AVONMOUTH AND ROYAL PORTBURY DOCKS

Ecological Management Plan 2018-2022

for

The Bristol Port Company

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The information which we have prepared and provided is true, and has been prepared and provided in accordance with the Chartered Institute of Ecology and Environmental Management's Code of Professional Conduct. We confirm that the opinions expressed are our true and professional bona fide opinions.

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1.0 INTRODUCTION & BACKGROUND

Introduction

1.1 This Management Plan has been produced by The Landmark Practice (TLP) on behalf of The Bristol Port Company (TBPC). It describes the ecological and landscape management prescriptions required to maintain and enhance key ecological and green areas of land owned by TBPC within Avonmouth and Royal Portbury Docks (**Figure 2** refers).

Background

1.2 TBPC acquired the Port of Bristol from Bristol City Council in 1991. Keen to ensure that subsequent development of the Estate would not be at the expense of resident wildlife, TBPC commissioned a 'Wildlife and Landscape Masterplan' in 1992. This was further supported by the first Management Plan for Royal Portbury Docks (RPD) in April 1993.

1.3 Due to the preponderance of natural and semi-natural features being concentrated at RPD, this has been the focus of Ecological Monitoring on the Port Estate since 1993. The biennial monitoring has informed on going site management prescriptions, with revisions and updates to the RPD Management Plan subsequently taking place in 1998, 2005 and 2012.

1.4 Since the initial Management Plan for RPD was written in 1993, the character and extent of semi-natural habitats within RPD has changed significantly. Further to this, development at other areas of the Port Estate, more specifically at Avonmouth Docks and Court House Farm has resulted in further change across the Estate. Many of the former fields have now been developed for commercial and industrial usage, with areas of retained habitat bisecting the site. Vole City to the north of Shipway Farm (west of RPD), has become the focus of ecological mitigation and enhancement to facilitate much of the development within the RPD, and is well linked with retained areas to ensure habitat connectivity and allow wildlife passage through an otherwise hostile environment.

1.5 For this next period of management, it was considered beneficial to consolidate all management and monitoring requirements resulting from recent developments (including any European Protected Species (EPS) licence requirements and planning conditions) across both the Avonmouth and Royal Portbury Docks.

1.6 In line with the 2012-2016 Management Plan, this plan aims to identify key ecological areas where targeted habitat management has the potential to result in significant biodiversity gains. This plan will also make clear those management and monitoring requirements associated with any currently held EPS licences and/or planning conditions. Existing wildlife corridors and areas of semi-natural habitats that fall outside of these key areas will be retained and allowed to develop naturally without specific management prescriptions.

2.0 SITE DESCRIPTION

General Description

2.1 The Port Estate is an approximately 800 ha area of land located at the mouth of the River Avon at its confluence with the River Severn with Avonmouth Docks (approximate central grid reference ST 51275 79305) on the northern bank and RPD (approximate central grid reference ST 50210 76998) on the southern.

2.2 The Severn Estuary forms the northern boundary of both Avonmouth and RPD with the River Avon bisecting the two. The site is characteristic of the lower River Severn coastal plain; it is largely flat, with a typical natural height of 7-10 metres AOD.

2.3 The Severn Estuary is designated as a Special Protection Area (SPA), a Special Area of Conservation (SAC), a Site of Special Scientific Interest (SSSI) and a Ramsar site. From here on this complex of sites is referred to as the Severn Estuary European Marine Site (EMS). Some of the coastal and intertidal habitats within the Port Estate fall within the Severn Estuary EMS (**Figure 1** refers). The Severn Estuary is the largest coastal plain estuary in the UK. The Estuary's classic funnel shape is unique in the UK, and contributes to the Severn Estuary having the third highest tidal range in the world. Estuarine fauna includes internationally important populations of waterfowl, invertebrate populations of considerable interest and large populations of migratory fish.

2.4 There are also a number of non-statutory designated Sites of Nature Conservation Interest (SNCI's) covering areas within the Port Estate (**Figure 1** refers).

2.5 The majority of the Port Estate comprises areas that are used for port related activities such as car parks, warehouses, rail and transit services and other industrial type units interlinked and bisected by an extensive network of roads. The Estate also comprises Shipway Farm to the east of Portbury Dock which is under lease to a tenant farmer to manage. The M5 transport corridor lies to the south of the Port Estate.

