# ARNOS VALE CEMETRY

## LANDSCAPE MANAGEMENT PLAN
## 2010-2015

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**APPENDICES**




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**Landscape Management Plan**

## 1.0 Introduction

Arnos Vale Cemetery is a 45 acre site, the boundary of which is set out at Appendix 1. The Cemetery is presently held on a license by Arnos Vale Cemetery Trust from Bristol City Council who will grant a 99 year lease from April 2012.

Arnos Vale Cemetery is included on the English Heritage Register of Parks and Gardens of Special Historic Interest as a Grade II* site. There are approximately 1600 historic parks and gardens on the English Heritage register compared with more than 500,000 listed buildings. This selectivity underlines the great importance of those historic parks and gardens which appear on the Register. The cemetery buildings, part of the landscape, and listed tombs and monuments have been restored following years of neglect under the previous owners.

This plan has been prepared following completion of the Heritage Lottery Funded restoration project which was delivered jointly by Arnos Vale Cemetery Trust and Bristol City Council. It sets out the ongoing development of the site to achieve the Trust's vision and maintenance and management of the landscape.

## 2.0 Landscape Description

Arnos Vale Cemetery is a working cemetery, and is subject to statutory regulation. Two Gardens of Rest are used to scatter cremated remains and for visitors to place flowers for their loved ones. It contains over 150,000 burials with a number of tombs and monuments of distinction

The cemetery occupies over 45 acres of steep hillside and was once part of the grounds of the Arnos Vale Estate. It is prominently visible from much of central Bristol.

Laid out between 1836 and 1840, it is one of this country's first metropolitan cemeteries. Like Kensal Green (1833), Highgate (1839) and others, it was created both in response to the overcrowding of existing city churchyard burial grounds and to take advantage of a perceived new business opportunity for the cemetery company's shareholders.

The architect of the early buildings is Charles Underwood, but no designer is credited with the layout of the grounds. The pre-eminent authority on cemetery layout at the time was John Claudius Loudon. However, he makes no mention of Arnos Vale in his book *On the Laying Out, Planting and Managing of Cemeteries and on the Improvement of Churchyards* (1843) and it seems more probable that the design was undertaken either by Charles Underwood himself, or by one of the many nurseries in the Bristol area.

The formal, Arcadian-style landscape of the original (lower) Cemetery was laid out between 1837 and 1839. A selection of planted specimen trees was integral to the design, including an avenue of Irish yews (*Taxus baccata 'fastigiata'*), 2 Austrian pines (*Pinus maritima*), Western red cedar (*Thuya plicata*), a monkey puzzle or Chilean pine (*Araucaria araucana*) and a deodar or Himalayan cedar (*Cedrus deodara*).

There are many other outstanding trees including English yews (*Taxus baccata*), veteran horse chestnuts (*Aesculus hippocastanum*) and English oak (*Quercus robur*).

Behind the Anglican chapel, two weeping ash trees (*Fraxinus excelsior* cv 'Pendula') are the likely sources of thousands of ash (*Fraxinus excelsior*) saplings which, together with those of sycamore (*Acer pseudoplatanus*), have turned much of the 45 acre site into secondary woodland since the 1970's, suppressing the plants and reducing the variety of wildlife.

The entire cemetery is located within the Arnos Vale Conservation Area and is designated as a Site of Nature Conservation Interest (SNCI) in the Bristol Local Plan. It contains a mosaic of wildlife habitats, including semi-natural broadleaved woodland, semi-improved neutral grassland, unimproved calcareous grassland and scrub. It is also important for a range of species including insects, slow worms, badgers and breeding birds.

The cemetery has strong social and community links through volunteers, Friends and the popular amenity of an attractive wooded landscape close to the centre of Bristol.

