HOGSMILL LOCAL NATURE RESERVE

MANAGEMENT PLAN

Final Draft
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INTRODUCTION

This final draft management plan covers approximately 38.3ha of the Hogsmill Local Nature Reserve, comprising the Hogsmill and Bones Gate Open Spaces.

The management plan has been produced following a number of site surveys and a review of available ecological, historical and other information. It focuses upon, and attempts to achieve a realistic balance, between a range of issues that include:

- Nature conservation
- Maintaining and enhancing historical, landscape and cultural value
- Providing appropriate facilities for public recreation and enjoyment
- Encouraging opportunities for education in all aspects of the Local Nature Reserve's ecology, history, culture and landscape.

STAGE ONE - DESCRIPTION

1.1 Introduction

The Hogsmill Local Nature Reserve, incorporating the Hogsmill and Bones Gate Open Spaces (Map 1), covers a total area of approximately 38.3ha. It represents the remains of farmland that once ran along the banks of the River Hogsmill and the Bones Gate Stream before the development of housing that surrounds most of the site today. The individual parcels of land that make up the Hogsmill Open Space were purchased in several stages between 1932 and 1937, whilst the Bones Gate Open Space was all purchased in 1937. A very recent addition to the Hogsmill Open Space is the area of land known as River View Copse (part of compartment 2), formerly leased by Surrey County Council.

All but a tiny portion of the site is designated as Metropolitan Green Belt in the Epsom & Ewell District-wide Local Plan Map (EEBC, 2000). In addition, a very high proportion of the Hogsmill and the entire area of the Bones Gate are designated as Grade 3 Sites of Nature Conservation Importance (SNCI) under the Epsom & Ewell District-wide Local Plan (Map 1).

The site is linear in character and comprises a mosaic of habitats that includes woodland of varying maturity and composition, a range of (primarily amenity) grasslands and a number of scrub types. Several large, mature stand-alone Oak trees and over-stood pollarded Willows are also present. The nationally rare (RDB1) Ladybird *Clitosthetus arcuatus* has recently been found at the site. The species is associated with Ivy and has recently been recorded from several other locations in Surrey.

Whilst Epsom and Ewell Borough Council hold the title deeds to the river bed and banks of both the Hogsmill River and Bones Gate Stream, the Environment Agency (EA) has responsibility for their management. This highlights the need for liaison with the EA over the management of the two watercourses, including the ways that day-to-day management might impact upon wildlife and amenity value. This also has implications for proposals to restore more natural channel characteristics to the two watercourses, an issue that is explored within the management plan.

There is open public access to the whole site, which forms an important local amenity for informal recreation. The site is adjoined for the most part by residential housing and there is easy access to the public from a number of points.

1.2 Location

The site lies in the northern part of the Borough of Epsom and Ewell (Map 1). The Hogsmill Open Space runs from Lower Mill on the Hogsmill River, in a roughly north-westerly direction as far as the bridge that takes the A240 Kingston Road over the river. From here it turns north-eastwards and continues to the Borough boundary with the Royal Borough of Kingston; opposite the Hogsmill Public House on Worcester Park Road. The Bones Gate comprises a narrow strip of land alongside the Bones Gate

Stream that runs from near the Bonesgate Public House on Chessington Road, eastwards to the Waters Edge Estate, where it joins the Hogsmill River.

County: Surrey

District/Borough: Epsom and Ewell

Local Planning Authority: Epsom & Ewell Borough Council

National Grid Reference: TQ 210 635 (Hogsmill); TQ 196 644 (Bones Gate)

Map Coverage:

First Edition of the Ordnance Survey (1871 – present day, held on GIS by EEBC).

Ordnance Survey Landranger series at 1:50,000 scale, sheet number 187.

Ordnance Survey Explorer series at 1:25,000 scale, sheet number 161.

Ordnance Survey 1:10,000 series sheets TQ16NE, TQ26NW.

Ordnance Survey maps at 1:2500 series sheets TQ 1963, 1964, 2063, 2064, 2065, 2163.

Ordnance Survey map at 1:1250 scale.

The site lies within the London Basin Natural Area. Natural area profiles can be obtained from English Nature.

1.3 Land Tenure

All of the land covered by this plan, including the two watercourses and their banks (see Section 1.1), is in the ownership of Epsom and Ewell Borough Council and was purchased in stages during the period of 1932 to 1937. The various conveyance documents can be found in the Town Clerk and Chief Executives Department of the Council.

Much of the adjacent land is in private residential ownership. A significant exception is the Tolworth Court Farm Meadows Local Nature Reserve, which lies to the north of the Bones Gate Stream, situated within and owned by the Royal Borough of Kingston. In addition, mid-way along the Hogsmill (and not forming part of the Open Space) is Ewell Court Manor and Gardens (owned by EEBC), and to the south of this lies the King George V playing fields (Poole Road Recreation Ground – again owned by EEBC). East of here lies the West Ewell allotment gardens, also owned by Epsom and Ewell Borough Council.

Services

A large sewage pipe crosses the Hogsmill near to the Curtis Road Playground, whilst a further sewage pipe, together with a gas pipeline, crosses the Bones Gate Stream at Cox Lane. What is also probably a further sewage pipe crosses the Hogsmill River behind Worcester Park Road. These represent only the most obvious known features and the appropriate utilities should be contacted for up to date information, before any work likely to affect any underground or overground services is undertaken.

1.4 Photographic Coverage

Aerial photographs dating from 2003 are held by the EEBC GIS Section.

1.5 Summary Description

1.5.1 Physical

1.5.1.1 Climate

Meteorological Office data (1961-1990 averages) for Wisley (approximately 15km to the south-west), show an annual rainfall of approximately 650mm per year (no measurements have been taken within the site itself). During this period, there was an average of 110 days per year with more than 1mm of rainfall recorded. In addition, an average total of c.1500 hours sunshine were recorded per year, along with 51 days of air frost. The average monthly maximum temperature was 14.2^{o}C (July being the hottest, at 22^{o}C), whilst the average monthly minimum temperature was 5.9^{o}C (with February being the coldest at 1.2^{o}C).

1.5.1.2 Geology

The site lies over London Clay, River Alluvium and unclassified terrace gravels. Further details of the geology can be seen in the Geological Survey maps for the area.

1.5.1.3 Topography and Hydrology

The site comprises two narrow strips of land beside the associated watercourses and is fairly level, with variations in topography being gently undulating. Ground level is in the order of 30m above sea level at its greatest and around 20m at its lowest.

The Hogsmill River itself is a tributary of the Thames. Its catchment consists almost entirely of built-up land within Epsom and Ewell. Upstream of Green Lane, water feeding into the river originates from springs arising from the chalk, whereas downstream of this point, water joining the Hogsmill runs off clay substrates. The Green Lane feeder-stream itself originates at Barons Pond on Epsom Common. Below this point, several more small feeder streams join the Hogsmill River, before being eventually met by the Bones Gate Stream (which is thus also a tributary of the

Hogsmill River). The Bones Gate Stream has a somewhat larger catchment, rising initially on Epsom Common and then draining an area of farmland to the north of Epsom Common, bordered by Chessington to the north and Horton Country Park to the east.

Due to the narrow, linear character of the site, water flow along the two watercourses is not so much influenced by precipitation falling within the site itself (there is insufficient ground surface to generate much input), but primarily by rapid urban run-off from the surrounding areas. To try and accommodate high flow events, there are stormwater tanks located beside the Hogsmill (but there are none on the Bones Gate). In spite of this measure, there is still a potential for flash flooding to occur and properties adjacent to Ruxley Lane bridge have been flooded in recent years.

Both the Hogsmill River and the Bones Gate Stream are today very artificial watercourses, much modified from their original meandering character and contained within straightened, artificial banks. Only a short section of the original course of the Hogsmill River remains, by-passed by an artificial channel. There are currently plans to restore parts of the original course of the Hogsmill River, which would have significant impacts on the site's hydrology.

Across the site as a whole, the combination of clay soils and fairly level ground means that unsurfaced paths tend to become waterlogged and muddy in wet weather, due to poor surface drainage (probably exacerbated by soil compaction). Adjacent to Meadow Walk, in the south-eastern part of the Hogsmill Open Space, the margin of the site includes a small depression that contains swamp vegetation. Surface drainage from here also floods across an adjacent path, which again becomes very muddy as a consequence.

1.5.1.4 Soils

There is little information available on the soils underlying the Hogsmill and Bones Gate Open Spaces. However, an Environmental Report prepared for the 'Hogsmill River Rehabilitation Project' suggests that this part of the Hogsmill River catchment supports shallow clayey soils and a fine deposit of alluvium over terrace gravels. Most soil within the site itself has been modified in some way, either through excavation, deposition of dredged river material, or of imported materials (Anon, 2005).

1.5.2 Biological

For the most part, there has been very limited biological recording at the site. Apart from the baseline habitat survey conducted during the course of preparing this management plan, the only known botanical survey is one conducted of the Hogsmill (but not the Bones Gate) by Surrey Wildlife Trust during 1998 as part of the Surrey SNCI project (this also listed some fauna). However, it should be noted that the area covered by the SNCI survey included additional areas of land within the Hogsmill corridor not being considered under this management plan.

A number of biological surveys have been commissioned in connection with the 'Hogsmill River Rehabilitation Project' (Anon, 2005), which plans to re-model the river channel close to its confluence with the Bones Gate Stream. Several surveys have also been conducted within the Tolworth Court Farm Meadows LNR area, on the Kingston side of the Bones Gate Stream. Although this area lies adjacent to and therefore outside the area being considered under this management plan, these surveys provide useful information on the ecological resource within which the Open Space lies. A majority of other records have been informally derived, such as the recent list of bird sightings during October 2004 provided by a local enthusiast.

1.5.2.1 Flora and Vegetation Communities

Between them the two sites have a fairly limited vascular plant flora, with over 200 taxa recorded to date (including non-native species). This figure compares with a total of around 350 for the nearby Horton Country Park, but that site is very much larger and has also seen a much greater recording effort.

For the purpose of preparing this management plan, a survey of habitats and vegetation communities has been conducted. A brief outline of the main habitats is given below, with more detailed information being provided in Appendix I. The distribution of the main habitat types is summarised in Map 2. It should be noted that since completion of the habitat surveys, several additional pieces of land have been added to the area covered by this management plan. Habitats for these have been derived from an evaluation of aerial photography with reference also to any relevant field notes made during the field surveys.

Woodlands, scrub and trees

Woodland communities are somewhat variable and poorly-defined, although broadly speaking, there are three main types. At the most recent end of the spectrum are a series of woodlands that were planted around 30 years ago, often upon what was originally grassland habitat. Also present is a suite of older-established and broadly 'semi-natural' woodlands, although even these tend to support a proportion of planted species. Finally, there are also discrete areas of older plantation woodland, generally occurring as small stands within the 'semi-natural' types. Many areas of woodland are disturbed, often scrub-like and patchy in their characteristics, with a generally poor representation of ground flora species.

Of the more-established, broadly 'semi-natural' woodlands, the most widespread species are Ash (*Fraxinus excelsior*), Oak (*Quercus robur*) and Sycamore (*Acer pseudoplatanus*). However, due to the variability of stand types, even these can vary in frequency from being dominant (in the case of Ash) or frequent (in the case of Oak and Sycamore), but all being rare in other areas. Alder (*Alnus glutinosa*) occurs occasionally in some wet areas.

A wide range of other, often planted, trees occur within the canopy; either as infrequently scattered individuals or small stands of long-established plantation. Planted (and subsequently self-sown) tree species include Ornamental Cherries/Plums (*Prunus* spp.), Norway Maple (*Acer platanoides*), Narrow-leaved ash (*Fraxinus*

angustifolia), Willows (*Salix* spp.), Limes (*Tilia* spp.), Horse-chestnut (*Aesculus hippocastanum*), London Plane (*Platanus* x *hispanica*), Turkey Oak (*Quercus cerris*), False-acacia (*Robinia pseudoacacia*), Poplars (*Populus* spp.), Beech (*Fagus sylvatica*) and Scots Pine (*Pinus sylvestris*).

The most common shrub species across the site are Hawthorn (*Crataegus monogyna*) and Elder (*Sambucus nigra*) (one of the plantation woodland areas contains a multi-stemmed, veteran Elder tree). Elm (*Ulmus* spp.) and Blackthorn (*Prunus spinosa*) are locally common. Widely occurring field layer associates include Bramble (*Rubus fruticosus* agg.), Ivy (*Hedera helix*), False-brome (*Brachypodium sylvaticum*), Wood Avens (*Geum urbanum*), Cow Parsley (*Anthriscus sylvestris*), Common Nettle (*Urtica dioica*) and Cleavers (*Galium aparine*). A number of woodland stands have been disturbed by playing children and there are varying amounts of litter and dumped rubbish, including garden refuse.

Broad-leaved woodland planted in recent times occupies significant areas within the Hogsmill Open Space and largely comprises discrete copses planted-up on what was formerly grassland habitat. Mowing of surrounding amenity grasslands has created a very abrupt edge to these woodlands. A wide range of tree species are present and include Hornbeam (*Carpinus betulus*), Ash, Narrow-leaved Ash, Limes, Birches (*Betula* spp.), Horse-chestnut, Ornamental Plum/Cherry and Pear (*Pyrus* sp.), plus Grey/White Poplar (*Populus* x *canescens*/*alba*). The field layer is generally extremely sparse.

Away from woodlands, there are a number of much older, larger trees present. Notable examples include a number of fine old Pedunculate Oak trees. The largest such specimen, in the south of the Hogsmill Open Space, has a diameter at breast height (DBH) of 1.75m. There are also a number of larger Oak trees to be found within the Bones Gate Open Space. An area of the Hogsmill Open Space contains a number of veteran, lapsed pollarded White Willows (*Salix alba*), which appear to be aligned along the course of the former river channel. In addition, there are also two avenues of established White Willows beside the Hogsmill River itself, whilst a large veteran pollard Crack Willow (*Salix fragilis*) is situated close to where the stream leading from Ewell Court meets the Hogsmill River.

Scrub of all types occupies approximately 35% of the site, although in places, it is difficult to make a clear separation between scrub and woodland habitat. As with many other habitats, it tends to occur in narrow strips, reflecting the linear character of the site. The three most frequent and extensive scrub types are dominated by Bramble, Hawthorn and Blackthorn. Less common species include Elder, Elm and Field Maple (*Acer campestre*).

The recently incorporated River View Copse represents a significant area of established scrub-woodland, bordered on its margin by a narrow fringe of dense Blackthorn scrub.

Mature trees, especially of Oak and Ash, are occasionally present throughout scrub-dominated habitats, enhancing structural diversity. As with woodlands, scrub can be quite disturbed as a result of trampling by children and the dumping of litter and other rubbish, including garden refuse along the site margins.

A number of trees in the Watersedge area were examined to assess their potential suitability for roosting bats during a bat survey undertaken in 2004 (Bailey, 2005). The results of this work are discussed under Section 1.5.2.2. In addition, trees beside the river were the subject of a safety inspection by the EEBC Arboricultural Officer during 2001 (the Environment Agency have accepted liability for these trees and are undertaking safety works).

Grasslands

Grasslands as a whole form one of the most extensive habitat types within the site, much of this taking the form of the regularly-mown amenity grassland areas that typify the Local Nature Reserve, along the Hogsmill in particular. These swards are typically dominated by Perennial Rye-grass (*Lolium perenne*) within a generally species-poor sward. Common associates include White Clover (*Trifolium repens*), Dandelions (*Taraxacum officinale* agg.), Greater Plantain (*Plantago major*), Ribwort Plantain (*Plantago lanceolata*), Daisy (*Bellis perennis*) and Wall Barley (*Hordeum murinum*). Along sections of the Hogsmill, Tall Fescue (*Festuca arundinacea*) also occurs as a component of the sward.

Amenity grassland within the Bones Gate appears less frequently-mown than on the Hogsmill. Thus, although Perennial Rye-grass still tends to dominate, the sward is generally taller and more 'weedy' than those of the Hogsmill, with species such as Common Chickweed (*Stellaria media*), Shepherd's Purse (*Capsella bursa-pastoris*), Cow Parsley (*Anthriscus sylvestris*), White Dead-nettle (*Lamium album*), Broad-leaved Dock (*Rumex obtusifolius*) and Hogweed (*Heracleum sphondylium*).

Very locally there are indications of a somewhat more diverse sward marked, in particular, by Common Knapweed (*Centaurea nigra*) and, less commonly, Common Bird's-foot-trefoil (*Lotus corniculatus*).

In addition to these main areas of mown amenity grassland, there are smaller, more marginal areas of generally unmanaged, rank grasslands, especially beside the two watercourses. This vegetation is characterised by often species-poor vegetation dominated by grasses such as False Oat-grass (*Arrhenatherum elatius*) and Common Couch (*Elytrigia repens*). Other common and frequent associates include Cock's-foot (*Dactylis glomerata*), Field Bindweed (*Convolvulus arvensis*), Cleavers, Creeping Thistle (*Cirsium vulgare*) and Tall Fescue, with more local Common Nettle and Hogweed.

One of the larger areas of rank grassland lies at the edge of the recently incorporated River View Copse, notable for the presence of frequent ant-hills.

Small or infrequent areas of somewhat more species-rich, but still unmanaged grassland, occupy a 'middle ground' between the frequently managed Perennial Rye-grass swards and these tall, unmanaged swards. The dominant grass here tends to be Creeping Bent (*Agrostis stolonifera*), but with Perennial Rye-grass still present at varying frequency. Other common grasses and herbs include Red Fescue (*Festuca rubra*), Timothy (*Phleum pratense*), Yorkshire Fog (*Holcus lanatus*), Meadow Barley (*Hordeum secalinum*) and Cock's-foot, Red Clover (*Trifolium pratense*) Greater

Plantain, Creeping Cinquefoil (*Potentilla reptans*), Autumn Hawkbit (*Leontodon autumnalis*), Yarrow (*Achillea millefolium*) and Dandelion. Hairy Sedge (*Carex hirta*), Ox-eye Daisy (*Leucanthemum vulgare*) and Cranesbills (*Geranium* spp.) are infrequent.

Nettle and other weed-dominated communities

A number of stands of vegetation dominated by Common Nettle and other weed species occur across the site. In many stands, Nettle is overwhelmingly dominant, with Cleavers being the only constant associate. This type of vegetation is especially common along the unmanaged fringes of the site, including beside the two watercourses. Beside the Bones Gate Stream, this vegetation supports locally abundant Himalayan Balsam (*Impatiens glandulifera*). This plant, an invasive, non-native species, also occurs along the Hogsmill River downstream of where it is joined by the Bones Gate Stream, but is not present on the Hogsmill upstream of the confluence.

Elsewhere, Common Nettle is not so dominant and other species such as Thistles (*Cirsium* spp.), Hedge Bindweed (*Calystegia sepium*), Field Bindweed, Hogweed and Bramble are present. Less frequent plants include Black Horehound (*Ballota nigra*), Russian Comfrey (*Symphytum* x *uplandicum*), Burdock (*Arctium* sp.), Greater Willowherb (*Epilobium hirsutum*) and White Dead-nettle (*Lamium album*).

Small stands dominated by Greater Willowherb are present in a few places, as well as a stand of Rose-bay Willowherb (*Chamerion angustifolium*). Several small stands of the invasive alien, Japanese Knotweed (*Fallopia japonica*) occur beside the Bones Gate Stream.

Other types of weed-dominated vegetation are present in some recently-disturbed parts of the site. One example occurs on the banks of the Hogsmill River, following ground disturbance caused by reconstructing the B284 Ruxley Lane road-bridge. A further example is located along recently-constructed earth bunds beside a path crossing the Bones Gate at Cox Lane. This vegetation is characterised by an abundance of Oraches (*Atriplex* spp.) and Goosefoots (*Chenopodium* spp.). Other species present (not necessarily at both locations) include Mugwort (*Artemisia vulgaris*), Scentless Mayweed (*Tripleurospermum inodorum*), Smooth Sow-thistle (*Sonchus oleraceus*), Knotgrass (*Polygonum aviculare*), Burdocks, Creeping Thistle, Nipplewort (*Lapsana communis*), Poppies (*Papaver* sp.), Prickly Lettuce (*Lactuca serriola*), Bristly Ox-tongue (*Picris echioides*), Russian Comfrey, and Shepherd's Purse. The Bones Gate stand also includes Hoary Mustard (*Hirschfeldia incana*) and the invasive alien, Goat's Rue (*Galega officinalis*).

Watercourses, water margin and swamp vegetation

Map 3 shows the location of the Hogsmill River and the Bones Gate Stream, plus their associated watercourses. Their vegetation was not included in the field surveys at that time, as it was understood that responsibility for management of watercourses and their banks lay with Environment Agency. It has subsequently emerged that responsibility for their management is less clear cut. As a consequence, it is not possible to provide a detailed account of the vegetation associated with these features,

although the Hogsmill was included in the SNCI survey conducted by Surrey Wildlife Trust.

In general the Hogsmill River has a restricted aquatic and marginal vegetation as the result of channelisation, sometimes within a concrete concourse. Locally, however, the vegetation is well-established and includes Watercress, Fool's Watercress, Branched Bur-reed (*Sparganium erectum*), Brooklime (*Veronica beccabunga*), Reed Canary-grass, Curled Pondweed (*Potamogeton crispus*) and Common Water-starwort (*Callitriche stagnalis*).

One section of watercourse that was surveyed is part of the original course of the Hogsmill River, where Reed Sweet-grass (*Glyceria maxima*) is abundant, along with Common Duckweed (*Lemna minor*) and Fool's Watercress (*Apium nodiflorum*).

A further small example of swamp vegetation within the Hogsmill Open Space is dominated by Reed Canary-grass (*Phalaris arundinacea*). Associates include Meadowsweet (*Filipendula ulmaria*), Hairy Sedge, Greater Willowherb, Water Figwort (*Scrophularia auriculata*), Pendulous Sedge (*Carex pendula*), Bulrush (*Typha latifolia*) and Watercress (*Rorippa nasturtium-aquaticum*).

Alien and invasive non-native species

In addition to many of the planted trees (see above), and invasive alien weeds like Himalayan Balsam, Japanese Knotweed and Goat's Rue, a number of plants have been introduced to the site as a result of the dumping of garden rubbish. These are listed in Appendix II).

Bryophytes

There has been no systematic recording of bryophytes and the potential is probably fairly limited. The only species actually recorded are *Brachythecium rutabulum* and *Eurhynchium praelongum* (from both sites), plus *Rhytidiadelphus squarrosus* (from the Bones Gate only).

Fungi

There has been no known recording of fungi at the site.

Lichens

There has been no known recording of lichens, although *Xanthoria parietina* was noted whilst conducting the habitat survey for this management plan.

1.5.2.2 Fauna

Invertebrates

A number of invertebrates (mainly butterflies) were recorded during the Surrey Wildlife Trust SNCI survey in 1998. A small number of others were noted whilst conducting the habitat survey for this management plan.

In total, ten common species of butterfly have been recorded, which can be largely divided into two main groups. The first covers those whose larvae feed upon Common Nettle, namely Comma (*Polygonia c-album),* Red Admiral (*Vanessa atalanta)* and Small Tortoiseshell (*Aglais urticae).* As can be seen from the above habitat description, there is an abundance of suitable food for these three species at both the Hogsmill and the Bones Gate Open Spaces.

The second main group feed upon a variety of grasses and includes Gatekeeper (*Pyronia tithonus),* Large Skipper (*Ochlodes venata faunus),* Meadow Brown (*Maniola jurtina),* Ringlet (*Aphantopus hyperantus*) and Small Skipper (*Thymelicus sylvestris).* All tend to be associated with scrub/grassland habitat and therefore are well provided for at both sites. Although each has its preferred range of food plant, it is the fine-to-medium range of leaves that are favoured, and coarse swards dominated by False Oat-grass tend to be less suitable, as are the frequently mown and trampled Perennial Rye-grass amenity swards. Therefore it is probably some of the smaller areas of rather 'intermediate' grassland that are the most important to this group of butterflies.

Another species whose larvae feed on grasses (mainly Common Couch and Cock's-foot) is Speckled Wood (*Pararge aegaria*). However, this prefers shadier conditions and tends to be associated with wooded habitat. Finally, Small White (*Pieris rapae)* has larvae that feed on members of the cabbage family.

A number of species of dragonfly were noted along the Hogsmill during the summer of 2004. The only one that could be confirmed was Common Darter (*Sympetrum striolatum*), although Southern Hawker (*Aeshna cyanea*) may also be present. Also known to be present along both watercourses are Common Blue Damselfly (*Enallagma cyathigerum*), Large Red Damselfly (*Pyrrhosoma nymphula*) and Beautiful Demoiselle (*Calopteryx virgo*) (S. Cocker, pers. comm.). The two watercourses undoubtedly represent good potential habitat for dragonflies and damselflies and it must be assumed that other species await recording.

