Woodland Habitat Survey and Condition Assessment

The Dingle, Chester CH4 8AD

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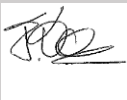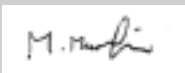14 Beecham Court

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Commissioned For:

Allan Hogan

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This work has been undertaken in accordance with the quality management system of RSK ADAS Ltd.

Revision History

ADAS Ref (Revision number)	Date	Amendment
00	18/12/2023	INITIAL REPORT

Contents

Summary

ADAS was commissioned by Allan Hogan of the Curzon Residents' Association in April 2023 to undertake a woodland habitat survey and condition assessment of The Dingle, Chester CH4 8AD (NGR: SJ 401 653). The purposes of the commission were to undertake the following:

• Habitat survey in accordance with the UK Habitat Classification and incorporating a National Vegetation Classification (NVC); and

• Woodland Condition Survey / Assessment using the Biodiversity Metric.

The Dingle is a small, mixed deciduous woodland of approximately 2.49 hectares (6.15 acres), owned and managed by Cheshire West and Chester Council, and tucked away in a dip at the side of the busy Grosvenor Bridge in Chester.

Surveys were conducted on 19 April and 17 May 2023 in optimal weather conditions (fine, sunny, and warm) by James Towers MCIEEM, an experienced Senior Ecological Consultant with ADAS.

It is considered that the woodland is of 'secondary' origin and constitutes the priority habitat *Lowland Mixed Deciduous Woodland* (UK Hab Code: w1f7 - Mixed woodlands of native species that are largely semi-natural and not *obviously* plantations)

As perhaps would be expected perhaps, given the secondary origins of the woodland, the sampled vegetation did not correspond particularly well with any NVC community, with relatively low matching coefficients for a range of woodland types including W12 *Fagus sylvatica – Mercurialis perennis* woodland, W8 *Fraxinus excelsior – Acer campestre – Mercurialis perennis* woodland and W10 *Quercus robur – Pteridium aquilinum – Rubus fruticosus* woodland.

Overall, the woodland was assessed as being in moderate condition with a Condition Assessment Score of 29 (out of a possible maximum of 35, with good condition is achieved by a score of greater than 35). It supports a good number of native tree / shrub species with a high level of abundance in the canopy and understorey and a moderate age distribution. The woodland also has a diverse vertical structure with a significant amount of regeneration and (fallen) deadwood, and with no evidence of herbivore impact or disturbance. However, the woodland is relatively small, with no open space or veteran trees and a relatively low proportion of favourable land cover (i.e. medium to very high distinctiveness habitats) in the surrounding area. As already discussed, the ground vegetation did not correspond particularly well with any NVC community, whilst the presence of invasive non-native plant species (albeit locally) and the tree disease, Ash Dieback, resulted in low scores for these criteria.

There are a couple of low-scoring attributes where it is considered enhancement interventions could be made to improve both their scores and, in so doing, the overall condition score of the woodland, if

not necessarily its overall condition class. These include: 'Invasive Non-native Plant Species' and 'Tree Health'. Continuing provision should also be made to accommodate both standing and fallen dead wood as a potentially important habitat for a range of wildlife, where not posing a hazard or causing an obstruction to users of the woodland.

Other recommendations include the provision of bat boxes and nest boxes for birds in lieu of the apparent lack of niches for hole-nesting birds and crevice-dwelling bats, as well as the compilation of a woodland management plan.

1   Introduction

1.1   Background and Survey Objectives

ADAS was commissioned by Allan Hogan in April 2023 to undertake a woodland habitat survey and condition assessment of The Dingle, Chester CH4 8AD (NGR: SJ 401 653) in line with a proposal submitted to Stephanie Hefferan, Greenspace Officer with Cheshire West and Cheshire Council, on 28 April 2022. The purposes of the commission were to undertake the following:

- Habitat survey in accordance with the UK Habitat Classification and incorporating a National Vegetation Classification (NVC); and
- Woodland Condition Survey / Assessment using the Biodiversity Metric.

This report sets out and describes the findings of the habitat survey and condition assessment(s). It includes a habitat map that highlights ecological features of interest or value such as the locations of ancient woodland indicator species, invasive non-native plant species, dead wood habitats, open space within the woodland and veteran trees where they have been encountered during the survey. Based on the findings of the condition assessment, the report also makes general recommendations for management to enhance of the condition of the woodland for biodiversity.

It has been compiled by James Towers BSc (Hons) MCIEEM, a Senior Ecological Consultant with ADAS. James is a skilled botanist and an active member of the Botanical Society of Britain and Ireland (BSBI) with much experience gained over many years in conducting habitat surveys and condition assessments.

1.2   Site Description

The Dingle is a small, mixed deciduous woodland of approximately 2.49 hectares (6.15 acres), owned and managed by Cheshire West and Chester Council, and tucked away in a dip at the side of the busy Grosvenor Bridge in Chester. Steep slopes and steps lead down from the road to a network of paths across its base, from which access to the nearby River Dee can be gained, with a footbridge spanning the woodland towards its northern end where it narrows between the main Grosvenor Road and Dingle Bank (Figure 1; Appendix 1).

Figure 1. Site location and wider landscape (site indicated by red line boundary)

Whilst the name of the woodland is said to come from Anglo Saxon or Old English, spoken in England before 1100, with 'dingle' meaning a small valley or hollow (Allan Hogan of the Curzon Residents Association pers. comm.), it is understood that the origins of the woodland on the site today date from the 1820/30s, at some point (most likely) prior to which a series of parallel small drainage channels or ditches were dug through the woodland, which are still clear in the woodland today (Antony Steven of the Hough Green Local History Group pers. comm.).

2   Methods

2.1   Habitat Survey

2.1.1   UK Habitat Classification Survey

A habitat survey was conducted on 19 April 2023 in optimal weather conditions (fine, sunny and warm) by James Towers MCIEEM, based on the method described in the UK Habitat Classification (UKHab) Version 2.0 (UKHAB 2023), with plant species recorded following standard nomenclature (Stace 2019).

UKHab is based on a hierarchical primary habitat system with associated habitat codes. The primary habitat codes are followed by secondary codes. Secondary codes are designed to give information on the environment, management, and origin of habitats, to identify habitat mosaics and complexes and identify specific features within primary habitats.

The habitat survey was extended to include the compilation of a full list of plant species within the woodland, as well as notes on features of the woodland that could potentially support protected species.

2.1.2   National Vegetation Classification (NVC)

The NVC survey was conducted on 19 April 2023 and 17 May 2023 in optimal weather conditions (fine, sunny and warm) by James Towers MCIEEM in accordance with best practice guidance (JNCC 2006, Kirby *et al.* 2004, Rodwell (Ed.) 1991).

The following (nested) quadrat sizes were used for sampling the woodland vegetation:

- Canopy layer - 50 m x 50 m (or equivalent area);
- Shrub layer - 10 m x 10 m; and
- Ground layer - 10 m x 10 m.

Quadrat locations were selected using professional judgement with a single (nested) quadrat placed towards the centre of each of the five main compartments of the woodland (Table 1) in areas of vegetation homogeneous to the eye in its floristics (species composition) and physiognomy (structure, including the patterned arrangement of species over the ground and vertical layering).

Table 1: NVC Quadrat Locations at The Dingle.

Quadrat Number	Quadrat Location
1	SJ 40135 65353
2	SJ 40181 65348
3	SJ 40123 65253
4	SJ 40177 65257
5	SJ 40111 65201

Data was collected using the DOMIN scale. Plant species cover/abundance is a measure of the vertical projection on to the ground of the extent of the living parts of a species. A constancy table of this data is presented in Appendix 8. The term constancy is used to describe how often a species is encountered in different stands or samples (or in this case quadrats) of a vegetation type, irrespective of how much of that species is present in each stand, sample, or quadrat. It is summarised in floristic tables using the Roman numerals I-V and referred to in descriptions of vegetation types.

Analysis of the data was undertaken using the keys and written descriptions in *British Plant Communities: Volume 1 – Woodlands and scrub* (Rodwell (Ed.) 1991) and the *National Vegetation Classification: Field Guide to Woodland* (Kirby *et al*. 2004) to assign the most closely corresponding NVC community type based on the abundance and frequency of plant species within the quadrats.

It was also supported by the MAVIS (Ver 1.04) computer programme (Smart et al. 2016). As this software requires that percentage cover (rather than DOMIN) values are assigned to each species, an arbitrary median percentage cover for each of the DOMIN values recorded was used, as follows:

Table 2: Mean Percentage Cover for each of the Domin Values.

DOMIN	Mean % Cover
10 (91-100%)	96%
9 (76-90%)	83%
8 (51-75%)	63%
7 (34-50%)	42%
6 (26-33%)	30%
5 (11-25%)	18%
4 (4-10%)	7%
3 (many individuals)	3%
2 (several individuals)	2%
1 (few individuals)	1%

2.2   Woodland Condition Survey

2.2.1   Background

The England Woodland Biodiversity Group (EWBG) and Forest Research have developed the Woodland Condition Survey to help rapidly assess the ecological condition of woodland[1]. The purpose of the assessment is to gain an understanding of the:

(i)   woodland attributes that have an important influence on wildlife (e.g. woodland composition, habitat types present)

(ii)   woodland condition and biodiversity indicators that can be assessed as a measure of the status of these attributes and

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[1] https://woodlandwildlifetoolkit.sylva.org.uk/assess; Defra's Biodiversity Metric, which is a tool that scores different habitat types based on their relative value to wildlife and can be used for the purposes of calculating biodiversity losses and gains from development projects, also uses an adaptation of the Woodland Condition Survey developed by the EWBG.

