A38 Derby Junctions

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6.3 Environmental Statement Appendices

Appendix 8.5b: River Habitat and River Corridor Survey in 2015

Regulation 5(2)(a)

Planning Act 2008

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Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

A38 Derby Junctions Development Consent Order 202[ ]

6.3 Environmental Statement Appendices
Appendix 8.5b: River Habitat and River Corridor Survey in 2015

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A38 Derby Junctions

River Corridor Survey and River Habitat Survey Report

Report Number: 47071319-URS-05-RP-EN-015
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1. INTRODUCTION

1.1 Background and Scope

1.1.1 On July 14, 2014 AECOM was awarded the contract by Highways England to provide design services regarding the development of the A38 Derby Junctions Scheme (referred to herein as the proposed scheme). This proposed scheme concerns three junctions on the A38 in Derby as follows (refer to Figure 1):

- A38/ A5111 Kingsway junction;
- A38/ A52 Markeaton junction; and
- A38/ A61 Little Eaton junction.

1.1.2 These three junctions are spread over an approximate 5.5 km distance along the A38 to the west and north-west of Derby.

1.1.3 AECOM will be preparing an Environmental Assessment Report (EAR) which will assess whether the proposed scheme has the potential to result in significant environmental effects, taking into account impact avoidance measures that are embedded into the proposed scheme design, as well as standard management activities that will be adopted. In order to support the ecological impact assessment to be reported in the EAR, in 2015, AECOM has undertaken an extended Phase 1 habitat survey along the route of the proposed scheme (AECOM report 47071319-URS-05-RP-EN-003). The results of the extended Phase 1 Habitat surveys have been used to identify watercourses that would be crossed or potentially directly impacted by the proposed scheme.

1.1.4 River Corridor Surveys (RCS) and River Habitat Surveys (RHS) were undertaken along those sections of watercourses that could potentially be impacted by the proposed scheme.

1.1.5 The RCS and RHS were undertaken along sections of four watercourses on May 26, 2015.

1.1.6 These surveys provide data on the main habitat features and current pressures that occur in the surveyed sections. This inventory can be used to ascertain the main habitats and species that should be considered when assessing potential impacts of the proposed scheme.

1.1.7 Results from the RCS and RHS are documented herein, together with recommendations where applicable.

1.2 Study Site

1.2.1 The proposed scheme under appraisal (herein the proposed scheme footprint is referred to as the ‘Site’) encompass the Kingsway and Markeaton junctions, west of the city of Derby (Centroid SK 32801 36103) and the Little Eaton junction north of Derby (Centroid SK 36402 39990). A plan showing the Site boundaries is presented in Figures 2 and 3 in Appendix A.

1.2.2 The A38 is an existing and busy arterial ‘A’ road carrying traffic around the west and north of Derby. South of the Kingsway junction, the road enters a cutting and is

bordered by semi-improved grassland and scrub covered verges. The central reservation south of Kingsway junction and the junction island in this location support a mosaic of habitat types, including semi-improved neutral grassland and native broadleaved woodland. Bramble Brook flows from the west of the proposed scheme in this location, through culverts located under the north-bound carriageway and the central reservation before connecting with further culverts located between the junction islands. North of the Kingsway junction there is an area of mixed plantation represented by semi-mature trees on embankment.

1.2.3 Markeaton junction is bordered to the east by residential properties and to the west by parkland with veteran trees. The outfall from Markeaton Lake and Markeaton Brook flows through culverts beneath the existing A38 at the northern extent of the Markeaton junction section of the proposed scheme.

1.2.4 The western boundary of the proposed scheme at Little Eaton borders the road bridge over the River Derwent. The existing A38 is on embankment in this location, with the embankments themselves represented by areas of scrub and immature broadleaved plantation habitats. A variety of grassland habitats exist at the base of the embankments in this location.

1.3 Study Area - Watercourses

1.3.1 The proposed scheme crosses or has potential to impact four watercourses as follows (in descending order of size):

- River Derwent;
- Markeaton Brook;
- Bramble Brook; and
- Dam Brook.

1.3.2 The locations of the four sections of watercourse relevant to the proposed scheme are detailed in Figures2 and 3. Descriptions of the four sections of watercourses are provided below.

1.3.3 River Derwent

- The River Derwent is a Derbyshire river, rising near Bleaklow in the north of the county and flowing southwards through the city of Derby to join the River Trent at Derwent-mouth, approximately 12 km south-east of the city;
- The A38 crosses the River Derwent approximately 500 m west of the existing Little Eaton junction. This river crossing is located at the western extent of the construction boundary to the Little Eaton junction section of the proposed scheme;
- The river meanders gently through mixed use agricultural land in this location. Residential properties are also present in this location, on the western bank of the river near to the existing A38 road bridge;
- Historical records of white-clawed crayfish *Austropotamobius pallipes*, otter *Lutra lutra* and water vole *Arvicola amphibius* using the River Derwent were provided as part of the Phase 1 survey consultation process conducted in January 2015.

1.3.4 Markeaton Brook

- Markeaton Brook is an approximate 17 km long tributary stream to the River Derwent;
- The brook drains from Hulland Ward to the north-west of the city and flows through Markeaton Park, north of Markeaton Lake, with some flow diverted to maintain water levels in the lake;
- Beyond Markeaton Park, the brook flows through residential areas and amenity parklands before being culverted for over approximately 2 km under the city, after which it joins the River Derwent;
- The brook is designated as a Local Wildlife Site (LWS) due to the nature conservation value of its macro-invertebrate fauna, with records of white-clawed crayfish, water vole and freshwater sponges all from within the brook catchment (refer to AECOM Phase 1 report 47071319-URS-05-RP-EN-003 for details);
- The proposed scheme crosses Markeaton Brook at the eastern extent Kingsway/ Markeaton section of the proposed scheme, approximately 65 m north-east of Markeaton junction;
- The proposed scheme also crosses the culvert separating Markeaton Lake from Mill Dam Lake and Mill Dam Canal. The drainage from this lake complex then re-joins Markeaton Brook east of the proposed scheme.

1.3.5 Bramble Brook

- Bramble Brook is a small stream that flows from the north of the A38, entering culverts under the A38 northbound carriageway into the Kingsway junction southern central reservation from the south;
- To the north, the brook is culverted beneath the Kingsway roundabout circular road through to the Kingsway junction northern island;
- After flowing through the Kingsway junction northern island, the brook is culverted beneath Kingsway Retail Park and Kingsway Close Industrial Park to arise in Cheviot Street Recreation Ground, approximately 1.3 km north-east of the Kingsway junction;
- The brook is then culverted beneath the city of Derby and drains into the River Derwent.

1.3.6 Dam Brook

- Dam brook is a small tributary of the River Derwent;
- The brook consists of two small streams which rise from land east of the existing Little Eaton junction, before converging to form Dam Brook;
- Flow is heavily canalised and culverted beneath the Little Eaton junction section of the proposed scheme before joining Watermeadows Ditch to the south of the Little Eaton junction and flowing west to join the River Derwent.

1.4 Relevant Legislation

1.4.1 The purpose of the RCS and RHS is to identify the presence of protected or notable habitats and species related to the quality of the watercourses which in this case are covered under one or more of the following legislation:

- The Natural Environment and Rural Communities (NERC) Act 2006;

- The Wildlife and Countryside Act (1981) as amended (WCA);
- The EC Habitats Directive (Directive 92/43/ECC) as translated into UK law by The Habitats and Species Regulations 2010 (as amended);
- The Hedgerow Regulations 1997;
- Water Resources Act 1991; and
- The Water Environment (Water Framework Directive) (England and Wales) (Amendment) Regulations 2015.

1.4.2 Further details are provided in Appendix D: Relevant Legislation for Protected Species and Relevant Planning Policy Guidance.

1.4.3 Highways England, through the national Road Investment Strategy (RIS), has set an aspiration that the operation, maintenance, and enhancement of the Strategic Road Network (SRN) should move to a position that delivers no net loss of biodiversity; and, in the long term, Highways England should deliver a net gain in biodiversity across its broader range of works. Highways England published a Biodiversity Plan (HEBP) in 2015 to show how it will work with service providers to halt overall biodiversity loss, and maintain and enhance habitats and ecological networks. The Government requires Highways England to demonstrate progress against the HEBP, to secure an ongoing annual reduction in the loss of net biodiversity due to its activities. The HEBP provides a general plan to protect and increase biodiversity. The HEBP supersedes the preceding 2002 Highways Agency Biodiversity Action Plan (HABAP), which still however carries some relevance as it lists specific habitats of conservation concern. Water features (including rivers and streams) are listed in the 2002 HABAP as priority habitats. The plan aims to protect water features associated with the existing road network, and to ensure that future road scheme take account of potential impacts on important aquatic habitats and associated species.

2. METHODOLOGY

2.1 Field Survey

2.1.1 Two river survey methodologies were used for the study, namely: River Corridor Survey (RCS) and River Habitat Survey (RHS) that followed the National Rivers Authority (NRA) River Corridor Assessment guidelines (NRA, 1992) and the River Habitat Survey Manual (Environment Agency, 2003).

2.1.2 During the RCS, data were systematically gathered from in-channel, on the banks and from the adjacent land along a 500 m river length to compile a habitat map of the river.

2.1.3 The RHS also comprised gathering data along 500 m survey lengths. The data gathered included channel substrate, habitat features, aquatic vegetation types, the complexity of bank vegetation structure and the type of artificial modification to the channel and banks. Data were recorded at each of 10 spot checks located at 50 m intervals.

2.1.4 A sweep-up checklist was also completed to ensure that features and modifications not occurring at the spot checks were recorded. Cross-section measurements of water and bankfull width, bank height and water depth were made at one representative location, to provide information about geomorphological processes acting on the channel. The number of riffles, pools and point bars found were also recorded. A copy of the RHS recording sheet is given in Appendix B. The RHS was conducted by a certified RHS surveyor.

2.1.5 The four sections of watercourses as detailed in Section 1 were each assessed based on a single 500 m section which spanned the existing and proposed scheme crossing points.

2.1.6 The surveys were undertaken on May 26, 2015, when vegetation was developed and most likely exhibited key features for identification. The low/ moderate flow levels and water transparency at the time of the surveys allowed the recognition of main habitat features required for the RHS.

2.2 Survey Limitations

2.2.1 There was some limited access where the watercourses flowed through culverts. Due to health and safety concerns these sections were not inspected. However, this is not considered to represent a constraint to the surveys.

2.2.2 Access to the River Derwent section was not possible from the western embankment so all observations were made from the eastern embankment. However, owing to the open landscape in this location and clear lines of sight, this is not considered to represent a constraint to the surveys.

2.2.3 The location of construction compounds and flood attenuation areas has not yet been determined; these areas have not been included as part of the RCS and RHS.

2.3 Data Analysis

2.3.1 No data analysis was undertaken on the RCS data; however, Geographic Information System (GIS) was used to compile the data onto maps.

2.3.2 The RHS data was analysed using the Habitat Quality Assessment scoring system (HQA; version 1.2) and Habitat Modification Score (HMS; Raven *et al*., 1998).

2.3.3 In describing individual RHS sites, both the HQA and HMS scores should be used in conjunction, as together they can provide a broad indication of how overall habitat quality and structural modification to the channel might be linked. HMS score relates only to modification of the channel, while the HQA score is derived from features in the channel and the river corridor.

Habitat Modification Score

2.3.4 The level of artificial modification to the physical structure of the channel can be expressed as an HMS. Biological factors and bank features are not included in the scoring process. HMS is based on the categories as illustrated in Table 1.

Table 1: HMS Categories for Describing the Physical State of the River Channel at RHS Sites (Raven *et al*, 1998)

Score for HMS	Designation(s)
0	Pristine *
0 - 2	Semi-natural
3 - 8	Predominantly unmodified
9 - 20	Obviously modified
21 - 44	Significantly modified
45 or more	Severely modified

* semi-natural includes pristine channels

2.3.5 The HMS score is based on totalling up scores assigned to observations of channel modification made at spot check points and elsewhere within the section. Further details are given in Appendix C.

2.3.6 The higher the score the more modified the channel is.

Habitat Quality Assessment

2.3.7 The HQA is a broad measure of the diversity and ‘naturalness’ of the physical (habitat) structure of a site, based on gathering data during the RHS from the whole river corridor (in-channel, banks and adjacent habitat) at 10 spot check locations and then undertaking a sweep up check of the whole 500 m sampling section. See Appendix C for calculation of HQA.

2.3.8 HQA scores should only be used to compare rivers of the same “type”. The higher the score, the better the river is for that type.

3. RESULTS

3.1 Survey Results

3.1.1 Photographs of the site taken during the course of the RCS and RHS surveys are provided in Appendix E. RCS maps are presented in Appendix A (Figures 4 to 9) and the RHS field sheets are presented in Appendix F.