The Environment Agency (EA) monitors the biological quality of watercourses by assessing the number of macroinvertebrate taxa present and their individual susceptibility to pollution (as part of the General Quality Assessment (GQA) system, which also encompasses chemical quality as well). The purpose of this monitoring is therefore to provide a measure the environmental quality and is not especially relevant for assessing nature conservation value. For example, macroinvertebrates are generally only identified down to broad groupings and not to the individual species present.

A strategic EA macroinvertebrate survey of the Hogsmill River and its tributaries (date and reference unknown) identified over 130 species, including London rarities. Particularly rich assemblages of water beetles, molluscs and water bugs were found. However, the variety of caddisflies, mayflies and dragonflies, which are more sensitive to water quality, was lower. The upper reaches of the Hogsmill River had the most diverse macroinvertebrate communities which included several taxa characteristic of a chalk stream, whilst the Bonesgate and Horton Streams were identified as supporting communities typical of lowland headwater streams.

One of the most notable findings during a macroinvertebrate study of the Hogsmill River in 2005 was the presence of the leech *Dina lineata*, which was found approximately 20m north of the 'stepping stones' (M. Skipper pers. comm.). The discovery of this species so far south in the UK is thought to be unusual. The same observer also reports that Freshwater Shrimp *Gammarus pulex* was understandably the most numerous of the aquatic invertebrates noted during this study.

Of greater interest is the recently recorded Ladybird *Clitosthetus arcuatus*. This species is listed as nationally rare (endangered) and was recorded from Ivy at several locations in Surrey during 2005 by entomologist Ian Menzies.

Other invertebrates recorded for the site are Water Cricket (*Velia caprai*) (actually a bug), 7-spot Ladybird (*Coccinella 7-punctata*) and Common Wasp (*Vespula vulgaris*).

Vertebrates

Birds

Birds are the best-recorded group of fauna, within the Hogsmill in particular. The list includes a number that are included on either the 'Red' or 'Amber' Lists of the RSPB, the 'Long List' of the United Kingdom Biodiversity Action Plan (LBAP) (UK Biodiversity Group, 1995) and/or Annex 1 of the EC 'Birds Directive' (see Section 2.3 and Appendix II for full details).

A significant proportion of the recorded species are common residents, or frequent visitors to the site. Breeding species include Blue Tit (*Parus caeruleus)*, Great Tit (*Parus major*), Blackcap (*Sylvia atricapilla)*, Chiffchaff (*Phylloscopus collybita),* Pied Wagtail (*Mocatilla alba*) and Greenfinch (*Carduelis chloris*) (all LBAP), in addition to Wren (*Troglodytes troglodytes*), Robin (*Erithacus rubecula),* Blackbird (*Turdus vulgaris*) and Chaffinch (*Fringilla coelebs)*. The 'Amber', LBAP and EC 'Habitats Directive' Annex 1 listed Kingfisher (*Alecdo atthis*) also breeds here and is regularly seen along the Hogsmill. The 'Amber'/LBAP listed Green Woodpecker (*Picus viridis*) has been recorded from both the Hogsmill and Bones Gate.

Common visitors throughout the year include Grey Heron (*Ardea cinerea*) and Mallard (*Anas platyhynchos*), as well as Sparrowhawk (*Accipiter nisus*) (LBAP) and Starling (*Sturnus vulgaris*) ('Red' listed). Ring-necked Parakeets (*Psittacula krameri*) are frequent visitors to the Hogsmill and probably also the Bones Gate. Summer visitors include Swallow (*Hirundo rustica*) and House Martin (*Delichon urbica)* (both

'Amber'/LBAP listed) in addition to Swift (*Apus apus*). Birds recorded as winter visitors or on passage include Linnet (*Carduelis cannabina*), Skylark (*Alauda arvensis*) (both 'Red'/LBAP Listed), Fieldfare (*Turdus pilaris*), Redwing (*Turdus iliacus*) and Meadow Pipit (*Anthus pratensis*) (all 'Amber'/LBAP listed).

Fish

The last fisheries survey of the Hogsmill River was undertaken in 1993 and the results of this are discussed in the Environmental Report of the Hogsmill River Rehabilitation Report (Anon, 2005). This survey was conducted a short distance upstream of the confluence of the Hogsmill with the Bones Gate Stream, and very few fish were found, the only species being Eel (*Anguilla anguilla*) and 3-spined Stickleback (*Gasterosteus aculeatus*). In addition, records made available to the report's authors from Surrey Wildlife Trust include the presence within this section of river of Bullhead (*Cottus gobio*), a species listed under Annex II the EC 'Habitats Directive' and also appearing on the 'long list' of the UKBAP.

Reptiles and Amphibians

No records have been made.

Mammals

There has been little recording of mammal activity, although a bat survey of the Watersedge area was conducted during 2004 (Bailey, 2005). The area covered by this survey encompassed the section of the Hogsmill Open Space between Ruxley Lane and Kingston Road. It also included a large field (part of Tolworth Court Meadows LNR), beyond the confluence of the Hogsmill River with the Bones Gate Stream – this is outside the area covered by this management plan.

At least four species of bat were recorded. These were Common (45 kHz) Pipistrelle (*Pipistrellus pipistrellus*), Soprano (55 kHz) Pipistrelle (*Pipistrellus pygmaeus*) – both Action Plan species of the UK BAP, in addition to Noctule (*Nyctalus noctula*), and an unidentified myotid, thought most likely to be Daubenton's Bat (*Myotis daubentonii*). Most frequent was the 45 kHz Pipistrelle, which appears to use the site for foraging on a regular basis, followed by the 55 kHz Pipistrelle, also probably foraging. For Noctules, this section of the Hogsmill is likely to represent part of a regularly-used flight line, rather than a foraging area. Likewise, the unidentified myotid bat was considered most likely to be a commuting individual. All species of bat are included under Schedule 5 of the 1981 Wildlife and Countryside Act and also Annex IV of the EC 'Habitats Directive'.

The author of the survey also suggested that although not recorded, the site could be suitable as an occasional flyway for Brown Long-eared Bat (*Plecotus auritus*). It is a common and widespread species in Surrey with a known roost in Horton Country Park, but is difficult to pick up using echolocation.

A number of trees and groups of trees were examined to assess their likely suitability for roosting bats. Whilst many of the trees are in 'good locations' (one of the grading criteria), it was generally found that their potential value as bat roost sites was limited

by a lack of decaying wood or rot. Eighteen out of the total 66 of these trees/groups occur within the Hogsmill Open Space. Using a grading system of 1 (very low probability) to 5 (very high), half of them were placed in either categories 1 or 2. Of the remaining nine, all but one fell within Category 3 (medium probability), which encompasses mature trees, with more than one type of potential roost site, or many holes and crevices, but in poor location (from a bat point of view).

Only one tree was placed in category 4, a dead willow (now felled) with some split branches and much peeling bark, and situated on the river-bank, immediately south of Kingston Road. Category 4 trees (high probability) are mature, in a good location with obvious deadwood and many holes and crevices, representing a variety of potential roost sites. During the survey as a whole, no trees were found to be in the highest category of suitability (category 5).

The author stresses that although the habitat suitable for bats within the site is limited in both size and quality, it represents an important linear habitat corridor for bats linking known better quality habitats to the south, north and west.

A separate, recent survey (Fure 2004) noted the presence of feeding Pipistrelles (species unspecified) in the vicinity of the car park of the Bones Gate Public House, situated at the extreme south-western point of the Bones Gate Open Space. This 'protected species survey' was conducted in advance of works to strengthen the culvert beneath the Moor Lane Bridge over the Bones Gate Stream.

Grey Squirrels (*Sciurus carolinensis)* are frequent throughout. Foxes (*Vulpes vulpes*) are also likely to be common inhabitants.

Despite a number of visits to the Hogsmill River in recent years, no sightings of Water Vole (*Arvicola terrestris*) have been made (D. Williams, pers. comm.), although it is cited as one of the Surrey 'refuges' for populations of this species. A survey at the confluence of the Hogsmill with the Bones Gate Stream in 2003 (Fure, 2004) also found no evidence of Water Vole presence. Brown Rats (*Rattus norvegicus*) are present along the Hogsmill River and it is likely these are being encouraged by the feeding of birds (D. Williams, pers. comm.).

There is no known evidence of any Badger activity at the site.

1.5.3 Cultural

1.5.3.1 Archaeology

There are no scheduled archaeological features within the site. The 1871 Ordnance Survey map highlights the original meandering course of both watercourses as compared with the much channelised features present today. However, a section of the meandering course of the Hogsmill River still exists, south of Ewell Court.

Little evidence remains today of the once extensive Ewell Gunpowder Mills beside the Hogsmill River. The swathes of farmland that once occupied this part of Surrey have all but disappeared, including Roxley Farm (beside what is now the Ruxley Lane

Bridge). However, Talworth (now Tolworth) Court Farm (in the Royal Borough of Kingston) still exists on land north of the Bones Gate.

1.5.3.2 Land Use

The 1871 Ordnance Survey map shows that in the mid-nineteenth century this part of Surrey was largely farmland with no significant settlements. The one exception was the complex of Gunpowder Mills, situated along the Hogsmill River between Ewell Court Gardens and Chamber Mead, which fell into decline in the latter part of the 19th Century. Today, the site is one of the few surviving fragments of this agricultural landscape, although much-modified, and is now used for public amenity and nature conservation.

1.5.3.3 Public Access and Recreation

Access

Subject to the various byelaws (Appendix III), there is open public access across the entire site, which is accessible on foot or by bicycle with a variety of surfaced paths being provided. No horse riding is permitted under the byelaws. There are numerous access points to the Hogsmill, whilst the Bones Gate can be accessed from either end and also from Cox Lane and Gatley Avenue.

Definitive rights of way crossing the site are all public footpaths (Map 4). Two public footpaths cross the southernmost section of the Hogsmill (one of these appearing on the 1871 O.S. map), whilst a third runs along the northernmost edge of this portion, in the proximity of Ewell Court Gardens. A single public footpath bisects the Bones Gate at Cox Lane.

The Thames Down Link, a 15-mile long distance footpath linking the Thames Path and the North Downs Way, passes through the site, running beside a section of the Bones Gate Stream between Chessington Road and Cox Lane. In addition, the London Loop long distance footpath passes through the Hogsmill Open Space, forming a link between Ewell and Kingston-upon-Thames.

There are plans to create a continuous surfaced footpath/cycleway along the length of the Hogsmill River running from Upper Mill near Bourne Hall, to the A240 Kingston Road. The first portion has recently been completed as part of the creation of a Doorstep Green adjacent to the Watersedge Estate, and runs between Ruxley Road and Kingston Road. This will also include a new bridge to replace the stepping stones across the Bones Gate Stream at the point of its confluence with the Hogsmill River; due for completion during early 2006.

Recreational use

The site is popular for a variety of uses that include walking, picnicking, nature watching, exercising of dogs, and cycling. Both the Hogsmill and the Bones Gate also include childrens playgrounds. The Hogsmill facility is situated near to Curtis Road,

whilst the Bones Gate playground is near to Gatley Avenue. Both are fenced and provided with safety surfacing. There are also several sets of goalposts, although in order to enhance the visual environment, those near to Curtis Lane were removed during late 2005, whilst consideration is also being given to removing the rusting example near to Cox Lane. In addition, the Bones Gate Open Space, adjacent to Cox Lane, has an area provided for playing basketball.

Being surrounded by residential housing, the site represents a valuable resource to the local community. The new Watersedge Doorstep Green, within the Hogsmill Open Space, includes improvements in access such as a new bridge and footpaths/cycleways. A new Community Green is also proposed for the Bones Gate Open Space adjacent to Gatley Avenue.

Educational use and site interpretation

A variety of promotional and educational literature has been provided for the site. The most recent general information leaflet (covering the Hogsmill only) adopts a 'house style' employed for similar ones that describe Epsom Common and the Horton Country Park. These provide an overview of features of interest, including the ecological and historical aspects of each of the three sites. In addition, both the Hogsmill and the Bones Gate Open Spaces are featured on the Epsom & Ewell Borough Council website, which includes information on their history and wildlife.

A new leaflet for the site (both Hogsmill and Bones Gate) is being prepared to coincide with the launch of the new Local Nature Reserve.

During 2004, the Countryside and Community Development Team of EEBC launched the Friends of the Hogsmill initiative to encourage local people to become involved in a range of activities. This led to several successful litter picking days during 2004/2005, together with a guided walk. The establishment of the 'Friends' mirrors the longer-established Hogsmill Action Group promoted along similar lines within the Royal Borough of Kingston, which focuses primarily upon their section of the Hogsmill. More recently, information boards have has been erected close to Ruxley Lane and at the stepping stones and, as mentioned above, the creation of the Watersedge Doorstep Green will bring some educational benefits to the Hogsmill.

The Lower Mole Countryside Management Project carries out occasional work at the site (e.g. the recent construction of a new section of path to a new bridge over the Bones Gate and signage of routes such as the London Loop).

Site boundaries/security

Site boundaries are largely formed by those of the adjoining properties, or in the case of the Bones Gate, the stream itself (which runs along the Kingston/Epsom and Ewell boundary). In some parts of the Hogsmill, the boundary runs beside public roads and there is no physical barrier as such. However, most site entrances have barriers to prevent inappropriate access (e.g. by vehicles).

A major problem affecting the site is the illegal dumping of refuse, primarily (although not exclusively) of garden origin, along the fringes. This activity tends to be most

noticeable where there are private gardens bordering directly onto the site. In a few cases within the Hogsmill, there has been direct encroachment onto the Open Space by householders of adjacent properties. A number of measures are being taken to address these unwelcome activities. Firstly, it is planned to write to owners of adjacent properties asking them to cease such infringements (letters have already been issued for the Bones Gate during 2005). Further litter-picking days are being planned by the Hogsmill 'Friends' and the possibility of clearing some areas of dense vegetation along property boundaries is being investigated.

In addition, the generally poor visual appearance of some sections of the two watercourses has created an impression of neglect that has encouraged dumping of rubbish and other material along riverbanks as well.

STAGE TWO – EVALUATION AND OBJECTIVES

2.1 International and National Status

Neither the Hogsmill Open Space nor the Bones Gate Open Space has been the subject of any international designation. The designation of the entire site as a Local Nature Reserve was confirmed in late 2005.

2.2 Local Designations

A very high proportion of the Hogsmill and the entire area of the Bones Gate are designated as Grade 3 Sites of Nature Conservation Importance (SNCI) under the local plan (see Map 1). In addition, the whole area of the Hogsmill and the Bones Gate Open Spaces are designated as Metropolitan Green Belt.

2.2.1 Byelaws and Other Statutory Information

These are included in Appendix III.

2.2.2 SNCI Descriptions

The SNCI description for the "Hogsmill River, West Ewell" is given below. It should be noted that the area covered by the SNCI survey is slightly different from the portion of the Hogsmill being considered by this Management Plan.

The site forms a corridor of semi-natural vegetation within the urban environment of West Ewell. It follows the course of the Hogsmill River from Lower Mill near Bourne Hall as far as its confluence with the Bones Gate Stream, near the Watersedge estate. The site lies over River Alluvium and unclassified terraces.

The site supports a mosaic of semi-natural vegetation lying either side of the Hogsmill River. Aquatic and semi-aquatic communities are to some extent restricted as a result of stream channelisation within a concrete concourse. However, a range of species are supported and in places the vegetation is well established and fairly diverse. For example Watercress, Branched Bur-reed, Brooklime, Reed Canary Grass, Curled Pondweed and Common Water-starwort are all fairly frequent throughout the course of the stream[1].

Fringing the stream are patches of semi-natural secondary woodland, composed of Pedunculate Oak, Ash and Sycamore, and planted stands of Willows and Poplars.

Elsewhere the stream is fringed with tall grassland swards, underscrub and scrub.

[1] Note the Surrey Wildlife Trust survey includes mention of the Surrey rarity Lesser Water-parsnip (*Berula erecta*). However, this species was undoubtedly mis-identified and probably relates to Fool's Watercress (*Apium nodiflorum*).

Blackthorn and Hawthorn are frequent whilst False Oat-grass, Tall Fescue, Cock's-foot, Meadowsweet, Bramble, Reed Canary-grass, Hogweed, Creeping Thistle and Greater Willowherb form the underscrub and grassland communities.

These in turn give way to extensive areas of mown grassland comprising Perennial Rye-grass, Annual Meadow Grass, Yorkshire Fog and Creeping Bent. These amenity swards are broken up by planted stands of young trees including Limes, Sycamore, Poplars and Silver Birch and additional patches of Blackthorn scrub. The edges of the amenity swards are softened by uncut rough grassland and this has allowed the development of woodland-grassland ecotones.

2.3 Criteria for Evaluation

Size

The site as a whole covers an area of 38.3ha. Although the area involved is relatively small, it represents an important resource of undeveloped land in what is otherwise an urban area.

Diversity

Overall diversity of species and habitat types is low. For the Hogsmill Open Space, around 190 vascular plant species have been recorded, whereas the Bones Gate total is only around 80. These figures should be compared with the total of around 350 for Horton Country Park (although this is a much larger and more diverse site and has been the focus of a greater recording effort).

A total of 50 birds have been recorded from the site as a whole, representing half the total for the Horton Country Park. In addition, a small proportion of these are migrants passing overhead, rather than specifically visiting the site. Of these 50 species, all have been noted from the Hogsmill, whereas only six have been recorded from the Bones Gate.

Monitoring of aquatic macroinvertebrates within the Hogsmill and its tributaries suggests that a wide diversity of species are present, especially so in its upper reaches where several taxa characteristic of a chalk stream have been recorded. However, only a small number of other invertebrate species have been recorded (again largely from the Hogsmill, with only two from the Bones Gate). Of these, the greater proportion are butterflies.

It is important to stress that, with the exception perhaps of aquatic macroinvertebrates for the purposes of monitoring water quality (although re-sampling of this section is perhaps now overdue), there has been no systematic recording of many groups and the current lists (Appendix II) should be regarded as incomplete.

Naturalness

The present day Open Spaces represent a much-modified remnant of the former river-margin habitat mosaic, which includes relatively large areas of planted woodland and

improved amenity grassland. However, the Hogsmill includes a short surviving section of the original meandering river-bed, now by-passed by a man-made channel.

A majority of species recorded from the Hogsmill and the Bones Gate are believed to be site-native. However, a significant number of accidentally or deliberately introduced non-native (neophtye) plant species are known. A number of the larger Pedunculate Oak trees clearly date back to the earlier agricultural landscape and could be 'semi-natural' in origin.

Rarity

Given their relatively small extent and condition, none of the habitats can be considered as rare, even at the county level. The Surrey Local Biodiversity Action Plan (Surrey Biodiversity Partnership, 1999) recognises the importance of woodlands at the local level, being the focus of Habitat Action Plans (HAP) for both 'Woodlands' and also 'Broadleaved mixed and Yew woodland', this last being a 'Broad Habitat' category of the United Kingdom Biodiversity Action Plan (UKBAP). However, even the most-mature woodlands of the site are either of quite recent origin or much modified by planting. 'Rivers and Streams' are also the focus of an action plan within the Surrey Local Biodiversity Action Plan.

Some of the free-standing trees date back to the former agricultural landscape and are thus remnants of a much larger mature tree population. Most notably these include the mature Pedunculate Oak trees and the row of lapsed veteran White Willow pollards along a former course of the Hogsmill River. Such trees take many centuries to reach maturity and are becoming increasingly rare in the English Countryside.

There are no records for any nationally rare or scarce vascular plant species for either the Hogsmill or the Bones Gate. However, there is a 1939 record from the Hogsmill near Tolworth for Summer Snowflake (*Leucojum aestivum* ssp. *aestivum*) (Ann Sankey, pers. com.), although it is highly likely that this species has since been lost.

Native Black Poplar (*Populus nigra* ssp. *betulifolia*) is rare in the county (Leslie, 1987). Trees of Black Poplar (*Populus nigra*) at the site are of planted origin and therefore unlikely to be the native species. The various types of Lime could also include Small-leaved Lime (*Tilia cordata*), a further rare species in the county, but again, these have all been planted in recent times.

The most notable invertebrate is the very recently recorded nationally rare (RDB1/endangered) Ladybird *Clitosthetus arcuatus*. The species has possibly been overlooked in the past, and recently been found by Ian Menzies on Ivy at a number of sites in Surrey.

Of the birds recorded, only two can be considered to be local in Surrey, namely Skylark (*Alauda arvensis*), a species on the RSPB "Red List" of birds of conservation concern, together with Marsh Tit (*Parus palustris*), a "Long List" species of the UK Biodiversity Action Plan. The full list of birds includes a further three species from the RSPB "Red List", plus fourteen from the "Amber List", the most notable of these being Kingfisher (*Alecdo atthis*) (a species appearing on Annex 1 of the EC 'Birds Directive'), plus several others on the UKBAP "Long List" (see Appendix II).

The upper catchments of rivers such as the Hogsmill are some of the last refuges within the county for Water Vole (*Arvicola terrestris*). The species is largely absent from the larger river systems primarily due to the presence of predatory Mink (*Mustela vison*). Whilst there have been no recent Water Vole sightings within the Open Space itself, it is believed there is a nearby population within Horton Country Park, underlining the need for management aimed at encouraging its return.

Fragility

Habitats and species occurring along the Hogsmill and the Bones Gate have developed to exist within the current, amenity-focussed management regime and are thus mainly quasi-artificial in nature and not especially fragile. Current threats to the grasslands of the site include habitat loss through tree-planting, plus the possible loss of more diverse swards under the current mowing regime.

Scrub is a relatively robust habitat, although in the longer term, a lack of management will allow the development of a dense and closed scrub cover, with a consequent loss of structural diversity, and an eventual succession to woodland.

Woodlands are primarily at risk of general habitat degradation through the combined effects of illegal tipping and trampling. The main threat to the mature tree population is deliberate damage through vandalism (e.g. fire). There is also a risk of over-zealous pruning on the grounds of public safety, coupled with that of losses through 'natural' causes (e.g. the large White Willow tree that toppled over during the winter of 2003/2004). Further threats include stresses posed by atmospheric pollution, coupled with the loss of site-native trees in the presence of so many exotic species. Some habitat features at the site could be at risk due to possible channel realignments. Whilst these will be carried out to provide a net overall environmental gain, important features, such as the row of lapsed veteran pollard willows, should be protected from any adverse effects resulting from such drastic topographical and hydrological modifications.

Some invasive plant species can lead to a loss of habitat and the displacement of native flora and fauna. Two of the most problematic on a national scale are Japanese Knotweed and Himalayan Balsam, with Goat's Rue being especially widespread in the Greater London area.

Many of the groups of fauna associated with the site are vulnerable to unfavourable habitat changes and indeed this site illustrates what can happen when watercourses are inappropriately managed. Water Voles are a particular example, in that they require a mosaic of habitats that includes tall, diverse bank-side herbaceous vegetation, free from grazing, without excessive scrub cover, and where water levels do not fluctuate too greatly throughout the year. Such a fragile balance of habitat conditions could all too easily be disturbed by a lack of sympathetic management and it is perhaps therefore understandable why the species has not been recently seen at the site.

Typicalness

The traditionally managed farming landscape is now virtually unrecognisable and only a small section of the original course of the Hogsmill River survives. Much of the site is fairly typical of amenity-managed parkland in an urban/suburban location.

Recorded history

From about 1754 to 1875 land on the south-western side of the Hogsmill was occupied by an extensive Gunpowder Mill complex. At its height, in the mid-19th Century, this employed 156 men. The location of the Mill complex is clearly visible on the 1871 O.S. map, although there is little physical evidence remaining on the ground today.

There is very little information about the site prior to this period (i.e. the manor estate and before) and further research would be welcome (S. Cocker, pers. comm.).

With a single exception (a botanical record from 1939), there are only two known biological surveys, the older of these dating from 1998. Therefore the recorded history of the site in terms of biological information is extremely poor.

Position in ecological unit

The site represents a significant 'wildlife corridor' in the Borough of Epsom and Ewell. The Hogsmill Open Space forms the most southerly extension of such a corridor along this river, which extends northwards from the Epsom and Ewell Borough boundary, well into the Royal Borough of Kingston, almost to the River Thames itself. The Bones Gate Stream in turn forms a tributary of the Hogsmill and this eventually forms a link with Horton Country Park.

Potential for enhancement

The site is an important 'green corridor' and also a place where people and nature meet. There are a range of opportunities for enhancing the value of both these facets. The major areas are discussed below:

Woodland and associated scrub habitat would benefit from a programme of clearing rubbish and other encroachments, in conjunction with public education and enforcement. Non-native tree species could be gradually thinned-out and replaced with native stock. All veteran trees require appropriate safeguards, including reducing competition and arboricultural surgery, to maintain longevity.

Scrub management could be undertaken to improve structural diversity and the potential value to a range of species (e.g. birds, invertebrates). Ensuring the continuity of the scrub habitat is one of the most important aspects of wildlife management across the site.

Localised areas of more species-rich grassland would benefit from being mown less frequently, to further encourage their botanical diversity, whilst the spread of invasive species such as Himalayan Balsam and Japanese Knotweed needs to be controlled.

