

APPENDIX 9.2 Hedgerow Survey

ISLAND FARM SPORTS VILLAGE, BRIDGEND, WALES
Environmental Statement

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Appendix 9.2 Hedgerow Survey

1.1 Executive summary

- 1.1.1 A hedgerow survey was commissioned to inform an Ecological Impact Assessment for a mixed use development proposal on the outskirts of Bridgend, South Wales.
- 1.1.2 The survey took place in mid-May 2009. All hedgerows on the site were surveyed, and the results used to assess them against the Hedgerow Regulations 1997 and UK Biodiversity Action Plan (BAP) definitions for Important Hedgerows and Priority Habitats respectively.
- 1.1.3 Four hedgerows were classified as 'Important' under the Hedgerow Regulations 1997, and were also species-rich according to the BAP definitions (*i.e.* contain at least five woody species per 30m). Two further hedgerows were also found to be species-rich.
- 1.1.4 Several more hedgerows were considered to be 'Nearly Important', as they contain an average of four or more woodland species.
- 1.1.5 Species-rich hedgerows are highlighted as important by the Local BAPs for Bridgend County Borough and the Vale of Glamorgan.
- 1.1.6 All hedgerows on site met the definition for the Hedgerow Priority Habitat on the UK BAP.
- 1.1.7 Other ecological value is provided by the wooded boundaries, particularly where large mature trees occur and where scrub/woodland forms a boundary and hedgerow-type habitat occurs.
- 1.1.8 Development should avoid damaging the Important hedgerows if at all possible, and any works should be subject to permission from the local planning authority.
- 1.1.9 The development should aim to minimise loss of any hedgerow, including species-rich hedgerows, and manage remaining hedgerows sensitively and compensate for hedgerow losses.
- 1.1.10 Other woodland and scrub boundaries, particularly where large mature trees occur, should be maintained where possible.
- 1.1.11 Finally, it should be noted that full assessment of the site against the Hedgerow Regulation criteria should include assessment against the Archaeology and History criteria, but that this has not been included here. Additionally, records for birds and other fauna may need to be more fully considered, as this survey focused primarily on plant species.

1.2 Introduction

- 1.2.1 A hedgerow survey was commissioned to inform an Ecological Impact Assessment for a mixed use development proposal on the outskirts of Bridgend, South Wales. All hedgerows on the site were surveyed, and the results used to assess them against the Hedgerow Regulations 1997 and UK Biodiversity Action Plan (BAP)

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definitions for Important Hedgerows and Priority Habitats respectively. Ancient and/or Species-rich Hedgerows are also a habitat listed in the Local BAPs for Bridgend County Borough and the Vale of Glamorgan. This resulting report discusses the ecological and biodiversity value of each hedgerow, with particular regard to the implications for the proposed development.

1.3 Survey Methodology

- 1.3.1 The field survey enabled assessment of the hedgerows present on site to the Hedgerow Regulation 1997 and UK BAP Priority Habitat definitions. Some selected additional information was also collected, using the Hedgerow Survey Handbook¹ as guidance (a document designed, in part, to support BAP reporting), where it was felt that it was useful to collect such information. This included hedge shape, adjacent land use, and presence of veteran trees.
- 1.3.2 It should be noted that full assessment of the site against the Hedgerow Regulation 1997 criteria should include assessment against the Archaeology and History criteria, but that this has not been included here. Additionally, records for birds and other fauna may need to be more fully considered as this survey focused primarily on plant species.
- 1.3.3 The survey took place in mid-May 2009. The field form used is included in Appendix 1.

Field survey

Hedgerow identification

- 1.3.4 Prior to survey, all boundaries were identified and coded with a pre-survey code. Following an initial tour of the site, each boundary present was surveyed in turn. Survey took place primarily from one side, but when possible, the boundary was also examined from the other side to check for additional species or features. For each hedgerow, the field form was completed, and coded digital photographs taken. The following paragraphs detail the information collected.

Hedgerow definition

- 1.3.5 According to the Hedgerow Regulations 1997, a hedgerow is “*a row of bushes forming a hedge, sometimes with trees growing in it*”. Individual hedgerows are required to have a continuous length of more than 20m, or else be contiguous with another hedgerow. Hedgerows end where there is a node with another hedgerow.
- 1.3.6 Additional criteria from the UK BAP Hedgerow Priority Habitat definition were also applied. This widened the definition to include any boundary broken line of trees or shrubs which was at least in the past continuous (gaps <20m were allowed), but narrowed it by stipulating that hedgerows should be less than 5m wide.

¹ Hedgerow Survey Handbook, 2nd Edition. A standard procedure for local surveys in the UK. Prepared on behalf of the Steering Group for the UK Biodiversity Action Plan for Hedgerows. Defra 2007.

- 1.3.7 Some boundaries which did not quite meet all the parts of these definitions were still surveyed, when it was felt that they formed a wooded boundary and probably originated from a former, more clearly defined, hedgerow. Where these are species-rich, they may be covered by the Bridgend County Borough (2002) and Vale of Glamorgan (2002) Local BAPs.
- 1.3.8 Hedges surrounding dwelling houses were not included as these are excluded from the Hedgerow Regulations.

Woody species

- 1.3.9 The presence of the native woody species specified in the Hedgerow Regulations 1997 was recorded within each hedgerow in specified 30m stretches as follows:
- Where the length of the hedgerow did not exceed 30m the number of woody species present in the whole hedgerow was counted.
 - Where the length of the hedgerow exceeded 30m, but did not exceed 100m, the number of woody species present in the central stretch of 30m was counted.
 - Where the length of the hedgerow exceeded 100m, but did not exceed 200m, the number of woody species present in the central stretch of 30m within each half of the hedgerow was counted, and an average taken.
 - Where the length of the hedgerow exceeded 200m, the number of woody species present in the central stretch of 30m within each third of the hedgerow was counted and an average taken.
- 1.3.10 Distances were estimated by calibrated pacing, with markers used to mark the beginning and end of each section.

Woodland species

- 1.3.11 The presence of the woodland species specified in the Hedgerow Regulations was recorded within a 1m distance of the whole length of each hedgerow.

Features

- 1.3.12 The following features were also recorded:
- A bank, wall or ditch, including an estimate of the proportion of the hedge along which it occurs.
 - Gaps, including an estimate of the proportion of the hedge they comprise in total.
 - Number of standard trees. These are defined in the Hedgerow Regulations 1997 as follows: "*in the case of a multi-stemmed tree, means a tree which, when measured at a point 1.3m from natural ground level, has at least two stems whose diameters are at least 15cm. In the case of a single-stemmed tree, means a tree which, when*

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measured at a point 1.3m from natural ground level, has a stem whose diameter is at least 20cm". In the case of the many tall wide hedges which were encountered during the survey, many stems were this large in diameter, and these hedges have been considered to be dense in standard trees, within the context of the Hedgerow Regulations. (The Hedgerow Survey Handbook works with the more specific term of "Isolated Hedgerow Trees").