3.1.2 The HQA and HMS scores for each river are summarised in Table 2. Interpretative comments and descriptions follow for each of the four sections of watercourse that were surveyed, along with details of the habitat features used in the HQA.

Table 2: HQA and HMS Results for Each Watercourse

Watercourse	HQA Score	HMS Score	Designation(s) based on HMS
River Derwent	42	25	Significantly modified channel
Markaton Brook	41	68	Severely modified channel
Bramble Brook	66	38	Significantly modified channel
Dam Brook	25	56	Severely modified channel

3.2 River Derwent

3.2.1 The River Derwent was surveyed from Ordnance Survey Grid Reference (OGR) SK 35968, 40165 to OGR SK 35976 39726, approximately 250 m north and 250 m south of the existing A38 road bridge in this location.

3.2.2 Near to the Little Eaton junction, north of the A38 road bridge, the River Derwent had moderate flow and passed through semi-improved and improved grassland in a shallow valley with no natural terraces. Residential properties were located within approximately 60 m of the western bank of the river to the north of the existing A38 in this location.

3.2.3 River dimensions comprised: approximately 15 m width; bank full width approximately 20 m; approximately 0.60 m water depth; bank heights of between 1.8 m and approximately 2.0 m.

3.2.4 The banks of the river in this location supported scattered mature trees on the left bank, and occasion clumps of trees on the right bank which provided some channel shading. The trees which were present on the banks included willow *Salix spp*., pedunculate oak *Quercus robur*, alder *Ulnus glutinosa*, common hawthorn *Crataegus monogyna*, blackthorn *Prunus spinosa*, ash *Fraxinus excelsior*, sycamore *Acer pseudoplatanus*, downy birch *Betula pubescens* and elder *Sambucus nigra* scrub.

3.2.5 North of the A38 road bridge in this location both banks had been re-sectioned and the channel is likely to have been realigned. The right bank was generally steep whilst the left bank was generally vertical, ranging from 0.2 m to 1.5 m from the water surface, with little emergent bankside vegetation. Small, discrete stands of common reed *Phragmites australis* and yellow-flag iris *Iris pseudacorus* were present on both banks along the surveyed section.

3.2.6 A section of concrete reinforcement was present for a short section on the western bank under the A38 road bridge in this location. On the eastern bank, under the road

bridge, a large gravel and sandbank was present which supported scattered emergent macrophytes.

3.2.7 The channel lacked major features and exhibited a glide habitat with predominant rippled and smooth flow from the start of the surveyed section to SK 35934 39838 where a large, shallow gravel bar with riffles extended across the channel. The gravel bar supported a large bed of water crowfoot Ranunculus spp. Beyond this gravel bar, the river deepened into a pool habitat that was too deep to survey further from within the channel.

3.2.8 Where the river was accessible for survey, the substrate comprised cobbles, gravel and sand. Leafy debris and large amounts of anthropogenic debris were recorded within the channel directly beneath the road bridge.

3.2.9 On the east bank at SK 35949 40069 and SK 35911 40010 discrete approximate 40 m stands of giant knotweed *Fallopia sachalinensis* were recorded overhanging the river channel. Himalayan balsam *Impatiens glandulifera* was also recorded associated with the banks of the river and adjoining habitats throughout the survey area.

3.2.10 On the west bank of the river, opposite SK 35934 39838, scrubby willow dominated woodland provided good habitat for otter with opportunities for holts and lying up areas. However, there was no evidence recorded of otters being recently active in the area (slides, prints, spoor or feeding stations).

3.2.11 HQA score was 42 (see Table 3) and the HMS was 26 (see Appendix C and F). HMS was calculated based on:

- Presence of minor bridge (1);
- Channel obviously realigned < 33% (5);
- Left bank resectioned (10);
- Right bank resectioned and reinforced (10).

Table 3: Habitat Quality Assessment Component Scores for the River Derwent

Component	Spot-check	Sweep-up	Total	Description
Flow type	6	0	6	Mainly rippled, smooth and unbroken standing waves also present.
Channel substrate	4	-	4	Mainly gravel and pebbles, cobbles also present
Channel features	0	0	0	-
Bank features	9	1	10	Stable and eroding cliffs. Natural berms and unvegetated side bar
Bank vegetation structure	12	-	12	Mainly simple and complex categories in both banks and bank tops
Point bars	-	0	-	-

Component	Spot-check	Sweep-up	Total	Description
In-stream channel vegetation	5	-	5	Mainly submerged linear-leaved and emergent reeds, sedges, rushes, grasses and horsetails.
Land-use within 50m	-	2	2	Broadleaved/mixed woodland extensive on the right bank
Trees and associated features	-	3	3	Isolated and scattered on the left bank and occasional clumps on the right bank
Special features	0	0	0	Leafy debris present.
TOTAL:			**42**	

3.3 Markeaton Brook

3.3.1 Markeaton Brook was surveyed from SK 33653 37687, to SK 34146 37126. The brook throughout the survey area was in a shallow "V" valley with no natural terraces.

3.3.2 River dimensions taken during RHS were approximately 2.0 m water width, bank full width of approximately 10 m, approximately 0.30 m water depth, bank height approximately 3.0 m. The survey was conducted from within the channel.

3.3.3 Markeaton Book is culverted under the existing A38 and also under the junction of Kedleston Road and Maxwell Avenue (west of the carriageway) and the junction of Kedleston Road and Broadway (east of the carriageway). In these sections the brook flows through concrete box culverts.

3.3.4 At the start of the survey stretch (SK 33653 37687) the brook flowed through three major box culverts and small areas of open channel. Where the channel was open, it was recorded as having a concrete base with banks comprised of concrete slabs and blocks.

3.3.5 The channel was heavily shaded by riparian vegetation comprising broad-leaved plantation woodland with alder, hawthorn, blackthorn sycamore, ash and dogwood *Cornus sanguinea*. Other vegetation recorded on the banks comprised tall ruderal herbs and bramble *Rubus fruticosus* agg. Himalayan balsam was also recorded throughout this section of the watercourse.

3.3.6 Tree roots were noted as having broken through the concrete reinforcement blocks in many places and provided in-channel features. Small amounts of deadwood and copious items of litter were also recorded, although other in-channel features were absent.

3.3.7 The surrounding land use comprised residential properties to the north of the brook, as well as semi-natural broadleaved woodland and amenity grassland to the south of the channel.

3.3.8 To the east of the A38 (after the culvert), the brook flows through steep banks and remains heavily engineered. The channel was heavily shaded by sycamore

dominated semi-natural broad-leaved riparian trees in this location, with commercial properties present on the north bank and semi-improved grassland to the south.

3.3.9 The surrounding land use to the east of the A38 in this location was predominately residential to the north of the brook, and a mix of semi-improved grassland, semi-natural broadleaved woodland, amenity grassland and allotments to the south of the brook.

3.3.10 The channel supported numerous features including boulders (at SK 33996 37438), exposed gravel beds (including an un-vegetated middle bar) and associated riffles, exposed tree roots, a small weir (at SK 34027 37389) and a large bed of water crowfoot (at SK 34119 37235).

3.3.11 An active management regime was in place for this section of the brook. Consequently deadwood and fallen trees had been removed to reduce the risk of flooding to nearby properties.

3.3.12 The substrate of the brook through the heavily canalised sections and box culverts associated with the A38 crossing point comprised engineered concrete. This was in contrast to the natural cobbles, gravel and sand with silt and coarse organic matter recorded downstream where the brook flows further to the east.

3.3.13 HQA score was 41 (see Table 4) and the HMS was 68 (see appendix C and F). Some spot-checks were located in culverted areas (2 culverts). HMS was calculated based on:

- Channel obviously realigned (10, on site estimate was <30%, but revision of maps, lead to obvious realignment of ≥ 33%);
- Right bank reinforced (16);
- Left bank reinforced (16);
- Channel reinforced (10), culverts in Spot-checks (16).

Table 4: Habitat Quality Assessment Component Scores for Markeaton Brook

Component	Spot-check	Sweep-up	Total	Description
Flow type	4	1	5	Mainly rippled. Smooth and unbroken standing waves also present.
Channel substrate	4	-	4	Mainly cobbles, gravel and pebbles, artificial also present
Channel features	0	1	1	Unvegetated mid-channel bar
Bank features	5	0	5	Natural berms, stable cliffs also present
Bank vegetation structure	12	-	12	Mainly simple and complex categories in both banks and bank tops.
Point bars	-	0	0	

Component	Spot-check	Sweep-up	Total	Description
In-stream channel vegetation	2	-	2	Presence of liverworts/mosses/lichens and emergent broad-leaved herbs
Land-use within 50m	-	4	4	Broadleaved/mixed woodland extensive on both banks
Trees and associated features	-	8	8	Continuous along both banks. Presence of exposed bankside roots and underwater tree roots.
Special features	0	0	0	Leafy debris present.
TOTAL:			**41**	

3.4 Bramble Brook

3.4.1 Bramble Brook was surveyed from SK 32554 35825 to SK 32838 36120. This survey section was located entirely within the existing Kingsway junction and southern reservation islands of the A38.

3.4.2 River dimensions were approximately 1.1 m water width, bank full width approximately 1.5 m, approximately 0.20 m water depth and bank height approximately 2.0 m.

3.4.3 Throughout the surveyed section, the brook was located within an asymmetric valley with natural terraces, with moderate to low flow rate. The channel of the brook in this location was heavily engineered.

3.4.4 At SK 32554 35825, Bramble Brook emerges from a culvert under the A38 southbound carriageway where it separates into two channels. One short section of the brook (approximately 50 m in length) was represented by a concrete channel with large amounts of fallen hawthorn and blackthorn. The brook then flows northwards, parallel and adjacent to the A38 southbound carriageway.

3.4.5 The second course of the brook flows through a small, concrete-sided channel north-west towards the A38 northbound carriageway to a confluence at SK 32537 35870 where a small tributary stream joins the brook from a culvert under the A38 northbound carriageway. The brook then flows northwards, adjacent to the A38 northbound carriageway through a steep sided channel, engineered using natural materials. It then flows toward a confluence with a small stream flowing though the disused railway cutting located to the west at SK 32712 35994, where the brook is culverted under the A38 Kingsway junction.

3.4.6 The channel in this location was heavily shaded throughout by semi-natural broad-leaved woodland dominated by hawthorn and blackthorn scrub with willow, ash, oak and sycamore. Tall ruderal herbs and Himalayan balsam were also present throughout the length of this watercourse.

3.4.7 The watercourse exhibited a lack of management and the channel was crossed at several points by fallen trees (largely willow) which form channel barriers, with large amounts of woody debris, occasional overhanging boughs, underwater roots and

extensive exposed bankside roots. The channel also supported several features, including depositional features such as middle, point and lateral bars and mature islands, reflecting the active nature of the channel. A diversity of flow types and habitats with riffles, glides, side channel and marginal dead-water were all recorded.

3.4.8 The confluence at SK 32712 35994 displayed a lack of management which had allowed a large woody debris dam to build up at the entrance to the culvert, with an associated deep layer of silt over the base of the channel.

3.4.9 Bramble Brook then flows northwards through a culvert under the junction circular road into the Kingsway junction island, where the brook continues to flow on through an engineered channel with steep sides, constructed from natural materials, to a culvert at SK 32838 36120.

3.4.10 At the culvert a lack of management had allowed a large debris dam comprising logs, sticks and litter to build up with associated deep silt over the base of the channel.

3.4.11 The brook then enters a culvert that continues for approximately 1.3 km north-east to emerge in Cheviot Street Recreation Ground.

3.4.12 HQA score was 66 (see Table 5) and the HMS was 38 (see Appendix C and F). A total of 2 culverts were present in the section. HMS was calculated based on:

- Channel obviously realigned <30% (5);
- Channel re-sectioned and culverts (16);
- Left bank reinforced and re-sectioned (8);
- Right bank reinforced and re-sectioned (5).

Table 5: Habitat Quality Assessment Component Scores for Bramble Brook

Component	Spot-check	Sweep-up	Total	Description
Flow type	6	2	8	Mainly rippled and smooth. Unbroken standing waves and chute flow also present.
Channel substrate	6	-	6	Mainly gravel and pebbles and sand
Channel features	1	1	2	Mature Island and unvegetated mid-channel bar.
Bank features	11	3	14	Natural berms, stable and eroding cliffs, unvegetated and vegetated point and side bars
Bank vegetation structure	11	-	11	Mainly simple and complex categories with exception of right bank face where is mainly uniform.
Point bars	-	1	1	3 point bars.
In-stream channel vegetation	3	-	3	Presence of emergent broad-leaved herbs and filamentous algae

Component	Spot-check	Sweep-up	Total	Description
Land-use within 50m	-	4	4	Broadleaved/mixed woodland extensive in both banks
Trees and associated features	-	12	12	Continuous along both banks. Presence of exposed bankside roots (extensive), underwater tree roots, fallen trees and large wood debris
Special features	0	5	5	Side channel, natural cascade, debris dam, backwater
TOTAL:			**66**	

3.5 Dam Brook

3.5.1 Dam Brook was surveyed from SK 36517 40047 to SK 36412 39700. The brook flows through a shallow "V" valley with no natural terraces throughout the surveyed section. The brook has been realigned and over-deepened along most of the surveyed section.