Much of the channel of the River Hogsmill and the Bones Gate Stream is currently over-engineered – i.e. artificially straightened, steep-sided and in places concrete-lined. This restricts the potential for the development of aquatic and marginal vegetation and reduces the ability of the watercourses to absorb excess water at times of flooding. It is also damaging to the aesthetic qualities of the river corridor, which has encouraged neglect by the local community and a general low appreciation of its value. There is therefore a major opportunity to restore the two watercourses back to a more natural channel and bank profile. Not only will this enhance the wildlife value of the river corridor, it will provide an aesthetic improvement and enable it to play a more effective role in flood alleviation.

There are opportunities to promote the site as an educational resource and make better provision for public interpretation.

Intrinsic appeal

Given its urban fringe location, the Local Nature Reserve represents an important and well-used recreational facility, forming a 'green corridor' in a heavily urbanised area. Individual specimen trees, stands of woodland and scrub, open areas of grassland and the rivers themselves provide an attractive landscape where people and wildlife can come together. The site has a long history, representing remnants of the former agricultural riverside landscape. The Hogsmill has its past associations with the gunpowder-making industry of the 18th and 19th centuries. In addition, this stretch of the Hogsmill River is where the pre-Raphaelite painters John Everett Milais painted his famous "Ophelia" and Holman Hunt painted "The Light of the World". The Bourne Hall Museum has an early Twentieth Century collection of photographic material showing what the area looked like around this time.

Demonstration of excellence

The Hogsmill and Bones Gate form both important areas for public access and amenity in an urban setting, as well as being important 'wildlife corridors'. The recent designation of the site as a Local Nature Reserve represents an opportunity to enhance the management of the site and thereby increase both its wildlife and amenity value. This in turn will promote a greater understanding and appreciation of nature conservation within an urban fringe setting.

2.4 Identification/Confirmation of Important Features

Site Features	National Importance	Regional Importance	Local Importance
1. Habitats			
Remnant mosaic of river-corridor habitats (including 'Rivers and Streams' of SyBAP)			*
Mature and veteran trees			*
Broadleaved woodlands (SyBAP)			*
Scrub			*
Fen swamp			*
Improved grasslands (SyBAP)			*
2. Species groups			
Plants			*
Bird assemblage (Red and Amber Listed)			*
Mammal assemblage (Bats – UKBAP)			*
Invertebrates (*Clitosthetus arcuatus* and Butterflies)	*		*
3. Culture and amenity			
Public recreation			*
Educational opportunities			*
Historical, landscape and cultural features			*

SyBAP = Action Plan habitats of Surrey Biodiversity Action Plan

2.5 Ideal Long-term Management Objectives

The ideal long-term management objectives outlined below have been determined from reviews of historical data and aerial photographs, liaison with various individuals and organisations and new information gained during recent site surveys (see also Map 6).

2.5.1 Objectives for Nature Conservation

- To manage the site as an important 'wildlife corridor' by ensuring the continuity of semi-natural habitat, including planting new areas of scrub, in a way that is compatible with achieving the recreational, educational, cultural and historical objectives.

- To maintain and enhance the mature and veteran tree population by protecting individuals from damage through vandalism, 'releasing' competition, appropriate surgery and ensuring veteran tree recruitment.

- To maintain and enhance the woodland habitat by selective thinning of non-native trees, coppicing, re-planting with appropriate native stock and encouraging natural regeneration.

- To maintain and enhance the scrub and scrub-margin habitat by rotational cutting and planting.

- To maintain and enhance the grassland habitat by reducing the frequency of cutting in selected areas.

- To secure effective, sustainable long-term management of the watercourses, water-margin and other wetland habitats in a way that encourages the restoration of more natural channel dynamics through close liaison with the Environment Agency and other key partners.

- To monitor and control the spread of non-native species such as Japanese Knotweed, Himalayan Balsam and Goat's Rue.

- To maintain and enhance the ornithological interest across all habitats present by ensuring habitat management meets with species requirements.

- To maintain and enhance populations of key mammal species, such as bats and to encourage species such as water voles, by ensuring appropriate habitat management.

- To maintain and enhance the invertebrate interest, including the RDB1 ladybird *Clitosthetus arcuatus*, across all habitats by first conducting appropriate baseline surveys and then using this to inform subsequent habitat management.

- To maintain and enhance the botanical interest across all habitats present by ensuring habitat management is compatible with species requirements.

2.5.2 Objectives for Access, Recreation, Education, Historical and Cultural Value

- To maintain and enhance public access and recreational use and to provide facilities for members of the public to enjoy the Open Space in a way that is compatible with achieving the nature conservation objectives.

- To maintain and enhance the landscape value of the site by appropriate management such as grassland mowing, scrub/woodland cutting and tree/scrub planting.

- To enhance the aesthetic qualities of the site by addressing issues of inappropriate use through a programme of litter and other rubbish removal, public education and enforcement.

- To promote and encourage an understanding and appreciation of the nature conservation, landscape, cultural and historical value of the Open Space by the provision of appropriate interpretation and other resources.

Possible sources of funding

Resources for management of the Hogsmill and Bones Gate Open Spaces are likely to be available from the following principal sources:

- EEBC core budget
- Countryside Agency "Doorstep Green" project (Hogsmill) – 25 year funding
- Woodland Grant Scheme
- Environment Agency
- Local Nature Reserve status
- Heritage Lottery Funding

2.6 Rationale

2.6.1 The Site as an Important Wildlife Corridor

The most important ecological feature of the site is the 'green corridor' that it forms in what is otherwise a largely built-up area. Thus, strips of scrub, woodland and coarse grassland form an almost continuous link along the length of the site, mainly along its margins and also beside the two main watercourses. However, at present, there are breaks in the continuity of these semi-natural habitats and a major focus of this management plan will therefore be aimed at improving habitat linear continuity. This work is addressed under the individual habitat headings. In general, it will be

achieved by the planting of new areas of scrub and trees, and allowing wider fringes of un-mown grassland to develop that will then form links between the existing features.

2.6.2 Mature and Veteran Trees

The site supports some notable veteran trees, in particular the lapsed pollard White Willows along the old course of the Hogsmill plus the two White Willow avenues beside the existing river channel. In addition, there are also the very large Pedunculate Oaks in the east of the Hogsmill Open Space (compartment 13), plus some further large Oaks along the margins of the Bones Gate. As well as the potential value that these veteran trees have in terms of their decaying timber resource, they are also important for the aesthetic qualities they bring to the landscape of the Local Nature Reserve.

Damage through vandalism (e.g. fire) poses a major threat to these trees. There are a number of examples of mature trees within the Local Nature Reserve that have been damaged in this way. The presence of decay at the base of a tree seems to be a temptation to vandals to set fire to a tree at this point. The occurrence of such activities is to some extent encouraged by the untidy and disturbed character of many scrub/woodland areas of the site. Plans to clear rubbish from these areas will help to reduce the temptation for such acts of vandalism. The situation also reinforces the need for a greater on-site presence, which will again discourage acts of vandalism in general.

A proportion of these veteran trees is currently at risk of collapse – resulting in the loss of a valuable ecological resource and a very real risk of causing public injury. Indeed, such a fate befell one of the lapsed pollard White Willow trees during the winter of 2003/2004. It is perhaps these old trees where the risk of collapse is currently most acute, but the possibility has to be considered for all of the Local Nature Reserve's major trees. Therefore it is proposed that an arboricultural specialist survey these trees to establish what work is required to maintain their long-term stability and minimise any risk to the public.

In a few situations, large trees are currently 'hidden' by surrounding regeneration of younger specimens. This may offer a degree of protection from the attention of vandals. However, the 'release' of some individuals by thinning of competing younger trees will help not only the tree itself, but will improve the landscape character of the site. One such example is a large Ash tree on the edge of the area formerly used for the disposal of silt dredged from the pond at Ewell Court. This individual is currently surrounded by extensive regeneration of Grey Poplar trees which could be thinned to make a feature of the tree. As it lies in a very conspicuous location, the increase in risk of vandalism here would probably be fairly minimal. A further group of trees that would benefit from a reduction in potential competition are the large maiden Oaks in the extreme south of the Hogsmill Open Space (compartment 13) (as discussed under Section 2.6.3).

With all veteran trees, care should also be taken to prevent any other activity that could result in soil compaction around their roots (e.g. by driving vehicles too close to

them). Whilst it is generally unlikely that this might happen at this site, such impacts should be considered if any vehicular access is being planned. For example, tractor-mounted mowing around the large Pedunculate Oak trees in the south of the Hogsmill Open Space should avoid the area directly beneath the canopy to reduce the risk of soil compaction around their root systems.

The current population of veteran Oak and White Willow specimens is rather even-aged and action is needed to ensure a continuity of such trees when this generation expires. To some extent this can be achieved through retaining and managing existing planted trees to become mature specimens. However, there are at present no younger specimens that could take the place of the veteran White Willows and therefore suitable stock should be planted and encouraged in this area. In addition, it would be appropriate to plant a number of young Oak trees, grown from acorns collected from veteran Oaks already present, which could become parkland trees of the future. As well as planting in areas where veterans currently exist, scattered individuals will be planted out into open grassland areas, primarily to improve the landscape character of the Local Nature Reserve (see below). Any planted trees will require appropriate stakes and tree guards to protect them from damage in their early years (e.g. grazing by deer and other herbivores, and vandalism).

Further tree-planting is required to enhance the continuity of habitats along the corridor. As this largely involves the creation of new scrub margins, this subject is considered below under Section 2.6.4.

There is a need to manage the two avenues of White Willows beside the Hogsmill River. The more southerly feature supports multi-stemmed trees that have obviously been coppiced or pollarded in the past. These trees would therefore be suitable for re-pollarding and coppicing. This would be better achieved over a number of years to maintain the canopy structure and visual elements of the landscape. There is also a need to plant new specimens into gaps between existing trees and manage these by coppicing and pollarding in future.

The more northerly avenue of trees are mature and rather tall, but in no way veteran in character and appear to have received little management since their original planting. The main value of these specimens lies in the visual impact they possess in this relatively narrow part of the site, sandwiched in between areas of housing on either side. It would therefore be inappropriate to coppice these trees to ground level, as this visual function would be severely compromised. Instead, it would be beneficial to undertake careful thinning and crown reduction to maintain them roughly at their current extent.

Trees beside the two watercourses were the subject of a safety inspection by the EEBC Arboricultural Officer in 2001 and the Environment Agency are currently responsible for their management in this regard, so liaison with the EA on the management of these features is essential.

2.6.3 Broadleaved Woodlands

Within the recent plantation woodlands, a major conservation priority is to change the balance of tree species in favour of native ones. A majority of stands have developed to a stage where thinning of the canopy is required, which can be followed by the planting of site-native stock once this has taken place. Some of these woodlands can also be extended or developed to enhance the continuity of semi-natural habitats along the length of the site, through the planting of appropriate native tree and shrub species. The impact of this proposed management upon the quantity of Ivy present within the Local Nature Reserve needs to be considered (as potential habitat for the RDB1 ladybird *Clitosthetus arcuatus*). However, it is likely that good amounts of Ivy are present in woodlands that will not be managed in this way and mature trees elsewhere within the Local Nature Reserve.

In some areas where good linear habitat already exists, thinning of recent plantations can be very extensive, retaining only a fraction of the 'more interesting' trees. This will effectively convert these stands back to open grassland with scattered 'parkland' tree specimens. A suitable location is an area of plantation beside the Hogsmill River within compartment 6, where specimens of Lime, Pear, Hornbeam and possibly some riverside Willows could be retained as specimen trees. This feature also contains a veteran Elder tree, which should be conserved as part of this management.

Some areas of recent plantation would also benefit from a diversification of their fringes, through scalloping and planting of shrub species such as Hawthorn and Blackthorn. Where mature, established, native trees exist within plantation areas, the surrounding canopy should be thinned to 'release' them.

Areas of plantation woodland in the extreme east of the Hogsmill Open Space lie very close to a number of fine old maiden Oak trees and indeed their canopies are starting to touch. Thinning of these woodlands should include clearance of any trees that impinge on the canopy of these mature trees.

The more mature woodlands will also benefit from the thinning of non-native species in favour of native ones. The creation of glades will improve structural diversity. Natural regeneration can be enhanced through supplementary planting with site-native stock. The structural diversity of woodland and existing glade margins can again be improved by scalloping the edges and encouraging a denser shrub layer in these areas. Again, any impact on the quantity of Ivy needs to be considered.

Within the recently incorporated River View Copse, an area of secondary scrub-woodland is to be encouraged to develop as woodland and thinned of younger trees to encourage a number of larger specimens.

The diversity of woodlands within the site would be further enhanced by the creation of an area of coppice. This will require extensive thinning of an existing stand of rather disturbed woodland (whilst retaining some mature specimens of Pine, Hawthorn and Elder), and replanting with Hazel.

2.6.4 Scrub and Scrub Margins

The importance of scrub to the overall habitat corridor has already been highlighted. The two main priorities are to manage existing scrub to improve its nature conservation value and to improve habitat continuity.

Many stands of scrub are at present rather uniform and overgrown in character and would benefit from rotational cutting and the local creation of glades to improve structural diversity for the benefit of animals such as birds. Frequent amenity mowing has often produced an abrupt edge to existing stands of scrub. The nature conservation value of this marginal habitat can be enhanced by 'scalloping' the edges, again to improve structural diversity. Where Bramble is the dominant scrub species, structure would be improved by thinning some of this and planting occasional bushes of Blackthorn and Hawthorn.

Measures to improve habitat continuity involve the planting of new areas of scrub and trees, mainly along the margins of the site, but also locally beside the Hogsmill River. As well as being of benefit for nature conservation, these new features will enhance the site's visual landscape (e.g. to screen housing that is at present conspicuously visible from the site). A new hedge could also be planted along the length of the marginal drain to the rear of properties adjoining Eastcroft Road and also alongside the southern edge of the B284 Ruxley Lane.

There is at least one area where local residents might object to the creation of a visual barrier adjacent to their properties (i.e. behind houses along Pams Way, within compartment 6). Here, an existing stand of plantation woodland might be more effectively adopted as the 'nucleus' of new scrub/woodland, by thinning around 75% of the non-native tree canopy and re-planting with native trees and shrubs. Another location where the creation of a new zone of scrub might be more appropriate within the site, rather than along its margins, lies opposite Gatley Avenue, within the area of the Bones Gate Open Space. Here, there are plans to create a Community Green in front of houses along Gatley Avenue and Iris Road, where the creation of a scrub margin would thus be inappropriate. Instead, an existing line of trees running along the centre of the site could be developed into a scrub-corridor instead.

A short section of 'demonstration hedge' planted along the northern edge of Ruxley Lane is to be maintained as an example of a traditional hedgerow. On the southern side of Ruxley Lane, the site boundary at present comprises an old chestnut pail fence, which offers no visual separation from the road. A length of new hedgerow with specimen trees is also to be planted along this boundary and managed using traditional techniques.

2.6.5 Grasslands

Grassland is a major habitat component of the site and given its important amenity value, the major focus will need to be upon regular mowing of swards for this type of land use. The smaller areas of rank grassland, mainly around the periphery of the site (and their associated nettle-dominated vegetation), form an important element of the linear habitat corridor. Their tall structure and tussocky growth pattern represents a

valuable potential invertebrate habitat (few invertebrates are able to withstand regular destruction of their habitat through mowing). In particular, ant-hills have developed in some areas of rank grassland, and they are especially frequent within the recently-added River View Copse area. Nettles are a major food plant for several common species of butterfly, whilst thistles represent an important nectar source for many flying invertebrates.

There are opportunities to make a modest increase in the extent of coarse grassland by the leaving of wider, un-mown fringes beside some of the amenity grassland areas (e.g. beside the watercourses). However, to maintain the maximum range of structural habitat conditions, areas of coarse grassland will benefit from periodic, small-scale rotational mowing, again to encourage invertebrates.

Botanical diversity of the intensively-managed amenity swards is generally very limited. However, there are local areas where species diversity seems somewhat better. It would be possible to develop one such area, in what is a relatively 'quiet' part of the site, into a wild flower meadow, by cutting much less frequently than the current regime. Any perception that management of the site is being 'cut-back', can be countered by the educational opportunity that this will provide to see the flower sward develop (Common Knapweed and Common Bird's-foot Trefoil already occur in this area). Monitoring of the sward will be undertaken to follow any changes that occur in its composition and structure.

Traditionally, much of the land beside the Hogsmill would have been managed as either permanent pasture or as hay meadow. As a demonstration of the latter management technique, part of the area known as Chamber Mead, which has not been cut for some time, will be developed as a haymeadow area. Again, this will provide an educational function and also provide an opportunity for the monitoring of impact upon plants and invertebrate populations.

2.6.6 Watercourses, Water Margin and other Wetland Habitat

A major feature of the two watercourses as they stand at present is their extensive modification through a process of channelisation. Thus, the channel is generally constrained to a pre-defined course by artificial banks, whereas originally, it would have meandered naturally across the floodplain area and its margins would have supported areas of marginal and swamp vegetation. A natural mosaic of habitats such as this is able to 'absorb' excess water at times of high flow, which helps to reduce the extent of flooding. The creation of artificial, straightened water channels, generally lacking in marginal vegetation, greatly increases the risk of flash flooding, as the river system has no capacity to contain rising water levels.

In the light of this, a major objective of this management plan is to focus on investigating ways of restoring more natural channel dynamics and river marginal habitat to the two watercourses. With the responsibility of managing the two watercourses and their banks resting with the Environment Agency, this highlights the need to work in close partnership with them over this issue. In addition, the Bones Gate Stream lies along the boundary between Epsom and Ewell and the Royal

Borough of Kingston and is presumably owned in part by both local authorities – again highlighting a need for close liaison with this stakeholder.

One possible example of how such an approach might take shape is being provided through the Hogsmill River Rehabilitation Project. Work is due to commence during 2006 and includes the re-modelling of a section of the Hogsmill to create a new river meander and associated backwater channel, in addition to various in-channel improvements.

Elsewhere, the River Hogsmill has good evidence of the existence of a former river channel. This takes the form of a by-passed remnant of its original course, near to Ewell Court, created when a section of the river was straightened and realigned to follow a different course at this point. This feature now supports one of the most extensive surviving fragments of water marginal habitat within the site, although it is currently much overshaded by adjoining trees and would benefit from a thinning of the canopy to allow more light to reach the water. At present it is unclear how water enters this section of watercourse. It could be fed by springs, but surveys to examine this are required. Ultimately it may be possible to restore it as part of the river channel network, even if the present course is also retained as the main flow. Additional survey work is required to measure land levels along the various channels in this area to help with establishing the feasibility of such a proposal. Again, all of this work would need to be done in partnership with the Environment Agency.

Whilst the foregoing focuses upon possible ways of restoring more natural channel dynamics to the two watercourses, potential impacts on existing habitat features have also to be considered as part of this process. As an example, further evidence of the existence of the former Hogsmill river channel can be seen in the form of the veteran, lapsed pollard White Willow trees that appear to lie along the edge of an earlier river channel (but now some distance from where the river now runs). These trees are of such ecological significance that their conservation should take precedence over any proposed river realignment near to them. Environment Agency standards of tree maintenance would be incompatible with maintaining the current levels of decaying timber on these trees and any realignment here should be engineered to keep these trees a safe distance away.

A further area where improvements to the river channel could be made is at the confluence of the Green Lane Stream with the Hogsmill River. At present, this has an artificial river bed (like many other areas) which could be removed to allow a more natural mosaic of river and river margin habitat to develop in this area.

Additional wetland could be provided through the creation of a new pond close to the Hogsmill River where it passes along the edge of Chamber Mead.

A further important issue regarding the management of water-margin habitat is its potential value as habitat for of Water Voles (see Section 2.6.9).

The stand of fen-swamp vegetation within compartment 11 lies in a small depression, hydrologically unconnected with the main river channel, at the extreme south-eastern margin of the Hogsmill Open Space. It is currently very shaded by developing scrub and trees and would therefore benefit from thinning of these. During wet periods,

water overflowing from here has caused flooding of an adjacent path. A need has been identified to improve the drainage of the affected area of the path. Any proposed work should be carefully planned so as not to affect the supply of water into this fen-swamp area.

2.6.7 Non-native Species

The most extensive non-native species is Himalayan Balsam, which occurs extensively along the margins of the Bones Gate Stream and also along the Hogsmill below the Bones Gate confluence (but not upstream of here). There are scattered colonies of Japanese Knotweed on the Bones Gate Stream, and a single small stand of Goat's Rue.

As Himalayan Balsam is so widespread and abundant (it spreads by seed, especially along watercourses), complete eradication of the plant is impractical. The main focus of management should be to discourage its spread to new areas, especially along the Hogsmill upstream of the Bones Gate confluence. Smaller colonies can be managed by hand-weeding. Chemical treatment is probably not an option, given the close proximity to a watercourse (although an application can be made to the Environment Agency to give consent for this). Continued monitoring is required to identify new colonies as they develop to prevent the plant from spreading elsewhere.

Stands of Japanese Knotweed are at present quite localised. The plant is infertile in Britain and only spreads vegetatively. Therefore, the risk of progressive spread along the watercourse is lower than a viable seed-producing plant like Himalayan Balsam. Given its current extent it would be amenable to treatment with an appropriate herbicide (again, EA consent would be required, as the material is growing in close proximity to the Bones Gate Stream). Several applications will probably be required over a number of years.

Physical control of Japanese Knotweed is also possible (Coleshaw 1999, 2001), such as regular cutting or digging up the rhizomes, although these activities pose the risk of spreading the plant accidentally (and the plant can re-grow from a single remaining fragment). As it is an offence to cause the plant to grow in the wild, all cut material and any excavated rhizomes should either be carefully collected and disposed of on site (e.g. burning), or taken to an appropriately licensed landfill site. Cutting in particular may take many years to be effective, as the rhizomes are very long-lived, whilst excavating rhizomes is also a very labour intensive process, further suggesting that herbicide may be the best option. As with Himalayan Balsam, continued monitoring of the occurrence of Japanese Knotweed will be required to ensure that existing colonies are being effectively treated and to look out for any new infestations before they take a hold.

The stand of Goat's Rue appears to have been introduced to the site in material used to create a bund to stop access by unauthorised vehicles gaining access to the Bones Gate Open Space at Cox Lane. Hand weeding may thus be sufficient to control the colony at its present extent.

2.6.8 Ornithological Interest

The main value of the Local Nature Reserve for birds is the habitat they provide for a range of common residents. The proposed management of the mosaic of habitats present should further enhance their ornithological value. The fact that birds are easily seen and recognised has meant that they are the best-recorded group of fauna within the site, and ideally suited, at this level to voluntary recording. The submission of records could be encouraged via the 'Friends of the Hogsmill' Group. The only species where a particular focus is required at present, is the Kingfisher, where a detailed survey to establish nesting sites along the Hogsmill River and Bones Gate Stream is required. Again, this could probably be undertaken by volunteers. The results of this and other bird survey data and on-going monitoring could then be used to inform subsequent habitat management.

2.6.9 Water Voles

Water Voles (*Arvicola terrestris*) are a "Priority Species" of the UK BAP. The nearest known colony is situated within Horton Country Park (Newman, 2000). The species suffered dramatic declines in recent decades and Water Vole "places of shelter" are afforded protection under Schedule 5 of the 1981 Wildlife and Countryside Act. Consideration is also currently being given to placing them on Schedule 9 of the Act. In Surrey, remaining Water Vole colonies are mainly confined to the upper reaches of river catchments, being absent from the main rivers primarily due to the presence of predatory Mink.

In view of the high conservation priority attached to Water Voles, it is important, firstly, that a comprehensive baseline survey of the Hogsmill River and Bones Gate Stream is performed to establish whether the species is present. Even if they are not found to occur, both watercourses should be managed as potential habitat for this species. The main habitat requirements include a well-developed marginal vegetation fringe, with a low level of tree shading, and fairly constant water levels. Thus, current plans for the creation of a backwater to a section of the Hogsmill should accommodate this requirement here. In addition, reducing tree cover along the section of the old Hogsmill River Channel margins will encourage more prolific marginal vegetation growth in currently shaded areas.

On-going monitoring will establish whether any of this and other management aimed at encouraging the species has been successful.

2.6.10 Other Mammals

Bat surveys in association with the Watersedge Doorstep Green Project (Bailey, 2005) have revealed that the Ruxley Lane to Kingston Road section of the Hogsmill Open Space is important as a foraging area, especially for the 45 khz Pipistrelle. It also forms part of a flyway for bats linking surrounding populations (with records indicating that a total of eight species occur within range of the site). This survey has also highlighted the limited potential of mature trees in this part of the site as bat roosts, largely because of restricted amounts of decaying timber. On this evidence

there is a clear need to perform bat surveys across the site as a whole and to assess the potential value of all other mature trees as potential bat roosts.

Managing and enhancing the site as a linear habitat corridor, especially with a continuity of mature trees along the watercourses, will enhance its value as a bat flyway. Thus, planting new trees and scrub to enhance this habitat feature will be of benefit to bats. Strategic planting of trees can also be used to screen artificial lighting from the site.

