs and tall ruderals.		
Adjacent land use	LB	Golf course.		
	RB	Golf course.		
Fauna of interest (State LB or RB if specific to single bank)	Badger (<i>Meles meles</i>) sett in woodland on left bank of main channel. Grass snake (<i>Natrix natrix</i>) in tributary on left bank.			
Recreation features	Golf course.			
Existing management	Deepened and straightened for drainage, with one culvert and 6 footbridges on main channel and two on tributary. New plantation woodland and young scrub along banks.			
Observed or potential threats to conservation value (e.g. crop spraying, scrub invasion etc)	Undisturbed.			
Suggestions for habitat improvement	Add meanders and floodplain and encourage diverse energy systems by adding groynes, etc, to increase erosion and sediment deposition. The channels run through amenity grassland (golf course), which could be used as floodplain in places, if agreed with the			

	landowner.
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River Thame (CFA 11)

Figure 159: Survey Site 020-RS1-064-001 (CFA 11)

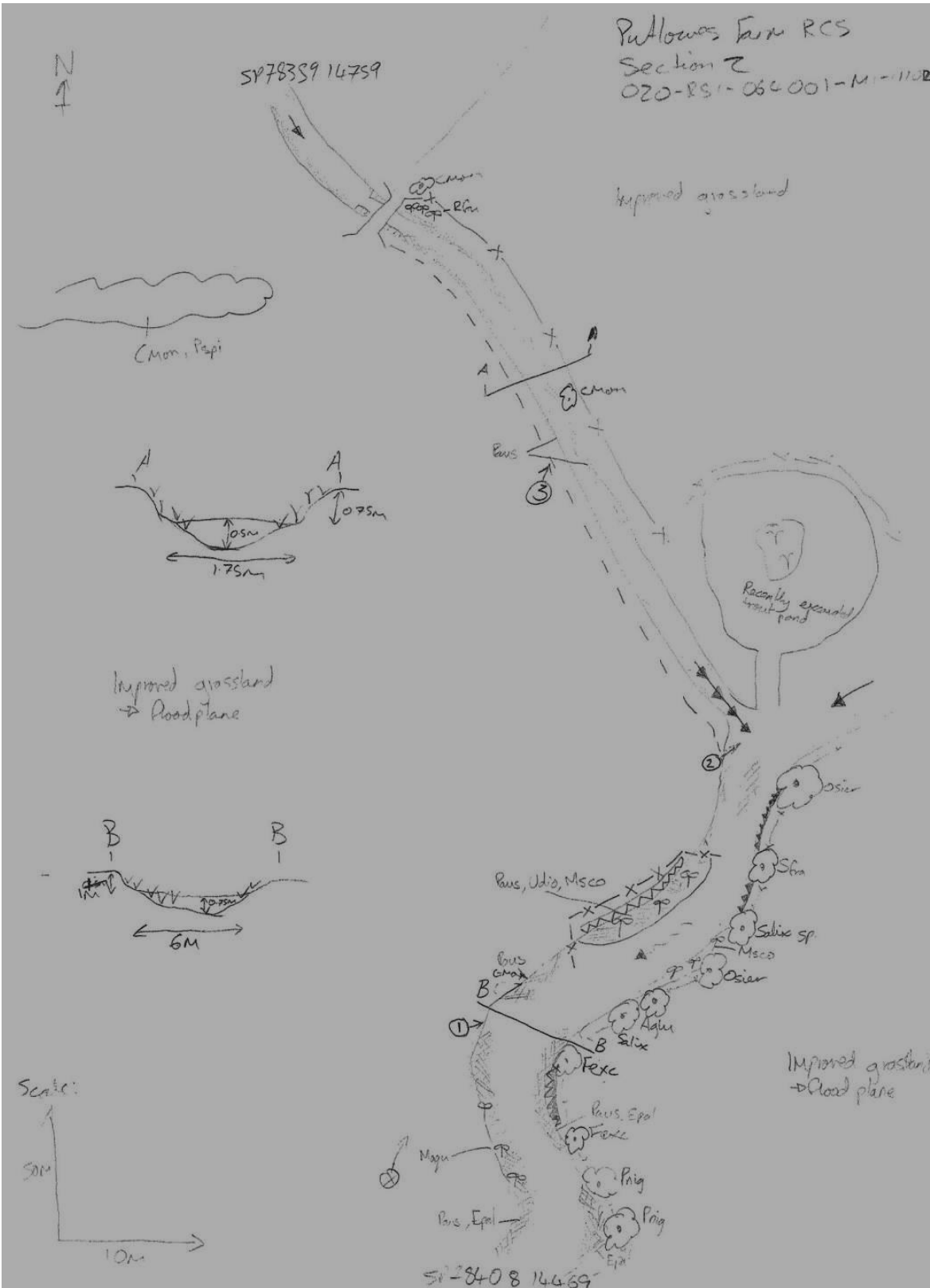


Table 77 RCS results for Survey Site 020-RS1-064-001 (CFA 11)

Ecology survey code	020-RS1-064001		
Name of watercourse	River Thame and a tributary		
Surveyor(s)	MW and PR	Date	11.10.12
Survey start (24 hr clock)	15:00	Survey Finish (24 hr clock)	17:15
Weather conditions (description)	100% cloud, heavy rain for last half hour		
OS Grid Ref (8 digit)	Start Section	SP 78359 14759	
	End Section	SP 78408 14469	
Photo Ref(s)	020-RS1-064001-P1-111012; 020-RS1-064001-P2-111012; 020-RS1-064001-P3-111012		
Average width (m)	1.5-2m in the northern 2/3 of the river, and 6m wide in the lower 1/3.		
Average depth (m)	0.25-0.75m in the northern 2/3 of the river, and 0.75 - 1.25m wide in the lower 1/3.		
Brief description of channel	A tributary flowing into the River Thame covers approximately two thirds of this section with the River Thame itself making up the final one third. The depth of the channel is variable but averages 0.5m in the tributary and 1m in the Thame. The width of the channel is a maximum of 2m (exclusive of banks) in the tributary and 6m in the Thame. The west bank of the river is less steep than the east bank, which is almost uniformly steep and does not permit cattle to drink from the river. There is a bridge which crosses the river in the north of the section and a recently dug trout pond that adjoins the river.		
Base substrate	Sand with mud/silt layer.		
Bank type (include height, angle and extent of erosion)	LB	The east bank of the tributary is predominantly at a 75-90 degree angle and up to 1-1.25m above the water level. The east bank of the Thame was similarly steep with no significant erosion evident given the age of the bank-side trees.	
	RB	In the tributary in the north of this section, the west bank was approximately 0.75m above the water level, with short, steep cliffs with an angle of 70-90 degree angle. On the Thame itself, the bank is also steep with a similar angle to that of the tributary, although the bank is between 0.5-1m above the water level.	
Notable channel features	LB	A recently excavated inlet presumably stocked for trout or other recreational fish.	
	RB	None	
Marginal vegetation (Description)	LB	Large amounts of common reed in the tributary with occasional patches of common spike-rush (<i>Eleocharis palustris</i>) and water forget-me-not in the Thame.	
	RB	Large amounts of common reed in the tributary and large patches of common spike-rush in the Thame with patches of reed sweet-grass, water mint and water forget-me-not.	
Bank zone habitats (Description)	LB	Significant numbers of shrub and small tree species including willow sp., ash and poplar (<i>Populus sp.</i>).	
	RB	Entirely improved grassland as per the adjacent field.	
Adjacent land use	LB	Improved grassland, grazed by cattle.	
	RB	Improved grassland, grazed by cattle.	
Fauna of interest (State LB or RB if specific to single bank)	Signal crayfish (<i>Pacifastacus leniusculus</i>) were seen in an Environment Agency trap next to the bridge.		
Recreation features	None noted.		

Existing management	Nothing obvious.
Observed or potential threats to conservation value (e.g. crop spraying, scrub invasion etc)	The presence of signal crayfish in the river system is a significant threat to the biodiversity of the river and stability of the banks.
Suggestions for habitat improvement	Removal of signal crayfish.

Figure 160: Survey Site 020-RS1-064-002 (CFA 11)

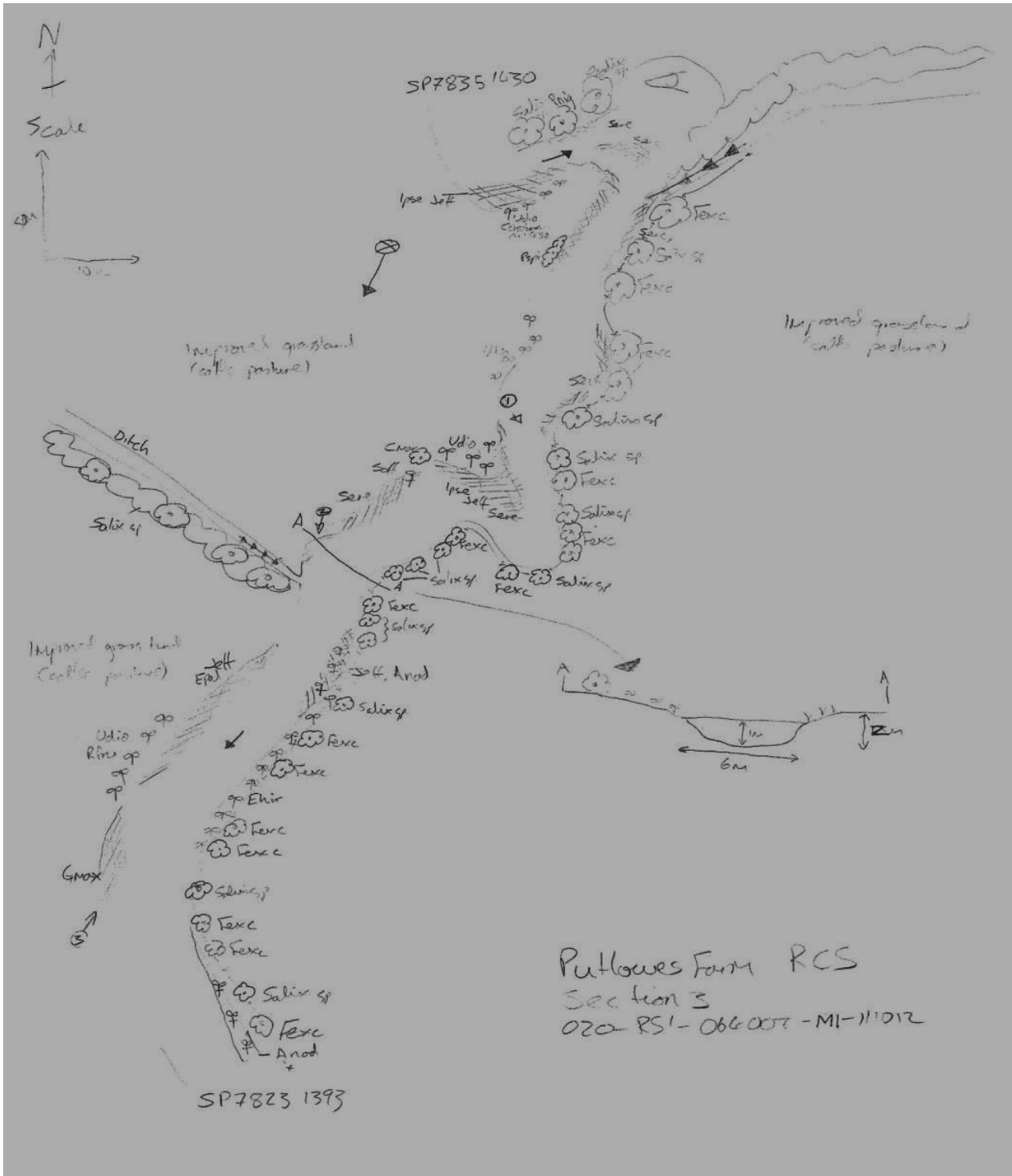


Table 78 RCS results for Survey Site 020-RS1-064-002 (CFA 11)


Ecology survey code	020-RS1-064002		
Name of watercourse	River Thame and a tributary		
Surveyor(s)	MW and PR	Date	11.10.12
Survey start (24 hr clock)	15:00	Survey Finish (24 hr clock)	17:15
Weather conditions (description)	100% cloud, heavy rain for last half hour		
OS Grid Ref (8 digit)	Start Section	SP 7835 1430	
	End Section	SP 7823 1393	
Photo Ref(s)	020-RS1-064002-P1-111012; 020-RS1-064002-P2-111012; 020-RS1-064002-P3-111012		
Average width (m)	6m		
Average depth (m)	1-1.25m		
Brief description of channel	This section comprises 500m of the Thame, meandering through cattle-grazed improved grassland. The banks on both sides are steep with a 6m wide channel. Scrub vegetation is present only on the east bank presumably due to a fence which has prevented grazing of seedlings/saplings.		
Base substrate	Sand with mud/silt layer.		
Bank type (include height, angle and extent of erosion)	LB	Similar in profile to the west bank, the east bank is mostly steep at 70-80 degree angle and a height of 1m above the water level.	
	RB	A steep bank at an angle of 70-90 degree angle from the water. There are the occasional vegetated shelves, which are likely to flood frequently given their level in relation to the river, and extend up to 0.25m above the water level. The average height of the bank is 1m above the water level.	
Notable channel features	LB	None	
	RB	A wet ditch and a parallel tree line adjoin the channel from the west bank.	
Marginal vegetation (Description)	LB	Occasional patches of common spike-rush and water forget-me-not.	
	RB	Large patches of common spike-rush in the Thame with patches of reed sweet-grass, water mint and water forget-me-not.	
Bank zone habitats (Description)	LB	Significant numbers of shrub and small trees comprised almost entirely of willow sp., ash and black poplar.	
	RB	Improved grassland as per the adjacent field with vegetated shelves including species such as common nettle and soft-rush (<i>Juncus effusus</i>).	
Adjacent land use	LB	Improved grassland, grazed by cattle.	
	RB	Improved grassland, grazed by cattle.	
Fauna of interest (State LB or RB if specific to single bank)	Signal crayfish were seen in an Environment Agency trap next to the bridge in Section 2 of the river. It is assumed that signal crayfish are likely to be in this section of river as well.		
Recreation features	None noted.		
Existing management	Nothing obvious.		

Table 79 RCS results for Survey Site 020-RS1-064-003 (CFA 11)

Ecology survey code	020-RS1-064-003		
Name of watercourse	Thame		
Surveyor(s)	SH and ZT	Date	08.05.13
Survey start (24 hr clock)	15:30	Survey Finish (24 hr clock)	16:30
Weather conditions (description)	Dry but blustery and overcast.		
OS Grid Ref (8 digit)	Start Section	SP7845214567	
	End Section	SP7842112475	
Photo Ref(s)	020-RS1-064-003 P1 080513, 020-RS1-064-003 P2 080513, 020-RS1-064-003 P3 080513.		
Average width (m)	7		
Average depth (m)	>2		
Brief description of channel	Naturalised river section that shows signs of having been modified in the past; with uniform width and over-deepening. It has natural features such as berms, eroding cliffs and riffles. In the upstream end the river is joined by a tributary and is also linked to a pool. Surveyed entirely from the right bank. The channel vegetation includes floating sweet-grass (<i>Glyceria fluitans</i>), reed sweet-grass, bulrush and common club-rush (<i>Schoenoplectus lacustris</i>), yellow water-lily (<i>Nuphar lutea</i>) and occasional water forget-me-not.		
Base substrate	Silt.		
Bank type (include height, angle and extent of erosion)	LB	Steep sloping bank, 4m high, 45 degree angle, with some evidence of eroding cliffs (not extensive).	
	RB	Steep sloping bank, 4m high, 45 degree angle with some evidence of eroding cliffs (not extensive).	
Notable channel features	LB	Eroded bank pool.	
	RB	Recovery berm, predominantly un-vegetated.	
Marginal vegetation (Description)	LB	Occasional fringing common club-rush, reed sweet-grass, greater pond sedge and bulrush.	
	RB	Frequent fringing, common club-rush, reed sweet-grass, greater pond sedge and bulrush.	
Bank zone habitats (Description)	LB	Scattered trees and tall ruderals, with grey willow, alder and ash, with common nettle the dominant ruderal species.	
	RB	Tall ruderals and short grazed grassland. Common nettle is the dominant ruderal species.	
Adjacent land use	LB	Improved grassland, grazing pasture.	
	RB	Improved grassland, grazing pasture.	
Fauna of interest (State LB or RB if specific to single bank)	Signal crayfish and mink (<i>Neovison vison</i>) present (according to landowner). Evidence of burrows that could be used by the signal crayfish, but which could also be suitable for water vole and/or white-clawed crayfish (<i>Austropotamobius pallipes</i>).		
Recreation features	None.		

Existing management	Modified in the past, but the river looks like it is recovering, as evidenced by the recovery berms and other natural features.
Observed or potential threats to conservation value (e.g. crop spraying, scrub invasion etc)	Presence of invasive species (signal crayfish and mink present according to landowner).
Suggestions for habitat improvement	Eradication of invasive species - signal crayfish and mink.

Figure 162: Survey Site 020-RS1-064-004 (CFA 11)

Reach Reference Number: 020-RS1-064-004	NGR: U/S SP7886414164 D/S SP7961812989	 Mott MacDonald	
River Name: Tributary to R. Thame	Date: 31/05/13		

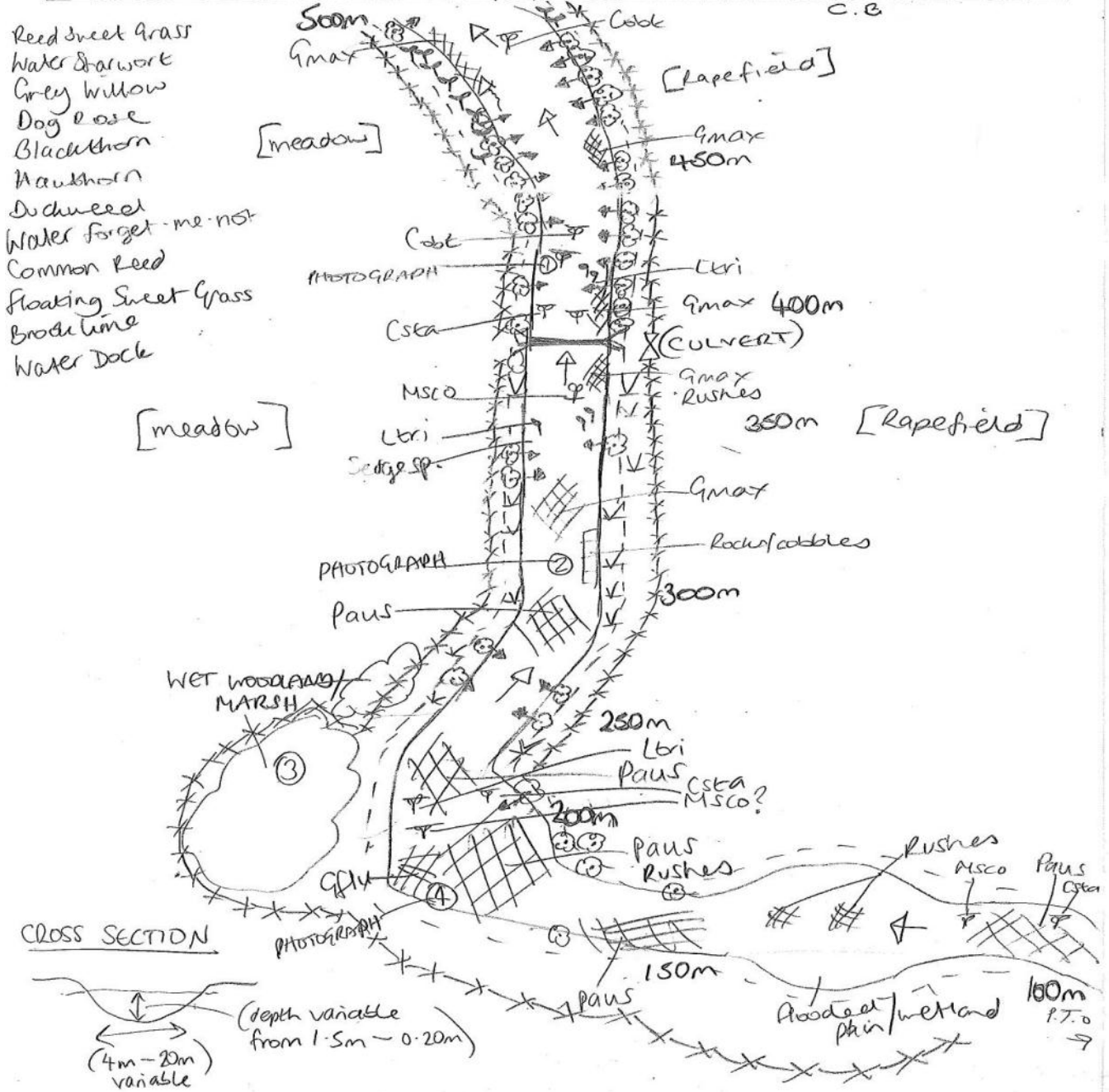


Table 80 RCS results for Survey Site 020-RS1-064-004 (CFA 11)

Ecology survey code	020-RS1-064-004		
Name of watercourse	Tributary to River Thame		
Surveyor(s)	SH and CB	Date	31.05.13
Survey start (24 hr clock)	13:00	Survey Finish (24 hr clock)	15:00

Weather conditions (description)	Bright and dry	
OS Grid Ref (8 digit)	Start Section	SP7961812989
	End Section	SP7886414164
Photo Ref(s)	020-RS1-064-004 P1 310513, 020-RS1-064-004 P2 310513, 020-RS1-064-004 P3 310513, 020-RS1-064-004 P4 310513, 020-RS1-064-004 P5 310513, 020-RS1-064-004 P6 310513.	
Average width (m)	4-10m variable (10m average)	
Average depth (m)	0.2-1.5m variable (1m variable)	
Brief description of channel	Varied river reach that is straightened and deepened in first two thirds, with evidence of bank reinforcement (riprap), last third is naturalised with extensive floodplain, with wet meadow and wet woodland, and wide flooded river. River narrows again in fourth section and enters extensive underground culvert.	
Base substrate	Silt	
Bank type (include height, angle and extent of erosion)	LB	Steep earth first third, gentle slopes second two thirds.
	RB	As for LB
Notable channel features	LB	Flooded section in last third.
	RB	As for LB
Marginal vegetation (Description)	LB	Frequent marginal vegetation, especially in upstream half, with water starwort sp. (<i>Callitriche sp.</i>), common reed (most abundant), reed sweet-grass, brooklime, water forget-me-not, water dock (<i>Rumex hydrolapathum</i>), ivy-leaved duckweed and floating sweet-grass.
	RB	As for LB
Bank zone habitats (Description)	LB	Mostly tree-lined apart from last third. Grey willow dominant with blackthorn, hawthorn, dogwood and dog-rose (<i>Rosa canina</i>).
	RB	As for LB
Adjacent land use	LB	Arable and pasture
	RB	Arable
Fauna of interest (State LB or RB if specific to single bank)	Warbler sp. (whitethroat ? <i>Sylvia communis</i>), reed warbler (<i>Acrocephalus scirpaceus</i>), grey heron (<i>Ardea cinerea</i>), yellowhammer (<i>Emberiza citrinella</i>), red kite (<i>Milvus migrans</i>). Reptile potential.	
Recreation features	None. Private land.	
Existing management	Reinforcement along bank evidence and past straightening and deepening in first half (downstream half).	
Observed or potential threats to conservation value (e.g. crop spraying, scrub invasion etc)	None	
Suggestions for habitat improvement	This river reach should be avoided where at all possible; particularly the naturalised parts further downstream that form a wetland area that could be suitable for many amphibians, reptiles and birds. There is scope to restore more of this river reach in the upstream area (where the river is slow and deep), as the river runs through meadow that could form part of the floodplain.	

Figure 163: Survey Site 020-RS1-065-001 (CFA 11)

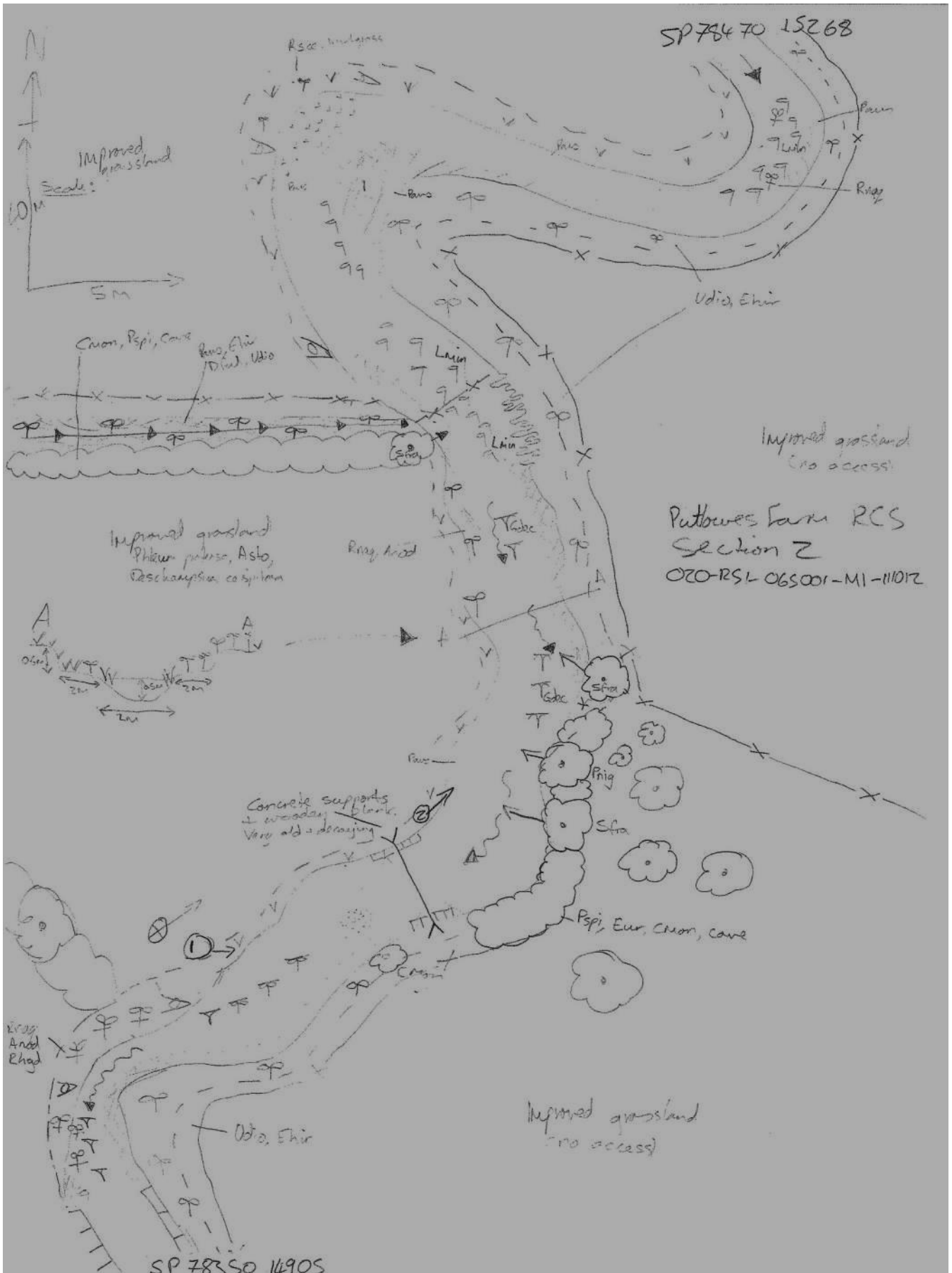



Table 81 RCS results for Survey Site 020-RS1-065-001 (CFA 11)

Ecology survey code	020-RS1-065001		
Name of watercourse	Fleet Marston Brook (tributary of the Thames)		
Surveyor(s)	MW and PR	Date	11.10.12
Survey start (24 hr clock)	15:00	Survey Finish (24 hr clock)	17:15
Weather conditions (description)	100% cloud, heavy rain for last half hour		
OS Grid Ref (8 digit)	Start Section	SP 78470 15268	
	End Section	SP 78350 14905	
Photo Ref(s)	020-RS1-065001-P1-111012; 020-RS1-065001-P2-111012;		
Average width (m)	1.5-2m		
Average depth (m)	0.25-0.75m		
Brief description of channel	A tributary flowing into the River Thames. The depth of the channel is variable but averages 0.5m. The width of the channel is a maximum of 2m. The west bank of the river is more variable than the east bank, which is almost uniformly steep, which precludes cattle drinking from the river. The west bank in contrast, with its shallower profile, has numerous areas of the bank which have been poached by cattle.		
Base substrate	Sand with mud/silt layer.		
Bank type (include height, angle and extent of erosion)	LB	The east bank is predominantly steep at a 75-90 degree angle at up to 1.25m above the water level.	
	RB	This bank was variable in topography along its length, with several areas where the bank has a gentle angle which allows cattle access to the river. This has led to moderate poaching. There were two tiers to the bank along most of this section. The lower tier, being liable to flooding, is up to 0.25m above the water level and up to 2m wide with the second tier, 0.5m above the lower tier at an 80 degree angle.	
Notable channel features	LB	Extension of the bank into the channel opposite the wet ditch inflow and a small section of mature trees that border the bankside.	
	RB	A wet ditch that flows into the river, several cattle drinking areas and a terraced bank.	
Marginal vegetation (Description)	LB	Extensive common reed.	
	RB	Large stand of common reed with localised patches of water dock, fool's-water-cress, watercress.	
Bank zone habitats (Description)	LB	Predominantly tall ruderal vegetation dominated by common nettle with abundant great willowherb.	
	RB	Entirely improved grassland as per the adjacent field, on both terraces of the bank.	
Adjacent land use	LB	Improved grassland grazed by cattle.	
	RB	Predominantly tall ruderal vegetation dominated by common nettle with abundant great willowherb.	
Fauna of interest (State LB or RB if specific to single bank)	None noted, although there is a strong likelihood that signal crayfish is present in the watercourse as this species was seen in Section 2 of the river.		
Recreation features	None noted.		

Existing management	Nothing obvious.
Observed or potential threats to conservation value (e.g. crop spraying, scrub invasion etc)	The presence of signal crayfish in the river system is a significant threat to the biodiversity of the river and stability of the bank.
Suggestions for habitat improvement	Removal of signal crayfish.

Figure 164: Survey Site 020-RS1-066-001 (CFA 11)

Reach Reference Number: 020-RS1-066-001	NGR: U/S SP7715016326 D/S SP7717115869	 Mott MacDonald
River Name:	Date: 8/5/13	Surveyor: Sarah Hodgetts

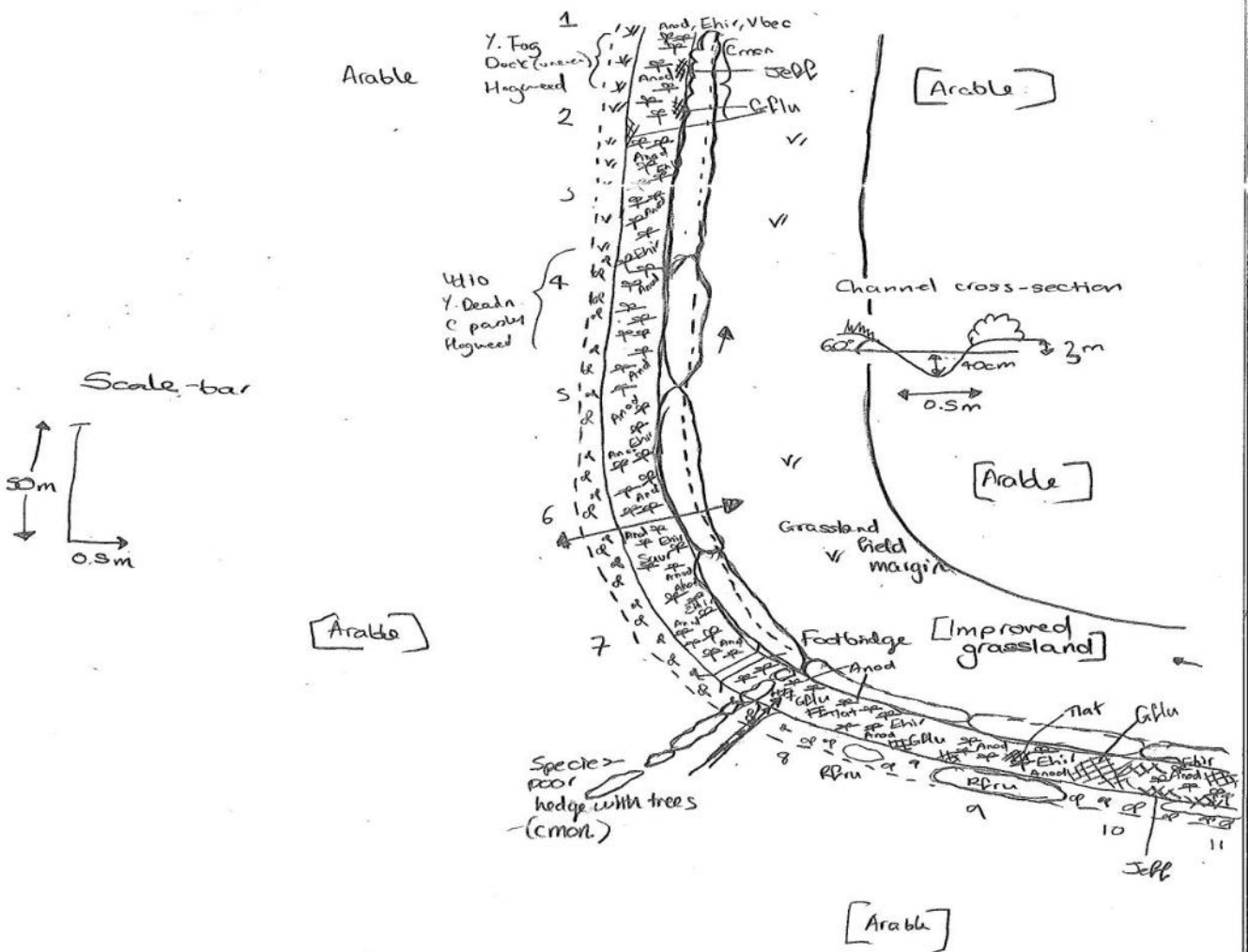



Table 82 RCS results for Survey Site 020-RS1-066-001 (CFA 11)

Ecology survey code	020-RS1-066-001		
Name of watercourse	Tributary to Fleet Marston Brook		
Surveyor(s)	SH and ZT	Date	08.05.13
Survey start (24 hr clock)	10:30	Survey Finish (24 hr clock)	11:30
Weather conditions (description)	Overcast, blustery,, dry.		
OS Grid Ref (8 digit)	Start Section	SP7715016326	
	End Section	SP7717115869	
Photo Ref(s)	020-RS1-066-001-P1-080513, 020-RS1-066-001-P2-080513, 020-RS1-066-001-P3-080513		
Average width (m)	0.5		
Average depth (m)	0.4		
Brief description of channel	Highly modified ditch (straightened and over-deepened). Minimal change in physical characteristics, the tributary joins a ditch at the downstream end, with a second ditch joining it one third of the way downstream. Water is slow-moving. Ditch not accessible as steep banks and silty; thus surveyed entirely from the right bank. Channel vegetation is dominated in the downstream half by fool's-water-cress, with a mixture of great willowherb, bulrush and water figwort, and patches of floating sweet-grass and soft-rush.		
Base substrate	Silt		
Bank type (include height, angle and extent of erosion)	LB	Steep sloping earth bank, 3.5m high, 60 degree angle, with little or no evidence of erosion.	
	RB	Steep sloping earth bank, 3.5m high, 60 degree angle, with little or no evidence of erosion.	
Notable channel features	LB	None	
	RB	None	
Marginal vegetation (Description)	LB	Minimal marginal vegetation, with occasional patches of floating sweet-grass.	
	RB	Minimal marginal vegetation, with occasional patches of floating sweet-grass and soft-rush.	
Bank zone habitats (Description)	LB	Tall ruderal vegetation.	
	RB	Dense hawthorn scrub.	
Adjacent land use	LB	Arable	
	RB	Arable with grassland field margin.	
Fauna of interest (State LB or RB if specific to single bank)	None		
Recreation features	None		
Existing management	Heavily modified.		
Observed or potential threats to conservation value (e.g. crop spraying, scrub invasion etc)	None		

Suggestions for habitat improvement	Drainage ditch with minimal flow and little opportunity for habitat improvement.
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Figure 165: Survey Site 020-RS1-066-002 (CFA 11)

Reach Reference Number: 020-RS1-066-002	NGR: U/S SP7675515738 D/S SP726162009	 Mott MacDonald
River Name:	Date: 8/5/13	

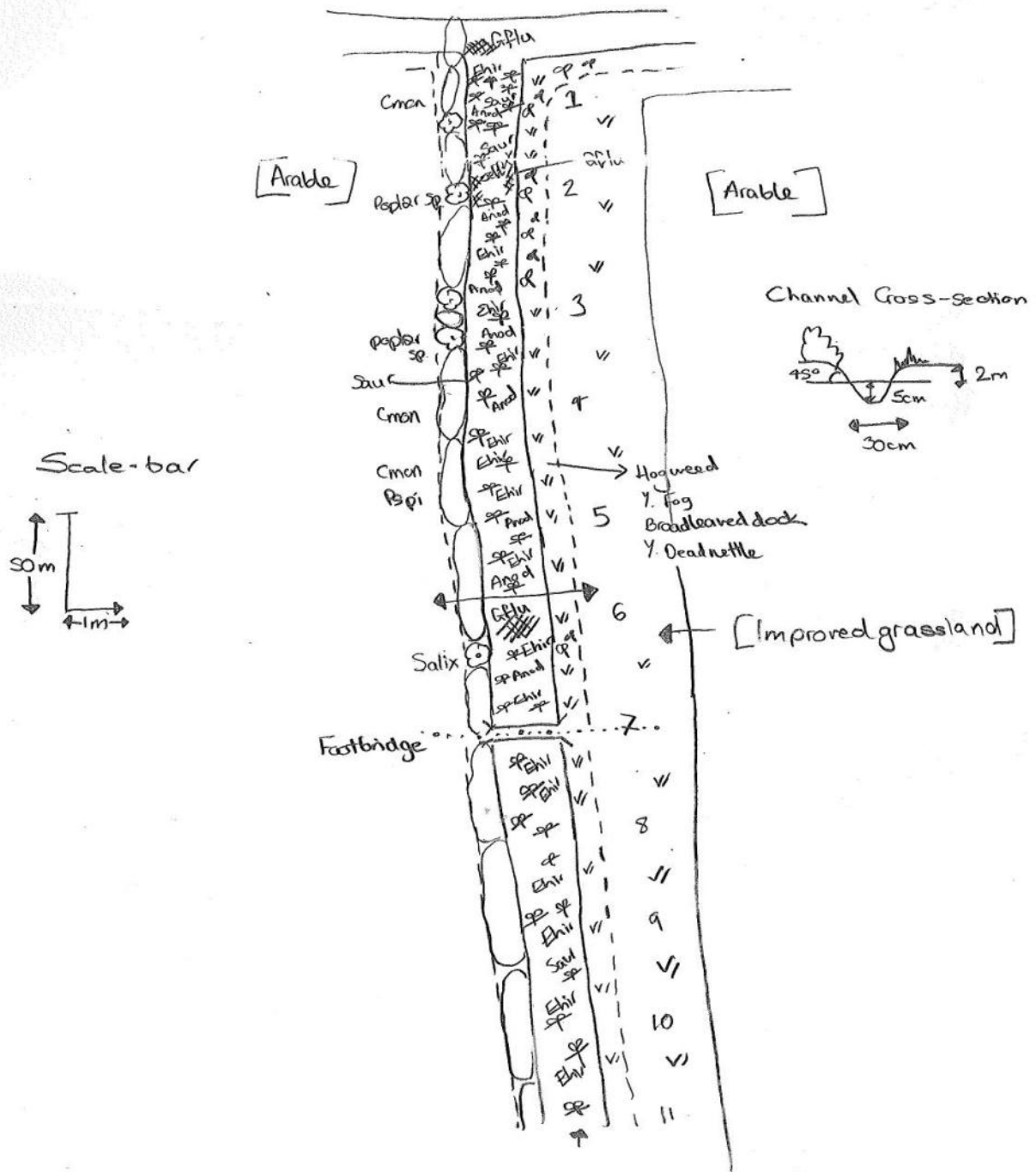


Table 83 RCS results for Survey Site 020-RS1-066-002 (CFA 11)

Ecology survey code	020-RS1-066-002		
Name of watercourse	Tributary to Fleet Marston Brook		
Surveyor(s)	SH and ZT	Date	08.05.13
Survey start (24 hr clock)	09:30	Survey Finish (24 hr clock)	10:30
Weather conditions (description)	Overcast, blustery, dry.		
OS Grid Ref (8 digit)	Start Section	SP7675515738	
	End Section	SP7712616009	
Photo Ref(s)	020-RHS-066-002 P1 080513		
Average width (m)	0.3		
Average depth (m)	0.05		
Brief description of channel	Highly modified watercourse that has been over-deepened and straightened, with low diversity of bankside and channel vegetation. Steep, silty ditch with shallow, slow-moving water. Surveyed entirely from left bank. Channel is choked in places with great willowherb, with frequent watercress, water figwort and floating sweet-grass.		
Base substrate	Silt.		
Bank type (include height, angle and extent of erosion)	LB	Steep sloping earth bank. No evidence of erosion.	
	RB	Steep sloping earth bank. No evidence of erosion.	
Notable channel features	LB	None	
	RB	None	
Marginal vegetation (Description)	LB	Minimal marginal vegetation. Rare patches of soft-rush.	
	RB	Minimal marginal vegetation. Rare patches of soft-rush.	
Bank zone habitats (Description)	LB	Predominantly dense scrub (blackthorn) and hawthorn with occasional willow and poplar trees.	
	RB	Mainly short, grazed grassland, as field margin. Some areas of tall ruderal at the downstream end.	
Adjacent land use	LB	Arable	
	RB	Arable with grassland field margin.	
Fauna of interest (State LB or RB if specific to single bank)	Bankside vegetation good for nesting birds.		
Recreation features	Footpath crossing watercourse at footbridge.		
Existing management	Heavily modified.		
Observed or potential threats to conservation value (e.g. crop spraying, scrub invasion etc)	None		
Suggestions for habitat improvement	Watercourse acts as a drainage ditch with a low flow. No specific suggestions.		

Desk study data (CFA 11)

Sedrup Ditch

SP806122 to SP806117 (570m)

Survey date: 21/05/1997

Surveyor: Tim Rafferty

Site summary:

- 7.4.4 Straight field boundary ditch with slow-flowing, shallow water (0.05-0.2m deep). The ditch is approximately 1m wide with steep banks 1m high. Small sections have been recently dredged. The ditch is bordered by semi-improved pasture and arable crops to the west, and arable fields with set-aside to the east. There is a diverse range of bankside trees, shrubs, scrub, tall herbs and grasses to both sides of the ditch.

Eastern bank:

- 7.4.5 Open bank with hedge mustard (*Sisymbrium officinale*), cow parsley (*Anthriscus sylvestris*), hogweed (*Heracleum sphondylium*), common nettle, cock's-foot (*Dactylis glomerata*), false oat-grass (*Arrhenaterium elatius*), black grass (*Alopecurus myosuroides*) and annual meadow grass (*Poa annua*). Downstream these species continue but scattered scrub and trees are also found, including bramble, pollarded black poplar, English elm (*Ulmus procera*) and ash saplings.

Western bank:

- 7.4.6 Upstream there is a continuous, low cut, species-rich hedgerow of blackthorn, dog rose, bramble, field maple, hawthorn, elder and spindle, with poplar, grey poplar (*Populus alba x tremula*) and ash trees. Further downstream bordering vegetation is dominated by tall herbs and grasses similar in composition to those on the eastern bank.

Channel:

- 7.4.7 Scrub and trees overhang the channel, creating complete shade in places. Sparsely occurring dicotyledons including great willowherb, fool's-water-cress and bittersweet are found upstream. Downstream are areas of dense reed sweet-grass.

Birds:

- 7.4.8 Common farmland songbirds are present in hedgerow and trees bordering the ditch.

Conservation features:

- 7.4.9 Bankside hedgerow and trees provide valuable habitat in the arable landscape.

River Thame (upper reaches)

SP78451456 to SP78411421 (540m)

SURVEY DATE: 24/08/1998

SURVEYOR: Vanessa Tindale

Site summary:

- 7.4.10 Tightly meandering, 7-9m wide and 0.5-0.7m deep with 45 degree angle, sloped earth banks. This section of the river Thame flows through semi-improved grassland with

dense bankside vegetation comprising tall herbs, grasses and scattered trees and scrub. There is a hedge and drain perpendicular to the eastern bank.