## 3.0 Habitat Types

The main habitats present on the site are:

- secondary woodland dominated by ash and sycamore
- unimproved grassland (species-rich and species-diverse), that survives as remnants threatened by scrub encroachment in the north-western part of the site.
- semi-improved grassland, dominated by false oat-grass, which is concentrated on the hilltop plateau at the southern end of the site;

The under-lying soils are heavy clays derived from Mercia Mudstone. These have weathered to form mildly calcareous soils that are slow to drain.

## 3.1 Woodland

The woodland is widely distributed across the site but is concentrated on and about the steepest slopes that run east-west across the centre of the site and in a separate block in the south-eastern corner of the site. The structure of the woodland is fairly uniform, with most being overwhelmingly dominated by young ash with smaller quantities of sycamore. Much of this woodland is coppice origin, typically over-stood, dense and growing in or close to graves.

Mature trees within the woodland areas include sycamore, ash, hybrid lime, white poplar, black pine, pedunculate oak, atlas cedar, plane, beech, horse chestnut and apple.

The most frequent under-storey species are sapling ash and sycamore, with dense patches of bramble on the edges of some areas of woodland and large clumps of ivy in some areas.

Other widespread species include holly, laurel, laurustinus and hawthorn. English elm occurs in some areas as suckers from now-dead trees; some of the wych elm on site has also died as a result of Dutch Elm Disease, but several live bushes of this species survive.

The ground flora throughout is dominated by ivy, with other frequent species including wood false-brome, cow parsley, goosegrass and hogweed, winter heliotrope, bluebell, primrose, cuckoo flower, wood speedwell and bush vetch, goldilocks buttercup, Ivy broomrape.

There are several dense patches of Japanese knotweed, which have been treated and whose management will be described in section…

In terms of the National Vegetation Classification (NVC) the dominant woodland community is W8 *Fraxinus excelsior-Acer campestre-Mercurialis perennis* woodland of the *Hedera helix* sub-community, with much smaller patches of the *Allium ursinum* sub-community.

A stand of poplars in the north-western side of the Cemetery provides the most important habitat for invertebrates at the cemetery. Four Red Data Book species and four nationally

scarce species were found here. Three of these species have not been recorded elsewhere in south-western England.

### 3.2 Unimproved Grassland

The most important grasslands on the cemetery are in the north-western part of the site.

Grassland here is restricted to small remnants by scrub encroachment, largely along path edges, but also on and around graves. The dominant grass species are upright brome and red fescue, with smaller quantities of a range of other species including yellow oat-grass and wood false-brome. Glaucous sedge is locally frequent. The diversity of herb species in these small patches is high, and includes several indicator species of unimproved grassland such as field scabious, lady's bedstraw, bird's-foot trefoil and creeping restharrow.

In terms of the National Vegetation Classification this grassland is CG3 *Bromopsis erecta* grassland of the *Festuca rubra* sub-community.

A small area of grassland close to the Top Lodge building is dominated by false oat-grass and red fescue, but is less diverse than the previous grasslands. Species recorded here include lady's bedstraw, meadow vetchling, hoary ragwort and black knapweed.

In terms of the National Vegetation Classification this area is MG1 *Arrhenatherum elatius* grassland of the *Centaurea nigra* sub-community.

Locally notable plant species at Arnos Vale include scaly male fern (*Dryopteris affinis*), hard shield fern (*Polystichum aculeatum*), zigzag clover (*Trifolium medium*), spiny restharrow (*Ononis spinosa*) and common cornsalad (*Valerianella locusta*).

Tall herb vegetation supports the rare micro-moth, *Mompha bradleyi* and the bumblebee *Bombus rupestris*. The latter species is possibly becoming more widespread, but Arnos Vale Cemetery probably supports the largest population of this species in Bristol. In addition, the large patches of bush vetch in Upper Cemetery support the fly *Agromyza viciae*, which is new to Britain. Although this species might prove to be fairly widespread with further survey effort, the population at the cemetery is very large and of significance.