3.5.2 River dimensions were approximately 0.8 m water width, bankfull width of approximately 2 m, approximately 0.40 m water depth and an average bank height of 1.5 m.

3.5.3 Dam Brook flows westwards towards the existing Little Eaton junction through a steep sided channel which was completely shaded by a hawthorn and blackthorn hedge at the time of survey.

3.5.4 At SK 36517 40047, the banks of the brook are engineered using concrete rip-rap to turn the flow southwards alongside the A461 carriageway. The brook then flows over a small weir and into a culvert under the east side of the Little Eaton junction.

3.5.5 The brook emerges at SK 36462 39977 to flow through a channel engineered using natural materials. In this location the brook lacks any notable in-channel features. The channel borders semi-improved grassland, dense scrub and scattered broad-leaved trees on the left bank. On the right bank are occasional stands of willow, hawthorn, alder and white poplar *Populus alba*. Both banks have been re-sectioned throughout. Dam Brook continues to flow southwards from this location to SK 36412 39700 where the channel is again heavily engineered using concrete rip-rap. It then flows west into a culvert under the A461 carriageway to join Watermeadows Ditch, a tributary of the River Derwent.

3.5.6 Land use adjacent to the brook is represented by a mixture of improved grassland used for pasture and hay production. Broad-leaved plantation woodland exists to the east of the brook, and the A38/ A461 roads and Little Eaton junction to the west.

3.5.7 HQA score was 25 (see Table 6) and the HMS was 54 (see Appendix C and F). HMS was calculated based on:

- Channel obviously realigned ≥30% (10);
- Channel re-sectioned and culvert (16);
- Left bank reinforced and re-sectioned and with embankment (12);

- Right bank reinforced and re-sectioned (15);
- Reinforced-toe only right bank (1).

Table 6: Habitat Quality Assessment Component Scores for Dam Brook

Component	Spot-check	Sweep-up	Total	Description
Flow type	2	0	2	Smooth or otherwise imperceptible flow
Channel substrate	3	-	3	Mainly sand. Artificial substrate also present.
Channel features	0	0	0	None.
Bank features	8	0	8	Stable and eroding cliffs. Natural berms also present.
Bank vegetation structure	6	-	6	Mainly uniform.
Point bars	-	0	0	None.
In-stream channel vegetation	1	-	1	Presence of emergent broad-leaved herbs.
Land-use within 50m	-	2	2	Broadleaved/mixed woodland present in both banks
Trees and associated features	-	3	3	Isolated/scattered trees on the left bank and occasional clumps of trees on the right bank.
Special features	0	0	0	Side channel, natural cascade, debris dam, backwater
TOTAL:			**25**	

4. DISCUSSION

4.1.1 A high HMS value is indicative of a modified watercourse. Consequently, the HMS scores detailed in this report indicate that all four of the river channels surveyed have undergone either severe modification (i.e. HMS 21 to 44) or significant modification (i.e. HMS 45 or more).

4.1.2 Markeaton Brook and Dam Brook have the highest HMS values: 68 and 54 respectively, indicating very high levels of modification (i.e. HMS scores of 45 or more). For Markeaton Brook the high HMS score reflects the artificial nature of both the banks and the channel.

4.1.3 The River Derwent and Bramble Brook watercourses had the lowest HMS scores: 26 and 38 respectively. However, these two watercourses were also identified as having significantly modified channels. The main scoring modification features were the re-sectioned banks and the channel realignments. Further artificial features were also recorded along the surveyed sections of these watercourses, including culverts.

4.1.4 Conversely to the HMS scores, the River Derwent and Bramble Brook watercourses exhibit higher values of HQA, 42 and 66 respectively, reflecting less impacted or recovered sites (supported by HMS) with higher diversity and habitat features of known wildlife interest. The River Derwent has undergone historic realignment, but some evidence of recovery was recorded within the current alignment, including bars and rifles. Bramble Brook has been culverted along part of the surveyed section, but also has areas of good riparian vegetation and a range of naturalistic habitat features and active in-channel depositional and erosional dynamics.

4.1.5 Markeaton Brook in particular is highly modified (HMS-68; HQA-41) due to the presence of reinforcements throughout and culverts which limits the recovery of natural fluvio-geomorphological features**.**

4.1.6 Dam Brook scores also reflects a modified watercourse with realignments, reinforced banks with low habitat diversity, and an absence of special or in-channel features (HMS-54; HQA-25).

5. SUMMARY

5.1.1 Four watercourses (the River Derwent, Markeaton Brook, Bramble Brook and Dam Brook) were surveyed using the RCS and RHS techniques. The RHS data were analysed using the Habitat Quality Assessment (HQA) scoring system and Habitat Modification Score (HMS) system. HMS score relates only to modification of a watercourse channel, while the HQA score is derived from features in the channel and the watercourse corridor.

5.1.2 Throughout the surveyed section of the River Derwent, this watercourse flows through mixed use farmland and rough semi-improved grasslands. A large stand of giant knotweed was recorded on the eastern bank, upstream of the existing A38 road bridge. The banks of the watercourse have been engineered and reinforced, particularly around the base of the bridge carrying the existing A38 carriageway, to prevent erosion and channel movement. Below the bridge, in the downstream area of the surveyed section of this watercourse, the river was recorded as having a more natural channel which included a large gravel bar supporting water crowfoot. Beyond this section the river channel meanders through mixed use agricultural land. The surrounding land use in this location limits the availability of good quality habitat of potential value to protected and/ or notable species such as otter, badger and water vole.

5.1.3 The channel of the surveyed section of Markeaton Brook has been heavily modified and engineered to prevent the watercourse from meandering and following a more natural course. These measures are likely to have been implemented to prevent bank erosion and associated issues with regard to surrounding land use and properties. At the start of the surveyed section of this watercourse, the brook flows through a rip-rap reinforced channel (banks and channel base) and three separate box culverts. The surrounding land is heavily urbanised, and represented by a mix of residential and commercial properties and roads. Beyond the box culverts, the brook is bordered by amenity grassland and allotments, with the area immediately to the north dominated by residential properties. The banks of the watercourse support mature broadleaved trees which heavily shade the channel. Furthermore, due to a high level of management, the channel is largely free from debris and channel features limiting the habitat available for white clawed crayfish. The proximity to busy arterial roads and residential properties would indicate a high level of disturbance and also limits the available habitat for other protected and/ or notable species such as otter and water vole.

5.1.4 The channel of Dam Brook is engineered along the length of the surveyed section. These modifications are likely to have been undertaken to prevent erosion and channel movement from affecting the adjacent A461. The banks of the watercourse are vertical and lack emergent vegetation. Surrounding land use comprises improved grassland and roads with limited good quality habitat to support protected and/ or notable species such as otter and water vole.

5.1.5 Bramble Brook flows through the A38 Kingsway junction islands (north and south) via pipe culverts under the A38 north and south bound carriageways. Where the channel is open, the banks are steeply cut (+45°) and the channel is heavily shaded by riparian broadleaved woodland. It also lacks any submerged or emergent macrophytes, though the shading and steep banks do provide suitable habitat for bryophyte species. The largely isolated nature of the junction islands, heavy shading of the channel by riparian vegetation and the low water levels throughout limit good

quality habitat for protected and/ or notable species such as otter, water vole and white-clawed crayfish.

5.1.6 Based on the results of the HQA and HMS, all four watercourses detailed in this report are considered to have undergone significant modification.

5.1.7 The following noxious/ invasive plant species were recorded within the corridors of the surveyed watercourses:

- Giant knotweed – recorded alongside the River Derwent; and
- Himalayan balsam - recorded alongside the River Derwent, Markeaton Brook, Dam Brook and Bramble Brook.

5.1.8 The potential presence of protected/ notable species has been further evaluated in species specific reports for otter and water vole and white-clawed crayfish.

5.1.9 Recommendations for preconstruction surveys, mitigation and/ or enhancement of the proposed scheme will be considered and reported in the Environmental Assessment Report (EAR).

6. REFERENCES

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Environment Agency (2003). River Habitat Survey in Britain and Ireland. Field Survey Guidance Manual: 2003 Version. Environment Agency, Bristol.

P. J. Raven, N. T. H. Holmes, F. H. Dawson, P. J. A. Fox, M. Everard, I. R. Fozzard, & K. J. Rouen. (1998) River Habitat Quality the physical character of rivers and streams in the UK and Isle of Man. Environment Agency, Bristol.

National Rivers Authority (1992) River Corridor Surveys. Conservation Technical Handbook 1. National Rivers Authority, Bristol Highways England Biodiversity Action Plan (2002). http://webarchive.nationalarchives.gov.uk/20101110115126/http://www.highways.gov.uk/aboutus/1153.aspx (Accessed 28/10/2015).

Highways Agency Biodiversity Action Plan (2002) http://webarchive.nationalarchives.gov.uk/20101110115126/http://www.highways.gov.uk/aboutus/documents/water_feat_assc_species.pdf (Accessed 29/02/2016)

Highways England (2015) Our plan to protect and increase biodiversity. Publication code PR34/15. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/441300/N150146_-_Highways_England_Biodiversity_Plan3lo.pdf (Accessed 28/10/2015).

Lowland Derbyshire Biodiversity Partnership (2011) Lowland Derbyshire Biodiversity Action Plan 2011 - 2020.

Appendix A Figures

N

M1 JUNCTION 28

A38/A61 LITTLE EATON JUNCTION

A38/A6 PALM COURT JUNCTION

A38/A52 MARKEATON JUNCTION

A38/A5111 KINGSWAY JUNCTION

A50/A38 JUNCTION

2 0 2 4 6 8 Kilometres

Project Title/Drawing Title

A38 DERBY JUNCTIONS SCHEME LOCATION PLAN

Project Number 47071319		
Drawn GB	Checked SW	Approved SW
Date 02/03/2016	Scale @ A3 1:100,000	Purpose of issue FINAL
Drawing Number Figure 1		Rev 2F

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File Name:\\ch-wip-001\CH_Roads\A38 Derby Jcns - PO1339\12 CAD\12.1 WIP\FIGURE 1.1 - LOCATION PLAN F1.mxd

Markeaton Brook - Figure 6

Markeaton Brook - Figure 7

750 m

Mackworth Brook

Markeaton Brook

SK33703,37663

SK33999,37445

Middle Brook

Markeaton Brook

SK34145,37101

Markeaton Lake

Mill Pond 1

Mill Pond 2

Bramble Brook
Figure 9

SK32829,36119

Bramble Brook

SK32681,36001

470 m

Bramble Brook

SK32557,35824

Legend

- Site boundary
- 50 m buffer
- 250 m buffer
- 500 m buffer
- Water body

100 0 100 200 300 400 500 Metres

File Name: J:\Derby-Jobs\Highways Agency\47071390 A38 Derby Jcns - Environment\Technical\Ecology\GIS_Chesterfield\project_files\Kingsway\RCS\A38 Kingsway Markeaton RCS 2015.mxd

Project Title/Drawing Title A38 DERBY JUNCTIONS MARKEATON AND KINGSWAY RIVER CORRIDOR SURVEY	Project Number 47071319	
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	Approved OB	
	Date 02/03/2016	Scale @ A3 1:7,000
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	Drawing Number Figure 2	Rev 2F

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N

Derwent River- Figure 5

SK35963,40187

SK35870,39943

530 m

River Derwent

Watermeadows ditch

SK35959,39721

Dam Brook
Figure 8

400 m

SK36522,40027

Boosemoor Brook

Dam Brook

Dam Brook

SK36419,39883

SK36385,39690

Legend

- Site boundary
- 50 m buffer
- 250 m buffer
- 500 m buffer
- Water body

100 0 100 200 300 400 500 Metres

File Name:J:\Derby-Jobs\Highways Agency\47071390 A38 Derby Jcns - Environment\Technical\Ecology\GIS_Chesterfield\project_files\Little Eaton\RCS\A38 Little Eaton RCS 2015.mxd

Project Title/Drawing Title

A38 DERBY JUNCTIONS
LITTLE EATON
RIVER CORRIDOR SURVEY

Project Number 47071319		
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Key based on the River Corridor Surveys Conservation Technical Handbook (National Rivers Authority, 1992):

AQUATIC AND MARGINAL ZONES

CHANNEL FEATURES

- Bridge (road/track)
- Footbridge
- Lock
- Inlet
- Weir
- Pool
- Riffle
- Rapids
- Run
- Waterfall
- Protruding rock
- Island (with vegetation)
- Direction of flow