Biotic Features

2.6 The majority of the Port Estate has been developed for commercial and industrial use. This has resulted in the loss of significant areas of semi-natural habitat, and its replacement with hard-standing and buildings. Nevertheless, where commercially feasible, areas of habitat have been retained. In addition to the retention of important habitat areas in-situ, a significant compensation area has been created on farmland south of Weston-Super-Mare on the Bleadon Levels. The site is subject of an ecological management plan (The Landmark Practice, 2014). Under provisions made by the management plan the site is being managed sensitively for the benefit of a range of species once present on the farmland which now comprises the active working area of Royal Portbury Dock.

2.7 Retained habitat types within the Port Estate include:

- Broadleaved semi-natural & plantation woodland;
- Scrub – both dense/continuous and scattered;
- Unimproved & poor semi-improved grassland;
- Tall ruderal vegetation;
- Swamp and marginal vegetation;
- Standing water;
- Coastal and floodplain grazing marsh;
- Coastal saltmarsh; and
- Intertidal Mudflats

2.8 As stated previously, the target is to maintain habitat connectivity through the Estate where possible, with retained habitats forming a network of green corridors. Two larger areas of habitat are present within RPD, in the form of Vole City (in the west of the Estate) and the area to the east of the M5 motorway and Saltmarsh along the River Avon. Areas within Avonmouth Docks are limited to foreshore areas and the retained areas of the former Railway Sidings.

2.9 A range of notable and protected species are known to be present within the Port Estate including great crested newt, water vole, slow worm, badger, barn owl and Cetti's warbler.

2.10 The intertidal habitats within the Port Estate, found along Portbury Wharf and Avonmouth Foreshore, support a wide variety of overwintering wildfowl and wading birds, including SPA species such as curlew (*Numenius arquata*), dunlin (*Calidris alpina*), redshank (*Tringa totanus*) and shelduck (*Tadorna tadorna*). Peak numbers of birds are recorded in the winter months (October to March) particularly during high tides, with the saltmarsh and creek habitat in the vicinity of Chapel Pill in Royal Portbury Dock and Stup Pill in Avonmouth Docks known to be favoured. Waders including ringed plover (*Charadrius hiaticula*) and oystercatcher (*Haematopus ostralegus*) are also known to breed within the Port Estate.

2.11 Details of those species monitored including their known distribution and populations are provided in the 2015/2016 Ecological Monitoring Report (The Landmark Practice, 2016).

3.0 KEY MANAGEMENT AREAS & OBJECTIVES

3.1 The Port Estate has an assortment of disparate habitats spread across its 800 ha area. As set out above, some of these represent relict habitats which have been retained within the estate following development. Others are large contiguous areas of land which are the focus of much of the ecological management and enhancements which have been developed and implemented. A series of Key Management Areas (KMA) within the Port Estate have been identified where:

- Targeted management has the potential to result in significant ecological gains for existing habitats; or
- Management is required as part of ongoing protected species licences or planning condition requirements relating to port development (**Figure 1** refers).

3.2 The management objectives outlined below are tasks which are required to avoid degradation to the habitats which comprise the KMAs or loss of protected and notable species which the KMAs support. Where the management of an area is required as part of a licence or planning condition obligation, this distinction is made clear to enable compliance.

3.3 Outline and detailed management prescriptions to meet identified objectives are given in **Section 5**.

Vole City

3.4 Vole City is an area of semi-improved grassland in the west of the RPD Estate, bisected by wet ditches, freshwater ponds and mature hedgerows. Notably, the ditches are known to support water vole (*Arvicola amphibius*) whilst several of the ponds are known to support important invertebrate assemblages, great crested newts (*Triturus cristatus*) and water shrews (*Neomys fodiens*). Stands of common reed provide habitat for breeding birds including Schedule 1 species such as Cetti's warbler (*Cettia cetti*). Barn owl (*Tyto alba*) have also been noted using these fields for foraging and part of the focus of management has been to increase the availability of prey (predominantly field and bank voles) for this Schedule 1 bird. Part of this area is designated as a Site of Nature Conservation Interest (SNCI).

3.5 Vole City has been the focus of extensive ecological enhancement and its extent has recently expanded to include two adjacent fields (previously farmed) to provide receptor areas for protected species translocations from other parts of the Estate. Therefore, some aspects of the management of Vole City are in part covered by the requirements of two European Protected Species Mitigation (EPSM) Licences for great crested newts: related to the redevelopment at Plots 33 and 33a at RPD (licence number 2015-13118-EPS-MIT-2) and for the development of land at Court House Farm (licence number 2017-27673-EPS-MIT). Legal obligations under the terms of the licences require management works for the years 2016-2019 and 2017-2025 respectively.