### 3.3 Semi-Improved Grassland

A few areas of grassland, including those in the Gardens of Rest and around some of the War Graves, are actively managed. These generally have a sward dominated by perennial rye-grass, but they are moderately rich in plants of unimproved grassland, including bird's-foot trefoil, creeping restharrow, rough hawkbit and lady's bedstraw.

In terms of the National Vegetation Classification these grasslands are MG6 *Lolium perenne-Cynosurus cristatus* grassland of the *Trisetum flavescens* sub-community.

The largest areas of grassland are in the southern part of the cemetery, and occupy much of the Upper Cemetery. They are less diverse than those in the previous category. False oat-

grass is overwhelmingly dominant and few other plants are able to compete with this species, although bush vetch and hedge bindweed are locally frequent. The edges of the grassland, by tracks and graves, are slightly more diverse and additional species here include lesser stitchwort, common catsear and field bindweed.

In terms of the National Vegetation Classification these grassland areas are MG1 *Arrhenatherum elatius* grassland of the *Festuca rubra* sub-community.

Several rare and scarce invertebrate species were recorded in the grassland habitats. Seven of these species have not been recorded elsewhere in the Bristol region, an indication of the conservation importance retained by this habitat despite widespread scrub encroachment. Two of the seven species are particularly associated with the very short and sparse grassland found on road edges and graves. This habitat is generally very important for nesting solitary bees and wasps.

### 3.4 Scrub

There are several substantial areas of scrub on the cemetery. The largest, which are overwhelmingly dominated by bramble, are in Upper Cemetery. Elsewhere there are slightly more diverse areas of scrub. In the north-western part of the cemetery hawthorn is frequent, with other species including wild privet, dog rose, field rose and elder, with non-natives such as cotoneaster, fire-thorn and buddleia.

The ground flora in scrub areas is overwhelmingly dominated by ivy. Other herbaceous species associated with scrub are generally tall ruderals such as rosebay willowherb, hairy willowherb and spear thistle.

In terms of the National Vegetation Classification the scrub is a mixture of W24 *Rubus fruticosus-Holcus lanatus* underscrub and W21 *Crataegus monogyna-Hedera helix* scrub.

A total of 375 species of invertebrate have been identified on the site. This is a high total for a relatively small site in an urban context. Of these species 27 are either rare or scarce in a national context. The proportion of these species at Arnos Vale Cemetery is comparable to that found on most nature reserves. However, if the nationally scarce species are disregarded and only the thirteen more rare Red Data Book Species are considered the cemetery ranks extremely highly compared to nature reserves surveyed in the area. Two of these species had not been recorded in Britain previously. The Red Data Book species recorded are as follows:

| | |
|---|---|
| *Mompha bradleyi* | (a micro-moth) |
| *Mycteophila uliginosa* | (a fungus gnat)* |
| *Platypalpus excisus* | (a hybotid fly)* |
| *Medetera parenti* | (a dolichopodid fly)* |
| *Dasiops calvus* | (a lonchaid fly)* |
| *Lonchaea hackmani* | (a lonchaid fly)* |
| *Cnemacantha muscaria* | (a lauxanid fly) |
| *Pseudolyciella pallidiventris* | (a lauxanid fly) |

| | |
|---|---|
| *Agromyza viciae* | (a leaf-mining fly - new for Britain) |
| *Leiomyza sp* | (an asteiid fly - new for Britain) |
| *Tricimba humeralis* | (a chloropid fly)* |
| *Phaonia canescens* | (a muscid fly) |
| *Paracraspedothrix montivaga* | (a parasitoid fly) |

The six species marked * in the above list are not known from other sites in the Bristol region (and records are sufficient for this absence of records to be meaningful) and would therefore probably become locally extinct if the population at Arnos Vale Cemetery was lost.
Over 80 species of lichen have been recorded on the tombs, buildings, walls and trees of the cemetery. The size of the thalli (patches) shows that most lichens have colonised the site recently, as air quality has improved following a period of very heavy pollution

## 4.0 Protected Wildlife Features

Arnos Vale Cemetery is identified in the Bristol Local Plan as a Site of Nature Conservation Interest (SNCI), in recognition of its citywide importance for wildlife.