Eastern bank:

- 7.4.11 Dominated by false oat-grass, cock's-foot, hedge bindweed (*Calystegia sepium*) and common nettle with common cleavers, creeping thistle (*Cirsium arvense*) and common couch (*Elytrigia repens*). Scattered trees and scrub include crack-willow, ash, poplar sp., alder and hawthorn.

Western bank:

- 7.4.12 Dominated throughout by tall herbs and grasses including common nettle, cock's-foot and false oat-grass. Occasional creeping thistle and perennial ryegrass (*Lolium perenne*) upstream and timothy (*Phleum pratense*) and prickly lettuce (*Lactuca serriola*) downstream.

Channel:

- 7.4.13 A virtually continuous fringe of common club-rush, branched bur-reed (*Sparganium erectum*), pink water-speedwell (*Veronica catenata*), fool's-water-cress, water-pepper (*Persicaria hydropiper*), gypsywort, watercress, reed canary-grass and reed sweet-grass is found on the eastern side. The western side has a similarly diverse fringe flora as listed above, but also includes great willowherb, marsh woundwort (*Stachys palustris*), greater pond sedge, common water-plantain (*Alisma plantago-aquatica*) and arrowhead (*Sagittaria sagittifolia latifolia*). The channel has yellow water-lily, common duckweed, arrowhead, unbranched bur-reed, water starwort and common club-rush throughout.

Fauna:

- 7.4.14 Yellowhammer, mallard (*Anas platyrhynchos*), brown hawker dragonfly (*Aeshna grandis*), blue-tailed damselfly (*Ischnura elegans*) and shrew sp. (*Sorex sp.*) were recorded during the survey.

Conservation features:

- 7.4.15 Good adjacent habitats and a structurally varied and diverse flora including unbranched bur-reed which is uncommon in Buckinghamshire.

3 sections of Stoke Brook

SP84640930 to SP83440978 (1661m)

Survey Date: 03/10/1997

Surveyor: John Hiskett

Site summary:

- 7.4.16 Gently meandering narrow stream 1-1.5m wide, 0.1-0.2m deep, banks are 1.2-1.8m high with a 45-75 degree angle. Straightened in the past and highly modified in places. The stream is predominantly bordered by arable fields and grazed pasture, and is crossed by several farm bridges. Downstream it flows through garden and under a main road. Upstream, the channel flows adjacent to an abandoned orchard and is joined by Chalkshire stream from the west. A ditch runs alongside the channel in the

central part of this section. The stream is frequently shaded by dense bankside trees and scrub, and has occasional emergent vegetation throughout.

South/west bank:

- 7.4.17 Patchy open areas throughout the stretch of stream are dominated by tall herbs and grasses including common nettle, willowherb sp., meadowsweet and cock's-foot. Areas of dense scrub and trees including ash, native black poplar, field maple, goat willow, crack-willow, elder, hawthorn and blackthorn. The central stretch runs alongside a drainage ditch. Vegetation between the stream and ditch comprises a wide strip of scrub and rough grassland dominated by false oat-grass with yarrow, common nettle, wood sage (*Teucrium scorodonia*), thistle sp. (*Cirsium sp.*) and scattered hawthorn and blackthorn scrub. Downstream the channel flows through gardens and is bordered by scattered ornamental trees and lawn. Downstream of the main road crossing there is a pumping station on the southwest bank which is surrounded by dense hawthorn, elder and native black poplar.

North/east bank:

- 7.4.18 The vegetation on the north-eastern bank is similar to that on the south-west bank, with the absence of native black poplar. The central and downstream stretches are more open on the north-western bank, with common nettle, great willowherb and hogweed dominant.

Channel:

- 7.4.19 Being heavily shaded there is little channel vegetation present. Small patches of yellow iris, branched bur-reed, great willowherb, fool's-water-cress, reed sweet-grass, brooklime and water forget-me-not are present.

Fauna:


- 7.4.20 None seen during survey.

Conservation features:

- 7.4.21 Mature bankside trees including native black poplar along with the wide strip of unmanaged rough grassland and scrub provide some conservation interest.

Fleet Marston Brook (Tributary to Thames) (CFA 12)

Figure 166: Survey Site 020-RS1-070-001 (CFA 12)

Reach Reference Number: 020-RS1-070-001	NGR: U/S SP7399118282 D/S SP7435318496	 Mott MacDonald
River Name:	Date: 23/5/13	Surveyor: Sarah Hodggett

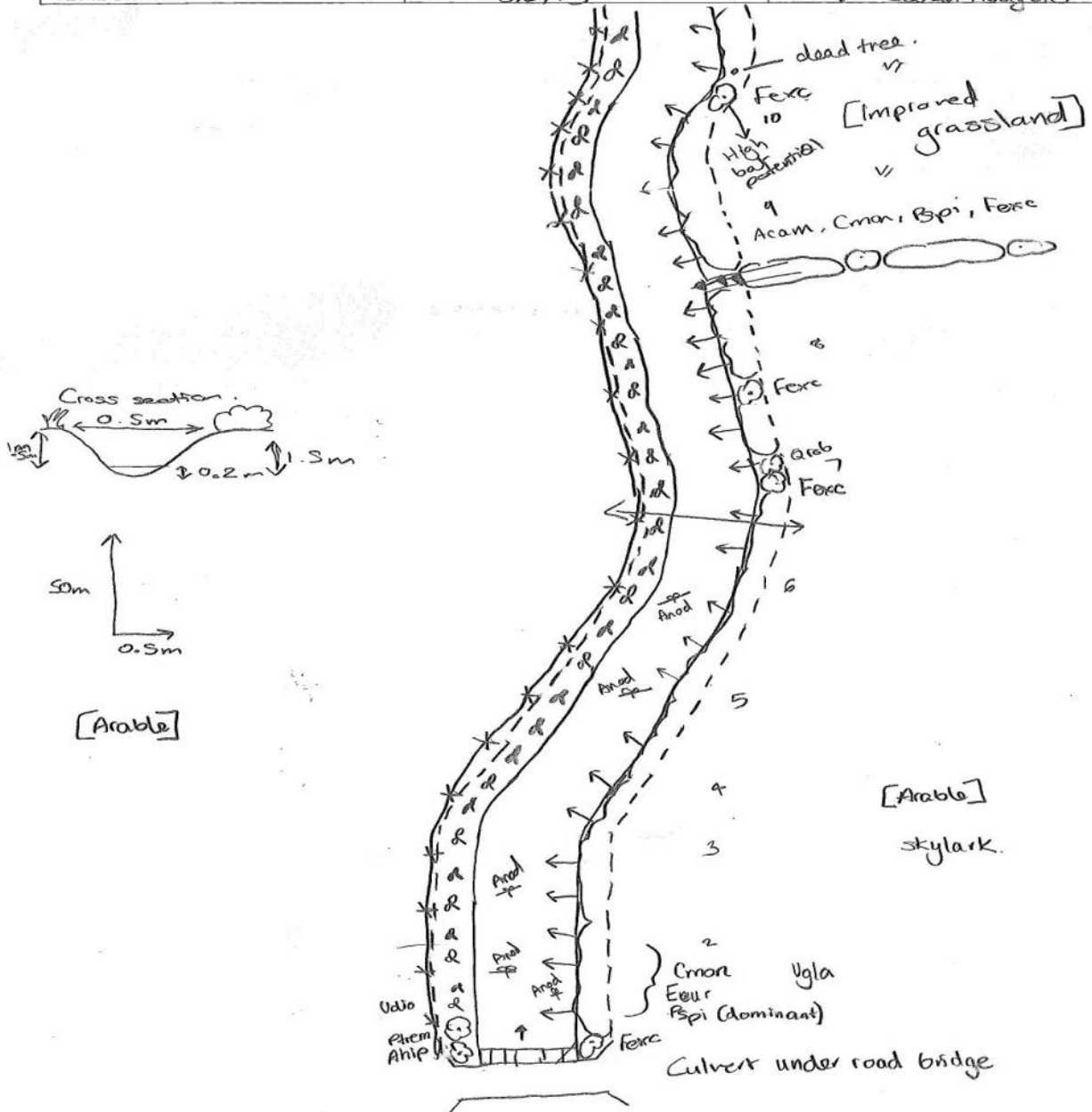



Table 84. RCS results for Survey Site 020-RS1-070-001 (CFA 12)

Ecology survey code	020-RS1-070-001		
Name of watercourse	Fleet Marston Brook (tributary to Thames)		
Surveyor(s)	SH and CF	Date	23.05.13
Survey start (24 hr clock)	09:30	Survey Finish (24 hr clock)	10:30

Weather conditions (description)	Cloudy, dry and bright.	
OS Grid Ref (8 digit)	Start Section	SP7399118282
	End Section	SP7435318496
Photo Ref(s)	020-RS1-070-001 P1 230513, 020-RS1-070-001 P2 230513, 020-RS1-070-001 P3 230513, 020-RS1-070-001 P4 230513, 020-RS1-070-001 P5 230513	
Average width (m)	0.5	
Average depth (m)	0.2	
Brief description of channel	Channel difficult to view from right bank (where access was available) because of dense scrub (mainly blackthorn). From what could be seen, the channel is fairly uniform (deepened and straightened) with dense scrub shading the channel on the right bank and tall ruderals on the left bank. Occasional fool's-water-cress.	
Base substrate	Silt.	
Bank type (include height, angle and extent of erosion)	LB	Steep earth bank, 1.7m high, no evidence of erosion but not visible entirely.
	RB	Steep earth bank, 1.7m high, no evidence of erosion but not visible entirely.
Notable channel features	LB	None
	RB	None
Marginal vegetation (Description)	LB	Minimal, occasional fool's-water-cress.
	RB	Minimal, occasional fool's-water-cress.
Bank zone habitats (Description)	LB	Tall ruderals dominated by common nettle.
	RB	Dense scrub dominated by blackthorn, with also hawthorn, spindle, ash and pedunculate oak.
Adjacent land use	LB	Arable
	RB	Arable and improved grassland in meadow.
Fauna of interest (State LB or RB if specific to single bank)	Skylark (<i>Alauda arvensis</i>) heard in fields on right bank.	
Recreation features	None	
Existing management	Past management.	
Observed or potential threats to conservation value (e.g. crop spraying, scrub invasion etc)	Over-shaded banks, with arable crops right up to left bank.	
Suggestions for habitat improvement	Add field margin to help protect channel. Remove some shrubs or overhanging branches to create more light in the channel.	

Tributary to the River Ray (CFA 12)

Figure 167: Survey Site 020-RS1-075-001 (CFA 12)

Reach Reference Number: 020-RS1-075-001	NGR: U/S SP70868 22175 D/S SP70869 21767	 Mott MacDonald
River Name:	Date: 22/5/13	Surveyor: IAIN BRAY

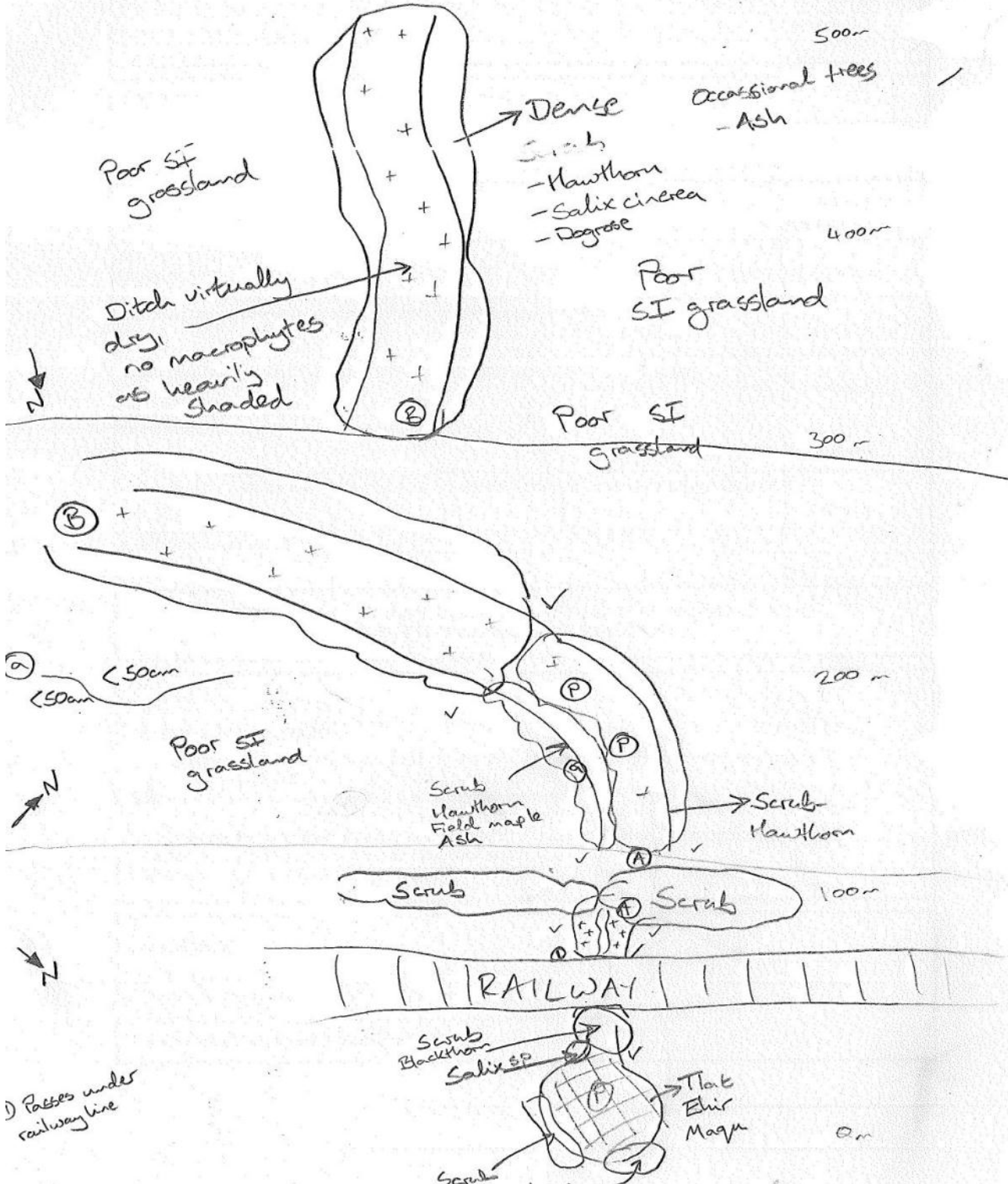



Table 85 RCS results for Survey Site 020-RS1-075-001 (CFA 12)

Ecology survey code	020-RS1-075-001		
Name of watercourse	Tributary to the River Ray		
Surveyor(s)	SH and IB	Date	22.05.13
Survey start (24 hr clock)	13:40	Survey Finish (24 hr clock)	15:30
Weather conditions (description)	Overcast, light wind, dry		
OS Grid Ref (8 digit)	Start Section	SP7086822175	
	End Section	SP7046921767	
Photo Ref(s)	020-RS1-075-001 P1 200513, 020-RS1-075-001 P2 200513, 020-RS1-075-001 P3 200513, 020-RS1-075-001 P4 200513, 020-RS1-075-001 P5 200513, 020-RS1-075-001 P6 200513		
Average width (m)	0.5		
Average depth (m)	0.5		
Brief description of channel	Starts at a pond then as a near dry ditch, passes under railway. Very heavily shaded along entire 500m survey area.		
Base substrate	mud		
Bank type (include height, angle and extent of erosion)	LB	30 degree angle, very shallow.	
	RB	30 degree angle, very shallow.	
Notable channel features	LB	None - virtually dry, no flow.	
	RB	None - virtually dry, no flow.	
Marginal vegetation (Description)	LB	Some at pond otherwise none.	
	RB	Some at pond otherwise none.	
Bank zone habitats (Description)	LB	Dense scrub and scattered trees.	
	RB	Dense scrub and scattered trees.	
Adjacent land use	LB	Poor semi-improved grassland - fields.	
	RB	Poor semi-improved grassland - fields.	
Fauna of interest (State LB or RB if specific to single bank)	None		
Recreation features	None		
Existing management	None		
Observed or potential threats to conservation value (e.g. crop spraying, scrub invasion etc)	Covered in dense scrub - field boundary.		
Suggestions for habitat improvement	Mostly dry ditch, little options for habitat improvement unless more water in channel.		

Figure 168: Survey Site 020-RS1-076-001 (CFA 12)

Reference Number: 020-RS1-076-001	NGR: U/S SP70S23 23067 D/S SP69935 22563	 Mott MacDonald
River Name:	Date: 22/5/13	

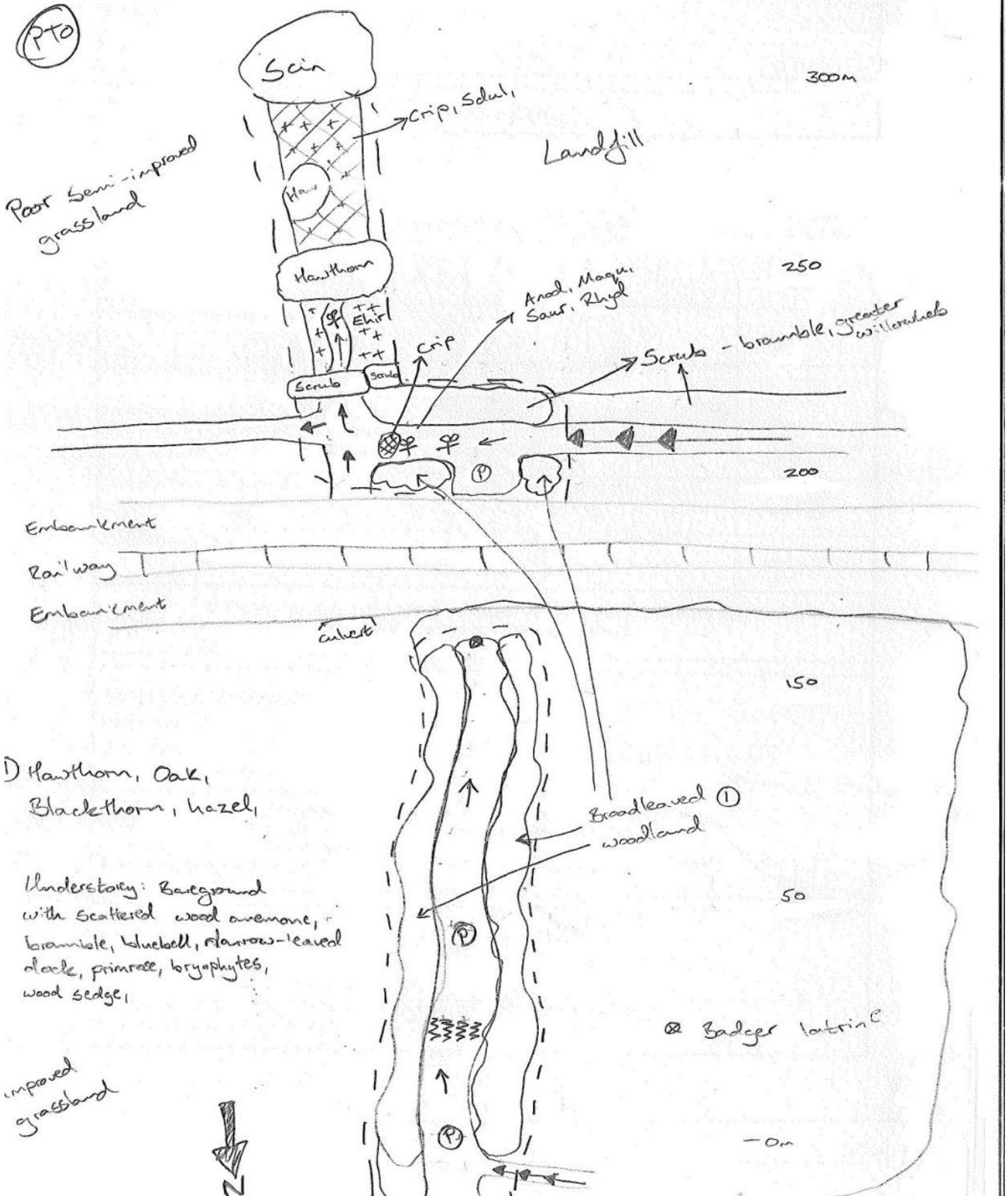


Figure 16g: Survey Site 020-RS1-076-001 (CFA 12)

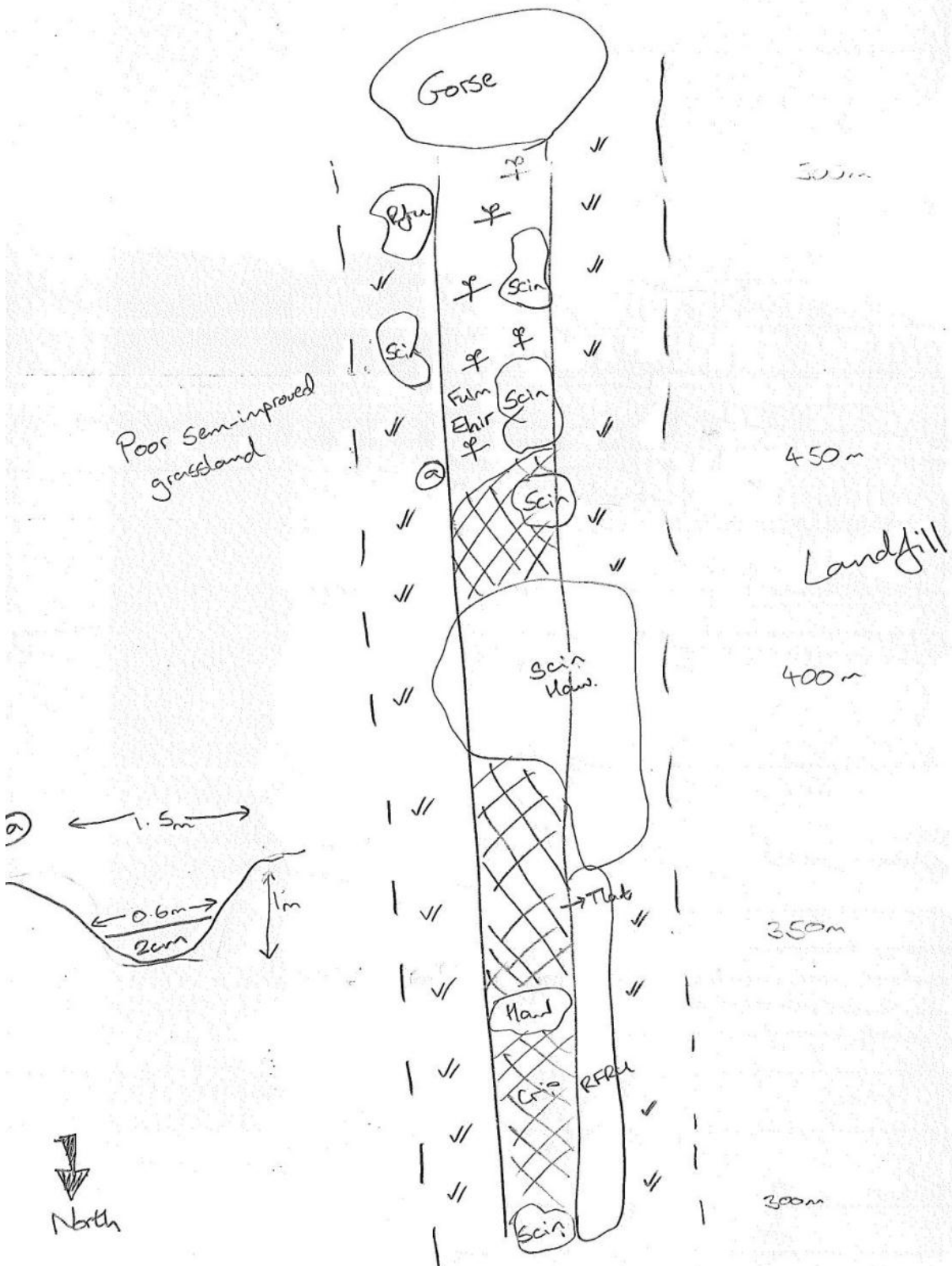



Table 86 RCS results for Survey Site 020-RS1-076-001 (CFA 12)

Ecology survey code	020-RS1-076-001
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Name of watercourse	Tributary to the River Ray		
Surveyor(s)	SH and IB	Date	22.05.13
Survey start (24 hr clock)	09:15	Survey Finish (24 hr clock)	11:30
Weather conditions (description)	Overcast light wind and dry		
OS Grid Ref (8 digit)	Start Section	SP7052323067	
	End Section	SP6993522563	
Photo Ref(s)	020-RS1-076-001 P1 220513, 020-RS1-076-001 P2 220513, 020-RS1-076-001 P3 220513, 020-RS1-076-001 P4 220513, 020-RS1-076-001 P5 220513, 020-RS1-076-001 P6 220513, 020-RS1-076-001 P7 220513, 020-RS1-076-001 P8 220513		
Average width (m)	1.5		
Average depth (m)	0.1		
Brief description of channel	Shallow muddy channel, heavily shaded, minimal macrophytes - north of railway. Open, shallow, with marginal vegetation - south of railway.		
Base substrate	Mud		
Bank type (include height, angle and extent of erosion)	LB	Height 1m max, 45 degree angle. Bare ground (North. Scrub (south), no erosion evident.	
	RB	Height 1m max, 45 degree angle. Bare ground (North. Scrub (south), no erosion evident.	
Notable channel features	LB	Muddy, leaf litter, no notable features (North) Macrophytes and scrub (South)	
	RB	Muddy, leaf litter, no notable features (North) Macrophytes and scrub (South)	
Marginal vegetation (Description)	LB	None (North) Scrub, poor semi-improved grassland (South)	
	RB	None (North) Scrub, poor semi-improved grassland (South)	
Bank zone habitats (Description)	LB	Very shallow, bare ground	
	RB	Very shallow, bare ground	
Adjacent land use	LB	Improved grassland (North) Poor semi-improved grassland (South)	
	RB	Semi-natural broadleaved woodland (North) Landfill (South)	
Fauna of interest (State LB or RB if specific to single bank)	Badger latrine on south embankment of railway.		
Recreation features	None		
Existing management	None		

Observed or potential threats to conservation value (e.g. crop spraying, scrub invasion etc)	None
Suggestions for habitat improvement	None; ditch acts as a drainage ditch to the north of the railway, and is more naturalised to the south of the railway where it runs through woodland.

Figure 170: Survey Site 020-RS1-076-002 (CFA 12)

Reference: 020-RS1-076-002	NGR: U/S SP70191 22845 D/S SP 70541 22415	 Mott MacDonald
River Name: Tributary of the River <i>Rain</i>	Date: 22/5/13	Surveyor: LB

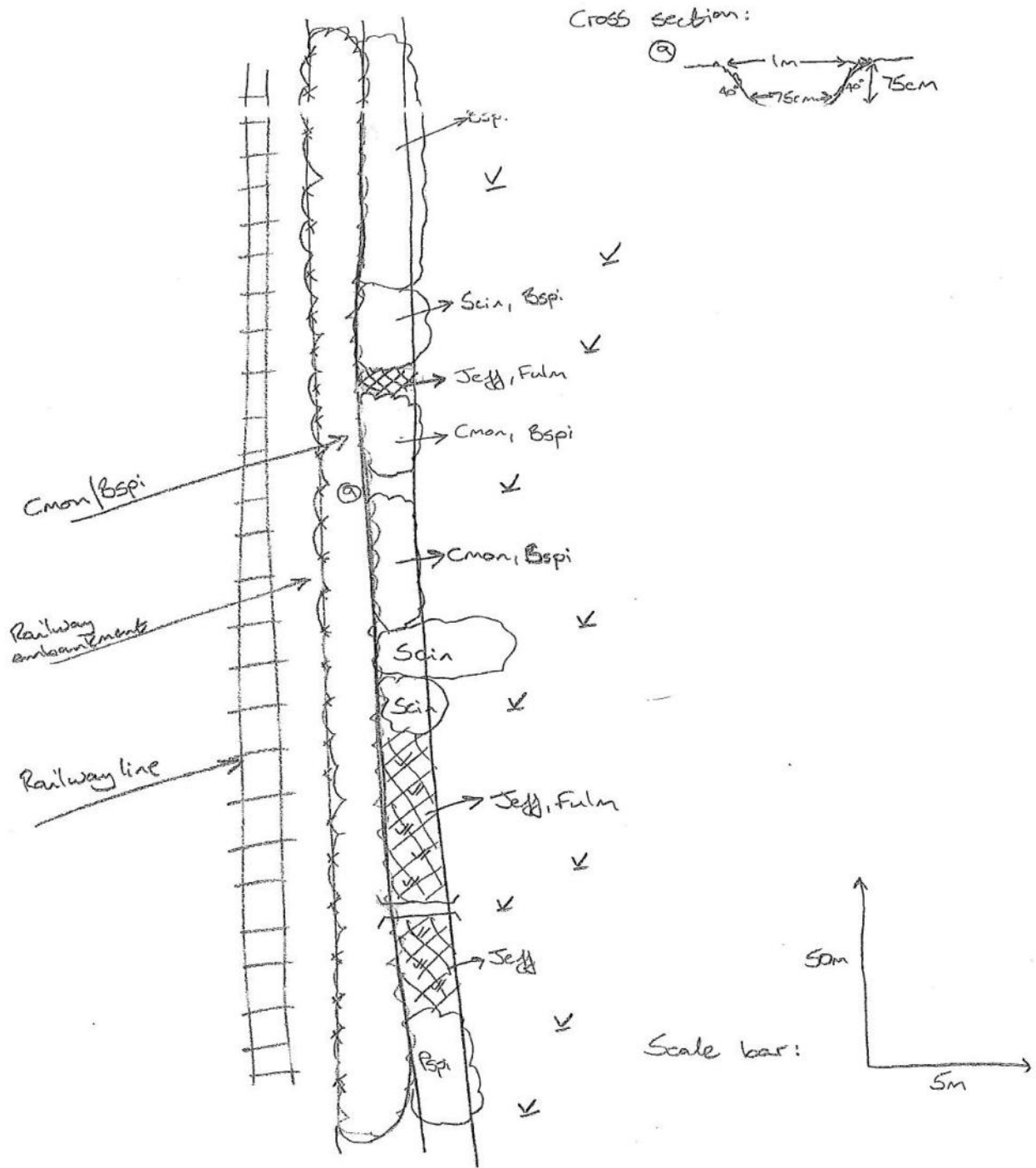


Table 87 RCS results for Survey Site 020-RS1-076-002 (CFA 12)

Ecology survey code	020-RS1-076-002		
Name of watercourse	Tributary to the River Ray		
Surveyor(s)	SH and IB	Date	22.05.13
Survey start (24 hr clock)	11:40	Survey Finish (24 hr clock)	12:50
Weather conditions (description)	Overcast, light wind, dry		
OS Grid Ref (8 digit)	Start Section	SP7019122845	
	End Section	SP7054122415	
Photo Ref(s)	020-RS1-076-002 P1 220513, 020-RS1-076-002 P2 220513, 020-RS1-076-002 P3 220513, 020-RS1-076-002 P4 220513		
Average width (m)	1		
Average depth (m)	0.05		
Brief description of channel	Mostly shaded/overgrown by blackthorn /hawthorn scrub. Ditch features more prevalent adjacent to railway line.		
Base substrate	Mud		
Bank type (include height, angle and extent of erosion)	LB	10 - 30cm; 30 - 50 degree angle; no erosion.	
	RB	10 - 30cm; 30 - 50 degree angle; no erosion.	
Notable channel features	LB	Mostly dry	
	RB	Mostly dry	
Marginal vegetation (Description)	LB	Limited areas of marginal vegetation dominated by soft-rush and meadowsweet. Majority of ditch overgrown with scrub.	
	RB	Limited areas of marginal vegetation dominated by soft-rush and meadowsweet. Majority of ditch overgrown with scrub.	
Bank zone habitats (Description)	LB	Scrub	
	RB	Scrub	
Adjacent land use	LB	Railway line	
	RB	Poor semi-improved grass	
Fauna of interest (State LB or RB if specific to single bank)	Slow worm (<i>Anguis fragilis</i>)		
Recreation features	None		
Existing management	None		
Observed or potential threats to conservation value (e.g. crop spraying, scrub invasion etc)	None		
Suggestions for habitat improvement	Not applicable as watercourse is drainage ditch and very shallow.		

Desk Study Data (CFA 12)

RIVER RAY- SECTIONS 49 & 50

SP720215 to SP711211 (1070m)

SURVEY DATE: 10/07/1993

SURVEYOR: J. Green

SITE SUMMARY:

- 7.4.22 Gently meandering, narrow river 0.5-1m wide and 0.02-0.05m deep with high, steep, soft earth banks. Upstream this section of the river channel has been subject to modifications at the large meanders. The section passes underneath two railway bridges, a vehicle bridge and a public footpath. Dry sections of the channel are used as crossing points by livestock. The river is bordered by rough and semi-natural grassland to the south with a road running parallel to the south bank. The right bank is bordered by Woodlands Farm comprising pasture, old orchard, farm buildings, silage and open rough ground.

South bank:

- 7.4.23 Dominated by ruderals and tall grasses including false oat-grass, cock's-foot, common nettle and meadowsweet. Patches of scrub are dominated by hawthorn with willow, blackthorn, field maple, bramble, wild privet (*Ligustrum vulgare*) and occasional elm sp.. There is little fringe vegetation with patches of branched bur-reed, reed canary-grass and reed sweet-grass downstream.

North bank:

- 7.4.24 Vegetated areas are dominated by dense scrub of hawthorn, blackthorn, field maple willow, elder and apple (*Malus sp.*). Scattered trees include oak, ash, field maple and horse chestnut. Upstream is an open area of false oat-grass, cock's-foot, common nettle, meadowsweet and hogweed. Marginal vegetation is similar to that found along the south bank in terms of distribution and species composition, with additional species present, for example, water mint and fool's-water-cress.

Channel:

- 7.4.25 Channel vegetation is sparse, comprising reed sweet-grass, reed canary-grass, bulrush, branched bur-reed and fool's-water-cress.

Fauna:

- 7.4.26 No information provided.

Conservation features:

- 7.4.27 No information provided.

Padbury Brook (CFA 13)

Figure 171: Survey Site 020-RS1-081-001 (CFA 13)

Reach Reference Number: 020-RS1-081-001	NGR: U/S SP6673726615 D/S SP6718926737	Mott MacDonald	
River Name:	Date: 8/5/13	Surveyor: SH	

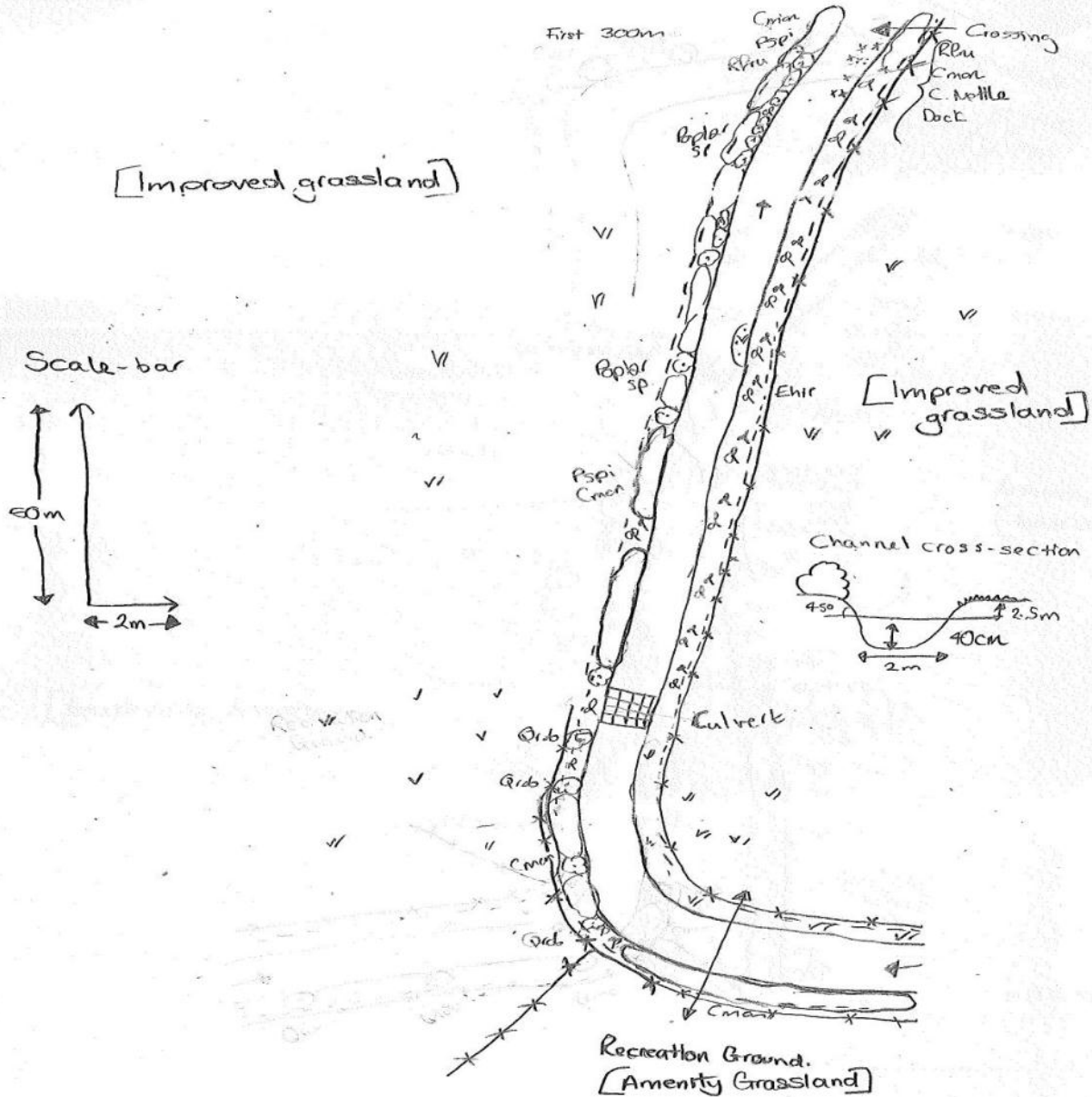



Fig 2
Pg 2 of 2

Table 88 RCS results for Survey Site 020-RS1-081-001 (CFA 13)

Ecology survey code	020-RS1-081-001		
Name of watercourse	Tributary of Padbury Brook		
Surveyor(s)	SH and ZT	Date	08.05.13

Survey start (24 hr clock)	09:00	Survey Finish (24 hr clock)	11:00
Weather conditions (description)	Cloudy, blustery, dry.		
OS Grid Ref (8 digit)	Start Section	SP6673726615	
	End Section	SP6718526737	
Photo Ref(s)	020-RS1-081-001 P1 080513, 020-RS1-081-001 P2 080513, 020-RS1-081-001 P3 080513, 020-RS1-081-001 P4 080513, 020-RS1-081-001 P5 080513.		
Average width (m)	2		
Average depth (m)	0.4		
Brief description of channel	Over-deepened and straightened tributary of Padbury Brook, with scattered trees on left bank, including pollarded poplar trees. River channel is not visible for approximately 50%, but channel is fairly uniform. There is minimal channel vegetation, with some small patches of duckweed downstream. The river channel was not visible for approximately 50%, but channel was fairly uniform.		
Base substrate	Silt with gravel sidebars.		
Bank type (include height, angle and extent of erosion)	LB	Steep sloping earth bank, 3m high, 45 degree angle, with little evidence of erosion.	
	RB	Steep sloping earth bank, 3m high, 45 degree angle, with little evidence of erosion.	
Notable channel features	LB	Culvert in the first 100m upstream. Intake ditch.	
	RB	Culvert in the first 100m upstream, and several vegetated and unvegetated sidebars downstream.	
Marginal vegetation (Description)	LB	Minimal, one patch of marginal vegetation downstream.	
	RB	One patch of marginal vegetation downstream.	
Bank zone habitats (Description)	LB	Mixture of scrub and scattered trees (pedunculate oak, hawthorn, blackthorn, poplar sp., willow and elder).	
	RB	Mixture of tall ruderal, scrub, trees and short grassland.	
Adjacent land use	LB	Improved grassland (grazing pasture), recreation ground (amenity grassland).	
	RB	Improved grassland (grazing pasture) and arable.	
Fauna of interest (State LB or RB if specific to single bank)	None		
Recreation features	Footbridge and footpath crosses the watercourse. Recreation ground nearby.		
Existing management	Over-deepened and straightened, with culvert.		
Observed or potential threats to conservation value (e.g. crop spraying, scrub invasion etc)	Not natural, water very slow-moving and unvegetated.		
Suggestions for habitat improvement	Bank habitats are improving, with vegetation growing back in many areas. The evidence of sidebars suggests the river is starting to naturalise. Given that the river flows through grazing pasture there may be some scope to restore the river to its natural form, with meanders and floodplain.		

Figure 172: Survey Site 020-RS1-081-001 (CFA 13)

Reach Reference Number: 020-RS1-081-001	NGR: U/S SP6673726615 D/S SP6718926737	 Mott MacDonald
River Name:	Date: 8/5/13	Surveyor: S.H.