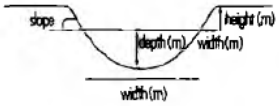
SUBSTRATE

- Mud
- Sand
- Bare gravel/ shingle
- Vegetated gravel/shingle
- Cobbles
- Boulders

CHANNEL VEGETATION

- Emergent Monocots
- Emergent Dicots
- Submerged Monocots
- Submerged Dicots
- Bryophytes
- Floating leaves

CHANNEL CROSS-SECTION



SURVEY INFORMATION

- Direction of survey/bank used
- Photograph

BANK AND ADJACENT LAND ZONES

BANK FEATURES

- Base of bank
- Top of bank
- Slump
- Stable earth cliff
- Eroding earth cliff
- Rock cliff
- Artificial bank protection
- Cattle drink
- Shelf / berm
- Spring / flush
- Inflow stream
- Outfall
- Dredgings/spoil

ADJACENT LAND FEATURES

- Fence
- Gate
- Road / track
- Railway
- Footpath
- Power lines
- Building
- S.T.W. Sewage works
- Flood bank
- [ ] Land use category Defined name / Phase 1 code

VEGETATION

Trees

- Conifer
- Broadleaf
- - overhanging
- - fallen
- - exposed roots
- Woodland + symbol for type
- *P + symbol* Pollarded tree
- *(P) + symbol* Tree needs pollarding
- *C + symbol* Coppiced tree
- Sapling

Shrubs/hedgerows

- Shrub (single)
- Dense shrubs
- Sparse shrubs
- Hedgerow
- Hedgerow with trees

Grasses and herbs

- Reed / sedge
- Tall grass
- Tall herb / ruderal
- Tall grass with herbs
- Short grass
- Mown

Abbreviations	Scientific name	Common name
A. ela	*Arrhenatherum elatius*	False oat-grass
A. glut	*Alnus glutinosa*	Alder
A. pseu	*Acer pseudoplatanus*	Sycamore
B. pub	*Betula pubescens*	Dawny birch
C. ave	*Corellus avellana*	Hazel
C. mon	*Crataegus monogyna*	Hawthorn
F. exc	*Fraxinus excelsior*	Ash
F. sch	*Fallopia sachalinensis*	Giant knotweed
F. syl	*Fagus sylvatica*	Beech
H. hip	*Aesculus hippocastanum*	Horse chestnut
H. lan	*Holcus lanatus*	Yorkshire-fog
P. ace	*Platanus acerifolia*	London plane
Q. rob	*Quercus robur*	English oak
R. fru	*Rubus fruticosus*	Bamble
S. alba	*Salix alba*	White willow
Salis spp.	*Salix spp.*	Willow spp.
U. dio	*Urtica dioica*	Common nettle
Ulmus spp.	*Ulmus spp.*	Elm spp.

(D)	Dominant
[SNBW]	Semi-natural broad-leaved woodland
[I]	Improved grassland
[SNG]	Semi-natural grassland
[HS]	Hard standing
[PBW]	Plantation broad-leaved woodland

Project Title/Drawing Title

A38 DERBY JUNCTIONS
RIVER CORRIDOR SURVEY
KEY

Project Number
47071319

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Drawing Number		Rev
Figure 4		2F

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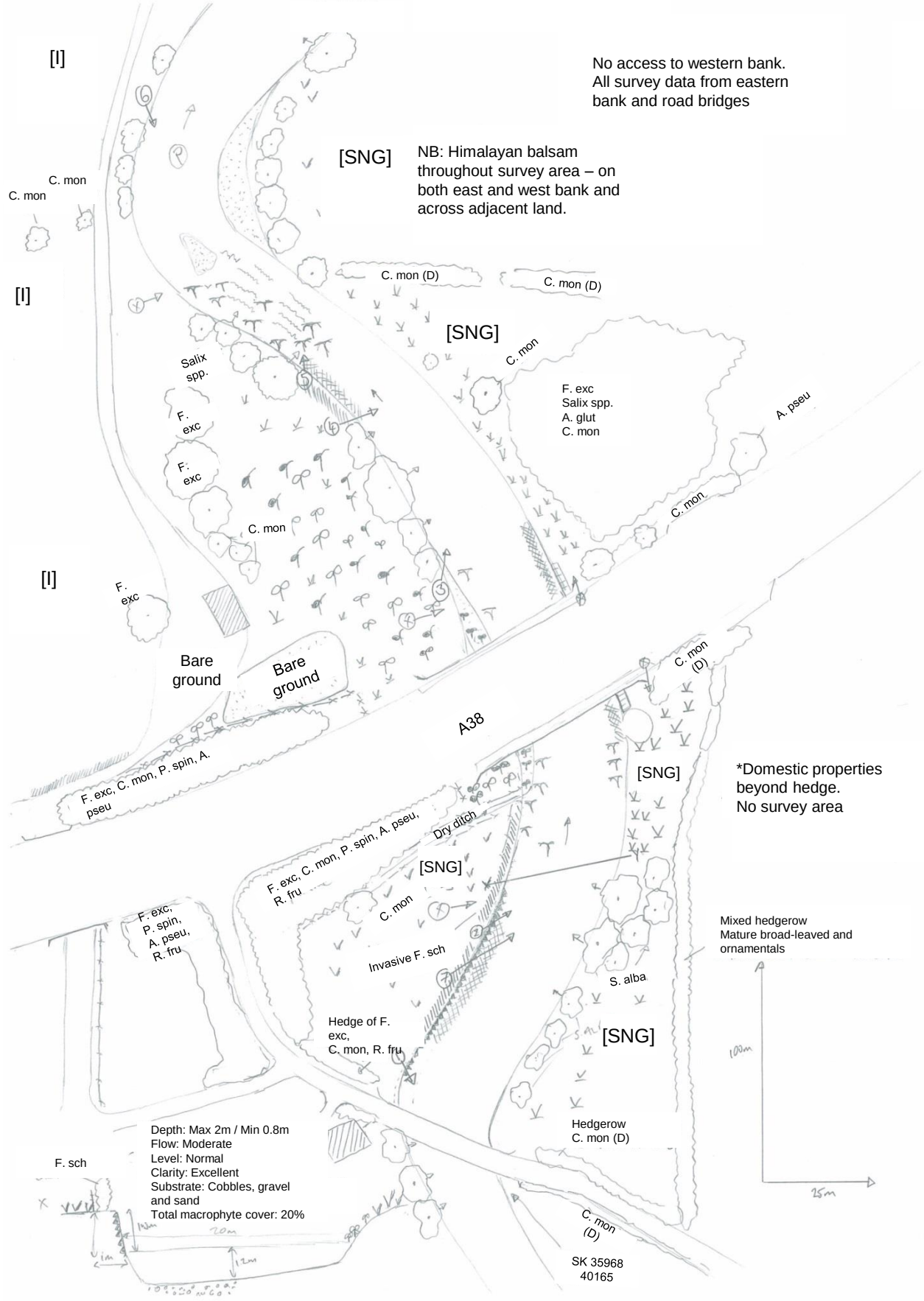

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Project Title/Drawing Title

A38 DERBY JUNCTIONS DERWENT RIVER RIVER CORRIDOR SURVEY

Project Number		
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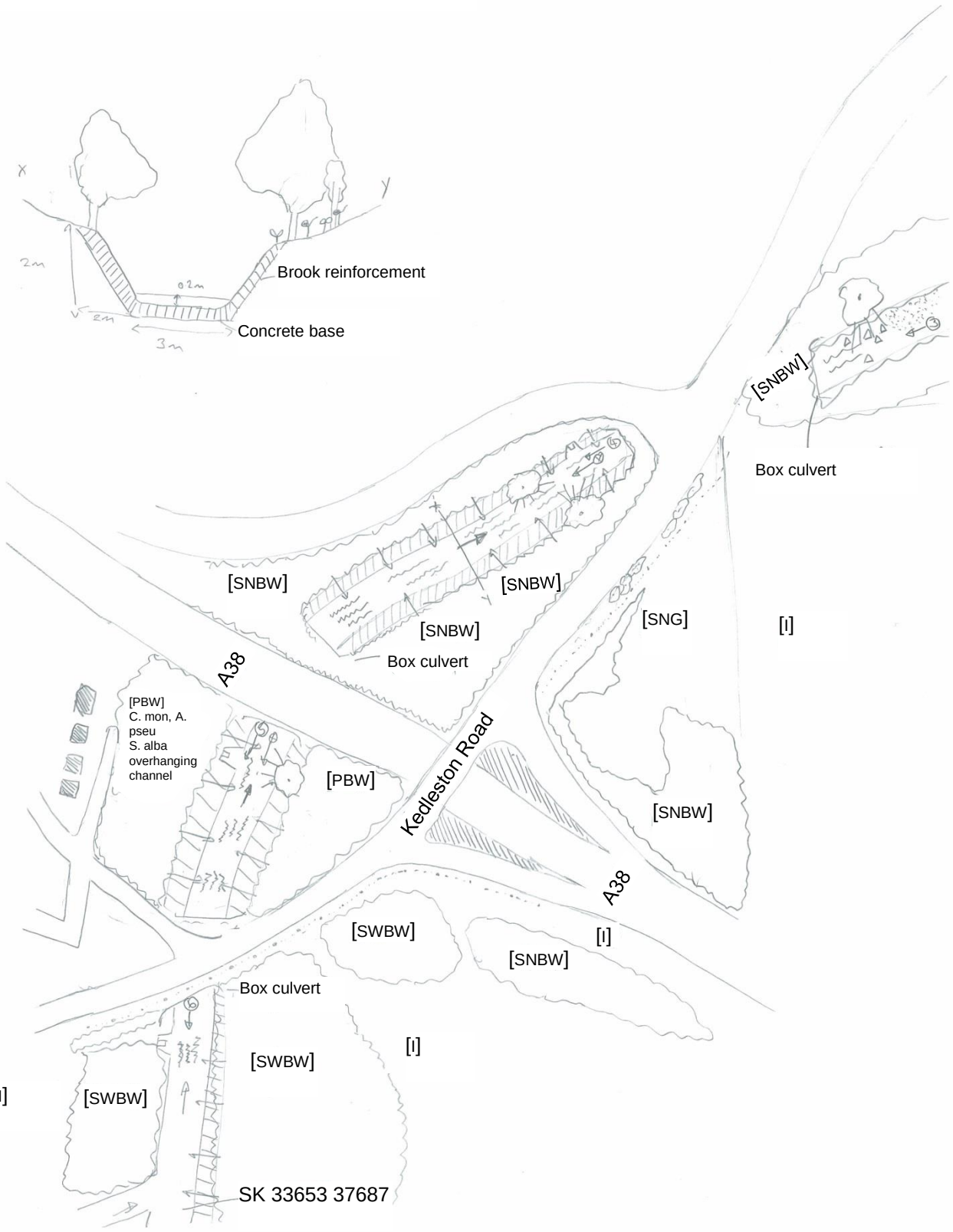