### 4.1 Badgers

The cemetery supports one large social group of badgers, whose main sett is close to the non-conformist chapel. Badger activity is widespread across the site and at least thirty graves have small holes or scrapes underneath them. Foraging signs can be found throughout the site.

Badgers appear to be fairly self-contained within the cemetery, but they use single crossing points into the Roman Catholic cemetery and into the gardens to the west of the cemetery and several crossing points between Old Orchard and the woodland and gardens to the south and into Arnos Court Park to the east. Several residents of houses to the west and south of the cemetery report badgers visiting their gardens.

### 4.2 Breeding Birds

A total of 23 species have been recorded breeding on the site; three other species - green woodpecker, collared dove and house sparrow - breed just outside the site but regularly feed on the cemetery. House martin and swift were frequently seen feeding over the cemetery. Some species are widespread across the cemetery. These include blackbird, robin and in particular wren, which is present in very large numbers. Others are more closely associated with particular habitats, as follows:

- Woodland species present in good numbers include chaffinch, blackbird, goldcrest, chiffchaff, wood pigeon and robin. Song thrush is present on some woodland edges. Woodland breeding birds recorded in smaller numbers include stock dove, jay, sparrow hawk and great-spotted woodpecker.

- Species particularly associated with scrub include wren, dunnock and blackcap. Smaller numbers of bullfinch, long-tailed tit and lesser whitethroat were recorded breeding in scrub habitats.

- No grassland-breeding species were recorded, but the grasslands provide an important feeding habitat for woodland nesters such as song thrush and for one species, green woodpecker, which does not nest on the site itself.

The survey confirmed the importance for birds resting during their migrations, suggested by the data search. The cemetery was used by far higher numbers of birds such as blackcap and chiffchaff than actually bred on the site. Species recorded as non-breeding migrants included grasshopper warbler, wood warbler, garden warbler, willow warbler and redstart.

### 4.3 Bats

Recorded species of bats include: Myotid (*Myotis sp*), Serotine (*Eptesicus serotinus*), Long-eared (*Plectocus sp*), probably brown long-eared (*Plectocus auritus*)

The cellar beneath the roadway between the East and West Lodges is a bat roost, used by a single or a small number of lesser horseshoe bats.

The basement below the Crematorium Spielman Centre has been used in the past by either single or small numbers of lesser horseshoe bats, probably during the autumn, winter and/or spring.

No bats roosts were found in trees but it is possible that small numbers might roost in trees in the cemetery, or might do so in the future.

The site does not appear to be heavily used by foraging bats. However, six species were recorded and the cemetery is likely to be an important foraging area for the small number of bats that do use it.

### 4.4 Slow Worms

Slow worms have been found in widespread areas of the site, all on sloping ground with grassland and scattered scrub.

## 5.0 Introduction to Management

For management purposes, the site has been split into named sections and then into numbered compartments.

The works were based on the prescriptions of NPA's Vegetation Clearance Works with Outline Management / Maintenance Operations document, April 2005.

The previous management plan and the subsequent prescriptions have been / will be written in consideration of the presence of the protected species found on the site. Changes were made to the Habitats Regulations which increased legal protection given to the European Protected Species in England in August 2007 (see section 3.2).

Certain management practices will be restricted to less-sensitive times of the year and best-practice methods adopted throughout.

See map showing the habitat types within the Cemetery.

## 5.1 Habitat Management

Whilst the Cemetery was originally designed as a formal, open landscape, the vegetation that was allowed to develop during the long period of neglect has created important habitats for a great variety of birds, mammals, plants and invertebrates. It therefore requires careful management, to conserve its value as a habitat and to ensure that it is safe, both for visitors and monuments.