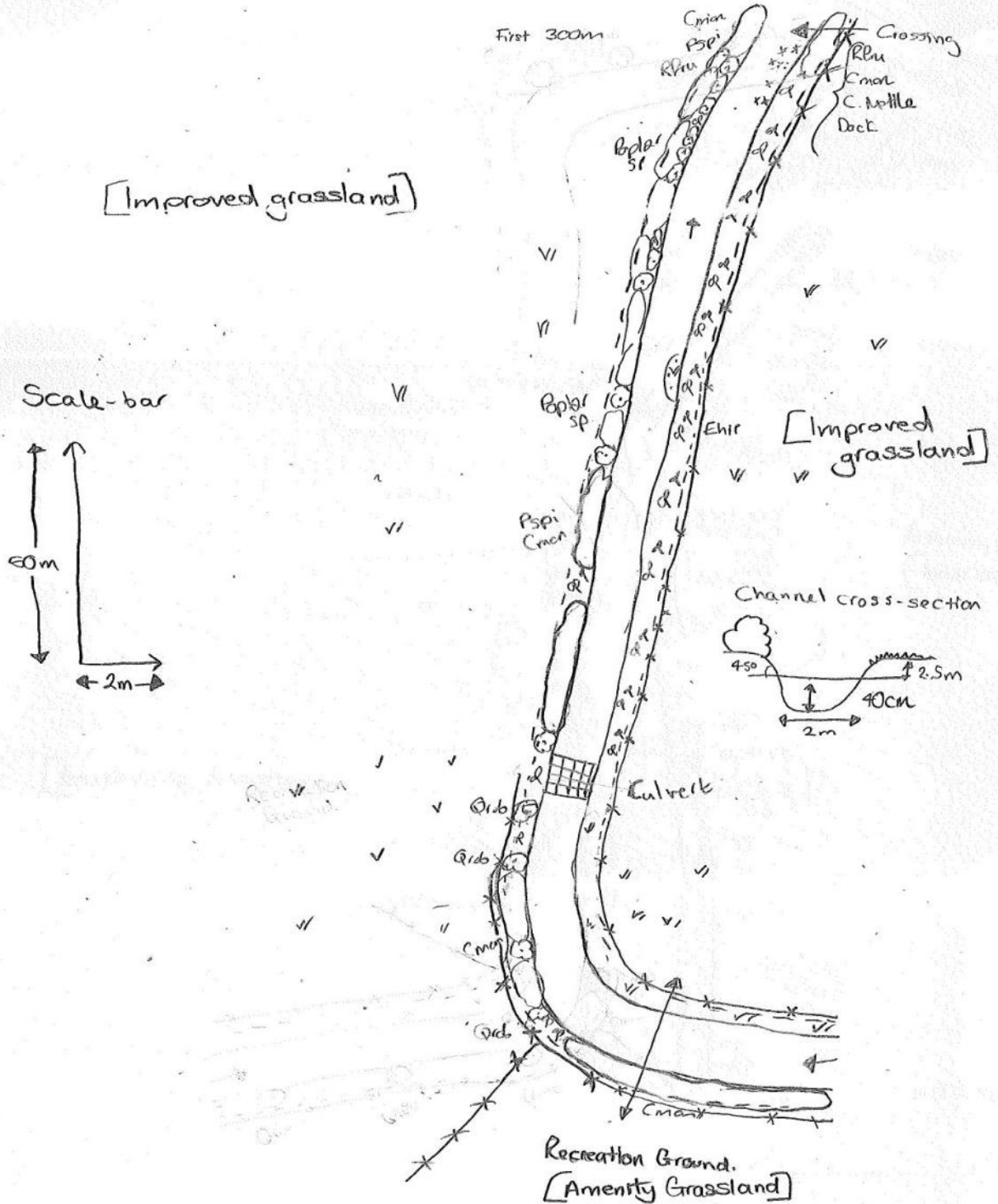



Fig 2

Figure 173: Survey Site 020-RS1-082-001 (CFA 13)

Reach Reference Number: 020-RS1-082-001	NGR: U/S SP67185 26 282 D/S SP6682 32 7 000	 Mott MacDonald
River Name: Padbury Brook	Date: 8/5/13	Surveyor: Sarah Hodgetts

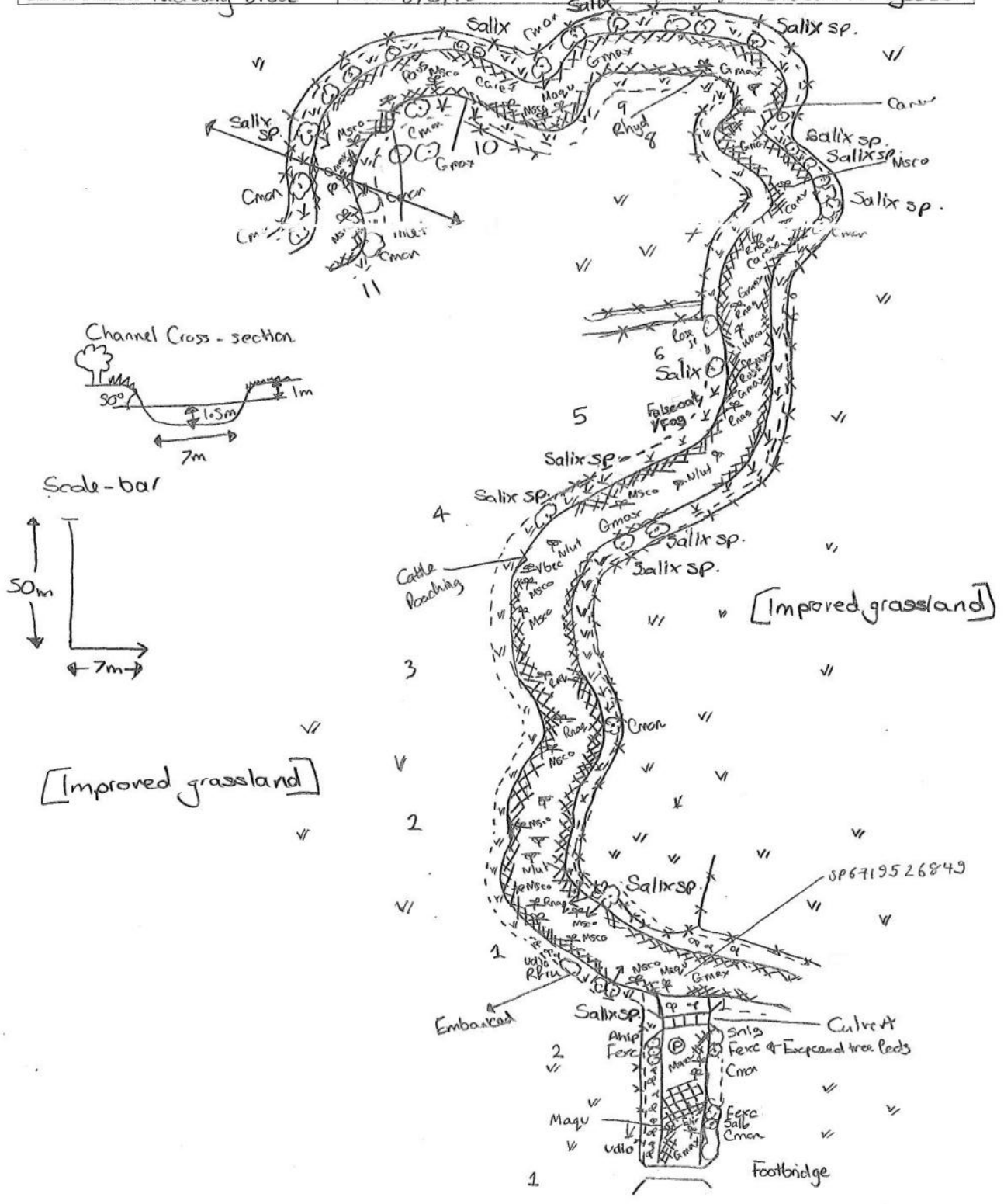



Table 8g RCS results for Survey Site 020-RS1-082-001 (CFA 13)

Ecology survey code	020-RS1-082-001		
Name of watercourse	Padbury Brook		
Surveyor(s)	SH and ZT	Date	08.05.13
Survey start (24 hr clock)	10:00	Survey Finish (24 hr clock)	12:00
Weather conditions (description)	Overcast, blustery, dry.		
OS Grid Ref (8 digit)	Start Section	SP6718526882	
	End Section	SP6682327000	
Photo Ref(s)	020-RS1-082-001 P1 080513, 020-RS1-082-001 P2 080513, 020-RS1-082-001 P3 080513, 020-RS1-082-001 P4 080513, 020-RS1-082-001 P5 080513.		
Average width (m)	7		
Average depth (m)	1.5		
Brief description of channel	Re-sectioned (widened) and embanked (left bank) river with slow-moving water throughout. Areas of bank on both sides are poached by cattle. The channel was visible throughout, surveyed from the left bank. Water too deep and silty to enter. The channel is choked in places and fringed almost entirely throughout by reed sweet-grass and sedge sp. (<i>Carex</i> sp.). Emergent species scattered but frequent; water mint, water forget-me-not and water-cress. Submerged water lily frequent.		
Base substrate	Silt.		
Bank type (include height, angle and extent of erosion)	LB	Steep sloping earth bank, 2.5 m high, 50 degree angle, a few areas of erosion.	
	RB	Steep sloping earth bank, 2.5 m high, 50 degree angle, a few areas of erosion.	
Notable channel features	LB	Intake ditch at the upstream start of the reach.	
	RB	None	
Marginal vegetation (Description)	LB	Fringed almost entirely with reed sweet-grass and sedge, with frequent water mint, water forget-me-not and watercress.	
	RB	Fringed almost entirely with reed sweet-grass and sedge, with frequent water mint, water forget-me-not and watercress.	
Bank zone habitats (Description)	LB	Mainly short grassland the same as the adjacent land use (grazed pasture-improved grassland). Occasional trees (willow, hawthorn).	
	RB	Mainly short grassland with tall ruderals and scattered trees (predominantly willows).	
Adjacent land use	LB	Improved grassland (grazing pasture).	
	RB	Improved grassland (grazing pasture).	
Fauna of interest (State LB or RB if specific to single bank)	Otter spraint recorded previously (according to landowner).		
Recreation features	None		
Existing management	Modified (as above).		
Observed or potential threats to conservation value (e.g. crop spraying, scrub invasion etc)	Mink in the area (according to landowner).		

Suggestions for habitat improvement	River is showing signs of naturalising, further improvements could be made, to increase the energy systems in the river (i.e. add areas of riffle and pool to increase variability). The land on both sides of the river is improved grassland and could be used as part of the natural floodplain of the river.
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Figure 174: Survey Site 020-RS1-082-002 (CFA 13)

Reach Reference Number: 020-RS1-082-002	NGR: U/S SP66 ²⁵² 350 27 598 D/S SP66371 27091	 Mott MacDonald
River Name: Dahn	Date: 28 / 05 / 2013	Surveyor: S.H C.B

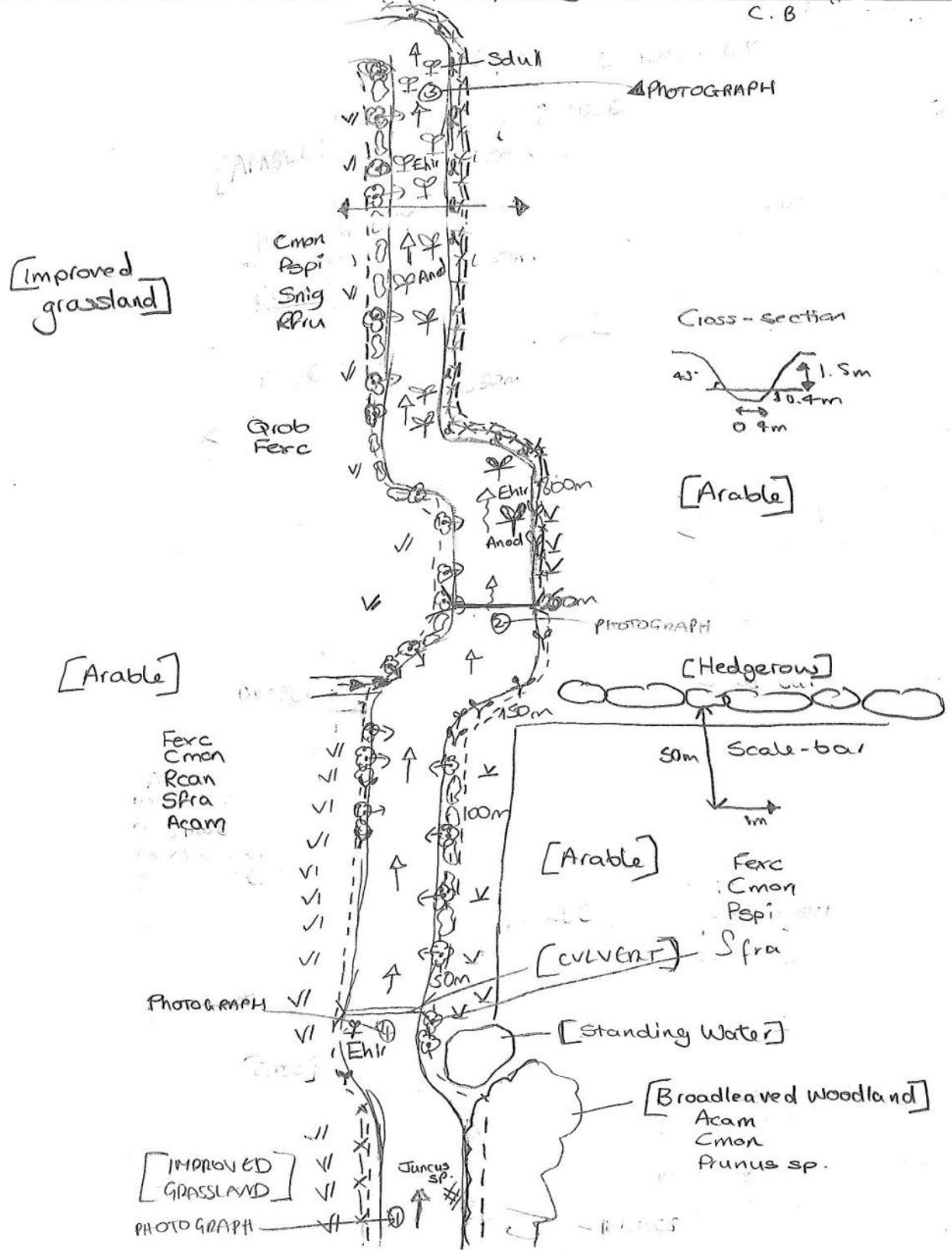



Table 90 RCS results for Survey Site 020-RS1-082-002 (CFA 13)

Ecology survey code	020-RS1-082-002		
Name of watercourse	Tributary of Padbury Brook		
Surveyor(s)	SH and CB	Date	28.05.13
Survey start (24 hr clock)	17:00	Survey Finish (24 hr clock)	18:00
Weather conditions (description)	Damp and overcast.		
OS Grid Ref (8 digit)	Start Section	SP66282 27548	
	End Section	SP66371 27091	
Photo Ref(s)	020-RS1-082-002 P1 280513, 020-RS1-082-002 P2 280513, 020-RS1-082-002 P3 280513, 020-RS1-082-002 P4 280513, 020-RS1-082-002 P5 280513.		
Average width (m)	0.5		
Average depth (m)	0.4		
Brief description of channel	Heavily modified ditch that has been straightened in parts and over-deepened. The channel is heavily shaded by over-hanging trees, shrubs and tall ruderals, with occasional patches of great willowherb and fool's-water-cress.		
Base substrate	Silt		
Bank type (include height, angle and extent of erosion)	LB	Steep (greater than 45 degree angle) earth bank, 2m high, little evidence of erosion.	
	RB	Steep (greater than 45 degree angle) earth bank, 2m high, little evidence of erosion.	
Notable channel features	LB	None	
	RB	None	
Marginal vegetation (Description)	LB	Minimal marginal vegetation, except occasional patches of great willowherb and fool's-water-cress and rare occurrences of rush (<i>Juncus sp.</i>) and bittersweet.	
	RB	None	
Bank zone habitats (Description)	LB	Tall ruderal dominated by common nettle and cow parsley, scrub and trees; ash, field maple, hawthorn, blackthorn and crack-willow.	
	RB	Tall ruderal dominated by common nettle and cow parsley, scrub and trees; ash, field maple, hawthorn, blackthorn and crack-willow.	
Adjacent land use	LB	Grazed arable land with semi-improved grassland field margin and small broadleaved woodland area.	
	RB	Entirely arable, with semi-improved grassland field margin and small broadleaved woodland area.	
Fauna of interest (State LB or RB if specific to single bank)	Nesting birds in standards.		
Recreation features	Footbridge.		
Existing management	Past management.		
Observed or potential threats to conservation value (e.g. crop	Crop spraying and over shading of the channel by trees and shrubs.		

spraying, scrub invasion etc)	
Suggestions for habitat improvement	Very shallow, narrow ditch. Reduce shading of channel in places to encourage macrophyte growth.

Figure 175: Survey Site 020-RS1-084-001 (CFA 13)

Reference Number: 020-RS1-084-001	NGR: U/S SP650532 7954 D/S SP64786 27707	 Mott MacDonald
River Name: Padbury Brook	Date: 03/06/2013	

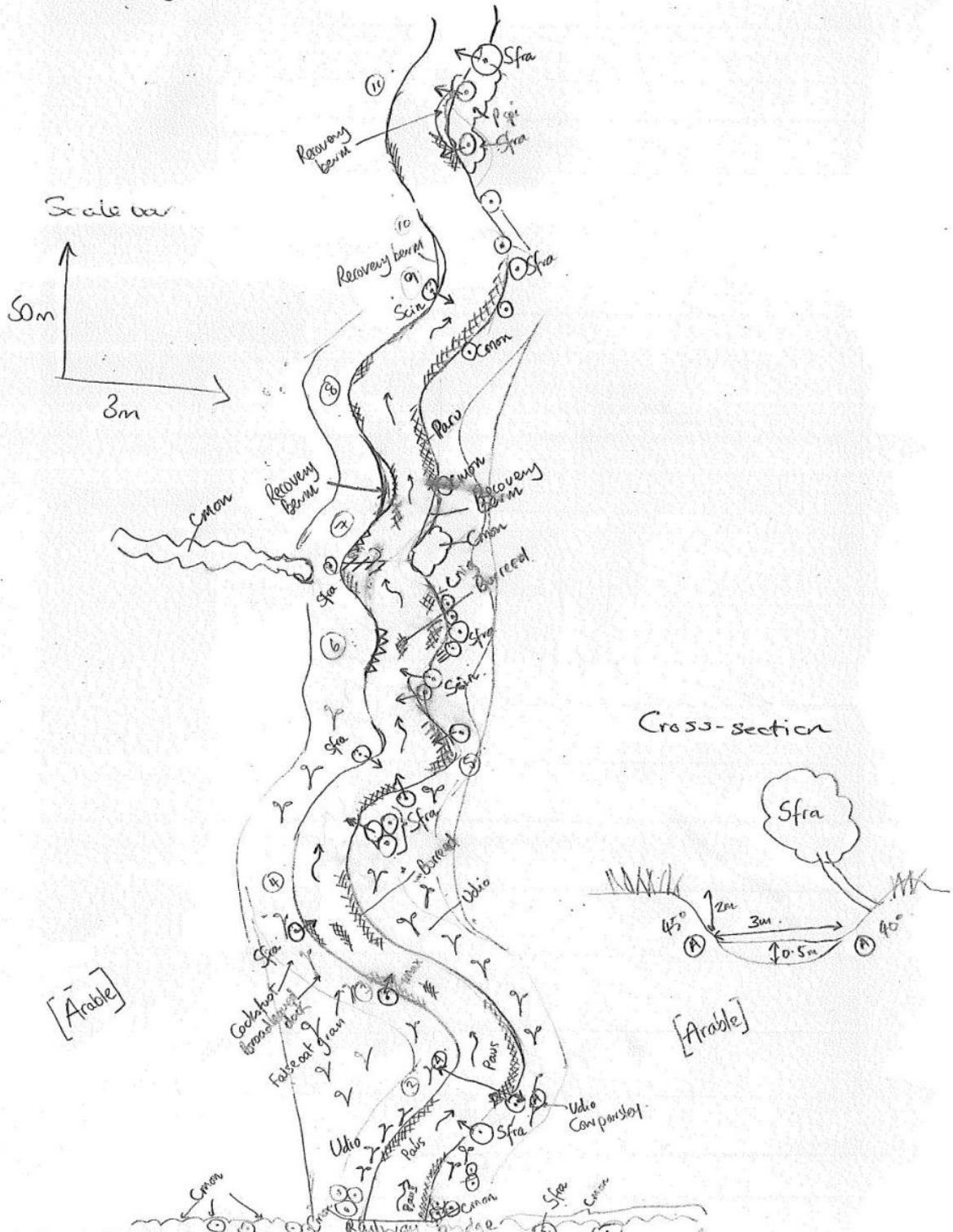



Table 91 RCS results for Survey Site 020-RS1-084-001 (CFA 13)

Ecology survey code	020-RS1-084-001		
Name of watercourse	Padbury Brook		
Surveyor(s)	EH and SH	Date	03.06.13
Survey start (24 hr clock)	14:00	Survey Finish (24 hr clock)	15:00
Weather conditions (description)	Sunny and breezy		
OS Grid Ref (8 digit)	Start Section	SP6505327954	
	End Section	SP6478627707	
Photo Ref(s)	020-RS1-084001 P1 030613, 020-RS1-084001 P2 030613, 020-RS1-084001 P3 030613, 020-RS1-084001 P4 030613, 020-RS1-084001 P5 030613, 020-RS1-084001 P6 030613, 020-RS1-084001 P7 030613, 020-RS1-084001 P8 030613, 020-RS1-084001 P9 030613, 020-RS1-084001 P10 030613, 020-RS1-084001 P11 030613		
Average width (m)	3		
Average depth (m)	0.75		
Brief description of channel	Meandering channel between arable fields. Has been dug out/deepened. Scattered crack-willow along bank. Slow flow. Steep banks.		
Base substrate	Silt		
Bank type (include height, angle and extent of erosion)	LB	2.5m, 50 degree angle, mud, some erosion present.	
	RB	2.5m, 50 degree angle, mud, some erosion present.	
Notable channel features	LB	Recovery berms and eroding earth cliff.	
	RB	Recovery berms.	
Marginal vegetation (Description)	LB	Tall grass and common nettle.	
	RB	Tall grass and common nettle.	
Bank zone habitats (Description)	LB	Tall ruderal - common nettle, cow parsley, false oat-grass. Wide margins.	
	RB	Tall ruderal - common nettle, cow parsley, false oat-grass. Wide margins.	
Adjacent land use	LB	Arable	
	RB	Arable	
Fauna of interest (State LB or RB if specific to single bank)	Cliffs suitable for kingfishers. Suitable for water vole.		
Recreation features	Footpath		
Existing management	Deepened but not straightened. Showing signs of recovery.		
Observed or potential threats to conservation value (e.g. crop spraying, scrub invasion etc)	Potential for crop spraying		
Suggestions for habitat improvement	Scope for in-channel restoration works to increase the diversity of flows. It might also be possible to restore more meanders and floodplain, as there is a wide field margin on parts of the left bank (and it would be possible to reduce the steepness of the bank profile).		

Figure 177: Survey Site 020-RS1-087-001 (CFA 13)

Reach Reference Number: 020-RS1-087-001	NGR: U/S SP6 3239 30367 D/SP62926 29895	 Mott MacDonald
River Name:	Date: 29/05/2013	Surveyor: Emma Heald

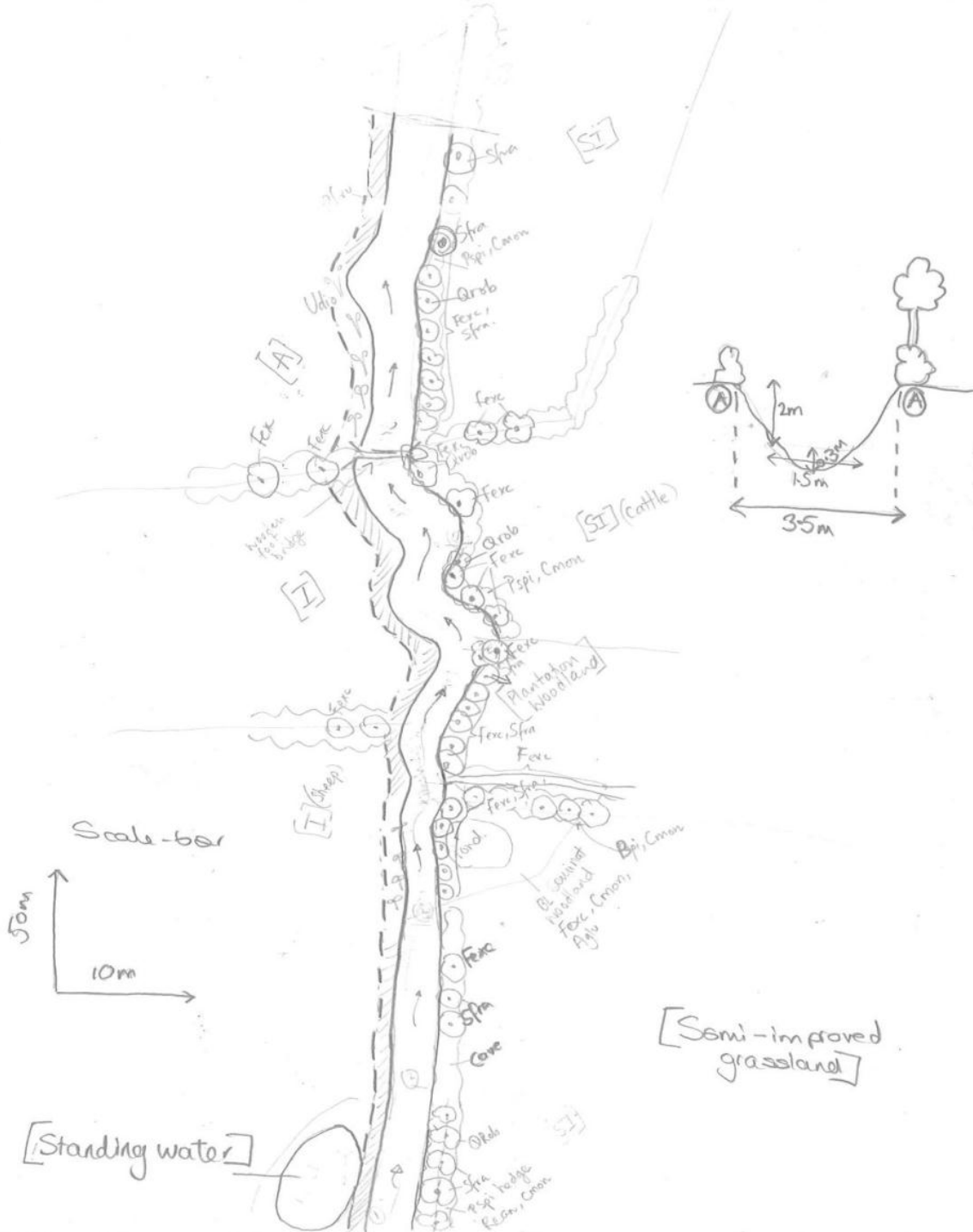


Table 92 RCS results for Survey Site 020-RS1-087-001 (CFA 13)

Ecology survey code	020-RS1-087-001
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Name of watercourse	Tributary of Padbury Brook		
Surveyor(s)	EH and SH	Date	29.05.13
Survey start (24 hr clock)	10:30	Survey Finish (24 hr clock)	11:30
Weather conditions (description)	Drizzle.		
OS Grid Ref (8 digit)	Start Section	SP63239 30367	
	End Section	SP62926 29895	
Photo Ref(s)	020-RS1-087-001 P1 290513, 020-RS1-087-001 P2 290513, 020-RS1-087-001 P3 290513, 020-RS1-087-001 P4 290513		
Average width (m)	1.5		
Average depth (m)	0.25-0.5		
Brief description of channel	Slow flowing ditch with steep banks. Tree and hedge lined.		
Base substrate	Silt		
Bank type (include height, angle and extent of erosion)	LB	1.5m high, 50 degree angle some erosion evident	
	RB	1.5m high, 50 degree angle, some erosion evident	
Notable channel features	LB	None	
	RB	None	
Marginal vegetation (Description)	LB	No aquatic species: bramble and common nettle.	
	RB	No aquatic species, hedge with mature crack-willow and ash.	
Bank zone habitats (Description)	LB	Scrub	
	RB	Hedge and trees.	
Adjacent land use	LB	Improved grassland, arable and standing water (pond).	
	RB	Semi-improved grassland with cattle, and standing water (pond).	
Fauna of interest (State LB or RB if specific to single bank)	Burrows in left bank in upstream section.		
Recreation features	None		
Existing management	Sectioned but not for several years.		
Observed or potential threats to conservation value (e.g. crop spraying, scrub invasion etc)	None		
Suggestions for habitat improvement	Widen field margins, introduce meanders and energy systems. There is scope for restoration work (with the landowners consent), as the channel runs through improved and semi-improved grassland, mostly used for grazing.		

Figure 178: Survey Site 020-RS1-091-001 (CFA 14)

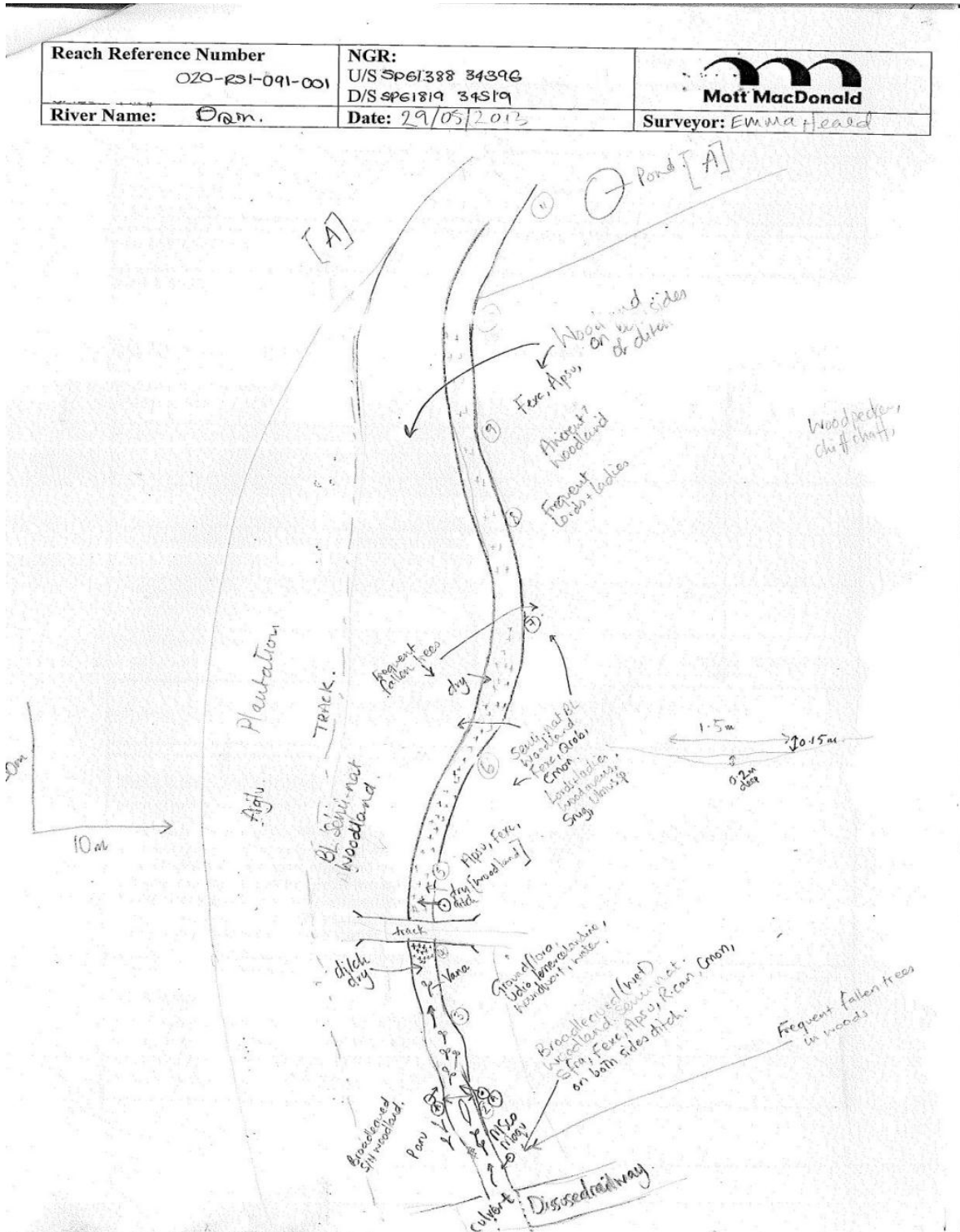



Table 93 RCS results for Survey Site 020-RS1-091-001 (CFA 14)

Ecology survey code	020-RS1-091-001
Name of watercourse	Tributary of River Great Ouse

Appendix EC-001-002

Surveyor(s)	EH and SH		Date	29.05.13
Survey start (24 hr clock)	10:00		Survey Finish (24 hr clock)	12:00
Weather conditions (description)	Overcast, drizzle, light rain.			
OS Grid Ref (8 digit)	Start Section	SP61388 34396		
	End Section	SP61819 34519		
Photo Ref(s)	020-RS1-091-001 P1 290513, 020-RS1-091-001 P2 290513, 020-RS1-091-001 P3 290513, 020-RS1-091-001 P4 290513, 020-RS1-091-001 P5 290513, 020-RS1-091-001 P6 290513, 020-RS1-091-001 P7 290513, 020-RS1-091-001 P8 290513, 020-RS1-091-001 P9 290513, 020-RS1-091-001 P10 290513.			
Average width (m)	Dry			
Average depth (m)	Dry			
Brief description of channel	Very shallow meandering channel for most of length, with a deeper dug out section. 3/4 of length was dry at the time of the survey. Heavily shaded by semi-natural woodland.			
Base substrate	Silt.			
Bank type (include height, angle and extent of erosion)	LB	Very shallow 5 degree angle with no clear bank top for most of length, 0.5m high, some erosion evident.		
	RB	Very shallow 5 degree angle with no clear bank top for most of length, 0.5m high some erosion evident.		
Notable channel features	LB	None		
	RB	None		
Marginal vegetation (Description)	LB	None		
	RB	None		
Bank zone habitats (Description)	LB	Heavily wooded with semi-natural broadleaved woodland (possibly ancient).		
	RB	Heavily wooded with semi-natural broadleaved woodland (possibly ancient).		
Adjacent land use	LB	Plantation and arable.		
	RB	Semi-natural broadleaved woodland.		
Fauna of interest (State LB or RB if specific to single bank)	Woodpecker sp., chiffchaff (<i>Phylloscopus collybita</i>).			
Recreation features	Crossed by public bridleway.			
Existing management	None evident. Dense woodland may hinder access.			
Observed or potential threats to conservation value (e.g. crop spraying, scrub invasion etc)	None			
Suggestions for habitat improvement	There may be opportunity to improve the water flow.			

Figure 179: Survey Site 020-RS1-092-001 (CFA 14)

Reach Reference Number: 020-RS1-092-001	NGR: U/S SP6169335258 D/S SP6205635485	 Mott MacDonald
River Name:	Date: 04/06/2013	Surveyor: Emma Heald

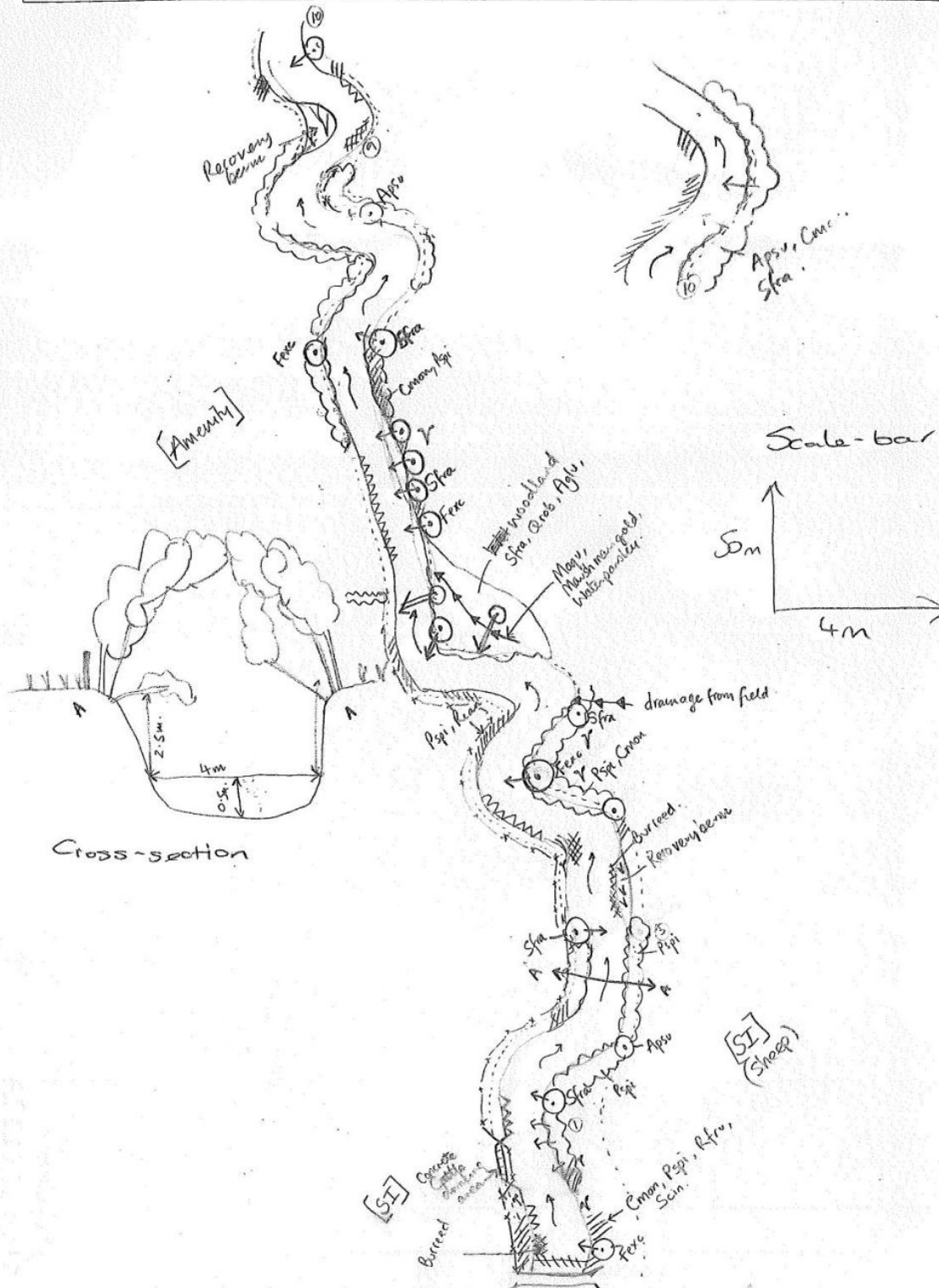



Table 94 RCS results for Survey Site 020-RS1-092-001 (CFA 14)

Ecology survey code	020-RS1-092-001
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Name of watercourse	Great Ouse		
Surveyor(s)	EH and SH	Date	04.06.13
Survey start (24 hr clock)	09:20	Survey Finish (24 hr clock)	10:40
Weather conditions (description)	Sunny		
OS Grid Ref (8 digit)	Start Section	SP6169335258	
	End Section	SP6205635485	
Photo Ref(s)	020-RS1-092001 P1 040613 ,020-RS1-092001 P2 040613, 020-RS1-092001 P3 040613, 020-RS1-092001 P4 040613, 020-RS1-092001 P5 040613, 020-RS1-092001 P6 040613, 020-RS1-092001 P7 040613, 020-RS1-092001 P8 040613		
Average width (m)	4		
Average depth (m)	0.5		
Brief description of channel	Meandering river through grazing pasture. Steep banks, fairly slow flow, much overhung by trees/shrubs. Some erosion of earth banks, recovery berms present. Minimal aquatic species. Weir upstream.		
Base substrate	Silt/gravel		
Bank type (include height, angle and extent of erosion)	LB	2.5m, 70 degree angle, extensive eroding cliffs.	
	RB	2.5m, 60 degree angle, occasional eroding cliffs.	
Notable channel features	LB	Recovery berms, man-made cattle drinking area.	
	RB	Recovery berms.	
Marginal vegetation (Description)	LB	Very occasional bur reed, mostly too shaded and no vegetation.	
	RB	Very occasional bur reed, mostly too shaded and no vegetation.	
Bank zone habitats (Description)	LB	Narrow steep bank with tall ruderal (common nettle) and occasional shrub (blackthorn)	
	RB	Unmanaged hedge/shrubs (blackthorn) and large trees (ash, crack-willow). Ruderal (common nettle) in gaps.	
Adjacent land use	LB	Semi-improved grassland (cattle) and school playing field.	
	RB	Semi-improved grassland (sheep), small area of woodland.	
Fauna of interest (State LB or RB if specific to single bank)	Potential for water vole (possible sighting), commuting for otters, potential for kingfishers. Very good breeding bird habitat. Crayfish potential.		
Recreation features	None		
Existing management	Possibly managed in past (deepened?). Weir at upstream end.		
Observed or potential threats to conservation value (e.g. crop spraying, scrub invasion etc)	Scrub encroachment, sheep trampling/grazing and nutrification.		
Suggestions for habitat improvement	Reduce grazing pressure, cut trees to allow more light, marginal planting, increase river flow.		

Figure 180: Survey Site 020-RS1-097-001 (CFA 14)

Reference: 020-RS1-097-001	NGR: U/S SP58579 40097 D/S SP59005 40306	 Mott MacDonald Surveyor: Zoë Trent
River Name: Cardinham Water	Date: 30/5/2013	

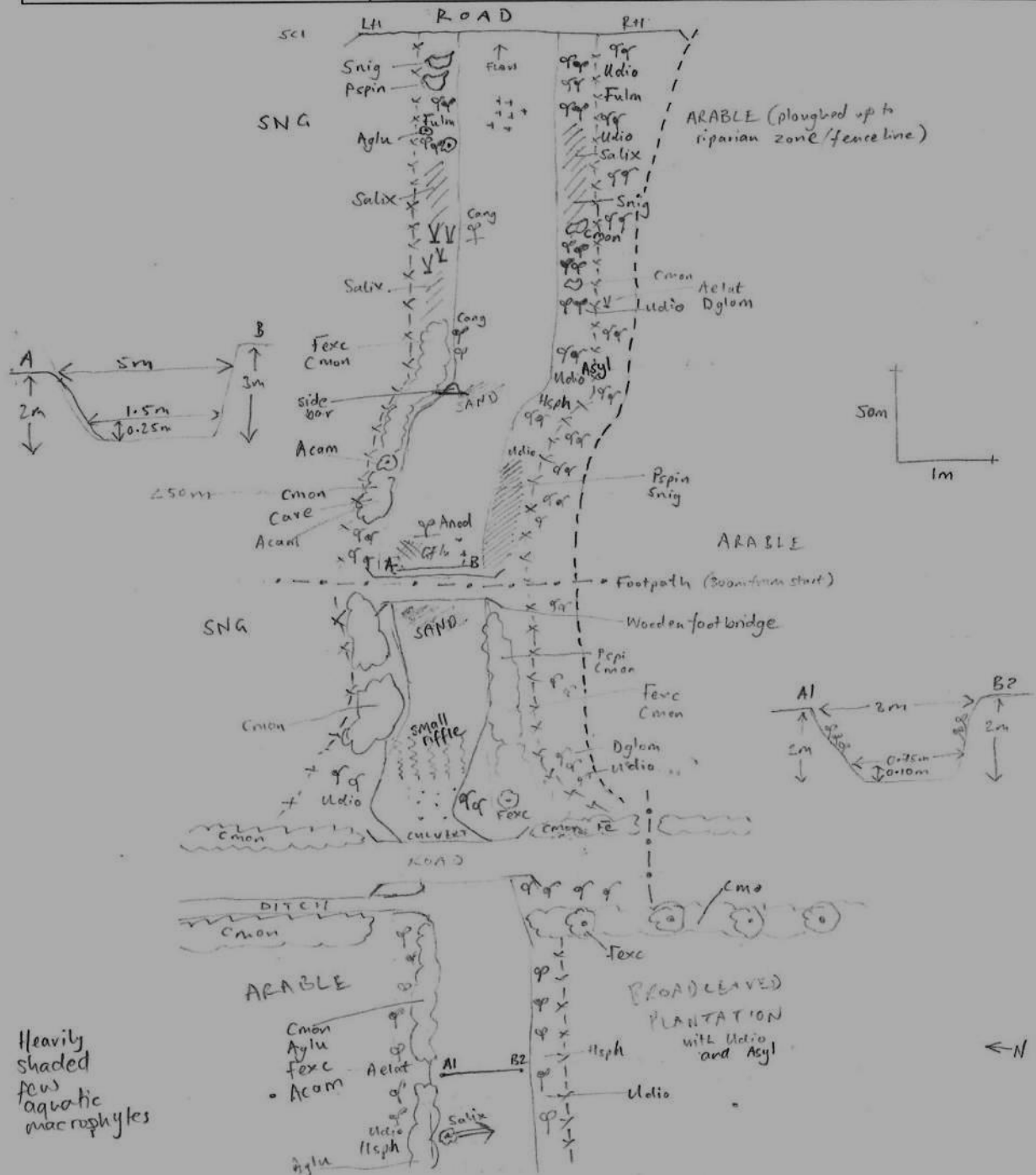
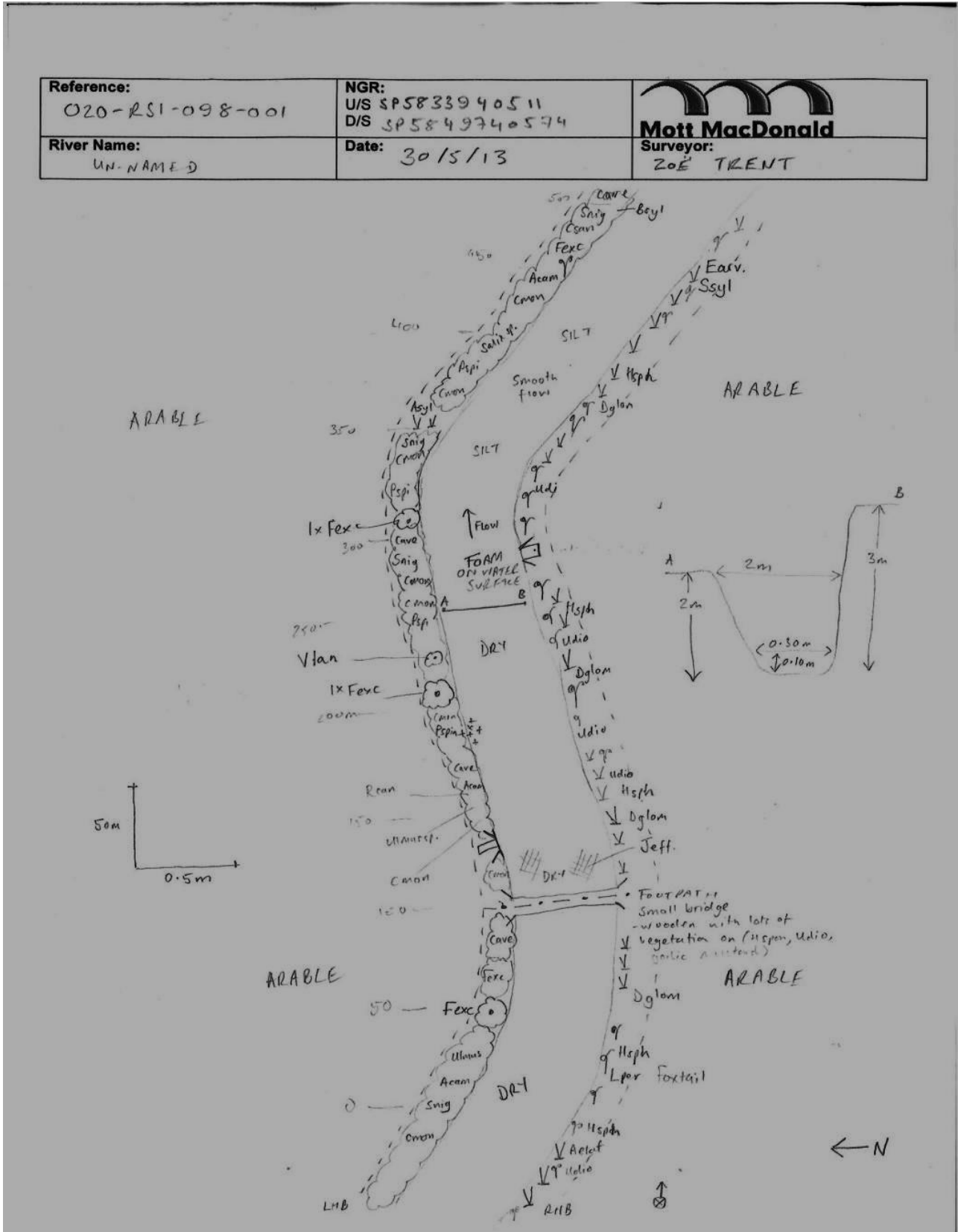


Table 95 RCS results for Survey Site 020-RS1-097-001 (CFA 14)

Ecology survey code	020-RS1-097-001		
Name of watercourse	Cardinham Water (tributary of the Great Ouse)		
Surveyor(s)	ZT and CF	Date	30.05.13
Survey start (24 hr clock)	09:00	Survey Finish (24 hr clock)	11:30
Weather conditions (description)	Overcast		
OS Grid Ref (8 digit)	Start Section	(D/S) SP5900540306	
	End Section	(U/S) SP5857940097	
Photo Ref(s)	020-RS1-097-001-P1-300513, 020-RS1-097-001-P2-300513, 020-RS1-097-001-P3-300513, 020-RS1-097-001-P4-300513, 020-RS1-097-001-P5-300513		
Average width (m)	0.5		
Average depth (m)	0.02		
Brief description of channel	Over-deepened channel which is no longer free to move in its floodplain. Most of reach has arable field on the RHB ploughed very close to the channel. Heavily shaded.		
Base substrate	Silt. Some sand. Occasional gravel/pebble		
Bank type (include height, angle and extent of erosion)	LB	Steep 75 degree angle. 2m high. Very vegetated often obscured by shrubs	
	RB	Steep 75 degree angle. 3m high. Small amount of erosion near 450m. Mainly very vegetated and obscured by shrubs.	
Notable channel features	LB	One side bar where river is naturalising.	
	RB	None observed.	
Marginal vegetation (Description)	LB	Common nettle, false oat-grass, hogweed, meadowsweet. Trees including alder, ash, hawthorn, hazel, willow. Rosebay willowherb (<i>Chamerion angustifolium</i>) growing in the water. No true marginal zone.	
	RB	Common nettle, false oat-grass, hogweed, meadowsweet. Trees including alder, ash, hawthorn, hazel, willow. Rosebay willowherb growing in the water. No true marginal zone.	
Bank zone habitats (Description)	LB	Mainly very heavily shaded with alder, willow, ash, hawthorn, hazel and blackthorn.	
	RB	Mainly very shaded - species same as for LB. Also narrow strip of common nettle hogweed, cow parsley and various grasses. Ploughed close to banktop.	
Adjacent land use	LB	Pasture (and arable)	
	RB	Arable (and broadleaved woodland)	
Fauna of interest (State LB or RB if specific to single bank)	Lots of birds utilising riparian scrub and trees.		
Recreation features	Footpath		
Existing management	None obvious		
Observed or potential threats to conservation value (e.g. crop	Ploughing up close to river.		

spraying, scrub invasion etc)	
Suggestions for habitat improvement	Add meanders. Reconnect with floodplain.