(iii)   where woodland management can be altered to improve conditions.

The survey involves a walk through the woodland to be surveyed collecting information from temporary survey plots of 10-metre radius at fixed stopping points ('10m radius plot survey'), but also during the walk between these survey plots ('whole woodland survey'). In small and/or woodland of unchanging woodland type and age classes, a minimum of five temporary survey plots is usually required. The information collected can be compared directly against condition assessment criteria scores for woodland condition and biodiversity indicators (Appendix 5).

The woodland condition survey focuses on woodland attributes important to wildlife that can be altered by management. There are, however, additional attributes that have an important influence on woodland biodiversity/wildlife, but that cannot feasibly be altered through management activities. These could, for example, include the size of the woodland, its connectivity to other woodland and its inherent physical heterogeneity based on variability in topography.

2.2.2   Woodland Types

For the purposes of the survey, two broad woodland habitat types are recognised: 1) Broadleaved, mixed and yew woodland and 2) Coniferous woodland; defined in UKHab as w1 & w2, respectively. The broad woodland habitat type 'Broadleaved, mixed and yew woodland' includes woodland types which are Priority Habitats under the UK Biodiversity Action Plan (UK BAP). These include *mixed broadleaved woodland* (*lowland mixed deciduous woodland*).

In England, 'native woodland' is defined as woodland that is composed of at least 80% native tree species. Up to 20% of this can comprise "naturalised species" if they are already present in the wood.

2.2.3   Methodology

2.2.3.1   Survey Route and Plots

Based on an examination of the available online aerial photography[2] and the surveyor's own knowledge of the broad woodland types that might be present, it was determined that The Dingle entirely comprises 'native woodland' meeting the 'broadleaved, mixed and yew woodland' broad habitat definition.

The route of the walk was largely based on the existing network of footpaths criss-crossing the woodland, whilst also taking in the locations of the plots.

In small and/or woodland of unchanging woodland type and age classes, a minimum of five temporary survey plots is required. These were planned using a map of the woodland with one plot located in

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[2] https://magic.defra.gov.uk/MagicMap.aspx

each of the five largest 'compartments' of the woodland as effectively defined by the network of footpaths (Appendix 3). In a woodland of this size, and in view of the lack of variation in the woodland type(s) present, it was considered that this would adequately reflect any smaller-scale variation in the woodland, whilst also avoiding possible observer bias in the selection of the plots.

The temporary 10m radius survey plots were laid out by placing an object (e.g. rucksack) on the ground to mark the centre of the circular plot; the boundary of the circle was then identified using a tape measure leading 10m away from this point in the 4 cardinal directions (north, south, east and west) to give an approximate area to survey.

A list of the range of woodland condition and biodiversity indicators that were assessed on the woodland walk and / or within (each) survey plot(s) is as follows with their definitions provided in Appendix 2:

1. *Age distribution of trees* (on woodland walk)
2. *Wild, domestic and feral herbivore impact* (within survey plots)
3. *Invasive non-native plant species* (on woodland walk and within survey plots)
4. *Number of native tree species* (within each survey plot)
5. *Occupancy of native trees (in whole woodland)* (within survey plots)
6. *Open space within woodland* (during woodland walk)
7. *Proportion of favourable land cover i.e. medium to very high distinctiveness habitats around woodland* (desk exercise)
8. *Woodland Regeneration* (on woodland walk and within survey plots)
9. *Tree health* (on woodland walk)
10. *Vegetation and ground flora* (within each survey plot)
11. *Woodland vertical structure* (within each survey plot)
12. *Veteran trees* (during woodland walk)
13. *Amount of deadwood* (on woodland walk and within survey plots)
14. *Size of woodlands* (desk exercise)
15. *Woodland disturbance* (on woodland walk)

Each indicator is given a condition score (3 – Good, 2 – Moderate or 1 - Poor) based on the condition assessment criteria set out in Appendix 5. The indicators are numbered and cross-referenced with the survey forms (Appendices 6 and 7).

For best results, the survey should be conducted once in early spring before ground vegetation obscures views to certain indicators (e.g. deadwood) and again in the summer months when trees are

in leaf and ground vegetation is present to allow for other indicators to be identified (e.g. presence of invasive plant species, evidence of browsing).

In view of the above, the initial survey was carried out on 19 April 2023 in optimal weather conditions (fine, sunny and warm) by James Towers MCIEEM, with the follow-up survey undertaken on 17 May 2023 also in good weather conditions.

2.2.3.2   *Assessment of Woodland Ecological Condition*

The scores (i.e. 1 or 2 or 3) for each individual indicator were added together for the fifteen indicators to give a total score for the woodland assessed. Woodlands scoring greater than 35 are considered to be in good condition, in moderate condition when scoring between 26 to 35 and in poor condition when scoring less than 26.

2.3   Limitations of Surveys

The surveys were carried out in favourable weather conditions at an optimal time of year, enabling the identification of woodland ground flora species but before ground vegetation obscured views to certain indicators (e.g. deadwood), whilst also allowing for other indicators to be identified (e.g. presence of invasive plant species).

Nevertheless, and whilst every effort was made to cover all areas of the woodland and compile a full list of plant species during the walkover survey, it is possible that some may have been missed.

Furthermore, the survey was not carried out during the optimal period for assessing the risk of tree diseases - when trees are in full leaf – and was undertaken from ground level. It is possible, therefore, that specific tree diseases, such as those of Horse Chestnut (e.g. leaf blotch and leaf-miner) may have been missed.

3   Findings of Habitat Survey and Condition Assessment

3.1   Habitat Survey

3.1.1   UK Habitat Classification Survey

The Dingle is essentially deemed to comprise entirely broadleaved woodland (despite containing a scattering of ornamental conifers) that is 'secondary' rather than 'ancient' in origin. As is known and has been documented elsewhere, it therefore occupies a site that has not been continuously wooded or comprises woodland that has at least grown up on an open (field) site since about 1600.

Whilst the woodland contains frequent canopy species such as Beech (*Fagus sylvatica*), and Hornbeam (*Carpinus betulus*), which are mostly only native to southern parts of the UK, but widely planted elsewhere, as well as a scattering of Sycamore (*Acer pseudoplatanus*), which is non-native but widely naturalised, it nevertheless exhibits characteristics of semi-natural woodland. It does not seem to have obviously originated from planting, with the distribution of species generally reflecting natural variations in the topography of the site and the soil. Beech, for example, appears largely to be most frequent around the sides of the dell on its moderately steep slopes where it would be expected that the soils are generally drier and more free-draining, with Hornbeam and Pedunculate Oak (*Quercus robur*) more frequent on the deeper and heavier soils in the lower-lying parts of the dell, whilst Alder (*Alnus glutinosa*) is confined to a small area where the soil is clearly damp all year round. The woodland is also structurally diverse with well-developed canopy and shrub layers, together with much regeneration in the form of young native trees and saplings.

It is therefore considered that the woodland constitutes the priority habitat *Lowland Mixed Deciduous Woodland* (Table 3)[3]. This is listed as a habitat of principal importance for biodiversity conservation in England in Section 41 of the Natural Environment and Rural Communities Act 2006. The legislation essentially requires public bodies (including local authorities and statutory undertakers) to consider what they can do to conserve and enhance these habitats in their policy or decision making. This 'biodiversity duty' has been further strengthened by the Environment Act 2021.

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[3] Also depicted as the priority habitat *Lowland Mixed Deciduous Woodland* in Natural England's *Priority Habitat Inventory (England)*. Source: https://magic.defra.gov.uk/magicmap.aspx

Table 3: Summary of UK Habitat Classification for The Dingle.

UK Hab Code	Description	Broad Habitat	Priority Habitat
w1f7	Mixed woodlands of native species that are largely semi-natural and not *obviously* plantations	Broadleaved, Mixed and Yew Woodland	Lowland Mixed Deciduous Woodland

3.1.2   National Vegetation Classification

As perhaps would be expected perhaps, given the secondary origins of the woodland, the sampled vegetation did not correspond particularly well with any NVC community, with relatively low matching coefficients for a range of woodland types including W12 *Fagus sylvatica – Mercurialis perennis* woodland, W8 *Fraxinus excelsior – Acer campestre – Mercurialis perennis* woodland and W10 *Quercus robur – Pteridium aquilinum – Rubus fruticosus* woodland (Table 4; Appendix 8).

Table 4: Matched NVC Communities for The Dingle (Woodland).

NVC Community	Matching Coefficients
W12a	51,52
W8d	48.71
W10	47.52
W10c	47.32
W8e	47.22
W12	46.36

The levels of affinity that *were* shown with these woodland communities may at least in part simply reflect the relative frequency (constancy) of some of the respective characteristic canopy species, notably Beech (W12), Ash (*Fraxinus excelsior*) (W8) and Pedunculate Oak (W10). Hornbeam, which was also frequent here, can sometimes form a significant component of W8 *Fraxinus excelsior – Acer campestre – Mercurialis perennis* woodland and W10 *Quercus robur – Pteridium aquilinum – Rubus fruticosus* woodland. Some of the sub-communities of these main woodland types are also characterised by an abundance of Ivy (*Hedera helix*) in their field layers, and which formed a prominent

carpet over large areas of the woodland at The Dingle. These include the W12a *Mercurialis perennis* sub-community, W8d *Hedera helix* sub-community, W8e *Geranium robertianum* sub-community and W10c *Hedera helix* sub-community. Species usually more characteristic of rather base-rich soils, such as Hart's-tongue (*Asplenium scolopendrium*), Lords-and-Ladies (*Arum maculatum*), Enchanter's Nightshade (*Circaea lutetiana*), Wild Privet (*Ligustrum vulgare*) and Sanicle (*Sanicula europaea*), and which can form significant components of some forms of W12 *Fagus sylvatica – Mercurialis perennis* woodland and W8 *Fraxinus excelsior – Acer campestre – Mercurialis perennis* woodland, were also present here, albeit (with the exception of Hart's-tongue and Lords-and-Ladies) at relatively low frequencies.