## 5.2 Woodland and Tree Management

Woodland management over the past few years has focussed on converting to a high forest system via selective thinning of coppice stools and 'singling' i.e. removing all but one stem (tree) per multi-stemmed coppice stool.

- In areas which are heavily over-stood by semi-mature, coppiced sycamore and ash, a programme of coppicing is likely to be most successful on trees which are at pole stage and which are young enough to respond to the lack of light. The regeneration of these younger trees should enhance the structural diversity of the woodland and improve biodiversity.

- Mature trees will be left in their current state, unless they are assessed as being structurally unsafe or diseased. This includes originally-planted species, as well as established mature sycamore, ash and other trees. An annual tree survey will be conducted by a qualified arborist and works will be recommended, to conform to health and safety requirements.

- Veteran and candidate veteran trees, as identified, will benefit from the removal of competition from secondary re-growth within their surrounding zones. Such works will be tailored to each tree, including options to retain shrub and other species of benefit to invertebrates.

- Forestry Commission Felling Licences FLA/018/333, FLA/018/334/05-06 and FLA/018/250/11-12 were granted to allow for selected tree-felling in specified areas, as prescribed by the first management plan and this subsequent plan. Separate applications will be made for works to mature trees as required. A felling licence is not required to prune trees or to undertake safety works, including felling if this is the reason.

- Extensive removal of sycamore and ash saplings will be required annually to manage the structure of the under-storey, to prevent damage to graves caused by trees growing through them and to control scrub encroachment. Saplings should not just be cut and left to allow to coppice: they should be pulled or dug out by the roots as much as possible, or stumps must be treated. Other species of tree-sapling will be allowed to grow to encourage diversity, in appropriate and safe areas only.

- There is an opportunity to increase the volume and diversity of dead wood across the site including leaving standing dead wood where this does not constitute a risk, and leaving cut timber in situ.

- A Woodland Grant Scheme covers the Estate, to provide Woodland Management and Woodland Improvement grants between 2007 and 2012. These have helped to fund the improvements to four principal woodland footpaths and much of the woodland management work.

- All felling and thinning works will be carried out between November and February only.

### 5.3 Grassland Management

- The grass should be allowed to grow long and should be cut in August, to allow the annual flowers to fruit and shed their seeds before the grass is cut. The cuttings should be removed or they will smother new growth and add extra nutrients to the soil as they decompose. Areas of long grass are important for invertebrates, amphibians and small mammals, even when they do not support a wide range of wildflowers.

- Arnos Vale already supports diverse and interesting populations of plants, so wild flowers should not be introduced to the site. This reduces the risk of the naturally-occurring wild flowers being crowded out by different plants, especially if the new plants would not normally have been found on the site. Introducing rare plants can confuse records of the natural distributions of our native species.

- Scrub must be prevented from invading species-rich grassland, where it will reduce the nature conservation value.
- No fertiliser or herbicide should be applied to the grassland as they change the natural composition that the management regimes aim to conserve.
- Spanish bluebells should be removed from the bulb: this species hybridizes with the native species and could eventually cause its disappearance.

### 5.4 Scrub Management

- Scrub is of considerable nature conservation value and provides nesting habitat for a large diversity of birds at Arnos Vale, often at high concentrations. Fruiting scrub species, especially bramble, ivy and hawthorn, provide valuable food sources for birds and other animals in the autumn and winter. Scrub also provides valuable habitat for invertebrates which nectar on the flowers of shrubs such as hawthorn, blackthorn, bramble and ivy. They also use scrub for breeding, the larvae feeding on the leaves and other plant parts.
- The edge habitat is particularly important, where there is plenty of light and shelter, so increasing that edge habitat by cutting "scallops" into the scrub is very beneficial. Scrub can enhance the value of adjacent grassland areas, by providing habitat for animal species that require both habitats, and by providing shelter.
- All heavy scrub management work will be carried out between November and February only.