Management Objective – Pond and ditch management

3.6 The ponds and ditches within Vole City are one of the KMAs most important habitat features. Regular management is required to prevent the water bodies becoming inundated with common reed (*Phragmites australis*) and bulrush (*Typha latifolia*) and shaded by encroaching scrub. Management of the ponds and ditches will be rotational and aim to create a range of successional stages across the water bodies within the site.

3.7 Under the requirements of the aforementioned EPSM licences, newly created mitigation/receptor ponds 8, 9 and 10 require specific management measures including the following:

1. Aquatic vegetation management to provide c ⅔ submerged and ¼ to ½ emergent vegetation;
2. Clearance of tree/scrub cover around margins;
3. Desilting and clearance of leaf fall;
4. Checking for fish presence and appropriate removal; and
5. Checking pond condition and remedial action as required.

3.8 The ditches will be managed sensitively in accordance with current best practice detailed in the *Water Vole Conservation Handbook* (Strachan et al. 2011). Desilting (where required) is to take place every 5 years, whilst minimising disturbance of bankside vegetation. This will be achieved by, working on small sections of ditch from one bank at any one time, leaving gaps untouched as refuge areas and no more than 2 thirds of the ditch worked at any one time. Vegetation removal on ditch banks will focus on removing all dense over shading scrub cover with a cut in late autumn (flail cutters set to high 10-15cm) every three years, with either cutting of only one bank in any year or leaving vegetation at intervals as refuges.

Management Objective – Sensitively manage grassland and boundary habitats for wildlife

3.9 Much of Vole City comprises large fields dominated by semi-improved grassland. The fields have typically been managed on a rotational basis, with the main body of the fields cut annually in late summer, and the field margins cut on a three year rotation. Having large field boundaries cut irregularly will promote a tussocky structure valuable for small mammals (in particular as prey items for barn owls). Boundary hedgerows to be managed when required but no more frequently than once in three years on a rotational basis to promote production of flowers, nuts and berries to provide a foraging resource for wildlife. Areas of scrub and ruderal habitats to be managed as required via selective scrub removal to prevent encroachment on grassland habitats and complete succession. These measures balance the requirement to ensure floral diversity with that of providing structural diversity that is important to wildlife.

Area to East of M5

3.10 This area is currently undeveloped and contains a mosaic of semi-improved grassland, scrub, ruderal vegetation surrounding three large waterbodies. This area lies adjacent to the extensive area of saltmarsh along the River Avon (designated as part of the Severn Estuary EMS). The area is also partially designated as an SNCI.

Management Objective – Grassland management

3.11 The western area of semi-improved grassland should be mown/cut at least every three years in late summer to maintain habitat structure and encourage botanical diversity and to prevent the grassland from becoming coarse and rank. The arisings should be removed from site immediately following the cut. The eastern area of grassland nearest the saltmarsh has a tussocky structure unsuited for mowing/cutting, the extent of the grassland in this area should be maintained (and increased if possible) through regular and selective scrub control.

Management Objective – Selective scrub clearance

3.12 Scrub is encroaching upon the semi-improved grassland areas and margins of the waterbodies within this area. To prevent the complete succession to scrub, selective thinning of scrub, bramble and other woody vegetation should be implemented. Extensive scrub control should be implemented in the first two years, with c.50 % of scrub removed. Subsequent scrub control should be completed selectively biennially thereafter.

Management Objective – Pond and ditch management

3.13 This area includes three large waterbodies and several ditches of varying size. The ponds in particular are becoming inundated with common reed and bulrush. Specific management prescriptions in relation to these waterbodies will be set after the first years' scrub clearance when the ponds will be accessible for assessment. Management is likely to take the form of periodic partial removal of marginal and inundation vegetation.

River Avon and Portbury Foreshore

3.14 The Port Estate includes several extensive areas of Saltmarsh, the largest of which comprises approximately 96 hectares of saltmarsh and tidal mudflats along the banks of the River Avon between residential Pill to the south and the confluence of the River Avon and Severn to the north. This KMA also includes Portbury Foreshore which covers the areas along the sea wall between Chapel Pill and the RPD dock entrance lock. The majority of this KMA lies within the Severn Estuary EMS, and is of importance both for the habitats present and the species which they support. Any management must be undertaken in consultation with key stakeholders including Natural England.

Management Objective – Saltmarsh management

3.15 The biennial ecological monitoring has noted significant decline in notable saltmarsh floral species over many years since the cessation of cattle grazing (an area of common land in Portbury was traditionally grazed until port expansion in the late 90's reduced the area available for grazing making it untenable). Notable saltmarsh species have declined as a result of an increase in aggressively dominant species such as sea couch (*Elytrigia atherica*) that were previously kept under control by grazing. An essential objective of this management plan is to reduce the cover of sea couch on the saltmarsh, allowing other species opportunities to germinate and grow.