Figure 181: Survey Site 020-RS1-098-001 (CFA 14)



Appendix EC-001-002

Table g6 RCS results for Survey Site 020-RS1-098-001 (CFA 14)

Ecology survey code	020-RS1-098-001		
Name of watercourse	Tributary to the Great Ouse		
Surveyor(s)	ZT and CF	Date	30.05.13
Survey start (24 hr clock)	11:45	Survey Finish (24 hr clock)	13:00
Weather conditions (description)	Overcast/drizzle		
OS Grid Ref (8 digit)	Start Section	(U/S) SP5833940511	
	End Section	(D/S) SP5849740574	
Photo Ref(s)	020-RS1-098-001-P1-300513, 020-RS1-098-001-P2-300513, 020-RS1-098-001-P3-300513		
Average width (m)	0.3		
Average depth (m)	0.01		
Brief description of channel	Very over-deepened channel. Dry at location where HS2 will cross. Then reach has two outfalls (also 3rd outfall at bend beyond 500m reach)		
Base substrate	Silt		
Bank type (include height, angle and extent of erosion)	LB	Steep 70 degree angle, 2m high, no erosion - vegetated	
	RB	Steep 80 degree angle, 3m high, no erosion - vegetated	
Notable channel features	LB	None	
	RB	None	
Marginal vegetation (Description)	LB	No true marginal zone.	
	RB	No true marginal zone.	
Bank zone habitats (Description)	LB	Hedgerow along whole length. Approximately 1m wide and then arable field.	
	RB	1m width of long grass/common nettles and then arable field.	
Adjacent land use	LB	Arable	
	RB	Arable	
Fauna of interest (State LB or RB if specific to single bank)	Skylarks in arable field		
Recreation features	Footpath.		
Existing management	None obvious		
Observed or potential threats to conservation value (e.g. crop spraying, scrub invasion etc)	Ploughing up close to channel.		
Suggestions for habitat	Un-deepen - difficult as fed by outfalls.		

improvement	
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Figure 182: Survey Site 020-RS1-099-001 (CFA 14)

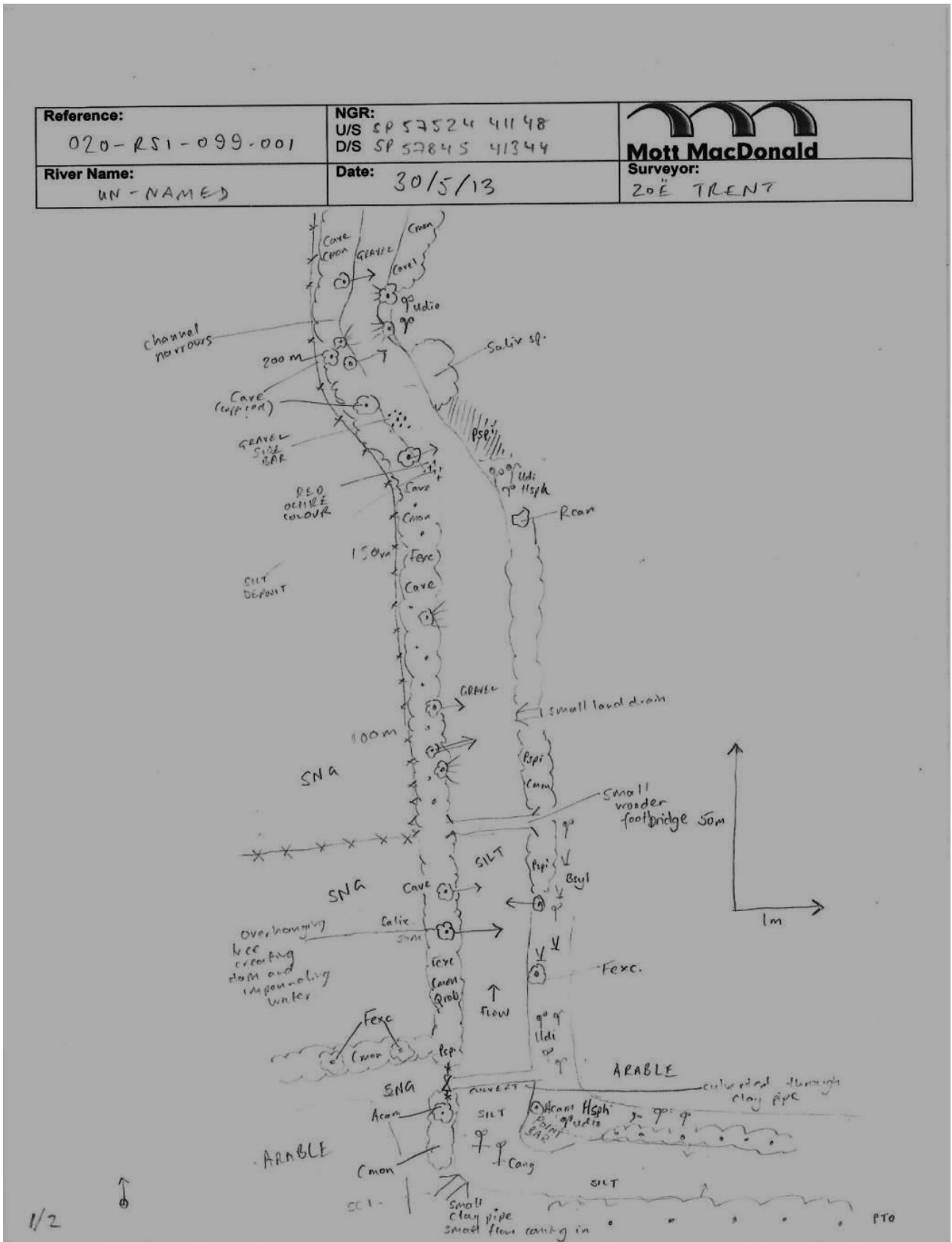


Figure 183: Survey Site 020-RS1-099-001 (CFA 14)

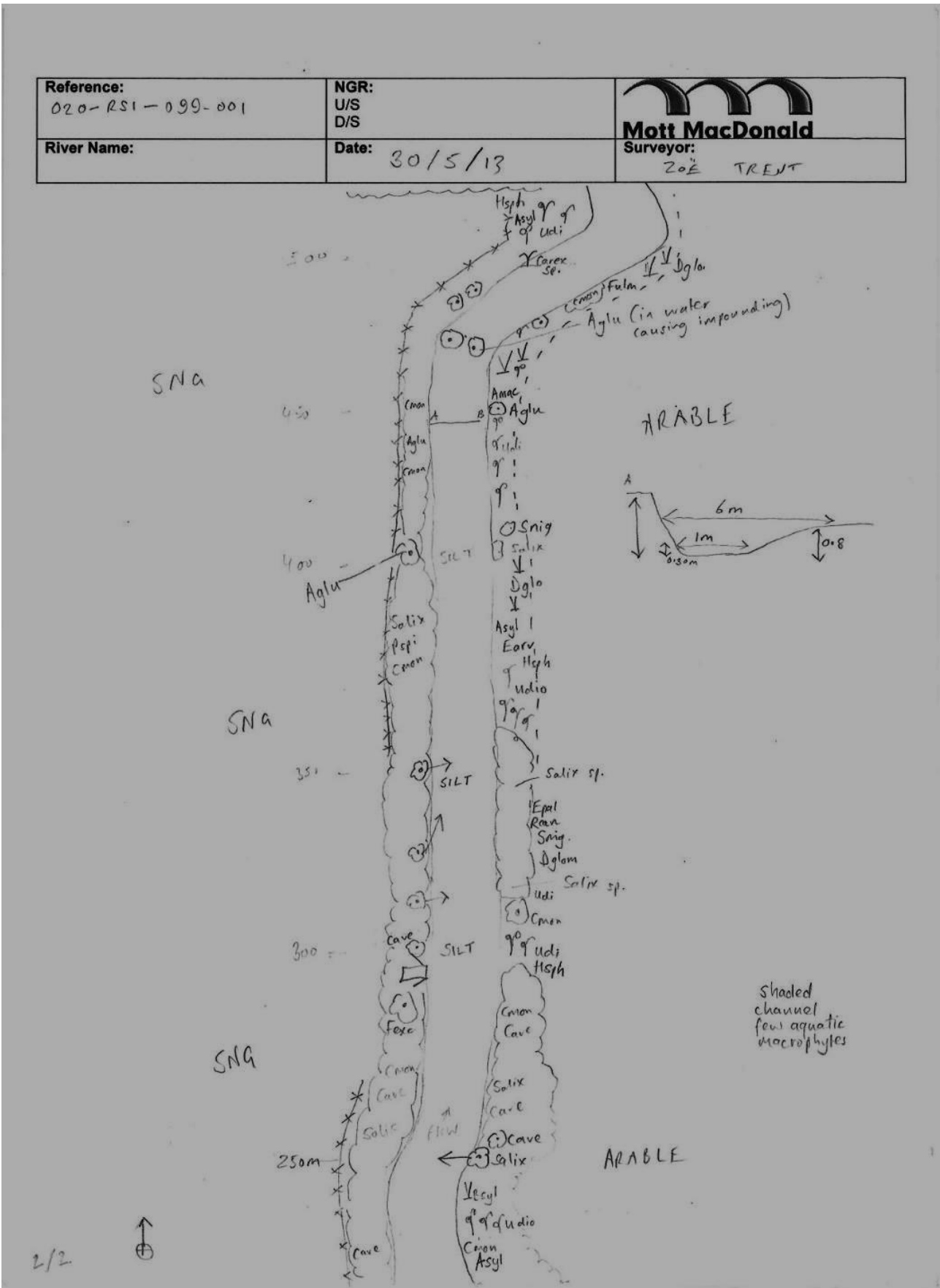


Table 97 RCS results for Survey Site 020-RS1-099-001 (CFA 14)

Ecology survey code	020-RS1-099-001		
Name of watercourse	Tributary to the Great Ouse		
Surveyor(s)	ZT and CF	Date	30.05.13
Survey start (24 hr clock)	13:30	Survey Finish (24 hr clock)	15:15
Weather conditions (description)	Overcast		
OS Grid Ref (8 digit)	Start Section	(U/S) SP5752441148	
	End Section	(D/S) SP5784541344	
Photo Ref(s)	020-RS1-099-001-P1-300513, 020-RS1-099-001-P2-300513, 020-RS1-099-001-P3-300513		
Average width (m)	1		
Average depth (m)	0.03		
Brief description of channel	Heavily shaded. Silty. Area of red ochre precipitating		
Base substrate	Silt mainly. Some gravel/pebble		
Bank type (include height, angle and extent of erosion)	LB	Steep 65 degree angle, 2m. Erosion evident.	
	RB	Variable but gentle (30 degree angle) unmodified sections as well as steep (60 degree angle) re-sectioned parts, 0.5 to 2m high. Some erosion evident.	
Notable channel features	LB	Overhanging trees and exposed tree roots - wood debris.	
	RB	Some overhanging trees and woody debris	
Marginal vegetation (Description)	LB	Very small area near downstream end of reach with sedges. Generally minimal marginal vegetation as heavily shaded.	
	RB	None - very shaded	
Bank zone habitats (Description)	LB	Heavily wooded. Little ground flora.	
	RB	Scrub, common nettle, long grass.	
Adjacent land use	LB	Mainly semi-improved neutral grassland.	
	RB	Arable	
Fauna of interest (State LB or RB if specific to single bank)	Badger sett (not within reach - approximately 500m downstream) Good habitat for birds as is within large area of farmland with few hedges.		
Recreation features	None		
Existing management	None observed		
Observed or potential threats to conservation value (e.g. crop spraying, scrub invasion etc)	None observed		
Suggestions for habitat	Could open up some areas to reduce shading and increase macrophyte growth.		

improvement	
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Desk Study Data (CFA 14)

RIVER GREAT OUSE- SECTIONS 21 & 24

SP60942 35730 to SP61665 35242 (1045m)

SURVEY DATE: unknown

SURVEYOR: unknown

Site summary:

- 7.4.28 A narrow, tightly meandering stretch of the River Great Ouse running through arable and semi-improved pasture to the south west of Westbury. The easternmost point of this section lies approximately 30m to the north of a disused railway. The section has an approximate channel width of 3-4m with banks to approx. 1.5m above water level. It is crossed by 5 vehicle bridges.

Northern bank:

- 7.4.29 The northern bank is open, apart from occasional alder saplings and small white poplar (*Populus alba*). It is dominated by grasses and tall herb, including common nettle, cleavers, perennial ryegrass, cock's-foot, false oat-grass, meadow foxtail (*Alopecurus pratensis*) and Yorkshire fog, with hemlock (*Conium maculatum*), broad-leaved dock (*Rumex obtusifolius*), barren brome (*Bromus sterilis*), great willowherb and cow parsley. The discontinuous fringe vegetation is broad in places and consists of water forget-me-not, watercress, fool's-water-cress, reed canary-grass, floating sweet-grass, greater pond sedge, branched bur-reed, great willowherb and amphibious bistort (*Persicaria amphibia*).

Southern bank:

- 7.4.30 Lined with occasional trees and scrub, comprising pollards of willow, ash, sycamore, hawthorn and bramble. The southern bank is dominated by common nettle and cleavers, with cow parsley, hemlock, creeping thistle and great willowherb and with grasses including false oat-grass, reed canary-grass, cock's-foot, and common couch. The discontinuous, broad fringe of marginal vegetation is dominated by reed canary-grass with branched bur-reed, water forget-me-not, reed sweet-grass, greater pond sedge, fool's-water-cress and great willowherb.

Channel:

- 7.4.31 Scattered algae, common water starwort, water forget-me-not, unbranched bur-reed, fennel pondweed (*Potamogeton pectinatus*), watercress, Canadian waterweed (*Elodea canadensis*), duckweed sp., and patchy common club-rush cover 5-40% of the channel together with the marginal vegetation.

Fauna:

- 7.4.32 The main habitats for birds include the steep banks, marginal vegetation and scattered trees and shrubs on both banks. 15 species were considered likely to hold breeding territories which included this section of the river corridor; blackbird (*Turdus*

merula), blue tit (*Cyanistes caeruleus*), bullfinch, carrion crow (*Corvus corone*), chaffinch (*Fringilla coelebs*), dunnoek (*Prunella modularis*), great tit (*Parus ater*), mallard, moorhen, red-legged partridge (*Alectoris rufa*), reed bunting (*Emberiza schoeniclus*), treecreeper (*Certhia familiaris*), woodpigeon (*Columba palumbus*), wren (*Troglodytes troglodytes*), and yellowhammer.

Conservation features:

7.4.33 No information provided.

RIVER GREAT OUSE- SECTIONS 8, 9 & 10

SP60304 38888 to SP59969 37948 (1731m)

SURVEY DATE: unknown

SURVEYOR: unknown

Site Summary

7.4.34 A narrow, gently meandering section of the River Great Ouse. The northern section is bordered by semi-improved pastures on both sides; further downstream the river splits into two channels which rejoin at Turweston. The western branch is 2m wide and tightly meandering, bordered by semi-improved pasture to the west and ungrazed, semi-improved grassland and gardens to the east. The channel of the eastern branch is 1-3m wide and straighter, with hay meadows to the east, and ungrazed, semi-improved grassland, gardens, and a mill house to the west.

Western bank

7.4.35 The western bank is dominated by tall hawthorn, willow and alder, over common nettle, cleavers, creeping thistle and false oat-grass. Downstream it is dominated by tall herb and grasses including common nettle, great willowherb, cow parsley, false oat-grass, cock's-foot and perennial ryegrass, with occasional trees and scrub including alder, hawthorn, poplar and elder. Fringe vegetation consists of small patches of branched bur-reed and common club-rush, downstream the fringe is broader and more diverse, comprising water forget-me-not, greater pond sedge, fool's-water-cress, reed canary-grass and pink water speedwell.

Eastern bank

7.4.36 The eastern bank is lined with alder, willow and occasional sycamore with scattered scrubby hawthorn over hemlock, common nettle, false oat-grass, meadow foxtail and cock's-foot. Downstream it is more open, dominated by tall grasses with occasional sycamore, hawthorn, bramble, creeping thistle and broad-leaved dock. The intermittent, narrow fringe consists of branched bur-reed, water forget-me-not, greater pond sedge, great willowherb and fool's-water-cress.

Island

7.4.37 Bank vegetation of the island between the two channels is dominated by tall herb including common nettle, hedge bindweed, cleavers, cow parsley and hemlock; grasses including Yorkshire fog, false oat-grass and cock's-foot; under scattered willow, poplar, elder, alder, and sycamore.

Channel

- 7.4.38 Fringes and macrophyte vegetation merge to cover of 5-75% of the channel. Channel vegetation comprises duckweed, water mint, fool's-water-cress, water starwort, branched bur-reed and pink water speedwell.

Fauna


- 7.4.39 The main habitats for birds include scattered trees, damp pasture and hedgerows coming in from both sides of the river. 18 species were considered likely to hold breeding territories which included this section of the river corridor; blackbird, blue tit, carrion crow, chaffinch, garden warbler (*Sylvia borin*), great tit, greenfinch (*Carduelis chloris*), grey wagtail (*Motacilla cinerea*), little grebe (*Tachybaptus ruficollis*), long-tailed tit (*Aegithalos caudatus*), moorhen, reed bunting, robin (*Erithacus rubecula*), song thrush (*Turdus philomelos*), treecreeper, willow warbler (*Phylloscopus trochilus*), woodpigeon and wren.

Conservation Features

- 7.4.40 No information provided.

Cherwell (CFA 15)

Figure 184: Survey Site 020-RS1-104-001 (CFA 15)

Reach Reference Number: 020-RS1-104-001	NGR: U/S SP5434244606 D/S SP5385644700	 Mott MacDonald
River Name: Stream	Date: 04/06/2013	

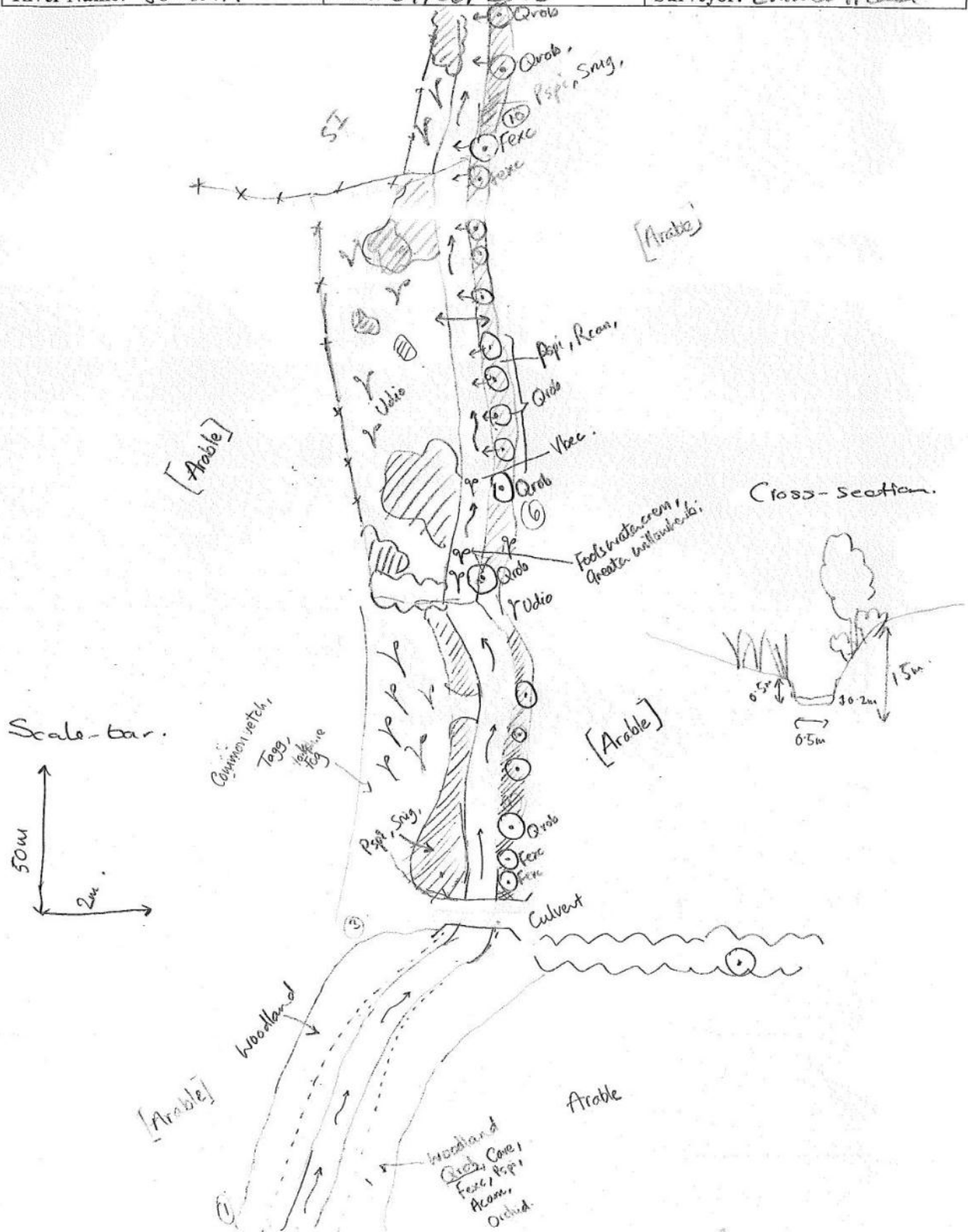


Table 98 RCS results for Survey Site 020-RS1-104-001 (CFA 15)

Ecology survey code	020-RS1-104-001		
Name of watercourse	Tributary of the Cherwell		
Surveyor(s)	EH and SH	Date	04.06.13
Survey start (24 hr clock)	12:00	Survey Finish (24 hr clock)	13:00
Weather conditions (description)	Sunny, breezy		
OS Grid Ref (8 digit)	Start Section	SP5434244606	
	End Section	SP5385644700	
Photo Ref(s)	020-RS1-104001 P1 040613, 020-RS1-104001 P2 , 020-RS1-104001 P3 040613, 020-RS1-104001 P4 040613, 020-RS1-104001 P5 040613, 020-RS1-104001 P6 040613, 020-RS1-104001 P7 040613		
Average width (m)	0.5m		
Average depth (m)	0.25m		
Brief description of channel	Narrow ditch with low flow. Much scrub invasion		
Base substrate	Silt		
Bank type (include height, angle and extent of erosion)	LB	0.5m, 35 degree angle, no evidence of erosion	
	RB	1.5m, 60 degree angle, no evidence of erosion	
Notable channel features	LB	None	
	RB	None	
Marginal vegetation (Description)	LB	Very occasional great willowherb.	
	RB	None	
Bank zone habitats (Description)	LB	Woodland, marshy grassland, ruderals, scrub - early-purple orchid (<i>Orchis mascula</i>) recorded.	
	RB	Scrub and mature trees	
Adjacent land use	LB	Arable and semi-improved grassland. Wide margin next to arable.	
	RB	Arable	
Fauna of interest (State LB or RB if specific to single bank)	Good habitat for breeding birds		
Recreation features	None		
Existing management	Has been dug out in the past.		
Observed or potential threats to conservation value (e.g. crop spraying, scrub invasion etc)	Scrub invasion, close proximity of arable on RB.		
Suggestions for habitat improvement	Scrub reduction, widen channel, create meanders. Scope to use wide field margin on left bank as part of restoration.		

Figure 185: Survey Site 020-RS1-105-001 (CFA 15)

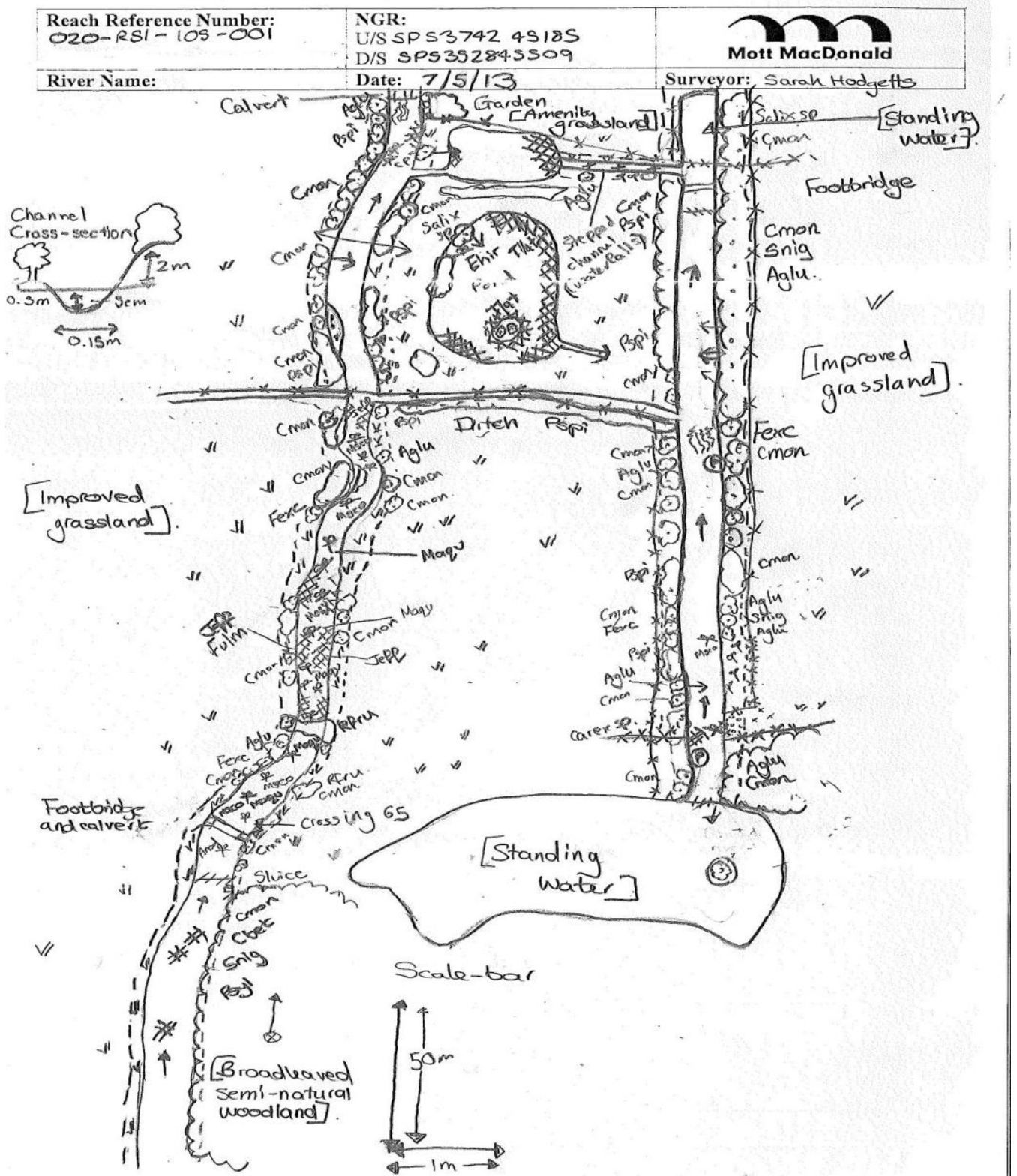



Table 99 RCS results for Survey Site 020-RS1-105-001 (CFA 15)

Ecology survey code	020-RS1-105-001		
Name of watercourse	Lower Thorpe Brook		
Surveyor(s)	SH and ZT	Date	07.05.13
Survey start (24 hr clock)	09:00	Survey Finish (24 hr clock)	11:00
Weather conditions (description)	Overcast, blustery, dry.		
OS Grid Ref (8 digit)	Start Section	SP5374245185	
	End Section	SP5352845509	
Photo Ref(s)	020-RS1-105-001 P1 070513, 020-RS1-105-001 P2 070513, 020-RS1-105-001 P3 070513, 020-RS1-105-001 P4 070513, 020-RS1-105-001 P5 070513, 020-RS1-105-001 P6 070513.		
Average width (m)	0.15		
Average depth (m)	0.05		
Brief description of channel	Two watercourses leading down from springs and lakes upstream. Both are modified and the left is over-deepened and straightened, with areas of cattle poaching, two outfalls and one footbridge. The right has been straightened and runs through scrub and tree vegetation. The left runs through grazed pasture. Both channels were accessible from both banks, water very shallow. There is sparse vegetation in the channel. The left channel has frequent water forget-me-not, water mint and fool's-water-cress, with patches of soft-rush. Areas of shaded channel have little vegetation. The right channel is more shaded with few channel species.		
Base substrate	Silt with gravel sections.		
Bank type (include height, angle and extent of erosion)	LB	(left channel) shallow (30 degree angle) sloping earth bank, 0.5m high with no erosion evident. (Right channel very similar)	
	RB	(left channel) shallow (30 degree angle) sloping earth bank, 2m high, with no erosion evident.	
Notable channel features	LB	One un-vegetated sidebar.	
	RB	None	
Marginal vegetation (Description)	LB	The right channel has minimal marginal vegetation. The left channel has sparse marginal vegetation (including soft rush and water mint), mainly in the mid-section of the reach where there were few trees to shade the channel.	
	RB	The right channel has minimal marginal vegetation. The left channel has sparse marginal vegetation (including soft rush and water mint), mainly in the mid-section of the reach where there were few trees to shade the channel.	
Bank zone habitats (Description)	LB	Left channel: scattered trees (hawthorn, ash and alder) and short grassland. Right channel: continuous trees and scrub (hawthorn, alder, blackthorn, ash).	
	RB	Left channel: woodland, scattered trees and short grassland. Right channel: Continuous trees.	
Adjacent land use	LB	Improved grassland.	
	RB	Improved grassland.	
Fauna of interest (State LB or RB if	None.		

specific to single bank)	
Recreation features	None (private land)
Existing management	Poached by cattle, right hand channel is dammed at the downstream end next to the lake. The whole system has been modified in the past for use by the mill. The channels merge downstream and are culverted under the road.
Observed or potential threats to conservation value (e.g. crop spraying, scrub invasion etc)	None
Suggestions for habitat improvement	There could be scope to restore nature channel and bank, raising the water level and allowing the channel to meander freely, as the channel flows through improved grassland that could form part of the floodplain.

Figure 186: Survey Site 020-RS1-105-002 (CFA 15)

Reach Reference Number: 020-RS1-105-002	NGR: U/S SP5278945812 D/S SP5331945849	 Mott MacDonald
River Name: DITCH	Date: 04/06/2013	

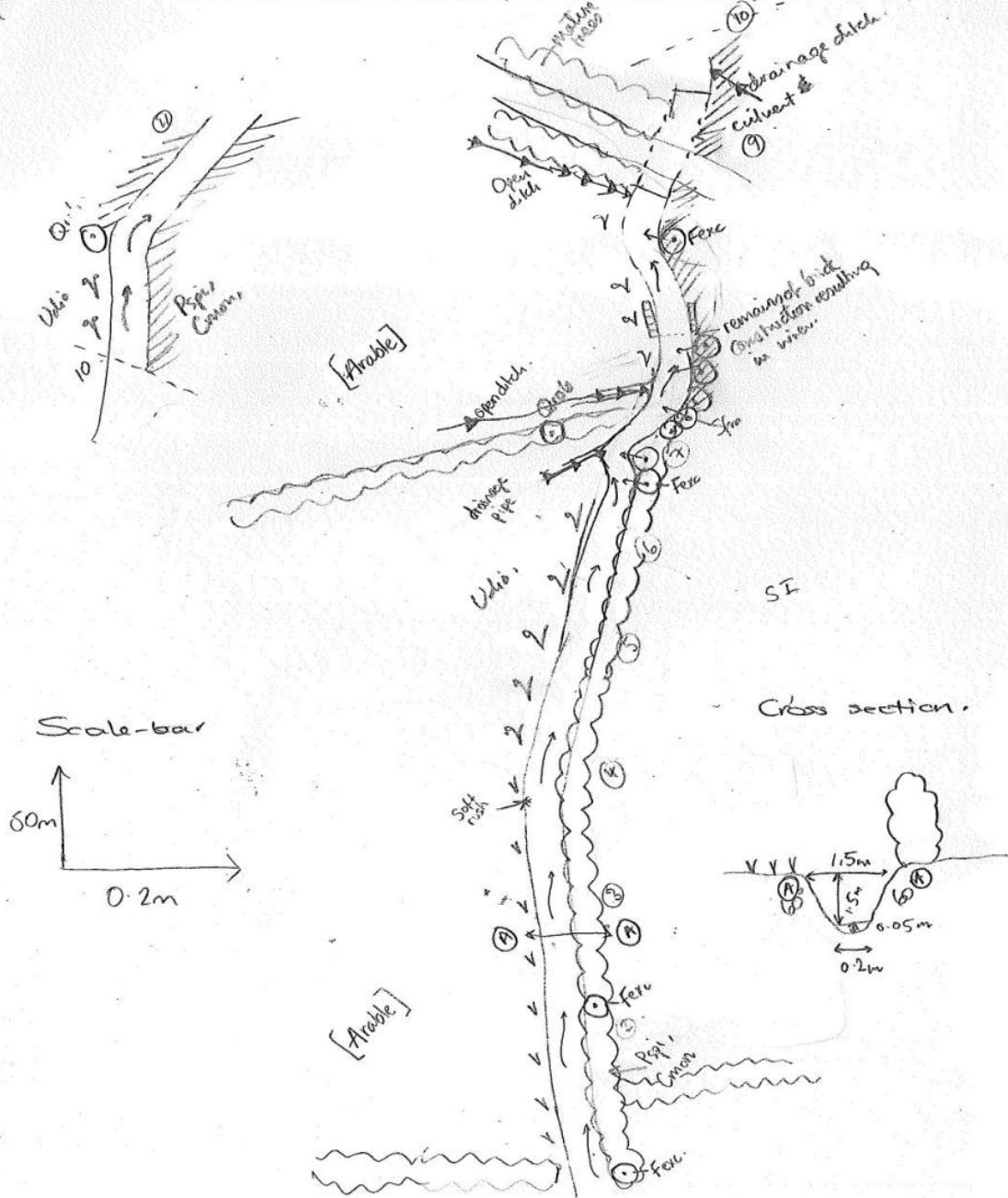



Table 100 RCS results for Survey Site 020-RS1-105-002 (CFA 15)

Ecology survey code	020-RS1-105-002		
Name of watercourse	Tributary of the Cherwell		
Surveyor(s)	EH and SH	Date	04.06.13

Survey start (24 hr clock)	15:00	Survey Finish (24 hr clock)	16:00
Weather conditions (description)	Sunny, breezy		
OS Grid Ref (8 digit)	Start Section	SP5278945812	
	End Section	SP5331945849	
Photo Ref(s)	020-RS1-105002 P1 040613, 020-RS1-105002 P2 040613, 020-RS1-105002 P3 040613, 020-RS1-105002 P4 040613, 020-RS1-105002 P5 040613, 105002 P6 040613, 020-RS1-105002 P7 040613, 020-RS1-105002 P8 040613, 020-RS1-105002 P9 040613, 020-RS1-105002 P10 040613		
Average width (m)	0.2		
Average depth (m)	0.05		
Brief description of channel	Drainage ditch with hedge on Right Bank. Narrow and Straight. Deep ditch but only shallow water. Little vegetation within ditch.		
Base substrate	Silt		
Bank type (include height, angle and extent of erosion)	LB	Recently dredged. 1.5m, 60 degree angle, no evidence of erosion	
	RB	Recently dredged. 1.5m, 60 degree angle, no evidence of erosion	
Notable channel features	LB	Culvert under railway. 3 small inlets.	
	RB	Culvert under railway. 1 small inlet (drainage pipe)	
Marginal vegetation (Description)	LB	None	
	RB	None	
Bank zone habitats (Description)	LB	Narrow arable margin. Occasional hedges perpendicular to ditch.	
	RB	Hedgerow and semi-improved grassland	
Adjacent land use	LB	Arable	
	RB	Semi-improved grassland	
Fauna of interest (State LB or RB if specific to single bank)	None		
Recreation features	None		
Existing management	Maintained as drainage ditch		
Observed or potential threats to conservation value (e.g. crop spraying, scrub invasion etc)	Proximity of arable land use.		
Suggestions for habitat improvement	Widen arable margins. Otherwise not applicable as a drainage ditch.		

Figure 187: Survey Site 020-RS1-108-001 (CFA 15)

Reference: 020-RS1-108-001	NGR: U/S SP51473 48317 D/S SP51438 48096	 Mott MacDonald
River Name: Ditch	Date: 18.06.2013	Surveyor: C.B

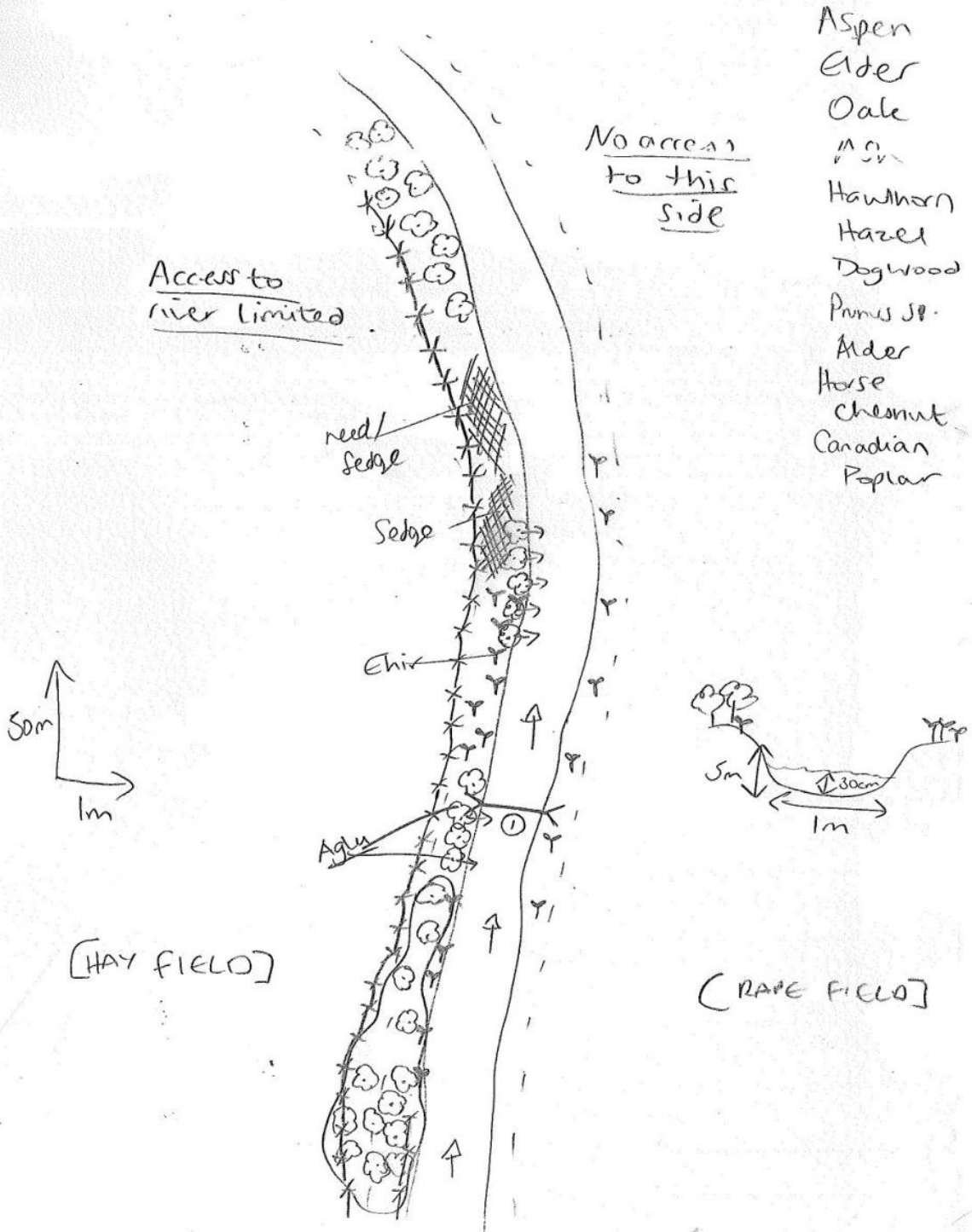



Table 101 RCS results for Survey Site 020-RS1-108-001 (CFA 15)

Ecology survey code	020-RS1-108-001
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Name of watercourse	Tributary of Cherwell		
Surveyor(s)	CB and SH	Date	18.06.13
Survey start (24 hr clock)	11:30	Survey Finish (24 hr clock)	11:50
Weather conditions (description)	Mild, overcast		
OS Grid Ref (8 digit)	Start Section	SP5180447894	
	End Section	SP5152548094	
Photo Ref(s)	020-RS1-108-001 P1 180613, 020-RS1-108-001 P2 180613, 020-RS1-108-001 P3 180613		
Average width (m)	1		
Average depth (m)	0.3		
Brief description of channel	Small ditch with lots of surrounding trees. It joins the River Cherwell. Limited access to the river bank due to land owner issues, so information is not accurate or detailed.		
Base substrate	Silt		
Bank type (include height, angle and extent of erosion)	LB	Gentle in part that was visible (majority was not accessible).	
	RB	Gentle in part that was visible (majority was not accessible).	
Notable channel features	LB	None	
	RB	None	
Marginal vegetation (Description)	LB	None visible in small section that was visible (majority not accessible).	
	RB	None visible in small section that was visible (majority not accessible).	
Bank zone habitats (Description)	LB	Strip of broadleaved woodland, with aspen, elder, pedunculate oak, ash, hawthorn, hazel, dogwood, Prunus sp., alder, horse chestnut and hybrid black poplar (<i>Populus x canadensis</i>).	
	RB	Strip of broadleaved woodland, with aspen, elder, oak, ash, hawthorn), hazel, dogwood, Prunus sp., alder, horse chestnut and hybrid black poplar.	
Adjacent land use	LB	Hay meadow (semi-improved grassland)	
	RB	Oilseed rape field and grazing pasture (horses)	
Fauna of interest (State LB or RB if specific to single bank)	Breeding birds.		
Recreation features	Public footpath within the hay meadow.		
Existing management	Not obvious on small section visible, but may have been straightened in the past as it acts as a field and landownership boundary.		
Observed or potential threats to conservation value (e.g. crop spraying, scrub invasion etc)	None.		
Suggestions for habitat improvement	Not applicable - shallow ditch.		