Where possible, old and mature trees should be retained as they provide foraging areas and potential roost sites. Surveys need to identify those trees that are the most likely to be of importance to bats so that this can be taken account of in their management. Whilst the safety of the public is an overriding concern, over-zealous pruning of decaying branches restricts the potential value of a tree as a bat roost. Therefore only the minimum amount should be removed in order to make the tree safe, whilst retaining standing stumps, split trunks, ivy growth or reduced limbs. Such work should be undertaken by an arboriculturalist with experience of managing trees to encourage bats.

Finally, plans to restore more natural channel characteristics to the watercourses should enhance the diversity and number of aquatic invertebrates and increase the value of these habitats as foraging areas for bats. Then, toward the end of the 10-year management plan, the bat survey needs to be repeated to establish the effectiveness of these various nature conservation measures.

2.6.11 Invertebrates

The most notable invertebrate is the RDB1 ladybird *Clitosthetus acruatus*, which was found at the site during 2005; one of several recordings that year of the species in Surrey, where it appears to be preferentially associated with Ivy. At present, the exact habitat requirements are unclear and therefore the most appropriate action is to conserve the presence of Ivy on trees, probably in well-lit situations (for example through consideration during clearance/thinning of non-native tree species) and undertake monitoring of the species at the site.

As with birds, the site is likely to support a range of common invertebrates associated with the habitats present. Most recording to date has been on a casual/voluntary basis and this approach could contribute significantly to baseline surveys of groups such as Dragonflies/Damselflies and Butterflies. Again, the encouragement of such activities through the Friends of the Hogsmill Group can play an important role. Given the presence of a small veteran tree population, especially the old lapsed pollard White Willows, there is a need for targeted surveys of these features to look at their invertebrate fauna (especially beetles). Invertebrate surveys could also play a role in monitoring the impacts of various forms of grassland management, such as the proposed creation of a haymeadow area at Chamber Mead.

2.6.12 Botanical Interest

The Friends of the Hogsmill Group and the EEBC Hogsmill Open Space homepage could help to promote voluntary botanical recording. To date, the site is poorly recorded in this regard, with most information obtained whilst undertaking the habitat survey as a part of writing this management plan. On-going monitoring is also required to establish the effectiveness of certain proposed forms of management. For example, this might include the hay/flower meadow grassland areas, and water margin vegetation beside the two watercourses.

As the two main watercourses were excluded from the baseline botanical survey, a survey of their vegetation is required and there is a possibility that this could be approached on a collaborative basis with the Environment Agency.

2.6.13 Public Access and Recreation

Given the urbanised surroundings, the Local Nature Reserve represents an important and well-used recreational facility. Thus it is important that the areas of open grassland along its length are mown on a regular basis throughout the year so the site can continue to be enjoyed by the public.

In order to further enhance access along the 'green corridor', a major priority is to create a continuous surfaced path/cycleway along its entire length. A part of this has recently been completed under the Watersedge Doorstep Green initiative (see below). In addition, existing surfaced routes need to be maintained and upgraded (they are quite muddy in parts) and signage improved. One area that is in urgent need of attention is a path in the extreme east of the Hogsmill Open Space that is flooded by water from a nearby area of fen-swamp vegetation. Whilst there is a need to improve drainage of the path, the hydrological integrity of the 'basin' supporting this vegetation will also require protection from any adverse effects.

The Doorstep Green project is being implemented under the banner of the Hogsmill Improvement Project, also involving the Friends of the Hogsmill, through funding by the Countryside Agency (including maintenance of the new amenities provided for a 25-year period). In addition to new surfaced paths, it is providing a range of other improvements. These include the construction of new pedestrian entrances at Ruxley Lane and Kingston Road, and the replacement of the bridge at the confluence of the Hogsmill River and the Bones Gate Stream.

In conjunction with creating these new surfaced routes throughout the site, the possibility of having these designated as official Public Rights of Way (to pedestrians and cyclists) will be pursued, in order to give further recognition to the value of these routes along the 'green corridor'.

Adjoining the Watersedge Doorstep Green, River View Copse (the land formerly leased by Surrey County Council) has been transferred back to Epsom and Ewell Borough and will be managed as part of the LNR. To enhance the aesthetic qualities of this area, the unsightly fencing that exists on the boundary between these two land parcels is to be taken down. Elsewhere, access to parts of the Hogsmill Open Space

near Ewell Court will be further improved by the taking down of the old Chestnut paling fence that was erected around the area used for dumping silt dredged from the pond at Ewell Court a number of years ago. In addition, access to the stepping stones across the Hogsmill River will also be improved by the reconstruction of the steps that run up the banksides from the stepping stones.

In a number of localities areas of scrub adjoining some of the main paths have developed to such an extent that the route of access has been reduced to a narrow, shaded corridor. This scrub will be thinned to restore a more open access path, following the general principles of scrub management outlined for improving its nature conservation value.

A further community-oriented project is the plan to create a Community Green for the benefit of adjoining housing at Gatley Avenue. The provision of such an area here will be complimentary with the Childrens' Playground already present and will also include the realignment of some paths in this area. Note that maintenance of playgrounds within the site are the responsibility of a separate EEBC department.

Within the Local Nature Reserve at present, there are very few places to sit and enjoy the landscape. A number of new benches will therefore be provided, allowing visitors to appreciate the planned enhancements to the site's visual environment. Additional bins are also to be provided for the disposal of dog waste, which will further improve the site for people's enjoyment. This site furniture will require on-going maintenance.

Land on Royal Borough of Kingston side of the Bones Gate Stream is for the most part situated within the Tolworth Court Meadows LNR. As the two sites effectively form part of a single 'green corridor', it is important that effective liaison is maintained with Kingston Borough over their management.

Access to the easternmost part of the Hogsmill Open Space from the Lower Mill to Mill Pond section of the Hogsmill river corridor is via a wooden footway passing beneath the Epsom to Ewell railway line. Although the area on this side of the railway-bridge does not form a part of the Open Space being considered under this management plan, it does include the maintenance of this structure.

2.6.14 Landscape

The landscape and aesthetic qualities of the Local Nature Reserve is important to the public enjoyment and feeling of well-being that visitors gain from experiencing the site. Therefore, it is important to take into account the impact that habitat management can have upon landscape quality. Thus, mowing of grassland creates an open feel to the central corridor, whilst the margins of scrub and woodland help to screen the adjoining urban landscape and create a feeling of seclusion.

The planting of new marginal areas of scrub and trees will further enhance this feeling by helping to reduce the extent to which urban intrusions are visible from the site. A good example of this is the screening from the site, by a new hedgerow, of the intrusive Ruxley Lane, which is at present all too visible from the Open Space. There is also an unsightly bank and bund near to Cox Lane on the Bones Gate that would

benefit from being planted-up. The planting of new parkland trees will help to break-up some of the more extensive and uniform areas of open grassland and add interest to the visual landscape.

A further improvement to the visual landscape would be the removal of the apparently unused and unsightly, rusty goal-posts close to Cox Lane, (as done at the Curtis Road playground in 2005). As the Cox Lane example is very rusty, it probably requires removal on safety grounds in any case. If goalposts are still required at this location, a suitable replacement could be installed. A nearby waste bin has been dislodged and will be re-erected to its correct position.

2.6.15 Inappropriate Use and Site Boundary Security

In recent years, the dumping of garden (and other waste) in parts of the site has become an increasing problem. This activity tends to be most noticeable where there are private gardens bordering directly onto the site and to some extent, it occurs on the margins of the two watercourses as well. More locally, there have been small direct physical encroachments onto the Local Nature Reserve by adjacent owners. As well as detracting from the site's aesthetic qualities and potentially introducing non-native plants, the mere presence of such waste might encourage the problem to become worse. It can also encourage acts of vandalism and other abuses that can make the site seem neglected and hostile and thereby discourage visitors.

The Borough Council is keen to make improvements to the visual environment of the Open Spaces and aims to discourage the tipping of garden waste and other refuse onto the site. Firstly, it is planned to write to owners of adjacent properties asking them to cease such infringements (letters have already been issued for the Bones Gate during 2005). Increased levels of on-site presence will help in addressing this problem and ideally this could be achieved through the creation of a new permanent position within Countryside and Community Development Team. As a last resort, action is to be taken against persistent offenders through the use of penalty fines.

If the site is clear of waste, this enhances the visual perception of its value, making it more likely that people will want to keep it clean and tidy. Therefore, further litter-picking days are being planned by the Friends of the Hogsmill and the possibility of clearing some areas of dense vegetation along property boundaries, where this might help to discourage the tipping of garden waste, is being investigated.

Maintenance of site boundaries is largely the responsibility of adjoining private owners and for the most part these appear well-maintained. Some owners seem to prefer to have a dense, scrub-like 'buffer zone' fronting their boundary, whilst others seem to like a more open aspect that provides a view of the site. In some parts of the Hogsmill, the boundary runs beside public roads and there is no physical barrier as such. However, most site entrances have barriers to prevent inappropriate access (e.g. by vehicles) and these will require on-going maintenance.

2.6.16 Promoting an Understanding of the Site's Value

The new interpretation boards near to Ruxley Lane and the 'stepping stones' provide an opportunity to promote a greater understanding about the value of the site. Ideally, other ones need to be provided at suitable locations. A further way of encouraging greater appreciation would be through conducting guided walks, looking at themes such as aspects of the site's wildlife or its history. There is an opportunity to encourage greater volunteer action, for example through supporting and promoting 'The Friends of the Hogsmill' group. This could include activities such as biological recording and practical management work.

2.7 Identification of Operational Objectives and Outline Prescriptions

Operational Objective	Outline Prescription
Manage the site as an important wildlife corridor within the Borough	• Plant new areas of scrub and trees to ensure continuity of semi-natural habitat corridor (primarily along site margins, but other areas as well) • Allow areas of infrequently managed grassland to develop along site margins
Maintain and enhance the mature and veteran tree population	• Protect vulnerable trees from vandalism • Thin surrounding woodland canopy where appropriate (e.g. to release mature Ash specimen near to old silt deposition area and around maiden Oak trees behind Eastcroft Road) • Prevent soil compaction around the roots of veteran trees • Commission assessment of veteran trees with a view to surgery to prolong life where necessary and ensure public safety • Manage riverside avenues of Willow trees (coppice/pollard and undertake some supplementary planting) • Plant new specimen trees from appropriate native stock at specified locations (including Oaks grown from acorns of existing veteran specimens) • Protect veteran White Willow pollards in any future realignment of the Hogsmill River
Maintain and enhance the broadleaved woodland habitat	• Thin plantation woodlands to diversify structure, concentrating upon non-native canopy species • Plant new native stock in appropriate areas to supplement natural regeneration • Create and maintain woodland glades • Scallop woodland edges and plant scrub fringes to improve structural diversity of edge habitat

Operational Objective	Outline Prescription
	• Thin some stands to leave only a handful of 'specimen' trees (conserve veteran Elder in compartment 6) • Create an area of coppice (clear existing woodland, but retain mature specimen trees, followed by planting of Hazel) • Thin younger trees at River View Copse to promote mature tree population
Maintain and enhance the scrub and scrub-margin habitat	• Rotational cutting of some mature stands to improve structural diversity • Create glades in existing dense scrub • Scallop scrub edges to increase structural diversity • Thin encroaching Bramble in some areas, with local planting of species such as Blackthorn and Hawthorn • Plant new areas of (primarily marginal) scrub and trees to improve linear habitat continuity • Plant boundary hedge beside ditch at rear of houses along Eastcroft Road • Manage demonstration hedge alongside Ruxley Lane (north side of road) • Plant and maintain new hedgerow along southern boundary with Ruxley Lane
Maintain and enhance the grassland habitat	• Create wild flower meadow with infrequent cutting • Extend area of un-mown margins in appropriate areas (but mow occasionally) • Create haymeadow area at Chamber Mead • Continue regular mowing of main amenity grassland areas
Maintain and enhance watercourses, water margin and other wetland habitats	• Work in close partnership with Environment Agency (and Kingston Borough) to explore opportunities to restore more natural channel dynamics and marginal wetland vegetation to the two watercourses • Remove concrete channel lining at confluence of Hogsmill River and Green Lane Stream • Create new pond/wetland beside Hogsmill River at edge of Chamber Mead • Clear shading trees and encroaching scrub from original section of Hogsmill River • Survey to establish where water feeds into this feature and to establish ground level relative to existing river channel

Operational Objective	Outline Prescription
	• Thin scrub and shading trees from fen swamp area • Ensure any drainage works to adjacent path do not affect water regime of this area
Monitor and control the spread of non-native species	• Control stands of Japanese Knotweed, Goat's Rue and Himalayan Balsam • Monitor populations of these plants
Maintain and enhance the ornithological interest	• Monitor breeding and winter bird populations • Kingfisher nesting survey
Encourage Water Voles	• Water Vole survey • Encourage development of marginal aquatic vegetation • Manage canopy of riverside trees to prevent excessive shading
Maintain and enhance populations of other mammals	• Baseline bat surveys to inform management • Tree survey to identify potential bat roost sites • Retain and prolong life of mature and veteran trees through sympathetic management • Repeat survey near end of 10-year plan to establish effectiveness of management
Maintain and enhance invertebrate interest	• Undertake baseline surveys (e.g. Butterflies and Moths; Dragonflies and Damselflies; fauna associated with veteran trees) • Conserve adequate growth of epiphytic Ivy when clearing/thinning non-native trees (as potential habitat for the ladybird *Clitosthetus arcuatus)* • Monitor populations of *Clitosthetus arcuatus* • Monitor impacts of grassland management regimes
Maintain and enhance the botanical interest	• Perform baseline survey of aquatic vegetation • Encourage botanical recording and monitoring to inform subsequent habitat management
Maintain and enhance public access and recreational use	• Maintain and improve signage where necessary • Maintain surfaces and drainage of existing routes • Create a surfaced footpath/cycleway along the entire length of the Hogsmill Open Space. • Maintain site furniture • Establish a Community Green at Gatley Avenue, including path realignment (Bones Gate) • Thin scrub edge beside some of main paths • Improve steps down river banks to stepping-stone

Operational Objective	Outline Prescription
	crossing (Hogsmill) • Remove old Chestnut paling fence around former silt deposition area near to Ewell Court • Remove unsightly fencing alongside River View Copse • Ensure that Public Rights of Way are open and accessible at all times • Investigate possibility of securing PROW status for all main routes within the Local Nature Reserve • Install additional benches, signs and dog waste bins at appropriate locations • Assess condition of and maintain footway beneath railway line along SE boundary of the Hogsmill Open Space • Liaise with Kingston Borough over management of Tolworth Court Meadows LNR and other land adjoining the Bones Gate
Maintain the landscape qualities of the Open Spaces	• Take advantage of opportunities to enhance landscape character when planning habitat management (e.g. planting of 'parkland' trees and visual screen beside Ruxley Lane) • Clear rubbish and other encroachments • Investigate thinning vegetation alongside property boundaries where this may discourage tipping of garden waste • Remove unsightly/rusty goal posts at Cox Lane (replace if necessary) and re-erect dislodged waste bin (Bones Gate) • Plant tree screen along bund near to Cox Lane entrance (Bones Gate)
Control inappropriate use of the site and maintain boundary security	• Enforcement and action against encroachments through programme of letters to householders and other literature • Increased on-site presence (ideally through the creation of a new permanent post) • Maintain entrance barriers and other structures at site boundaries/entrances
Promote and encourage an understanding and respect for the wildlife, landscape and historical value of the site	• Maintain interpretation boards near to Ruxley Lane and 'stepping stones' and install further ones elsewhere at the site • Encourage volunteer action (e.g. through 'The Friends' group), to include biological recording and practical management work Programme of guided walks

STAGE THREE - PRESCRIPTION

The following tables outline management proposals across the Hogsmill and Bones Gate Open Spaces during the period 2006/0 to 2015/16. The format follows that given by Crowther and Groome (2005).

The various adopted management compartments are shown on Map 5, whilst the proposed management is summarised in Map 6. The area column outlines the total area or length of feature over which each prescription is proposed.

Prescriptions are defined under the heading "proposed work".

Outline costs are given for each year of the management plan. Year 1 relates to the 2006/07 tax-year, year 2 to 2007/08 etc. Costs have been calculated, during the first five years, and then during the second five-year period, on the following basis:

	First five years	**Second five years**
Contractors	£100/person/day	£120/person/day
Volunteers	£5/person/day	£6/person/day
Ecological Consultants	£250/person/day	£275/person/day
Arboricultural Contractors	£250/person/day	£275/person/day

Notes:
Volunteers: In addition, use of volunteer machinery (e.g. chainsaw/brush cutters) is £50/day and the hire of heavier equipment (e.g. mini excavator/dumper) is approx. £100/day.

Where the term volunteer/contractors is used, the deciding factor will be availability of volunteers, who would normally be the first choice. In all such cases, costings have therefore been based throughout on the preferential use of volunteers.

Cpt	Area (ha)	Proposed Work	Outline Costs (£)										Workforce
			Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10	
Manage the site as an important wildlife corridor within the Borough: - all prescriptions covered under other stated objectives													
Maintain and enhance the mature and veteran tree population:													
Whole site	N/A	Protect vulnerable trees from vandalism	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	EEBC staff/volunteer
10, 13	N/A	Thin surrounding woodland canopy where appropriate (e.g. to release mature Ash specimen near to old silt deposition area and around maiden Oak trees behind Eastcroft Road)	£1000					£1200					Contractor/ Volunteer
Whole site	N/A	Prevent soil compaction around the roots of veteran trees	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	EEBC staff
Whole site	N/A	Commission assessment of veteran trees and undertake any necessary remedial work to prolong tree life	£1000	£1000	£1000			£1100	£1100				Arboricultural contractor
3, 11	N/A	Manage riverside avenues of Willow trees (coppice/pollard and some supplementary planting).			£1000	£1000				£1100	£1100		Arboricultural contractor
9, 13	N/A	Plant new specimen trees from appropriate native stock (including Oaks grown from acorns of existing veteran specimens) and provide with adequate protection and aftercare (see Map 6 for locations)	£50	£50			£50	£60			£60	£60	Volunteer
12	N/A	Protect veteran White Willow pollards in any future realignment of the Hogsmill River	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	EEBC staff
Maintain and enhance the broadleaved woodland habitat:													
6, 11, 13	1.5	Thin plantation woodlands to diversify structure, concentrating upon non-native canopy species		£3000	£3000	£3000							Contractor/ Volunteer

Cpt	Area (ha)	Proposed Work	Outline Costs (£)										Workforce
			Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10	
6, 11, 13	N/A	Plant new native stock in appropriate areas to supplement natural regeneration			£500	£500	£500						Volunteer
11, 12	0.2	Create and maintain woodland glades		£1000		£1000		£1200		£1200		£1200	Contractor/ Volunteer
6, 11, 13	N/A	Scallop woodland edges and plant scrub fringes to improve structural diversity of edge habitat				£500	£500	£600			£600	£600	Contractor/ Volunteer
6	0.3	Thin plantation woodland to leave only a handful of more 'interesting' specimen trees of Lime, Pear, Hornbeam and riverside Willows (i.e. create parkland feel). Retain and avoid damaging veteran Elder tree	£2000					£2400					Contractor/ Volunteer
6	0.9	Create an area of coppice (clear existing woodland, but retain mature specimens, followed by planting of Hazel)			£5000	£5000							Contractor/ Volunteer
2	0.4	Thin younger trees at River View Copse to promote mature tree population	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	Contractor/ Volunteer
Maintain and enhance the scrub and scrub-margin habitat:													
13, 14, 16	0.5	Rotational cutting of some mature stands to improve structural diversity		£1000	£1000			£1200	£1200			£1200	Contractor/ Volunteer
13, 14, 16	0.5	Create glades in some areas of existing dense scrub	£500	£500			£500	£600				£600	Contractor/ Volunteer
13, 14, 16	0.5	Scallop scrub edges to increase structural diversity		£50	£50			£60	£60			£60	Volunteer
9, 11	<0.1	Thin encroaching Bramble in some areas, with local planting of species such as Blackthorn and Hawthorn	£50				£50				£60		Volunteer
2, 3, 6, 16	0.1	Plant new areas of (primarily marginal) scrub and trees to improve linear habitat continuity	£200	£200									Volunteer

Cpt	Area (ha)	Proposed Work	Outline Costs (£)										Workforce
			Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10	
13	250m approx	Plant boundary hedge beside ditch at rear of houses along Eastcroft Road		£200	£200	£200							Volunteer
4, 5	100m approx	Plant and maintain new section of hedgerow along southern boundary with Ruxley Lane and manage 'demonstration hedge' along northern side of Ruxley Lane	£500	£500	£50	£50	£50	£60	£60	£60	£60	£60	Volunteer
Maintain and enhance the grassland habitat:													
2	0.1	Create wild flower meadow with infrequent cutting (i.e. cut only twice per year)	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	Contractor
9, 12	0.1	Extend extent of un-mown margins in appropriate areas (but mow occasionally)	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	Contractor
12	1.0	Create haymeadow area at Chamber Mead (i.e. mow only once per year and remove clippings)	£500	£500	£500	£500	£500	£600	£600	£600	£600	£600	Contractor
2, 3, 4, 5, 6, 7, 8, 9, 11, 12, 13, 14, 16	12.0	Regular mowing of main amenity grassland areas	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	Contractor
Maintain and enhance the watercourses and water-margin habitat:													

Cpt	Area (ha)	Proposed Work	Outline Costs (£)										Workforce
			Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10	
Whole site	N/A	Develop close partnership with Environment Agency (and Kingston Borough) to explore opportunities to restore more natural channel dynamics and marginal wetland vegetation to the two watercourses (does not include cost of any identified works). HLF is a possible source of funding	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	EEBC staff
11, 12, 13	N/A	Remove concrete channel lining at confluence of Hogsmill River and Green Lane Stream (costs might be covered by Environment Agency)			TBA								?Environment Agency
12	<0.1	Create new pond/wetland beside Hogsmill River at edge of Chamber Mead				£10000							Contractor
11	N/A	Clear shading trees and encroaching scrub from original section of Hogsmill River		£500	£500	£500			£3000				Contractor/ Volunteer
11, 12	N/A	Survey to establish where water feeds into original section of Hogsmill River	TBA	TBA									?Environment Agency
11, 12	N/A	Survey of ground levels around original section of Hogsmill River, relative to existing river channel		TBA									?Environment Agency
Maintain and enhance the fen-swamp habitat:													
11	<0.1	Thin scrub and shading trees from fen swamp area		£50					£60				Volunteer
11	N/A	Drainage works to adjacent path		£1000									Contractor
11	N/A	Ensure any drainage works to adjacent path do not affect water regime of this area		No cost					No cost				EEBC staff
Monitor and control the spread of non-native species:													
15, 16	N/A	Control stands of Japanese Knotweed preferably using appropriate herbicide	£500	£500	£500				£600	£600	£600		Contractor
Whole site	N/A	Monitor extent of Japanese Knotweed	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	EEBC staff
14, 15	N/A	Control Goat's Rue by hand weeding	£50	£50			£50	£60					Volunteer

Cpt	Area (ha)	Proposed Work	Outline Costs (£)										Workforce
			Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10	
Whole site	N/A	Monitor extent of Goat's Rue	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	EEBC staff
14, 15, 16	N/A	Control spread of Himalayan Balsam to new parts of the site by hand-weeding (especially Hogsmill upstream of Bones Gate confluence)	£50	£50	£50	£50	£50	£60	£60	£60	£60	£60	Volunteer
Whole site	N/A	Monitor extent of Himalayan Balsam	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	EEBC staff
Maintain and enhance the ornithological interest:													
Whole site	N/A	Monitor breeding bird populations (as part of combined contract for this site plus Epsom Common and Horton Country Park)	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	Contractor/ Volunteer
Whole site	N/A	Monitor winter bird populations	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	Contractor/ Volunteer
Whole site	N/A	Conduct Kingfisher nesting survey	£1000	£1000									Consultant
Encourage Water Voles:													
Whole site	N/A	Conduct baseline Water Vole survey			£1000	£1000							Consultant
Whole site	N/A	Encourage development of marginal aquatic vegetation to encourage Water Voles	£50	£50	£50	£50	£50	£60	£60	£60	£60	£60	Volunteer
Maintain and enhance populations of other mammals:													
Whole site	N/A	Conduct baseline bat activity survey	£1500										Consultant

Cpt	Area (ha)	Proposed Work	Outline Costs (£)										Workforce
			Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10	
Whole site	N/A	Survey mature trees to establish potential as bat roosts	£500										Consultant
As appropriate	N/A	Manage old trees to prolong life and encourage bats		£1000			£1000			£1200			Arboricultural contractor
Whole site	N/A	Repeat bat survey to establish effectiveness of management				£1000				£1100			Consultant
Maintain and enhance the invertebrate interest:													
As appropriate	N/A	Conserve adequate growth of epiphytic Ivy when clearing/thinning of non-native trees, as potential habitat for the ladybird *Clitosthetus arcuatus*	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	EEBC staff
Whole site	N/A	Monitor populations of *Clitosthetus arcuatus*	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	Consultant/ volunteer
Whole site	N/A	Undertake baseline surveys (e.g. Butterflies and Moths; Dragonflies and Damselflies; fauna associated with veteran trees)	£1000	£1000									Consultant
As appropriate	N/A	Monitor impacts of grassland management regimes upon invertebrate populations			£1000			£1000			£1000		Consultant
Maintain and enhance the botanical interest:													