Otherwise, however, the woodland vegetation bore relatively little resemblance to the communities listed, with none of the defining canopy species for these woodland types assuming overall dominance (Table 4). Field Maple (*Acer campestre*) and Dog's Mercury (*Mercurialis perennis*), two of the defining species for W8 *Fraxinus excelsior – Acer campestre – Mercurialis perennis* woodland, which tends to favour relatively base-rich soils, were entirely lacking. Dog's Mercury is also the most distinctive field layer species for W12 *Fagus sylvatica – Mercurialis perennis* woodland, which again is usually restricted to free-draining, base-rich calcareous substrates. Beech tends to be dominant in this community, with other species such as Pedunculate Oak usually absent, which was obviously not the case here, whilst the dense shade cast by Beech usually means that shrub layer is also sparse. Here, both Pedunculate Oak and Hornbeam (along with Beech) were also frequent canopy species, with the shrub layer generally well-developed in many areas of the woodland, although admittedly not where Beech *was* dominant. Bracken (*Pteridium aquilinum*), Bramble (*Rubus fruticosus* agg.), Honeysuckle (*Lonicera periclymenum*) and Bluebell (*Hyacinthoides non-scripta*), which tend to be frequent, and even abundant, in most forms of W10 *Quercus robur – Pteridium aquilinum – Rubus fruticosus* woodland, were again, except for Bramble, which was generally no more than occasional and with low cover, absent from the woodland at The Dingle.

3.2   Woodland Condition Survey

Using the EWBG *Woodland Condition Survey Method*, the woodland, overall, was assessed as being in 'moderate condition' with a Condition Assessment Score of 29 (Appendix 5).

It supports a good number of native tree / shrub species with a high level of abundance in the canopy and understorey and a moderate age distribution. The woodland also has a diverse vertical structure with a significant amount of regeneration and (fallen) deadwood, and with no evidence of herbivore impact or disturbance (Table 5).

On the other hand, the woodland is relatively small, with no open space or veteran trees and a relatively low proportion of favourable land cover (i.e. medium to very high distinctiveness habitats) in the surrounding area. As already discussed, the ground vegetation did not correspond particularly well with any NVC community, whilst the presence of invasive non-native plant species (albeit locally) and the tree disease, Ash Dieback, resulted in low scores for these criteria (Table 5).

Table 5: Summary of Woodland Condition Assessment Scores.

Higher Scoring Attributes (2 or 3)	Low Scoring Attributes (< 2)
Age distribution of trees	Invasive Non-native Plant Species
(No) Herbivore Impact	Open Space within Woodland
Number of Native Tree Species	Proportion of Favourable Land Cover
(High) Occupancy of Native Species	Tree Health
Woodland Regeneration	Ground Vegetation
Woodland Vertical Structure	Veteran Trees
Amount of Deadwood	Size of Woodland
(Lack of) Woodland Disturbance	

1. Age Distribution of Trees

Across the woodland, there were essentially two age classes of trees, which were 'Young' (0 – 20 years) and 'Intermediate' (21 – 150 years). Whilst the origins of the woodland may date back to the 1830s (about 190 years), there appeared to be few, if any, truly old trees (> 150 years), although a relatively small number certainly did seem to be approaching this age class.

2. Herbivore Impact

As may have been expected given the location of the woodland, there was no evidence of any significant browsing pressure from wild, domestic or feral herbivores within each survey plot.

3. Invasive Non-native Plant Species

There was a large stand of Cherry Laurel (*Prunus laurocerasus*), an aggressive coloniser of woodland, adjacent to the southern side of the overhead footbridge at the northern end of Compartment 1, with

a few other isolated individual specimens scattered elsewhere in the same area of the woodland (Table 6; Appendix 3; Appendix 10 - Photo 8).

In the same area of the woodland, extending around the base of the embankment and alongside the perimeter metal palisade fencing comprising the boundary to the adjacent gardens, there was a large stand of Variegated Yellow Archangel (*Lamiastrum galeobdolon* subsp. *argentatum*), with two other smaller patches nearby, also in Compartment 1 (Table 6; Appendix 3; Appendix 11 – Photo 5).

Variegated Yellow Archangel (unlike Cherry Laurel) is listed in Schedule 9 Part II of the Wildlife and Countryside Act 1981 (as amended). Under Section 14 (2) of the Act, it is an offence to plant or otherwise cause to grow in the wild any plant which is included in Part II of Schedule 9.

Table 6: Summary of Locations of Invasive Non-native Plant Species.

Species	O.S. Grid References	Notes
Cherry Laurel	SJ 4018 6541	Large stand adjacent to southern side of overhead footbridge at northern end of Compartment 1
	SJ 4013 6533	Single shrub in central part of Compartment 1
Snowberry	SJ 4018 6544	Located in angle between two divergent footpaths immediately north of overhead footbridge
	SJ 4018 6541	Extending up embankment on southern side of steps up to Dingle Bank
Variegated Yellow Archangel	SJ 4015 6537	Extending around base of embankment alongside perimeter fencing
	SJ 4015 6534	Large patch in Plot 1
	SJ 4015 6535	Large patch in Plot 1

Whilst not listed in Schedule 9 Part II of the Wildlife and Countryside Act 1981 (as amended), Snowberry (*Symphoricarpos albus*), a deciduous shrub that produces white berries in the autumn, is also non-native and highly invasive. There were two discreet patches of Snowberry in proximity to the overhead footbridge towards the northern end of the woodland in Compartment 1 (Table 6).

Incidentally, although not on the list of invasive non-native plant species that are considered to affect the condition of woodland, Spanish Bluebell (*Hyacinthoides hispanica*) was present very locally as relatively small, discreet patches alongside footpaths in a couple of locations around the fringes of the

woodland (Table 7; Appendix 3; Appendix 11 – Photos 3 and 4). There was, however, no evidence of our native Bluebell (*Hyacinthoides non-scripta*) anywhere in the woodland. This is perhaps not surprising as it usually slow to very colonise woodland and its presence is, therefore, commonly used as an indicator of 'ancient woodland'.

Table 7: Summary of Locations of Hybrid / Spanish Bluebell.

Species	O.S. Grid References	Notes
Hybrid / Spanish Bluebell	SJ 40072 65254	Few small patches either side of footpath up to Curzon Park North
	SJ 40198 65456	Few small patches alongside footpath up to Grosvenor Road

In view of their locations, it is possible that all these species could have colonised the woodland from the adjacent gardens and effectively become naturalised. Alternatively, they could have been inadvertently introduced with fly-tipped garden waste.

There was no evidence of any other invasive non-native plant species such as Himalayan Balsam (*Impatiens glandulifera*), Japanese Knotweed (*Reynoutria japonica*) or Rhododendron (*Rhododendron ponticum*).

4. Number of Native Tree Species

A relatively large number of native or naturalised tree / shrub species were recorded across the woodland (between six and ten in each 10 m radius plot), although not all are considered native to this locality. The native species included Ash, Beech, Lime (*Tilia x europaea*), Elder (*Sambucus nigra*), Hawthorn (*Crataegus monogyna*), Hazel (*Corylus avellana*), Holly (*Ilex aquifolium*), Hornbeam, Pedunculate Oak, Wild Privet, Wych Elm (*Ulmus glabra*) and Yew (*Taxus baccata*), whilst the naturalised species included Horse-chestnut (*Aesculus hippocastanum*), Sweet Chestnut (*Castanea sativa*) and Sycamore. Conversely, no non-native tree / shrub species were recorded in the 10 m radius plots.

5. Occupancy of Native Trees

Within the survey plot boundaries, 100% of the canopy cover in the upper storey (>5m) and understorey (up to 5m) layers was made up of native tree species.

6. Open Space within Woodland

Perhaps not surprisingly, given its relatively small size and its management as a closed-canopy woodland, there was no open space at least 10 m wide within the woodland (e.g. glades, rides and footpaths.

7. Proportion of Favourable Land Cover

Based on an examination of the available online aerial photography, it was estimated that there was only about 8% cover of favourable land cover (medium to very high distinctiveness habitats) within a 5.6 km radius (100 km^2) of the woodland, mainly comprising freshwater (rivers, ponds, lakes and meres), neutral grassland, rough low-productivity grassland (including wood pasture) and other woodland.

8. Woodland Regeneration

There was much woodland regeneration in the form of trees 4-7 cm dbh and saplings within the survey plots and throughout the woodland. Regenerating species included Ash, Beech, Hornbeam, Horse-chestnut and Sycamore, although the latter species, in particular, was noticeably rare as a component of the canopy, but occasional to frequent in the understorey and especially as saplings. There was, however, no regenerating Pedunculate Oak (e.g. saplings), despite mature specimens being occasional to frequent throughout the woodland. Pedunculate Oak is an especially light-demanding species (and relatively slow-growing) with seeds (acorns) and seedlings requiring open spaces or glades within woodlands, such as might be provided by fallen trees, in which to germinate, grow and establish themselves as saplings and young trees.