Figure 188: Survey Site 020-RS1-108-002 (CFA 15)

Reference: 020-RS1-108-002	NGR: U/S/SPS180447894 DIS/SPS152548094	 Mott MacDonald
River Name: River Cherwell	Date: 18/06/2013	Surveyor: C. B.

- Oak
- Alder
- Field Maple
- Ash
- Hawthorn
- Willow

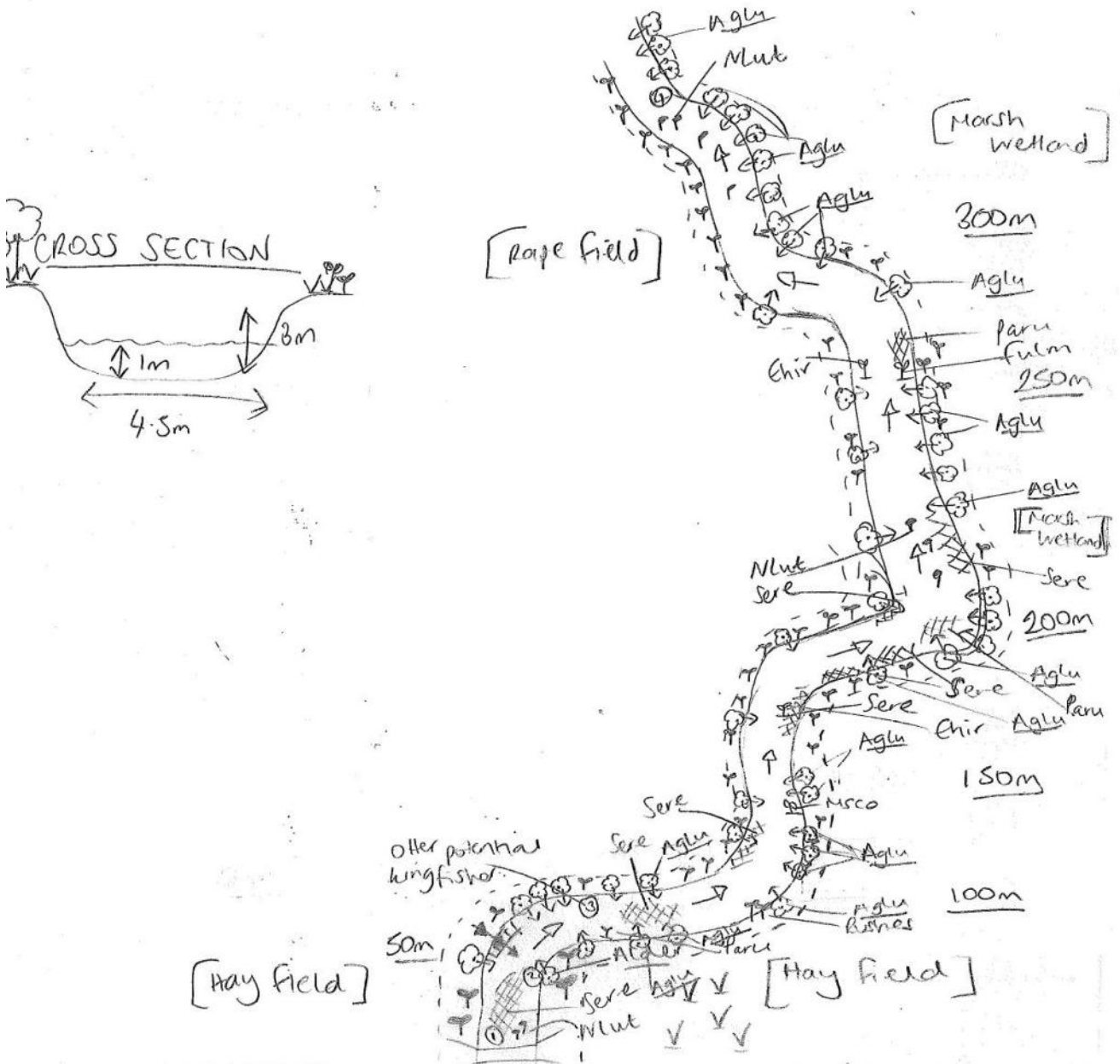


Table 102 RCS results for Survey Site 020-RS1-108-002 (CFA 15)

Ecology survey code	020-RC1-108-002		
Name of watercourse	Cherwell		
Surveyor(s)	CB and SH	Date	18.06.13
Survey start (24 hr clock)	10:00	Survey Finish (24 hr clock)	11:00
Weather conditions (description)	Mild, overcast		
OS Grid Ref (8 digit)	Start Section	SP5147348347	
	End Section	SP5143848096	
Photo Ref(s)	020-RS1-108-002 P1 180613, 020-RS1-108-002 P2 180613, 020-RS1-108-002 P3 180613, 020-RS1-108-002 P4 180613, 020-RS1-108-002 P5 180613, 020-RS1-108-002 P6 180613		
Average width (m)	4.5		
Average depth (m)	3		
Brief description of channel	Meandering river with few aquatic plants. Right bank is mainly tree lined by alders with a few oaks and willows. Left bank has fewer trees and more tall ruderals. Slow flow suggesting that the river has been deepened and re-sectioned. Marshy wetland and semi-improved grasslands surround.		
Base substrate	Silt		
Bank type (include height, angle and extent of erosion)	LB	45 degree angle, steep to vertical. Extensive erosion, many kingfisher holes.	
	RB	45 degree angle, steep to vertical. Extensive erosion.	
Notable channel features	LB	None	
	RB	None	
Marginal vegetation (Description)	LB	Few trees - ash and willow, with tall ruderals (common nettle and branched bur-reed).	
	RB	Mainly tree lined with alder, with frequent ash willow and pedunculate oak. Abundant tall ruderals - common nettle and cow parsley.	
Bank zone habitats (Description)	LB	Abundant common nettle, hogweed, common cleavers and cow parsley. Very overgrown.	
	RB	Abundant common nettle, hogweed, common cleavers and cow parsley.	
Adjacent land use	LB	Immediate adjacent land use - Marshy wetland Next piece of land - Arable	
	RB	Hay field (Semi-improved grassland) and marshy wetland with sedge sp. and reed canary-grass.	
Fauna of interest (State LB or RB if specific to single bank)	Potential for kingfisher, breeding birds, otters and water vole. Lots of woodpecker holes in trees and potential for bats.		
Recreation features	None		
Existing management	River re-sectioned and deepened.		
Observed or potential threats to conservation value (e.g. crop	Not disturbed. Large unused margins.		

spraying, scrub invasion etc)	
Suggestions for habitat improvement	<p>Allow natural water levels to rise in the river, so water overflows into the natural wetlands. This would provide more energy and flow, which should encourage more diverse and abundant aquatic plants and invertebrates. Channel was not entirely visible throughout this reach due to land access issues.</p>

Highfurlong Brook (CFA 15)

Figure 18g: Survey Site 020-RS1-113-001 (CFA 15)

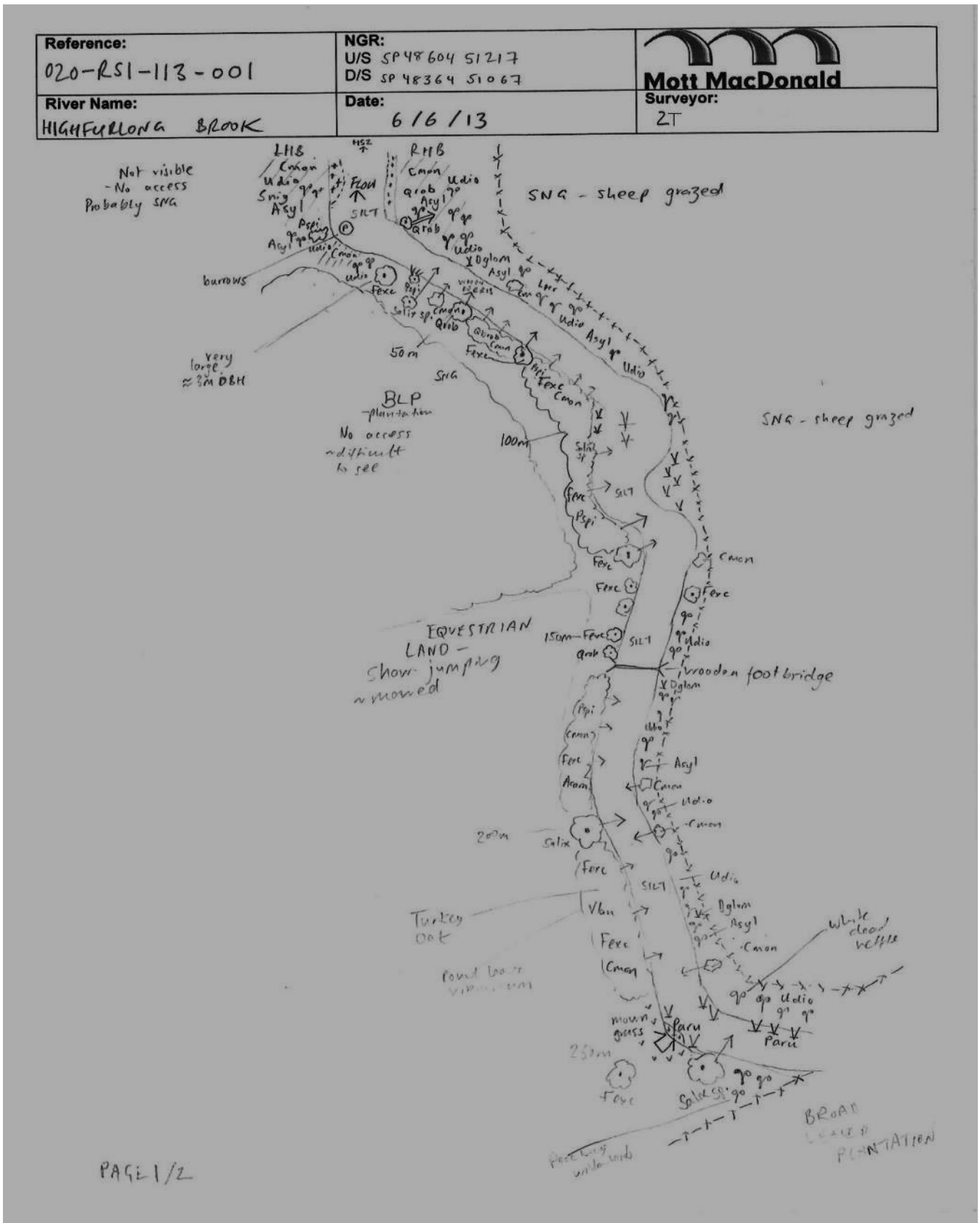


Figure 190: Survey Site 020-RS1-113-001 (CFA 15)

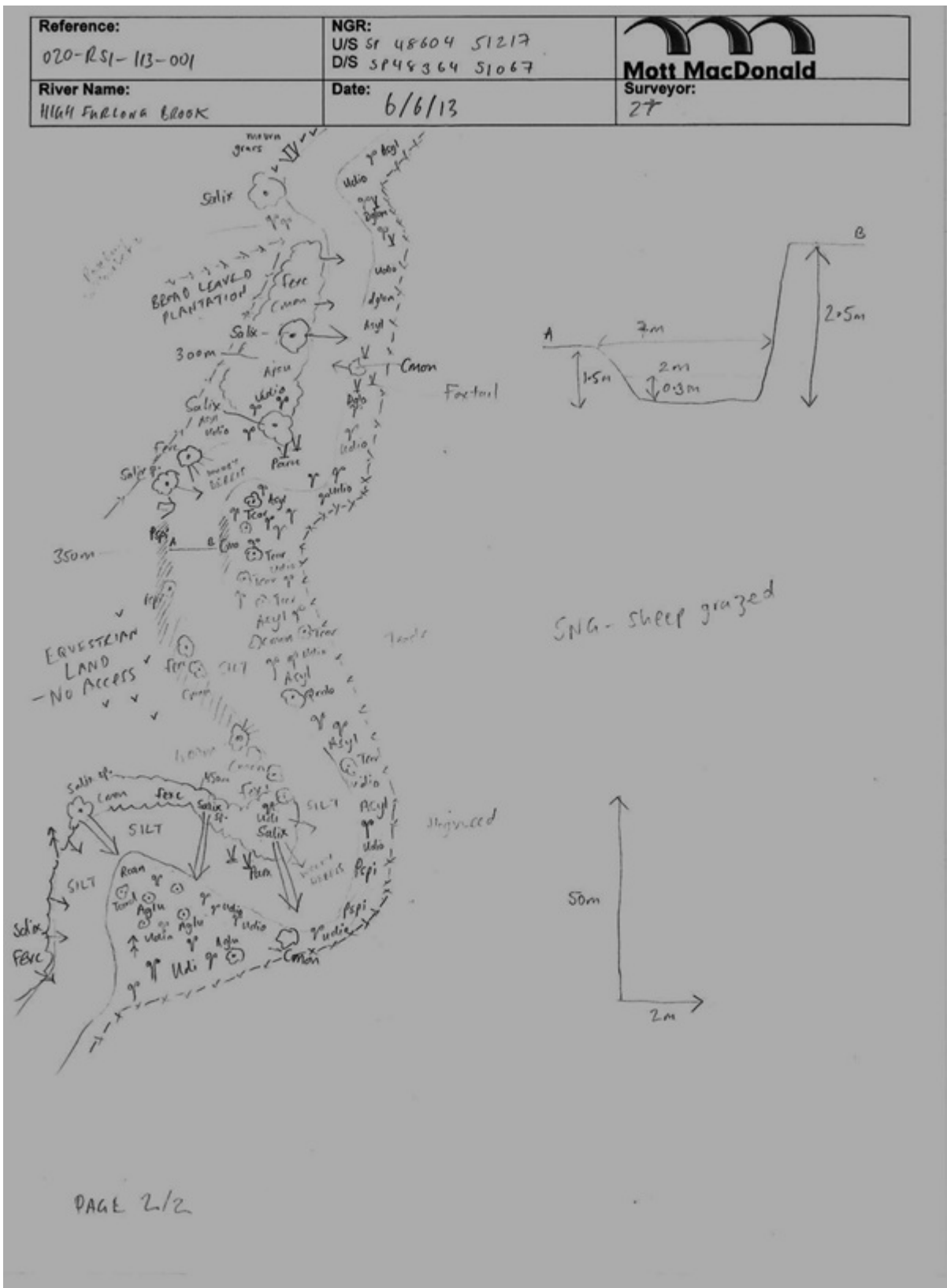


Table 103 RCS results for Survey Site 020-RS1-113-001 (CFA 15)

Ecology survey code	020-RS1-113-001		
Name of watercourse	Highfurlong Brook		
Surveyor(s)	ZT and CF	Date	06.06.13
Survey start (24 hr clock)	09:15	Survey Finish (24 hr clock)	11:10
Weather conditions (description)	Overcast		
OS Grid Ref (8 digit)	Start Section	(D/S) SP4836451067	
	End Section	(U/S) SP4860451217	
Photo Ref(s)	020-RS1-113-001 P1 060613, 020-RS1-113-001 P2 060613, 020-RS1-113-001 P3 060613, 020-RS1-113-001 P4 060613, 020-RS1-113-001 P5 060613		
Average width (m)	2		
Average depth (m)	0.3		
Brief description of channel	Heavily shaded channel. Over-deepened in the past but now mature trees (particularly on the right-hand bank) Very few macrophytes but some small patches of reed canary-grass.		
Base substrate	Silt		
Bank type (include height, angle and extent of erosion)	LB	Steep - 80 degree angle, 1.5m. No evidence of erosion	
	RB	Variable. Some steep - 80 degree angle but also gentler areas - 30-45 degree angle, 2.5m. Some evidence of erosion.	
Notable channel features	LB	Deposition - point bar	
	RB	Side bar	
Marginal vegetation (Description)	LB	Reed canary-grass in places but otherwise minimal marginal vegetation.	
	RB	Reed canary-grass in places but otherwise minimal marginal vegetation.	
Bank zone habitats (Description)	LB	Mainly common nettle and cow parsley, and also some scrub (mainly hawthorn).	
	RB	Densely wooded with ash, pedunculate oak and willow.	
Adjacent land use	LB	Sheep-grazed pasture (semi-improved neutral grassland)	
	RB	Equestrian land and broadleaved plantation - no access.	
Fauna of interest (State LB or RB if specific to single bank)	Heron. Burrows in banks - water vole may be present.		
Recreation features	Footbridge.		
Existing management	Unknown but does not look recently dredged.		
Observed or potential threats to conservation value (e.g. crop spraying, scrub invasion etc)	None observed.		
Suggestions for habitat improvement	Remove some of bankside vegetation to increase light getting to channel for macrophyte growth. Water is slow flowing from over-deepening.		

Canal Feeder (CFA 15)

Figure 191: Survey Site 020-RS1-113-002 (CFA 15)

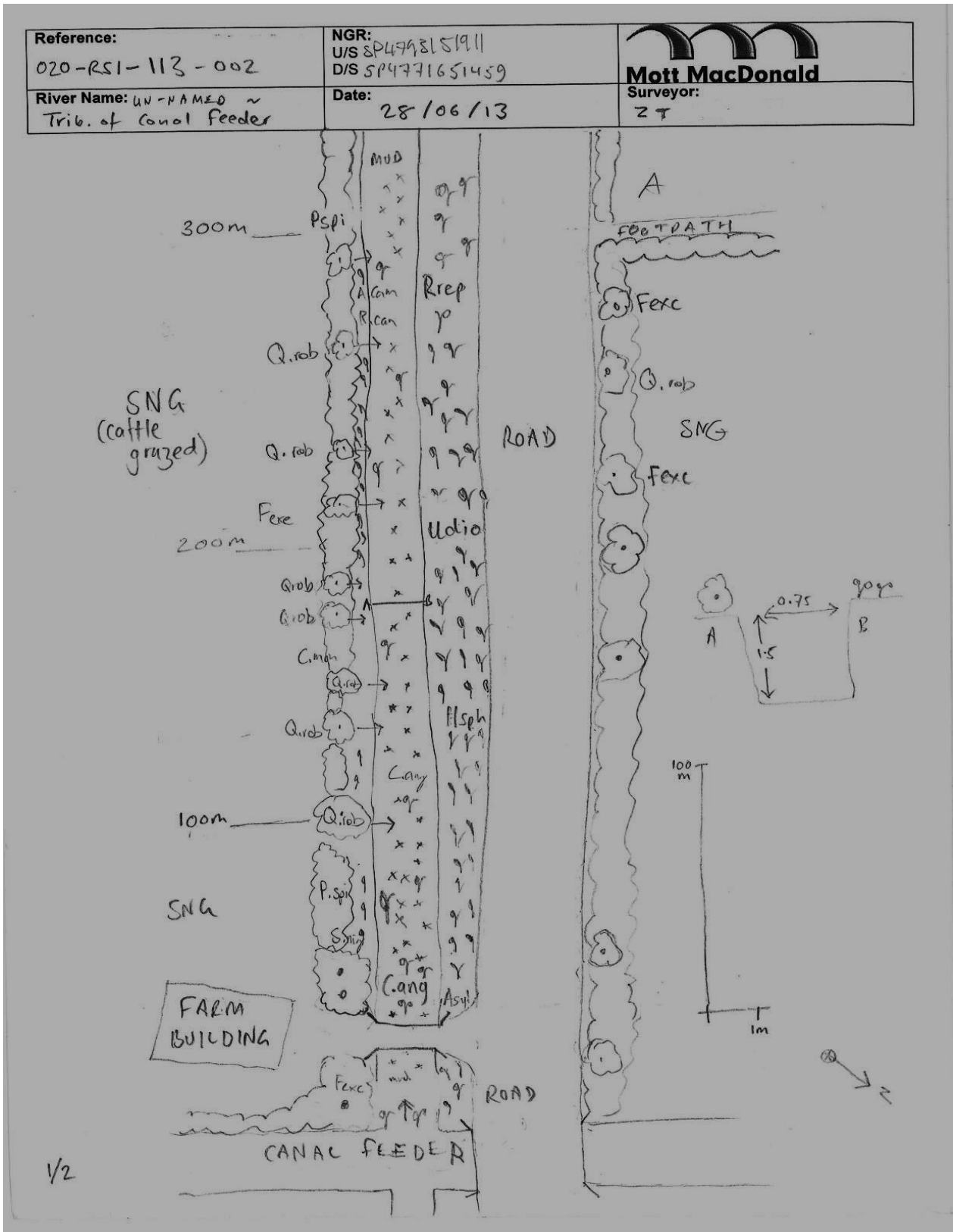


Figure 192: Survey Site 020-RS1-113-002 (CFA 15)

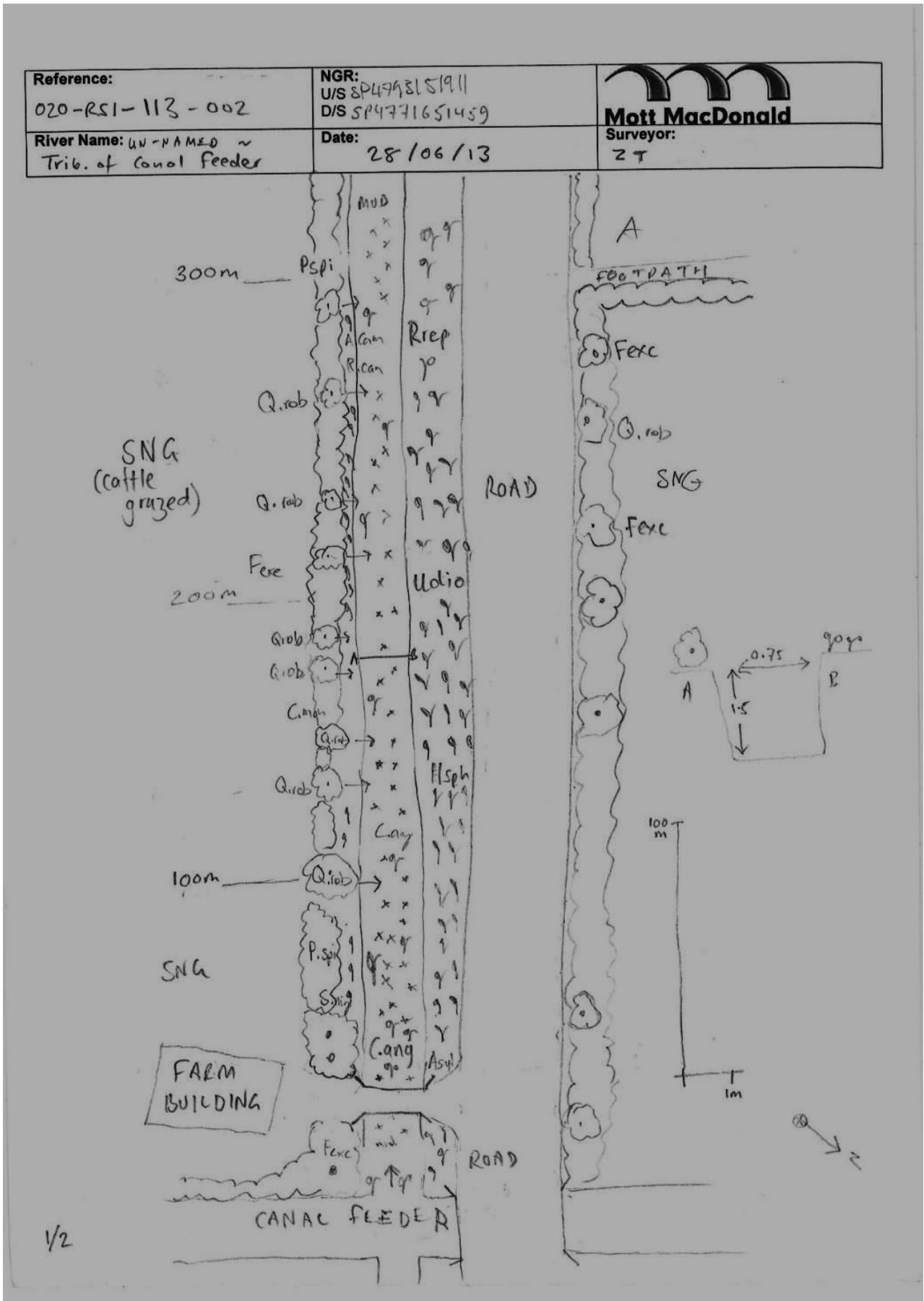



Figure 193: Survey Site 020-RS1-113-002 (CFA 15)

Reference: 020-RS1-113-002	NGR: U/S SP4793151911 D/S SP4771651459	 Mott MacDonald
River Name: UN-NAMED TRIB. OF CANAL FEEDER	Date: 28/06/2013	Surveyor: ZT

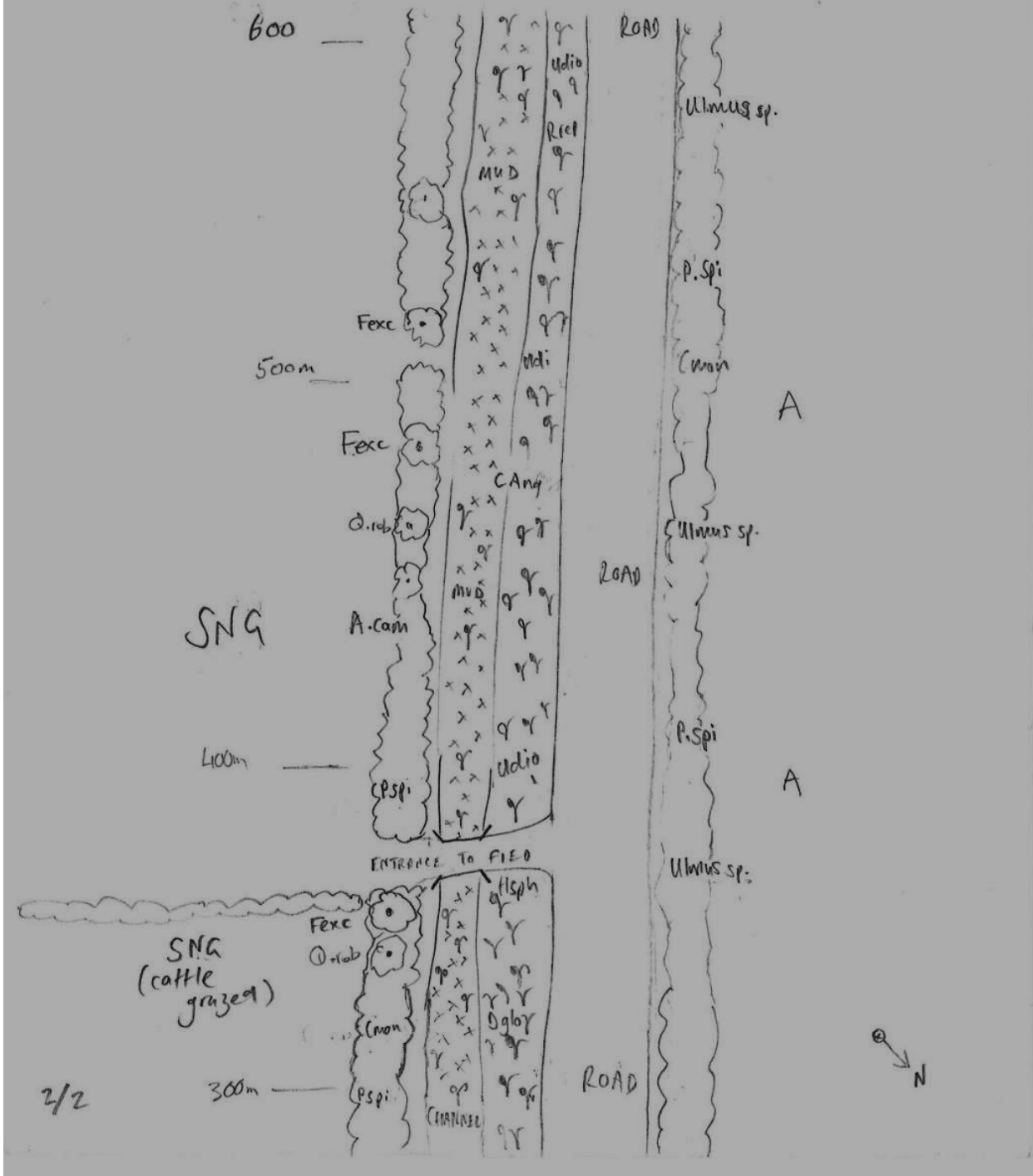



Table 104 RCS results for Survey Site 020-RS1-113-002 (CFA 15)

Ecology survey code	020-RS1-113-002		
Name of watercourse	Unnamed - tributary of canal feeder		
Surveyor(s)	ZT and Fish surveyors from Ahern	Date	28.06.13
Survey start (24 hr clock)	09:00	Survey Finish (24 hr clock)	10:00
Weather conditions (description)	Cloudy, drizzle		
OS Grid Ref (8 digit)	Start Section	(U/S) SP4712252426	
	End Section	(D/S) SP4771651459	
Photo Ref(s)	020-RS1-113-002 P1 280613, 020-RS1-113-002 P2 280613, 020-RS1-113-002 P3 280613.		
Average width (m)	0.75		
Average depth (m)	1.5		
Brief description of channel	Dry channel. Landowner says is only wet in the winter. Shown on OS map as flowing from the canal feeder (i.e. in a south-easterly direction)		
Base substrate	Mud		
Bank type (include height, angle and extent of erosion)	LB	Very Steep - 90 degree angle, 1.5m high. No erosion evident.	
	RB	Very Steep - 80 degree angle. 1.5m high. No erosion evident.	
Notable channel features	LB	None	
	RB	None	
Marginal vegetation (Description)	LB	None	
	RB	None	
Bank zone habitats (Description)	LB	Blackthorn hedgerow with mature oak and ash trees.	
	RB	Tall ruderals - common nettle, hogweed, creeping buttercup (<i>Ranunculus repens</i>) and cow parsley.	
Adjacent land use	LB	Cattle-grazed pasture (semi-improved neutral)	
	RB	Road, hedgerow, pasture and arable.	
Fauna of interest (State LB or RB if specific to single bank)	Good habitat for small birds in hedgerows and trees.		
Recreation features	Footpath		
Existing management	Vegetation on right hand bank by road has been strimmed.		
Observed or potential threats to conservation value (e.g. crop spraying, scrub invasion etc)	None		
Suggestions for habitat	None as this is just an ephemeral ditch.		

improvement	
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Figure 194: Survey Site 020-RS1-114-001 (CFA 15)

Reference: 020-RS1-114-001	NGR: U/S SP4716952439 DIS SP4712252426	 Mott MacDonald Surveyor: _____ ZT
River Name: Un. named - drain to canal feeder	Date: 6/6/13	

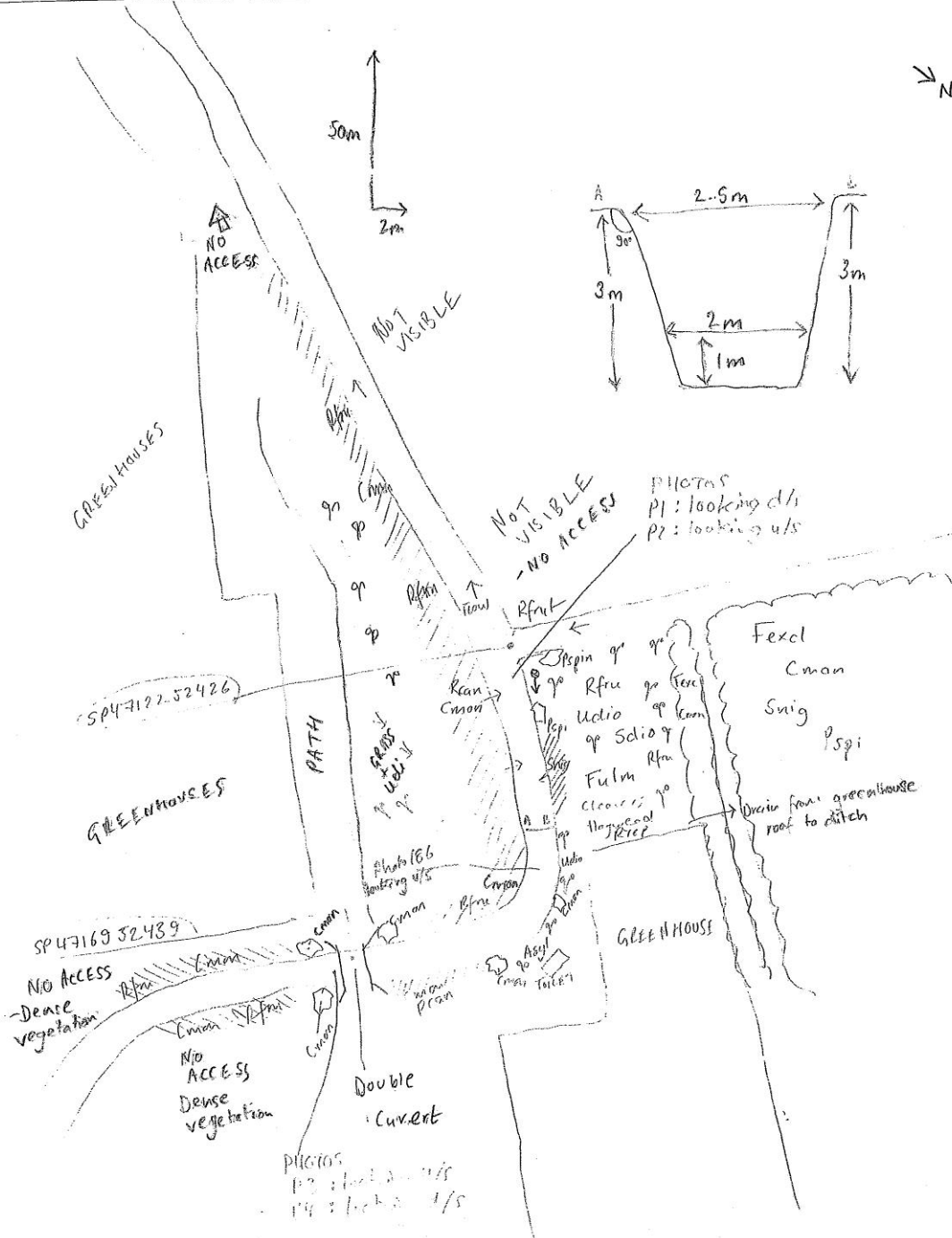


Table 105 RCS results for Survey Site 020-RS1-114-001 (CFA 15)

Ecology survey code	020-RS1-114-001		
Name of watercourse	Canal Feeder		
Surveyor(s)	ZT and CF	Date	06.06.13
Survey start (24 hr clock)	12:00	Survey Finish (24 hr clock)	12:50
Weather conditions (description)	Clear, sunny		
OS Grid Ref (8 digit)	Start Section	(D/S) SP4712252426	
	End Section	(U/S) SP4716952439	
Photo Ref(s)	020-RS1-114-001 P1 060613, 020-RS1-114-001 P2 060613, 020-RS1-114-001 P3 060613, 020-RS1-114-001 P4 060613		
Average width (m)	3		
Average depth (m)	1		
Brief description of channel	Deep heavily shaded. Very steep bank. 500m stretch inaccessible due to density of vegetation and thus not surveyed.		
Base substrate	Silt		
Bank type (include height, angle and extent of erosion)	LB	Very Steep - 90 degree angle, 3m high. No evidence of erosion.	
	RB	Very Steep - 90 degree angle, 3m high. No evidence of erosion.	
Notable channel features	LB	None	
	RB	None	
Marginal vegetation (Description)	LB	None	
	RB	None	
Bank zone habitats (Description)	LB	Very dense vegetation - bramble, hawthorn, common nettle, and ash.	
	RB	Very dense vegetation - bramble, hawthorn, common nettle, meadowsweet, buttercup sp., red campion (<i>Silene dioica</i>), common cleavers and hogweed.	
Adjacent land use	LB	Agricultural - not visible	
	RB	Plant nursery - green houses.	
Fauna of interest (State LB or RB if specific to single bank)	None		
Recreation features	None		
Existing management	Unknown		
Observed or potential threats to conservation value (e.g. crop spraying, scrub invasion etc)	None		
Suggestions for habitat improvement	Channel is very over-deepened. Maybe land available on right-hand bank for improvement.		
	Reduce shading.		

River Colne (CFA 7)

- 7.4.41 Three RCS (020-RS1-027-001, 020-RS1-028-001, 020-RS1-028-002) were carried out on the River Colne in 2012 and a further three in 2013 (020-RS1-028-003, 020-RS1-028-004, 020-RS1-028-005). In 2013, three RHS (020-RH1-028-003, 020-RH1-028-004, 020-RH1-028-005) were also carried out. The surveys adequately covered the reaches of the river likely to be affected by the Proposed Scheme. These reaches were also surveyed in 1996 (by Ecological Services Ltd. on behalf of the Thames Region Environment Agency) and in 2011 (by Mott MacDonald on behalf Veolia Water (now Affinity Water)).
- 7.4.42 The river has clearly been extensively modified in the past as it is over-deepened. The river alterations are likely to have taken place during the excavation of the adjacent gravel pits and the construction of the Grand Union Canal. The gravel pits are flooded and form part of the Mid Colne Valley SSSI. RHS habitat modification scores for these reaches (from the 2011 surveys) are 'obviously modified' and 'significantly modified'. The 2013 RHS surveys show that the flow was exclusively 'slow' or 'rippled' with no riffles present and only one point bar (vegetated) in the three reaches surveyed (1.5km).
- 7.4.43 The main changes on the river between the 1996 and 2011 surveys were an increase in scrub and a consequent increase in shading of the channel. In addition, invasive species have generally increased along the River Colne (Japanese knotweed, Indian balsam and floating pennywort). The floating pennywort was particularly prevalent in 2011 and 2012, but in 2013 it was reduced as the EA have been undertaking removal.
- 7.4.44 There is limited scope for creating sinuosity and flow variation in the river where it is within land required for the construction of the Proposed Scheme, due to space and the limited land availability, constrained by the lakes and other factors such as topography. There is potential for the incorporation of backwaters; however, the eradication of floating pennywort would be necessary for such a feature to reach its full biodiversity potential. Signal crayfish are known to be present upstream and other non-native crayfish are also present in the adjacent lakes.

River Misbourne (CFA 8)

- 7.4.45 Two RCS (020-RS1-037-001 and 020-RS1-042-001) and two RHS surveys (020-RH1-037-001 and 020-RH1-042-001) were carried out on the River Misbourne in 2013. Access availability was a limiting factor in survey coverage in this area.
- 7.4.46 Both of the reaches surveyed showed the river to have a diverse range of natural features such as riffles, pools and various macrophytes. The reaches surveyed were well connected with the floodplain and had reedbeds and marshy areas.
- 7.4.47 The river has extensive modifications in places (such as mill leats and Shardeloes Lake), although the reaches where these occur were not surveyed. The river also dries up completely in certain locations and so the habitat is not continuous. In particular, the dry reaches create a barrier for fish.
- 7.4.48 Signal crayfish are known to be present in the River Misbourne.

Stoke Brook (CFA 11)

- 7.4.49 Three RCS (020-RS1-057-001, 020-RS1-057-002, 020-RS1-058-001) and three RHS (020-RH1-057-001, 020-RH1-057-002, 020-RH1-058-001) were undertaken on Stoke Brook. This includes surveys where land required for the construction of the Proposed Scheme will cross (both the upper and lower channel) and a survey where a haul road will cross (approximately 1km downstream of the Proposed Scheme crossing points).
- 7.4.50 At the location where land required for the construction of the Proposed Scheme will cross, the brook has been straightened and deepened in the past. Signs of recovery were noted with some depth variation and areas of gravel deposition; however, channel siltation was common and is typical of over-deepened rivers.
- 7.4.51 There is little marginal vegetation at present owing to the over-deepened channel. However, river restoration opportunities exist as the adjacent land is mainly pasture. The RHS showed the flow to be mainly 'slow', which is typical of over-deepened rivers. A river restoration scheme in this area should seek to incorporate meanders and different flow types, which would enhance the biodiversity value of the brook.
- 7.4.52 The reach (020-RS1-058-001) was partly naturalised and partly straightened and deepened. The naturalised section had various flow types as well as meanders and other natural features (eroding banks and a marginal zone with macrophytes).

Thame and tributaries (CFA 11)

Sedrup Ditch (CFA11)

- 7.4.53 RCS was undertaken on Sedrup Ditch (020-RS1-061-001) and one of its tributaries (020-RS1-060-001) was also surveyed. A RHS was completed on Sedrup Ditch (020-RH1-061-001) but not on the tributary. This is because the tributary only had water present for a length of 150m before it became a hedgerow. Both surveys showed that the channels are heavily modified and are extensively over-deepened and straightened. In their present state they have limited biodiversity value. Sedrup Ditch itself is heavily shaded as there is a mature broadleaved plantation along the left bank. The substrate was exclusively silt and the flow smooth, which is typical of over-deepened and straightened rivers.

Hartwell Ditches (CFA11)

- 7.4.54 Two RCS were carried out at the Hartwell ditches; one at Hartwell Ditch (020-RS1-062-001) and one at Lower Hartwell Ditch (020-RS1-063-001). RHS was also undertaken on both ditches (020-RH1-062-001 and 020-RH1-063-001). The Hartwell ditches flow into Bear Brook which flows into the Thame. The ditches are heavily modified (over-deepened and straightened) and also quite shaded, although some macrophytes were present. There is some scope for increasing the biodiversity of these channels by adding meanders and groyne to create different flow types. The RHS showed that the flow, in both ditches, was almost entirely smooth and the substrate predominantly silt which is typical of over-deepened streams.

River Thames and Fleet Marston Brook (CFA11)

- 7.4.55 Within CFA11, RCS were undertaken on the River Thame (020-RS1-064-001, 020-RS1-064-002, 020-RS1-064-003); Fleet Marston Brook (020-RS1-064-001) and its

tributaries (020-RS1-066-001 and 020-RS1-066-002), and another tributary of the Thame (020-RS1-064-001 and 020-RS1-065-001). Three surveys were undertaken in 2012 and the rest in 2013. RHS was also undertaken at the same time as the 2013 surveys (020-RH1-064-003, 020-RH1-064-004, 020-RH1-066-001, 020-RH1-066-002).

- 7.4.56 One of the surveys undertaken on Fleet Marston Brook is located within CFA12.
- 7.4.57 Along the sections surveyed, the River Thame meanders but it has been over-deepened in the past. There are sections, however, which show signs of recovery, with features recorded such as berms and eroding cliffs. Different flow types are present and riffles were recorded. The channel is approximately 7m wide and although the left bank has some scrub, the river is not overshadowed and there is a good diversity of macrophytes. There is some scope for restoration to reduce the over-deepening and re-connect the river with its floodplain. Signal crayfish are present and mink are also known to be in the area.
- 7.4.58 The reach of Fleet Marston Brook in CFA11 which was surveyed (020-RS1-064001) has its confluence with the River Thame close to where land required for the construction of the Proposed Scheme will cross. There is also an artificial trout pond at this location which is fed by the rivers. The character of Fleet Marston Brook here is similar to the Thame, retaining meanders despite being over-deepened. The two tributaries of Fleet Marston Brook which were surveyed (020-RS1-066-001 and 020-RS1-066-002) are highly modified, straightened and over-deepened but nevertheless contain some macrophytes.
- 7.4.59 Another tributary upstream of the confluence with the Thame and Fleet Marston Brook was also surveyed (020-RS1-064-004). This reach, although being over-deepened and straightened for two thirds of it, also had a naturalised section with extensive floodplain with wet meadow, wet woodland, and wide flooded river. It is recommended that this naturalised section is avoided.

Fleet Marston Brook (Tributary to Thame) (CFA 12)

- 7.4.60 One RCS (020-RS1-070-001) and one RHS (020-RH1-070-001) was undertaken in the reach of Fleet Marston Brook that will be crossed by the Proposed Scheme. The channel was difficult to survey as it was obscured by overhanging vegetation but it appeared to be over deepened and straightened. There is potential to increase the biodiversity value of the reach by reducing the vegetation and associated shading. It may also be possible to create a more natural form by adding meanders and flow variation.

River Ray (CFA 12)

- 7.4.61 Although an attempt was made to survey the River Ray at the location that will be crossed by the Proposed Scheme, this was not possible owing to access cancellations. However, it is understood that the Proposed Scheme will require an extension of an existing culvert at this location.
- 7.4.62 Three RCS (020-RS1-075-001, 020-RS1-076-001, 020-RS1-076-002) and three RHS (020-RH1-075-001, 020-RH1-076-001, 020-RH1-076-002) were undertaken on

tributaries of the River Ray. All were shallow, straight ditches with little opportunity for restoration.