Cpt	Area (ha)	Proposed Work	Outline Costs (£)										Workforce
			Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10	
As appropriate	2.5	Perform baseline survey of aquatic vegetation			£1000								Consultant/ Environment Agency
Whole site	N/A	Encourage botanical recording and monitoring to inform subsequent habitat management	£50	£50	£50	£50	£50	£60	£60	£60	£60	£60	Volunteer
Manage public access and recreational use:													
As appropriate	N/A	Maintain and improve signage where necessary	£2000	£2000	£2000	£2000	£1000	£1200	£1200	£1200	£1200	£1200	EEBC staff
Whole site	N/A	Maintain surfaces of existing routes	£2000	£2000	£2000	£2000	£2000	£2400	£2400	£2400	£2400	£2400	Contractor
As appropriate	N/A	Create a surfaced footpath/cycleway along the entire length of the Hogsmill Open Space (in part under Doorstep Green initiative)			£75000			£75000					Contractor
As appropriate	N/A	Maintain site furniture	£2000	£2000	£2000	£2000	£2000	£2400	£2400	£2400	£2400	£2400	Contractor
16	0.2	Establish a Community Green at Gatley Avenue, including path realignment (Bones Gate)		£5000									Contractor
14	<0.1	Thin scrub edge beside some of main paths		£500				£500				£500	Contractor/ Volunteer
11, 12	N/A	Improve steps down river banks to stepping-stone crossing (Hogsmill)			£2000								Contractor

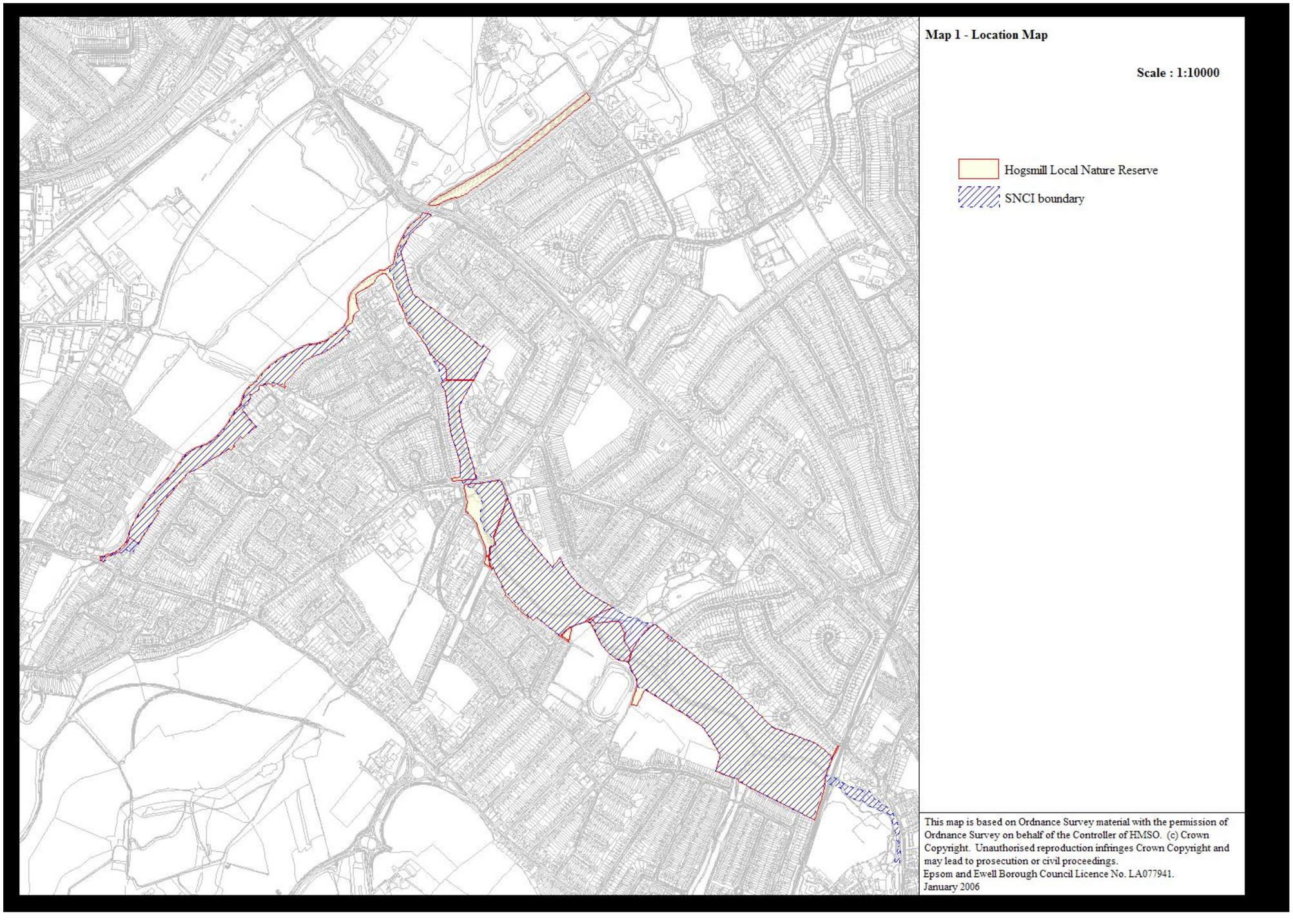
Cpt	Area (ha)	Proposed Work	Outline Costs (£)										Workforce
			Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10	
10	N/A	Remove old chestnut paling fence around former "silt deposition area" near to Ewell Court.	£100										Volunteer
2	N/A	Remove unsightly fencing at River View Copse	£2500										Contractor
Whole site	N/A	Ensure that public rights of way are open and accessible at all times	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	EEBC staff
Whole site	N/A	Investigate possibility of securing PROW status for all main routes within the Local Nature Reserve	No cost	No cost									EEBC staff
As appropriate	N/A	Install additional benches and signs at appropriate locations	£2000		£2000		£2000		£2000		£2000		EEBC staff
As appropriate	N/A	Install additional dog waste bins	£1000	£1000	£1000	£1000							EEBC staff
N/A	N/A	Condition assessment of footway beneath railway line along SE boundary of Open Space		£1000									Contractor
N/A	N/A	Maintain 'footway' beneath railway line along SE boundary of the Open Space				£10000				£10000			Contractor
N/A	N/A	Liaise with Kingston Borough over management of Tolworth Court Meadows LNR and other adjoining land adjoining the Bones Gate	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	EEBC staff
Maintain the landscape qualities of the Open Space:													
Whole site	N/A	Take account of landscape character when planning habitat management (e.g. planting of 'parkland' trees and visual screen beside Ruxley Lane)	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	EEBC staff

Cpt	Area (ha)	Proposed Work	Outline Costs (£)										Workforce
			Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10	
As appropriate	N/A	Clear rubbish and other encroachments	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	EEBC staff/volunteer
As appropriate	TBA	Possible thinning of vegetation alongside property boundaries in areas where it might discourage tipping of garden waste	£50	£50				£60	£60				Volunteer
14	N/A	Remove unsightly/rusty goal posts (replace if necessary) and re-erect dislodged waste bin (Cox Lane, Bones Gate)	£500										Contractor
15	N/A	Plant tree screen along bund near to Cox Lane entrance (Bones Gate)		£250									Volunteer
Control inappropriate use of the site and maintain boundary security:													
N/A	N/A	Enforcement of policy on illegal tipping through programme of letters to householders and other literature, backed up with a last resort of fines	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	EEBC staff
As appropriate	N/A	Take action against 'gardening' encroachments	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	EEBC staff
N/A	N/A	Seek to increase levels of on-site presence (ideally through the funding of a new post)	£25000	£25000	£25000	£25000	£25000	£27500	£27500	£27500	£27500	£27500	EEBC staff
As appropriate	N/A	Maintain entrance barriers and other structures at site boundaries/entrances	£2000			£2000			£2400			£2400	EEBC staff
Promote and encourage an understanding and respect for the wildlife, landscape and historical value of the site:													

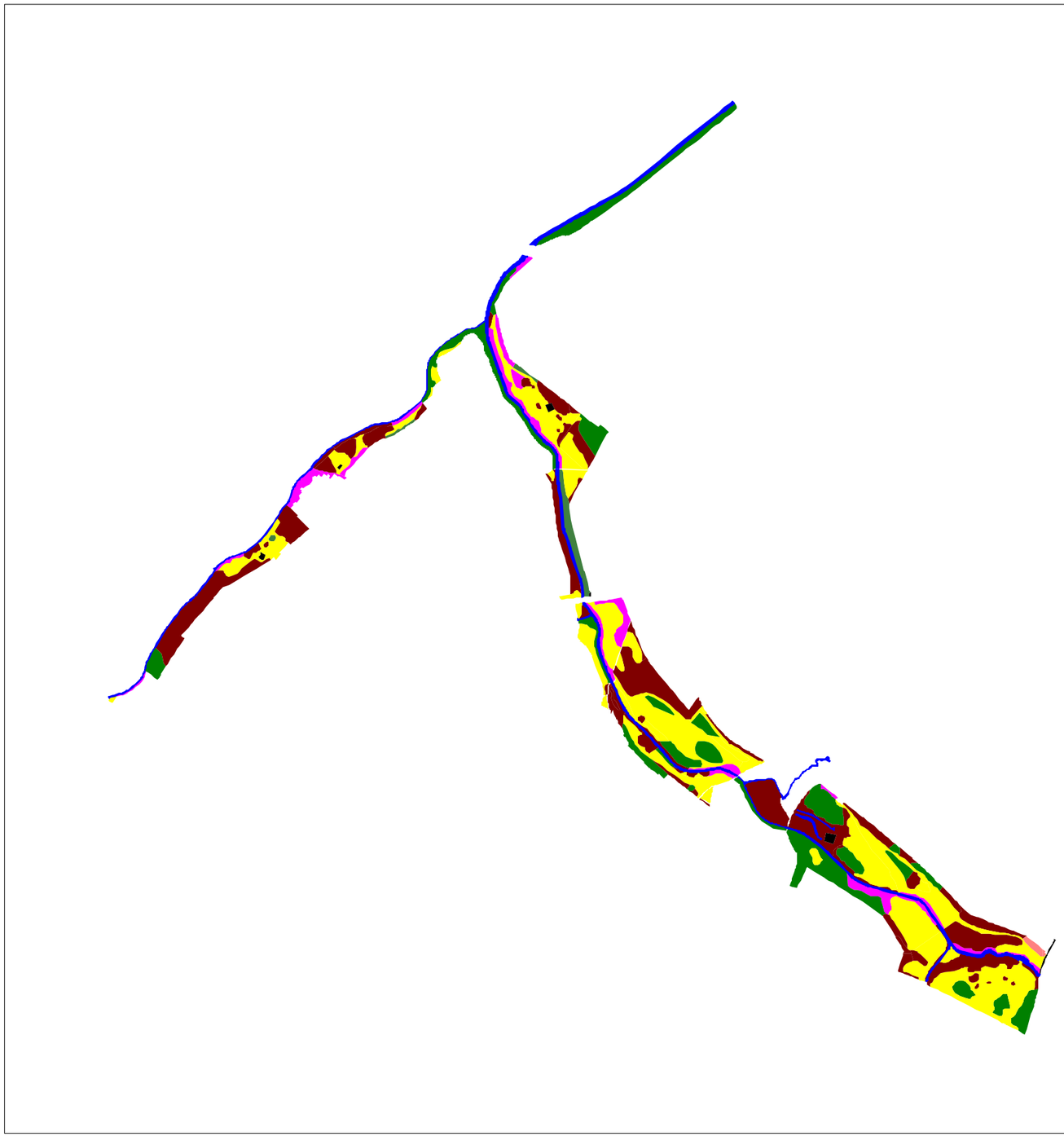
Cpt	Area (ha)	Proposed Work	Outline Costs (£)										Workforce
			Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10	
N/A	N/A	Conduct programme of guided walks	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	No cost	EEBC staff
As appropriate	N/A	Maintain interpretation boards near to Ruxley Lane and the 'stepping stones', and install further ones elsewhere at entrances to the site	£2000		£2000		£2000		£2400		£2400		Contractor
Whole site	N/A	Encourage volunteer action (e.g. through 'The Friends' group), to include biological recording and practical management work	£250	£250	£250	£250	£250	£250	£250	£250	£250	£250	EEBC staff/volunteer
TOTAL STAFF/CONTRACTOR/ECOLOGICAL CONSULTANCY/VOLUNTEER COSTS (inc. all estimates and averaged annual costs)			TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	Staff/Vols
TOTAL CONTRACTOR COSTS (inc. all estimates and averaged annual costs)			TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	Contractor
TOTAL ANNUAL COSTS (inc. all estimates and averaged annual costs)			TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	TBA	ALL

MAPS

Map 1 – Location Map



Map 2 – Summary Habitat Map



Map 2 - Summary Habitat Map

Scale : 1:10000

Broad Habitats

- Woodland
- Grassland
- Ruderal/ Weed-dominated Vegetation
- Playground and Various Hardstanding
- Fen-swamp
- Scrub

Water courses

Data largely derived from 2004 NVC Survey. The survey involved 'polygon mapping' of homogenous vegetation as determined from aerial photographs. Habitat-types shown here are summarised categories for the dominant vegetation of each GIS-mapped polygon Data for areas not covered by the NVC Survey are derived from a review of aerial photographs.