3.16 Ideally, traditional management of the saltmarsh via grazing of cattle or sheep should be implemented. In areas where livestock grazing is not feasible, alternative measures should be explored such as by mechanical breaking up of the sea couch beds. Due to the sensitive nature of these areas, as they form part of the Severn Estuary EMS, any proposals would need to be agreed with Natural England and monitored closely to ensure favourable condition of the site.

3.17 Natural England is aware of the declining condition of the saltmarsh in this area and in its site improvement plan has highlighted the need for investigation of alternative means of improving the condition of saltmarsh where the re-introduction of grazing is not feasible. TBPC awaits feedback on these investigations and is looking forward to working with Natural England to introduce appropriate management measures in an attempt to increase saltmarsh diversity and bring it back into favourable condition.

Management Objective – Invasive species and scrub control

3.18 A patch of the invasive sea buckthorn (*Hippophae L.*) was present on the Portbury frontage along with several patches on the River Avon foreshore in the vicinity of the M5 Bridge. Sea buckthorn is not a native species on the west coast of Great Britain. It easily develops into very dense shade-bearing thickets under which no other plant species will grow. It is considered likely that if left untreated the continued spread of the sea buckthorn will lead to the demise of some of the rare/scarce saltmarsh species in this area.

3.19 These patches of sea buckthorn were removed in 2015/16 and treated to prevent re-growth. As sea buckthorn can spread both via rhizomes and through seed dispersal the continued monitoring of these areas is vital to prevent a reoccurrence.

3.20 All invasive species including sea buckthorn, Japanese knotweed (*Fallopia Japonica*) and Himalayan balsam (*Impatiens glandulifera*) must be controlled in this area.

3.21 The increasing amounts of scrub on the sea walls will also need co-ordinated management to ensure that bramble (*Rubus fruticosus*) and hawthorn (*Crataegus monogyna*) in particular do not cause the localised extinction of shade intolerant notable plant species. Scrub should be selectively cleared on a rotational basis.

3.22 The Chapel Pill sea bank is of particular concern due to the extent of scrub and the botanical interest in this area. It is therefore recommended that 75 % of the scrub in this area is cleared in sections over the next three years and that the stumps are treated carefully with herbicide to prevent regrowth. Due to the botanical interest in this area, it is essential that cut material is passed over the fence into the adjacent compound to be removed from site and not stacked, chipped or burnt on site.

Chittening Warth

3.23 Chittening Warth represents the largest area of semi-natural habitat within Avonmouth Docks. It comprises an approximately 37ha area of land dominated by saltmarsh interspersed with scrub, reedbeds, semi-improved grassland and tidal mudflats. Chittening Warth also lies within the Severn Estuary EMS. It is managed in consultation with key stakeholders including Natural England.

Management Objective – Saltmarsh management

3.24 TBPC working in partnership with "A Forgotten Landscape Project" has recently reintroduced grazing to Chittening Warth. This is an attempt to restore the saltmarshes to

a favourable conservation status by reducing the extent and dominance of sea couch and opening up the saltmarsh sward which will lead to a more diverse saltmarsh community.

3.25 Grazing was gradually introduced to the site with a maximum stocking density of under 10 sheep per hectare per year. Due to the difficulty encountered in breaking up the sea couch stands it was subsequently agreed with Natural England to increase the stocking density. The grazing regime will be monitored by key stakeholders in consultation with Natural England and the Environment Agency. This will include repeat surveys of grazed saltmarsh areas in 2018, surveillance of grazing activity and regular site visits.

Avonmouth Railway Sidings

3.26 This former railway sidings comprises an area of semi-natural habitat in Avonmouth Docks. This area was retained and enhanced in connection with delivery of a port related development (Bristol City Council Planning Ref: 11/02773/F). Planning Conditions 2 and 8 of this planning permission relate to the creation of an Ecological Mitigation Strategy (TLP, 2013a) and Biodiversity Management & Monitoring Plan (TLP, 2013b). As such, there is an obligation in accordance with the extant planning consent to undertake such works for the life of the plans (2014 – 2018).

3.27 The retained habitats at the Avonmouth Railway Sidings comprise 1.7ha of semi-natural habitats including species-rich unimproved and semi-improved grassland, scrub and woodland. These were retained following the partial redevelopment of the site for vehicle storage. Of particular interest is the unimproved species-rich grassland which includes characteristics of calcareous substrate with an excellent diversity of floral species. The retained areas are designated as a Site of Nature Conservation Interest (SNCI).