- 'Connections' with another hedgerow, a pond or broadleaved woodland. (A hedgerow was considered connected not only on meeting but also if it has a point within 10m of it and would meet it if the line of the hedgerow continued). Scrub woodland was considered to be qualifying broadleaved woodland.
- The presence of a parallel hedge within 15m of the hedgerow.

Public rights of way

- 1.3.13 The survey recorded whether the hedgerow is adjacent to a public right of way (bridleway, footpath or road used as a public path, or a byway open to all traffic).

Other important species

- 1.3.14 The presence of other important species was noted, including those:
- Listed in Part I (protection at all times) of Schedule 1 (birds which are protected by special penalties), Schedule 5 (animals which are protected) or Schedule 8 (plants which are protected) to the Wildlife and Countryside Act 1981.
 - Categorised as a declining breeder (category 3) bird².
 - Which are Red Data Book species³.

Hedge shape

- 1.3.15 The hedge shape was recorded using the guidance in the Hedgerow Survey Handbook as shown in Appendix 2.

Assessment against Hedgerow Regulations

- 1.3.16 The collected field data were used provide summary attribute data on each hedgerow including:
- Number of woody species present in an average 30m section.

² "Red Data Birds in Britain" Batten LA, Bibby CJ, Clement P, Elliott GD and Porter RF (Eds.), published in 1990 for the Nature Conservancy Council and the Royal Society for the Protection of Birds.

³ RED DATA BOOKS: "Vascular Plants" Perring FH and Farrell L, 2nd Edition, published in 1983 for the Royal Society for Nature Conservation; "Insects" Shire DB (Ed.), published in 1987 for the Nature Conservancy Council;

- Presence of notable woody species including Black-poplar tree (*Populus nigra* ssp *betulifolia*), large-leaved lime (*Tilia platyphyllos*), small-leaved lime (*Tilia cordata*) and wild service-tree (*Sorbus torminalis*).
- Adjacency to a public right of way (bridleway, footpath or road used as a public path, or a byway open to all traffic).
- Number of qualifying associated features including:
 - Bank or wall along at least half the length of the hedgerow;
 - Ditch along at least half the length of the hedgerow;
 - Gaps which in aggregate do not exceed 10% of the length of the hedgerow;
 - At least one standard tree per 50m on average;
 - At least three woodland species within 1m of the hedgerow;
 - Within 15m of a parallel hedgerow;
 - A connection score of 4 or more: connections to another hedgerow (1 point), pond (2 points) or broad-leaved woodland (2 points).

1.3.17 These attributes were then used to identify any hedgerow which might be considered 'Important' using the Hedgerow Regulation 1997 criteria, as follows:

1.3.18 An 'Important' hedgerow was one which satisfied at least one of the following criteria:

- Contained at least seven woody species per 30m;
- Contained at least six woody species per 30m, including one of the following: Black-poplar tree (*Populus nigra* ssp *betulifolia*), large-leaved lime (*Tilia platyphyllos*), small-leaved lime (*Tilia cordata*) or wild service-tree (*Sorbus torminalis*);
- Contained at least six woody species per 30m and three associated features;
- Contained at least five woody species per 30m and four associated features;
- Runs along a public right of way and has at least four woody species per 30m and two associated features;
- Contains a species listed in the Wildlife and Countryside Act 1981, a Red Data Book species, or supports a declining breeding bird.

1.3.19 Additionally, for the purposes of this specific survey only, a 'Nearly Important'

"Invertebrates other than insects" Bratton JH (Ed.), published in 1991 for the Joint Nature Conservation Committee;
"Stoneworts" Stewart NF and Church JM, published in 1992 for the Joint Nature Conservation Committee

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hedgerow was one in which the number of woodland species was four or more.

Assessment against UK BAP Priority Habitat Definitions

- 1.3.20 Hedgerows have recently become a Priority Habitat on the UK BAP. The published definition for this Priority Habitat follows:

Hedgerows⁴

A hedgerow is defined as any boundary line of trees or shrubs over 20m long and less than 5m wide, and where any gaps between the trees or shrub species are less than 20m wide. Any bank, wall, ditch or tree within 2m of the centre of the hedgerow is considered to be part of the hedgerow habitat, as is the herbaceous vegetation within 2m of the centre of the hedgerow. All hedgerows consisting predominantly, i.e. 80% or more cover, of at least one woody UK native species are covered by this Priority Habitat, where each UK country can define the list of woody species native to their respective country. Climbers such as honeysuckle and bramble are recognised as integral to many hedgerows, however they require other woody plants to be present to form a distinct woody boundary feature, as such they are not included in the definition of woody species. The definition is limited to boundary lines of trees or shrubs, and excludes banks or walls without woody shrubs on top of them.

- 1.3.21 The previous Priority Habitat – ‘ancient or species-rich hedgerows’ - used the following definition:

Ancient or species-rich hedgerows⁵

Ancient hedgerows, which tend to be those which support the greatest diversity of plants and animals, may be defined as those which were in existence before the Enclosure Acts, passed mainly between 1720 and 1840 in Britain and from the mid seventeenth century in Ireland. Species-rich hedgerows may be taken as those which contain 5 or more native woody species on average in a 30 metre length, or 4 or more in northern England, upland Wales and Scotland. Hedges which contain fewer woody species but a rich basal flora of herbaceous plants should also be included but practical criteria for identifying them have yet to be agreed. Many of the thin straight hawthorn hedges which characterise later parliamentary enclosures, as well as most hedges which consist mainly of beech, privet or yew or non-native trees, are excluded. Recently planted species-rich hedges are included.

1.4 Results

Location and context

- 1.4.1 The survey site lies to the south of Bridgend, in South Wales. It is bounded by the A48 to the north, hedge-lined country roads to the south and west, railway to the

⁴ <http://www.ukbap.org.uk/library/UKBAPPriorityHabitatDescriptionsfinalAllhabitats20081022.pdf#H>

⁵ <http://www.ukbap.org.uk/UKPlans.aspx?ID=7>

south east and housing and a science park to the north and north east. The site comprises a mixture of arable fields, horse-grazed pasture, scrub and woodland and some rank and overgrown scrubby grassland areas. Most of the arable fields and some of the roads are bordered by hedgerows, while other boundaries are either fenced with scattered scrub, border dense scrub woodland, or support wider woodland strips.