9. Tree Health

Whilst Ash formed only a minor component of the woodland canopy and understorey, Ash Dieback (*Hymenoscyphus fraxineus*), a high-risk, chronic fungal disease, appeared to be present in a very small number of specimens, with dieback of the shoots and leaves clearly visible, although these symptoms were not fully confirmed as being those of Ash Dieback (Appendix 10 – Photo 7).

Overall, however, tree mortality across the woodland appeared to be considerably less than 10%, although the survey was not undertaken in the optimal period for assessing risk - when trees are in full leaf.

10. Ground Vegetation

Several ground-flora species present in the woodland (including some of the survey plots) have been variously cited as being 'Ancient Woodland Indicators (AWI) plants in different regions of the UK (e.g. Rose & O'Reilly 2006). These include Enchanter's Nightshade, False Brome (*Brachypodium sylvaticum*),

Hart's-tongue, Lady-fern (*Athyrium felix-femina*), Pendulous Sedge (*Carex pendula*), Ramsons, Sanicle, Wild Strawberry (*Fragaria vesca*) and Wood Sedge (*Carex sylvatica*). It is considered (including by this author), however, that except for Ramsons (which was present only as a single large patch in Compartment 5[4]), these species are not reliable as indicators of ancient woodland in Cheshire, with many often also occurring in recent woodland. Furthermore, apart from Ramsons, 'good', or even 'moderate', indicators of ancient woodland in Cheshire (Robinson & Whitbread 1988), such as Herb Paris (*Paris quadrifolia*), Small-leaved Lime (*Tilia cordata*), Moschatel (*Adoxa moschatellina*), Wood Anemone (*Anemone nemorosa*), Hazel (only where long established), Woodruff (*Galium odoratum*) and Wood Melick (*Melica uniflora*), were absent from the woodland at The Dingle. Indeed, across large areas of the interior of the woodland, the field layer was largely dominated by Ivy, which is itself perhaps indicative of secondary woodland (Robinson & Whitbread 1988).

As previously discussed, there were also no clearly recognisable NVC communities within the survey plots (Section 3.1.2).

11. Woodland Vertical Structure

A varied woodland (vertical) structure was evident in all the 10 m radius survey plots, for the most part comprising four different canopy storeys: 1) Upper (Canopy) 2) Middle (Understorey) 3) Lower (Saplings) and 4) Shrub Layer. In general, the greater the variation in woodland structure, the better it is for wildlife, and this diversity in structure was a particularly noticeable feature of the woodland at The Dingle.

12. Veteran Trees

As perhaps would be expected perhaps, given its secondary origins, the woodland contained no veteran trees.

13. Deadwood

Again, perhaps not surprisingly in a relatively small woodland that is frequented by members of the public, where it could pose a hazard, there was relatively little standing deadwood, with none visible in any of the five survey plots. There was, however, a standing dead tree stem (trunk) in Compartment 4, which was partially clad in Ivy with various cavities and splits, and prominent bracket fungi (Appendix 10 – Photo 1), together with another standing dead, fire-damaged, tree stem alongside the footpath in Compartment 5, which appeared to be somewhat hollow with woodpecker holes and other cavities evident (Appendix 10 – Photo 2).

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[4] But not in the respective survey plot.

Fallen dead branches / stems and stumps were, however, much more evident (where clearly not causing an obstruction to users of the woodland), both in the survey plots and in other parts of the woodland (i.e. visible over more than 50% of the woodland survey walk (Appendix 10 – Photos 3, 4 and 5). Fallen deadwood (especially where not chopped up into smaller pieces) can provide an important habitat for specialist fungi, mosses / liverworts, and invertebrates.

14. Size of Woodland

The woodland is approximately 2.49 ha in size and, therefore, less than 5 ha, with small woodlands less able to support some woodland taxa compared to larger woodlands.

15. Woodland Disturbance

Whilst there was a relatively small area of (previous) disturbance evident in front of the small electricity substation building at the southern end of the woodland, where ruderal plant species were dominant, there was no evidence of significant nutrient enrichment or damaged soil across the woodland.

4 Suggested Enhancement Interventions to Improve Woodland Condition Score and Other Recommendations

4.1 Woodland Condition

In view of the absolute constraints of the locality of the woodland, its small size and secondary origins, it is considered that there are probably relatively few enhancement interventions, if any, that could be made (or would be desirable or practical to implement) to improve the condition scores for some of the attributes, such as 'Age Distribution of Trees', 'Open Space within Woodland', 'Favourable Land Cover', 'Ground Vegetation', 'Veteran Trees' and 'Size of Woodland'. The condition scores for some attributes (e.g. 'Age Distribution of Trees' and 'Veteran Trees') might naturally be expected to improve over the medium to long term as the mature trees age further and become old, perhaps developing veteran characteristics such as major trunk cavities or hollowing, crevices in larger branches, missing or loose bark and large quantities of deadwood in the canopy.

On the other hand, however, there are a couple of low-scoring attributes where it is considered enhancement interventions *could* be made to improve both their scores and, in so doing, the overall condition *score* of the woodland, if not necessarily its overall condition *class*. These include: 'Invasive Non-native Plant Species' and 'Tree Health'.

Otherwise, continuing provision should be made to accommodate both standing and fallen dead wood as a potentially important habitat for a range of wildlife, where not posing a hazard or causing an obstruction to users of the woodland.

4.1.1 Invasive Non-native Plant Species

It is recommended that Cherry Laurel is removed from the woodland as it is an aggressive coloniser, forming dense, impenetrable thickets, the presence of which in any amount leads to an unfavourable condition score.

Cherry Laurel is an evergreen and shade-tolerant shrub that is unpalatable to animals and invertebrates owing to the presence of cyanide in its leaves, and which, in time, would shade out the woodland understorey and could ultimately prevent the regeneration of canopy trees. The flowers are insect pollinated, giving rise to black, single-seeded fruits (berries), which are eaten by birds with the seeds then dispersed in their droppings. Cherry Laurel can also reproduce vegetatively by layering, leading to the expansion of existing patches.

Whilst the area of the woodland currently affected by Cherry Laurel is relatively small, effectively comprising little more than a single discreet large stand adjacent to southern side of overhead footbridge at northern end of Compartment 1, once established it is relatively fast-growing, vigorous,

and can be difficult to eradicate. It is recommended, therefore, that professional advice on suitable methods for its control and removal is sought from Cheshire West and Chester Council.

Some degree of short-term control could potentially be achieved by cutting the stems as low as possible to the ground during the winter, making sure that the arisings are removed from the woodland (or perhaps burnt *in situ*) to prevent the larger branches from taking root and sprouting new growth along their lengths, in a similar way to layering. It is not a good idea to chip the brash as even the chippings can take root. Whilst the stools are likely to sprout fresh, strong, young re-growth, this could be treated through the careful application of a foliar herbicide spray between May – October to achieve longer-term control, although further applications may well be required. Removal of toxic leaf litter might also be advisable to enable other plant species to grow. Any individual plants could be dug up or uprooted, again with the arisings burnt or removed from the woodland. As previously stated, however, professional advice should be sought prior to undertaking any form of control or eradication.

Variegated Yellow Archangel is a low-growing and patch-forming perennial that can again outcompete native flora, spreading by long, underground runners or rhizomes, which root at the nodes, to form carpets. Because it is shallow-rooted, control is often best achieved by mechanical means - pulling or digging it out of the ground, although care must be taken to ensure that all parts of the plant are removed, especially the roots, as they can break up easily and readily form new colonies. However, because it is listed in Schedule 9 of the Wildlife and Countryside Act 1981 (as amended), soils or other waste materials containing Variegated Yellow Archangel are classed as 'controlled waste' and must be disposed of at a licensed landfill.

Although Snowberry provides potentially suitable nesting sites and shelter for birds, with its flowers also being attractive to insects, it is quite vigorous, spreading by underground root suckers to form dense thickets that displace the native woodland ground flora. Again, some degree of control can usually be achieved by cutting it back with loppers during the winter months (ensuring that arisings are removed), and then spraying any persistent re-growth.

There is possibly relatively little, if anything, to be gained from trying to completely eradicate or remove Yellow Archangel and Snowberry. Instead, effort should perhaps focus on monitoring and preventing their further spread.

Whilst Himalayan Balsam, Japanese Knotweed and Rhododendron were not seen during the survey, should any of these species be found to have colonised the woodland, or are inadvertently introduced, then further professional advice and appropriate steps should be taken to ensure their immediate removal.

4.1.2 Tree Health

Ash Dieback, a high-risk disease caused by the fungus *Hymenoscyphus fraxineus*, has now become widespread across the UK. It appeared to be present in a very small number of specimens forming part of the canopy and understorey within the woodland with dieback of the shoots and leaves clearly visible, although these symptoms were not fully confirmed as being those of Ash Dieback.

The fungus overwinters in the leaf litter, particularly on the central mid-ribs of the ash leaves. Very small, white fruiting bodies are produced on these mid-ribs between July and October, which then release their spores into the air where they can be blown many kilometres, infecting other trees through their leaves, and eventually blocking their water-transport systems, leading to death.

The main symptoms of Ash Dieback are:

- Dead branches.