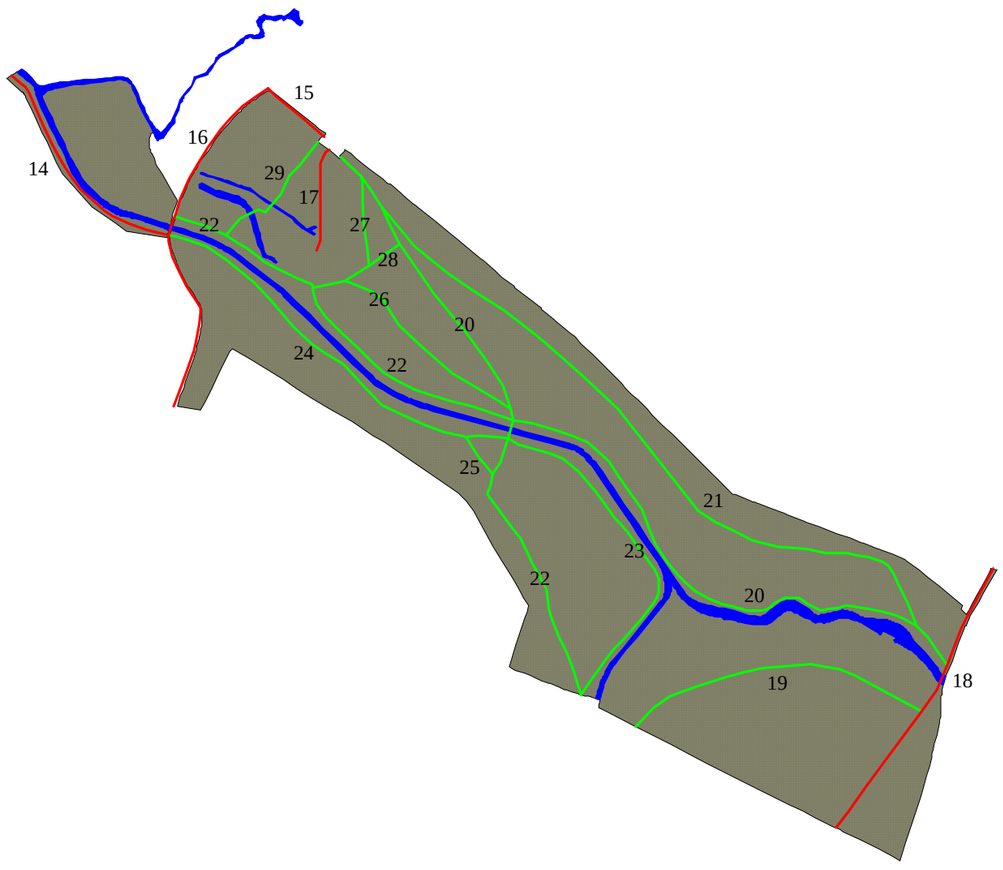
Map 3 – Watercourses

Map 3 - Watercourses

Scale : 1:10000

Water Courses
Hogsmill Local Nature Reserve

Map 4a – Access and Amenity Map 1

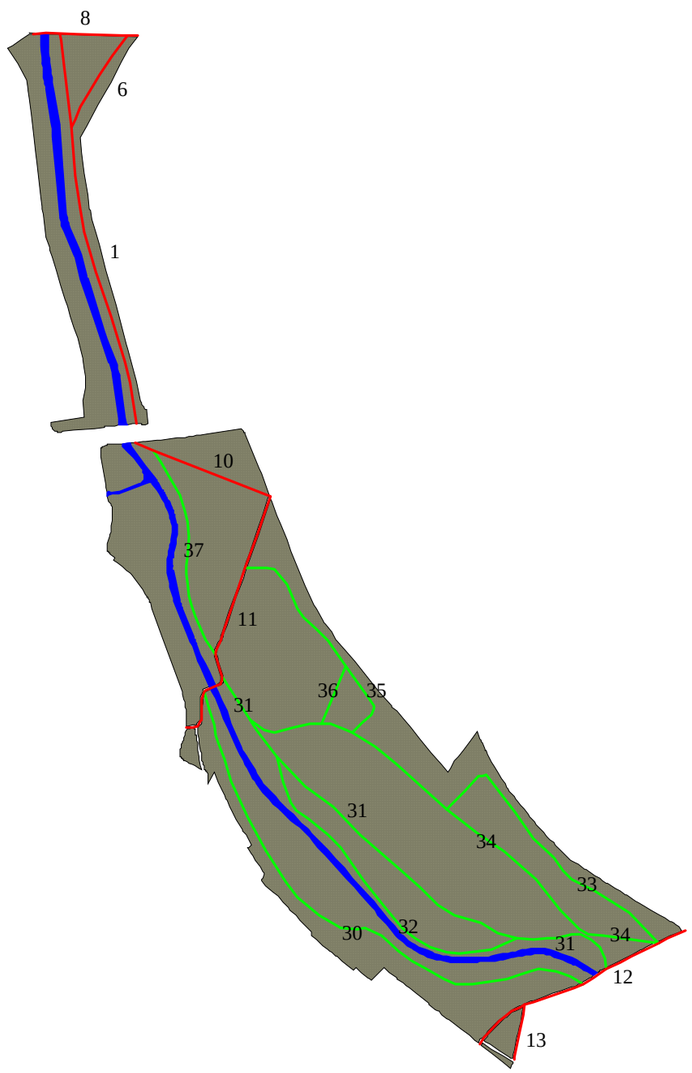


Map 4a - Access and Amenity Map 1

Scale : 1:4000

Hogsmill LNR boundary
Watercourses
Surfaced paths
Unsurfaced paths

Map 4b – Access and Amenity Map 2



Map 4b - Access and Amenity Map 2

Scale : 1:4000

Hogsmill LNR boundary
Watercourses
Surfaced paths
Unsurfaced paths

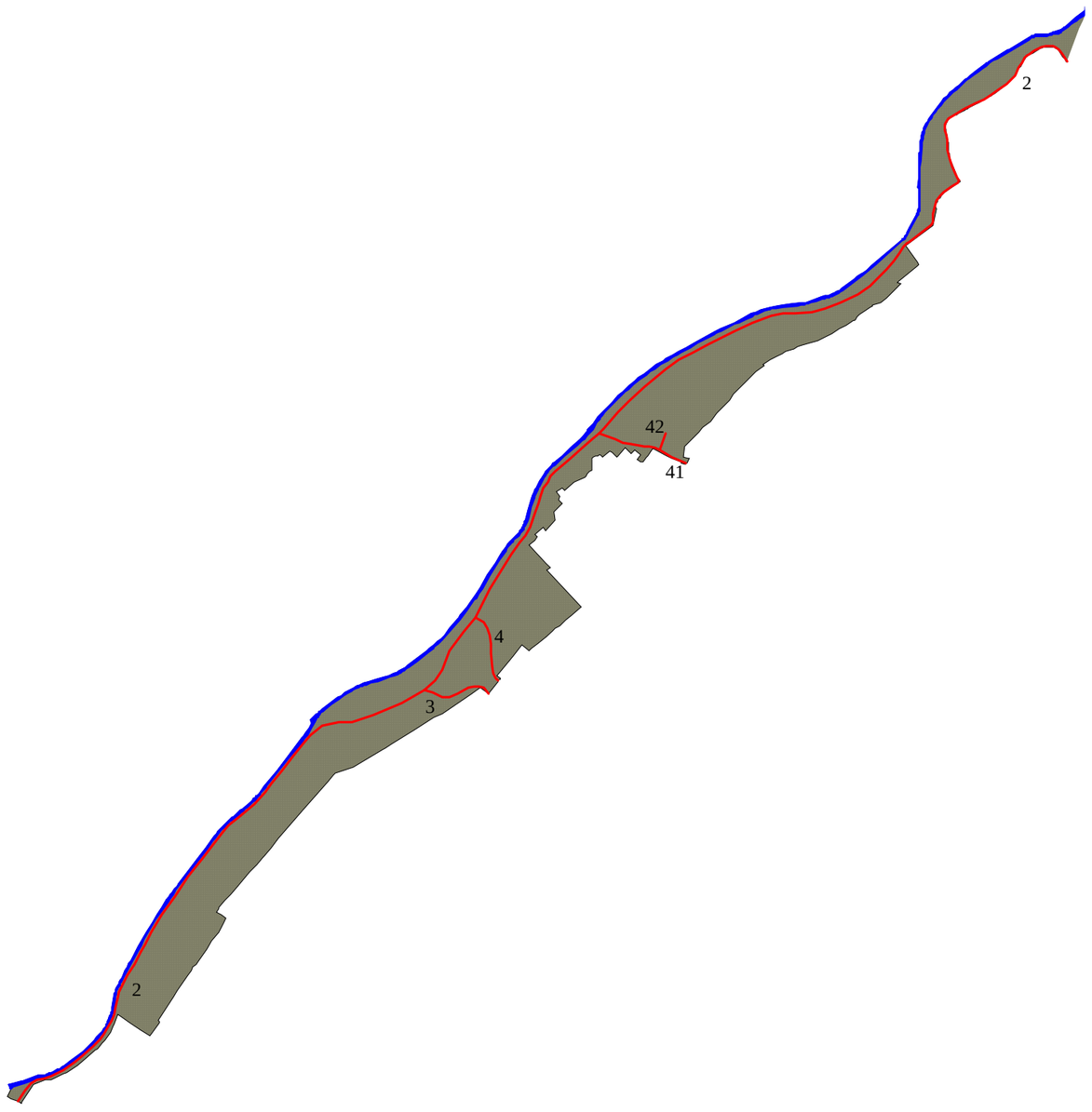
Map 4c – Access and Amenity Map 3

Map 4c - Access and Amenity Map 3

Scale : 1:4000

Hogsmill LNR boundary
Watercourses
Surfaced paths
Unsurfaced paths

Map 4d – Access and Amenity Map 4

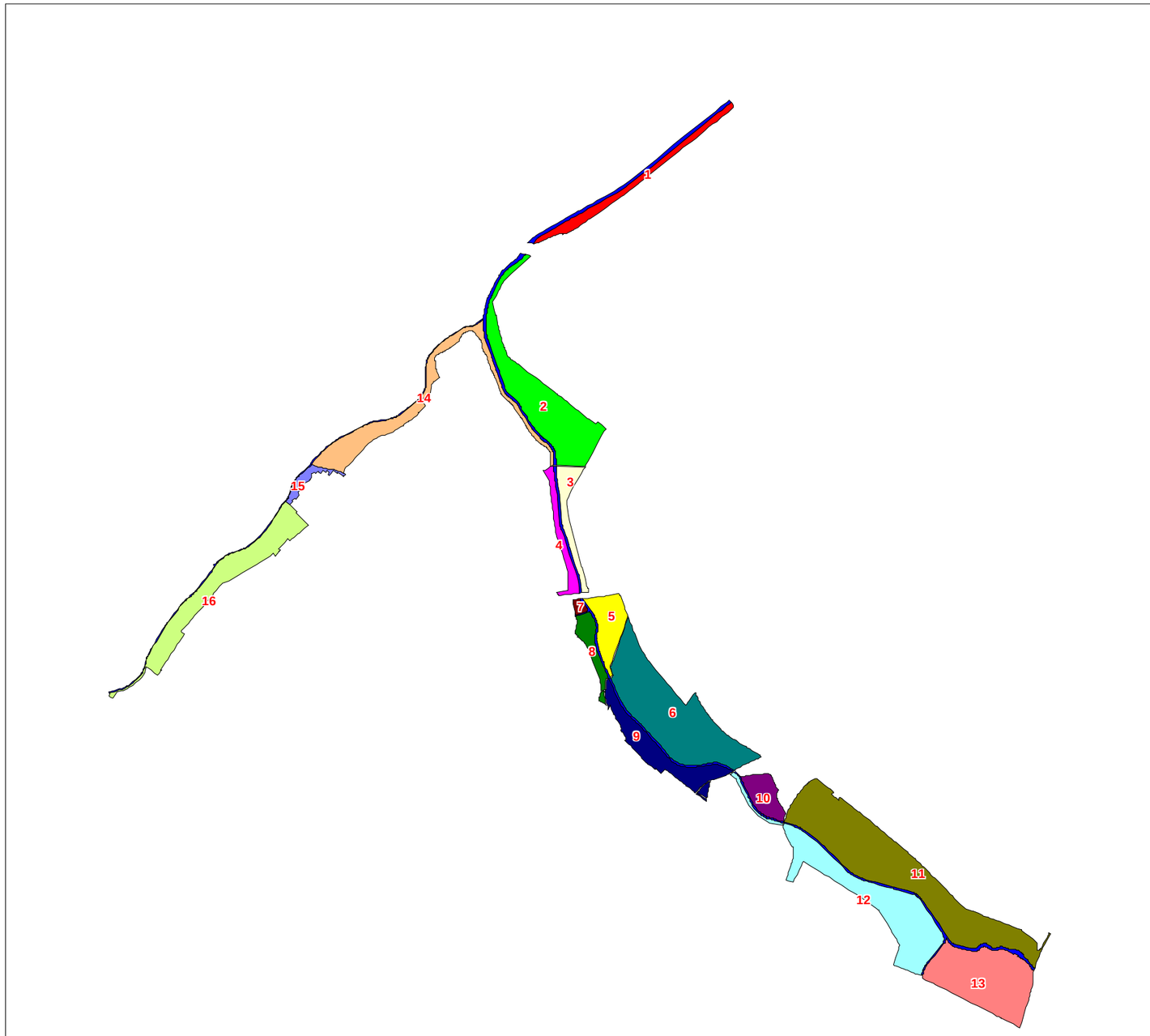


Map 4d - Access and Amenity Map 4

Scale : 1:4000

Hogsmill LNR boundary
Watercourses
Surfaced paths

Map 5 – Management Compartments



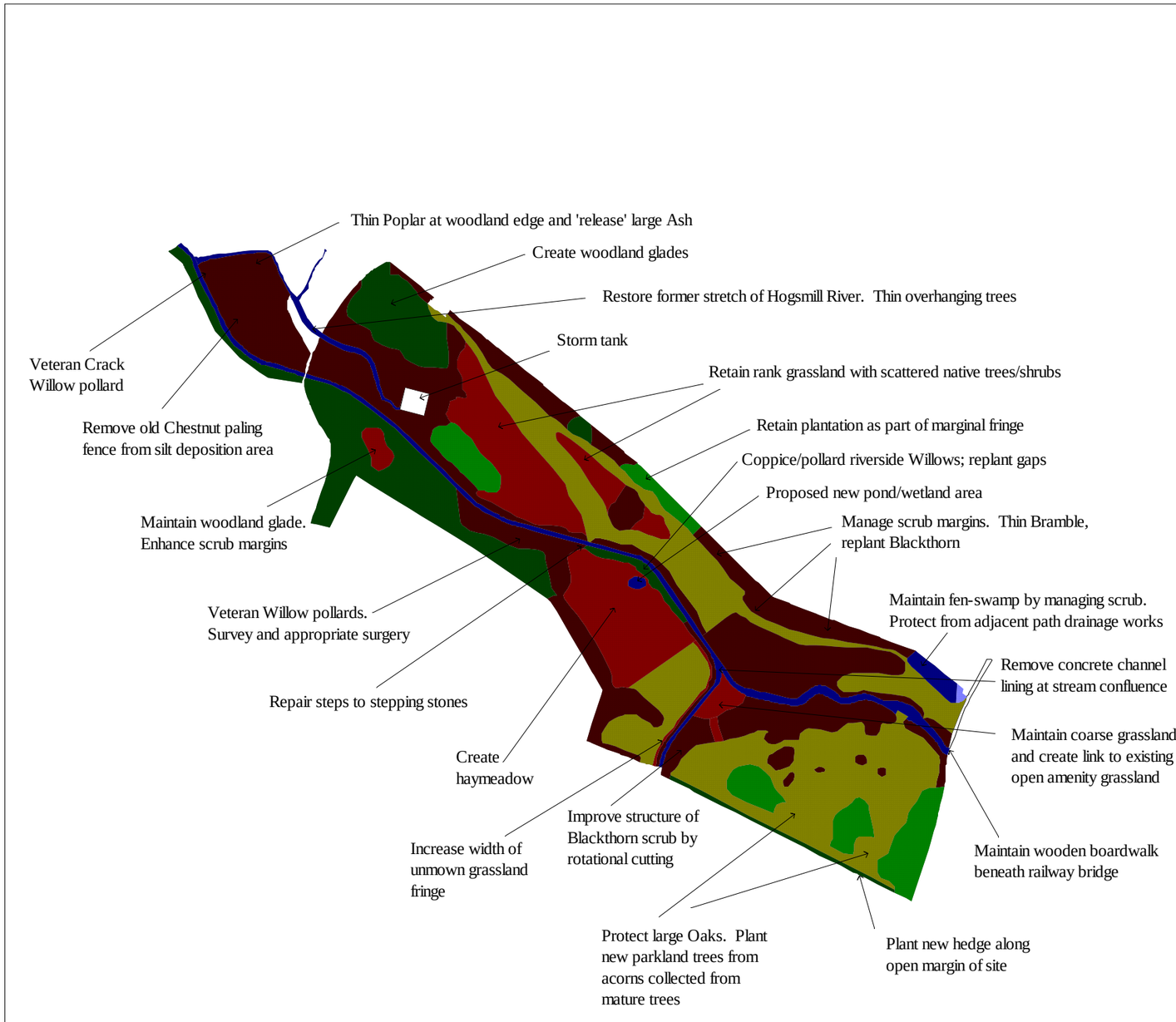
Map 5 - Management Compartments

Scale : 1:10000

Compartments

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17 (all water courses)

Map 6a – Proposed Habitat Management Map 1



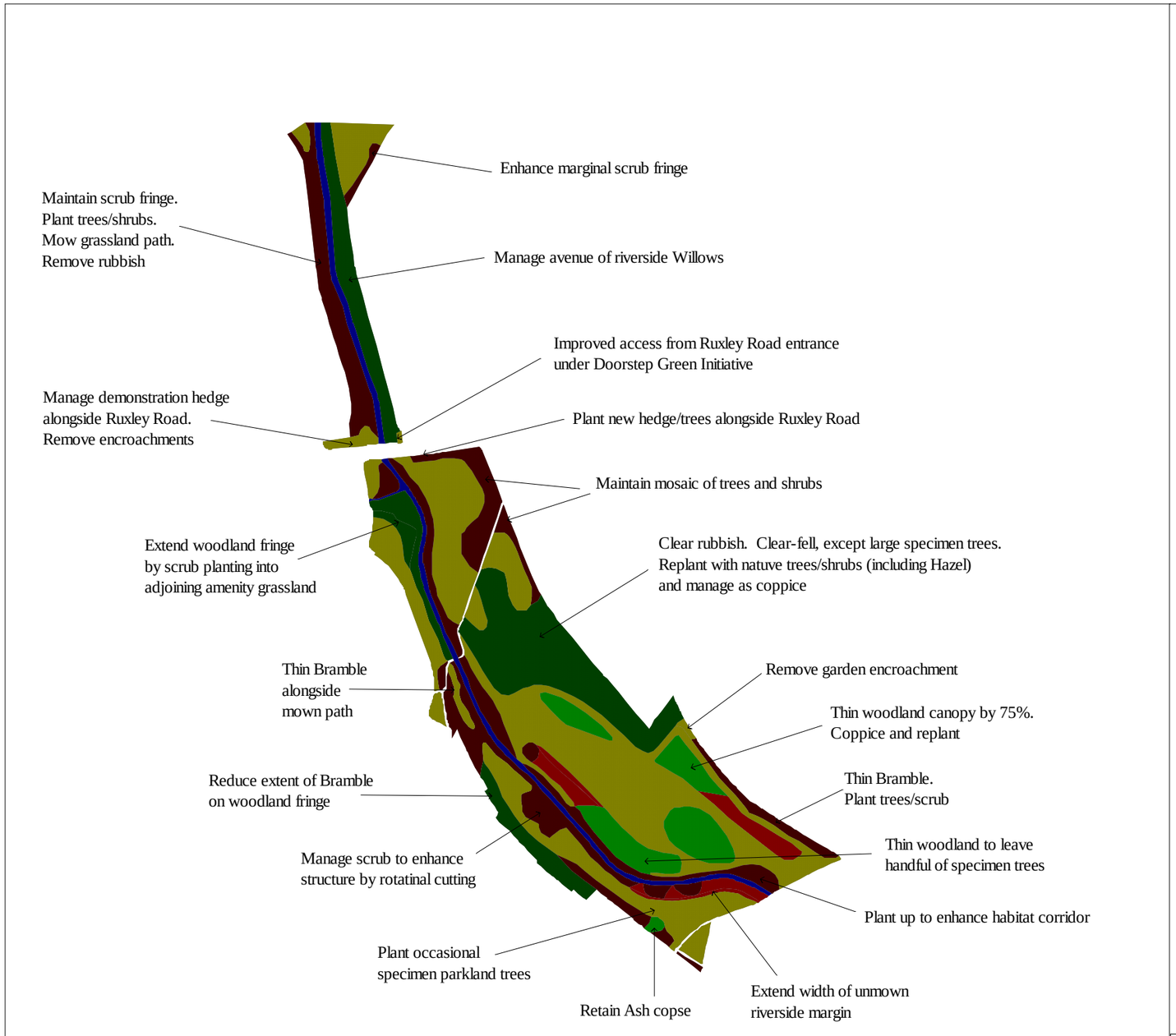
Map 6a - Proposed Habitat Management Map 1

Scale : 1:4000

Proposed Management

- Coarse grassland
- Planted woodland
- Amenity grassland
- Woodland/trees (as avenues)
- Scrub/trees
- Open water/wetland

Map 6b – Proposed Habitat Management Map 2



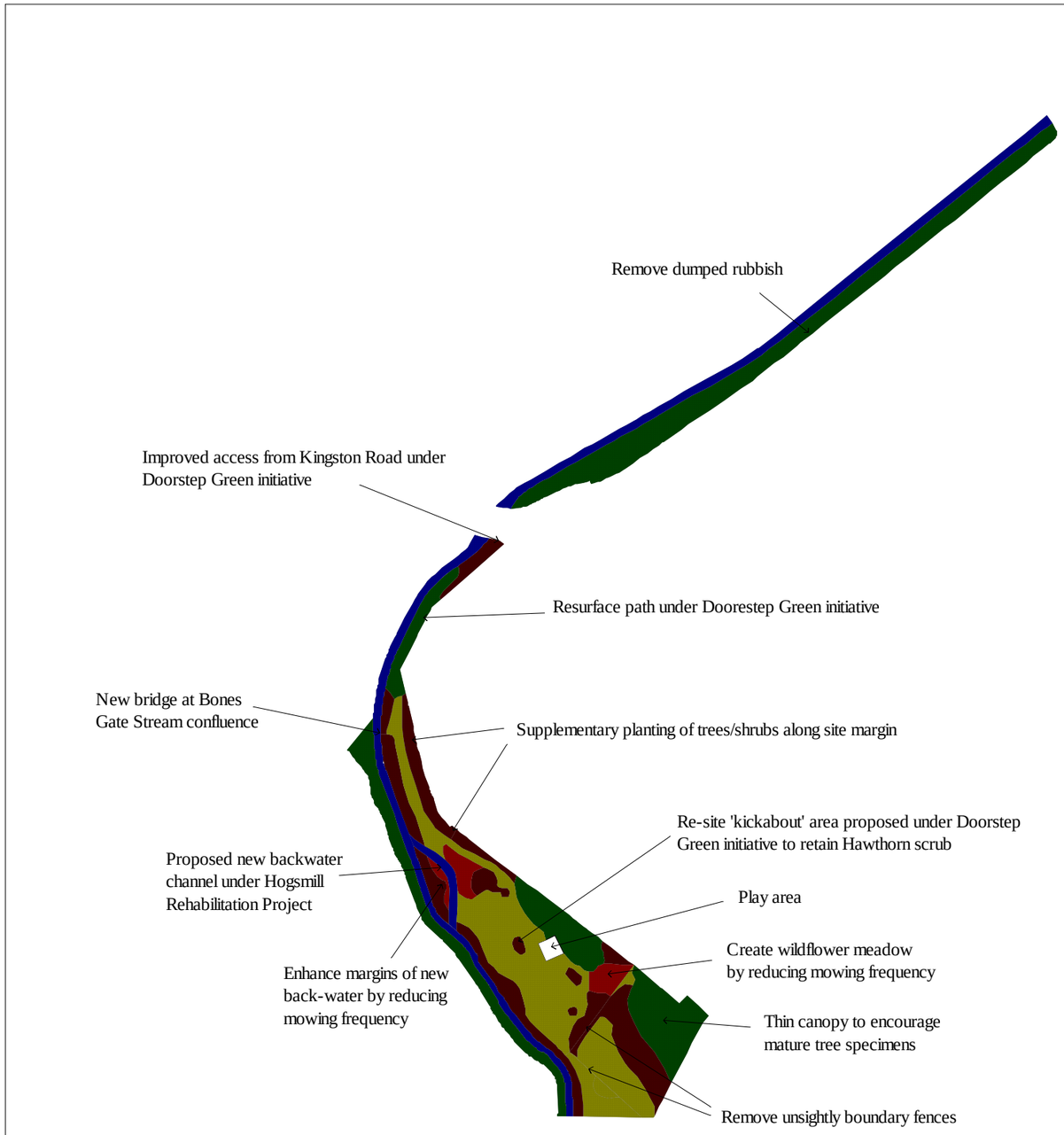
Map 6b - Proposed Habitat Management Map 2

Scale : 1:4000

Proposed Management

- Coarse grassland
- Planted woodland
- Amenity grassland
- Woodland/trees (as avenues)
- Scrub/trees
- Open water/wetland

Map 6c – Proposed Habitat Management Map 3



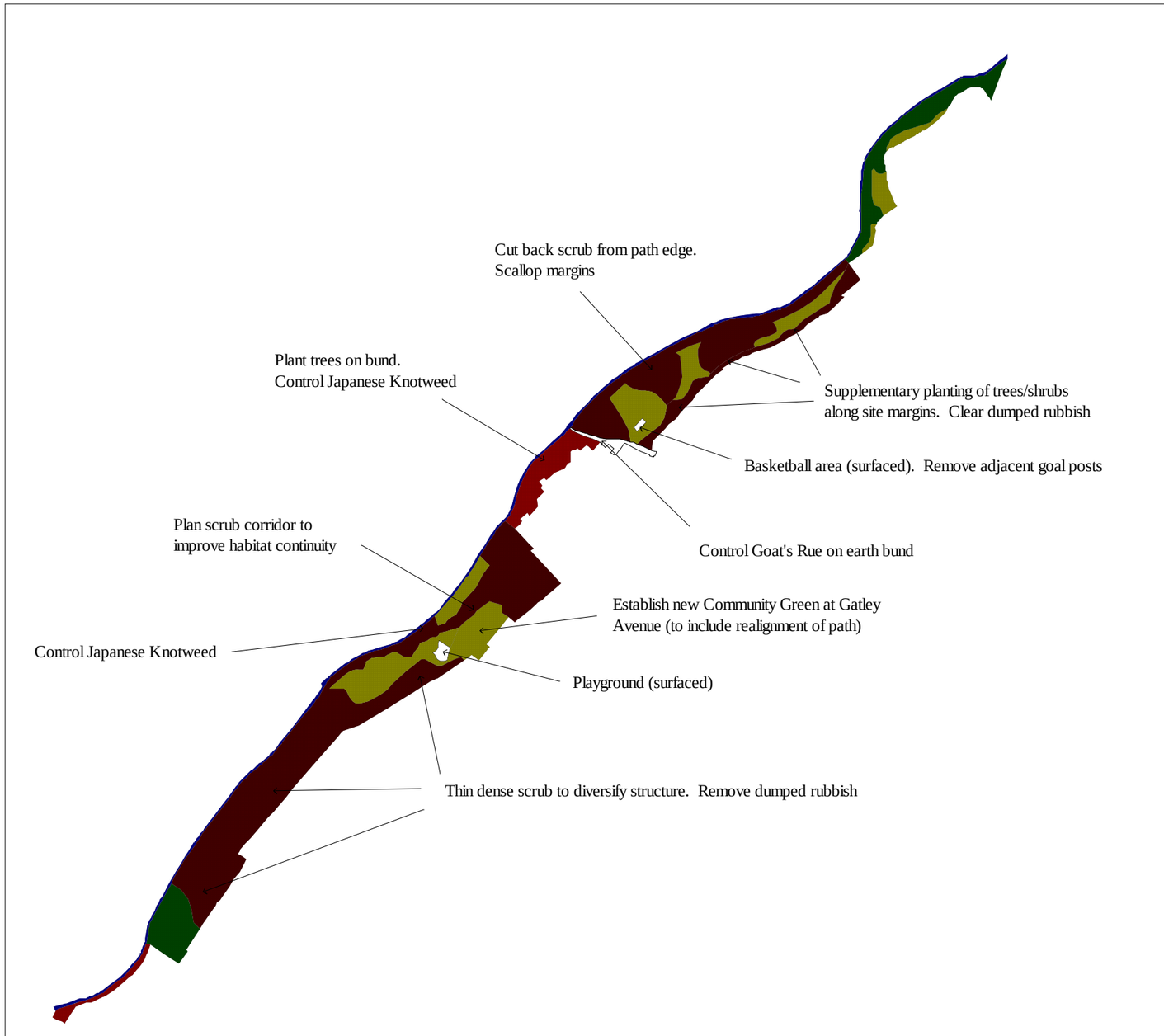
Map 6c - Proposed Habitat Management Map 3

Scale : 1:4000

Proposed Management

- Coarse grassland
- Planted woodland
- Amenity grassland
- Woodland/trees (as avenues)
- Scrub/trees
- Open water/wetland

Map 6d – Proposed Habitat Management Map 4



Map 6d - Proposed Habitat Management Map 4

Scale : 1:4000

Proposed Management

- Coarse grassland
- Planted woodland
- Amenity grassland
- Woodland/trees (as avenues)
- Scrub/trees
- Open water/wetland

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APPENDICES

Appendix I – Habitat/NVC Survey Results

Methods for habitat survey

The habitat survey was conducted over several visits during the period August to September 2004. The site was separated into 'compartments' of largely homogeneous land cover as identified on a series of orthorectified aerial photographs. Mapping was done directly onto photographs in the field and these boundaries were then transferred into GIS (MapInfo). The vegetation in each 'compartment' (GIS polygon) was assigned wherever possible into vegetation communities recognised within the National Vegetation Classification (NVC – Rodwell, 1991-2000). Very often, more than one community type was present and so the percentage of total ground cover made up by each individual community was recorded, and appropriate descriptive target notes compiled. These figures were then entered into an Excel spreadsheet, together with abbreviated notes (maximum of 250 characters). This spreadsheet was subsequently imported into the GIS database and was thus linked to the relevant polygons.

The area covered by the habitat survey excludes several areas that are now covered under this management plan. This includes the watercourses themselves, in addition to areas of land near to Ewell Court, beside the Bones Gate Stream adjacent to the Watersedge Estate and 'River View Copse', the area formerly leased to Surrey County Council. For the sake of completeness, habitats for these areas have been based upon the interpretation of aerial photography in conjunction with the relevant few brief notes made during site visits. However, the composition of these areas is not included within the following account.

Description of habitats and vegetation communities

Numbers with 'P' prefixes relate to the GIS polygon numbers

Woodlands and individual trees

Woodland communities of the Hogsmill and Bones Gate Open Space are somewhat variable and poorly-defined, and do not correlate with the NVC communities. Broadly speaking, there are three main types. At the most recent end of the spectrum are a series of woodlands that were clearly planted around 30 years ago, often upon what was originally grassland habitat. Also present is a suite of older-established and broadly 'semi-natural' woodlands, although even these tend to support a proportion of planted species. Finally, there are also discrete areas of older plantation woodland, generally occurring as small stands within the 'semi-natural' types. Many areas of woodland are disturbed, often scrub-like and patchy in their characteristics, with a generally poor representation of ground flora species.

Of the more-established, broadly 'semi-natural' woodlands, the most widespread species are Ash (*Fraxinus excelsior*), Oak (*Quercus robur*) and Sycamore (*Acer pseudoplatanus*). However, due to the variability of stand types, even these can vary in frequency from being dominant (in the case of Ash) or frequent (in the case of oak and Sycamore), but all being rare in other areas. Alder (*Alnus glutinosa*) occurs occasionally in some wet areas.

A wide range of other, often planted trees occur within the canopy, either as infrequently scattered individuals or small stands of long-established plantation. Planted (and frequently self-sown) tree species include Ornamental Cherries/Plums (*Prunus* spp.), Norway Maple (*Acer platanoides*), Narrow-leaved ash (*Fraxinus angustifolia*), Willows (*Salix* spp.), Lime (*Tilia* sp.), Horse Chestnut (*Aesculus hippocastanum*), London Plane (*Platanus* x *hispanica*), Turkey Oak (*Quercus cerris*), False-acacia (*Robinia pseudoacacia*), Poplars (*Populus* spp.), Beech (*Fagus sylvatica*) and Scots Pine (*Pinus sylvestris*).

The most common shrub species across the site are Hawthorn (*Crataegus monogyna*) and Elder (*Sambucus nigra*) (one of the plantation woodland areas contains a multi-stemmed, veteran Elder tree). Elm (*Ulmus* spp.) and Blackthorn (*Prunus spinosa*) are locally common. Widely occurring field layer associates include Bramble, Ivy (*Hedera helix*), False-brome (*Brachypodium sylvaticum*), Wood Avens (*Geum urbanum*), Cow Parsley (*Anthriscus sylvestris*), Common Nettle and Cleavers (*Galium aparine*). A number of woodland stands have been disturbed by playing children, and there are varying amounts of litter and dumped rubbish, including garden refuse.

Broadleaved woodland planted in recent times occupies significant areas within the Hogsmill Open Space and largely comprises discrete copses planted-up on what was formerly grassland habitat. Mowing of surrounding amenity grasslands has created a very abrupt edge to these woodlands. A wide range of tree species are present and include Hornbeam (*Carpinus betulus*), Ash (*Fraxinus excelsior*), Narrow-leaved Ash (*Fraxinus angustifolia*), Limes (*Tilia* spp.), Birches (*Betula* spp.), Horse Chestnut (*Aesculus hippocastanum*), Ornamental Plum/Cherry (*Prunus* spp.) and Pear (*Pyrus* sp.), plus Grey/White Poplar (*Populus canescens*/*alba*). The field layer is generally extremely sparse.

Away from woodlands, there are a number of much older, larger trees present. Notable examples include are a number of fine old Pedunculate Oak trees. The largest such specimen (T5), in the south of the Hogsmill Open Space, has a diameter at breast height (DBH) of 1.75m, whilst a second tree nearby (T2) has a DBH of 1.3m. In between these lie a further two somewhat smaller Pedunculate Oak trees (T3, T4). There are also a number of larger Oak Trees to be found within the Bones Gate Open Space (up to around 0.9m DBH); many of these oak trees were noted to support 'spangle galls'.

An area of the Hogsmill Open Space contains a total seven of veteran, lapsed pollarded White Willows (*Salix alba*) (P-70), which appear to be aligned along the course of the former river channel (one of these trees toppled during the winter of 2003-04). Two further significant features take the form of established riverside avenues of White Willow trees beside the Hogsmill (P-72, 93). Effectively, these form a continuous canopy, but have not been mapped as woodland, as they really are narrow, linear features and lack a woodland feel to them (e.g. no woodland shrub or field layer present).

In addition to the planted woodlands described above, there are more local areas of sparsely-planted trees within grassland habitat. The most extensive example (P – 52) includes trees of Spindle (*Euonymus europaeus*), Italian Alder (*Alnus cordata*), Limes, Scots Pine and Willows.

One further individual standing tree was mapped as a 'point feature', this being a large Horse Chestnut tree on the Hogsmill (T1).

Other individual trees include Ash, Narrow-leaved Ash, Poplars, Limes, Field Maple, Hornbeam, Sycamore and Crack Willow (*Salix fragilis*). Interestingly, this last-mentioned tree is uncommon on the Hogsmill, but seems more abundant on the Bones Gate than White Willow. Hybrids are of course likely to also be present.