Padbury Brook (CFA 13)

- 7.4.63 Two RCS (020-RS1-082-001 and 020-RS1-084-001) and two RHS (020-RH1-082-001 and 020-RH1-084-001) were undertaken on Padbury Brook. Neither survey covered locations within land required for the construction of the Proposed Scheme owing to access constraints; however, the survey locations were close by and provided an accurate characterisation of nearby reaches.
- 7.4.64 Padbury Brook has been over-deepened and also widened in places and one section was partly embanked. There were a variety of macrophytes present and also features indicative of naturalisation such as berms. The adjacent habitat comprised improved pasture and so there is some scope for reconnecting the river with its flood plain. It would also be possible to carry out in-channel restoration works to create different flow types. The RHS recorded mainly slow flow and silt substrate, which is indicative of over-deepened rivers.
- 7.4.65 Three RCS (020-RS1-081-001, 020-RS1-082-002, 020-RS1-087-001) and three RHS (020-RH1-081-001, 020-RH1-082-002, 020-RH1-087-001) were also carried out on tributaries of Padbury Brook. All of the tributaries have been re-sectioned in the past but show some signs of recovery and have some scope for improving their biodiversity value by creating meanders, reducing shading and creating different flow types.

River Great Ouse (CFA 14)

- 7.4.66 One RCS (020-RS1-092-001) and one RHS (020-RH1-092-001) were carried out on the River Great Ouse although this was not at the crossing point owing to access restrictions. The river has meanders, but has slow flow and steep banks. Natural features were recorded including side bars, point bars, eroding cliffs and stable cliffs. Some areas were considered to be naturalised, but in other places (mainly on the left bank) some re-sectioning was evident. There was also a weir upstream.
- 7.4.67 Three RCS (020-RS1-097-001, 020-RS1-098-001, 020-RS1-099-001) and three RHS (020-RH1-097-001, 020-RH1-098-001, 020-RH1-099-001) were undertaken on tributaries of the Great Ouse. Two of these reaches were over-deepened with slow flowing water and silt substrate and these have some scope for restoration. The other channel was a very shallow meandering ditch, which was mainly dry and heavily shaded by broadleaved woodland.

River Cherwell (CFA 15)

- 7.4.68 One RCS (020-RS1-108-002) and one RHS (020-RH1-108-002) were carried out on the River Cherwell. The Proposed Scheme will cross the river at two locations within this reach. The channel is meandering and has an adjacent marshy area. The river has potential for kingfisher, water vole and otter. The river appeared to have been re-sectioned in the past but has naturalised in parts.
- 7.4.69 Four RCS (020-RS1-104-001, 020-RS1-105-001, 020-RS1-105-002, 020-RS1-108-001) and three RHS (020-RH1-104-001, 020-RH1-105-001, 020-RH1-105-002) were undertaken on tributaries of the Cherwell. This included Lower Thorpe Brook. Three

of these were over-deepened and straightened channels with limited scope for restoration. One ditch (020-RS1-108-001) was inaccessible owing to dense vegetation.

- 7.4.70 Lower Thorpe Brook (020-RS1-105-001) was also over-deepened and straightened and has been extensively altered in the past to feed a mill leat and medieval ponds. Some macrophytes were present and this brook has potential opportunities for restoring a natural channel form that is connected with its floodplain.

Highfurlong Brook and Canal Feeder (CFA 15)

- 7.4.71 One RCS (020-RS1-113-001) and one RHS (020-RH1-113-001) were carried out at Highfurlong Brook. The channel has many meanders but has been over-deepened in the past. However, it now has a corridor of mature trees and the channel itself is naturalising with a point bar recorded during the survey. Owing to the mature trees, there is little light penetration to the channel, resulting in few macrophytes. The water is slow flowing and the substrate is predominantly silt. A high number of overhanging branches and underwater tree roots were recorded. Some sections could be cleared to reduce shading and encourage the growth of aquatic macrophytes.
- 7.4.72 Two RCS (020-RS1-113-002 and 020-RS1-114-001) and one RHS (020-RH1-113-002) were carried out on the canal feeder and a tributary. The tributary was dry and the canal feeder could not be fully surveyed at the location where the Proposed Scheme will cross it, owing to dense vegetation. However, it was deep, steep and slow flowing. It is an artificial channel that is fed by water from Highfurlong Brook to feed the Oxford Canal.

8 Hedgerow survey

8.1 Introduction

8.1.1 This section of the appendix presents details of baseline information relating to hedgerows for the section of the Proposed Scheme that will pass through CFA7 to CFA15 inclusive.

8.2 Methodology

8.2.1 Details of the standard methodology for hedgerow surveys are provided in the Scope and Methodology Report Addendum (Volume 5: Appendix CT-001-000/2).

8.2.2 All surveys were undertaken in accordance with guidance in the Hedgerow Regulations 1997. These regulations are intended to protect important hedges from removal. The objectives of the surveys were to identify hedgerows that are of importance for wildlife, landscape or historical reasons. The key to wildlife and landscape criteria in Table 107 is applied throughout this baseline section.

8.2.3 Desk study records relating to hedgerows were obtained from the Chilterns Conservation Board.

8.3 Deviations, constraints and limitations

8.3.1 No deviations to the standard methodology were applied, and subject to constraints and limitations identified below.

8.3.2 Field surveys have been limited to locations where landowner permission has been obtained or areas that are accessible to the public.

8.3.3 Hedgerow surveys can be carried out at any time of the year although 90% were carried out between April and November when shrubs and trees are in leaf. The remaining 10% were carried out in winter. Nevertheless it is considered that sufficient data for hedgerow evaluation were obtained between April and November, and therefore winter survey is unlikely to have detracted from the reliability of the results.

8.3.4 The optimum time of year for identifying hedgerow ground flora is between April and June when the majority of species is in flower. 60% of surveys were carried out within this period, the remaining 40% were carried out in autumn and winter. In some areas this may have resulted in an under-recording of ground flora. Nevertheless it is considered that this is unlikely to have detracted from the reliability of the results, as the majority were found in intensively farmed or improved grassland areas with limited connectivity to woodland.

8.3.5 Information on the connectivity of hedgerows was not recorded for every hedge surveyed, due to a change in the survey requirements part way through the surveying period.

- 8.3.6 Information on the DAFOR³³ score of plant species was not recorded for every hedge surveyed due to a change in the survey requirements during the surveying period. The absence or presence of species were recorded instead.

8.4 Baseline

CFA7

- 8.4.1 Of the 24 hedgerows surveyed (4.4km total length) in the Colne Valley area (CFA7), 15 qualified as important (1.3km total length). 11 of these important hedgerows met criterion six (i.e. adjacent to a bridleway, footpath/road used by public, path/byway open to all traffic and at least four woody species), and six met criterion three (i.e. includes at least seven woody species).
- 8.4.2 On average the important hedgerows in the area have 5.4 woody species, and 0.6 non-woody species. The maximum number of woody and non-woody species recorded was 12 species, found in a hedge located east of Chalfont Common (020-HS1-031007); the majority of the hedgerows have up to six woody species (10 out of the 15 hedgerows in the area) and two non-woody species (two out of the 15 important hedgerows in the area). Only one hedgerow has more than nine woody species. The most abundant woody species in the area are pedunculate oak (*Quercus robur*) (13 hedgerows), holly (*Ilex aquifolium*) (nine hedgerows), hawthorn (*Crataegus monogyna*) (eight hedgerows), blackthorn (*Prunus spinosa*) (eight hedgerows), field maple (*Acer campestre*) (eight hedgerows) and elder (*Sambucus nigra*) (eight hedgerows). The most abundant non-woody species are dog's mercury (*Mercurialis perennis*) and bluebell (*Hyacinthoides non-scripta*), although these are only present in four hedgerows; the ground flora of all important hedgerows in the area is generally very species poor, with a peak of three non-woody species found in 020-HS1-029021.
- 8.4.3 Only two significant hedgerow species were found in the area: elm species (*Ulmus* sp.) and hart's-tongue (*Phyllitis scolopendrium*). Elm sp. was found in two of the 15 important hedgerows, while hart's tongue was found in one hedgerow.
- 8.4.4 All 24 hedgerows are classified as habitats of principal importance and of the 15 important hedgerows in the area, 10 are also classified as species rich.

CFA8

- 8.4.5 Of the 24 hedgerows surveyed (4km total length) in the Chalfonts and Amersham area (CFA8), ten qualified as important (1.7km total length). Eight of these important hedgerows met criterion three (i.e. includes at least seven woody species), and five met criterion six (i.e. adjacent to a bridleway, footpath/road used by public, path/byway open to all traffic and at least four woody species).
- 8.4.6 On average the important hedgerows in the area have 7.3 woody species, and 0.9 non-woody species. The maximum number of woody and non-woody species recorded was 12 in a hedge located east of Chalfont St Peter (020-HS1-031006). The majority of hedgerows have up to seven woody species (six out of the ten hedgerows in the area)

and up to three non-woody species (four out of the ten hedgerows in the area). Only two hedgerows have more than nine woody species. The most abundant woody species in the area are hawthorn (nine hedgerows), field maple (nine hedgerows), elder (nine hedgerows) and hazel (*Coryllus avellana*) (six hedgerows). The most abundant non-woody species are dog's mercury and bluebell, although these are only present in two hedgerows; the ground flora of all important hedgerows in the area is generally very species poor, with a peak of three non-woody species found in the aforementioned most species rich hedgerow, 020-HS1-031006.

8.4.7 Only one significant hedgerow species was found in the area, elm (*Ulmus* sp.), which was found in seven of the ten important hedgerows.

8.4.8 All 24 hedgerows are classified as habitats of principal importance and of the ten important hedgerows in the area, all are classified as species rich.

CFA9

8.4.9 Of the 37 hedgerows surveyed (5.3km total length) in the Central Chilterns area (CFA9), 19 qualified as important (2.7km total length). Six hedges were recorded as having two connections (subject to the limitations described in section 1.3). 14 of these important hedgerows met criterion six (i.e. adjacent to a bridleway, footpath/road used by public, path/byway open to all traffic and at least four woody species), 10 met criterion three (i.e. includes at least seven woody species) and nine met criterion four (i.e. includes at least six woody species and three features from subparagraph 4).

8.4.10 On average, the important hedgerows in the area have 6.7 woody species, and 0.9 non-woody species. The maximum number of woody and non-woody species recorded was 11 in a hedge located north-west of Hyde Heath (020-HS1-045004); the majority of the hedgerows have six woody species (seven out of the 19 important hedgerows in the area) and two non-woody species (six out of the 19 hedgerows in the area). Only two hedgerows have more than nine woody species. The most abundant woody species in the area are hawthorn (18 hedgerows), holly (*Ilex aquifolium*) (17 hedgerows), elder (13 hedgerows), blackthorn (11 hedgerows), ash (*Fraxinus excelsior*) (13 hedgerows) and hazel (12 hedgerows). The most abundant non-woody species are bluebell and herb robert (*Geranium robertianum*).

8.4.11 Only two significant hedgerow species were found in the area: yew (*Taxus baccata*) and rowan (*Sorbus aucuparia*), which were found in one of the 19 important hedgerows.

8.4.12 All 37 hedgerows are classified as habitats of principal importance and of the 19 important hedgerows in the area, 15 are also classified as species rich.

8.4.13 Desk study records from the Chilterns Conservation Board identified that hedgerows located in close proximity to Great Missenden were species rich and date from before 1840. The most abundant woody species are hawthorn, blackthorn and hornbeam (*Carpinus betulus*). Hedges located at Firth Hill east of Great Missenden have standard trees at regular intervals, the most abundant being ash and pedunculate oak.

- 8.4.14 In summary, field survey and desk study records identified that that hedgerows in this area were species rich and on average have 6.7 woody species and 0.9 non-woody species.

CFA10

- 8.4.15 Of the 76 hedgerows surveyed (approximately 12.8km total length) in the Dunsmore, Wendover and Halton area (CFA10), 26 qualified as important (5.1km total length). Nine hedges were recorded as having three or more connections (subject to the limitations described in section 1.3). 12 of these important hedgerows met criterion three (i.e. includes at least seven woody species), and 11 met criterion six (i.e. adjacent to a bridleway, footpath/road used by public, path/byway open to all traffic and at least four woody species).
- 8.4.16 On average, the important hedgerows in the area have 6.8 woody species, and 0.7 non-woody species. The maximum number of woody and non-woody species recorded was 15 in a hedge located south-west of Wendover Station (020-HS1-054002); the majority of the hedgerows have seven woody species (11 out of the 26 important hedgerows in the area) and one non-woody species (nine out of the 26 important hedgerows in the area). Five hedgerows have more than nine woody species. The most abundant woody species in the area are hawthorn (23 hedgerows), elder (19 hedgerows), field maple (17 hedgerows), hazel (15 hedgerows), blackthorn (19 hedgerows), ash (16 hedgerows) and rose species (*Rosa* sp.) (18 hedgerows). The most abundant non-woody species is dog's mercury, although this is only present in five hedgerows; the ground flora of all important hedgerows in the area is generally very species poor, with a peak of four non-woody species found in the aforementioned most species rich hedgerow, 020-HS1-054002.
- 8.4.17 Only four significant hedgerow species were found in the area: elm, guelder rose (*Viburnum opulus*), whitebeam (*Sorbus* sp.) and primrose (*Primula vulgaris*). Elm sp. were found in nine of the 26 important hedgerows, while the other three species were found in two, one and one hedgerows respectively.
- 8.4.18 All 76 hedgerows are classified as habitats of principal importance and of the 26 important hedgerows in the area, 25 are also classified as species rich.
- 8.4.19 Desk study records from the Chilterns Conservation Board identified that hedgerows in this area, located south of Wendover are species rich and date from before 1840. The most abundant woody species are blackthorn and hawthorn. Few have hedgerow standard trees. Conversely hedges located at Wendover station are species poor and date from after 1870. The most abundant species are blackthorn and hawthorn. Few have hedgerow standard trees.
- 8.4.20 In summary, field survey and desk study records identified that hedgerows in this area were generally species rich and on average have 6.8 woody species and 0.7 non-woody species.

CFA11

- 8.4.21 Of the 115 hedgerows surveyed (approximately 28.5km total length) in the Stoke Mandeville and Aylesbury area (CFA11), 29 qualified as important (9.3km total length).

One hedge was recorded as having three connections, while six had two connections (subject to the limitations described in section 1.3). 15 of these important hedgerows met criterion six (i.e. adjacent to a bridleway, footpath/road used by public, path/byway open to all traffic and at least four woody species), eight met criterion seven (i.e. contained at least five woody species and four features from sub-paragraph 4) and six met criterion three (i.e. includes at least seven woody species).

- 8.4.22 On average, the important hedgerows in the area have 6.8 woody species, and 0.6 non-woody species. The maximum number of woody and non-woody species recorded was 16 in a hedge located on Stoke House Road (020-HS1-057016); the majority of the hedgerows have seven woody species (10 out of the 29 important hedgerows in the area) and one non-woody species (five out of the 29 important hedgerows in the area). Only three hedgerows have more than nine woody species. The most abundant woody species in the area are hawthorn (18 hedgerows), blackthorn (27 hedgerows), elder (24 hedgerows), field maple (21 hedgerows), ash (21 hedgerows) and rose (21 hedgerows). The most abundant non-woody species is lords and ladies (*Arum maculatum*), although this is only present in four hedgerows; the ground flora of all important hedgerows in the area is generally very species poor, with a peak of five non-woody species found in the aforementioned most species rich hedgerow, 020-HS1-057016.
- 8.4.23 Only five significant hedgerow species were found in the area: elm, guelder rose, primrose, yew and wood sage (*Teucrium scorodonia*). Elm sp. were found in 16 of the 31 important hedgerows, while the other four species were found in two or less hedgerows.
- 8.4.24 All 115 hedgerows are classified as habitats of principal importance and of the 29 important hedgerows in the area, 28 are also classified as species rich.

CFA12

- 8.4.25 Of the 70 hedgerows surveyed (approximately 13.9km total length) in the Waddesdon and Quainton area (CFA12), 37 qualified as important (8.8km total length). Seven hedges were recorded as having three connections (subject to the limitations described in section 1.3). 14 of these important hedgerows met criterion six (i.e. adjacent to a bridleway, footpath/road used by public, path/byway open to all traffic and at least four woody species) and 13 met criterion three (i.e. includes at least seven woody species).
- 8.4.26 On average, the important hedgerows in the area have 6.1 woody species, and 0.17 non-woody species. The maximum number of woody and non-woody species recorded was 10 in a hedge located west of Quainton (020-HS1-074010); the majority of the hedgerows have four woody species (nine out of the 36 hedgerows in the area) and one non-woody species (three out of the 36 hedgerows in the area). Only two hedgerows have more than seven woody species. The most abundant woody species in the area are hawthorn (34 hedgerows), blackthorn (24 hedgerows), rose (*Rosa* sp) (20 hedgerows), pedunculate oak (12 hedgerows) and blackthorn (24 hedgerows). The most abundant non-woody species are wood false brome (*Brachypodium sylvaticum*) and lords and ladies (*Arum maculatum*), although these are only present in two hedgerows; the ground flora of all important hedgerows in the area is generally very

species poor, with a peak of two non-woody species found in hedgerows near Oak Tree Farm (020-HS1-074010) and near Woodlands Farm (020-HS1-071003).

- 8.4.27 Four significant hedgerow species were found in the area: elm, guelder rose (*Viburnum opulus*), sweet violet (*Viola odorata*) and wayfaring tree (*Viburnum lantana*). Elm species were found in 14 of the 26 hedgerows, while the other three species were found in one hedgerow respectively.
- 8.4.28 All 70 hedgerows are classified as habitats of principal importance and of the 37 important hedgerows in the area, 27 are also classified as species rich.

CFA13

- 8.4.29 Of the 142 hedgerows surveyed (approximately 19.3km total length) in the Calvert, Twyford and Chetwode area (CFA13), 49 qualified as important (11.7km total length). 11 hedges were recorded as having two connections (subject to the limitations described in section 1.3). 13 of these important hedgerows met criterion four (i.e. includes at least six woody species and three features from sub-paragraph 4), and 10 met criterion three (i.e. includes at least seven woody species).
- 8.4.30 On average, the important hedgerows in the area have 6.4 woody species, and zero non-woody species. The maximum number of woody and non-woody species recorded was nine in a hedge located north of Twyford (020-HS1-082003); the majority of the hedgerows have six woody species (nine out of the 23 hedgerows in the area). Only one hedgerow has more than nine woody species. The most abundant woody species in the area are hawthorn (41 hedgerows), ash (19 hedgerows), blackthorn (22 hedgerows) and rose (22 hedgerows).
- 8.4.31 Only one significant hedgerow species was found in the area, namely, elm. Elm species was found in three of the 49 hedgerows.
- 8.4.32 All 142 hedgerows are classified as habitats of principal importance and of the 49 important hedgerows in the area, 42 are also classified as species rich.

CFA14

- 8.4.33 Of the 67 hedgerows surveyed (approximately 15.2km total length) in the Newton Purcell to Brackley area (CFA14), 36 qualified as important (9.7km total length). Five hedges were recorded as having three connections (subject to the limitations described in section 1.3). 17 of these important hedgerows met criterion three (i.e. includes at least seven woody species), and 13 met criterion six (i.e. adjacent to a bridleway, footpath/road used by public, path/byway open to all traffic and at least four woody species).
- 8.4.34 On average, the important hedgerows in the area have 5.6 woody species, and 0.17 non-woody species. The maximum number of woody and non-woody species recorded was 10 in a hedge located north of Brackley (020-HS1-097001); the majority of the hedgerows have seven woody species (seven out of 36 hedgerows in the area) and one non woody species (five out of the 36 hedgerows in the area). Only four hedgerows have more than nine woody species. The most abundant woody species in the area are hawthorn (24 hedgerows), ash (19 hedgerows), blackthorn (16

hedgerows), rose (16 hedgerows) and field maple (15 hedgerows). The most abundant non-woody species are bluebell and lords and ladies, although these are only present in two hedgerows; the ground flora of all important hedgerows in the area is generally very species poor.

- 8.4.35 Six significant hedgerow species were found in the area: rowan, wild service tree (*Sorbus torminalis*), large-leaved lime (*Tilia platyphyllos*), elm and wayfaring tree. Elm species was found in eight of the 36 hedgerows, while the other five species were found in one hedgerow.
- 8.4.36 All 67 hedgerows are classified as habitats of principal importance and of the 36 important hedgerows in the area, 34 are also classified as species rich.

CFA15

- 8.4.37 Of the 134 hedgerows surveyed (approximately 31.4km total length) in the Greatworth to Lower Boddington area (CFA15), 62 hedgerows qualified as important (19km total length). Eight hedges were recorded as having three connections, while 10 had two connections and 11 had no connections (subject to the limitations described in section 1.3). Thirty three of these important hedgerows met criterion six (i.e. adjacent to a bridleway, footpath/road used by public, path/byway open to all traffic and at least four woody species) and 30 met criterion three (i.e. includes at least seven woody species).
- 8.4.38 On average, the important hedgerows in the area have 6.8 woody species, and 0.5 non-woody species. The maximum number of woody and non-woody species recorded was 13 in a hedge located south-east of Greatworth Hall (020-HS1-100002); the majority of the hedgerows have seven woody species (12 out of the 62 important hedgerows in the area) and one non-woody species (seven out of the 62 important hedgerows in the area). However, there is an even distribution of woody species number between five and eight species in a hedgerow. Eleven hedgerows have more than nine woody species. The most abundant woody species in the area are hawthorn (58 hedgerows), blackthorn (55 hedgerows), field maple (49 hedgerows), ash (47 hedgerows) and rose (47 hedgerows). The most abundant non-woody species are herb robert (*Geranium robertianum*) and wood avens (*Geum urbanum*), although these are only present in nine and eight hedgerows respectively. The ground flora of all important hedgerows in the area is generally very species poor, with a peak of four non-woody species found in a hedgerow in Lower Thorpe (020-HS1-105015).
- 8.4.39 Seven significant hedgerow species were found in the area, including elm and mountain ash (*Sorbus aucuparia*). An elm species was found in 18 of the 62 important hedgerows, while the other six species were found in two or less hedgerows.
- 8.4.40 All 134 hedgerows are classified as habitats of principal importance and of the 62 important hedgerows in the area, 56 are also classified as species rich.

Table 106 Summary of hedgerows qualifying as 'important hedgerows' under wildlife and landscape criteria

Ecology survey code	Centroid OS Grid Reference	Survey date	Qualifying wildlife and landscape criteria							CFA number	Within the Proposed Scheme (Yes/No)
			(1)	(2)	(3)	(4)	(5)	(6)	(7)		
020-HS1-031007	TQ 0250 9240	22/05/13			X	X		X		CFA7	No
020-HS1-032004	TQ 0229 9241	22/05/13			X					CFA7	No
020-HS1-029017	TQ 0292 8971	28/02/13			X					CFA7	Yes
020-HS1-029018	TQ 0305 8974	28/02/13			X					CFA7	No
020-HS1-029020	TQ 0313 9003	28/02/13			X			X		CFA7	Yes
020-HS1-030003	TQ 0267 9013	11/07/13						X		CFA7	Yes
020-HS1-030004	TQ 0256 9025	11/07/13						X		CFA7	Yes
020-HS1-031011	TQ 0222 9132	11/07/13						X		CFA7	Yes
020-HS1-031012	TQ 0222 9132	11/07/13						X		CFA7	Yes
020-HS1-031013	TQ 0218 9142	11/07/13						X		CFA7	Yes
020-HS1-031014	TQ 0218 9142	11/07/13						X		CFA7	Yes
020-HS1-029021	TQ 0335 9003	10/07/13						X		CFA7	Yes
020-HS1-029022	TQ 0311 9004	11/07/13			X			X		CFA7	Yes
020-HS1-029023	TQ 0292 9005	11/07/13						X		CFA7	Yes
020-HS1-029024	TQ 0283 9005	11/07/13						X		CFA7	Yes
020-HS1-031001	TQ 0183 9181	17/10/12			X					CFA8	No
020-HS1-031005	TQ 0199 9168	22/05/13			X					CFA8	Yes
020-HS1-031006	TQ 0185 9204	22/05/13			X	X		X		CFA8	No
020-HS1-034001	TQ 0000 9353	12/06/12			X	X		X		CFA8	No
020-HS1-034003	SU 9989 9320	12/06/12			X			X		CFA8	Yes
020-HS1-034004	TQ 0000 9316	12/06/12			X					CFA8	Yes
020-HS1-034005	TQ 0004 9306	12/06/12			X	X		X		CFA8	Yes
020-HS1-034006	TQ 0011 9312	12/06/12						X		CFA8	Yes
020-HS1-036004	SU 982 952	15/05/13						X		CFA8	Yes
020-HS1-036005	SU 982 952	15/05/13						X		CFA8	Yes
020-HS1-044004	SP 9211 0100	24/05/13			X	X		X		CFA9	Yes
020-HS1-046001	SP 9146 0164	11/06/13			X	X				CFA9	No
020-HS1-046002	SP 9146 0156	11/06/13			X	X				CFA9	Yes
020-HS1-046003	SP 9155 0152	11/06/13			X	X				CFA9	No

Ecology survey code	Centroid OS Grid Reference	Survey date	Qualifying wildlife and landscape criteria							CFA number	Within the Proposed Scheme (Yes/No)
			(1)	(2)	(3)	(4)	(5)	(6)	(7)		
020-HS1-046004	SP 9157 0160	11/06/13			X					CFA9	No
020-HS1-045003	SP 9177 0080	18/06/13			X					CFA9	Yes
020-HS1-045004	SP 9166 0105	18/06/13			X	X			X	CFA9	Yes
020-HS1-047004	SP 9056 0179	26/06/13						X		CFA9	Yes
020-HS1-047005	SP 9067 0185	26/06/13						X		CFA9	Yes
020-HS1-047001	SP 9032 0160	26/06/13			X	X		X		CFA9	Yes
020-HS1-047002	SP 9031 0181	26/06/13						X		CFA9	Yes
020-HS1-048003	SP 9008 0273	26/06/13						X		CFA9	Yes
020-HS1-048005	SP 8981 0326	26/06/13			X	X		X		CFA9	Yes
020-HS1-047006	SP 9069 0184	26/06/13				X		X		CFA9	Yes
020-HS1-048002	SP 8985 0254	26/06/13						X		CFA9	Yes
020-HS1-048004	SP 8996 0292	26/06/13				X		X	X	CFA9	No
020-HS1-047003	SP 9059 0179	26/06/13				X		X	X	CFA9	Yes
020-HS1-047007	SP 9014 0241	26/06/13			X			X	X	CFA9	Yes
020-HS1-047008	SP 9028 0253	26/06/13						X		CFA9	Yes
020-HS1-049003	SP 8934 0378	03/07/13			X					CFA10	Yes
020-HS1-049001	SP 8952 0316	03/07/13						X		CFA10	Yes
020-HS1-049002	SP 8952 0361	03/07/13						X		CFA10	Yes
020-HS1-048001	SP 8953 0337	03/07/13				X				CFA10	Yes
020-HS1-049004	SP 8903 0398	03/07/13				X				CFA10	Yes
020-HS1-049010	SP 8870 0404	03/07/13				X				CFA10	Yes
020-HS1-056021	SP 8440 0916	16/05/13							X	CFA10	Yes
020-HS1-056022	SP 8473 0942	16/05/13				X		X	X	CFA10	Yes
020-HS1-056024	SP 8436 0916	16/05/13							X	CFA10	Yes
020-HS1-056025	SP 8441 0912	16/05/13			X					CFA10	Yes
020-HS1-051001	SP 8781 0582	08/06/12						X		CFA10	Yes
020-HS1-055014	SP 8495 0835	08/06/12			X					CFA10	Yes
020-HS1-056011	SP 8486 0855	08/06/12							X	CFA10	Yes
020-HS1-055005	SP 8526 0821	08/06/12			X					CFA10	Yes
020-HS1-055008	SP 8537 0845	08/06/12			X					CFA10	Yes

Ecology survey code	Centroid OS Grid Reference	Survey date	Qualifying wildlife and landscape criteria							CFA number	Within the Proposed Scheme (Yes/No)
			(1)	(2)	(3)	(4)	(5)	(6)	(7)		
020-HS1-055009	SP 8516 0834	08/06/12						X		CFA10	Yes
020-HS1-055010	SP 8511 0835	08/06/12			X					CFA10	Yes
020-HS1-056008	SP 8485 0863	08/06/12				X				CFA10	Yes
020-HS1-054002	SP 8641 0751	29/05/13			X			X		CFA10	Yes
020-HS1-054003	SP 853 075	04/06/13						X		CFA10	No
020-HS1-052015	SP 8809 0577	24/06/13						X		CFA10	No
020-HS1-050005	SP 8892 0427	10/04/13			X	X		X		CFA10	Yes
020-HS1-050007	SP 8881 0458	10/04/13			X					CFA10	No
020-HS1-050008	SP 8882 0463	10/04/13			X			X		CFA10	No
020-HS1-056001	SP 8465 0866	28/06/13			X	X		X		CFA10	No
020-HS1-052001	SP 8725 0647	04/03/13						X		CFA10	Yes
020-HS1-067004	SP 7647 1671	06/06/12				X				CFA11	Yes
020-HS1-068007	SP 7622 1690	06/06/12			X					CFA11	Yes
020-HS1-060006	SP 8111 1159	04/09/12						X		CFA11	Yes
020-HS1-061001	SP 8019 1215	04/09/12			X					CFA11	Yes
020-HS1-061004	SP 8033 1183	04/09/12					X			CFA11	Yes
020-HS1-061005	SP 8066 1163	04/09/12			X		X	X		CFA11	Yes
020-HS1-061007	SP 8074 1188	04/09/12			X					CFA11	Yes
020-HS1-060002	SP 8097 1119	04/09/12						X		CFA11	Yes
020-HS1-060003	SP 8112 1106	04/09/12			X					CFA11	Yes
020-HS1-060005	SP 8117 1367	04/09/12				X		X		CFA11	Yes
020-HS1-062001	SP 8024 1234	04/09/12			X					CFA11	Yes
020-HS1-066005	SP 7762 1557	07/06/12							X	CFA11	Yes
020-HS1-063004	SP 7890 1356	21/05/13						X		CFA11	Yes
020-HS1-063006	SP 7913 1303	21/05/13				X				CFA11	No
020-HS1-064004	SP 7867 1381	21/05/13						X		CFA11	Yes
020-HS1-058008	SP 8318 0994	07/06/13						X		CFA11	Yes
020-HS1-057011	SP 8341 0955	06/06/13						X		CFA11	No
020-HS1-057012	SP 8386 1023	26/06/13							X	CFA11	No
020-HS1-057014	SP 8360 1024	26/06/13						X		CFA11	No

Ecology survey code	Centroid OS Grid Reference	Survey date	Qualifying wildlife and landscape criteria							CFA number	Within the Proposed Scheme (Yes/No)
			(1)	(2)	(3)	(4)	(5)	(6)	(7)		
020-HS1-057015	SP 8361 0988	26/06/13							X	CFA11	Yes
020-HS1-057016	SP 8385 0992	26/06/13						X	X	CFA11	No
020-HS1-059004	SP 8288 1091	26/06/13						X		CFA11	No
020-HS1-059006	SP 8270 1072	26/06/13							X	CFA11	No
020-HS1-058017	SP 8295 1025	26/06/13				X	X		X	CFA11	No
020-HS1-058023	SP 8316 1027	26/06/13						X		CFA11	Yes
020-HS1-058024	SP 8325 0998	26/06/13					X			CFA11	Yes
020-HS1-058025	SP 8288 0980	26/06/13						X		CFA11	Yes
020-HS1-058026	SP 8270 0984	26/06/13						X		CFA11	No
020-HS1-058027	SP 8293 1010	26/06/13						X		CFA11	Yes
020-HS1-071002	SP 7361 1901	25/02/13				X				CFA12	Yes
020-HS1-071014	SP 7350 1887	29/11/12						X		CFA12	Yes
020-HS1-074010	SP 7100 2110	08/05/13		X	X					CFA12	No
020-HS1-074008	SP 7149 2122	20/06/12		X						CFA12	Yes
020-HS1-074009	SP 7152 2114	20/06/12		X						CFA12	Yes
020-HS1-074002	SP 7177 2132	20/06/12				X				CFA12	Yes
020-HS1-074005	SP 7175 2110	20/06/12		X						CFA12	Yes
020-HS1-074006	SP 7158 2108	20/06/12		X						CFA12	Yes
020-HS1-075001	SP 7130 2172	20/06/12		X						CFA12	Yes
020-HS1-075002	SP 7109 2186	20/06/12		X						CFA12	Yes
020-HS1-075003	SP 7111 2200	20/06/12		X						CFA12	Yes
020-HS1-067003	SP 7668 1649	30/12/12						X		CFA12	Yes
020-HS1-071003	SP 7333 1951	23/05/13						X		CFA12	Yes
020-HS1-074012	SP 7171 2098	06/03/13			X					CFA12	Yes
020-HS1-075004	SP 7023 2181	13/06/13			X					CFA12	No
020-HS1-070001	SP 7390 1831	30/11/12						X	X	CFA12	Yes
020-HS1-071004	SP 7372 1855	28/11/12				X		X		CFA12	Yes
020-HS1-071005	SP 7361 1871	28/11/12				X		X		CFA12	Yes
020-HS1-071006	SP 7372 1852	28/11/12						X		CFA12	Yes
020-HS1-071007	SP 7360 1870	28/11/12				X		X		CFA12	Yes

Ecology survey code	Centroid OS Grid Reference	Survey date	Qualifying wildlife and landscape criteria							CFA number	Within the Proposed Scheme (Yes/No)
			(1)	(2)	(3)	(4)	(5)	(6)	(7)		
020-HS1-071009	SP 7348 1873	28/11/12						X		CFA12	Yes
020-HS1-071010	SP 7358 1882	28/11/12						X		CFA12	Yes
020-HS1-071011	SP 7342 1870	28/11/12			X	X		X		CFA12	Yes
020-HS1-071012	SP 7337 1908	28/11/12						X		CFA12	Yes
020-HS1-071013	SP 7346 1890	28/11/12						X		CFA12	Yes
020-HS1-074007	SP 7156 2129	20/06/12		X						CFA12	Yes
020-HS1-087002	SP 630 305	11/04/13				X			X	CFA13	Yes
020-HS1-087003	SP 632 606	11/04/13				X				CFA13	Yes
020-HS1-087004	SP 632 208	11/04/13							X	CFA13	Yes
020-HS1-086011	SP 6351 2971	10/04/13						X		CFA13	Yes
020-HS1-086012	SP 6360 2989	10/04/13				X		X		CFA13	Yes
020-HS1-086015	SP 6318 3002	10/04/13				X				CFA13	No
020-HS1-086016	SP 6326 3012	10/04/13			X					CFA13	Yes
020-HS1-086017	SP 6344 3017	10/04/13			X					CFA13	Yes
020-HS1-086018	SP 6376 3014	10/04/13			X	X		X		CFA13	No
020-HS1-086019	SP 6362 3025	10/04/13				X				CFA13	No
020-HS1-081003	SP 6692 2671	06/09/12							X	CFA13	Yes
020-HS1-080002	SP 6804 2618	30/01/13				X			X	CFA13	Yes
020-HS1-080003	SP 6833 2641	30/01/13			X	X			X	CFA13	Yes
020-HS1-080005	SP 6833 2635	13/06/13			X	X				CFA13	Yes
020-HS1-082001	SP 6631 2746	13/06/13				X				CFA13	No
020-HS1-083013	SP 6581 2741	13/06/13						X		CFA13	Yes
020-HS1-080001	SP 6797 2600	19/07/12				X		X		CFA13	Yes
020-HS1-082003	SP 6634 2762	12/06/13			X	X		X		CFA13	No
020-HS1-079001	SP 7096 2641	04/06/13						X		CFA13	Yes
020-HS1-079003	SP 6912 2640	25/06/13			X	X				CFA13	Yes
020-HS1-079009	SP 6899 2615	25/06/13			X	X				CFA13	Yes
020-HS1-079022	SP 6936 2647	25/06/13			X	X				CFA13	Yes
020-HS1-079023	SP 6919 2639	25/06/13			X					CFA13	Yes
020-HS1-086021	SP 6346 2964	28/06/13			X					CFA13	Yes

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			(1)	(2)	(3)	(4)	(5)	(6)	(7)		
020-HS1-086022	SP 6396 2995	28/06/13			X					CFA13	Yes
020-HS1-086023	SP 6384 3002	28/06/13			X					CFA13	No
020-HS1-086024	SP 6376 3014	28/06/13			X					CFA13	No
020-HS1-085003	SP 6447 2898	28/06/13			X					CFA13	Yes
020-HS1-085004	SP 6430 2901	28/06/13			X					CFA13	Yes
020-HS1-085005	SP 6425 2901	28/06/13			X					CFA13	Yes
020-HS1-085006	SP 6400 2903	28/06/13			X					CFA13	Yes
020-HS1-085007	SP 6404 2909	28/06/13			X					CFA13	Yes
020-HS1-085008	SP 6398 2913	28/06/13			X					CFA13	Yes
020-HS1-085009	SP 6393 2913	28/06/13			X					CFA13	Yes
020-HS1-085010	SP 6418 2915	28/06/13			X					CFA13	Yes
020-HS1-085011	SP 6416 2913	28/06/13			X					CFA13	Yes
020-HS1-085012	SP 6424 2928	28/06/13			X					CFA13	Yes
020-HS1-085013	SP 6425 2934	28/06/13			X					CFA13	Yes
020-HS1-085014	SP 6429 2942	28/06/13			X					CFA13	Yes
020-HS1-085015	SP 6413 2948	28/06/13			X					CFA13	No
020-HS1-085016	SP 6410 2958	28/06/13			X					CFA13	Yes
020-HS1-084001	SP 8915 0404	27/06/13				X		X		CFA 13	Yes
020-HS1-084002	SP 6493 2870	27/06/13			X	X		X	X	CFA 13	Yes
020-HS1-084003	SP 6465 2896	27/06/13			X	X		X		CFA 13	No
020-HS1-082008	SP 6618 2692	23/07/13			X					CFA 13	Yes
020-HS1-082007	SP 6626 2689	23/07/13			X					CFA 13	No
020-HS1-082010	SP 6594 2703	23/07/13			X					CFA 13	No
020-HS1-082011	SP 6587 2693	23/07/13			X					CFA 13	No
020-HS1-087007	SP 6330 3109	28/06/13			X					CFA 13	No
020-HS1-093002	SP 6063 3667	07/02/13						X		CFA14	Yes
020-HS1-093006	SP 6101 3644	07/02/13			X					CFA14	Yes
020-HS1-093007	SP 6092 3657	07/02/13				X		X		CFA14	Yes
020-HS1-097001	SP 5870 4000	20/08/12			X	X				CFA14	Yes
020-HS1-098001	SP 5853 40609	02/10/12			X					CFA14	No

Ecology survey code	Centroid OS Grid Reference	Survey date	Qualifying wildlife and landscape criteria							CFA number	Within the Proposed Scheme (Yes/No)
			(1)	(2)	(3)	(4)	(5)	(6)	(7)		
020-HS1-089003	SP 6252 330	14/12/12			X				X	CFA14	No
020-HS1-089004	SP 6237 3307	14/12/12			X	X				CFA14	Yes
020-HS1-089005	SP 6248 3269	30/05/13				X				CFA14	Yes
020-HS1-089006	SP 6230 3281	30/05/13				X				CFA14	Yes
020-HS1-089009	SP 6265 3277	30/05/13			X	X	X			CFA14	Yes
020-HS1-098003	SP 5854 4139	30/05/13				X		X	X	CFA14	No
020-HS1-098005	SP 5854 4139	30/05/13				X		X		CFA14	No
020-HS1-098007	SP 5871 4089	30/05/13				X				CFA14	No
020-HS1-098011	SP 5853 4060	22/05/13			X	X		X		CFA14	Yes
020-HS1-091004	SP 6148 3407	14/06/13						X		CFA14	No
020-HS1-091005	SP 6148 3407	14/06/13						X		CFA14	No
020-HS1-091007	SP 623 345	24/06/13			X					CFA14	No
020-HS1-091008	SP 623 345	24/06/13			X					CFA14	No
020-HS1-091009	SP 623 345	24/06/13			X					CFA14	No
020-HS1-090011	SP 646 343	24/06/13			X	X				CFA14	No
020-HS1-096013	SP 5003 4941	26/06/13						X	X	CFA14	No
020-HS1-096014	SP 5954 3852	26/06/13						X		CFA14	No
020-HS1-090006	SP 6198 3317	28/06/13						X		CFA14	Yes
020-HS1-090007	SP 6198 33107	28/06/13						X		CFA14	Yes
020-HS1-090009	SP 623 345	24/06/13			X					CFA14	Yes
020-HS1-090010	SP 623 345	24/06/13			X					CFA14	Yes
020-HS1-069003	SP 7472 1775	13/09/12			X	X				CFA12	Yes
020-HS1-069004	SP 7487 1790	13/09/12			X	X				CFA12	Yes
020-HS1-069005	SP 7486 1778	13/09/12			X					CFA12	Yes
020-HS1-069006	SP 7506 1759	13/09/12			X	X				CFA12	Yes
020-HS1-069007	SP 7522 1737	13/09/12			X					CFA12	Yes
020-HS1-069009	SP 7532 1764	13/09/12			X					CFA12	No
020-HS1-069010	SP 7551 1751	13/09/12			X					CFA12	Yes
020-HS1-070002	SP 7460 1783	14/09/12			X					CFA12	Yes
020-HS1-070003	SP 7467 1799	14/09/12						X		CFA12	Yes

Ecology survey code	Centroid OS Grid Reference	Survey date	Qualifying wildlife and landscape criteria							CFA number	Within the Proposed Scheme (Yes/No)
			(1)	(2)	(3)	(4)	(5)	(6)	(7)		
020-HS1-070006	SP 7415 1832	14/09/12			X					CFA12	Yes
020-HS1-070007	SP 7437 1821	14/09/12			X	X				CFA12	Yes
020-HS1-096003	SP 6053 3989	25/03/13						X		CFA14	Yes
020-HS1-096005	SP 6009 3956	25/03/13						X		CFA14	Yes
020-HS1-096006	SP 6011 3953	25/03/13						X		CFA14	Yes
020-HS1-096009	SP 5926 3923	25/03/13			X					CFA14	Yes
020-HS1-096011	SP 5924 3897	25/03/13			X					CFA14	Yes
020-HS1-096012	SP 5931 3869	25/03/13			X					CFA14	Yes
020-HS1-087009	SP 6314 3116	28/06/13			X					CFA14	No
020-HS1-087010	SP 6302 3124	28/06/13			X					CFA14	No
020-HS1-087011	SP 6302 3130	28/06/13			X					CFA14	No
020-HS1-088001	SP 6233 3183	28/06/13			X					CFA14	No
020-HS1-101008	SP 5590 4314	12/12/12						X		CFA15	Yes
020-HS1-101010	SP 5617 4311	13/12/12							X	CFA15	Yes
020-HS1-101012	SP 5630 4304	13/12/12			X					CFA15	No
020-HS1-101013	SP 5626 4293	13/12/12				X		X		CFA15	Yes
020-HS1-102005	SP 5581 4315	13/12/12			X			X		CFA15	Yes
020-HS1-102007	SP 5590 4330	13/12/12			X	X				CFA15	Yes
020-HS1-101002	SP 5616 4241	29/11/12			X					CFA15	Yes
020-HS1-101004	SP 5605 4260	29/11/12			X	X				CFA15	Yes
020-HS1-111001	SP 4949 5046	24/09/12			X					CFA15	Yes
020-HS1-105001	SP 5354 4536	14/11/12			X					CFA15	Yes
020-HS1-105002	SP 5352 4539	14/11/12			X					CFA15	Yes
020-HS1-100001	SP 5685 4234	29/05/13			X					CFA15	Yes
020-HS1-100002	SP 5677 4251	29/05/13			X	X		X		CFA15	Yes
020-HS1-100003	SP 5687 4270	29/05/13						X		CFA15	Yes
020-HS1-102013	SP 5555 4301	25/09/12						X		CFA15	Yes
020-HS1-105008	SP 5342 4566	28/11/12				X				CFA15	Yes
020-HS1-105015	SP 5345 4536	14/11/12				X		X		CFA15	Yes
020-HS1-106003	SP 5295 4625	02/08/12			X					CFA15	Yes

Ecology survey code	Centroid OS Grid Reference	Survey date	Qualifying wildlife and landscape criteria							CFA number	Within the Proposed Scheme (Yes/No)
			(1)	(2)	(3)	(4)	(5)	(6)	(7)		
020-HS1-105022	SP 5309 4594	02/08/12			X					CFA15	Yes
020-HS1-106001	SP 5305 4604	02/08/12			X					CFA15	Yes
020-HS1-106002	SP 5284 4609	02/08/12			X					CFA15	Yes
020-HS1-106004	SP 5266 4635	02/08/12			X					CFA15	Yes
020-HS1-105021	SP 5325 4586	02/08/12			X					CFA15	Yes
020-HS1-112001	SP 4871 5067	31/05/13			X	X				CFA15	Yes
020-HS1-110001	SP 5008 4915	04/06/13						X		CFA15	No
020-HS1-110002	SP 5026 4925	04/06/13			X					CFA15	Yes
020-HS1-104013	SP 5397 4517	12/06/13			X					CFA15	Yes
020-HS1-103009	SP 5517 4375	14/09/12			X					CFA15	Yes
020-HS1-103008	SP 5508 4391	14/09/12			X					CFA15	Yes
020-HS1-103004	SP 5492 4407	14/09/12			X					CFA15	Yes
020-HS1-110008	SP 5020 4948	26/06/13			X					CFA15	Yes
020-HS1-110009	SP 5025 4978	26/06/13						X		CFA15	Yes
020-HS1-115001	SP 4671 5259	24/09/12			X					CFA15	Yes
020-HS1-103002	SP 5473 4406	14/09/12			X					CFA15	Yes
020-HS1-113001	SP 4771 5167	12/06/13						X		CFA15	Yes
020-HS1-113002	SP 4754 5171	12/06/13						X		CFA15	Yes
020-HS1-114008	SP 4735 5161	12/06/13						X		CFA15	No
020-HS1-111006	SP 4940 4929	25/06/13			X					CFA15	Yes
020-HS1-109001	SP 5104 4875	24/06/13			X					CFA15	Yes
020-HS1-109002	SP 5104 4878	24/06/13			X					CFA15	Yes
020-HS1-113007	SP 4839 5158	27/06/13				X				CFA15	Yes
020-HS1-103011	SP 5468 4443	05/06/13			X			X		CFA15	Yes
020-HS1-104001	SP 5461 4498	05/06/13						X		CFA15	No
020-HS1-104002	SP 5456 4484	05/06/13						X		CFA15	Yes
020-HS1-104003	SP 5428 4464	05/06/13				X	X			CFA15	Yes
020-HS1-104004	SP 5439 4493	05/06/13			X			X		CFA15	Yes
020-HS1-104005	SP 5401 4483	05/06/13						X		CFA15	Yes
020-HS1-104007	SP 5421 4548	05/06/13				X		X		CFA15	No

Ecology survey code	Centroid OS Grid Reference	Survey date	Qualifying wildlife and landscape criteria							CFA number	Within the Proposed Scheme (Yes/No)	
			(1)	(2)	(3)	(4)	(5)	(6)	(7)			
020-HS1-104008	SP 5398 4543	05/06/13							X		CFA15	Yes
020-HS1-105020	SP 5337 4524	05/06/13			X	X			X		CFA15	Yes
020-HS1-113004	SP 4799 5161	28/11/12				X			X		CFA15	Yes
020-HS1-113005	SP 4784 5175	28/11/12							X		CFA15	Yes
020-HS1-113006	SP 4786 5179	28/11/12			X	X			X		CFA15	Yes
020-HS1-115003	SP 4711 5267	28/11/12							X		CFA15	No
020-HS1-115004	SP 4709 5266	28/11/12				X			X		CFA15	No
020-HS1-115006	SP 4665 5307	28/11/12							X		CFA15	No
020-HS1-115007	SP4678 5277	28/11/12							X		CFA15	Yes
020-HS1-115008	SP 4664 5305	28/11/12							X		CFA15	Yes
020-HS1-115009	SP 4696 5280	28/11/12							X		CFA15	No
020-HS1-116004	SP 4640 5337	27/11/12							X		CFA15	No
020-HS1-116005	SP 4618 5352	27/11/12							X		CFA15	Yes
020-HS1-114001	SP 4801 5214	06/02/13							X		CFA15	No

Table 107 Key to wildlife and landscape criteria:

1) Hedgerow contains species listed on either:

Part 1 of Schedule 1 of the Wildlife and Countryside Act (1981 as amended);

Schedule 5 of the Wildlife and Countryside Act (1981 as amended);

Schedule 8 of the Wildlife and Countryside Act (1981 as amended).