### 5.5 Pernicious Weeds and Invasive Plant Species

The Cemetery is vulnerable to the spread of several different plant species, introduced in the past through dumping of domestic garden waste which could cause management problems if their populations are allowed to proliferate.

**Japanese Knotweed**

Several large infestations of Japanese Knotweed have been sprayed with a herbicide three times per year since 2003, but the plant is still regenerating in patches. Any work to be carried out in affected areas must be done to minimise the potential risk of causing it to spread or infect other areas.

**Horsetail**

Common Horsetail (Equisetum arvensis) has become prevalent in small areas of the Cemetery and is spreading. It is very difficult to eradicate completely, due to a very robust rhizome / root system, the presence of a silica-based waxy substance on its surface which inhibits penetration of herbicide and the fact that there are no real leaves present to absorb a herbicide. Horsetail should not simply me pulled out as a new shoot will regenerate from the broken node. Control should be attempted through regular and repeated cutting of the vegetative shoots, or through artificially altering the Ph level of the soil, though adding lime (horsetail thrives in nutrient poor, acidic conditions).

**Winter Heliotrope**

Winter Heliotrope (Petasites fragrans) is an herbaceous plant introduced by the Victorians. It has established in a small area on the Cemetery and has spread into an adjacent area which underwent some clearance work. The plant has a robust root system and will regenerate from each broken growth node. Attempts at regular and repeated cutting may help to control the size of the population and contain the spread (preferred). The most effective way to eliminate it (not preferred) is to spray it with a glyphosate-based herbicide just after it has flowered in February/March.

### 5.6 Ivy, Moss, Lichen and Algae

Ivy, lichen, moss and algae have been allowed to develop extensively at Arnos Vale over the last 20 years. Ivy now covers and almost obscures many monuments. It has also colonised many of the older trees.

It is the vision and policy of the AVCT to retain and encourage the growth of the Ivy, lichen, moss and algae and prevent destruction of the habitats these have created through the implementation of a strict management policy.

See Management Policy for Ivy.

## 6.0 Footpaths

The Cemetery is densely-filled with graves, tombs and monuments, many of which have subsided over time due to ground-movement and through a lack of maintenance. A network of original footpaths largely remains accessible, but many have become unsafe and overgrown by vegetation.

A survey of the footpaths was carried out in November 2008 to identify the most regularly-used footpaths and to risk-assess their current state and potential use. Several conclusions were drawn and recommendations made with regards to closures and maintenance. Factors included frequency of use by visitors to graves and areas of historical interest; proximity and number of dangerous and potentially dangerous monuments and headstones; ground conditions (gradient, subsidence, etc); surface conditions (footpath-dressing, trip hazards, etc); condition of adjacent trees and canopy; other general hazards (for example, proximity to Japanese Knotweed infestation).

The footpaths are to be carefully managed, to control access and enhance accessibility whilst conserving any integral wildlife features. This will involve vegetation clearance, surface ameliorations, infrastructure improvements (steps, handrails, seating) and the use of signage and occasional physical barriers. For a detailed summary, refer to the Footpath Maintenance Schedule.

A number of hard-landscape improvements have been carried out as part of the Historic landscape restoration programme (Heritage Lottery-funded).

These include:

- Approximately 450m of improvements to four principal woodland footpaths, incorporating timber-edging, hardcore base, tarmac sub-base, tar-spray and stone-chip dressing, restoration of stone steps.
- Re-surfacing of Bath Road entrance and Ceremonial Way road, incorporating tarmac and tar-spray and stone-chip dressing.
- Installation of new road drainage system on Ceremonial Way.
- Re-surfacing of Richard Smith Road (formerly Poplar Ridge Road), incorporating tarmac and tar-spray and stone-chip dressing.
- Restoration of original stone drainage-gulleys along entire length of Richard Smith Road, feeding into Ceremonial Way drainage system.