Pre-existing data

1.4.2 A limited amount of pre-existing survey data were supplied by the client:

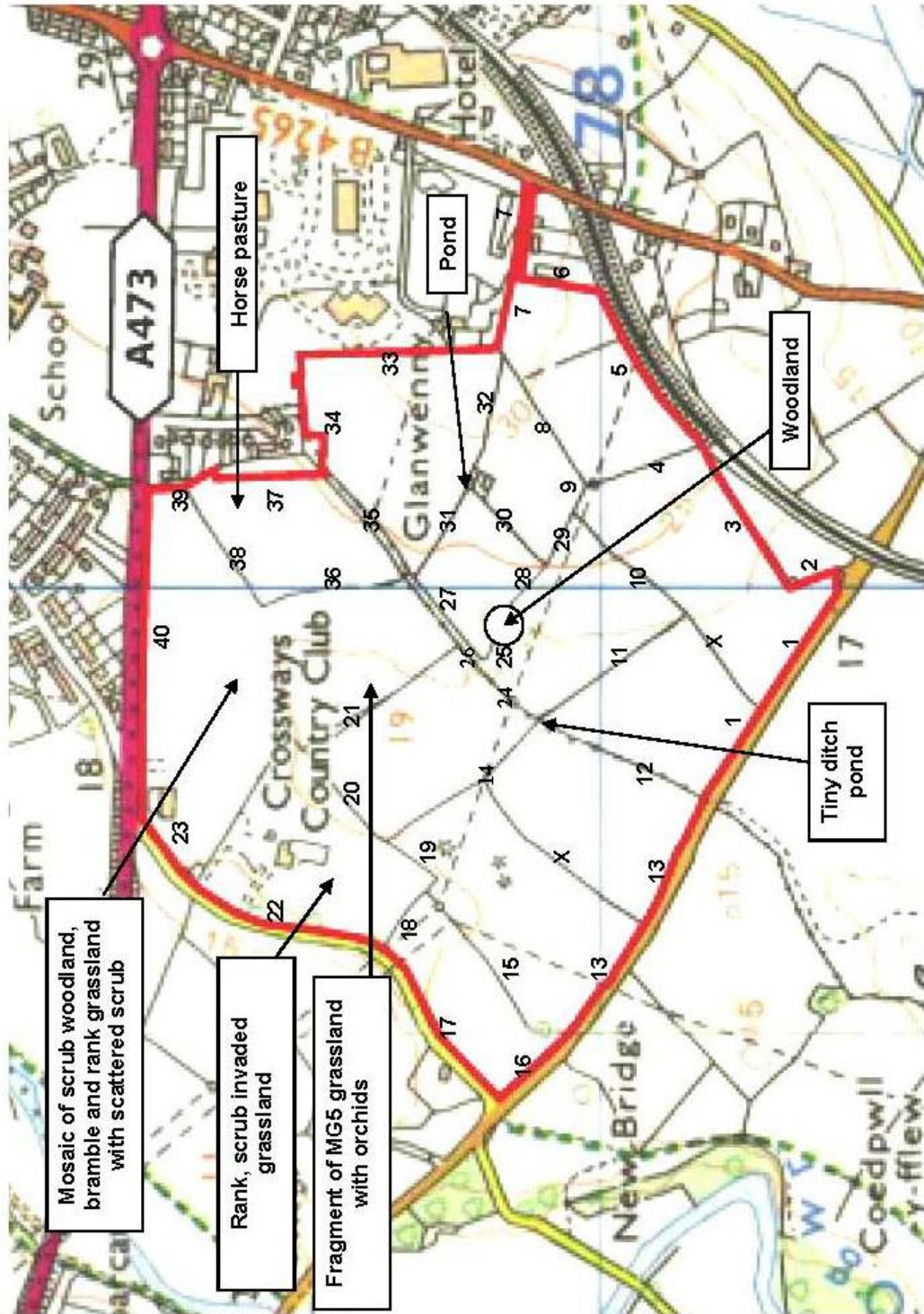
- ELMAW. 2009. Extended Phase 1 habitat survey, Island Farm, Bridgend. This indicates that the majority of hedges on the site were classified as Intact Species Rich Hedgerow without Trees, totalling 3,908m in length. The remaining hedgerows were classified as Intact Hedgerow with Trees, totalling 840m in length. The woody species recorded during this survey include: hazel, blackthorn, apple, oak, bramble, beech, dog rose and elder. It should be noted that the Phase 1 definition for species-rich hedgerows states they have “*a diversity of native woody species and a good hedgerow bottom flora*”. It is unclear how this relates to more objective measures of species-richness.
- Wye Valley Surveys. 2002. Island Farm Bridgend. Ecological Report. August 2002. Note, there were no maps available for this survey. This survey reported that the majority of hedges were low and squared trimmed, often with additional wire fencing. Up to eight species were recorded in the more diverse hedges, though blackthorn predominated. Several hedges were thought to be ‘Important’.

1.4.3 No additional pre-existing plant records were available for the site.

Site map

1.4.4 Figure 1 shows the hedgerows and other boundaries which were covered by the survey, plus shows the other features recorded on site.

Figure 1. The boundaries covered by this survey, showing other features recorded



(X = no boundary present)

Description of the hedgerow resource

- 1.4.5 Full raw data may be found in Appendix 3, and photographs in Appendix 4.
- 1.4.6 A total of 7.135km of boundaries were covered by this survey, divided into 40 sections. These have been further divided into 22 'true' hedgerows (3.855km), i.e. those which are clearly continuous hedges, less than 5m wide and do not border scrub and/or woodland, and 18 'other' boundaries including wide and former hedgerows, woodland strips, and scrub/woodland boundaries (3.280km). Table 1 below shows the nature of these 'other boundaries', and whether data were collected to allow assessment against the Hedgerow Regulations.

Table 1 The 'other' boundaries recorded on site, including wide and former hedgerows, woodland strips, and scrub/woodland boundaries

Code	Approx length (m)	Description	Full data collected?
34	225	Series of garden hedges	no
7	100	Woodland border wider than 5m	no
37	200	Wall	no
36	200	Scrub woodland and scattered scrub edge, possibly originating from a former hedge	no
38	200	Scrub woodland edge, possibly originating from a former hedge	no
40	450	Scrub woodland edge	no
23	300	Scrub woodland edge	no
39	50	Heavily wooded trackway	no
6	100	Fence line with scattered scrub and much bramble, bordering houses	no
5	225	Fence line with scattered scrub and much bramble on railway bank	no
33	275	Fence line with scattered scrub and much bramble	no
26	30	10m wide old hedgerow	yes
18	100	Scrubby and wider than 5m, though probably originating from a former	yes

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Code	Approx length (m)	Description	Full data collected?
		hedge	
19	75	Scrubby and wider than 5m, though probably originating from a former hedge	yes
20	150	Scrubby and wider than 5m, though probably originating from a former hedge	yes
35	275	Strip of woodland wider than 5m, though originating from two parallel hedges	yes
27	100	Scrub woodland edge and wider than 5m, though originating from a hedge	yes
21	225	Bramble fence line and scrub woodland boundary, possibly originating from a former hedge	yes

1.4.7 The Hedgerow Regulation woodland species recorded during the survey are shown in Table 2 below. None of these species are listed as Ancient Woodland Indicators (AWI) in Carmarthen (the nearest county with an AWI list) according to Rose (2006)⁶, though they may be indicators in other parts of the UK. Other common ground flora species which were widespread across the site included cleavers *Galium aparine*, nettle *Urtica dioica*, red campion *Silene dioica* and ground ivy *Glechoma hederacea*. The ground flora of many of the hedgerows bordering the arable fields were fairly species-poor and nutrient enriched, though the roadside hedges at the south and south western boundary of the site were slightly more species-rich, and it was here that dog's mercury *Mercurialis perennis* was recorded.