Or categorised as either:

a declining breeder (category 3) in "Red Data Birds in Britain" Batten LA, Bibby CJ, Clement P, Elliott GD and Porter RF (Eds.), published in 1990 for the Nature Conservancy Council and the Royal Society for the Protection of Birds (ISBN 0 85661 056 9);

"Endangered", "extinct", "rare" or "vulnerable" in Britain in British Red Data Books for vascular plants; insects; and invertebrates other than insects.

2) Hedgerow referred to in a biological desk study record as containing one of the species above within the last five (animals and birds) or ten years (for plants) (N.B. age of records should be considered in relation to November 2013 the proposed point of submission)

3) Hedgerow contains at least 7 woody species

4) Hedgerow contains at least 6 woody species and at least 3 of the following features identified in Schedule 1 Part II paragraph 7 sub-paragraph 4 of the Hedgerow Regulations, namely;

a bank or wall which supports the hedgerow along at least one half of its length; .

gaps which in aggregate do not exceed 10% of the length of the hedgerow; .

where the length of the hedgerow does not exceed 50 metres, at least one standard tree; .

where the length of the hedgerow exceeds 50 metres but does not exceed 100 metres, at least 2 standard trees; .

where the length of the hedgerow exceeds 100 metres, such number of standard trees (within any part of its length) as would when averaged over its total length amount to at least one for each 50 metres; .

at least 3 woodland species within one metre, in any direction, of the outermost edges of the hedgerow; .

a ditch along at least one half of the length of the hedgerow; .

connections scoring 4 points or more - connection with another hedgerow scores one point and a connection with a pond or a woodland in which the majority of trees are broad-leaved trees scores 2 points; and a hedgerow is connected with something not only if it meets it but also if it has a point within 10 metres of it and would meet it if the line of the hedgerow continued;

a parallel hedge within 15 metres of the hedgerow.

5) Hedgerow contains at least 6 woody species, including one of the following

black-poplar (*Populus nigra ssp betulifolia*);

large-leaved lime (*Tilia platyphyllos*);

small-leaved lime (*Tilia cordata*);

wild service-tree (*Sorbus torminalis*)

6) Hedgerow is adjacent to a bridleway or footpath, a road used as a public path, or a byway open to all traffic and includes at least 4 woody species and at least 2 of the features specified under (4) above.

7) Hedgerow contains at least 5 woody species, and has associated with it at least 4 of the features specified in sub paragraph (4).

Table References

1. Perring FH and Farrell L (1983), Vascular Plants, 2nd Edition, for the Royal Society for Nature Conservation (ISBN 0 902484 04 4);

2. Shirt DB (Ed.) (1987), Insects, for the Nature Conservancy Council (ISBN 0 86139 380 5);

3. Bratton JH (Ed.) (1991), Invertebrates other than Insects, for the Joint Nature Conservation Committee, (ISBN 1 873701 00 4).

9 Ditch survey

9.1 Introduction

9.1.1 This section of the appendix presents details of the ditch surveys and associated baseline data for the section of the land required for construction of the Proposed Scheme that will pass through CFA7 to 15 inclusive.

9.2 Methodology

9.2.1 Details of the standard methodology utilised for ditch surveys are provided in the Scope and Methodology Report Addendum (Volume 5: Appendix CT-001-000/2).

9.2.2 Desk study records relating to ditches were obtained from the following national and local organisations and sources:

- Greenspace Information for Greater London (GIGL);
- Buckinghamshire and Milton Keynes Environmental Records Centre (BMERC);
- Thames Valley Biological Records Centre (TVERC); and
- Northamptonshire Biodiversity Records Centre (NBRC).

9.2.3 Ditches were selected for a detailed survey based upon a two stage process:

- OS maps and aerial photographs were reviewed to identify the location of all ditches within 100m of the land required for construction of the Proposed Scheme.
- ditches were 'scoped in' for detailed survey if they were found to meet the criteria outlined in the Field Survey Methods and Standards using Phase 1 habitat survey data in consultation with an entomologist.
- the criteria for triggering a detailed ditch survey as set out in the Field Study Methods and Standards include: a diverse community of plant species; high potential value for invertebrates; and/or the ditch was to be heavily affected by the land required for construction of the Proposed Scheme. On the basis of these scoping requirements, only two locations (supporting six ditches) were identified for a detailed ditch survey (see Table 109). Reasons for 'scoping out' ditches are summarised below under each CFA.

9.3 Deviations, constraints and limitations

9.3.1 There were a small number of methodological deviations, as follows:

- field surveys undertaken to date have been limited to locations where landowner permission has been obtained, or areas that are accessible to the public, meaning that some ditches could not be assessed as to whether or not they required a detailed ditch survey (Table 108 provides a list of these locations).
- the ditch survey methodology states that both vegetation and invertebrate

samples should be collected. However, given the low nature conservation value of both of the locations selected for detailed survey, invertebrate sampling alone at one site and plant sampling alone at the second site, was considered sufficient.

- PH samples, water depth, water colour and turbidity were not recorded for all ditches due to inaccessibility and/or lack of water.

Table 108 Summary of locations where requirement for ditch survey was identified but no access available for survey

Survey site name	Survey Location	Description	CFA	Distance from the land required for construction of the Proposed Scheme (m) and orientation
The Bungalow, Old Uxbridge Road	West Hyde	Feeder ditch linked to lake. Ditch shaded fully along length. Ditch flows along the boundary of an area of semi-improved grassland.	7	443.5
Uxbridge Golf Course	North west of Ickenham	Two ditches south west of the Oil Depot.	7	Within the the Proposed Scheme
Denham Country Park	North west of Ickenham	A ditch lying parallel to the Grand Union Canal.	7	Within the Proposed Scheme
Land to the south of Akeman Street	Waddesdon	Highly shaded ditch alongside main road.	12	181.0
Land to the south east and north west of Station Road	Quainton	Ditch running through arable fields. No shade, considered likely to be dry from maps and aerial photographs.	12	157.7
Crossroads Farm	Aylesbury	Network of ditches within arable fields.	12	58.8
Unregistered land to the north of Upper South Farm	Quainton	Ditch running through grassland across disused railway.	12	Within the Proposed Scheme
Unregistered land to the north, east and west of Diddershall House	Quainton	Network of ditches running through grassland and across disused railway.	12	Within the Proposed Scheme
Pond Farm	Steeple Claydon	Network of ditches running through woodland, arable land and grassland.	13	37.2
Land to the south of Cowley Lodge	Buckingham	Long ditch running though arable land. No shade.	13	Within the Proposed Scheme
Casemore Farm	Preston Bissett	Long ditch running through arable land.	13	Within the Proposed Scheme
Land at Manor Farm	Barton Hartshorn	Ditch running through arable fields.	13	183.7
Land at Chetwode Priory Estate	Buckingham	Ditch running through amenity grassland. Shaded.	13	291.4
Shepherd's Furze Farm	Steeple Claydon	Network of ditches in arable farmland.	13	13.6
Portway Farm	Twyford	Number of ditches running through	13	Within the Proposed Scheme

		arable fields.		
Barleyfields Farm	Shelswell	Ditch running through arable field.	14	111.9
Barleyfields Farm lying on the north west and south east side of Bicester – Buckingham road	Shelswell	Ditch running though arable field. No shade.	14	45.0
Land east of Widmore Farm	Finmere	Ditch running along boundary of arable field.	14	378.5
Oatleys Farm	Brackley	Ditch running though farm land and agricultural buildings.	14	395.2
Land at Turweston	Turweston	Fenced ditch running through arable fields.	14	306.1
Land on the west and south east sides of Manor Farm	Whitfield	Ditch running from man-made pond through arable land.	14	172.5
Beeches Farm	Chipping Warden	Long ditch with flowing water along arable field. Open with high banks.	15	362.1
Land to the north of Wormleighton - Upper Boddington road	Boddington	Ditch running through arable field beneath hedgerow. Shaded, considered likely to be dry.	15	Within the Proposed Scheme
Greatworth Hall Farm	Greatworth	Ditch running along arable field boundary.	15	152.5
Land to the west of Banbury Lane	Thorpe Mandeville	Shaded ditch running along edge of arable land leading to road.	15	118.1

9.4 Baseline

9.4.1 A summary of the results from the ditch surveys is presented in Table 109.

Table 109 Summary of results from ditch surveys

Ecology survey code	OS Grid Reference Start and Finish	Survey date	Summary of results	CFA	Distance from the land required for construction of the Proposed Scheme (m) and Orientation
020-DS1-062001	SP 797 129 – SP 795 128	26/06/13	Ditch approximately 50m in length, damp in places, on Aylesbury Park Golf Club fairway. A narrow strip of rough grassland 2.5m wide was present along both banks, beyond which was the golf course fairway. 14 plant species present, dominated by False oat-grass (<i>Arrhenatherum elatius</i>). 18 species of beetle (<i>Coleoptera</i>); eight species of butterfly/moth (<i>Lepidoptera</i>); one species of dragonfly/damselfly (<i>Odonata</i>); and seven species of spider (<i>Arachnida</i>).	11	9.65 north-east
020-DS1-062002	SP 800 126 – SP 800 125	26/06/13	Ditch approximately 50m in length, dry and on Aylesbury Park Golf Club fairway. A narrow strip of rough grassland 1m wide was present along both banks, beyond which was the golf course fairway. 14 plant species present,	11	11.02 south-west

			dominated by false oat-grass. Seven species of beetle; four species of butterfly/moth; two species of dragonfly/damselfly; and five species of spider.		
020-DS1-063001	SP 797 131 – SP 795 130	26/06/13	Ditch approximately 70m in length, damp in places on Aylesbury Park Golf Club fairway. A narrow strip of tall herb vegetation 2m wide was present on both banks, beyond which was the golf course fairway. 11 plant species present, dominated by false oat-grass and rosebay willowherb <i>Chamaenerion angustifolium</i> . Nine species of beetle, two species of butterfly/moth, one species of bumblebee <i>Bombus</i> sp., one species of dragonfly/damselfly; and five species of spider.	11	Within the the Proposed Scheme
020-DS1-064001	SP 790 140 – SP 791 139	26/06/13	Dry ditch, approximately 30m in length on Aylesbury Park Golf Club fairway. A narrow strip of vegetation 2m wide on both banks. 13 plant species present, dominated by rough meadow-grass <i>Poa trivialis</i> . 15 species of beetle, two species of butterfly/moth; one species of dragonfly/damselfly; and 10 species of spider.	11	146.69 north-east
020-DS1-075001	SP 710 215 – SP 710 214	13/06/13	Fenced ditch approximately 70m long, with cattle-grazed pasture on either side. Wet and unmanaged with a narrow strip of rough grassland 1.5m wide on both banks with 40% bare earth. Approximately 5 cm depth of water present. 45 plant species present of which six species are aquatic. Bank vegetation dominated by false oat-grass, rough meadow-grass, broad-leaved dock <i>Rumex obtusifolius</i> , with locally abundant soft-rush <i>Juncus effusus</i> .	12	195.65 south
020-DS1-075002	SP 708 215 – SP 705 217	13/06/13	Fenced ditch approximately 250m in length, with cattle-grazed pasture on either side. Wet and unmanaged with a narrow strip of scrub 1.5m wide over-shaded both banks with shade cover estimated at 90-100%. Water clarity and depth unknown due to vegetation cover. 22 plant species present, dominated by blackthorn <i>Prunus spinosa</i> . No aquatic plant species recorded.	12	397.39 south-east

CFA 7 Colne Valley

- 9.4.2 Ditch habitat in the Colne Valley is located in Denham Country Park and at Uxbridge Golf Course, both of which lie within the land required for construction of the Proposed Scheme, where an overhead power line diversion is proposed. None of these three ditches could be accessed to assess their nature conservation significance. No other ditches were identified in accessible areas of land.

CFA8 The Chalfonts and Amersham

- 9.4.3 No ditch habitat was identified in or adjacent to the land required for construction of the Proposed Scheme in this area.

CFA9 Central Chilterns

- 9.4.4 No ditch habitat was identified in or adjacent to the land required for construction of the Proposed Scheme in this area.

CFA10 Dunsmore, Wendover and Halton

- 9.4.5 Ditch habitat was recorded at one location in this area. A single ditch was present at Wellwick Farm; however it was heavily shaded by hedgerows with a low diversity of plant species present and thus was 'scoped out' for detailed survey.

CFA11 Stoke Mandeville and Aylesbury

- 9.4.6 Ditch habitat in this area is located primarily in areas of arable farmland to the west of Aylesbury and south of Lower Hartwell, and on Aylesbury Park Golf Club. Access was available to all locations with ditches in this area.

- 9.4.7 The following sites were 'scoped out' for detailed survey:

- 19 & 21 Lower Road, west of Stoke Mandeville – the ditch at this site did not meet the criteria required for further survey as it is not permanently wet and does not support any wetland plants or animals.
- farmland either side of the River Thame (Putlowes Farm) – the ditch at this location (to the north-west of the farm) does not meet the criteria required for further survey as it has a low diversity of marginal and emergent wetland plants, dominated by common reed (*Phragmites australis*).
- farmland in the vicinity of Fleet Marston (Lower Blackgrove Farm) – three ditches at this site do not meet the criteria required for further survey as none of them hold permanent water.
- Lower Hartwell (Hartwell Estate) – the short ditch at this site does not meet the criteria required for further survey as it is narrow and is mostly dry.

- 9.4.8 Four ditches on Aylesbury Park Golf Club were 'scoped in' for detailed survey. All four of these ditches are predominantly dry; however they will all be directly impacted by the Proposed Scheme. No plant sampling was undertaken as there were few wetland plants present and of those that are, none are of conservation significance:

- ditch 020-DS1-062001 – this ditch is approximately 50m in length, damp and with grassy banks. The grassy banks are dominated by false oat-grass with abundant annual meadow-grass (*Poa annua*) and barren brome (*Anisantha sterilis*). The following invertebrates were recorded: two species of butterfly; six species of moth; common blue damselfly (*Enallagma cyathigerium*); and seven species of terrestrial beetle (three of which were not found in three ditches at the site). Seven species of spider were also recorded, all of which are common across the UK.
- ditch 020-DS1-062002 – this ditch is approximately 50m in length, and is mostly dry. *Sedges Carex* sp. are locally frequent; however the majority of the ditch is dominated by false oat-grass with occasional scattered trees along the banks. The following invertebrates were recorded: four species of moth, two species of damselfly, 18 species of beetle (of which 11 were unique to this ditch at the site) including specialists of open sward plants such as red clover (*Trifolium pratense*), and five species of spider (all of which are common UK species).

- ditch 020-DS1-063001 – this ditch is approximately 70m in length, and is dominated by tall ruderal vegetation including rosebay willowherb and cow parsley (*Anthriscus sylvestris*). The tall, ruderal vegetation features scattered trees including ash (*Fraxinus excelsior*), alder (*Alnus glutinosa*), willow (*Salix sp.*), oak (*Quercus sp.*), hornbeam (*Carpinus betulus*) and blackthorn. The following invertebrates were recorded: two species of moth, one species of damselfly, one species of bee, nine species of beetle, and 10 species of spider (all of which are common in the UK). Of the beetle species that were recorded, one species, *Grammoptera ruficornis*, is a dead wood specialist. However, this species is regularly encountered on flowering plants away from its breeding sites and its presence does not necessarily indicate that the site was favourable for dead wood species.
- ditch 020-DS1-064001 – this ditch is approximately 70m in length and is dominated by rough meadow-grass, annual meadow-grass and false oat-grass with scattered hawthorn (*Crataegus sp.*) and bramble (*Rubus fruticosus agg.*) scrub. The following invertebrates were recorded: two species of butterfly, one species of damselfly, 15 species of beetle (including both willow and short sward specialists), and five species of spider, all of which are common in the UK.

9.4.9 No notable aquatic or wetland plant species were recorded, and in general the vegetation is dominated by grass species, with few wetland or aquatic plants present. No notable invertebrates as identified on Buglife's (2010) list of notable native aquatic invertebrate species³⁴ were recorded. A diverse assemblage of common beetle species was found, a number of which are restricted to the southern half of the UK. However, the invertebrate communities are typical of areas of short sward grassland rather than wetland habitats.

CFA12 Waddesdon and Quainton

9.4.10 Ditch habitats in Waddesdon and Quainton are located within arable farmland and semi-improved grassland. Ditches at Crossroads Farm; land to the north of Upper South Farm; land to the south-east and north-west of Station Road; and land to the north, east and west of Doddershall House could not be accessed but all of these areas have ditch habitat present.

9.4.11 The following sites were 'scoped out' for ditch surveys:

- Buckinghamshire Railway Centre – Two ditches are located in the northern part of this site. They do not qualify for further survey work as neither contain permanent water, and both support a low diversity of wetland plants.
- Calvert Jubilee NR – This site comprised of a number of ditches surrounding the clay pits. However, none of these ditches are subject to further survey as none of the ditches support a diverse and / or notable aquatic flora.

³⁴ Buglife (2010). A manual for the survey and evaluation of the aquatic plant and invertebrate assemblages of grazing marsh ditch systems. Buglife.

9.4.12 A single ditch at Oak Tree Farm, west of Finmere Woods was 'scoped in' for a survey as it supports a number of aquatic plant species and marsh plants. For the purposes of the survey, this ditch was divided into two sections (ditch 020-DS1-075001 and ditch 020-DS1-075002) – an upstream and a downstream section, at either end of an artificial pond. No invertebrate samples were collected as about 80% of this ditch is densely shaded by scrub and the ditch itself does not support wetland vegetation:

- ditch 020-DS1-075001 – this ditch is approximately 100m in length. It holds permanent water which is about 5cm deep which flows sluggishly from west to east into an artificial pond. The ditch is surrounded by cattle-grazed pasture. The banks of the ditch are dominated by false oat-grass. Five species of aquatic plant listed on the checklist of native aquatic plants (Buglife, 2010) were recorded in this ditch: common water-plantain (*Alisma plantago-aquatica*), floating sweet grass (*Glyceria fluitans*), water-cress (*Nasturtium officinale*), water starwort (*Callitriche sp.*) and brooklime (*Veronica beccabunga*).
- ditch 020-DS1-075002 – this ditch is approximately 400m in length with cattle-grazed pasture on either side. The entire length of the ditch is shaded by dense hawthorn and blackthorn scrub, with no wetland or aquatic plant species present.

9.4.13 The majority of this ditch is heavily shaded by scrub which limited its value for plants and invertebrates. About 25% of the ditch was surveyed and found to support five species of common aquatic plant.

CFA13 Calvert, Steeple Claydon, Twyford and Chetwode

9.4.14 Ditch habitats in this area are located in arable farmland, although at Chetwode a single ditch is located within amenity grassland. Ditches at Pond Farm, land to the south of Cowley Lodge, Casemore Farm, land at Manor Farm, Portway Farm and land at Chetwode Priory Estate could not be accessed but all support ditch habitat.

9.4.15 The following sites were 'scoped out' for surveys: Stone Court Farm, Home Farm House and Chetwode Priory.

- Stone Court Farm – One ditch is present in the south east corner of this site. It was 'scoped out' for detailed survey work as it supports a species-poor plant assemblage and based upon Phase 1 habitat data is considered unlikely to be permanently wet.
- Home Farm House – Two ditches are present; however, neither support diverse or notable aquatic flora and both were 'scoped out'.
- Chetwode Priory – One ditch is present in an area of amenity grassland. It is not considered for detailed survey as it is short (approximately 5m in length) and does not support any notable plant species.

CFA14 Newton Purcell to Brackley

9.4.16 Ditch habitat in this area is principally located within arable farmland. Ditches at Barleyfields Farm; land east of Widmore Farm; Oatleys Farm; land at Turweston; and

land on the west and south east sides of Manor Farm could not be accessed, but may contain important ditch habitats.

9.4.17 No sites were 'scoped in' for detailed survey. The following sites were 'scoped out' for ditch surveys:

- land to the west of the Brackley to Helmdon road - A number of ditches are present; however, all of these are species-poor and none support any notable plant species.
- Shelswell Inn - The ditches at this site do not support a sufficiently high diversity of plant species and / or do not support permanent water.
- Glebe Farm - This site supports a network of ditches; however, all of these ditches are shallow and dry, and do not support wetland plant species.

CFA15 Greatworth to Lower Boddington

9.4.18 Ditch habitat in this area is mainly located within arable land. The following sites supported ditch habitat but could not be accessed: Beeches Farm, land to the north of the Wormleighton to Upper Boddington road, Greatworth Hall Farm, and land to the west of Banbury Lane.

9.4.19 No sites in this area were 'scoped in' for surveys. The following sites were 'scoped out' for surveys:

- land to the south-east of the junction of Bulls Lane and Banbury Lane - The ditch at this site is mainly dry and supports a limited number of plant species, none of which were notable.
- Culworth Grounds Farm - The ditches present at this site do not support diverse wetland or aquatic vegetation.

10 Pond survey

10.1 Introduction

10.1.1 This section of the appendix presents details of the pond surveys and relevant associated desk study data for the section of the Proposed Scheme that will pass through CFA7 to 15 inclusive.

10.2 Methodology

10.2.1 Details of the standard methodology utilised for pond surveys are provided in the Scope and Methodology Report Addendum (Volume 5: Appendix CT-001-000/2).

10.2.2 All ponds were surveyed using the Predictive System for Multimetrics (PSYM), developed by the Pond Conservation Trust (PCT)³⁵. PSYM was developed to provide a standardised method for assessing the biological quality of still waters in England and Wales.

10.2.3 Desk study records relevant to the baseline for aquatic macro-invertebrate and aquatic plants were obtained from the following sources:

- Greenspace Information for Greater London.(GIGL);
- Buckinghamshire and Milton Keynes Environmental Records Centre;
- Thames Valley Biological Records Centre (TVERC); and
- Northamptonshire Biodiversity Records Centre (NBRC).

10.2.4 Evaluation of the nature conservation quality of pond data was based on two sources of information:

- all 24 ponds in this data set were compared against each other to differentiate between ponds of high quality and those of poor quality. In order to compare the ponds, a system was devised using the four PSYM metrics: number of plant species; number of invertebrate taxa; Biological Monitoring Working Party (BMWP)³⁶; and average score per taxon (ASPT)³⁷. For each of these metrics, the ponds were ranked in order from highest to lowest. Each pond was then allocated to one of four quartiles, with quartile 1 being the highest (representing 'best' quality) and quartile 4 the lowest (representing 'poorest' quality). The results are given in Table 112, Table 113 and Table 114; and
- each pond was compared against the national database held by the Pond Conservation Trust – the General Quality Assessment score.

³⁵ Pond Action [now the Pond Conservation Trust] (2002). A guide to monitoring the ecological quality of ponds and canals using PSYM. Pond Action. Oxford.

³⁶ BMWP (Biological Monitoring Working Party) scores assigned to taxa defined by Maitland (1977), so each is allocated a value from 1 to 10 depending on its known tolerance to organic pollution, a higher score indicates lower tolerance.

³⁷ ASPT = BMWP/No. of scoring taxa.

10.3 Deviations, constraints and limitations

- 10.3.1 Figure EC-01 shows the extent of ponds that were subject to field survey. Table 110 identifies those ponds where the requirement for survey was identified but it has not been possible to undertake any survey visits.
- 10.3.2 All ponds were surveyed using PSYM which was developed to provide a method for assessing the biological quality of still waters in England and Wales. This is due to seasonality and access constraints and because none were considered to warrant a more detailed National Pond Survey (NPS).
- 10.3.3 PSYM uses a number of aquatic plant and invertebrate measures (known as metrics), which are combined together to give a single value which represents the water body's overall quality. As such, PSYM may conceal the diversity of invertebrate species. For this reason, the analysis and discussion of the ponds below includes the Biological Monitoring Working Party (BMWP) score (part of the PSYM method) and the number of invertebrate taxa, as they provide additional information on invertebrate biodiversity.
- 10.3.4 PSYM is designed for use in the summer season (June, July and August); however, about 50% of the ponds surveys reported here were carried out in late-spring and early-autumn which is outside of the recommended period for using PSYM. The intention behind the seasonality of PSYM is to optimise the time when both plants and invertebrates can be sampled. However, in reality, autumn and spring are often more effective times to sample pond invertebrates as there is a higher chance of detecting their larval stages. Thus the data is considered to provide a reliable representation of the invertebrate interest of ponds.
- 10.3.5 Spring and autumn are suboptimal times to sample aquatic plants, as several species cannot be identified to species level without fruiting specimens, and aquatic plants tend to fruit in summer. It is possible that early and late season surveys may have underestimated aquatic plant diversity.
- 10.3.6 Surveys deviated from the Field Survey Methods and Standards where banks of ponds were too steep, or so overgrown to prevent full access. Similarly, some ponds were too deep to undertake comprehensive invertebrate sampling. In these cases, invertebrate surveys were completed as effectively as possible given the partial access to the pond edge.

Table 110 Summary of locations where requirement for pond survey was identified but no access available for survey

Ecology survey code	Pond description	Survey method proposed	CFA	Approximate distance from land required for construction of the Proposed Scheme (m) and orientation
Land on the east side of Denham Way, Rickmansworth	Large pond in amenity grassland, surrounded by trees. Island present.	Rapid assessment method/ Predictive System for Multimetrics (PSYM)/National Pond Survey (NPS)	7	300.13 north-east

Ecology survey code	Pond description	Survey method proposed	CFA	Approximate distance from land required for construction of the Proposed Scheme (m) and orientation
Hyde Manor, Chesham Road, Hyde End, HP16 0RG	Medium pond, set in amenity grassland, heavily shaded by overhanging mature trees	Rapid assessment method;/Predictive System for Multimetrics (PSYM)/National Pond Survey (NPS)	9	309.93m north-east
Land forming part of Hunts Green Farm, Hunts Green, Great Missenden, HP16 9LX	Small pond in arable field. No shading.	Rapid assessment method/ Predictive System for Multimetrics (PSYM)/National Pond Survey (NPS)	10	415.97m north-east
Barton Hill Farm, Newton Purcell, MK18 4BA	Small pond in improved grassland. Some shading from surrounding trees and shrubs.	Rapid assessment method/ Predictive System for Multimetrics (PSYM)/National Pond Survey (NPS)	13	207.83m west
Portway Farm, Twyford, MK18 4EA	Medium pond situated in small area of broadleaf woodland. Shaded.	Rapid assessment method/Predictive System for Multimetrics (PSYM)/National Pond Survey (NPS)	13	209.08m south-east

10.4 Baseline

Scoping

10.4.1 Ponds were scoped in for a detailed pond survey if they met the following criteria which are included within the Field Study Methods and Standards:

- holds water for four consecutive months or longer;
- has not been heavily managed; and
- supports a diverse or otherwise notable aquatic, emergent and marginal flora.

10.4.2 A Summary of the results from PSYM surveys is provided in Table 111.

10.5 Predictive System for Multimetrics (PSYM)

Table 111 Summary of results from PSYM surveys

Ecology survey code	Pond description	Plants			Invertebrates			General Quality Assessment (GQA) ³⁸	CFA	Approximate distance from land required for construction of the Proposed Scheme (m) and orientation
		Number of submerged and emergent plant species	Trophic ranking score for aquatic and emergent plants	Number of uncommon ³⁹ plant species	Average score per taxon	Number of dragonfly (Odonata) and alderfly (Megaloptera) families	Number of beetle families			
020-PS1-051001	Small, very shallow pond in area of grassland, south of farm. Exposed, no shade, hawthorn border on one edge.	2	10	2	5.5	1	1	Poor	10	Within the Proposed Scheme
020-PS1-055001	Medium pond surrounded by shrubs and trees in farmland. No shade.	3	10	1	4.42	0	1	Poor	10	83.68m
020-PS1-062001	Medium, deep pond on golf course. One side shaded by overhanging trees.	4	6.77	1	3.8	0	1	Very Poor	11	Within the Proposed Scheme
020-PS1-062002	Small, deep, fenced pond on golf course. No shade.	2	9	0	3.83	0	0	Very Poor	11	Within the Proposed Scheme
020-PS1-063001	Large pond on golf course. Southern end inaccessible, bordered	3	7.3	0	4.14	1	2	Poor	11	Within the Proposed Scheme

³⁸ GQA refers to the PSYM quality category (Index of Biotic Integrity (IBI) >75%=Good, 51-75%= Moderate, 25-50%=Poor, <25%=V Poor)

³⁹ Uncommon species refers to those which can be described as 'local', 'nationally scarce' or 'Red Data Book' based on existing definitions derived from the Red Data Books and other authorities.

Ecology	Pond description	Plants			Invertebrates			General	CFA	Approximate distance
	by trees. Northern end open and accessible.									
020-PS1-063002	Medium, shallow pond on golf course fairway. Managed to edge. No shade.	4	6.3	0	3.83	0	0	Very Poor	11	Within the Proposed Scheme
020-PS1-063003	Large, deep pond on golf course fairway. No shade, 1m border of emergent plants.	8	9.18	2	4.13	1	2	Poor	11	Within the Proposed Scheme
020-PS1-063004	Medium pond on golf course fairway. Some shade, 1m border of emergent plants.	3	9	0	4.67	1	1	Poor	11	Within the Proposed Scheme
020-PS1-064001	Small pond in corner of cattle pasture. Highly shaded.	5	10	1	4.29	0	2	Poor	11	374-33m
020-PS1-065001	Large pond in cattle pasture. Used by cattle. No shade, edges grazed.	5	9.67	1	4.14	0	2	Poor	11	58.90m
020-PS1-066001	Small pond in arable field with trees surrounding. Highly shaded.	3	9.5	1	3.75	0	1	Poor	11	Within the Proposed Scheme
020-PS1-071001	Small, shallow pond on the edge of cattle pasture. Grazed edges, no shade. One side inaccessible due to boundary fence.	7	9.67	1	4.25	0	0	Poor	12	6.39m

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Ecology	Pond description	Plants			Invertebrates			General	CFA	Approximate distance
020-PS1-074001	Small pond in amenity grassland. No shade.	4	9.17	0	4.5	1	0	Poor	12	Within the Proposed Scheme
020-PS1-074002	Medium pond in amenity grassland. Some shade on south side. Linked to River Ray.	7	9	0	4.88	3	3	Moderate	12	Within the Proposed Scheme
020-PS1-085001	Medium pond in amenity grassland. Some shade from overhanging trees. One edge managed.	4	8.1	0	4.56	1	3	Poor	13	12.60m
020-PS1-088001	Medium pond on disused railway line. Island in centre. Partial shade from surrounding trees.	7	8.83	0	5	2	2	Moderate	14	Within the Proposed Scheme
020-PS1-094001	Small, highly shaded pond in the corner of cattle pasture.	1	9	0	4.88	0	3	Poor	14	242.85m
020-PS1-104001	Large pond in cattle pasture surrounded by trees. Some shade, grazing along one side.	2	10	0	3.75	0	0	Very Poor	15	22.11m
020-PS1-105001	Small pond surrounded by trees, set in the middle of grassland pasture. Partial shade from surrounding trees.	4	9.5	0	3	0	0	Very Poor	15	108.77m
020-PS1-110001	Small, shallow pond in woodland area, set within amenity	2	9.5	0	3.5	0	0	Very Poor	15	182.48m

Ecology	Pond description	Plants			Invertebrates			General	CFA	Approximate distance
	grassland. Highly shaded.									
020-PS1-112001	Very large pond set in area of amenity grassland. Border 1m-2m of emergent plants surrounding entire pond. Several islands present.	7	8.6	0	4.3	0	0	Poor	15	228.35m
020-PS1-112002	Large, deep pond in amenity grassland. Shaded by overhanging trees, with one side inaccessible.	3	10	1	3.8	0	1	Poor	15	94.13m
020-PS1-112003	Large, deep pond set in amenity grassland. No shade with 2-3m border of emergent plants surrounding pond.	16	7.82	4	4.44	1	2	Good	15	258.87m
020-PS1-116001	Large, deep pond in area of woodland. High shaded and mostly inaccessible.	7	8.27	1	6.67	1	2	Moderate	15	11.54m

10.6 CFA 7 Colne Valley

- 10.6.1 Eleven ponds are present in the land required for construction of the Proposed Scheme. In areas of accessible land, no ponds meet the criteria to be scoped in for a detailed survey. However, one pond located in the vicinity of Buckinghamshire Golf Course was not accessible for a scoping survey and so its quality could not be determined.

10.7 CFA 8 The Chalfonts and Amersham

- 10.7.1 One pond is present within the land required for construction of the Proposed Scheme in this area; however this pond does not meet the criteria to be scoped in for a detailed survey.

10.8 CFA 9 Central Chilterns

- 10.8.1 Five ponds are present in the land required for construction of the Proposed Scheme. In areas of accessible land, no ponds meet the criteria to be scoped in for a detailed survey. However, four ponds were not accessible for a scoping survey and so their quality could not be determined. All of these ponds are located in the vicinity of Jenkins Wood, Great Missenden.

10.9 CFA10 Dunsmore, Wendover and Halton

- 10.9.1 Four ponds are present in the land required for construction of the Proposed Scheme. Two of these ponds were scoped in for survey. One pond is present in the vicinity of Nash Lee which could not be accessed for a scoping survey.
- 10.9.2 Pond 020-PS1-051001 is located at Hartley Farm, to the west of Kingsash, in an area of grassland. It is a small, shallow, clay-lined pond of approximately 100m², constructed by the farmer within the last five years. Two aquatic plant species were recorded. Both are considered local⁴⁰ by PSYM having been recorded from between 101 and 700 grid squares in Great Britain. Whilst water dock (*Rumex hydrolapathum*) has probably colonised naturally, it is almost certain that frogbit (*Hydrocharis morsus-ranae*) has been artificially introduced as it is usually found in longer-established and larger, more interconnected water bodies. Four scoring invertebrate taxa⁴¹ were recorded resulting in this pond being placed in the lowest quartile of all ponds surveyed. While the Average Score Per Taxon (ASPT)⁴² of 5.5 is the highest of any pond in the sample, this index is inflated by the presence of a dragonfly family (*Cordulegasteridae*) which is scored more highly in PSYM than other taxa. The BMWP score of 22 places this pond in the bottom quartile of all ponds surveyed.

⁴⁰ The PSYM method classifies plants at 'local' if they have been recorded from between 101 and 700 10x10 km grid squares in Britain. This is opposed to 'common' species which have been recorded from more than 700 10x10 km grid squares in Britain.

⁴¹ Scoring taxa are those listed and given a score in the BMWP/ASPT system used by PSYM. There may be other invertebrate taxa present in ponds which are not included in the system.

⁴² The ASPT is calculated by summing the Biological Monitoring Working Party (BMWP) scores for all taxa present at the site and dividing by the total number of BMWP taxa present.

- 10.9.3 Pond 020-PS1-055001 of 544.2m² is located at How Wellwick Farm, to the west of Wendover. It is situated in an area of grassland and appeared to have been recently created. Five aquatic plant species were recorded, of which two are considered by PSYM to be local: common water-crowfoot (*Ranunculus aquatilis*) and an unidentified species of stonewort (*Chara sp.*); an algae. The pond is one of the richest in invertebrates of all ponds surveyed, with ten scoring taxa recorded. Both the BMWP and ASPT scores are the third highest of any pond on the survey. PSYM data was compared to a national database held by the PCT and within CFA₁₅, two ponds are ranked 'poor'.

10.10 CFA 11 Stoke Mandeville and Aylesbury

- 10.10.1 Nine ponds are present in the land required for construction of the Proposed Scheme. All nine ponds were scoped in for detailed pond survey.
- 10.10.2 Pond 020-PS1-062001 is located at Aylesbury Park Golf Club, south-west of Aylesbury. This small, deep pond of 67m² is situated in amenity grassland, with one side being shaded by overhanging trees. The Trophic Ranking Score (TRS)⁴³ of 6.3, though based on a very limited number of species, is the lowest of all ponds surveyed, indicating only moderate levels of nutrient enrichment. Mare's-tail (*Hippuris vulgaris*) was recorded, a species which is classified as local under PSYM methodology. The invertebrate fauna of this pond appears to be limited, with five scoring taxa recorded, with both BMWP and ASPT scores being in the bottom quartile of all ponds surveyed.
- 10.10.3 Pond 020-PS1-062002 is located at Aylesbury Park Golf Club, south-west of Aylesbury. The pond is situated in amenity grassland, it is not shaded and is fenced. Only two emergent plant species were recorded from this pond, both of which are common. Six scoring invertebrate taxa were recorded, which is below average, as were the BMWP and ASPT scores indicating an invertebrate fauna of limited interest.
- 10.10.4 Pond 020-PS1-063001 is located at Aylesbury Park Golf Club, south-west of Aylesbury. It is a large pond (220m²) situated in amenity grassland. The southern end of the pond was inaccessible, as it is surrounded by trees. The northern end is open and accessible. Three common aquatic plant species were recorded. The Trophic Ranking Score of 6.3, although based only on a limited number of species, is the lowest of all ponds surveyed, indicating only moderate levels of nutrient enrichment. Seven scoring invertebrate taxa were recorded, and all of the invertebrate metrics are in the mid-range for the survey, placing this pond in the third quartile for both plant and invertebrate metrics.
- 10.10.5 Pond 020-PS1-063002 is located at Aylesbury Park Golf Club, south-west of Aylesbury. A small pond of 64m², situated in amenity grassland with 95% of the pond surface shaded by emergent sedge species (*Cyperaceae* spp.). Four common aquatic plant species were recorded, three emergent and one submerged species. The Trophic

⁴³ The PSYM methodology defines Trophic Ranking Score (TRS) as a measure of the average trophic rank for the pond. This is calculated by assigning each plant species with a trophic score based on its affinity to waters of a particular nutrient status. Plant scores vary between 2.5 (dystrophic, nutrient poor conditions) and 10 (eutrophic, nutrient rich conditions).

Ranking Score of 6.3, although based only on a limited number of species, is the lowest of all ponds surveyed, indicating only moderate levels of nutrient enrichment. Six scoring taxa of invertebrates were recorded, and all of the invertebrate metrics are in the fourth quartile.

- 10.10.6 Pond 020-PS1-063003 is located at Aylesbury Park Golf Club, south-west of Aylesbury. The pond is situated in amenity grassland. It is a large pond (929.74m²) with frequent emergent plants around the edges and open water in the centre. With eight plant species, this is the most botanically species-rich pond on Aylesbury Golf Course. Two of these species, water dock and white water-lily (*Nymphaea alba*), are classified as local under PSYM methodology. With a Trophic Ranking Score of 9.18, this pond is the most eutrophic pond on the golf course. All of the invertebrate metrics are in the mid-range of ponds on the survey, placing the pond in the second quartile for invertebrate metrics.
- 10.10.7 Pond 020-PS1-063004 is located at Aylesbury Park Golf Club, south-west of Aylesbury. This medium-sized pond (92m²) pond is situated in amenity grassland, and has marginal plants along its edges and open water in the centre. Approximately 25% of the pond edge is overhung by semi-mature trees. Three common aquatic plant species were recorded. With nine scoring taxa, a BMWP score of 42 and an ASPT score of 4.67, this is the best pond for invertebrates on the golf course, placing this pond in the upper quartile of all the ponds on the survey.
- 10.10.8 Pond 020-PS1-064001 is located at Putlowes Farm, to the north-west of Aylesbury. It is situated in the corner of a cattle pasture and is partly shaded. Five aquatic plant species were recorded four emergent and one submerged species, various-leaved water-starwort (*Callitriche platycarpa*), which is classified as local under PSYM methodology. The Trophic Ranking Score of 10 is the highest possible, indicating a very high level of eutrophication. Seven scoring invertebrate taxa were recorded and all invertebrate metrics were close to the median for the ponds surveyed, placing this pond in the third quartile for invertebrates.
- 10.10.9 Pond 020-PS1-065001 is located at Putlowes Farm, to the north-west of Aylesbury. It is situated in the centre of a cattle pasture and was heavily nutrient-enriched. Four marginal and emergent plant species were recorded, with common water-crowfoot present in the pond, a species classified as local under PSYM methodology. The Trophic Ranking Score of 9.67 is in the fourth quartile, indicative of a high level of eutrophication. This pond has an extremely high population of a *Daphnia* species (small aquatic crustaceans) although this is not a scoring taxon for BMWP. Seven scoring taxa were recorded, which is an average number for the survey, but both the ASPT and BMWP scores are in the third quartile, indicating that those taxa present are tolerant of relatively poor water quality.
- 10.10.10 Pond 020-PS1-066001 is located at Putlowes Farm, to the north-west of Aylesbury. It is situated in an arable field and is surrounded by scrub and trees, and is heavily shaded. This pond is largely covered by common duckweed (*Lemna minor*). Three emergent and marginal plant species were recorded, of which, common water-

crowfoot is classified as local under PSYM methodology. Four scoring invertebrate taxa were recorded, and all of the invertebrate metrics are in the fourth quartile, indicative of a poor quality pond. PSYM data was compared to a national database held by the PCT and within CFA15, three ponds are ranked 'very poor' and six ponds are ranked 'poor'.