- Blackening of leaves which often hang on the tree; and

- Discoloured stems often with a diamond-shape lesion where a leaf was attached.

Overall, however, tree mortality across the woodland appeared to be considerably less than 10%, although the survey was not undertaken in the optimal period for assessing risk - when trees are in full leaf.

In view of the tentative findings of the woodland condition survey, it is recommended that a full and proper assessment of the incidence and risks of tree disease in the woodland is undertaken by a suitably qualified arboriculturist in conjunction with Cheshire West and Chester Council. Assessment of the incidence of tree disease should be undertaken in the summer when trees are in full leaf.

If confirmed to be present, and considering any risks posed to the public, consideration should be given to merits and practicalities of felling and removing the very small number of trees infected with Ash Dieback. In some circumstances, even in the absence of felling, collecting up and burning (where permitted) fallen leaves and other material can be beneficial, disrupting the fungus's life cycle and slowing the spread of the disease.

4.1.3 Amount of Deadwood

Whilst there already appears to be a significant fallen deadwood component across the woodland, it is recommended that fallen deadwood is continued to be left *in situ* where possible (brash can be removed if required), preferably as whole trunks / limbs and stumps, without chopping up into smaller pieces (except where necessary).

Fallen deadwood provides numerous microhabitats for a range of specialist fungi (main agents of decay in wood), mosses / liverworts and invertebrates with the nutrients from its decomposition released into the soil which can be used by living trees in the woodland to aid their growth, effectively recycling them.

Standing deadwood often supports its own suite of specialist invertebrates, as well as providing a habitat in which woodpeckers and other birds can excavate nest holes with crevices beneath bark and cavities in the tree often used by bats in which to roost, hibernate or even breed. It is also recommended, therefore, that standing deadwood is left where possible, although it is acknowledged that opportunities to do so will be determined by safety considerations.

4.2 Other Recommendations

4.2.1 Sycamore

Since being introduced from its native central, eastern and southern Europe, possibly in the 1600s or even earlier, Sycamore has become widely naturalised in many woodlands and elsewhere in the UK.

Sycamore provides a habitat for a range of wildlife, including fungi, invertebrates (including aphids which are attracted to its sugar-rich leaves) and nesting birds. Its flowers provide a good source of pollen and nectar for insects, and its leaves, seeds and the invertebrates that it supports, provide a source of food for the caterpillars of a range of moths, as well as a variety of birds.

It is, however, a fast-growing tree with a dense canopy and large leaves that can shade out other species, but which is itself shade tolerant. It seeds prolifically, the seeds readily germinating to produce very large numbers of seedlings, many of which develop as saplings and then into young trees. Over a long period of time, it can become dominant at the expense of other species such as oak, especially in secondary woodland.

Here, it was an infrequent canopy species, but rather more prevalent as a component of the understorey, and especially frequent as saplings. As part of a management plan for the woodland, therefore, consideration should be given to the desirability of controlling Sycamore, perhaps through the hand-pulling seedlings, although they would probably have to be cut beyond this stage of growth. This would, however, need to be undertaken on an ongoing basis and so may not be practical, or even desirable in terms of any perceived benefit to be gained. Even with Sycamore only being a relatively minor component of the canopy, much of the woodland floor is already heavily shaded and largely dominated by Ivy.

4.2.2 Spanish / Hybrid Bluebell

Spanish Bluebell was introduced to the UK as a garden plant by the Victorians, but has since become naturalised in many broadleaved woodlands, along woodland edges and in verges, especially in urban (fringe) areas, spreading by seed and underground runners which produce new bulbs. It differs from our native Bluebell in having broad leaves (up to 3 cm wide), pale blue (often white or pink), conical bell flowers with spreading and open tips, flowers all round an upright stem with no scent and blue or pale green pollen.

Spanish Bluebell is more vigorous than our native Bluebell, with which it can also hybridise, producing fertile plants with the full range of characteristics intermediate between the two, and so changing the genetic make-up of our native species. Indeed, it is quite possible, or even likely that the form present here in the woodland is Hybrid Bluebell (*Hyacinthoides x massartiana*).

In situations where there is a risk of Spanish / Hybrid Bluebell displacing our native Bluebell, the early removal of the former would be recommended to prevent hybridisation and to maintain the genetics of the native population. In this woodland, however, there is no such risk as there are no populations of native Bluebell present. It is, therefore, not advocated that the relatively small patches of Spanish / Hybrid Bluebell which *are* present are removed as they are doing no harm and there is nothing to be gained. Indeed, it is suggested that they provide a welcome splash of colour to users of the woodland during the spring months and so should be left *in situ*.

4.2.3   Bat Boxes and Nest Boxes

Understandably, given the age of the trees – and the absence of veteran trees, as well as the health and safety issues that might arise with leaving such a resource, the woodland appears to be rather lacking in standing deadwood, apart from a couple of isolated examples of standing dead tree stems (trunks). Consequently, there appear to be relatively few niches for hole-nesting birds and crevice-dwelling bats.

Consideration should, therefore, be given installing nest boxes and bat boxes on some trees at appropriate locations in the woodland. Ideally, however, this should be carried out only after surveys for these species' groups (i.e. breeding birds and bats) have been undertaken to determine the existing value of the woodland for them. This would help to ensure that the existing equilibrium is not significantly disrupted through the possible attraction of new species to the woodland by the introduction of the boxes.

4.2.4   Woodland Management Plan

Taking into account the findings of this report and its suggested enhancement interventions, it is recommended that a woodland management plan for the site is compiled either by, or in conjunction with, Cheshire West and Chester Council.

Using information about the woodland, its history, its previous management, structure, and composition, this should identify any risks and issues and how they will be addressed and provide a detailed plan of any management work that is proposed to be undertaken.

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Appendix 1: Site Boundary Map

The Dingle, Chester — site boundary map

Cheshire West and Chester

1/11/2018

1:1729

Appendix 2: Woodland Biodiversity Indicators and Definitions

No.	Indicator	Definition	Assessment Method
1	Age distribution of trees	Trees are grouped into classes of young, intermediate and old according to their age. Each woodland can be recorded as having one of these possible combinations of age classes: Young only; Intermediate only; Old only; Young and Intermediate; Young and Old; Intermediate and Old; Young, Intermediate and Old. Note: Certain broadleaved trees such as birch (Betula), cherry (Prunus) or Sorbus species are typically quicker to reach maturity than other species and so are attributed a lower age threshold for the 'old' class: If tree species is not a birch, cherry or Sorbus, 0 – 20 years = Young; 21 - 150 years = Intermediate; >150 years = Old. For birch, cherry or Sorbus species; 0 - 20 years = Young; 21 - 60 years = Intermediate; >60 years = Old.	On woodland walk record the number of different tree age classes found across the whole woodland.
2	Wild, domestic and feral herbivore impact	Browsing pressure can be recognised as follows: * Browse line: Lower branches and shoots of trees and shrubs are browsed back so that leaves no longer occur within reach of livestock. *Bark stripping * Damaged or absent shoot tips: Includes damage to shoots present at the base, on the trunk or on the lower branches of trees and taller shrubs.* 'Topiary' appearance of shrubs *Well-used deer tracks * Browsing pressure is considered to be significant where >20% of vegetation visible within each survey plot shows damage from any type of browsing pressure listed.	Note evidence of significant browsing within survey plots.
3	Invasive non-native plant species	Invasive species cover (see table 1) is calculated as a percentage of the total area of the woodland. These percentages are used to assign a score for each woodland. Note that because rhododendron and cherry laurel are regarded as aggressive colonisers, their presence at any amount leads to an unfavourable score.	Record the presence of invasive non-native plant species on woodland walk and within survey plots.
4	Number of native tree species	The number of different native tree/ shrub species including young trees and shrubs. A list of commonly found native tree and shrub species is provided in table 2. Not all species listed are native to all parts of the UK. Note a list of commonly found non-native tree species are also included and should be recorded if present.	Record the main tree and shrub species present in the upper canopy (>5m) within each survey plot.

5	Occupancy of native trees (in whole woodland)	The abundance of native tree species in upper (>5m) and understorey (up to 5m) layers including young trees and shrubs.	Record percentage cover in the upper and understorey canopies of native tree and shrub species within survey plots.
6	Open space within woodland	This is temporary open space in which trees can be expected to regenerate (e.g. glades, rides, footpaths, areas of clear-fell). This differs from permanent open space where tree regeneration is not possible or desirable (e.g. tarmac, buildings, rivers). Area is at least 10m wide. Less than 20% is covered by shrubs or trees, but to reach good condition, transitions between areas of more open space and more closed canopy woodland should be graded ecotones, with transitions not clearly delineated.	Note areas of open habitat on map of woodland during woodland walk. In addition, highlight any other known/ potential areas of open habitat according to aerial photographs. Visit these areas where confirmation is required.
7	Proportion of favourable land cover i.e. medium to very high distinctiveness habitats around woodland	Land Cover Map classes below are incorporated as 'supportive' habitats for woodland: * Acid grassland * Bog * Calcareous grassland *Dwarf shrub heath* Fen marsh and swamp *Freshwater * Inland rock * Montane habitats * Neutral grassland *Rough low-productivity grassland	Record percentage cover of favourable land cover within a 5.6 km radius (100 km^2 circle) of woodland
8	Woodland Regeneration	Record % cover of native (include naturalised broadleaved species) and non-native trees 4-7cm dbh, saplings and seedlings or advanced coppice regrowth.	Record the % cover of native/non-native regeneration on woodland walk and within survey plots.
9	Tree health	Tree health indicators (see table 3) include: rapid rate of tree mortality above natural or background levels; large proportion of crown dieback across a stand of trees; presence of significant tree diseases (identified and recorded via observatree/ tree alert). Tree death is a necessary part of ecosystem function, and as a measure of tree health, mortality is about capturing rapid loss.	On woodland walk note and estimate percentage of dead canopy trees and/or trees showing crown die-back across woodland (if present) and presence of pest/diseases.