Table 2 The woodland species recorded during the survey, showing frequency in of the total 29 hedge or wooded boundaries in which recording took place.

1.4.8

Species	Frequency (%)
Bluebell (<i>Hyacinthoides non-scriptus</i>)	89.7
Lords-and-ladies (<i>Arum maculatum</i>)	72.4
Hart's tongue (<i>Asplenium scolopendrium</i>)	41.4
Male fern (<i>Dryopteris filix-mas</i>)	17.2

⁶ The Wild Flower Key. Frances Rose, revised and expanded by Clare O'Reilly. Warne 2006.

Dog's mercury (<i>Mercurialis perennis</i>)	13.8
Herb-robert (<i>Geranium robertianum</i>)	10.3
Wood avens/Herb bennet (<i>Geum urbanum</i>)	10.3
Wood false-brome (<i>Brachypodium sylvaticum</i>)	6.9
Broad buckler fern (<i>Dryopteris dilatata</i>)	3.4
Soft shield fern (<i>Polystichum setiferum</i>)	3.4
Wild strawberry (<i>Fragaria vesca</i>)	3.4

1.4.9

1.4.10 The Hedgerow Regulation 1997 woody species recorded in 30m survey sections during the survey are shown in Table 3 below. This shows that the most common species were blackthorn *Prunus spinosa*, hawthorn *Crataegus monogyna* and hazel *Corylus avellana*, which occurred in the majority of cases. Other woody species encountered outside of these sections included sycamore *Acer pseudoplatanus* and lime *Tilia* sp, whilst ivy, bramble and honeysuckle and were also frequent in hedgerows across the site.

Table 3. The woodland species recorded during the survey, showing frequency in the total 54 hedgerow or wooded 30m sections in which recording took place.

Species	Frequency (%)
Blackthorn (<i>Prunus spinosa</i>)	94.4
Hawthorn (<i>Crataegus monogyna</i>)	85.2
Hazel (<i>Corylus avellana</i>)	72.2
Elder (<i>Sambucus nigra</i>)	35.2
Rose (<i>Rosa</i> species)	20.4
Elm (<i>Ulmus</i> species)	14.8
Ash (<i>Fraxinus excelsior</i>)	14.8
Holly (<i>Ilex aquifolium</i>)	13.0
Oak, pedunculate (<i>Quercus robur</i>)	9.3
Dogwood (<i>Cornus sanguinea</i>)	7.4
Maple, field (<i>Acer campestre</i>)	7.4
Gorse, western (<i>Ulex gallii</i>)	3.7
Apple, crab (<i>Malus sylvestris</i>)	1.9

1.4.11 Of the true hedgerows, all were at least partly trimmed, though they varied in height from 3m to 8m. Due to their height, many contained tree stems of circumference sufficient to be classed as standard trees according to the Hedgerow Regulations. However, only a very few contained 'isolated hedgerow trees' as defined by the Hedgerow Survey Handbook. The only veteran/mature hedgerow trees recorded were ash and oak by the road in hedgerows 16 and 17, and in the wide wooded strip by the horse pasture (35).

1.4.12 No hedgerow bordered a Public Right of Way, though some bordered roads. Only two hedgerows contained a ditch, and hedge-banks occurred only in the hedgerows of the lane to the west of the site (17 and 22). The only cases of two parallel hedgerows occurring within 15m of each other were on the roadside hedgerows (1, 13, 16, 17 and 22). Two ponds, one extremely small, were found connecting with hedgerows on site (see Figure 1). 43% of boundaries connected with broadleaved woodland, including scrub woodland and dense scrub. All surveyed 'true' and 'other' hedgerows connected with at least one other hedgerow.

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Hedgerow evaluation

- 1.4.13 Table 4 below shows Hedgerow Regulation and BAP Priority Habitat evaluation of the 'true' hedgerows and 'other' hedgerow (including wide and former hedgerows, woodland strips, and scrub/woodland edge) boundaries for which data were collected.
- 1.4.14 Four hedgerows were classified as 'Important' under the Hedgerow Regulations. These hedgerows occur along the roads along the western boundary of the site (16, 17 and 22) and central in the site (27). These four hedgerows, in addition to hedgerows 25 (short section) and 32 (to the centre-east of the site) are 'species-rich' according to the BAP definitions (*i.e* contain at least five woody species per 30m), and are thus also covered by the Bridgend County Borough (2002) and Vale of Glamorgan (2002) Local BAPs.
- 1.4.15 Several more hedgerows (1, 3, 13, 15) were considered to be 'Nearly Important', as they contain an average of four or more woodland species.
- 1.4.16 Figure 2 shows the location of these hedgerows.
- 1.4.17 All hedgerows in Table 4 comprised >80% native woody species, and hence meet the definition for the Hedgerow Priority Habitat in the UK BAP. Additionally, of the un-surveyed 'other' boundaries, the fence line with scattered scrub (boundary 5) also questionably met the Hedgerow Priority Habitat definition. All hedgerows, but particularly the many taller hedgerows provide a good variety of wildlife habitat and wildlife corridors.
- 1.4.18 Other ecological value is provided by the wooded boundaries not covered above, particularly where large mature trees occur (boundary 35 by the horse pasture) and where scrub/woodland forms a boundary and hedgerow-type habitat occurs (boundaries 7, 23, 36, 38 and 40). Of these, boundaries 36 and 38 were considered to be actual hedgerows in the previous Phase 1 survey (ELMAW, 2009) and are indeed probably overgrown former hedgerows grading to scrub.