Scrub

Scrub of all types occupies approximately 35% of the site, although in places, it is difficult to make a clear separation between scrub and woodland habitats. Of all the habitat polygons mapped during the survey (144 in total), scrub making up more than 5% of the area within, occurred in 85 (i.e. 59%) of polygons. As with many of the other habitats, scrub tends to occur in narrow strips, reflecting the linear character of the site. The three most frequent and extensive scrub types are as follows:

W21 *Crataegus monogyna – Hedera helix* scrub

Hawthorn (*Crataegus monogyna*)-dominated scrub was found to be the second-most frequently-occurring type, being mapped at more than 5% in a total of 41 polygons (28%). Other species present include Elder (*Sambucus nigra*) and Elm (*Ulmus* spp.) in particular, plus Roses (*Rosa* spp.), occasionally with a scattering of mature trees, especially of Oak and Ash, so the composition can be locally quite varied. Scattered Hawthorn scrub as a component of other habitats has also been included within this category (and in such cases, therefore, represents only a small proportion of the habitat within these polygons).

W22 *Prunus spinosa – Rubus fruticosus* scrub

This type of scrub was the third most frequent, occurring at more than 5% cover in 13 polygons (9%). It tends to be overwhelmingly dominated by dense thickets of Blackthorn, with other species poorly-represented. This scrub is much less extensive than the W21 type and stands generally tend to be small. However, there is one large area of scrub beside the Hogsmill where Blackthorn is the predominant species (P – 80).

W24 *Rubus fruticosus – Holcus lanatus* underscrub

Bramble-dominated scrub represents the most frequent and extensive type of scrub present, being recorded at more than 5% cover in a total of 61 polygons (42%). Frequent associates include Common Nettle, Field Bindweed, Hedge Bindweed and Cleavers.

Non-referable scrub types

A number of stands of scrub could not easily be assigned to the NVC. Although some Hawthorn and Blackthorn were often present, neither was sufficiently constant to suggest either the **W21** or **W22** communities. A range of separate mapping categories have been provided to denote scrub types dominated individually by either Elms, Ornamental Plum/Cherry, Field Maple (*Acer campestre*) and Goat Willow (*Salix caprea*). Of these, the most frequently-encountered were Elm-dominated stands (5 polygons in total), with just three examples of Field Maple, plus one each of Ornamental Plum/Cherry and Goat Willow.

Beyond these non-referable scrub-types with an obvious dominant species, there are further examples with no clear dominant (6 polygons). In addition to Hawthorn and Blackthorn, other shrub (and tree) constituents include Willows, Elder, Blackthorn, Elm, Roses, Sycamore, Hazel, Oak, Ash and Birch. The largest area assigned to this category is to be found in the western section of the Bones Gate (P – 140). A further mapping category was used to denote scattered bushes of Elder that occurred within other habitats (being mapped on only two occasions).

Mature trees, especially of Oak and Ash, are occasionally present throughout scrub-dominated habitats, enhancing structural diversity. As with woodlands, scrub can be quite disturbed as a result of trampling by children and the dumping of litter and other rubbish, including garden refuse along the site margins.

Hedgerow Features

Only a single section of hedgerow was noted, on a verge beside the B284. This comprises a short, free-standing and recently planted 'feature', presumably placed here for 'demonstration' purposes. Trees noted were Hazel, Hawthorn, Plum/Cherry, Field Maple, Norway Maple (*Acer platanoides*) and Crab Apple (*Malus sylvestris*). There were signs of this having being carefully 'pruned' at some point.

Grasslands

Grasslands as a whole form one of the most extensive and frequently-occurring habitat types within the site, much of this taking the form of the regularly-mown amenity grassland areas that typify the Open Space, along the Hogsmill in particular. Of all mapped polygons, grassland comprising more than 5% of the area, occurs in 75, or 52% of the total, making grassland the second-most frequently mapped habitat type (after scrub). The main grassland types are as follows:

MG1 – *Arrhenatherum elatius* grassland

Coarse, rank, un-mown grassland characterised by grasses such as False Oat-grass (*Arrhenatherum elatius*) and Common Couch (*Elytrigia repens*) tends to occur in narrow, marginal strips around the fringes of the main areas of mown amenity grassland (see below). The major part is consistent with the **MG1a *Festuca rubra* sub-community**. Often this vegetation is very species-poor, with false oat-grass overwhelmingly dominant. Other common and frequent associates include Cock's-foot (*Dactylis glomerata*), Field Bindweed (*Convolvulus arvensis*), Cleavers (*Galium aparine*), Creeping Thistle (*Cirsium vulgare*) and Tall Fescue (*Festuca arundinacea*). In smaller areas, where such vegetation is accompanied by frequent Common Nettle (*Urtica dioica*) and occasionally, Hogweed (*Heracleum sphondylium*), this represents areas of the **MG1b *Urtica dioica* sub-community**.

MG6 *Lolium perenne – Cynosurus cristatus* grassland

Vegetation attributable to this category was noted in only a handful of situations. In some respects, it fits within a 'middle ground' between the frequently managed and species-poor amenity grassland swards dominated by Perennial Rye-grass (MG7 – see below) and the rank MG1-type swards. Apart from the dominant grass species, the main difference lies in the higher relative species diversity. Thus, the dominant grass tends to be Creeping Bent (*Agrostis stolonifera*), with varying frequency of Perennial Rye-grass (*Lolium perenne*). Other common grasses include Red Fescue (*Festuca rubra*), Timothy (*Phleum pratense*), Yorkshire Fog (*Holcus lanatus*), Meadow Barley (*Hordeum secalinum*) and Cock's-foot (*Dactylis glomerata*). Other frequent associates include Red Clover (*Trifolium pratense*) Greater Plantain (*Plantago major*), Trailing Tormentil (*Potentilla reptans*), Autumn Hawkbit (*Leontodon autumnalis*), Yarrow (*Achillea millefolium*) and Dandelion (*Taraxacum officinale* agg.).

All three observed stands occur in somewhat different situations. The first instance (P-42) relates to part of a grassland area within the Hogsmill that has been planted-up with trees (the predominant grassland type here is MG1a). Occasional ant-hills were also noted within the sward. The second instance (P-71 also within the Hogsmill) relates to a fairly large area of un-mown grassland (apart from occasional marginal paths). Hairy Sedge (*Carex hirta*), Creeping Buttercup (*Ranunculus repens*) and Creeping Thistle (*Cirsium arvense*) were also present here. Unusually, the final area occurs within a mown amenity grassland area within the Bones Gate (P-133). However, grasslands along this section appear to be less-frequently mown than along the Hogsmill. Species of note from here include Ox-eye Daisy (*Leucanthemum vulgare*) and Cranesbills – including Dove's-foot Cranesbill (*Geranium molle*) and possibly also Small-flowered Cranesbill (*Geranium pusillum*).

Within the Hogsmill, there were several rather localised areas within the main mown amenity grassland swards (see MG7 below), where there were indications of an MG6-type sward. This occurs within Polygon 104, where several more marginal areas of the sward were seen to support species such as Bird's-foot Trefoil (*Lotus corniculatus*) along with Common Knapweed (*Centaurea nigra*), Common Sorrel (*Rumex acetosa*) and Tall Fescue (*Festuca arundinacea*).

MG7 Lolium Perenne leys and related grasslands

Grassland of this type is indicated by the often almost complete dominance of Perennial Rye-grass within a generally species-poor sward. This is the most extensive grassland type, occupying large areas, especially along the Hogsmill, comprising regularly-mown amenity grassland swards. In addition to mowing, the development of such vegetation is also due to the effects of eutrophication from dogs. Common associates include White Clover (*Trifolium repens*), Dandelions, Greater Plantain, Ribwort Plantain (*Plantago lanceolata*), Daisy (*Bellis perennis*) and Wall Barley (*Hordeum murinum*). A variant of this vegetation has been identified, representing areas where Tall Fescue also occurs as a component of the sward along the Hogsmill (P – 1, 8, 22).

Very locally, there are indications of a somewhat more diverse sward with, in particular, the presence of Common Knapweed (*Centaurea nigra*) (P-120). This represents one of a suite of grasslands occupying the 'open space' of the Bones Gate, that appear to be less-frequently-mown than those of the Hogsmill. Owing to the general dominance of Perennial Rye-grass, these have been predominantly been placed within the MG7 category (note P-133 above), although they are somewhat longer and less clearly-defined than those along the Hogsmill. In places (P-134), the sward appears quite rank and weedy, supporting species such as Chickweed (*Stellaria media*), Creeping buttercup, Smooth Hawk's-beard (*Crepis capillaris*), Dandelion, Cow Parsley (*Anthriscus sylvestris*), White Dead-nettle (*Lamium album*), Broad-leaved Dock (*Rumex obtusifolius*) and Hogweed (*Heracleum sphondylium*).

Weed and ruderal Communities

The NVC recognises a suite of communities associated with weedy/ruderal/open/disturbed habitats. Extensive stands occur within the site, with a total of 62 (i.e. 43%) of mapped polygons supporting 5% or more cover of weed/ruderal-dominated vegetation of some kind.

OV24/25 *Urtica dioica – Galium aparine* community and *Urtica dioica – Cirsium arvense* community

There is considerable overlap between the characteristic forms of these two communities and they have therefore been grouped together. Both in effect, are Common Nettle-dominated vegetation. O**V24** has Common Nettle as the overwhelming dominant in a species-poor sward, where Cleavers (*Galium aparine*) is the only constant associate. O**V25** has a more patchy, open cover of Nettles and is thus more diverse, with other associates present, including Thistles (*Cirsium* spp.) in particular. Other common associates of these two communities include Hedge Bindweed (*Calystegia sepium*), Field Bindweed, Hogweed and Bramble (*Rubus fruticosus* agg.). Noted occasionally were Black Horehound (*Ballota nigra*), Russian Comfrey (*Symphytum* x *uplandicum*), Burdock (*Arctium* sp.), Greater Willowherb (*Epilobium hirsutum*) and White Dead-nettle (*Lamium album*).

Extensive stands of these communities occur especially along the unmanaged fringes of the site, including beside the two watercourses. One further, frequent and locally abundant associate, beside the Bones Gate Stream within stands of Common Nettle, is Himalayan Balsam (*Impatiens glandulifera*). The plant also occurs along the Hogsmill River downstream of where it is joined by the Bones Gate Stream, but is not present on the Hogsmill upstream of this point.

Of the 62 polygons supporting weed/ruderal vegetation at more than 5% cover, all but one contain either **OV24** or **OV25**, thus making Common Nettle-dominated vegetation by far the most frequently-occurring weed/ruderal community within the site.

OV26 *Epilobium hirsutum* community

Whilst Greater Willowherb was found as a component of the **OV24/25** stands, in several small areas (in just 3 polygons) it was found to occur as discrete stands, representing the **OV26** *Epilobium hirsutum* community.

OV27 *Epilobium angustifolium* community

Just one small stand of Rose-bay Willow-herb (*Chamerion angustifolium*) was recorded.

Non-referable weed/ruderal communities

Some stands of weed-dominated vegetation could not be assigned to NVC types. One of the main examples was found on the banks of the Hogsmill river, where there had been recent ground disturbance as a result of reconstructing the road bridge over the B284 (P – 3, 15, 93, 143). A further example is located along recently-constructed earth bunds beside a gravelled path crossing the Bones Gate (P – 127) This vegetation is characterised by an abundance of Oraches (*Atriplex* spp.) and Goosefoots (*Chenopodium* spp.). Other associates noted (not necessarily at both locations) include, Mugwort (*Artemisia vulgaris*), Scentless Mayweed

(*Tripleurospermum inodorum*), Smooth Sow-thistle (*Sonchus oleraceus*), Knotgrass (*Polygonum aviculare*), Burdocks, Creeping Thistle, Nipplewort (*Lapsana communis*), Poppies (*Papaver* sp.), Prickly Lettuce (*Lactuca serriola*), Bristly Ox-tongue (*Picris echioides*), Russian Comfrey, and Shepherd's Purse (*Capsella bursa-pastoris*). Noted specifically in the Bones Gate example were Goat's Rue (Galega *officinalis*) and Hoary Mustard (*Hirschfeldia incana*).

The final example of vegetation under this heading relates to several small stands of Japanese Knotweed (*Fallopia japonica*) found beside the Bones Gate Stream (2 polygons, i.e. P – 128, 135).

Swamp Communities

Examples of this type of vegetation are of extremely limited occurrence.

S28 *Phalaris arundinacea* tall-herb fen

A single small area of this vegetation, overwhelmingly dominated by Reed Canary-grass (*Phalaris arundinacea*) was found at the margin of the Hogsmill Open Space (P – 63). Other associates include locally frequent Meadowsweet (*Filipendula ulmaria*) and Hairy Sedge (*Carex hirta*), occasional/frequent Greater Willowherb, locally occasional Creeping Thistle, plus rare Water Figwort (*Scrophularia auriculata*) and Pendulous Sedge (*Carex pendula*). A wet area within this vegetation also includes Bulrush (*Typha latifolia*) and Watercress (*Rorippa nasturtium-aquaticum*).

A further small area of swamp/marginal aquatic vegetation was found along a short section of the original course of the Hogsmill River (P – 50). Dense marginal vegetation growth made this feature largely impossible to examine. However, those sections that could be viewed were found to support locally abundant (*Glyceria maxima*), with Common Duckweed (*Lemna minor*) and Fool's Watercress (*Apium nodiflorum*) also being noted. At the time of field surveys, it was understood that all other watercourses did not form part of the site and they were therefore excluded.

Appendix II – Hogsmill Local Nature Reserve Species Lists

The following lists have been extracted from various sources, outlined as appropriate in the following sections. These lists are intended to bring together all known information sources. They do not represent a full inventory of all taxa occurring at the Local Nature Reserve (indeed, such an undertaking would be impossible for any site). Therefore, these lists should be viewed as being very much incomplete, but representing the fullest information about the site at the present time.

Vascular Plants, Bryophytes and Lichens

This list represents a combination of species recorded during summer 2004 by Karl Crowther (KAC), plus records made during the survey by Surrey Wildlife Trust during the SNCI survey of 1998 (note that this covered a slightly different area to that being considered by this Management Plan). Many species were recorded by both surveys. However, to avoid repetition, records from the SWT survey have only been specified where they relate to plants not recorded during 2004. Unless otherwise indicated, the listed species have been recorded from both the Hogsmill and the Bones Gate (HM = Hogsmill only; BG = Bones Gate only). In addition, an old botanical record from the Hogsmill (see below) has been made available by A. Sankey, the BSBI Vice County recorder for Surrey. A record for one additional species has also been provided by the Environmental Report of the Hogsmill River Rehabilitation Project (Anon, 2005) (shown as HRRP). Several records have been derived from a survey done by Alison Fure (shown as AF) as part of Culvert Strengthening on the Moor Lane Bridge over the Bones Gate Stream (Fure, 2004). Part of the area covered by this survey lies outside the EEBC Bones Gate Open Space.

Latin name	Vernacular name	Comments
Acer campestre	Field Maple	
Acer platanoides	Norway Maple	Planted
Acer pseudoplatanus	Sycamore	
Acer cf. *rubrum*	Red Maple	(HM), Planted
Achillea millefolium	Yarrow	
Aegopodium podagraria	Ground Elder	(BG)
Aesculus hippocastanum	Horse Chestnut	(HM)
Agrimonia eupatoria	Agrimony	
Agrostis capillaris	Common Bent	(HM),(SWT)
Agrostis stolonifera	Creeping Bent	
Alliaria petiolata	Crow Garlic	
Alnus cordata	Italian Alder	(HM)
Alnus glutinosa	Alder	(HM)
Alnus incana	Grey Alder	(HM), Planted
Alopecurus pratensis	Meadow Foxtail	(HM)
Anthriscus sylvestris	Cow Parsley	
Apium nodiflorum	Fool's Watercress	(HM)
Arctium sp.	A Burdock	
Armoracia rusticana	Horseradish	
Arrhenatherum elatius	False Oat-grass	
Artemisia vulgaris	Mugwort	
Arum maculatum	Lords and Ladies	(HM)
Aster novi-belgii	Michaelmas Daisy	(HM) – Established alien
Atriplex prostrata	Spear-leaved Orache	
Atriplex sp.	An Orache	(HM)
Ballota nigra	Black Horehound	
Bellis perennis	Daisy	(HM)
Betula pubescens	Downy Birch	
Brachypodium sylvaticum	False-brome	

Latin name	Vernacular name	Comments
Bromopsis ramosa	Hairy Brome	(HM)
Calltiriche cf. *platycarpa*	Various-leaved Water-starwort	(HM)
Callitriche stagnalis s.s.	Common Water-starwort	(HM) (SWT)
Callitriche sp.	A Water-starwort	(HM)
Calystegia sepium	Hedge Bindweed	(HM)
Capsella bursa-pastoris	Shepherd's Purse	
Carex hirta	Hairy Sedge	(HM)
Carex pendula	Pendulous Sedge	(HM)
Carex sylvatica	Wood Sedge	(HM)
Carpinus betulus	Hornbeam	(HM); Planted
Castanea sativa	Sweet Chestnut	(HM)
Cedrus sp.	A Cedar	(HM)
Centaurea nigra	Common Knapweed	
Cerastium fontanum	Common Mouse-ear	(BG)
Chamerion angustifolium	Rose-bay Willow-herb	(HM)
Chenopodium album	Fat-hen	
Chenopodium polyspermum	Many-seeded Goosefoot	(HM)
Circaea lutetiana	Enchanter's Nightshade	(HM) (SWT)
Cirsium arvense	Creeping Thistle	
Cirsium palustre	Marsh Thistle	(HM)
Cirsium vulgare	Spear Thistle	(HM)
Convolvolus arvensis	Field Bindweed	(HM)
Cornus sanguinea	Dogwood	
Corylus avellana	Hazel	
Crataegus monogyna	Hawthorn	
Crataegus sp.	A Hawthorn	(probably *C. laevigata* hybrid) (HM)
Crepis capillaris	Smooth Hawk's-beard	(HM)
Cymbalaria muralis	Ivy-leaved Toadflax	(HM)
Dactylis glomerata	Cock's-foot	
Daucus carota	Wild Carrot	(BG) (AF)
Elymus caninus	Bearded Couch	(HM) (SWT)
Elytrigia repens	Common Couch	
Epilobium hirsutum	Greater Willowherb	(HM)
Equisetum arvense	Field Horsetail	(BG)
Euphorbia peplus	Petty Spurge	(HM) (SWT)
Fagus sylvatica	Beech	(HM) Probably planted
Fallopia baldschuanica	Russian Vine	(BG); Garden escape
Fallopia convolvolus	Black Bindweed	(BG) (AF)
Fallopia japonica	Japanese Knotweed	(BG); Invasive alien
Festuca arundinacea	Tall Fescue	
Festuca gigantea	Giant Fescue	(HM) (SWT)
Festuca rubra	Red Fescue	
Filipendula ulmaria	Meadowsweet	

Latin name	Vernacular name	Comments
Fraxinus angustifolia	Narrow-leaved Ash	(HM); Planted
Fraxinus excelsior	Ash	
Galega officinalis	Goat's Rue	(BG); invasive alien
Galium aparine	Cleavers	
Geranium dissectum	Cut-leaved Cranesbill	(HM) (SWT)
Geranium cf. *pusillum*	Small-flowered Cranesbill	(BG)
Geranium molle	Dove's-foot Cranesbill	(BG) (HM - SWT)
Geranium pyrenaicum	Hedgerow Cranesbill	(HM) (SWT)
Geranium robertianum	Herb Robert	(HM)
Geranium spp.	Cranesbills	Garden escapes
Geum urbanum	Wood Avens	
Glechoma hederacea	Ground Ivy	
Glyceria maxima	Reed Sweet-grass	(HM)
Hedera helix	Ivy	
Heracleum sphondylium	Hogweed	
Hippuris vulgaris	Mare's-tail	(BG) (AF)
Hirschfelida incana	Hoary Mustard	(BG)
Holcus lanatus	Yorkshire Fog	
Holcus mollis	Creeping Soft-grass	(HM) (SWT)
Hordeum murinum	Wall Barley	
Hordeum secalinum	Meadow Barley	(HM)
Humulus lupulus	Hop	(HM) - (SWT)/BG
Hypochaeris radicata	Cat's-ear	(HM)
Ilex aquifolium	Holly	(HM)
Impatiens glandulifera	Himalayan Balsam	Invasive alien
Iris foetidissima	Stinking Iris	
Iris pseudacorus	Yellow Flag	(HM)
Juncus effusus	Soft Rush	(HM) (SWT)
Juncus inflexus	Hard Rush	(HM) (SWT)
Juglans regia	Walnut	(HM); ?self-sown
Lactuca serriola	Prickly Lettuce	
Lamium album	White Dead-nettle	(HM)
Lamium purpureum	Red Dead-nettle	(HM) (SWT)
Lapsana communis	Nipplewort	(HM)
Lathyrus pratensis	Meadow Vetchling	(HM) (SWT)
Leontodon autumnalis	Autumn Hawkbit	
Lemna minor	Common Duckweed	(HM)
Leucanthemum vulgare	Ox-eye Daisy	(BG)
Leucojum aestivum ssp. *aestivum*	Summer Snowflake	(HM) – 1939 record (A. Sankey, pers. comm).
Ligustrum ovalifolium	Garden Privet	(HM); Garden escape
Ligustrum vulgare	Wild Privet	(HM)
Lolium perenne	Perennial Rye-grass	
Lonicera periclymenum	Honeysuckle	(HM)

Latin name	Vernacular name	Comments
Lotus corniculatus	Bird's-foot Trefoil	(HM)
Lunaria annua	Honesty	(HM)
Malus sylvestris	Crab Apple	(HM)
Malus sp.	An Apple	(HM); Planted
Malva sylvestris	Common Mallow	(HM)
Matricaria discoidea	Pineappleweed	(HM)
Myosotis scorpioides	Water Forget-me-not	(HM) (HRRP)
Odontites vernus	Red Bartsia	(BG) (AF)
Oenanthe crocata	Hemlock Water-dropwort	(HM)
Paeonia officinalis	Garden Peony	(HM); Garden escape
Papaver sp.	A Poppy	(HM)
Persicaria amphibia	Amphibious Bistort	(HM)
Persicaria maculosa	Redshank	(HM)
Petasites hybridus	Butterbur	(HM)
Phalaris arundinacea	Reed Canary-grass	(HM)
Phleum pratense	Timothy	(HM)
Phragmites australis	Common Reed	(HM)
Picris echioides	Bristly Ox-tongue	(HM)
Pinus sylvestris	Scots Pine	(HM); Planted
Pinus sp.	A Pine	(HM); Planted
Plantago lanceolata	Ribwort Plantain	
Plantago major	Greater Plantain	
Platanus x *hispanica*	London Plane	(HM); Planted
Poa annua	Annual Meadow-grass	
Poa pratensis	Smooth Meadow-grass	(HM)
Poa trivialis	Rough Meadow-grass	(HM) (SWT)
Polygonum aviculare	Knotgrass	
Populus alba	White Poplar	(HM); Planted
Populus x *canadensis*	Hybrid Black Poplar	(HM); Planted
Populus x *canescens*	Grey Poplar	(HM); Planted
*Populus nigra** [1]	Black Poplar	Planted
Populus nigra 'italica'	Lombardy Poplar	(HM); Planted
Populus tremula	Aspen	(BG); Planted
Populus sp.	A Balsam Poplar	(HM); Planted
Potamogeton crispus	Curled Pondweed	(HM) (SWT)
Potentilla anserina	Silverweed	(BG)
Potentilla reptans	Creeping Cinquefoil	
Prunus avium	Wild Cherry	(HM) (SWT)
Prunus domestica ssp. *domestica*	Plum	(HM) (SWT); Planted
Prunus laurocerasus	Cherry Laurel	(HM) (SWT)
Prunus spinosa	Blackthorn	
Prunus sp.	Ornamental Plum/Cherry	Planted
Pyrus sp.	A Pear	(HM); Planted

Latin name	Vernacular name	Comments
Quercus cerris	Turkey Oak	(HM); Planted
Quercus ilex	Holm Oak	(HM)
*Quercus robur**[2]	Pedunculate Oak	
Quercus cf. *rubra*	Red Oak	(HM); Planted
Ranunculus acris	Meadow Buttercup	(BG)
Ranunculus repens	Creeping Buttercup	
Ranunculus sceleratus	Celery-leaved Buttercup	(HM) (SWT)
Rhus typhina	Stag's-horn Sumach	(HM)
Robinia pseudocacacia	False Acacia	(HM); Planted
Rorippa nasturtium-aquaticum	Watercress	(HM)
Rosa canina	Dog Rose	(HM) (SWT)
Rosa spp.	Roses	
Rubus fruticosus agg.	Bramble	
Rumex acetosa	Common Sorrel	(HM)
Rumex conglomeratus	Clustered Dock	(HM) (SWT)
Rumex obtusifolius	Broad-leaved Dock	
Rumex sanguineus	Wood Dock	(HM)
Salix alba	White Willow	Mainly planted?
Salix caprea	Goat Willow	
Salix cinerea	Grey Willow	(HM) (SWT)
Salix fragilis	Crack Willow	
Salix matsudana 'tortuosa'	Corkscrew Willow (Mitchell)	(HM); Planted
Salix x *sepulcralis*	Weeping Willow	(HM); Planted
Sambucus nigra	Elder	
Scrophularia auriculata	Water Figwort	(HM)
Scrophularia nodosa	Common Figwort	(HM) (SWT)
Senecio erucifolius	Hoary Ragwort	(HM)
Senecio jacobaea	Ragwort	(HM)
Sisymbrium officinale	Hedge Mustard	(HM)
Solanum dulcamara	Bittersweet	(HM)
Sonchus arvensis	Perennial Sow-thistle	(HM) (SWT)
Sonchus oleraceus	Smooth Sow-thistle	
Sorbus aucuparia	Rowan	(BG)
Sparganium erectum	Branched Bur-Reed	(HM)
Stachys palustris	Marsh Woundwort	(BG) (AF)
Stachys sylvatica	Woundwort	
Stellaria media	Chickweed	(BG)
Symphoricarpos albus	Snowberry	(HM); Garden escape
Symphytum x uplandicum	Russian Comfrey	(HM)
Tanacetum vulgare	Tansy	(BG)
Taraxacum officinale agg.	Dandelions	
Taxus baccata	Yew	(HM)
Tilia x europaea	A Lime	(HM) (SWT); Planted

Latin name	Vernacular name	Comments
Tilia spp.	Limes	(HM); Planted
Trifolium campestre	Hop Trefoil	(BG) (AF)
Trifolium pratense	Red Clover	
Trifolium repens	White Clover	(HM)
Tripleurospermum inodorum	Scentless Mayweed	
Triticum sp.	A Wheat	(HM); Casual escape from cultivation
Typha latifolia	Bulrush	(HM)
Ulmus glabra	Wych Elm	(HM) (SWT)
Ulmus procera	English Elm	
Ulmus sp.	An Elm	(HM); Planted
Urtica dioica	Stinging Nettle	
Veronica anagallis-aquatica	Blue Water-speedwell	(HM) (SWT)
Veronica beccabunga	Brooklime	(HM)
Veronica chamaedrys	Germander Speedwell	(HM) (SWT)
Veronica montana	Wood Speedwell	(HM)
Vicia sepium	Bush Vetch	(BG) (AF)
Viola sp.	A Violet	(HM)
Brachythecium rutabulum		
Eurhynchium praelongum		
Rhytidiadelphus squarrosus		(BG)
Xanthoria parietina		(HM)

Notes:

*[1] A planted specimen of Black Poplar (*Populus nigra*) beside the Watersedge Estate adjacent to the Bones Gate Stream, may belong to the 'native' subspecies '*betulifolia'*. However, this area of land was not examined in any detail, as it was added to the area to be covered by the management plan after field surveys has been completed. This therefore requires confirmation.