Project Title/Drawing Title

A38 DERBY JUNCTIONS
MARKEATON BROOK 1
RIVER CORRIDOR SURVEY

Project Number
47071319

Drawn	Checked	Approved
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Date	Scale @ A3	Purpose of issue
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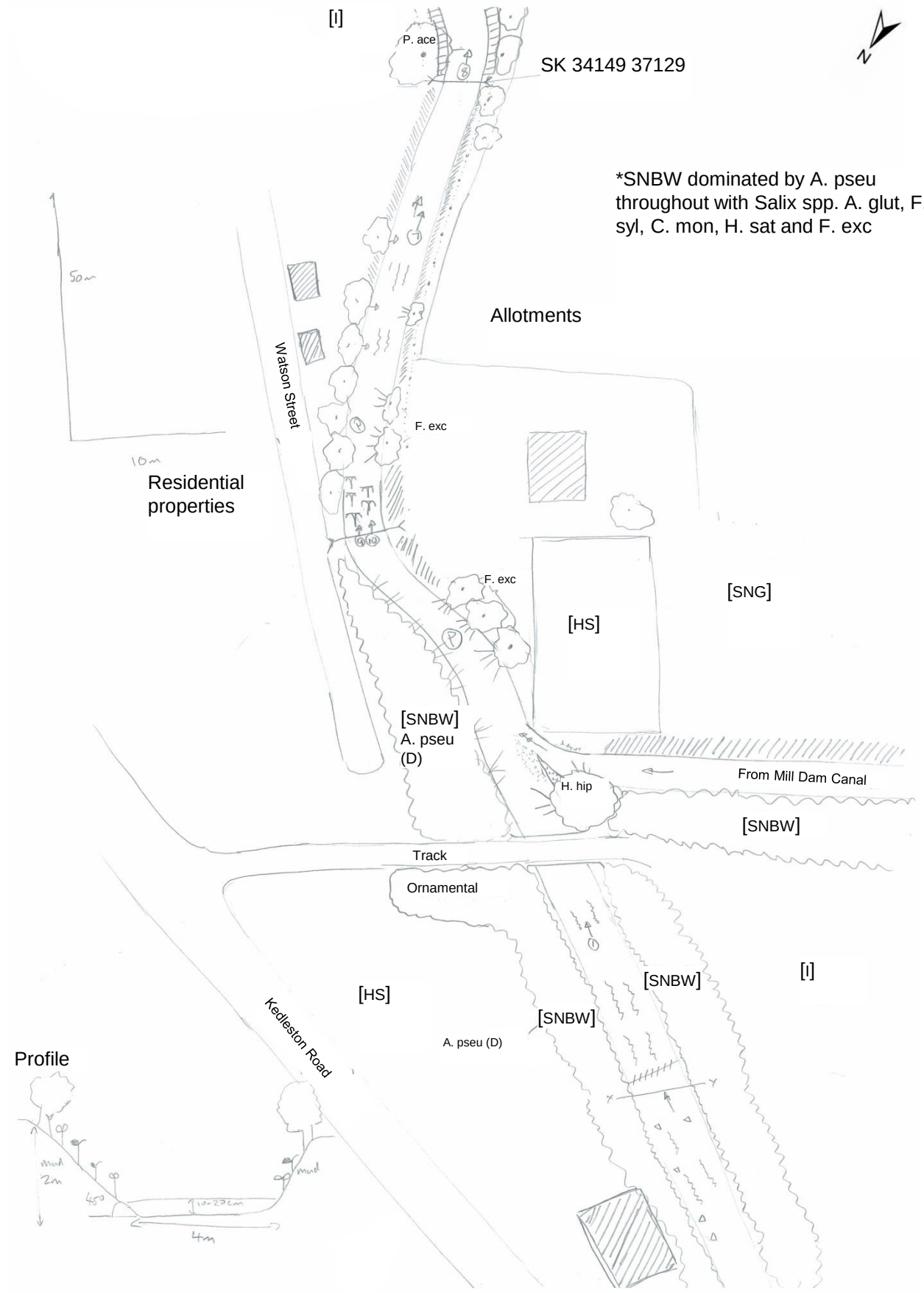

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	Drawn: GSB	Checked: SR	Approved: OB
	Date: 02/03/2016	Scale @ A3: Not to scale	Purpose of issue: FINAL
	Drawing Number: Figure 7		Rev: 2F

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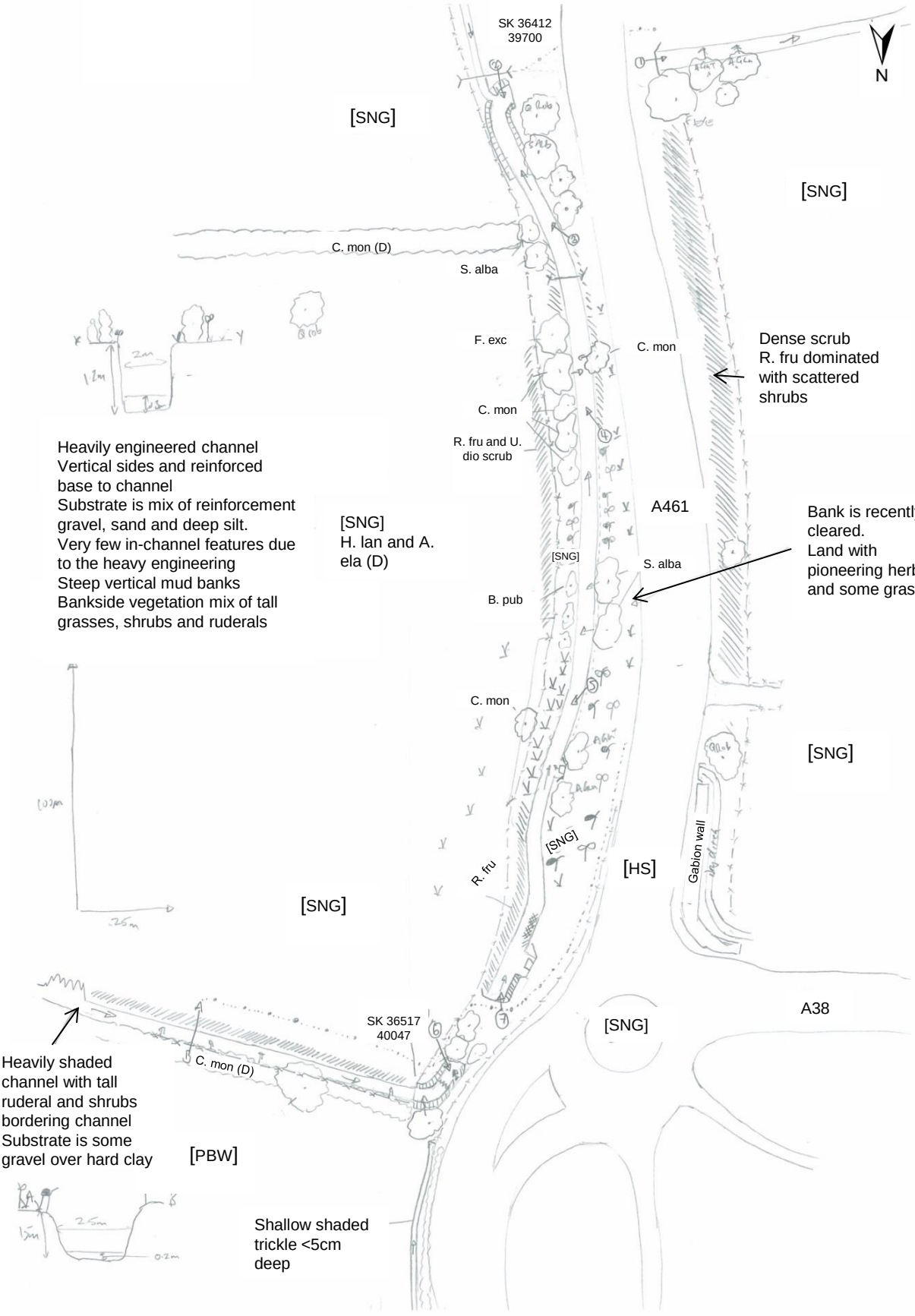

Project Title/Drawing Title: A38 DERBY JUNCTIONS DAM BROOK RIVER CORRIDOR SURVEY	Project Number: 47071319		
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	Date: 02/03/2016	Scale @ A3: Not to scale	Purpose of issue: FINAL
	Drawing Number: Figure 8		Rev: 2F

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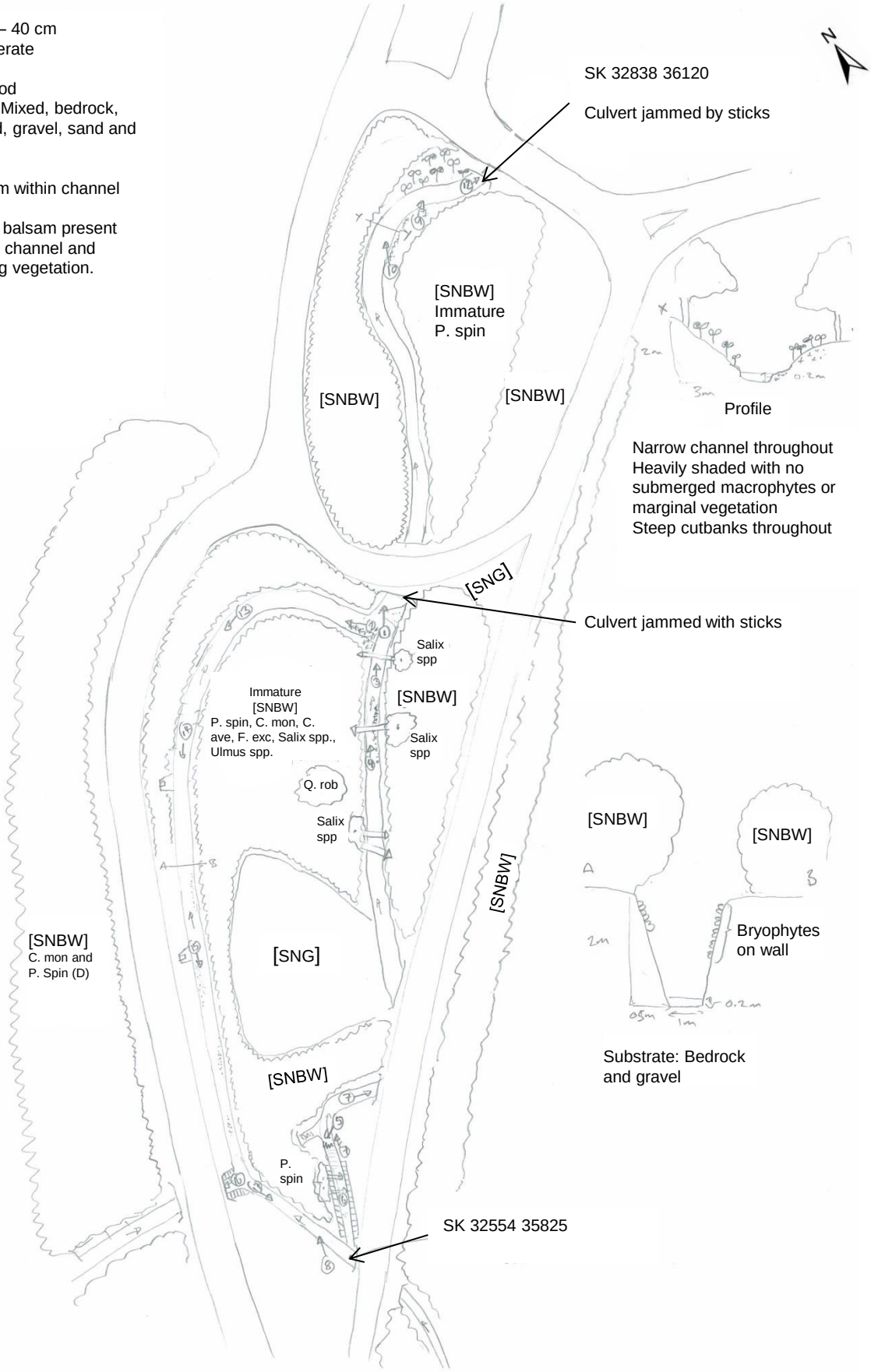
Depth: 10 – 40 cm
Flow: Moderate
Level: Low
Clarity: Good
Substrate: Mixed, bedrock, engineered, gravel, sand and deep silt

Survey from within channel

Himalayan balsam present throughout channel and surrounding vegetation.



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	Date: 02/03/2016	Scale @ A3: Not to scale	Purpose of issue: FINAL
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Appendix B River Habitat Survey Forms and Spot-check Key (2003)

RIVER HABITAT SURVEY 2003 Version **Page 1 of 4**

A FIELD SURVEY DETAILS

Site Number: (leave blank if new site)

Site Reference:

Spot-check 1 Grid Ref:

Spot-check 6 Grid Ref:

End of site Grid Ref:

Reach Reference:

River name:

Date / /20 Time:

Surveyor name:

Accredited Surveyor code:

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: ☐

Photo references:

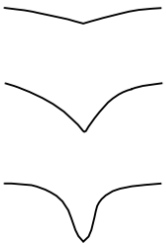
Site surveyed from: left bank ☐ right bank ☐ channel ☐

☐ **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)

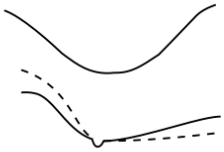
(tick one box only)



☐ shallow vee

☐ 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)		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
Weirs/sluices				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** ☐

SITE REF.	**RIVER HABITAT SURVEY: TEN SPOT-CHECKS**										**Page 2 of 4**
Spot-check 1 is at: upstream end ❑					downstream end ❑			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											
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM											
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB											
CHANNEL	GP- ring either G or P if predominant										
Channel substrate NV, BE, BO, CO, GP, SA, SI, CL, PE, EA, AR											
Flow-type NV, FF, CH, BW, UW, CF, RP, UP, SM, NP, DR											
Channel modification(s) NK, NO, CV, RS, RI, DA, FO											
Channel feature(s) NV, NO, EB, RO, VR, MB, VB, MI, TR											
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											
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM											
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB											
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											
LEFT BANK-FACE (structure) B/U/S/C/NV											
RIGHT BANK-FACE (structure) B/U/S/C/NV											
RIGHT BANKTOP (structure within 1m) B/U/S/C/NV											
LAND-USE WITHIN 5m OF RIGHT BANKTOP											
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											

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

Use end column for overall assessment over 500m, including types not occurring in spot-checks (use ✓, E or NV) ↑