10.11 CFA 12 Waddesdon and Quainton

- 10.11.1 Thirty-four ponds are present in the land required for construction of the Proposed Scheme. However, ponds in the vicinity of Doddershall House and Upper South Farm, Quainton, are not accessible for a scoping survey and so their quality could not be determined.
- 10.11.2 Pond 020-PS1-071001 is located at Buckinghamshire Railway Centre to the south-west of Quainton. It is situated at the northern edge of a cattle pasture, and the margins were trampled and grazed. A reasonable diversity of marginal plants are present with seven species, including pink water-speedwell (*Veronica catenata*), which is classified as uncommon under PSYM methodology, but with the water surface itself covered by common duckweed. The Trophic Ranking Score of 9.67 indicates a highly eutrophic condition, possibly as a result of enrichment by dung from grazing stock. This pond has a very limited invertebrate fauna. Although the ASPT score of 4.25 appears average, this is based on only four scoring taxa and a BMWP score of 17, which is one of the lowest recorded.
- 10.11.3 Pond 020-PS1-074001 is located at Woodlands Farmhouse, to the north-west of Quainton. The pond is situated in semi-improved grassland but is largely surrounded by trees. The combination of overhanging trees and steep banks limited the extent to which the invertebrate fauna could be sampled. Six common aquatic plant species were recorded, all of which were common emergent species, including soft-rush (*Juncus effusus*) and great willowherb (*Epibolium hirtutum*). The invertebrate metrics were approximately mid-range for ponds surveyed, placing this pond in the third quartile for invertebrate metrics.
- 10.11.4 Pond 020-PS1-074002 is located at Woodlands Farm, to the north-west of Quainton. The pond is set in semi-improved grassland. Seven aquatic plant species were recorded, but this pond is dominated by two invasive alien species New Zealand pigmyweed (*Crassula helmsii*) and parrot's-feather (*Myriophyllum aquaticum*). In spite of the alien plant species present, this pond is the most diverse in terms of invertebrates, with sixteen scoring taxa including three families of both Coleoptera and Odonata. At least eight species of Coleoptera are present. The BMWP score of 78 is by far the highest of any pond surveyed, while the ASPT score of 4.88 is the fourth highest. This high level of invertebrate diversity is considered most likely due to the shallow pond depth and drawdown zone, which provides habitat for a number of species. PSYM data was compared to a national database held by the PCT and within CFA12, two ponds are ranked 'poor' and one pond is ranked 'moderate'.

10.12 CFA 13 Calvert, Steeple Claydon, Twyford and Chetwode

- 10.12.1 Thirty-six ponds are present within the land required for construction of the Proposed Scheme. Several ponds are present in the vicinity of Calvert which could not be accessed for a scoping survey.
- 10.12.2 Pond 020-PS1-085001 is located at Rosehill Farm, to the south of Chetwode. The pond is situated in amenity grassland and was artificially created, probably recently. The owner stated that fish are present. Four common aquatic plant species are present. The Trophic Ranking Score of 8.1 is one of the lowest of all ponds surveyed, indicating a relatively low level of eutrophication. With nine scoring taxa, including three families of Coleoptera, this pond holds one of the more diverse invertebrate faunas. The Odonata and Megaloptera metrics are both in the second quartile of ponds surveyed. PSYM data was compared to a national database held by the PCT and within CFA13, one pond is ranked 'poor'.

10.13 CFA 14 Newton Purcell to Brackley

- 10.13.1 Eight ponds are present in the land required for construction of the Proposed Scheme. Several ponds are present in the vicinity of Widmore Farm, Newton Purcell and Oatleys Farm, Turweston which could not be accessed for a scoping survey.
- 10.13.2 Pond 020-PS1-088001 is located to the north of Newton Purcell, in grassland along a dismantled railway. The majority (65%) of this pond is overhung by trees and it has very steep sides, making sampling for invertebrates difficult, with water accessible at only two points. Seven aquatic species were recorded, with 75% of the pond surface covered by emergent plants. One floating-leaved plant is present, common duckweed, and no submerged plants are present. Eight scoring invertebrate taxa were recorded and the ASPT score of 5 is the fourth highest on the survey, indicating relatively good water quality.
- 10.13.3 Pond 020-PS1-094001 is located at Glebe Farm, Turweston. The pond is located in the corner of a cattle pasture and was largely dry at the time of the survey. The only aquatic plant species recorded from this pond was common duckweed, placing this pond in the fourth quartile for plant metrics. In spite of the lack of aquatic plants, the pond is relatively rich in invertebrates with eight scoring taxa and all invertebrate metrics above average, placing this pond in the second quartile. PSYM data was compared to a national database held by the PCT and within CFA14, one pond is ranked 'poor' and one pond is ranked 'moderate'.

10.14 CFA 15 Greatworth to Lower Boddington

- 10.14.1 Twenty-nine ponds are present in the land required for construction of the Proposed Scheme. In areas of accessible land, seven ponds met the criteria to be scoped in for a detailed survey. Several ponds are present in the vicinity of Culworth but could not be accessed for a scoping survey.

- 10.14.2 Pond 020-PS1-104001 is located at Magpie Farm, to the north-east of Thorpe Mandeville. The pond is set in cattle pasture, and is heavily shaded (80%) and anoxic. Two emergent plant species but no submerged or floating-leaved plant species were recorded. The Trophic Ranking Score is ten, the maximum possible, indicating a very high level of eutrophication. Four scoring invertebrate taxa were recorded, all of which are common and tolerant of poor water quality. All of the invertebrate metrics are among the lowest of all ponds on the survey, placing this pond in the fourth quartile for both plant and invertebrate metrics.
- 10.14.3 Pond 020-PS1-105001 is located to the west of Banbury Lane in Thorpe Mandeville. This small pond is set in an arable field and surrounded by trees. The pond is partially shaded by adjacent trees. Five species of aquatic plants (four emergent species and common duckweed) were recorded from this pond. One scoring invertebrate taxon, a leech species of the family Glossiphoniidae, was recorded. This is the lowest quality pond (based on its BMWP and ASPT scores) of all ponds surveyed for its invertebrate assemblage, placing this pond in the fourth quartile for invertebrate metrics.
- 10.14.4 Pond 020-PS1-110001 is located at Chipping Warden Manor in Chipping Warden. The pond is situated in a small area of woodland set within amenity grassland. The pond is stagnant and was entirely shaded by trees. Only common duckweed and a starwort species (*Callitriche* sp.) were recorded from the pond, and the Trophic Ranking Score of ten is the maximum possible score, indicating a very high level of eutrophication, placing this pond in the fourth quartile for plant metrics. Although eight invertebrate scoring taxa were recorded, these are all species tolerant of poor water quality and the ASPT score of 3.5 is the second lowest of all the ponds surveyed. Placing this pond in the third quartile for invertebrate metrics.
- 10.14.5 Pond 020-PS1-112001 is located at Manor Farm in Aston le Walls. This very large pond (over 10,000m²) is situated in area of amenity grassland. A 2m buffer of marginal vegetation is present around the entire pond. A number of islands are present within the pond. Seven aquatic plant species were recorded, and the Trophic Ranking Score of 8.6 placed the pond in the bottom quartile, suggesting a relatively low level of eutrophication. Ten scoring invertebrate taxa were recorded, the equal third highest number found in any pond on the survey, giving a BMWP score of 43, the fourth highest. However, the ASPT score of 4.3 is average, suggesting most of these taxa are tolerant of poor water quality.
- 10.14.6 Pond 020-PS1-112002 is located at Manor Farm in Aston le Walls. It was a large pond of 615.8m² and is set in amenity grassland. The pond is shaded by overhanging trees, with one edge being inaccessible due to overgrown scrub. Three emergent plant species were recorded, one of which, water dock, is classified as local under PSYM methodology. No submerged plants were recorded, but there is an abundance of ivy-leaved duckweed (*Lemna trisulca*), a floating-leaved plant. Five scoring invertebrate taxa were recorded and all of the invertebrate metrics are in the fourth quartile.
- 10.14.7 Pond 020-PS1-112003 is located at Manor Farm in Aston le Walls. The pond is 1682.5m² and is set in amenity grassland. This large pond supports sixteen species of aquatic plants, which is the highest number of plant species recorded from any pond.

Three of these species are classified as local under PSYM methodology: water dock, yellow loosestrife (*Lysimachia vulgaris*) and pink water speedwell. The Trophic Ranking Score of 7.8 is the fourth lowest of any pond surveyed. In summary, this pond is considered to be the best overall for plants, placing it in the first quartile for plant metrics. However, the land owner stated that he had introduced a number of native plant species to these recently excavated ponds (020-PS1-112001, 020-PS1-112002, 020-PS1-112003). In terms of its overall invertebrate diversity, this pond was ranked as slightly above average, while the number of scoring taxa places it in equal fourth place. This indicates that there is a good range of taxa present, but all of the species recorded have some tolerance of poor water quality. This pond places in the second quartile for invertebrate metrics.

- 10.14.8 Pond 020-PS1-116001 is located at Fox Covert, to the east of Wormleighton. The pond of 260m² is set in woodland, and is completely overhung by trees, but its size allowed a reasonable amount of light to reach the water's surface. The majority of the pond is inaccessible, with only a small section of bank along one edge suitable to sample invertebrates. Seven aquatic plant species were recorded including water chickweed (*Myosoton aquaticum*) which is classified as local under PTSM methodology. This pond places in the first quartile for plant metrics. Nine scoring invertebrate taxa were recorded, and all of the invertebrate metrics are in the first quartile. PSYM data was compared to a national database held by the PCT and within CFA15, three ponds are ranked 'very poor', two ponds are ranked 'poor', one pond is ranked 'moderate' and one pond is ranked 'good'.

10.15 Discussion

- 10.15.1 Many of the ponds surveyed can readily be allocated to a quartiles e.g. Pond 020-PS1-074002 is in the first quartile for all metrics and therefore of high quality, whereas Pond 020-PS1-104001 is in the lowest quartile for all metrics and is therefore of poor quality.
- 10.15.2 Some ponds score highly for some metrics but less so for others; for example, Pond 020-PS1-094001 supports few plant species but a high number of invertebrate taxa relative to other ponds surveyed.
- 10.15.3 The outcome of comparing the various PSYM metrics for all of the ponds surveyed is presented in Table 112 and Table 113.

Table 112 Pond Survey Data and Pond BMWP and ASPT Scores

Ecological survey code	CFA	Number of plant species	Number of invertebrate taxa	BMWP score	ASPT score
020-PS1-051001	10	2	4	22	5.5
020-PS1-055001	10	5	10	50	5
020-PS1-062001	11	4	5	19	3.8
020-PS1-062002	11	2	6	23	3.83

Ecological survey code	CFA	Number of plant species	Number of invertebrate taxa	BMWP score	ASPT score
020-PS1-063001	11	3	7	29	4.14
020-PS1-063002	11	4	6	23	3.83
020-PS1-063003	11	8	8	33	4.13
020-PS1-063004	11	3	9	42	4.67
020-PS1-064001	11	5	7	30	4.29
020-PS1-065001	11	5	7	29	4.14
020-PS1-066001	11	3	4	15	3.75
020-PS1-071001	12	7	4	17	4.25
020-PS1-074001	12	4	6	27	4.5
020-PS1-074002	12	7	16	78	4.88
020-PS1-085001	13	4	9	41	4.56
020-PS1-088001	14	7	8	40	5
020-PS1-094001	14	1	8	39	4.88
020-PS1-104001	15	2	4	15	3.75
020-PS1-105001	15	4	1	3	3
020-PS1-110001	15	2	8	28	3.5
020-PS1-112001	15	7	10	43	4.3
020-PS1-112002	15	3	5	19	3.8
020-PS1-112003	15	16	9	40	4.44
020-PS1-116001	15	7	9	42	4.7

Table 113 Ranked Data Expressed as Quartiles by PYSM Criteria (where 1 = highest (best), 4= lowest (worst))

Ecological survey code	CFA	Number of plant species	Number of invertebrate taxa	BMWP score	ASPT score	Sum
020-PS1-074002	12	1	1	1	1	4
020-PS1-055001	10	2	1	1	1	5
020-PS1-112001	15	1	1	1	2	5
020-PS1-116001	15	1	1	1	2	5
020-PS1-	15	1	1	2	2	6

Ecological survey code	CFA	Number of plant species	Number of invertebrate taxa	BMWP score	ASPT score	Sum
112003						
020-PS1-088001	14	1	2	2	1	6
020-PS1-063004	11	3	1	1	2	7
020-PS1-085001	13	2	1	2	2	7
020-PS1-063003	11	1	2	2	3	8
020-PS1-094001	14	4	2	2	1	9
020-PS1-064001	11	2	3	2	3	10
020-PS1-074001	12	2	3	3	2	10
020-PS1-065001	11	2	3	3	3	11
020-PS1-063002	11	2	3	3	3	11
020-PS1-063001	11	3	3	3	3	12
020-PS1-071001	12	1	4	4	3	12
020-PS1-110001	15	4	2	3	4	13
020-PS1-051001	10	4	4	4	1	13
020-PS1-062002	11	4	3	3	4	14
020-PS1-062001	11	2	4	4	4	14
020-PS1-105001	15	2	4	4	4	14
020-PS1-112002	15	3	4	4	4	15
020-PS1-066001	11	3	4	4	4	15
020-PS1-104001	15	4	4	4	4	16

10.15.4 On the basis of these scores, it is considered that the following ten ponds are of higher ecological value:

- 020-PS1-074002
- 020-PS1-055001
- 020-PS1-112001
- 020-PS1-116001
- 020-PS1-112003
- 020-PS1-088001
- 020-PS1-063004
- 020-PS1-085001
- 020-PS1-063003
- 020-PS1-094001

10.15.5 The following five ponds are of lower comparable quality using this assessment method, for both plants and invertebrates, and therefore considered to be of lower ecological value.

- 020-PS1-051001
- 020-PS1-062002
- 020-PS1-112002
- 020-PS1-066001
- 020-PS1-104001

10.15.6 The remaining nine remaining ponds are comparable of intermediate ecological quality.

- 020-PS1-071001
- 020-PS1-064001
- 020-PS1-074001
- 020-PS1-065001
- 020-PS1-063002
- 020-PS1-062001
- 020-PS1-105001
- 020-PS1-063001

- 020-PS1-110001

Table 114 PSYM quality category (Index of Biotic Integrity (IBI) >75%=Good, 51-75%= Moderate, 25-50%=Poor, <25%=V Poor)

Ecological Survey Code	CFA	Sum of Individual Metrics	Index of Biotic Integrity	PSYM Quality Category
020-PS1-051001	10	9	50%	Poor
020-PS1-055001	10	6	33%	Poor
020-PS1-062001	11	4	22%	Very Poor
020-PS1-062002	11	4	22%	Very Poor
020-PS1-063001	11	6	33%	Poor
020-PS1-063002	11	2	11%	Very Poor
020-PS1-063003	11	9	50%	Poor
020-PS1-063004	11	8	44%	Poor
020-PS1-064001	11	7	39%	Poor
020-PS1-065001	11	6	33%	Poor
020-PS1-066001	11	6	33%	Poor
020-PS1-071001	12	5	28%	Poor
020-PS1-074001	12	6	33%	Poor
020-PS1-074002	12	13	72%	Moderate
020-PS1-085001	13	9	50%	Poor
020-PS1-088001	14	11	61%	Moderate
020-PS1-094001	14	9	50%	Poor
020-PS1-104001	15	3	17%	Very Poor
020-PS1-105001	15	2	11%	Very Poor
020-PS1-110001	15	3	17%	Very Poor
020-PS1-112001	15	8	44%	Poor
020-PS1-112002	15	5	28%	Poor
020-PS1-112003	15	14	78%	Good
020-PS1-116001	15	10	56%	Moderate

10.15.7 Data was received from the Pond Conservation Trust which gives an Index of Biotic Integrity (IBI) for each of the ponds surveyed. The IBI ranks each pond and may be used in addition to the PSYM to provide an indication of overall pond quality. This information is presented in Table 114 along with the PSYM data.

- 10.15.8 The IBI data indicates that of the 24 ponds surveyed, one pond (020-PS1-112003) is regarded as being of 'good' quality, three ponds are regarded as being of 'moderate' quality, 14 are regarded as being of 'poor' quality, and the remaining six are regarded as being of 'very poor' quality.
- 10.15.9 The majority of the ponds (20 out of 24) within the land of the construction of the Proposed Scheme are thus of 'poor' or 'very poor' quality. The findings of the pond surveys undertaken broadly accord with the findings provided by Countryside Survey 2007⁴⁴ data which provided consistent evidence that ponds in England and Wales were widely degraded, with around 80% of ponds 'poor' or 'very poor' quality. On average, ponds supported 38% of the expected number of wetland plant species and 21% of the expected number of uncommon plants. Mean Trophic Ranking Scores are 13% above predicted levels suggesting ponds are commonly polluted by nutrients.
- 10.15.10 Ponds are poorer in quality or had fewer plant species where: (i) they have elevated nutrients levels, (ii) are located in areas of arable land, or (iii) have inflows. There is also a strong relationship between poorer pond quality and greater tree shade.

⁴⁴ Countryside Survey Technical Report No. 7/07 (2010). Ponds Report from 2007.

11 Lake Ecological Surveys

11.1 Introduction

11.1.1 This section of the appendix presents details of the baseline information relating to lake ecological surveys for the section of the Proposed Scheme that will pass through CFA 7 to 8 inclusive.

11.2 Methodology

11.2.1 Lake ecological surveys were carried out on lakes, including benthic diatoms, cyanobacteria, zooplankton, aquatic macrophytes, macroinvertebrates and fish. Methodologies are presented below as they were not initially provided in Scope and Methodology Report Addendum (Volume 5: Appendix CT-001-000/2).

11.2.2 Results from all 2013 field surveys are clearly marked as '2013 data' under each CFA in the section entitled "baseline".

Desk Study - Affinity Water Data

11.2.3 Sand and gravel extraction in the last century has led to the creation of a series of lakes and wetlands in the Mid Colne Valley. These lakes form part of the Colne Valley Regional Park: Stockers, Springwell, Marsh, Clubhouse, Lynster's Lakes (three lakes), Pynesfield, Broadwater, Harefield, Allen and Korda. The purpose of the Mid Colne assessment undertaken by Affinity Water (a water supply company) was to quantify the baseline condition of each of the lakes, and to understand the hydrological and ecological inter-dependencies. The ecological condition of each lake was determined with the aim of establishing whether these conditions are related to the current levels of water abstraction from the lakes by Affinity Water. Affinity Water data from 2011-2012 (where available) was summarised for each lake waterbody.

2013 Surveys

Diatom

11.2.4 Diatom (phytobenthos) samples were collected and analysed according to SNIFFER (2008) diatom procedure⁴⁵, which is compliant with the DARES/DALES methodologies and DARLEQ (WFD compliant) methodology. The sampling method used followed the general principles set out in the standard method EN 13946:2003 Water Quality – Guidance standard⁴⁶ for the routine sampling and pre-treatment of benthic diatoms from rivers.

11.2.5 Samples of benthic diatom species were collected by brushing the upper surface of cobbles or small boulders obtained from the littoral zones of lakes in order to remove

⁴⁵ Water Framework Directive - United Kingdom Advisory Group (UK-TAG), 2008. UK-TAG Lake Assessment Methods - Macrophytes and Phytobenthos: Phytobenthos - Diatom Assessment of Lake Ecological Quality (DARLEQ). SNIFFER, Edinburgh

⁴⁶ British Standards Institution, 2003. BS EN 13946:2003, BS 6068-5-33:2003. Water Quality. Guidance standard for the routine sampling and pre-treatment of benthic diatoms from rivers. www.bsigroup.com

the biofilm. Where the bed of a lake was dominated by fine sediments, samples were collected from submerged stems of emergent macrophytes such as common reed (*Phragmites australis*), branched bur reed (*Sparganium erectum*), reed sweet-grass (*Glyceria maxima*) or bulrush (*Typha* spp). Samples were preserved with Lugol's Iodine Solution upon collection and permanent slides were made using acid digestion techniques.

- 11.2.6 Data were analysed in terms of Lake Trophic Diatom Index (TDI) for each lake sample. The analytical method used conformed to EN 14407:2004 Water Quality – Guidance standard⁴⁷ for the identification, enumeration and interpretation of benthic diatom samples from running waters.

Cyanobacteria

- 11.2.7 Cyanobacteria (blue-green algae) samples were taken by immersing a clean sample bottle beneath the surface of the water until full, from a depth of around 30cm in water that was at least one metre deep. Samples were preserved with Lugol's Iodine Solution upon collection and were analysed according to SNIFFER's Water Framework Directive-compliant methodology (2008)⁴⁸. Results were presented in the form of calculated species abundances per litre.

Zooplankton

- 11.2.8 Zooplankton samples were undertaken using a 250µm mesh plankton net, which was be trawled horizontally across the water's surface for five metres at three locations (15m total). Samples were preserved by use of Industrial Methylated Spirits (IMS) according to methodology proposed by Black & Dodson (2003)⁴⁹. Samples were analysed according to a method compliant with the Environmental Change Network (ECN) zooplankton methodology (1999)⁵⁰. Results were presented in the form of calculated species abundances per litre.

Macrophytes

- 11.2.9 Macrophyte surveys were conducted in accordance with SNIFFER's Water Framework Directive-compliant LEAFPACS methodology (2008)⁵¹. Between two and four lake sectors were surveyed. Each sector comprised a 100 metre length, extending from the shore to the centre of the lake, or to the maximum depth of colonisation of macrophytes. The sectors were arranged to give an approximately equal spread around the perimeter of the lake.

⁴⁷ British Standards Institution, 2004. BS EN 14407:2004, BS 6068-5-35:2004. Water Quality. Guidance standard for the identification, enumeration and interpretation of benthic diatom samples from running waters. www.bsigroup.com

⁴⁸ Water Framework Directive - United Kingdom Advisory Group (UK-TAG), 2008. UK-TAG Lake Assessment Methods - Phytoplankton: Chlorophyll A and Percentage Nuisance Cyanobacteria. SNIFFER, Edinburgh.

⁴⁹ Black, A.R., and Dodson, S.I., 2003. Ethanol: a better preservation technique for Daphnia. Limnol. Oceanogr. Methods 1: 45-50

⁵⁰ NERC, 1999. FZP Protocol for Crustacean Zooplankton: To monitor changes in the abundance of zooplankton in standing waters. The UK Environmental Change Network Protocols for Standard Measurements at Freshwater Sites, www.ecn.ac.uk

⁵¹ Water Framework Directive - United Kingdom Advisory Group (UK-TAG), 2008. UK-TAG Lake Assessment Methods - Macrophytes and Phytobenthos: Macrophytes (Lake LEAFPACS). SNIFFER, Edinburgh.

- 11.2.10 The lake was surveyed in order to establish a list of each macrophyte species present in each sector. Each taxon was assigned a value (0 -100 %) which was an estimate of the percentage cover of the taxon in the area of the lake surveyed. The surveying method conformed to BS EN 15460:2007⁵² Water Quality – Guidance standard for the surveying of macrophytes in lakes. LEAFPACS analysis was conducted on the survey results to provide: Lake Macrophyte Nutrient Index (LMNI), Number of functional groups of macrophyte taxa (NFG), Number of macrophyte taxa (NTAXA), Mean percentage cover of hydrophytes (COV) and Relative percentage cover of filamentous algae (ALG).

Macroinvertebrates

- 11.2.11 Macroinvertebrate surveys were conducted in accordance with SNIFFER Water Framework Directive-compliant RICT methodology (2008)⁵³, adapted to suit the lentic conditions experienced in lake ecosystems.
- 11.2.12 A kick sample survey was carried out in the lake whereby the substrate was disturbed with the feet. A hand net with a mesh size of one millimetre was held vertically in the water and moved through the resulting cloud of detritus. In addition, the net was swept through marginal vegetation, knocking the plants with the frame of the net to dislodge any invertebrates present. The kick sample and sweep of marginal vegetation was conducted for three minutes to ensure all habitats within the selected survey site were sampled.
- 11.2.13 The lake was surveyed in order to establish a list of macroinvertebrate species present. Each taxon was assigned a value based on the tolerance to pollution of their macroinvertebrate family, and the sum of these values used to calculate the Biological Monitoring Working Party (BMWP) score for the water body. The surveying method conformed to BS EN 27828:1994 Water Quality - Guidance standard for hand net sampling of aquatic benthic macroinvertebrates. Analysis was conducted on the survey results to provide BMWP, number of taxa (NTAXA) and average score per taxon (ASPT).

Fish

- 11.2.14 All lakes sampled were relatively small (less than 50ha) and lacked a pelagic/profundal zone. Harefield Moor was moderately deep, reaching 3.65m at its deepest point. No recording of depth was taken at Shardeloes Lake. In order to establish fish community present sampling methods were selected in line with BS EN 14962:2006⁵⁴, whilst taking site specific constraints into account. Where possible littoral habitat was sampled using a combination of electric fishing (BS EN 14011:2003⁵⁵) and fyke netting,

⁵² British Standards Institution, 2007. BS EN 15460:2007. Water Quality. Guidance standard for the surveying of macrophytes in lakes. www.bsigroup.com

⁵³ Water Framework Directive - United Kingdom Advisory Group (UK-TAG), 2008. UK-TAG River Assessment Methods - Benthic Invertebrate Fauna: River Invertebrate Classification Tool (RICT). SNIFFER, Edinburgh.

⁵⁴ British Standards Institution, 2006, BS EN 14962:2006, BS 6068-5.40:2006. Water Quality - Guidance on the scope and selection of fish sampling methods.

⁵⁵ British Standards Institution, 2003, BS EN 14011:2003, BS 6068-5.32:2003. Water Quality - Sampling of fish with electricity.

middle habitat was sampled with fyke nets. Fyke netting consisted of three sets of seven ring double D nets set overnight. Fish species and fork length were recorded along with environment and habitat data.

11.3 Deviations, constraints and limitations

Site Access Constraints

11.3.1 The following lakes were not surveyed due to access issues:

- Korda / Long pond - unable to access for fishery surveys;
- Savay Lake – no access permitted for any survey; and
- Harefield no. 2 (Denham Lake) – no access permitted for any survey.

Macroinvertebrate survey limitations

11.3.2 Macroinvertebrate samples were analysed to family-level, therefore, no detailed conservation value assessment was possible. 2013 data were limited to a single autumn sample, therefore seasonal variability was not assessed. No comparison was made between observed and expected ASPT/BMWP scores.

Macrophyte survey limitations

11.3.3 Macrophyte surveys were conducted from a boat, using grapnels to subsample, and by observing with polarised glasses. Due to the high algal and macrophyte cover, it is possible that infrequent taxa were missed during survey. This risk was reduced by conducting multiple transects.

Fish survey limitations

11.3.4 Otter guards were used in compliance with Environment Agency consent; this precludes the sampling of larger fish, although juveniles will still enter. Sampling using beach seine was planned, but not possible due absence of landowner consent

11.4 Baseline

CFA7

Korda Lake (027001)

Affinity Water Data

Lake Habitat Survey

11.4.1 A Lake Habitat Survey carried out in 2011 recorded that Korda Lake is linked to Long Pond in to which there is seepage from the adjacent River Colne, but no outlets were seen.

11.4.2 The riparian zone is bordered by woodland comprising trees greater than 5m in height and less than 0.3m in diameter, with woody shrubs, saplings, and tall herbs and

grasses. Japanese knotweed (*Fallopia japonica*) was also recorded as being present in two of the 10 habitat plots assessed. The bank face slope varied from gentle to near vertical with the vegetation structure comprising trees greater than 5m in height. Macrophytes on the bank extended lakewards, and Nuttall's pondweed (*Elodea nuttallii*) was recorded with an extent of more than 1 - 10% in four of the 10 habitat plots. Non-deltaic un-vegetated islands comprised 1% of the lake surface area, with non-deltaic vegetated islands comprising a further more than 1 - 10%. The water in the lake had moderate turbidity, and the substrate was composed of silt/clay.

- 11.4.3 Signal crayfish (*Pacifastacus leniusculus*) and zebra mussels (*Dreissena polymorpha*) have been recorded as being present at the site, and are predated by mink (*Neovision vision*). Anecdotal evidence suggests that the lake had been full of Canadian pondweed (*Elodea canadensis*) and signal crayfish, but the abundance of these species had reduced in recent years. Korda Lake was considered to be excellent for tench (*Tinca tinca*), and contains carp (*Cyprinus carpio*) and large eels (*Anguilla anguilla*). Large swan mussel (*Anodonta cygnea*) shells were observed by the surveyors, along with sewage fungus near the site of water seepage from the River Colne.

Macrophyte Survey

- 11.4.4 In 2011, macrophyte surveys were carried out on Korda Lake, comprising three boat transects and three wader transects, each 100m in length. The average water depth at 50cm from the shoreline during the wader surveys was 0.16m, with an average depth of 0.4m 100cm from the shoreline. The average water depth during the boat transects was 2.70m. The substrate was composed predominantly of silt and gravel, with filamentous algae (*Cladophora spp.*), Nuttall's pondweed (*Elodea nuttallii*), common reed (*Phragmites australis*) and bulrush (*Typha spp.*) present. No additional species of macrophyte were recorded during the boat survey transects.

Macroinvertebrate Survey

- 11.4.5 Macroinvertebrate surveys were carried out on behalf of Affinity Water during spring and autumn 2012. The spring survey recorded 15 families within the sample, dominated by Crangonyctidae (amphipod crustaceans) and Chironomidae (midge larvae). The results of the autumn survey recorded 10 families within the sample, three of which (Ancyliidae, Planorbidae and Sphaeriidae) were not recorded in the spring survey. The autumn sample was dominated by Chironomidae and Oligochaetae (worms).

2013 Data

Diatom

- 11.4.6 A total of 18 species were recorded from the sample, which was dominated by *Amphora pediculus*, *Achnantheidium minutissimum* var. *minutissimum* and *Nitzschia liebtruhii*.

Cyanobacteria

- 11.4.7 Three species of blue-green algae were recorded from the sample, which was dominated by *Anabaena variabilis s. lato*. *Anabaena compacta* filaments and *Microscystis flos-aquae* colonies were also recorded at the site.

Zooplankton

- 11.4.8 Zooplankton were sampled using three 5m trawls. Three species of zooplankton were recorded from the sample, which was dominated by the waterflea, *Daphnia longispina*. The copepod, *Thermocyclops crassus* and a single large indeterminate copepod were also found.

Long Pond (028001)

Affinity Water Data

Lake Habitat Survey

- 11.4.9 A Lake Habitat Survey carried out in 2011 recorded that Long Pond has an outlet into Korda Lake. A total of 10 habitat-plot locations were surveyed, of which two contained algal blooms, and one was recorded as having Japanese knotweed (*Fallopia japonica*) present with an extent of more than 40 - 75%. The riparian zone is bordered by woodland comprising trees greater than 5m in height and less than 0.3m in diameter, with woody shrubs, saplings, and tall herbs and grasses. The bank face slope varied from sloped to near vertical with the vegetation structure comprising mixed vegetation with trees greater than 5m in height. The littoral substrate comprises silt/clay, pebbles and sand, and any macrophytes present do not extend lakewards. Some free-floating algal mats and surface scum were present, along with some filamentous algae; no non-native macrophyte species were recorded at Long Pond.
- 11.4.10 Pressures on lake ecology comprise angling from shore, non-boat recreation/swimming and anthropogenic influences increasing nutrient levels, but the overall intensity was considered to be minimal. The water in the lake has moderate turbidity, with no odour and surface films comprising algal mats.

Macrophytes

- 11.4.11 In 2011, macrophyte surveys were carried out on Long Pond comprising three boat transects and three wader transects, each 100m in length. The average water depth at 50cm from the shoreline during the wader surveys was 0.45m, with an average depth of 0.56m 100cm from the shoreline. The average water depth during the boat transects was 2.61m. The substrate comprised predominantly of silt and gravel, with filamentous algae, water forget-me-not (*Myosostis scorpioides*), water mint (*Mentha aquatica*), creeping buttercup (*Ranunculus repens*) and blue-green algae present. In addition, filamentous algae (*Cladophora spp.*) were recorded during the boat survey transects.

Macroinvertebrates

- 11.4.12 Macroinvertebrate surveys were carried out during spring and autumn 2012. The spring survey recorded 10 families within the sample, dominated by Crangonyctidae (amphipod crustaceans) and Chironomidae (midge larvae). The results of the autumn survey recorded only three families within the sample, again dominated by Crangonyctidae. Oligochaeta (worms) and Chironomidae were also present in the sample in low numbers.

2013 Data

Diatoms

- 11.4.13 A total of 17 species were recorded from the sample, which was dominated by *Amphora pediculus*, *Nitzschia dissipata* and *Nitzschia liebtruhii*. This site is heavily shaded and bordered by the River Colne.

Cyanobacteria

- 11.4.14 Three species of blue-green algae were recorded from the sample, which was dominated by *Anabaena variabilis s. lato*. *Anabaena planctonica* and *Pseudanabaena redeckeii* filaments were also recorded at the site.

Zooplankton

- 11.4.15 Two species of zooplankton were recorded from the sample, which was dominated by *Daphnia longispina*; *Thermocyclops crassus* was also found. The sample was dominated by Volvocaceae (most likely *Volvox* sp.) and filamentous material.

Harefield Moor (027002)

Affinity Water Data

Lake Habitat Survey

- 11.4.16 A Lake Habitat Survey was carried out on Harefield Moor in 2011. A total of 10 habitat-plot locations were surveyed; no non-native species were recorded as being present. The riparian zone is bordered by woodland comprising trees greater than five metres in height and less than 0.3m in diameter, with woody shrubs, saplings, and tall herbs and grasses. The bank face slope varied from gentle to near vertical with the vegetation structure comprising mixed vegetation with trees greater than 5m in height. There were also bankside modifications present in the form of angler posts. The littoral substrate comprises silt/clay, pebbles and sand, and any macrophytes present do not extend lakewards. The beach displays evidence of active gain, and is present due to quarry spoil. The littoral vegetation structure is limited, with no greater than 40% volume inhabited by macrophytes; no non-native species were recorded at Harefield Moor.
- 11.4.17 An active quarry on the eastern side of the lake indirectly affects the whole site, and directly affects three of the 10 habitat-plots. Sediment is offloaded directly into the lake, which is changing the lake profile in the north-eastern corner. In the same three habitat plots affected by the quarry, the lake is also affected by the mooring of

derelict vessels. Non-deltaic un-vegetated islands comprise 1% of the lake surface area, with non-deltaic vegetated islands comprising a further more than 1 - 10%.

- 11.4.18 Pressures on lake ecology comprise sediment extraction/dredging, dumping, angling from shore and fish stocking, but the overall intensity of recreational pressures is considered to be minimal. The water in the lake is turbid, but with no odour or surface films.

Macrophytes

- 11.4.19 In 2011, macrophyte surveys were carried out on Harefield Moor comprising three boat transects and three wader transects, each 100m in length. The average water depth at 50cm from the shoreline during the wader surveys was 0.24m, with an average depth of 0.38m 100cm from the shoreline. The average water depth during the boat transects was 1.92m. The substrate was comprised predominantly of silt and gravel, with unbranched bur-reed (*Sparganium emersum*), willow (*Salix* spp.), creeping cinquefoil (*Potentilla reptans*), alder (*Alnus* spp.), water forget-me-not (*Myosostis scorpioides*), white water-lily (*Nymphaea alba*), water mint (*Mentha aquatica*) and common reed (*Phragmites australis*) present. No additional species of macrophyte were recorded during the boat survey transects.

Macroinvertebrates

- 11.4.20 Macroinvertebrate surveys were carried out during spring and autumn 2012. The spring survey recorded 14 families within the sample, dominated by Crangonyctidae (amphipod crustaceans), Corophiidae (amphipods) and Chironomidae (midge larvae). The results of the autumn survey recorded only 6 families within the sample, again dominated by Crangonyctidae and Corophiidae. Oligochaeta (worms), Sphaeriidae (bivalve molluscs), Asellidae (isopod crustaceans) and Chironomidae were also present in the sample in low numbers.

2013 Data

Diatom

- 11.4.21 A total of 17 species were recorded from the sample, which was dominated by *Amphora pediculus* and *Achnanthes minutissima*. In addition, two species of plankton were recorded from the sample, predominantly comprising *Stephanodiscus parvus* with *Stephanodiscus hantzschii* also present.

Cyanobacteria

- 11.4.22 No species of blue-green algae were recorded from this sample; however, small numbers of Euglenoid flagellates were present. The sample was dominated by silt and detritus.

Zooplankton

- 11.4.23 Two species of zooplankton were recorded from the sample, which comprised a small number of *Daphnia longispina* and a single immature water mite. The sample was dominated by cyclopoid copepods, predominantly *Acanthocyclops* species most likely

comprising the robustus or vernalis group. Most of the cyclopods were without egg sacks.

Fish

- 11.4.24 Fish populations were sampled using fyke netting, electric fishing was not possible due to the turbidity of the water and seine netting was not permitted. Common roach (*Rutilus rutilus*), perch (*Perca fluviatilis*) and roach x common bream hybrids (*Abramis brama* x *Rutilus rutilus*) were found. Due to the sampling bias of fyke netting larger species were not captured. Anecdotal information from the angling club suggested that tench (*Tinca tinca*), European eel (*Anguilla anguilla*), common carp (*Cyprinus carpio*) and the non-native wels catfish (*Silurus glanis*) are also present. This lake was, until recently managed for angling, principally as a commercial carp fishery.

Broadwater Lake

Affinity Water Data

Lake Habitat Survey

- 11.4.25 A Lake Habitat Survey was carried out on Broadwater Lake in 2011. A total of 10 habitat-plot locations were surveyed; floating pennywort (*Hydrocotyle ranunculoides*) was recorded as being present in three of the habitat-plots, and Japanese knotweed was observed on the eastern bank of lake between, but not occurring within, two of the 10 habitat-plots. The riparian zone is bordered by woodland comprising trees greater than 5m in height and both greater than 0.3m and less than 0.3m in diameter, with woody shrubs, saplings, and tall herbs and grasses. The River Colne was recorded as passing within 50m of four of the 10 habitat-plot locations.
- 11.4.26 The bank face slope varied from gentle to near vertical with the vegetation structure comprising mixed vegetation with trees greater than 5m in height. The bank face had been reinforced in three of the 10 habitat-plots. The littoral substrate comprises silt/clay, pebbles, cobbles and sand; macrophytes on the bank extended lakewards, and Nuttall's pondweed (*Elodea nuttallii*) was recorded with an extent of between more than 10% and 75% in all habitat-plots. Non-deltaic vegetated islands comprise more than 1 - 10% of the lake surface area.
- 11.4.27 Lake-site pressures comprise macrophyte manipulation, angling from shore and introduced species, and the overall intensity of recreational pressures is considered to be moderate. The water in the lake has moderate turbidity with no odour and surface films comprising mats of blue-green algae.

Macrophytes

- 11.4.28 In 2011, macrophyte surveys were carried out on Broadwater Lake comprising three boat transects and three wader transects, each 100m in length. The average water depth at 50cm from the shoreline during the wader surveys was 0.13m, with an average depth of 0.25m 100cm from the shoreline. The average water depth during the boat transects was 3.35m. The substrate was composed of silt, gravel, cobbles and pebbles with Nuttall's pondweed (*Elodea nuttallii*), blue-green algae, common reed

(*Phragmites australis*), yellow iris (*Iris pseudacorus*), field bindweed (*Convolvulus arvensis*), American bittersweet (*Celastrus scandens*), alder (*Alnus spp.*), willow (*Salix spp.*), water mint (*Mentha aquatica*), great willowherb (*Epilobium hirsutum*) and bittersweet (*Solanum dulcamara*) present. In addition, stonewort (*Chara spp.*) were recorded during the boat survey transects.

Macroinvertebrates

- 11.4.29 Macroinvertebrate surveys were carried out during spring and autumn 2012. The spring survey recorded 20 families within the sample, dominated by Crangonyctidae (amphipod crustaceans); Hydrobiidae (freshwater snails), Oligochaetae (worms) and Chironomidae (midge larvae) were also present in moderate abundances. The results of the autumn survey recorded 13 families within the sample, again dominated by Crangonyctidae and Oligochaetae.

2013 Data

- 11.4.30 No additional surveys were conducted on Broadwater Lake

Allen Lake

Affinity Water Data

Lake Habitat Survey

- 11.4.31 A Lake Habitat Survey was carried out on Allen Lake in 2011. A total of 10 habitat-plot locations were surveyed; dense stands of Japanese knotweed (*Fallopia japonica*) were recorded as being present between, but not within, the habitat-plots. The riparian zone is bordered by woodland comprising trees greater than 5m in height and both greater than 0.3m and less than 0.3m in diameter, with woody shrubs, saplings, and tall herbs and grasses. The bank face slope varied from gentle to near vertical with the vegetation structure comprising mixed vegetation with trees greater than 5m in height. The littoral substrate comprises silt/clay, sand, pebbles and cobbles; any macrophytes on the bank did not extend lakewards.
- 11.4.32 Signal crayfish (*Pacifastacus leniusculus*) were recorded as being present in the littoral zone of three of the 10 surveyed habitat-plot locations. Deltaic, stable vegetated islands comprised more than 10 - 40% of the lake surface area.
- 11.4.33 Lake-site pressures comprise motorboat activities, non-boat recreation/swimming and introduced species, and the overall intensity of recreational pressures is considered to be intensive. The water in the lake is clear with no odour or surface films.

Macrophytes

- 11.4.34 In 2011, macrophyte surveys were carried out on Allen Lake comprising three boat transects and three wader transects, each 100m in length. The average water depth at 50cm from the shoreline during the wader surveys was 0.11m, with an average depth of 0.26m 100cm from the shoreline. The average water depth during the boat transects was 2.75m. The substrate was composed of predominantly of silt and gravel, with filamentous algae (*Cladophora spp.*), bulrush (*Typha latifolia*), reed-canary grass

(*Phalaris arundinacea*), willow (*Salix spp.*), Japanese knotweed (*Fallopia japonica*), filamentous algae, common reed (*Phragmites australis*), branched bur-reed (*Sparganium erectum*), water mint (*Mentha aquatica*), butterfly bush (*Buddleja davidii*) and gypsywort (*Lycopus europaeus*) present. In addition Canadian pondweed (*Elodea canadensis*) and curled pondweed (*Potamogeton crispus*) were recorded during the boat survey transects.

Macroinvertebrates

- 11.4.35 Macroinvertebrate surveys were carried out during spring and autumn 2012. The spring survey recorded eight families within the sample, dominated by Crangonyctidae (amphipod crustaceans). The results of the autumn survey recorded six families within the sample, dominated by Hydrobiidae (freshwater snails), Crangonyctidae and Chironomidae (midge larvae).

Discussion

- 11.4.36 The lake habitats as a whole are typical gravel pit lakes with a high level of turbidity and an associated impoverished macrophyte and macroinvertebrate communities. They are likely to be nutrient-rich based on the dominance of (organic) pollution-tolerant taxa present. The fish fauna of the lakes is dominated by benthivores such as carp and tench; these species are notable for destabilising sediments in nutrient-rich lakes and reducing their viability as habitat for macrophytes.

CFA8

Shardeloes Lake (041001)

Affinity Water Data

- 11.4.37 No Affinity Water data were available for Shardeloes Lake.

2013 Data

Macrophytes

- 11.4.38 A total of 16 species of macrophyte were recorded during transect 1, of which two - great willow herb (*Epilobium hirsutum*) and bittersweet (*Solanum dulcamara*) - were non-scoring taxa. During transect 2, a total of 15 species of macrophyte were recorded, of which one (*Epilobium hirsutum*) was a non-scoring taxon. Both transects were dominated by filamentous green algae, indicating high nutrient levels. Stoneworts (*Chara spp.*) were abundant, indicating the alkaline water conditions, expected in this catchment. Willow moss (*Fontinalis antipyretica*) was abundant. Mare's tail (*Hippuris vulgaris*) was present in transect 1 and throughout the lake. The lake had low turbidity, with excellent water clarity and no shade. It is likely that this was a factor in high macrophyte and algal cover. Thick algal mats were present on the substrate, and mats of algae were also found floating on the lake's surface.

Macroinvertebrates

- 11.4.39 A total of 13 macroinvertebrate families were recorded from the sample, which was dominated by Corixidae (water boatmen), Physidae (freshwater snails) and Baetidae

(mayflies). Two species in the sample were non-scoring taxa. The site was covered with filamentous algae and *Lemna minor* (duckweed); the sample was taken from the lake margins. The BMWP score was low (44) but this is likely to be due to poor habitat quality/diversity rather than water quality issues.

Fish

- 11.4.40 Two species of fish were caught, common rudd (*Scardinius erythrophthalmus*) and three-spined stickleback (*Gasterosteus aculeatus*). Two further species, rainbow trout (*Oncorhynchus mykiss*) and chub (*Squalius cephalus*), were observed but not caught. Large numbers of rudd were present, this mirrors the survey on the connected River Misbourne downstream. Signal crayfish were present in very high densities.

Discussion

- 11.4.41 The high cover of macrophytes reflect the water clarity of the lake, while the constituent species indicate both high nutrient status and alkalinity. The limited range of invertebrate taxa suggest that Shardeloes Lake does not support a diverse assemblage of invertebrates; however, identification was to family level only. Although the diversity of fish was low, the species present are indicative of moderately good water quality, despite evidence of nutrient enrichment.

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