10	Vegetation and ground flora	Surveys should be undertaken within an April to October survey window in order for an accurate assessment of the sites ground vegetation status to be made. See 'NVC Key' Tab for woodland NVC communities. Lists of ancient woodland indicator plants vary in different parts of the UK, but they all share in common the fact that the more of these species found in a wood, the more likely it is to be ancient woodland. Strongly characterised means at least several ancient woodland specialist species are noted as occasional, frequent or abundant across the ground vegetation. In many instances these will enable identification of NVC communities.	Using the NVC key establish whether there is a recognisable NVC community or not at ground level in each survey plot and note also whether there are ancient woodland indicators.
11	Woodland vertical structure	Vertical structure is defined as the number of canopy storeys present. Possible storey values are: 1) Upper 2) Complex: recorded when the stand is composed of multiple tree heights that cannot easily be stratified into broad height bands (such as upper, middle or lower) 3) Middle 4) Lower and 5) Shrub layer.	Record the number of different canopy storeys present in each survey plot.
12	Veteran trees	Veteran trees are defined either by DBH for a given species, and/or a total of three or more features and attributes combined. https://www.forestresearch.gov.uk/documents/3162/20PointFeaturesV6a.pdf - These include * Major trunk cavities or hollowing * Water pools in tree crevices * Small holes in the trunk, larger branches or larger roots caused by decay * Missing or loose bark * Large quantities of dead wood in the canopy * Areas where sap is seeping through the bark * Crevices sheltered from direct rainfall * Fungi on the trunk or larger branches * Plants growing on the trunk or branches (not including mosses or lichens). Aim to record all veteran trees on the Ancient Tree Inventory https://ati.woodlandtrust.org.uk	On a map of the woodland, note the location of veteran trees encountered during the woodland walk. Additionally, record on the map any other known veteran trees present in the woodland.
13	Amount of deadwood	Includes logs, large dead branches on the forest floor and stumps (<1m tall) >20cm diameter at narrowest point and >50cm long. Also includes standing dead trees (>1m tall) and deadwood on standing live trees. Diameter is measured at the narrowest point on the stem. Minimum diameter of 20cm.	Record presence of standing deadwood on woodland walk by woodland type and within survey plots.

| 14 | Size of woodlands | There is an established relationship between species richness and habitat area which is particularly well-documented for more specialist species. As habitat parcel size increases so does the area to perimeter ratio, resulting in proportionally more of the internal woodland environment that is important to some species and proportionally less edge habitat that can be detrimental to some species. For woodland biodiversity, there is evidence that woodland parcels less than 3-5 ha in size are less able to support some woodland taxa compared to larger woodlands, although different woodland species require different minimum woodland areas, and this can change according to the landscape and environmental context. | Record total area of woodland. |
| 15 | Woodland disturbance | Record significant patches (>0.1ha) of nettle and/or goose grass/cleavers which can indicate significant nutrient enrichment. Also note soil that has been damaged (e.g. deep ruts) and/or excessive or continuous compaction (e.g. by forestry machinery, animal poaching etc.). Some soil disturbance by animals is necessary and desirable for ecological functioning in woodland. | Record evidence of nutrient enrichment and/or damaged ground on <u>woodland walk.</u> |

Appendix 3: UKHab Woodland Habitat Survey Map

See following page

Cheshire West and Chester Council

The Dingle,
Chester MRA9019

Woodland Habitat Survey

Site boundary *(Total area 2.49 ha)*

Survey Plot Locations

Invasive non-native plant species

Cherry Laurel

Snowberry

Variegated Yellow Archangel

UK Habitat classification

w1f7

Compartment Numbers	Easting	Northing
1	340135	365353
2	340181	365348
3	340123	365253
4	340177	365257
5	340111	365201

Drawn by Paul Taylor 20/12/2023, Verified by James Towers 20/12/2023

0   25   50
Metres
Scale 1:1,250 at A3 size

Base map provided by Cheshire West and Chester Council
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ADAS

General Cemetery

Grosvenor Road

Curzon Park North

Dingle Bank

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Appendix 4: Plant Species List

Common Name	Scientific Name	Main Woodland Compartments					Overall
		1	2	3	4	5	
Alder	*Alnus glutinosa*					L/F	L
Ash	*Fraxinus excelsior* (C)		R	R	R	R	R
Ash	*Fraxinus excelsior* (Sapl.)	O	R	O	R	R	O
Beech	*Fagus sylvatica* (C)	O	O	O	O	F	O
Beech	*Fagus sylvatica* (U)			R	O	O	O
Beech	*Fagus sylvatica* (Sapl.)			R	O	R	R
Broad-leaved Willowherb	*Epilobium montanum*	R					R
Bramble	*Rubus fruticosus* agg.			F	O	O	O
Broad Buckler-fern	*Dryopteris dilatata*			R		R	R
Cherry Laurel	*Prunus laurocerasus*	L/A					L/A
Cleavers	*Galium aparine*		O	R	O	L/A	O
Cock's-foot	*Dactylis glomerata*				L	R	R
Common Ivy	*Hedera helix*	A	A	A	A	A	A
Common Nettle	*Urtica dioica*	R	R	L	O	L/A	O
Cow Parsley	*Anthriscus sylvestris*	R	R				R
Creeping Buttercup	*Ranunculus repens*					L	R
Dandelion	*Taraxacum* agg.	R	O	R	L	R	R
Dog-rose	*Rosa canina* agg.				R		R
Elder	*Sambucus nigra* (U)	R	R		R	R	R
Elder	*Sambucus nigra* (Sapl.)	R					R
Enchanter's-nightshade	*Circaea lutetiana*	F	O	O	O	F	F
European Larch	*Larix decidua* (fallen / dead)				R		R
False Brome	*Brachypodium sylvaticum*	R	O	R			R
Field Horsetail	*Equisetum arvense*				R		R
Field-rose	*Rosa arvensis*	O	O	O	O	O	O
Fool's-water-cress	*Helosciadium nodiflorum*				R		R
Garlic Mustard	*Alliaria petiolata*	R	R			L	R
Goat Willow	*Salix caprea* (Sapl.)			R			R
Gooseberry	*Ribes uva-crispa*	O		R			R
Great Willowherb	*Epilobium hirsutum*	L				R	R
Greater Celandine	*Chelidonium majus*					L	R
Ground-elder	*Aegopodium podagraria*	L/A					L/A
Hairy Bitter-cress	*Cardamine hirsuta*				R	L/A	R
Hart's-tongue	*Asplenium scolopendrium*	O	F	O	O	O	O
Hawthorn	*Crataegus monogyna* (U)			O	O	O	O
Hawthorn	*Crataegus monogyna* (Sapl.)	R	O			R	R
Hazel	*Coryllus avellana* (U)	R	R	R	R	R	R
Hazel	*Coryllus avellana* (Sapl.)		R	R	R	R	R
Hedge Woundwort	*Stachys sylvatica*	R	R	R		O	R
Herb-Robert	*Geranium robertianum*		R	L	R		R
Hogweed	*Heracleum sphondylium*	R	R	R		R	R
Holly	*Ilex aquifolium* (U)	R	R		O	R	R

Holly	*Ilex aquifolium* (Sapl.)		R	R	R		R
Hornbeam	*Carpinus betulus* (C)	F	O	F			L/F
Hornbeam	*Carpinus betulus* (U)	O	F		F	R	L/F
Hornbeam	*Carpinus betulus* (Sapl.)	O	F	F			L/F
Horse-chestnut	*Aesculus hippocastanum* (C)				R		R
Horse-chestnut	*Aesculus hippocastanum* (U)			R		R	R
Horse-chestnut	*Aesculus hippocastanum* (Sapl.)	R	R	R	O	O	O
Hybrid / Spanish Bluebell	*Hyacinthoides x massartiana / H. hispanica*	R	R			R	R
Italian Lords-and-Ladies	*Arum italicum*					R	R
Ivy-leaved Speedwell	*Veronica hederifolia*	L/A				R	R
Lady-fern	*Athyrium filix-femina*		O	R	R	R	R
Larch	*Larix* sp. (C)			R			R
Lesser Celandine	*Ficaria verna*	O	O		O	L/A	O
Lime	*Tilia x europaea* (C)	O	R			O	O
Lime	*Tilia x europaea* (U)	R	R			R	R
Lime	*Tilia x europaea* (Sapl.)		R				R
Lords-and-Ladies	*Arum maculatum*	R	O	O	O	O	O
Male-fern	*Dryopteris filix-mas*	O	O	O	O	O	O
Marsh-marigold	*Caltha palustris*				R		R
Meadow Buttercup	*Ranunculus acris*			R			R
Norway Maple	*Acer platanoides* (Sapl.)		R				R
Pedunculate Oak	*Quercus robur* (C)	F	O	O	O	F	O - F
Pendulous Sedge	*Carex pendula*	R	R	O	O	O	O
Ramsons	*Allium ursinum*					L/A	L/A
Raspberry	*Rubus idaeus*					L/A	L/A
Red Currant	*Ribes rubrum*	O	O	L/A		R	O
Remote Sedge	*Carex remota*	R	L	R		R	R
Rosebay Willowherb	*Chamaenerion angustifolium*		R		R		R
Rough Meadow-grass	*Poa trivialis*		R				R
Sanicle	*Sanicula europaea*	R	O	R	R	O	O
Shining Crane's-bill	*Geranium lucidum*						L
Silver Birch	*Betula pendula* (C)				R		R
Snowberry	*Symphoricarpos albus*	L/A					L/A
Sweet Chestnut	*Castanea sativa* (C)		R				R
Sycamore	*Acer pseudoplatanus* (C)	R	R		R		R
Sycamore	*Acer pseudoplatanus* (U)	O	O	F	O	F	O
Sycamore	*Acer pseudoplatanus* (Sapl.)	F	F	F		F	F
Variegated Yellow Archangel	*Lamiastrum galeobdolon* ssp. *argentatum*	L/A					L/A
Wild Cherry	*Prunus avium* (Sapl.)	R		R			R
Wild Privet	*Ligustrum vulgare*			L/A	R	L/A	L/A
Wild Strawberry	*Fragaria vesca*	R	R			L	R
Wood Avens	*Geum urbanum*	O	O	O	O	O	O
Wood Dock	*Rumex sanguineus*	O	O	O	R	O	O