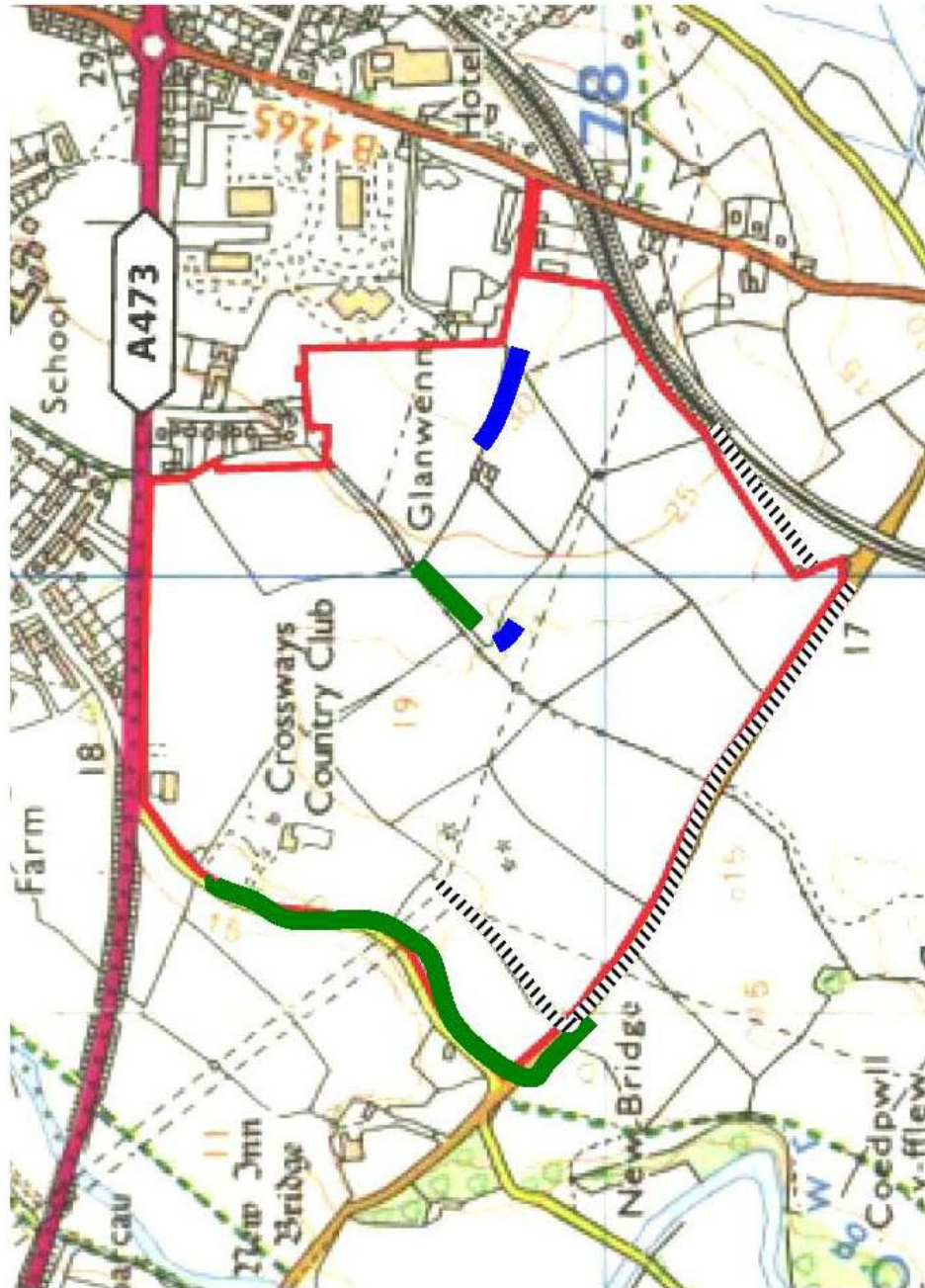
Table 4. Summary hedgerow attribute data (n=22)

Code	Approx length (m)	No woodland spp.	Average no woody spp.	No. Associated features	"Important"?	"species-rich"?
'True' hedgerows						
29	75	2	2	1	no	no
9	50	3	2	2	no	no
30	100	1	3	2	no	no
24	100	2	3	1	no	no
3	225	5	3	3	nearly	no
12	225	1	3.33	1	no	no
11	225	2	3.33	1	no	no
15	275	5	3.33	3	nearly	no
10	200	2	3.5	1	no	no
4	150	2	3.5	1	no	no
1	325	4	3.5	3	nearly	no
13	350	4	3.67	4	nearly	no
2	60	1	4	2	no	no
28	75	2	4	2	no	no

Code	Approx length (m)	No woodland spp.	Average no woody spp.	No. Associated features	"Important"?	"species-rich"?
31	150	2	4	2	no	no
8	200	3	4	2	no	no
14	250	3	4	3	no	no
32	150	0	5	1	no	yes
22	300	5	5	5	yes	yes
16	100	5	5	4	yes	yes
17	250	7	5	5	yes	yes
25	20	3	6	2	no	yes
<i>Sub-total</i>	<i>3.855km</i>	<i>average =3</i>	<i>average=4</i>	<i>average=2</i>	<i>yes = 3 nearly = 6</i>	<i>yes = 5</i>
'other' boundaries including wide, and former hedgerows and woodland strips						
26	30	1	4	2	no	no
18	100	3	3	3	no	no
35	275	1	3	2	no	no
19	75	3	4	2	no	no
20	150	3	3	2	no	no
21	225	3	3	3	no	no
27	100	3	6	3	yes	yes
<i>Sub-total</i>	<i>0.955km</i>	<i>average =2.4</i>	<i>average=3.7</i>	<i>average=2.4</i>	<i>yes = 1 nearly = 0</i>	<i>yes = 1</i>

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Figure 2. Hedgerow evaluation



Green Important and species-rich
Blue Species-rich (5 or more woody spp./30m)
Red 'Nearly important' (4 or more woodland spp.)
Note: all other hedgerows on site met the definition for the Hedgerow Priority Habitat on the UK BAP.

1.5 Conclusions

– Hedgerows

1.5.1 This survey indicated that four hedgerows were 'Important' according to the Hedgerow Regulations 1997. Damage to these hedgerows should be avoided if at all possible, and any works should be subject to permission from the local planning authority. More information on the Hedgerow Regulations may be found at:

– <http://www.naturalengland.org.uk/ourwork/regulation/hedgeregs/default.aspx>

1.5.2 Additionally, the two hedgerows which were found to be species-rich in terms of woody species should also be prioritised for protection during any development. These are also covered by the Bridgend County Borough (2002) and Vale of Glamorgan (2002) local BAPs.