River Habitat Survey Manual: 2003 version 2.6

SITE REF.	**RIVER HABITAT SURVEY: TEN SPOT-CHECKS**										**Page 2 of 4**
Spot-check 1 is at: upstream end ❑					downstream end ❑			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											
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM											
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB											
CHANNEL	GP- ring either G or P if predominant										
Channel substrate NV, BE, BO, CO, GP, SA, SI, CL, PE, EA, AR											
Flow-type NV, FF, CH, BW, UW, CF, RP, UP, SM, NP, DR											
Channel modification(s) NK, NO, CV, RS, RI, DA, FO											
Channel feature(s) NV, NO, EB, RO, VR, MB, VB, MI, TR											
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											
Bank modification(s) NK, NO, RS, RI, PC(B), BM, EM											
Marginal & bank feature(s) NV, NO, EC, SC, PB, VP, SB, VS, NB											
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											
LEFT BANK-FACE (structure) B/U/S/C/NV											
RIGHT BANK-FACE (structure) B/U/S/C/NV											
RIGHT BANKTOP (structure within 1m) B/U/S/C/NV											
LAND-USE WITHIN 5m OF RIGHT BANKTOP											
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											

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

Use end column for overall assessment over 500m, including types not occurring in spot-checks (use ✓, E or NV) ↑

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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)		
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			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)

	Left	Right
None	☐	☐
Isolated/scattered	☐	☐
Regularly spaced, single	☐	☐
Occasional clumps	☐	☐
Semi-continuous	☐	☐
Continuous	☐	☐

ASSOCIATED FEATURES (tick one box per feature)

	None	Present	E (≥33%)
Shading of channel	☐	☐	☐
*Overhanging boughs	☐	☐	☐
*Exposed bankside roots	☐	☐	☐
*Underwater tree roots	☐	☐	☐
Fallen trees	☐	☐	☐
Large woody debris	☐	☐	☐

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	☐	☐	☐	Exposed bedrock	☐	☐	☐
Chute flow	☐	☐	☐	Exposed boulders	☐	☐	☐
Broken standing waves	☐	☐	☐	Vegetated bedrock/boulders	☐	☐	☐
Unbroken standing waves	☐	☐	☐	Unvegetated mid-channel bar(s)	☐	☐	☐
Rippled flow	☐	☐	☐	Vegetated mid-channel bar(s)	☐	☐	☐
*Upwelling	☐	☐	☐	Mature island(s)	☐	☐	☐
Smooth flow	☐	☐	☐	Unvegetated side bar(s)	☐	☐	☐
No perceptible flow	☐	☐	☐	Vegetated side bar(s)	☐	☐	☐
No flow (dry)	☐	☐	☐	Unvegetated point bar(s)	☐	☐	☐
Marginal deadwater	☐	☐	☐	Vegetated point bar(s)	☐	☐	☐
Eroding cliff(s)	☐	☐	☐	*Unvegetated silt deposit(s)	☐	☐	☐
Stable cliff(s)	☐	☐	☐	*Discrete unvegetated sand deposit(s)	☐	☐	
				*Discrete unvegetated gravel deposit(s)	☐	☐	

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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)		Bankfull width (m)		Banktop height (m)	
Is banktop height also bankfull height? (Y or N)		Water width (m)		Is banktop height also bankfull height? (Y or N)	
Embanked height (m)		Water depth (m)		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)

M FEATURES OF SPECIAL INTEREST Use ✓ or E (≥ 33% length) *record even if <1%

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 ✓ or E (≥ 33% length) *record even if <1%

		bankface	banktop to 50m		bankface	banktop to 50m
None ☐	*Giant hogweed	☐	☐	*Himalayan balsam	☐	☐
	*Japanese knotweed	☐	☐	*Other (state).....	☐	☐

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 ❑ 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?	☐

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RIVER HABITAT SURVEY 2003 VERSION: SPOT-CHECK KEY Page 1 of 2

PHYSICAL ATTRIBUTES (SECTION E)

BANKS

Predominant bank material

NV = not visible

BE = bedrock
BO = boulder
CO = cobble
GS = gravel/sand
EA = earth (crumbly)
PE = peat
CL = sticky clay

CC = concrete
SP = sheet piling
WP = wood piling
GA = gabion
BR = brick/laid stone
RR = rip-rap
TD = tipped debris
FA = fabric
BI = bio-engineering materials

Bank modifications

NK = not known
NO = none

RS = resectioned (reprofiled)
RI = reinforced
PC = poached
PC(B) = poached (bare)
BM = artificial berm
EM = embanked

Marginal and bank features

NV = not visible (e.g. far bank)
NO = none

EC = eroding cliff (EC if sandy substrate)
SC = stable cliff (SC if sandy substrate)

PB = unvegetated point bar
VP = vegetated point bar

SB = unvegetated side bar
VS = vegetated side bar

NB = natural berm

CHANNEL

Predominant substrate

NV = not visible

BE = bedrock
BO = boulder
CO = cobble
GP = gravel/pebble (G or P if predominant)
SA = sand
SI = silt
CL = clay
PE = peat
EA = earth
AR = artificial

Predominant flow-type

NV = not visible
FF = free fall
CH = chute
BW = broken standing waves (white water)
UW = unbroken standing waves
CF = chaotic flow
RP = rippled
UP = upwelling
SM = smooth
NP = no perceptible flow
DR = no flow (dry)

Channel modifications

NK = not known
NO = none

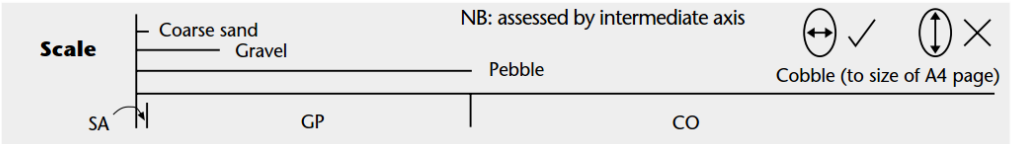
CV = culverted
RS = resectioned
RI = reinforced
DA = dam/weir/sluice
FO = ford (man-made)

Channel features

NV = not visible
NO = none

EB = exposed bedrock
RO = exposed boulders
VR = vegetated rock
MB = unvegetated mid-channel bar
VB = vegetated mid-channel bar
MI = mature island
TR = Trash (urban debris)

FLOW-TYPES	DESCRIPTION
FF: Free fall	clearly separates from back-wall of vertical feature ~ associated with waterfalls
CH: Chute	low curving fall in contact with substrate ~ often associated with cascades
BW: Broken standing waves	white-water tumbling waves must be present ~ mostly associated with rapids
UW: Unbroken standing waves	upstream facing wavelets which are not broken ~ mostly associated with riffles
CF: Chaotic flow	a chaotic mixture of three or more of the four fast flow-types with no predominant one obvious
RP: Rippled	no waves, but general flow direction is downstream with disturbed rippled surface ~ mostly associated with runs
UP: Upwelling	heaving water as upwellings break the surface ~ associated with boils.
SM: Smooth	perceptible downstream movement is smooth (no eddies) ~ mostly associated with glides
NP: No perceptible flow	no net downstream flow ~ associated with pools, ponded reaches and marginal deadwater
DR: No flow (dry)	dry river bed



2.3 *River Habitat Survey Manual: 2003 version*

RIVER HABITAT SURVEY: SPOT-CHECK KEY

Page 2 of 2

LEFT **Banks are determined by looking downstream** **RIGHT**

CHANNEL MODIFICATION INDICATORS

One or more of the following may be indicative of resectioning:

1. Uniform bank profile
2. Straightened planform
3. Bankfull width/bankfull height ratio <4:1
4. Uniform/low energy flow-types
5. No trees/uniformly-aged trees along bank
6. Intensive/urban land-use

LAND-USE WITHIN 5m OF BANKTOP (SECTION F) & 50m (SECTION H)

BL = Broadleaf/mixed woodland (semi-natural)
BP = Broadleaf/mixed plantation
CW = Coniferous woodland (semi-natural)
CP = Coniferous plantation
SH = Scrub & shrubs
OR = Orchard
WL = Wetland (e.g. bog, marsh, fen)
MH = Moorland/heath
AW = Artificial open water
OW = Natural open water
RP = Rough unimproved grassland/pasture
IG = Improved/semi-improved grassland
TH = Tall herb/rank vegetation
RD = Rock, scree or sand dunes
SU = Suburban/urban development
TL = Tilled land
IL = Irrigated land
PG = Parkland or gardens
NV = Not visible

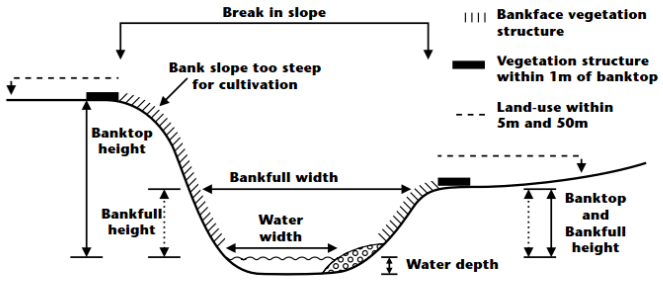
BANKTOP AND BANKFACE VEGETATION STRUCTURE To be assessed within a 10m wide transect (SECTION F)

bare	B	bare earth/rock etc.	vegetation types
uniform	U	predominantly one type (no scrub or trees)	bryophytes
simple	S	two or three vegetation types	short/creeping herbs or grasses
complex	C	four or more types	tall herbs/ grasses
			scrub or shrubs
			saplings and trees

Channel dimensions guidance (Section L)

- Select location on uniform section.
- If riffle is present, measure there. If not, measure at straightest and shallowest point.
- **Banktop** = first major break in slope above which cultivation or development is possible.
- **Bankfull** = point where river first spills on to floodplain.

Cross-section of channel showing definitions used to define where spot-check recording and channel dimensions measured



ENVIRONMENT AGENCY

EMERGENCY HOTLINE 0800 80 70 60

24 hour free emergency telephone line for reporting all environmental incidents relating to air, land and water.

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Appendix C Scoring system for HMS and HQA (Raven et al., 1998)

Habitat Quality Assessment (HQA) scoring system: version 1.2

The HQA score for a site is the total of all the component scores in the categories listed below.

FLOW TYPES

Each predominant flow-type recorded scores **1**; if it occurs at 2 - 3 spot-checks, it scores **2**; if it occurs at 4 or more spot-checks, it scores **3**. If only one type occurs at **all 10 spot-checks**, the score will be **3**. Dry channel scores **0**.

If recorded in the sweep-up, **score 1 for each of the following channel features provided that an equivalent flow-type has not been recorded in any spot-check**: waterfall(s), if *free fall* flow absent; cascade(s), if *chute* flow absent; rapid(s), if *broken standing wave* absent; riffle(s), if *unbroken standing wave* absent; run(s), if *rippled* flow absent; boil(s), if *upwelling* absent; glide(s), if *smooth* flow absent; pool(s), if *no perceptible flow* absent. Score **1** for marginal deadwater recorded as present **or** extensive in the sweep-up.

CHANNEL SUBSTRATES

Each predominant natural substrate type (ie bedrock, boulder, cobble, gravel/pebble, sand, silt, clay, peat) recorded scores **1**; if it occurs at 2 - 3 spot-checks it scores **2**; if it occurs at 4 or more spot-checks, it scores **3**.

If only one predominant type is recorded at all 10 spot-checks, the score will be **3**.

Extra substrate(s) recorded (on the 1997 form) do **not** count.

"Not visible" does not score, unless recorded at 6 or more spot-checks, when it scores **1**.

CHANNEL FEATURES

Each 'natural' channel feature (ie exposed bedrock/boulders, unvegetated mid-channel bar, vegetated mid-channel bar, mature island) recorded scores **1**; if it occurs at 2-3 spot-checks, it scores **2**; if it occurs at 4 or more spot-checks, it scores **3**. *[NB: more than one feature can occur at a single spot-check.]*

If any of these features are **not** recorded in the spot-checks, but occur as present or extensive in the sweep-up, then they score **1** each.

BANK FEATURES

Each bank is scored **separately**.

Each natural feature (ie eroding earth cliff, stable earth cliff, unvegetated point bar, vegetated point bar, unvegetated side-bar, vegetated side-bar) recorded scores **1**; if it occurs at 2 - 3 spot checks, it scores **2**; if it occurs at 4 or more spot-checks, it scores **3**. *[NB: more than one feature can be recorded at a single spot-check.]*

If any of unvegetated point bar, vegetated point bar, unvegetated side bar or vegetated side bar are **not** recorded in the spot-checks, but appear in the sweep-up, then they will score **1** each. *[NB: vertical/undercut cliff profile recorded in the sweep-up does not equate to eroding or stable earth cliff.]*

BANK VEGETATION STRUCTURE

Only simple and complex vegetation structure score. Both score equally.

Each bank is scored **separately**.

Bankface and banktop are scored **separately**.

Bankface

If simple **or** complex is recorded at one spot-check it scores **1**; if simple and/or complex recorded at 2 - 3 spot-checks, score **2**; if simple and/or complex occur at 4 or more spot-checks, the score will be **3**.