*2 In the same area of land as the above, a planted tree of what appears to be the '*fastigiata'* variety of *Quercus robur* was noted ('Cypress Oak' in Mitchell, 1978).

Fauna

Note that in the following tables:

Records attributable to the Hogsmill – (HM)
Records attributable to the Bones Gate – (BG)

Vertebrates

Birds

The list of birds has been compiled from sightings by Karl Crowther (KAC) during 2004 whilst undertaking the habitat survey, together with information supplied by Paul Brayshaw (PB) outlining birds noted by him along the Hogsmill during October 2004. A few additional records have been obtained from the Surrey Wildlife Trust (SWT) survey of the Hogsmill during July of 1998. A single additional record (for "Redshank") has been gleaned from the Environmental Report of the Hogsmill River Rehabilitation Project (Anon, 2005), which includes some land outside the Local Nature Reserve boundary, and so could relate to this area instead. This information appears to have originated from Surrey Wildlife Trust's 'Recorder' database and may not in fact be a bird, but the plant *Persicaria maculosa*, which has the same vernacular name.

Key to status :

LBAP = Species on the United Kingdom Biodiversity Action Plan "Long List"
UKSAP = "Priority Species" of United Kingdom Biodiversity Action Plan
SyBAP = Surrey Biodiversity Action Plan species
ECBD (1) = Species listed on Annex 1 of the Council Directive 92/409/EEC on the conservation of wild birds (the 'Birds Directive')

Red/Amber list status taken from the RSPB website (Anon., 2002), based upon Gregory *et al*. (2002). Species on the 'Long List' of the Biodiversity Action Plan have been taken from Appendix F of the 'UK Steering Group report' (UK Biodiversity Steering Group, 1995).

Common Name	Latin name	Conservation status	Comments
Brent Goose	*Branta bernicla*	Amber-listed/LBAP	3 birds noted overhead by PB on 09.10.04 (HM)
Little Grebe	*Tachybaptus ruficollis*		One present at Ewell Court (PB, October 2004) (HM)
Grey Heron	*Ardea cinerea*		KAC, 2004 (HM)
Mallard	*Anas platyhynchos*	LBAP	KAC, 2004 (HM)
Sparrowhawk	*Accipiter nisus*	LBAP	SWT, 14.07.1998 (HM)
Peregrine	*Falco peregrinus*	LBAP/Amber-listed/ECBD (1)	Immature male noted by PB on 24.10.04 (HM)
Moorhen	*Gallinula chloropus*		KAC, 2004 (HM)
Coot	*Fulica atra*		SWT, 14.07.1998 (HM)
Redshank*	*Tringa tetanus*	LBAP (also Amber-listed)	Anon (2005) (HM)

Common Name	Latin name	Conservation status	Comments
Common/Arctic Tern	*Sterna hirundo/paradisaea*	LBAP/ECBD (1) (Arctic also Amber-listed)	Small number noted overhead by PB on 09.10.04 (HM).
Wood Pigeon	*Columba palumbus*		KAC, 2004 (HM). Large numbers noted on passage by PB in late October 2004 (HM).
Ring-necked Parakeet	*Psittacula krameri*		KAC, 2004 (HM). Common visitor with quite frequent sightings.
Kingfisher	*Alecdo atthis*	LBAP/Amber Listed/ECBD (1)	KAC, 2004 (HM). Up to 8 resident birds (PB, October 2004) (HM).
Green Woodpecker	*Picus viridis*	LBAP/Amber Listed	Breeding resident? KAC, 2004 (HM, BG)
Skylark	*Alauda arvensis*	UKSAP/Red Listed	Small numbers seen by PB in October 2004 (HM). Passage migrant?
Swallow	*Hirundo rustica*	LBAP/Amber listed	Noted by PB in small numbers until 22.10.04 (HM)
House Martin	*Delichon urbica*	LBAP/SyBAP /Amber Listed	Last sighting by PB on 17.10.04 (HM)
Swift	*Apus apus*		SWT, 14.07.1998 (HM)
Meadow Pipit	*Anthus pratensis*	LBAP/Amber Listed	Good numbers on autumn migration (PB, October 2004) (HM).
Pied Wagtail	*Mocatilla alba*	LBAP	Small numbers seen by PB in October 2004 (HM). Possible breeding resident?
Grey Wagtail	*Mocatilla cinerea*	Amber-listed/LBAP	SWT, 14.07.1998 (HM)
Yellow wagtail	*Mocatilla flava*	Amber-listed/LBAP	Single bird noted by PB on 02.10.04 (HM).
Wren	*Troglodytes troglodytes*		Breeding resident. KAC, 2004 (HM)
Blackcap	*Sylvia atricapilla*	LBAP	Breeding resident? KAC, 2004 (HM)
Chiffchaff	*Phylloscopus collybita*	LBAP	KAC, 2004 (HM). Present until 31.10.04 at least (PB) (HM). Breeding resident?

Common Name	Latin name	Conservation status	Comments
Firecrest	*Regulus ignicapillus*	LBAP/Amber-listed	Single bird noted by PB on 18.10.04 (HM)
Goldcrest	*Regulus regulus*	LBAP/Amber Listed	Small groups seen by PB in October 2004 (HM)
Robin	*Erithacus rubecula*		Common breeding resident. KAC, 2004 (HM, BG)
Fieldfare	*Turdus pilaris*	LBAP/Amber Listed	Small numbers seen by PB in October 2004 (HM)
Blackbird	*Turdus merula*		Common breeding resident. KAC, 2004 (HM)
Redwing	*Turdus iliacus*	LBAP/Amber Listed	Good numbers on autumn migration (PB, October 2004) (HM).
Long-tailed Tit	*Aegithalos caudatus*		Large flocks of up to 65 (PB, October 2004) (HM). Common breeding resident?
Coal Tit	*Parus ater*	LBAP	Occasional sightings by PB in October 2004 (HM). Scarce winter visitor?
Blue Tit	*Parus caeruleus*	LBAP	KAC, 2004 (HM, BG). Flocks of up to 70 (PB, October 2004) (HM). Common breeding resident
Great Tit	*Parus major*	LBAP	KAC, 2004 (HM). Flocks of up to 20 (PB, October 2004) (HM). Common breeding resident
Marsh Tit	*Parus palustris*	LBAP/Red Listed	3 birds noted near to Ewell Court by PB on 22.10.04 (very unusual) (HM). Rare visitor
Nuthatch	*Sitta europaea*	LBAP	Noted frequently in vicinity of Ewell Court by PB in October 2004 (HM).
Chaffinch	*Fringilla coelebs*		KAC/PB, 2004 (HM). Common breeding resident

Common Name	Latin name	Conservation status	Comments
Brambling	*Fringilla montifringilla*	LBAP	Single bird noted by PB on 18.10.04 (HM)
Greenfinch	*Carduelis chloris*	LBAP	Probably breeding resident. Good numbers seen by PB in October 2004 (HM)
Siskin	*Carduelis spinus*	LBAP	Scarce winter visitor (PB – small numbers in October 2004) (HM)
Goldfinch	*Carduelis carduelis*	LBAP	Flock of 121 birds noted by PB on 18.10.04 (HM)
Linnet	*Carduelis cannabina*	UKSAP/Red Listed	Small numbers seen by PB in October 2004 (HM)
Redpoll	*Acanthis flammea*		Scarce winter visitor (PB – small numbers in October 2004) (HM)
Starling	*Sturnus vulgaris*	Red Listed	KAC, 2004 (HM). Good numbers seen by PB in October 2004 (HM)
Jay	*Garrulus glandarius*		KAC (HM, BG); PB, 2004 (HM)
Magpie	*Pica pica*		Breeding resident? KAC, 2004 (HM, BG)
Rook	*Corvus frugilegus*		Single bird noted by PB on 02.10.04 (HM)
Jackdaw	*Corvus monedula*		KAC, 2004 (BG). Small numbers seen by PB in October 2004 (HM). Possible breeding resident.
Carrion Crow	*Corvus corone corone*		KAC, 2004 (HM). Breeding resident?

Note: The record for Redshank* may have originated through confusion with the vascular plant *Persicaria maculosa* with the same vernacular name within records held on Surrey Wildlife Trust's Recorder database.

Mammals

Records from KAC, 2004; Watersedge Bat Survey (Steve Bailey, 2005); Dave Williams (pers. comm.).

Key to status:

WCA Schedule 5 = Species listed on Schedule 5 of the Wildlife and Countryside Act, 1981
ECHD (IV) = Species listed on Annex IV of the Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (the 'Habitats Directive').
UKSAP = "Priority Species" of United Kingdom Biodiversity Action Plan

Common name	Latin name	Conservation status	Comments
Brown Rat	*Rattus norvegicus*		(HM) (DW)
Fox	*Vulpes vulpes*		Seen occasionally (KAC) after heavy rain (few people about) (HM)
Grey Squirrel	*Sciurus carolinensis*		Fairly common (both sites) (KAC)
Common Pipistrelle	*Pipistrellus pipistrellus*	WCA Schedule 5; UKSAP; ECHD (IV)	Frequent foraging activity at Watersedge (SB)
Noctule	*Nyctalus noctula*	WCA Schedule 5; ECHD (IV)	Site represents part of regularly-used flight line (SB)
Soprano Pipistrelle	*Pipistrellus pygmaeus*	WCA Schedule 5; UKBAP; ECHD (IV)	Foraging activity at Watersedge (SB)
Non-determined myotid bat*[1]	*Myotis* sp.	Not known (but all bats are WCA Schedule 5 and ECHD (IV)	Possible record of single bat in transit at Watersedge (SB)

Notes:
*[1] This is considered most likely to be Daubenton's (*Myotis daubentonii*).

Fish

Records extracted from Environmental Report of Hogsmill River Rehabilitation Project (Anon, 2005).

Key to status:

ECHD (II) = Listed on an Annex II to the Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (the 'Habitats Directive').

Common name	Latin name	Conservation status	Comments
Bullhead	*Cottus gobio*	LBAP; ECHD (II)	Hogsmill or 'in vicinity'
Eel	*Anguilla anguilla*		Hogsmill, near BG confluence
3-spined Stickleback	*Gasterosteus aculeatus*		Hogsmill, near BG confluence

Herptiles

No records known (this undoubtedly reflects a lack of records rather than an absence of herptiles).

Invertebrates

Records come mainly from the Surrey Wildlife Trust (SWT) SNCI survey of 1998, with a few from Stewart Cocker (SC) and Karl Crowther (KAC) during 2004. In addition, a small number of records from 2005 have very recently come to light from Martin Skipper (MS) and Ian Menzies (ISM).

Key to Status:

RDB = Nationally rare species, recorded in 1-15 national hectads (RDB1 = endangered; RDB2 = vulnerable; RDB3 = rare).

Common name	Latin name	Status	Comments
Lepidoptera (butterflies and moths)			
Comma	*Polygonia c-album*		SWT, 14.07.1998 (HM)
Gatekeeper	*Pyronia tithonus*		SWT, 14.07.1998 (HM)
Large Skipper	*Ochlodes venata faunus*		SWT, 14.07.1998 (HM)
Meadow Brown	*Maniola jutrina*		SWT, 14.07.1998 (HM)
Red Admiral	*Vanessa atalanta*		SWT, 14.07.1998 (HM)
Ringlet	*Aphantopus hyperantus*		SWT, 14.07.1998 (HM)
Small Skipper	*Thymelicus sylvestris*		SWT, 14.07.1998 (HM)
Small Tortoiseshell	*Aglais urticae*		SWT, 14.07.1998 (HM)
Small White	*Pieris rapae*		SWT, 14.07. 1998 (HM); KAC, 2004 (HM, BG)
Speckled Wood	*Pararge aegaria*		Numerous (KAC, 2004) (HM, BG)

Common name	Latin name	Status	Comments
Odonata (Dragonflies and Damselflies)			
Beautiful Demoiselle	*Calopteryx virgo*		SC (HM, BG)
Common Blue Damselfly	*Enallagma cyathigerum*		SC (HM, BG)
Common Darter	*Sympetrum striolatum*		Occasional sightings (KAC, 2004) (HM)
Large Red Damselfly	*Pyrrhosoma nymphula*		SC (HM, BG)
Hemiptera (Bugs)			
Water Cricket	*Velia caprai*		SWT, 14.07.1998 (HM)
Coleoptera (Beetles)			
A ladybird	*Clitosthetus arcuatus*	RDB1	ISM, 2005
7-spot Ladybird	*Coccinella 7-punctuta*		KAC, 2004 (HM)
Hymenoptera (Ants, Bees and Wasps)			
Common wasp	*Vespula vulgaris*		KAC, 2004 (HM)
Crustaceans			
Freshwater Shrimp	*Gammarus pulex*		MS, 2005 (HM)
Annelids			
A leech	*Dina lineata*		MS, 2005 (HM)

Appendix III – Byelaws

The following byelaws are for Alexandra Recreation Ground, Auriol Recreation Ground Court Recreation Ground, Ewell Court Recreation Ground (Poole Road), Gibraltar Recreation Ground, Rosebery Park, Shadbolt Park, and the Hogsmill Open Space.

With respect to **pleasure grounds and open spaces** made under Section 164 of the Public Health Act, 1875, and Section 15 of the Open Spaces Act, 1906, by the Mayor Aldermen and Burgesses of the Borough of Epsom and Ewell acting by the Council with respect to the PLEASURE GROUNDS AND OPEN SPACES.

1. Throughout these Byelaws the expression "the Council" means the Mayor, Aldermen and Burgesses of the Borough of Epsom and Ewell acting by the Council and the expression "The pleasure ground" means except where inconsistent with the context, each of the pleasure grounds and open spaces known as Alexandra Road, Auriol, Court, Ewell Court, and Gibraltar Recreation Grounds, Rosebery Park, Shadbolt Park and Hogsmill Open Space.

2. An act necessary to the proper execution of his duty in the pleasure ground by an officer of the Council or by any person employed by the Council shall not be deemed an offence against these Byelaws.

3. A person shall not in the pleasure ground
(a) carelessly or negligently deface, injure or destroy any wall or fence in or enclosing the pleasure ground, or any building, barrier, railing, post or seat or any erection or ornament;
(b) climb any wall or fence in or enclosing the pleasure ground, or any tree, or any barrier, railing, post, or other erection;
(c) wilfully, carelessly, or negligently remove or displace any barrier, railing, post or seat, or any part of any erection or ornament, or any implement, provided for use in the laying out or maintenance of the pleasure ground.

4. A person shall not bring or cause to be brought into the pleasure ground any cattle, sheep, goats, or pigs, or any beast of draught or burden, unless, in pursuance of an agreement with the Council, or otherwise in the exercise of any lawful right or privilege, he is authorised to do so.

5.
(a) A person shall not ride any bicycle or horse in the pleasure ground.
(b) A person shall not bring or cause or be brought into the pleasure ground any barrow, truck, machine, or vehicle, unless intended for the conveyance of a child or children or an invalid.
Provided that, where the Council set apart a space in the pleasure ground for the use of vehicles, this Byelaw shall not be deemed to prohibit the driving or wheeling in or to that space of vehicles of the class for which it is set apart.

Provided also that this Byelaw shall not be deemed to prohibit the wheeling of any bicycle or other similar machine on any footpath in the pleasure ground.

6. A person who brings a machine or vehicle into the pleasure ground shall not wheel or station it over or upon
(i) any flower bed, shrub, or plant, or any ground in course of preparation as a flower bed, or for the growth of any tree, shrub, or plant;
(ii) any part of the pleasure ground where the Council by a notice board affixed or set up in some conspicuous position in the pleasure ground prohibit its being wheeled or stationed.

7. A person shall not in the pleasure ground walk, run, stand, sit, or lie upon
(i) any grass, turf, or other place where adequate notice to keep off such grass, turf, or other place shall be placed.
Provided that such notice shall not apply to more than one-sixth of the area of the pleasure ground.
(ii) any flower bed, shrub, or plant, or any ground in course of preparation as a flower bed, or for the growth of any tree, shrub or plant.

8. A person shall not in the pleasure ground
(i) remove, cut, or displace any soil, turf, or plant;
(ii) pluck any bud, blossom, flower, or leaf of any tree, shrub, or plant.

9. A person shall not in the pleasure grounds known as Ewell Court Recreation Ground, Rosebery Park, and Shadbolt Park
(i) bathe, or wash, in the ornamental lake, or other water;
(ii) wilfully, carelessly, or negligently foul or pollute any such water;

(iii) take, injure, or destroy, or attempt to take, injure, or destroy any fish in any such water, or wilfully disturb or worry any waterfowl; provided that this Byelaw shall not be deemed to apply in any case where a person has obtained the permission of the Council to fish in the lake in the pleasure ground known as Ewell Court Recreation Ground.

10. A person shall not cause or suffer any dog belonging to him or in his charge to enter or remain in the pleasure ground, unless such dog be and continue to be under proper control, and be effectually restrained from causing annoyance to any person, and from worrying or disturbing any animal or waterfowl, and from entering any ornamental water.

11. Where the Council set apart any such part of the pleasure ground as may be fixed by the Council, and described in a notice board affixed or set up in some conspicuous position in the pleasure ground, for the purpose of any game specified in the notice board, which by reason of the rules or manner of playing, or for the prevention of damage, danger, or discomfort to any person in the pleasure ground may necessitate, at any time during the continuance of the game, the exclusive use by the player or players of any space in such part of the pleasure ground - a person shall not in any space elsewhere in the pleasure ground play or take part in any game so specified in such a manner as to exclude persons not playing or taking part in the game from the use of such space.

12. A person resorting to the pleasure ground and playing or taking part in any game for which the exclusive use of any space in the pleasure ground has been set apart shall
(i) not play on the space any game other than the game for which it is set apart;
(ii) in preparing for playing and in playing, use reasonable care to prevent undue interference with the proper use of the pleasure ground by other persons;
(iii) when the space is already occupied by other players not begin to play thereon without their permission;
(lv) where the exclusive use of the space has been granted by the Council for the playing of a match, not play on that space later than a quarter of an hour before the time fixed for the beginning of the match unless he is taking part therein;
(v) except where the exclusive use of the space has been granted by the Council for the playing of a match in which he is taking part, not use the space for a longer time than two hours continuously, if any other player or players make known to him a wish to use the space.

13. A person shall not in any part of the pleasure ground which may have been set apart by the Council for any game play or take part in any game when the state of the ground or other cause makes it unfit for use and a notice is set up in some conspicuous position prohibiting play in that part of the pleasure ground.

14. A person shall not in the pleasure ground
(i) except as hereinafter provided erect any post, rail, fence, pole, tent, booth, stand, building, or other structure.
Provided that this prohibition shall not apply where upon an application to the Council they grant permission to erect any post, rail, fence, pole, tent, booth, stand, building, or other structure, upon such occasion and for such purposes as are specified in the application;
(ii) beat, shake, sweep, brush, or cleanse any carpet, drugget, rug, or mat, or any other fabric retaining dust or dirt;
(iii) hang, spread, or deposit any linen or other fabric for drying or bleaching.

15. A person shall not in the pleasure ground wilfully obstruct, disturb, interrupt, or annoy any other person in the proper use of the pleasure ground, or wilfully obstruct, disturb, or interrupt any officer of the Council in the proper execution of his duty, or any person or servant of any person employed by the Council in the proper execution of any work in connection with the laying out or maintenance of the pleasure ground.

16. Every person who shall offend against any of these Byelaws shall be liable on summary conviction to a fine not exceeding two pounds.

17. Every person who shall infringe any Byelaw for the regulation of the pleasure ground may be removed therefrom by any officer of the Council, or by any constable, in any one of the several cases hereinafter specified: that is to say -
(i) Where the infraction of the Byelaw is committed within the view of such officer or constable, and the name and residence of the person infringing the Byelaws are unknown and cannot be readily ascertained by such officer or constable;
(ii) where the infraction of the Byelaw is committed within the view of such officer or constable, and, from the nature of such infraction, or from any other fact of which such officer or constable may have knowledge, or of which he may be credibly informed there may be reasonable ground for belief that the continuance in the pleasure ground of the person infringing the Byelaw may result in another infraction of a Byelaw, or that the removal of such person from the pleasure ground is otherwise necessary as a security for the proper use and regulation thereof.

The Common Seal of the Mayor Aldermen and Burgesses of the Borough of Epsom and Ewell was here-unto affixed in pursuance of a resolution passed at a meeting of the Council duly convened and held on the 26th day of July, 1949, in the presence of

F. TOMLIN,

Mayor.

EDWARD MOORE,
Town Clerk.

I hereby confirm the foregoing byelaws and fix the date upon which they are to come into operation as the 1st November, 1949.

J. CHUTER EDE,
One of His Majesty's
Principal Secretaries of State.
Whitehall, 1st October, 1949

BYELAWS

Made under Section 164 of the Public Health Act 1875 Section 15 of the Open Spaces Act 1906 and Section 92 and Schedule 3 of the Criminal Justice Act 1967, by the Mayor Aldermen and Burgesses of the Borough of Epsom and Ewell acting by the Council with respect to the PLEASURE GROUNDS AND OPEN SPACES.

1. In these Byelaws 'the Byelaws of 1949' means the series of Byelaws made by the Council of the Borough of Epsom and Ewell on the 26th day of July, 1949, and confirmed by the Home Secretary on the 1st day of October, 1949.

2. From and after the date upon which these Byelaws come into operation for the words 'two pounds' contained in Byelaw 16 of the Byelaws of 1949 there shall be substituted the words **'twenty pounds'.**

3. These Byelaws shall be read and construed as one with the Byelaws of 1949.
THE COMMON SEAL of the Mayor Aldermen and Burgesses of the Borough of Epsom and Ewell was hereunto affixed in pursuance of A resolution passed at a meeting of the Council duly convened and held on the 12th day of December, 1968 in the presence of

T. G. HOILAND
Mayor.

EDWARD MOORE
Town Clerk.

The Secretary of State this day confirmed the foregoing byelaws and fixed the date on which they are come into operation as 1st June 1969.

N. CAIRNCROSS
An Assistant Under Secretary of State
Home Office
Whitehall
29th April, 1969