1.5.3 Other hedgerows were widespread across the survey site, and most met the definition for the broad Hedgerow Priority Habitat in the UK BAP. They may be important for butterflies and moths, farmland birds, bats and dormice, providing valuable wildlife corridors and allowing dispersal and movement of species between other habitats. As a result, the development should aim to minimise loss of hedgerow, manage remaining hedgerows sensitively and compensate for hedgerow losses. Appropriate measures might include, for example:

- Avoid hedgerow neglect, as this may lead to poor structure and gaps. Manage the hedgerows using traditional cutting and laying techniques.
- Avoid trimming hedgerows in the bird nesting season (1 March to 31 July). The ideal time is the end of the winter.
- Leave ground cover at the hedge-base for over-wintering and ground-nesting birds.
- Avoid over-trimming hedgerows - in general taller hedgerows, and those with standard trees, provide a greater diversity of wildlife habitat. If possible, trim only the sides of the hedgerow to allow berries to remain as a wildlife food source.
- Avoid spray and fertiliser drift into hedges and hedge bottoms. Consider introducing a buffer strip of uncultivated land between the hedgerow and any arable crop.
- Use buffer strips of rough grassland to protect hedgerows from damage during and following development. This may include physical damage by machines and people, and nutrient enrichment from dogs.

1.5.4 Other ecological value is provided by other woodland and scrub boundaries, particularly where large mature trees occur. The aim should be to maintain these boundaries and mature trees where possible.

1.5.5 Finally, it should be noted that full assessment of the site against the Hedgerow Regulation criteria should include assessment against the Archaeology and History

Appendix 9.2 Hedgerow Survey

criteria, but that this has not been included here. Additionally, records for birds and other fauna may need to be more fully considered, as this survey focused primarily on plant species.




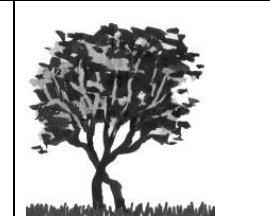


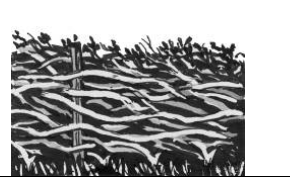
Other habitats on site

- 1.5.6 An area of species-rich and herb-rich grassland containing orchids, was found just beyond boundary 21 (see Figure 1). Other grassland patches within the north west of the site may be ecologically important, but grassland survey was beyond the remit for this study.

1.6 Appendices

Appendix 1: Field Form

Date		Surveyor	
Pre-survey hedge code		Next to a PROW?	yes / no
Sides surveyed	one / both	If one, state which	
Estimated length		No of 30m sections	1 / 2 / 3
Is it a hedgerow?	yes / no	If not hedge, state why	
Photo code(s)			
Associated features			
Wall	%	Bank	%
Ditch	%	Parallel hedge within 15m	yes / no
Gaps	%	Number of standard trees	
Connections			
Pond	yes / no	Other hedge	yes / no
		BL Woodland	yes / no
		Side A	Side B
Adjacent land use			
Veteran trees			
Important species			
Other notes/comments			

Hedgerow shape			
			
a) Trimmed & dense	b) Intensively managed	c) Untrimmed	d) Tall & leggy
			
e) Untrimmed, with outgrowth	f) Recently coppiced (facing view)	g) Recently laid (facing view)	h) Other - Sketch

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	1	2	3		1	2	3
Alder (<i>Alnus glutinosa</i>)				Hawthorn, midland (<i>Crataegus</i>)			
Apple, crab (<i>Malus sylvestris</i>)				Hazel (<i>Corylus avellana</i>)			
Ash (<i>Fraxinus excelsior</i>)				Holly (<i>Ilex aquifolium</i>)			
Aspen (<i>Populus tremula</i>)				Hornbeam (<i>Carpinus betulus</i>)			
Beech (<i>Fagus sylvatica</i>)				Juniper, common (<i>Juniperus</i>)			
Birch, downy (<i>Betula pubescens</i>)				Lime, large-leaved (<i>Tilia platyphyllos</i>)			
Birch, silver (<i>Betula pendula</i>)				Lime, small-leaved (<i>Tilia cordata</i>)			
Black-poplar (<i>Populus nigra sub-</i>				Maple, field (<i>Acer campestre</i>)			
Blackthorn (<i>Prunus spinosa</i>)				Mezereon (<i>Daphne mezereum</i>)			
Box (<i>Buxus sempervirens</i>)				Oak, pedunculate (<i>Quercus robur</i>)			
Broom (<i>Cytisus scoparius</i>)				Oak, sessile (<i>Quercus petraea</i>)			
Buckthorn (<i>Rhamnus cathartica</i>)				Osier (<i>Salix viminalis</i>)			
Buckthorn, alder (<i>Frangula alnus</i>)				Pear, Plymouth (<i>Pyrus cordata</i>)			
Butcher's-broom (<i>Ruscus aculeatus</i>)				Pear, wild (<i>Pyrus pyraster</i>)			
Cherry, bird (<i>Prunus padus</i>)				Poplar, grey (<i>Populus x canescens</i>)			
Cherry, wild (<i>Prunus avium</i>)				Poplar, white (<i>Populus alba</i>)			
Cotoneaster, wild (<i>Cotoneaster</i>				Privet, wild (<i>Ligustrum vulgare</i>)			
Currant, downy (<i>Ribes spicatum</i>)				Rose (<i>Rosa species</i>)			
Currant, mountain (<i>Ribes alpinum</i>)				Rowan (<i>Sorbus aucuparia</i>)			
Dogwood (<i>Cornus sanguinea</i>)				Sea-buckthorn (<i>Hippophae</i>			
Elder (<i>Sambucus nigra</i>)				Service-tree, wild (<i>Sorbus torminalis</i>)			
Elm (<i>Ulmus species</i>)				Spindle (<i>Euonymus europaeus</i>)			
Gooseberry (<i>Ribes uva-crispa</i>)				Spurge-laurel (<i>Daphne laureola</i>)			
Gorse (<i>Ulex europaeus</i>)				Walnut (<i>Juglans regia</i>)			
Gorse, dwarf (<i>Ulex minor</i>)				Wayfaring-tree (<i>Viburnum lantana</i>)			
Gorse, western (<i>Ulex gallii</i>)				Whitebeam (<i>Sorbus species</i>)			
Guelder rose (<i>Viburnum opulus</i>)				Willow (<i>Salix species</i>)			
Hawthorn (<i>Crataegus monogyna</i>)				Yew (<i>Taxus baccata</i>)			