Banktop

If simple **or** complex is recorded at one spot-check it scores **1**; if simple and/or complex recorded at 2 - 3 spot-checks, score **2**; if simple and/or complex occur at 4 or more spot-checks, the score will be **3**.

(continued)

POINT BARS

Add together the total number of unvegetated and vegetated point bars *(front page of form)*.

Score **1** if the total is 3 - 8; score **2** for 9 or more.

IN-STREAM CHANNEL VEGETATION

In-stream channel vegetation types are grouped into six categories for scoring purposes: (i) liverworts and mosses; (ii) emergent broad-leaved herbs; (iii) emergent reeds/rushes/sedges; (iv) floating-leaved, free-floating and amphibious; (v) submerged broad-leaved; and (vi) submerged linear and fine-leaved.

Score **1** for each category recorded within the site, and **2** for those categories recorded either as present or extensive at 4 or more spot-checks.

Filamentous algae do **not** score.

LAND-USE WITHIN 50m

Each bank is scored **separately**.

Only the sweep-up information is used.

Only broadleaf woodland (or native pinewood), moorland/heath, and wetland score.

Broadleaf woodland, moorland/heath and wetland each score **1** if present, and score **2** if extensive.

If broadleaf woodland (or native pinewood) or wetland, alone or together are the **only** land-use categories recorded, then score **7** for that bank. For naturally treeless sites, moorland/heath or equivalent qualifies.

TREES AND ASSOCIATED FEATURES

Trees

Each bank is scored **separately**.

Score **1** if trees are isolated/scattered; score **2** if regularly-spaced or occasional clumps; score **3** if semi-continuous or continuous.

Associated features

Overhanging boughs, exposed bankside roots, underwater tree roots, coarse woody debris and fallen trees each score **1** if present.

Extensive exposed bankside roots and underwater tree roots each score **2**.

Extensive coarse woody debris score 3.

Extensive fallen trees score **5**.

SPECIAL FEATURES

Score **5** if **any** of the following have been recorded: waterfall more than 5m high, braided or side channel, debris dams, natural open water, fen, carr, flush, bog. [*Score 5 regardless of number of special features present.]*

Footnote: *HQA scores should only be used when comparing sites of similar river type or character. For instance, sites in naturally treeless exposed or mountain areas should not be compared with those in lowland wooded valleys.*

Habitat Modification Score (HMS) rules: version 1.1

The HMS score for a site is the total of all the component scores in the categories listed below

A. Modifications at spot-checks
(abbreviations in brackets)

	Score per spot-check
Reinforcement to banks (RI)	2
Reinforcement to bed (AR)	2
Resectioned bank or bed (RS)	1
Two-stage bank modification (BM)	1
Embankment (EM)	1
Culvert (CV)	8
Dam, weir, ford (DA, FO)	2
Bank poached by livestock (PC)	0, if less than 3 spot-checks 1, if 3-5 spot-checks 2, if 6 or more spot-checks

B. Modification present but not recorded at spot-checks

	One bank (or channel)	**Both banks**
Artificial bed material	1	-
Reinforced whole bank	2	3
Reinforced top or bottom of bank	1	2
Resectioned bank	1	2
Embankment	1	1
Set-back embankment	1	1
Two-stage channel	1	3
Weed-cutting	1	-
Bank-mowing	1	1
Culvert	8 for each	
Dam, weir, ford	2 for each	

C. Scores for features in site as a whole

	One	**Two or more**	**Site**
Footbridge	0	0	
Roadbridge	1	2	
Enhancements, such as groynes	1	2	
Site partly affected by flow control			1
Site extensively* affected by flow control			2
Partly realigned channel**			5
Extensively* or wholly realigned channel**			10

** Extensive means at least a third of channel length.*
*** information from map*

Appendix D Relevant Legislation for Protected Species and Relevant Planning Policy Guidance

Legislation Relating to Invasive Species

Schedule 9 of the 1981 Wildlife and Countryside Act (as amended) details legislation covers the control of invasive plants and animals.

Legislation Relating to Plants

All wild plants are protected against unauthorised removal or uprooting under Section 13 of the Wildlife and Countryside Act (WCA) 1981 (as amended). Plants listed on Schedule 8 of the Act are afforded additional protection against picking, uprooting, destruction and sale.

Legislation Relating to Hedgerows

Under the Hedgerows Regulations 1997 it is against the law to remove or destroy certain hedgerows without permission from the local planning authority. The local planning authority is the enforcement body for offences created by the Regulations.

Local planning authority permission is normally required before removing hedges that are at least 20 metres (66 feet) in length, more than 30 years old and contain certain plant species. The authority will assess the importance of the hedgerow using criteria set out in the regulations.

The Hedgerow regulations provide provision for hedgerow retention when hedges are considered to be “important” based on criteria set out in the regulations.

The Water Environment Legislation

The Regulations require a new strategic planning process to be established for the purposes of managing, protecting and improving the quality of water resources.

Planning Policy

In December 2010, the Minister for Decentralisation and Planning, Greg Clark MP, announced a review of national planning policy, designed to consolidate all the existing Planning Policy Statements, Planning Policy Guidance’s and various circulars into a single consolidated document aimed to make the planning system less complex, more accessible and to promote sustainable growth. Known as the National Planning Policy Framework (NPPF), it was published in final form in March 2012.

The publication of the NPPF supersedes the majority of the previous national Planning Policy Statement and Planning Policy Guidance. Thus, it now forms the principal national planning policy for development. It sets out the Government’s key economic, social and environmental objectives and the planning policies needed to deliver them.

Appendix E Site Photos

Plate number	Notes	Plate
A1	River Derwent	
A2	River Derwent	
A3	River Derwent	
A4	River Derwent	

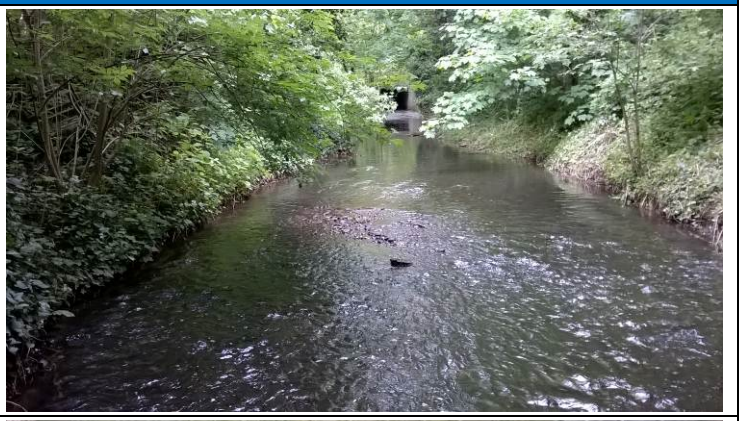
Plate number	Notes	Plate
A5	Markeaton Brook	
A6	Markeaton Brook	
A7	Markeaton Brook	
A8	Markeaton Brook	

Plate number	Notes	Plate
A9	Dam Brook	
A10	Dam Brook	
A11	Dam Brook	
A12	Dam Brook	

Plate number	Notes	Plate
A13	Dam Brook	
A14	Bramble Brook	
A15	Bramble Brook	
A16	Bramble Brook	

Plate number	Notes	Plate
A17	Bramble Brook	
A18	Bramble Brook	
A19	Bramble Brook	
A20	Bramble Brook	

Appendix F River Habitat Survey Forms

RIVER HABITAT SURVEY 2003 VERSION: SITE HEALTH AND SAFETY ASSESSMENT			
Site Number[1]:	Site Ref: MARKEATON	River Name: Markeaton	Date: 26/5/2015
Grid References/Co-ordinates:	Spot 1[2]: 34056/37373	Mid-site: see drawing	End of site[2]: SK33807 / 37601
Surveyor Name: JOANA CAPELA		Accredited Surveyor Code:	
[1] Leave blank if new site.		[2] Optional	

Weather Conditions: Cloudy

Flow Conditions: Low - moderate

Site details: (enter comments or circle if applicable and give details)	Risk Level (Low/Mod/High)
Access and Parking: (entry & exit)	Low
Conditions: comment on ground stability, footing, exposure/remoteness	Low
Obstacles/Hazards: fencing, stiles, dense vegetation, steep bank	Low
Occupied/Unoccupied: people, livestock, animals	Low
Activities/Land-use: agriculture, woodland, residential, industrial, construction, recreational	Low
Risk if lone-working	—

IF THERE ARE ANY HIGH RISKS OR MORE THAN THREE MODERATE RISKS
DO NOT CONTINUE WITH THE SURVEY.

Weil's Disease (***Leptospirosis***)

Instructions to card holders

1. As infection may enter through breaks in the skin, ensure that any cut, scratch or abrasion is thoroughly cleansed and covered with a waterproof plaster.
2. Avoid rubbing your eyes, nose and mouth during work.
3. Clean protective clothing, footwear and equipment etc. after use
4. After work, and particularly before taking food or drink, wash hands thoroughly.
5. Report all accidents and/or injuries, however slight.
6. Keep your card with you at all times.

Lyme Disease

1. Dress appropriately with skin covered up.
2. Regularly inspect for ticks when in the field.
3. Check for, and remove, any ticks as soon as possible after leaving the site.
4. Seek medical attention if bitten by a tick.

RIVER HABITAT SURVEY 2003 Version

A FIELD SURVEY DETAILS

leave blank if new site

Site Number: HARVEATON

Site Reference:

Spot-check 1 Grid Ref: 34056/3732

Spot-check 6 Grid Ref: See drawing

End of site Grid Ref: SX 33807/37601

Reach Reference: Harvey Ton

River name:

Date 26/05/2015 Time: 13:00

Surveyor name: Joana Capela

Accredited Surveyor code:

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: ☐

Photo references:

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

☐ 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)		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
Weirs/sluices				Outfalls/ intakes			
Culverts	11			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 ☐

SITE REF. MARKEATON

RIVER HABITAT SURVEY : 500m SWEEP-UP

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)	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	E	E
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)

	Left	Right
None	☐	☐
Isolated/scattered	☐	☐
Regularly spaced, single	☐	☐
Occasional clumps	☐	☐
Semi-continuous	☐	☐
Continuous	☑	☑

ASSOCIATED FEATURES (tick one box per feature)

	None	Present	E (≥33%)
Shading of channel	☐	☐	☑
*Overhanging boughs	☑	☐	☐
*Exposed bankside roots	☐	☐	☑
*Underwater tree roots	☐	☐	☑
Fallen trees	☑	☐	☐
Large woody debris	☑	☐	☐

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	☑	☐	☐	Exposed bedrock	☑	☐	☐
Chute flow	☑	☐	☐	Exposed boulders	☑	☐	☐
Broken standing waves	☑	☐	☐	Vegetated bedrock/boulders	☑	☐	☐
Unbroken standing waves	☐	☑	☐	Unvegetated mid-channel bar(s)	☐	☑	☐
Rippled flow	☐	☐	☑	Vegetated mid-channel bar(s)	☑	☐	☐
*Upwelling	☑	☐	☐	Mature island(s)	☑	☐	☐
Smooth flow	☐	☑	☐	Unvegetated side bar(s)	☑	☐	☐
No perceptible flow	☑	☐	☐	Vegetated side bar(s)	☑	☐	☐
No flow (dry)	☑	☐	☐	Unvegetated point bar(s)	☑	☐	☐
Marginal deadwater	☑	☐	☐	Vegetated point bar(s)	☑	☐	☐
Eroding cliff(s)	☑	☐	☐	*Unvegetated silt deposit(s)	☑	☐	☐
Stable cliff(s)	☑	☐	☐	*Discrete unvegetated sand deposit(s)	☑	☐	
				*Discrete unvegetated gravel deposit(s)	☑	☐	

RIVER HABITAT SURVEY 2003 VERSION: SITE HEALTH AND SAFETY ASSESSMENT			
Site Number[1]:	Site Ref: DAM BROOK	River Name: DAM Brook	Date: 26/05/2015
Grid References/Co-ordinates:	Spot 1[2]: SK 36412/ 39700	Mid-site: 36420/ 39917	End of site[2]: SK 36522/ 40027
Surveyor Name: Joana Capela		Accredited Surveyor Code:	
[1] Leave blank if new site.		[2] Optional	

Weather Conditions: Cloudy

Flow Conditions: Low - Moderate

Site details: (enter comments or circle if applicable and give details)	Risk Level (Low/Mod/High)
Access and Parking: (entry & exit)	Low
Conditions: comment on ground stability, footing, exposure/remoteness	Low
Obstacles/Hazards: fencing, stiles, dense vegetation, steep bank	Low
Occupied/Unoccupied: people, livestock, animals	Low
Activities/Land-use: agriculture, woodland, residential, industrial, construction, recreational	Low
Risk if lone-working	—

IF THERE ARE ANY HIGH RISKS OR MORE THAN THREE MODERATE RISKS
DO NOT CONTINUE WITH THE SURVEY.