Wood-sedge	*Carex sylvatica*	O	O	O	O	O	O
Wych Elm	*Ulmus glabra* (C)	R			R		R
Wych Elm	*Ulmus glabra* (U)	O		F		F	O
Wych Elm	*Ulmus glabra* (Sapl.)	F					R
Yew	*Taxus baccata* (U)	R		R	R		R

Key
C = Canopy
U = Understorey / Shrub Layer
Sapl. = Sapling

DAFOR Scale of Abundance:
D = Dominant
A = Abundant
F = Frequent
O = Occasional
R = Rare
(L/A = Locally Abundant, L/F = Locally Frequent, L = Local)

Appendix 5: EWBG Woodland Condition Survey Criteria and Scores

	Condition Assessment Criteria			
		Good	Moderate	Poor
Score per indicator		3	2	1
Total score		Greater than 35 = good	26 to 35 = moderate	Less than 26 = poor

No.	Indicator	Good	Moderate	Poor	Score
1	Age distribution of trees	Three age classes present	Two age classes present	One age class present	2
2	Wild, domestic and feral herbivore impact	No significant browsing damage evident in woodland	Evidence of significant browsing pressure is present in 40% or less of whole woodland	Evidence of significant browsing pressure is present in 40% or more of wholewoodland	3
3	Invasive non-native plant species	No invasive species present in woodland	Rhododendron and laurel not present, other invasive species < 10% cover	Rhododendron and laurel present, or other invasive species > 10% cover	1
4	Number of native tree species	Five or more native tree or shrub species found across whole woodland	Three to four native tree or shrub species found across whole woodland	None to two native tree or shrub species across whole woodland	3
5	Occupancy of native trees (in whole woodland)	> 80%	50-80%	< 50%	3
6	Open space within woodland	10 – 20% of woodland has areas of temporary open space	21- 40-% of woodland has areas of temporary open space	More than 40% or less than 10% of woodland has areas of temporary open space	1
7	Proportion of favourable land cover i.e. medium to very high distinctiveness habitats around woodland	>20%	10-20%	<10%	1
8	Woodland Regeneration	All three classes present in woodland; Trees 4-7cm dbh, saplings and seedlings or advanced coppice regrowth	One or two classes only present in woodland	No classes or coppice regrowth present in woodland	2
9	Tree health	Rapid tree mortality less than 10%, no pests or diseases and no crown dieback	11% to 25% rapid mortality and/or crown dieback or low risk pest or disease present	Greater than 25% tree rapid mortality and or any high risk pest or disease present	1
10	Ground vegetation	Recognisable NVC plant community at ground layer present, strongly characterised by ancient woodland flora specialists	Recognisable NVC plant community at grpound layer present	No recognisable NVC community at ground layer	1
11	Woodland vertical structure	Three or more storeys across all survey plots or a complex woodland	2 storeys across all survey plots	One or less storey across all survey plots	3
12	Veteran trees	Four or more veteran trees per hectare	One to four veteran trees per hectare	No veteran trees present in woodland	1
13	Amount of deadwood	More than 50% of woodland and/or 50% of all survey plots surveyed have standing deadwood, large dead branches/ stems and stumps	Between 25% and 50% of woodland and/or between 25% and 50% of all survey plots surveyed have standing deadwood, large dead branches/ stems and stumps	Less than 25% of woodland and/or less than 25% of all survey plots surveyed have standing deadwood, large dead branches/ stems and stumps	3
14	Size of woodlands	Greater than 20 hectares	Between 5 and 20 hectares	Less than 5 hectares	1
15	Woodland disturbance	No nutrient enrichment or damaged ground evident	Less than 1 ha in total of nutrient enrichment across woodland area and/or less than 20% of woodland area has damaged soil	More than 1 ha of nutrient enrichment and/or more than 20% of woodland area has damaged soil.	3
	Total score				29

Appendix 6: Whole Woodland Field Survey Form

Equipment checklist : Woodland map with locations of temporary survey plots marked, tape measure (at least 10m), DBH measuring tape, clip board, pencil, whole woodland survey form with definition Tables 1-2, GPS (if available)

GENERAL INFORMATION

Surveyor(s) name:	James Towers
Date:	19/04/2023
Time taken to conduct survey (hrs/days):	6 hours / 1 day

WOODLAND DETAILS

Woodland name:	The Dingle, Chester
Woodland National Grid Ref (e.g. TG197054):	SJ 401 652

(For help finding woodland grid reference see https://gridreferencefinder.com/)

See Indicator Notes

1 Age distribution of trees

Across the whole woodland how many age classes are present? (Young, Intermediate, Old) | 2 |

3 Invasive plant species

Put a tick against those species (from list below) that are commonly found throughout woodland, regardless of woodland type.

Latin name	Common name	
Lysichiton americanus	American skunk cabbage	
Impatiens glandulifera	Himalayan balsam	
Fallopia japonica	Japanese knotweed	
Prunus laurocerasus	Cherry Laurel	✓
Gaultheria shallon	Shallon	
Symphoricarpos albus	Snowberry	✓
Lamiastrum galeobdolon subsp. *argentatum*	Variegated yellow archangel	✓
Rhododendron ponticum	Rhododendron	

6 Open Space within woodland

What area (%) (all woodland types combined) is open space ? | 0 | % |

7 Proportion of favourable land cover

How much (%) favorable land cover is there within a 5.6km radius (100m2) of the woodland ? | 8 | % |

8 Woodland Regeneration

How many classes (4-7cm dbh, saplings, seedlings or coppice growth)are there by woodland type ?

Broadleaved, mixed and yew woodland | 2 |

9 Tree health   Coniferous woodland | |

Tick only one below for whole woodland

Is tree mortality less than 10%, no pests and diseases and no crown dieback?	
Is there 11% to 25% mortality and/or crown dieback or low risk pests or diseases present?	
Is there greater than 25% tree mortality and or high risk pests or diseases present?	✓

12 Veteran trees

Tick only one below for whole woodland

Does the woodland as a whole contain four or more veteran trees per ha (yes/ no)?	
Does the woodland as a whole contain one to four veteran tree per ha (yes/ no)?	
Does the woodland as a whole contain no veteran trees (yes/ no)?	✓

13 Deadwood

Tick only one below for whole woodland

Is standing deadwood/large dead branches/stems and stumps continuously visible over >50% of the woodland survey walk (yes/ no)?	✓
Is standing deadwood/large dead branches/stems and stumps continuously visible over between 25% and 50% of the woodland survey walk (yes/ no)?	
Is standing deadwood/large dead branches/stems and stumps continuously visible over less than 25% of the woodland survey walk (yes/ no)?	

14 Woodland area by type

Total woodland area (ha):	2.49
Total broadleaved, mixed and yew woodland area (ha):	2.49
Total coniferous woodland area (ha):	0

15 Woodland disturbance

Tick if there is evidence of significant nutrient enrichment across the woodland	
Tick if patch (or sum of patches) of nutrient enrichment exceeds one hectare	
Tick if there is evidence of damaged soil across the woodland	
Tick if more than 20% of woodland area has soil damage	

Appendix 7: 10 m Plot Field Survey Form

Equipment checklist : Site map with locations of temporary survey plots marked, tape measure (at least 10m), DBH measuring tape, clip board, pencil, whole woodland survey form with definitions Tables 1-2, GPS handheld device (if available)

GENERAL INFORMATION

Surveyor(s) name:	James Towers	Date:	19/04/2023

Woodland name:	The Dingle, Chester	Woodland National Grid Ref (e.g. TG197054):	SJ 401 652

(For help finding woodland grid reference see https://gridreferencefinder.com/)

GPS reading at centre of each survey plot:

Plot no.	1	SJ 40135 65353	Plot no.	3	SJ 40123 65253	Plot no	5	SJ 40111 65201
Plot no.	2	SJ 40181 65348	Plot no.	4	SJ 40177 65257			

Where no GPS device is available or where there is a poor signal, record approximate National Grid Reference at centre of survey plot

Predominant woodland type within survey plot. If woodland type can be distinguished (See UKHab w1 & w2), tick <u>one</u> from the two woodland type options below for each plot.