Barren strawberry (<i>Potentilla sterilis</i>)		Nettle-leaved bell-flower (<i>Campanula trachelium</i>)	
Bluebell (<i>Hyacinthoides non-scriptus</i>)		Oxlip (<i>Primula elatior</i>)	
Broad buckler fern (<i>Dryopteris dilatata</i>)		Pignut (<i>Conopodium majus</i>)	
Broad-leaved helleborine (<i>Epipactis helleborine</i>)		Primrose (<i>Primula vulgaris</i>)	
Bugle (<i>Ajuga reptans</i>)		Ramsons (<i>Allium ursinum</i>)	
Common cow-wheat (<i>Melampyrum pratense</i>)		Sanicle (<i>Sanicula europaea</i>)	
Common dog violet (<i>Viola riviniana</i>)		Scaly male-fern (<i>Dryopteris affinis</i>)	
Common polypody (<i>Polypodium vulgare</i>)		Small cow-wheat (<i>Melampyrum sylvaticum</i>)	
Dog's mercury (<i>Mercurialis perennis</i>)		Soft shield fern (<i>Polystichum setiferum</i>)	
Early dog violet (<i>Viola reichenbachiana</i>)		Sweet violet (<i>Viola odorata</i>)	
Early purple orchid (<i>Orchis mascula</i>)		Toothwort (<i>Lathraea squamaria</i>)	
Enchanter's nightshade (<i>Circaea lutetiana</i>)		Tormentil (<i>Potentilla erecta</i>)	
Giant fescue (<i>Festuca gigantea</i>)		Wild strawberry (<i>Fragaria vesca</i>)	
Goldilocks buttercup (<i>Ranunculus auricomus</i>)		Wood anemone (<i>Anemone nemorosa</i>)	
Great bell-flower (<i>Campanula latifolia</i>)		Wood avens/Herb bennet (<i>Geum urbanum</i>)	
Greater wood-rush (<i>Luzula sylvatica</i>)		Wood false-brome (<i>Brachypodium sylvaticum</i>)	
Hairy brome (<i>Bromus ramosus</i>)		Wood horsetail (<i>Equisetum sylvaticum</i>)	
Hairy woodrush (<i>Luzula pilosa</i>)		Wood meadow-grass (<i>Poa nemoralis</i>)	
Hard fern (<i>Blechnum spicant</i>)		Wood melick (<i>Melica uniflora</i>)	
Hard shield fern (<i>Polystichum aculeatum</i>)		Wood millet (<i>Millium effusum</i>)	
Hart's tongue (<i>Asplenium scolopendrium</i>)		Wood sage (<i>Teucrium scorodonia</i>)	
Heath bedstraw (<i>Galium saxatile</i>)		Wood sedge (<i>Carex sylvatica</i>)	
Herb paris (<i>Paris quadrifolia</i>)		Wood sorrel (<i>Oxalis acetosella</i>)	
Herb-robert (<i>Geranium robertianum</i>)		Wood speedwell (<i>Veronica montana</i>)	
Lady fern (<i>Athyrium filix-femina</i>)		Wood spurge (<i>Euphorbia amygdaloides</i>)	

Lords-and-ladies (<i>Arum maculatum</i>)		Woodruff (<i>Galium odoratum</i>)	
Male fern (<i>Dryopteris filix-mas</i>)		Yellow archangel (<i>Lamiaeum galeobdolon</i>)	
Moschatel (<i>Adoxa moschatellina</i>)		Yellow pimpernel (<i>Lysimachia nemorum</i>)	
Narrow buckler-fern (<i>Dryopteris carthusiana</i>)			

Appendix 2: Hedgerow Shape

- 1.6.1 [From Hedgerow Survey Handbook, 2nd Edition. A standard procedure for local surveys in the UK. Prepared on behalf of the Steering Group for the UK Biodiversity Action Plan for Hedgerows. Defra 2007.]

A. Trimmed & dense: Hedgerows that have obviously been trimmed in the fairly recent past (probably within the previous two to three years). If several months have passed since the last trimming, there may be some quite long shoots protruding from the hedgerow, but it will retain its basic shape. Hedgerows have a generally 'neat' appearance, with a rectangular, 'A' or 'topped-A' shape. This category also includes hedgerows that have most recently been trimmed only on one side, or on the top. Hedgerows are dense along most of their length, with branches and foliage in the lower parts of the hedgerow.

B. Intensively managed: Hedgerows that have been closely and frequently flailed and/or browsed by high densities of livestock, especially sheep. These hedgerows are usually low and narrow, and characteristically lack branches and foliage in the lower parts of the hedgerow.

C. Untrimmed: Hedgerows that have not been recently trimmed (probably not within the previous two to three years) and now have a very 'straggly' appearance, with numerous long and woody branches protruding from the main body of the hedgerow. They are usually still quite dense, with some foliage in the lower part of the hedgerow, although the increasing volume may be progressively shading out some of the lower branches. Essentially this is an unmanaged and slightly overgrown version of A. Such hedgerows may subsequently be trimmed (A) coppiced (F) or laid (G) but, if not, they will progressively take the shape of type D or E hedgerows.

D. Tall & leggy: A hedgerow that has not been trimmed for many years (probably at least eight years). The hedgerow lacks any significant foliage in the lower parts. Neglected hawthorn hedgerows often take this form, forming lines of twisted and gnarled stems, beneath more dense canopies.

E. Untrimmed, with outgrowths: Overgrown, usually very wide, hedgerows that no longer retain any clear evidence of their original shape. Hedgerows with a large proportion of blackthorn, or other readily suckering shrub species, may quickly develop into this type of hedgerow if left unmanaged.

F. Recently coppiced: A hedgerow that has recently been coppiced, probably within the last five years, appears as woody trunks (or 'stools')

Appendix 9.2 Hedgerow Survey

cut down to be more or less level with the ground, and from which multiple, thin, woody stems are re-growing.

G. Recently laid: A hedgerow that has obviously been recently laid, probably within the last 2-3 years (the illustration shows what this type would look like facing the hedgerow). It should still retain clear evidence of laying (e.g. stems cut at the base; horizontal and intertwined stems, supporting stakes in the hedgerow) and will not have attained the 'trimmed and dense' appearance of type A hedgerows.