Weil's Disease (***Leptospirosis***)

Instructions to card holders

1. As infection may enter through breaks in the skin, ensure that any cut, scratch or abrasion is thoroughly cleansed and covered with a waterproof plaster.
2. Avoid rubbing your eyes, nose and mouth during work.
3. Clean protective clothing, footwear and equipment etc. after use
4. After work, and particularly before taking food or drink, wash hands thoroughly.
5. Report all accidents and/or injuries, however slight.
6. Keep your card with you at all times.

Lyme Disease

1. Dress appropriately with skin covered up.
2. Regularly inspect for ticks when in the field.
3. Check for, and remove, any ticks as soon as possible after leaving the site.
4. Seek medical attention if bitten by a tick.

A FIELD SURVEY DETAILS

Site Number: (leave blank if new site) DAM BROOK.

Site Reference:

Spot-check 1 Grid Ref: SK 36412/39700

Spot-check 6 Grid Ref: 36420/39917

End of site Grid Ref: 36522/40027

Reach Reference:

River name: Dam Brook

Date 26/05/2015 Time: 16.00

Surveyor name: Joana Capela

Accredited Surveyor code:

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: ☐

Photo references:

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


☐ 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)		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
Weirs/sluices				Outfalls/ intakes			
Culverts	1			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 ☐

SITE REF. DAN Boom

RIVER HABITAT SURVEY : 500m SWEEP-UP

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)	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)

	Left	Right
None	☐	☐
Isolated/scattered	☑	☐
Regularly spaced, single	☐	☐
Occasional clumps	☐	☑
Semi-continuous	☐	☐
Continuous	☐	☐

ASSOCIATED FEATURES (tick one box per feature)

	None	Present	E (≥33%)
Shading of channel	☐	☑	☐
*Overhanging boughs	☑	☐	☐
*Exposed bankside roots	☑	☐	☐
*Underwater tree roots	☑	☐	☐
Fallen trees	☑	☐	☐
Large woody debris	☑	☐	☐

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	☑	☐	☐	Exposed bedrock	☑	☐	☐
Chute flow	☑	☐	☐	Exposed boulders	☑	☐	☐
Broken standing waves	☑	☐	☐	Vegetated bedrock/boulders	☑	☐	☐
Unbroken standing waves	☑	☐	☐	Unvegetated mid-channel bar(s)	☑	☐	☐
Rippled flow	☑	☐	☐	Vegetated mid-channel bar(s)	☑	☐	☐
*Upwelling	☑	☐	☐	Mature island(s)	☑	☐	☐
Smooth flow	☐	☑	☐	Unvegetated side bar(s)	☑	☐	☐
No perceptible flow	☐	☐	☑	Vegetated side bar(s)	☑	☐	☐
No flow (dry)	☑	☐	☐	Unvegetated point bar(s)	☑	☐	☐
Marginal deadwater	☑	☐	☐	Vegetated point bar(s)	☑	☐	☐
Eroding cliff(s)	☐	☑	☐	*Unvegetated silt deposit(s)	☑	☐	☐
Stable cliff(s)	☐	☑	☐	*Discrete unvegetated sand deposit(s)	☑	☐	
				*Discrete unvegetated gravel deposit(s)	☑	☐	

RIVER HABITAT SURVEY 2003 VERSION: SITE HEALTH AND SAFETY ASSESSMENT			
Site Number[1]:	Site Ref: Bramble Brook	River Name: Bramble Brook	Date: 26/5/2015
Grid References/Co-ordinates:	Spot 1[2]: 32829 36119	Mid-site: 32681 36001	End of site[2]: 32557 35824
Surveyor Name: Joana Capela		Accredited Surveyor Code:	
[1] Leave blank if new site.		[2] Optional	

Weather Conditions: Sunny + warm

Flow Conditions: Low - moderate

Site details: (enter comments or circle if applicable and give details)	Risk Level (Low/Mod/High)
Access and Parking: (entry & exit) Access through nowud about	Mod
Conditions: comment on ground stability, footing, exposure/remoteness	Low
Obstacles/Hazards: fencing, stiles, dense vegetation, steep bank	Mod
Occupied/Unoccupied: people, livestock, animals	Low
Activities/Land-use: agriculture, woodland, residential, industrial, construction, recreational	Low
Risk if lone-working 2. People	Low

IF THERE ARE ANY HIGH RISKS OR MORE THAN THREE MODERATE RISKS
DO NOT CONTINUE WITH THE SURVEY.

Weil's Disease (***Leptospirosis***)

Instructions to card holders

1. As infection may enter through breaks in the skin, ensure that any cut, scratch or abrasion is thoroughly cleansed and covered with a waterproof plaster.
2. Avoid rubbing your eyes, nose and mouth during work.
3. Clean protective clothing, footwear and equipment etc. after use
4. After work, and particularly before taking food or drink, wash hands thoroughly.
5. Report all accidents and/or injuries, however slight.
6. Keep your card with you at all times.

Lyme Disease

1. Dress appropriately with skin covered up.
2. Regularly inspect for ticks when in the field.
3. Check for, and remove, any ticks as soon as possible after leaving the site.
4. Seek medical attention if bitten by a tick.

A FIELD SURVEY DETAILS

Site Number: (leave blank if new site)

Site Reference:

Spot-check 1 Grid Ref: SK 32829/36119

Spot-check 6 Grid Ref: 32681/36001

End of site Grid Ref: 32557/35824

Reach Reference:

River name: Bramble Brook

Date 26/5/2015 Time: 0945

Surveyor name: Joana Capela

Accredited Surveyor code:

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: ☐

Photo references:

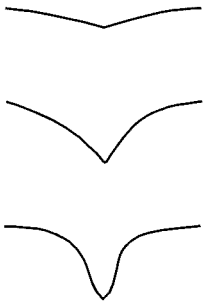
Site surveyed from: left bank ☐ right bank ☐ channel ☑

☐ **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)

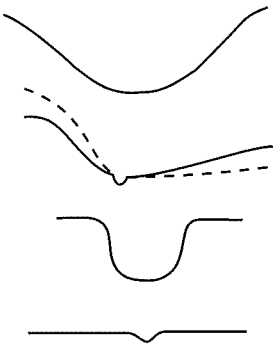
(tick one box only)



☐ shallow vee

☐ 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)	1	Unvegetated point bar(s)	1 1
Pool(s)		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
Weirs/sluices				Outfalls/ intakes			
Culverts	1 1			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 ☐

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	✓	E	Resectioned (reprofiled)	✓	✓
Vertical with toe	E	✓	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)

	Left	Right
None	☐	☐
Isolated/scattered	☐	☐
Regularly spaced, single	☐	☐
Occasional clumps	☐	☐
Semi-continuous	☐	☐
Continuous	✓	✓

ASSOCIATED FEATURES (tick one box per feature)

	None	Present	E (≥33%)
Shading of channel	☐	☐	✓
*Overhanging boughs	☐	✓	☐
*Exposed bankside roots	☐	☐	✓
*Underwater tree roots	☐	✓	☐
Fallen trees	☐	✓	☐
Large woody debris	☐	✓	☐

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	✓	☐	☐	Exposed bedrock	✓	☐	☐
Chute flow	☐	✓	☐	Exposed boulders	✓	☐	☐
Broken standing waves	✓	☐	☐	Vegetated bedrock/boulders	✓	☐	☐
Unbroken standing waves	☐	✓	☐	Unvegetated mid-channel bar(s)	☐	✓	☐
Rippled flow	☐	☐	✓	Vegetated mid-channel bar(s)	✓	☐	☐
*Upwelling	✓	☐	☐	Mature island(s)	☐	☐	✓
Smooth flow	☐	☐	✓	Unvegetated side bar(s)	☐	☐	✓
No perceptible flow	✓	☐	☐	Vegetated side bar(s)	☐	✓	☐
No flow (dry)	✓	☐	☐	Unvegetated point bar(s)	☐	✓	☐
Marginal deadwater	☐	✓	☐	Vegetated point bar(s)	☐	✓	☐
Eroding cliff(s)	☐	☐	✓	*Unvegetated silt deposit(s)	✓	☐	☐
Stable cliff(s)	☐	☐	✓	*Discrete unvegetated sand deposit(s)	✓	☐	
				*Discrete unvegetated gravel deposit(s)	☐	☐	

RIVER HABITAT SURVEY 2003 VERSION: SITE HEALTH AND SAFETY ASSESSMENT			
Site Number[1]:	Site Ref:	River Name: Derwent	Date: 26/05/2015
Grid References/Co-ordinates:	Spot 1[2]: 35963 40184	Mid-site: 35 890 39943	End of site[2]: SK359 78/ 40136
Surveyor Name: Joana Capela		Accredited Surveyor Code:	
[1] Leave blank if new site.		[2] Optional	

Weather Conditions: Sunny

Flow Conditions: Low - moderate

Site details: (enter comments or circle if applicable and give details)	Risk Level (Low/Mod/High)	
Access and Parking: (entry & exit)	✓	LOW
Conditions: comment on ground stability, footing, exposure/remoteness	✓	LOW
Obstacles/Hazards: fencing, stiles, dense vegetation, steep bank	fencing - land owner was informed	LOW
Occupied/Unoccupied: people, livestock, animals	NO	LOW
Activities/Land-use: agriculture, woodland, residential, industrial, construction, recreational	✓	LOW
Risk if lone-working	✓	LOW

IF THERE ARE ANY HIGH RISKS OR MORE THAN THREE MODERATE RISKS
DO NOT CONTINUE WITH THE SURVEY.

Weil's Disease (***Leptospirosis***)

Instructions to card holders

1. As infection may enter through breaks in the skin, ensure that any cut, scratch or abrasion is thoroughly cleansed and covered with a waterproof plaster.
2. Avoid rubbing your eyes, nose and mouth during work.
3. Clean protective clothing, footwear and equipment etc. after use
4. After work, and particularly before taking food or drink, wash hands thoroughly.
5. Report all accidents and/or injuries, however slight.
6. Keep your card with you at all times.

Lyme Disease

1. Dress appropriately with skin covered up.
2. Regularly inspect for ticks when in the field.
3. Check for, and remove, any ticks as soon as possible after leaving the site.
4. Seek medical attention if bitten by a tick.

RIVER HABITAT SURVEY 2003 Version

A FIELD SURVEY DETAILS

Site Number: (leave blank if new site)

Site Reference:

Spot-check 1 Grid Ref: SK 35978/40136

Spot-check 6 Grid Ref: SK 35870/39943

End of site Grid Ref: SK 35963/40187

Reach Reference:

River name: Derwent

Date 26/5/2015 Time: 15 00

Surveyor name: Joana Capela

Accredited Surveyor code:

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: ☐

Photo references:

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

☐ 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)	1	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
Weirs/sluices				Outfalls/ intakes			
Culverts				Fords			
Bridges			1	Deflectors/ groynes/croys			
Other - state	UPSTREAM BRIDGE NOT INCLUDED						

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 ☐

SITE REF. Derwent | **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	
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)		
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	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)

	Left	Right
None	☐	☐
Isolated/scattered	✓	☐
Regularly spaced, single	☐	☐
Occasional clumps	☐	✓
Semi-continuous	☐	☐
Continuous	☐	☐

ASSOCIATED FEATURES (tick one box per feature)

	None	Present	E (≥33%)
Shading of channel	☐	✓	☐
*Overhanging boughs	✓	☐	☐
*Exposed bankside roots	✓	☐	☐
*Underwater tree roots	✓	☐	☐
Fallen trees	✓	☐	☐
Large woody debris	✓	☐	☐

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	✓	☐	☐	Exposed bedrock	✓	☐	☐
Chute flow	✓	☐	☐	Exposed boulders	✓	☐	☐
Broken standing waves	✓	☐	☐	Vegetated bedrock/boulders	✓	☐	☐
Unbroken standing waves	✓	☐	☐	Unvegetated mid-channel bar(s)	✓	☐	☐
Rippled flow	☐	☐	✓	Vegetated mid-channel bar(s)	✓	☐	☐
*Upwelling	✓	☐	☐	Mature island(s)	✓	☐	☐
Smooth flow	☐	☐	✓	Unvegetated side bar(s)	☐	✓	☐
No perceptible flow	✓	☐	☐	Vegetated side bar(s)	✓	☐	☐
No flow (dry)	✓	☐	☐	Unvegetated point bar(s)	✓	☐	☐
Marginal deadwater	✓	☐	☐	Vegetated point bar(s)	✓	☐	☐
Eroding cliff(s)	✓	☐	☐	*Unvegetated silt deposit(s)	✓	☐	☐
Stable cliff(s)	☐	☐	✓	*Discrete unvegetated sand deposit(s)	✓	☐	
				*Discrete unvegetated gravel deposit(s)	✓	☐	