Plot no.	1	2	3	4	5
Broadleaved, mixed and yew woodland	✓	✓	✓	✓	✓
Coniferous woodland					

See Indicator TAB Notes

Consider carefully definitions given in the INDICATORS tab prior to answering the following questions, including guidance on what is considered 'significant'

2 Wild, domestic and feral herbivore impact

Are there significant signs of browsing impact within the survey plot (yes/no)?

No	No	No	No	No

3 Invasive plant species

Are invasive non-native plants present within the survey plot? Put a tick against those species (from list below) that are present in survey plot.

Latin name	Common name	1	2	3	4	5
Lysichiton americanus	American skunk cabbage					
Impatiens glandulifera	Himalayan balsam					
Fallopia japonica	Japanese knotweed					
Prunus laurocerasus	Cherry Laurel	✓				
Gaultheria shallon	Shallon					
Symphoricarpos albus	Snowberry					
Lamiastrum galeobdolon subsp. *argentatum*	Variegated yellow archangel	✓				
Rhododendron ponticum	Rhododendron					

4 Number of native tree/ shrub species richness

Using lists provided, identify within the survey plots the main native tree and shrub species present in the upper storey (>5m) and under storey (up to 5m) layers, including young trees and shrubs. Tick if present in plot.

Native trees and shrubs

Plot no.	1	2	3	4	5
Alder buckthorn					
Almond willow					
Ash					✓
Aspen					
Bay willow					
Beech	✓	✓	✓	✓	✓
Bird Cherry					
Black poplar					
Blackthorn					
Box					
Bramble					
Broom					
Butcher's broom					
Crack willow					
Common Alder					✓
Common lime		✓			
Crab Apple					
Dog Rose					
Dogwood					
Downy Birch					
Eared Willow					
Elder		✓			✓
English elm					
Field Maple					
Field rose					
Goat Willow					
Gorse					
Grey poplar					
Grey willow					
Guelder rose					
Hawthorn	✓	✓	✓	✓	✓
Hazel	✓				

Native trees and shrubs (contd.)

Plot no.	1	2	3	4	5
Holly	✓		✓	✓	✓
Hornbeam	✓	✓	✓	✓	
Juniper					
Large-leaved lime					
Midland hawthorn					
Montane Willows (all)					
Osier					
Pedunculate/common oak	✓		✓		✓
Purging buckthorn					
Purple willow					
Rowan					
Sessile Oak					
Silver Birch					
Small-leaved lime					
Small-leaved elm					
Smooth-leaved elm					
Spindle					
Spurge laurel					
Wayfaring tree					
Whitebeam (all native spp)					
White willow					
Wild cherry/gean					
Wild privet			✓		
Wild service tree					
Wych elm					✓
Yew			✓		
Naturalised species					
Horse chestnut			✓	✓	✓
Wild pear					
Sweet chestnut		✓			
Sycamore	✓	✓	✓	✓	✓
Wild plum					

Common non-native trees

Plot no.	1	2	3	4	5
Black walnut					
Cedar spp.					
Coast redwood					
Common walnut					
Corsican pine					
Douglas fir					
European larch					
European silver fir					
Grand Fir					
Holm oak					
Italian alder					
Japanese larch					
Lawson's cypress					
Lodge pole pine					
Maritime pine					
Noble fir					
Norway maple					
Norway spruce					
Other Conifer Species					
Other Broadleaved Species					
Raoul/Rauli/Roble					
Red oak					
Scots pine					
Silver maple					
Sitka spruce					
Turkey oak					
Western hemlock					
Western red cedar					

Plot totals for native spp.	7	7	9	6	10

Plot totals for non-natives	0	0	0	0	0

5 Occupancy of native trees

Record percentage of the canopy cover in the upper storey (>5m) and understorey (up to 5m) layers that is made up of native tree species within survey plot boundaries.

Plot No.	1	2	3	4	5
Occupancy of native trees	100	100	100	100	100

6 Open Space within woodland

What area (%) (all woodland types combined) of total woodland area is open space ?

	1	2	3	4	5
Open space	0	0	0	0	0

8 Woodland Regeneration

How many classes (4-7cm dbh, saplings, seedlings or coppice growth) are there in each plot ?

	1	2	3	4	5
Regeneration classes	2	2	2	2	2

10 Ground vegetation

Tick if there are at least several ancient woodland indicators?

Tick if there is a recognisable NVC community?

11 Woodland vertical structure

Record all tree size categories present (tick all that apply). DBH is diameter at 1.3m above base of tree.

		1	2	3	4	5
Large/Very Large (too big to hug/at least 80cm DBH)	Upper storey					
Medium (hides a thin person/at least 35cm DBH)	Upper storey	✓	✓	✓		✓
Small - Pole stage (wider than tin of beans/ at least 7cm DBH)	Middle storey	✓	✓	✓	✓	✓
Saplings or coppice growth (over 130cm tall, under 7cm dbh)	Lower storey	✓	✓	✓	✓	✓
Shrub species layer	Shrub	✓	✓	✓	✓	✓

13 Amount of deadwood

Tick if standing deadwood is visible in the survey plot

Tick if large dead branches/stems and stumps is visible in the survey plot

	1	2	3	4	5
Standing deadwood					
Large dead branches/stems and stumps	✓	✓	✓	✓	✓

NOTES

Appendix 8: NVC Constancy Table

Species Name	Constancy	Domin Score (Range)
Hedera helix	V	6 - 9
Quercus robur (C)	V	4 - 6
Fagus sylvatica (C)	V	4 - 5
Acer pseudoplatanus (Sapl.)	V	1 - 5
Carpinus betulus (C)	IV	5 - 6
Carpinus betulus (U)	IV	4 - 6
Fraxinus excelsior (C)	IV	4
Rosa arvensis	IV	2
Acer pseudoplatanus (U)	IV	1 - 4
Ilex aquifolium (U)	IV	1 - 4
Asplenium scolopendrium	IV	1 - 3
Arum maculatum	IV	1 - 2
Ulmus glabra (U)	III	2 - 5
Carpinus betulus (Sapl.)	III	1 - 4
Rubus fruticosus agg.	III	1 - 3
Aesculus hippocastanum (Sapl.)	III	1 - 2
Crataegus monogyna (U)	III	1 - 2
Dryopteris felix-mas	III	1 - 2
Acer pseudoplatanus (C)	II	4
Tilia x europaea (C)	II	4
Ulmus glabra (C)	II	4
Circaea lutetiana	II	2 - 4
Ribes rubrum	II	2
Geum urbanum	II	1 - 3
Crataegus monogyna (Sapl.)	II	1 - 2
Ulmus glabra (Sapl.)	II	1 - 2
Corylus avellana (Sapl.)	II	1
Ilex aquifolium (Sapl.)	II	1
Sambucus nigra (U)	II	1
Alnus glutinosa (C)	I	5
Ficaria verna	I	5
Ligustrum vulgare	I	5
Urtica dioica	I	5
Aesculus hippocastanum (C)	I	4
Betula pendula (C)	I	4
Castanea sativa (C)	I	4
Corylus avellana (U)	I	4
Galium aparine	I	4
Lamiastrum galeobdolon ssp. *argentatum*	I	4
Geum urbanum	I	3
Cardamine hirsuta	I	2
Carex pendula	I	2
Stachys sylvatica	I	2
Taxus baccata (U)	I	2

Athyrium felix-femina	I	1
Dryopteris dilatata	I	1
Epilobium hirsutum	I	1
Fagus sylvatica (U)	I	1
Fagus sylvatica (S)	I	1
Fraxinus excelsior (Sapl.)	I	1
Prunus avium (Sapl.)	I	1
Ribes uva-crispa	I	1
Sanicula europaea	I	1
Key C = Canopy U = Understorey / Shrub Layer Sapl. = Sapling		

Appendix 9: Photographs – Woodland Structure

Photo 1 – Compartment 1 (Plot 1).

Photo 2 – Compartment 1 (Plot 1).

Photo 3 – Compartment 2

Photo 4 – Compartment 2

Photo 5 – Compartment 2

Photo 6 – Compartment 3 (Plot 3)

Photo 7 – Compartment 3

Photo 8 – Compartment 3

Photo 9 – Compartment 4

Photo 10 – Compartment 4

Photo 11 – Compartment 5 (Plot 5)

Photo 12 – Compartment 5 (Plot 5)

Photo 13 – Compartment 5

Photo 14 – Compartment 5

Appendix 10: Photographs – Woodland Features

Photo 1 – Standing dead tree trunk (Compartment 4)

Photo 2 – Standing Dead Tree Trunk alongside Path (Compartment 5)

Photo 3 – Fallen tree (Compartment 4)

Photo 4 – Fallen tree (Compartment 4)

Photo 5 – Felled rotting tree trunk (Compartment 5)

Photo 6 – Electricity Substation

Photo 7 – Ash Dieback (Compartment 3)

Photo 8 – Large stand of Cherry Laurel (Compartment 1)

Appendix 11: Photographs – Woodland Plants

Photo 1 – Wood Sedge.

Photo 2 – Sanicle.

Photo 3 – Hybrid / Spanish Bluebell

Photo 4 – Hybrid / Spanish Bluebell

Photo 5 – Variegated Yellow Archangel
(*Lamiastrum galeobdolon* ssp. *argentatum*)

Photo 6 – Wild Strawberry

Photo 7 - Ramsons

Photo 8 – Ramsons (Compartment 5)

Photo 9 - Remote Sedge (foreground) and Pendulous Sedge (background)