Appendix 3: Raw data

Table A: Lengths, and descriptions

Pre-survey code	final code	Approx length (m)	No sections	Sides	If one side, which	True hedge?	description	comment
1+10	1	325	3	both	n/a	yes	uniform hedge	Also contains holly
11+12	2	60	1	one	W	yes	uniform hedge	
13	3	225	3	one	NW	yes	uniform hedge	
14	4	150	2	both	n/a	yes	uniform hedge	
15	5	225	n/a	one	NW	Fence line with scattered scrub and much bramble on railway bank	Wire fence with scrub (gorse, hawthorn and blackthorn) and tall ruderal plant community on railway embankment beyond.	
16 and 17	6	100	n/a	one	W	Fence line with scattered scrub and much bramble, bordering houses	Mainly fence line of dense bramble, with occasional hawthorn, elder, cotoneaster and sycamore at northern end.	
20	7	100	1	one	S	Woodland border wider than 5m.	Fenced woodland strip with buildings behind.	
21	8	200	2	one	NW	yes	uniform hedge	Also contains field maple
23	9	50	1	both	n/a	yes	uniform hedge	Also contains field maple
9	10	200	2	one	NW	yes	uniform hedge	Also contained holly and dogwood
8	11	225	3	both	n/a	yes	uniform hedge	
4	12	225	3	both	n/a	yes	uniform hedge	Also contains holly and field maple
2	13	350	3	both	n/a	yes	Wide, untrimmed and some gaps	Also contains ash, sycamore and clematis
5+6	14	250	3	both	n/a	yes	uniform hedge	
45+46	15	275	3	both	n/a	yes	Wide (to 5m)	Includes sycamore and oak mature trees, plus veteran hawthorns
47	16	100	1	both	n/a	yes	Wide and untrimmed	
48	17	250	3	both	n/a	yes	Variable width, to 5m to north. Roadside bank.	Also contains sycamore and field maple
44	18	100	1	both	n/a	Scrubby and wider than 5m, though probably originating from a former hedge	Edge of scrub margin to rank field. Probably originating from a former hedge.	
43	19	75	1	both	n/a	Scrubby and wider than 5m, though probably originating from a former hedge	Edge of scrub margin to rank field. Probably originating from a former hedge.	Contains bluebell and Hart's Tongue Fern
42	20	150	1	both	n/a	Scrubby and wider than 5m, though probably originating from a former hedge	Mature tall hazel - old coppice. Also occasional ash, willow and lime. Edge of scrub margin to rank field. Probably originating from former hedge.	Contains bluebell and Hart's Tongue Fern. Mature tall hazel - old coppice. Also occasional

Appendix 9.2 Hedgerow Survey

Pre-survey code	final code	Approx length (m)	No sections	Sides	If one side, which	True hedge?	description	comment
41 (part)	21	225	1	one	SW		Eastern part is a bramble and nettle covered fence line, with scattered hawthorn, ash and elder bushes. To the west it is woodier, and grading into the scrub woodland behind. Possibly originates from old hedge, as mature hazel coppice stools are present. Sample taken from western section only.	ash, willow and lime
49	22	300	3	one	W	yes	Tall uncut hedgerow roadside hedgerow with mature planted trees beyond (including horse chestnut and red beech), grading into scrub and rank grassland behind.	Also contains sycamore
50	23	300	n/a	one	W	Scrub woodland edge	Woodland edge by C-road	Also contains sycamore
28	24	100	1	both	n/a	yes	uniform hedge	
27	25	20	whole	both	n/a	yes	uniform hedge	
29	26	30	whole	both	n/a	10m wide	10m wide strip of trees and scrub	
30	27	100	1	one	S	Scrub woodland edge and wider than 5m, though originating from a hedge	Edge of scrub margin to rank field. Probably originating from a former hedge.	
26	28	75	1	both	n/a	yes	uniform hedge	
24	29	75	1	one	SW	yes	uniform hedge	
25	30	100	1	both	n/a	yes	uniform hedge	
31	31	150	2	both	n/a	yes	uniform hedge	
32	32	150	2	both	n/a	yes	uniform hedge	
33	33	275	n/a	one	W	Fence line with scattered scrub and much bramble	Fence line of dense bramble. Trees behind.	
34-36	34	225	n/a	one	S	Series of garden hedges	Some gorse, but not hedgerow. Next to houses - not surveyed	
37	35	275	n/a	one	W	Strip of woodland wider than 5m, though originating from two parallel hedges	Wide strip of trees, variable width to 10m. Some large standard trees. Possibly an old track way.	Also contains sycamore
40	36	200	n/a	one	NW	Scrub woodland and scattered scrub edge, possibly originating from a former hedge.	Border of scrub woodland, wire fence.	
38	37	200	n/a	one	S	Wall	wall, by houses	
39	38	200	n/a	one	E	Scrub woodland edge, possibly originating from a former hedge.	Fence with scrub beyond, hawthorn and bramble	
52	39	50	n/a	one	centre	Heavily wooded track way	Wooded track, with leylandii, sycamore and hawthorn on both sides	
51	40	450	n/a	one	N	Scrub woodland edge	Woodland edge by A-road	

Table B: Other data

final code	Height (m)	Shape	Adj land use	Adj land use	parallel hedgerow to 15m?	No of standard trees	standard trees > 1/50m?	pond connection? (score=2)	Woodland connection? (score=2)	Hedgerow connection? (score=1)	connection score	Veteran/mature	No of woodland species	Average No woody species	No of associated features	"Important"?	"species-rich"?
1	3	Part trimmed, wire fences	Arable	B-road	yes	0	no	no	no	yes	1		4	3.5	3	nearly	no
2	4	Part trimmed, wire fences	Arable	Chicken sheds and grassland	no	overgrown	yes	no	no	yes	1		1	4	2	no	no
3	4	Part trimmed, wire fences	Arable	Chicken sheds and grassland	no	overgrown	yes	no	no	yes	1		5	3	3	nearly	no
4	3	trimmed	Arable	Arable	no	1	no	no	no	yes	1		2	3.5	1	no	no
5	n/a	n/a	Arable	Railway embankment	no	n/a	n/a	no	no	yes	1		n/a	n/a	1	n/a	n/a
6	n/a	n/a	Arable	Houses	no	n/a	n/a	no	no	no	0		n/a	n/a	1	n/a	n/a
7	n/a	n/a	Arable	Woodland	no	Is woodland	yes	no	yes	yes	3		n/a	n/a	2	n/a	n/a
8	3	trimmed	Arable	Arable	no	0	no	no	no	yes	1		3	4	2	n	no
9	3	trimmed	Arable	Arable	no	0	no	no	no	yes	1		3	2	2	no	no
10	3	trimmed	Arable	Arable	no	0	no	no	no	yes	1		2	3.5	1	no	no
		Part trimmed, wire fences	Arable	Arable	no	0	no	yes	no								
11	3	trimmed	Arable	Arable	no	0	no	no	no	yes	1		2	3.33	1	no	no
12	3	trimmed	Arable	Arable	no	0	no	yes	no	yes	3		1	3.33	1	no	no
		Part trimmed, wire fences	Arable	B-road	yes	overgrown	yes	no	no	yes	1		4	3.67	4	nearly	no
13	5	Part trimmed, wire fences	Arable	Arable	no	0	no	no	no								
14	4	Part trimmed, wire fences	Arable	Arable	no	0	no	yes	yes	yes	5		3	4	3	no	no

Appendix 4: Photographs

Hedgerows 'Important' under the Hedgerow Regulations

Hedge 16



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Hedge 17



Hedge 22



Hedge 27



Hedgerows 'species-rich' according to the BAP definitions

Hedge 25



Appendix 9.2 Hedgerow Survey

Hedge 32