<u>Management Objective – Grassland monitoring and management</u>

3.28 The unimproved, species-rich grassland which has been retained was assessed as being of 'County Value' in terms of the composition of floral species. This was in part due to the uncommon soil conditions (former railway clinker) occurring within the site and the rarity of the habitat type within the local area. Ongoing management and annual monitoring is essential to ensure that the characteristic species which define this habitat are retained.

<u>Management Objective – Woodland and scrub management</u>

3.29 Much of the habitat within the site has succeeded to woodland, dominated by a range of pioneer species (birch, willow and ash). The site has also been subject to new woodland planting as part of the previous development. Without management, the woodland is likely to degrade in quality, as older trees die and younger ones struggle to become established. Suitable management, including selective thinning, will extend the lifespan of the woodland and ensure its function as a wildlife corridor. The security fencing provides an opportunity to protect saplings from deer browsing, thereby creating a thriving and diverse understorey.

<u>Management Objective – Ensure the retained area is suitable to support the slow worm population</u>

3.30 It is important that the KMA contains habitats which are sufficient in area and suitable to support the retained slow worm population (some of the population was relocated off site to a suitable receptor area). The mosaic should include areas of grassland and scrub, along with suitable hibernation sites.

Avonmouth pools and Avonmouth/River Avon earth bund

3.31 Avonmouth pools is a 2.2 ha area set-aside as a receptor site for slow worms following the translocation at the Former Railway Sidings. The site contains a mosaic of habitats including scrub, short ephemeral vegetation and semi-improved grassland. In addition, a number of brackish pools containing standing water are present within the site which were created as compensation for lost foreshore habitat elsewhere in Avonmouth in the mid 90's. These were specifically designed to flood on high spring tides and are connected to the foreshore via a pipe through the sea wall.

3.32 This area was used as a receptor site for the translocated slow worms from the Former Railway Sidings. It is, therefore, subject to a Management Plan (running from 2014 – 2019, TLP, 2013c) that was secured by planning condition as part of the planning permission for the Former Railway Sidings.

3.33 There is also an earth bund/old sea wall that runs along the length of the River Avon and Avonmouth foreshore areas.

3.34 Both areas fall within the Severn Estuary EMS and so any management must be undertaken in consultation with key stakeholders including Natural England.

Management Objective – Scrub management

3.35 The overall purpose of the management plan for the Avonmouth Pools area is to ensure that the habitats within the receptor site remain suitable for slow worms. As such, selective scrub management should be undertaken annually, with approximate 30m sections cut back on a rotational basis to maintain a mosaic of habitats within the site and prevent dominance by bramble scrub.

3.36 Ensure that bramble and hawthorn scrub are controlled along the Avonmouth/River Avon earth bund. Scrub should be selectively cleared on a rotational basis.

Management Objective – Invasive species control

3.37 All invasive species including sea buckthorn, Japanese knotweed and Himalayan balsam must be controlled in both the Avonmouth Pools area and along the Avonmouth/River Avon earth bund.

Management Objective – maintain inflow of water into Avonmouth Pools

3.38 Periodically clear debris from inflow pipe leading into the Avonmouth Pools.

Court House Farm and Shipway Farm Habitat Corridor

3.39 Land at Court House Farm, on the southern edge of RPD, is currently being developed by TBPC for port activities under NSC Planning Ref: 16/P/1987/F. The majority of the site will be developed into car storage.

3.40 As part of an Ecological Mitigation Strategy to compensate for loss of habitat as result of development proposals at Court House Farm, extensive habitat creation has been implemented within the retained boundaries of Court House Farm (on site) and also off site (the Shipway Farm Habitat Corridor).

3.41 On site habitats within Court House Farm include the creation of a new linear swale and species-rich hedgerow along the northern boundary, regrading of the western ditch and new tree and shrub landscape planting.

3.42 The Shipway Farm habitat corridor is a 4.76 ha area and is located on the western edge of Shipway Farm (to the west of RPD). This area comprises a new wildlife corridor through Shipway Farm including hedgerow, grassland and field margin habitat. Two ponds and a ditch have been created to provide enhancements for GCN and water voles respectively. Additionally, fields at either end of the corridor are subject to enhancement and managed as species diverse grassland habitat, sown with a mix of native flowering and/or fruiting species of known wildlife benefit. The habitat corridor will provide connectivity from the Vole City KMA via the defunct[1] Portishead railway line to on site mitigation at Court House Farm and beyond to the wider landscape.

3.43 A Landscape and Ecological Management Plan (LEMP) and a Habitat Creation Method Statement (HCMS) for the site have been produced in fulfilment of Conditions attached to the extant planning consent (NSC Ref: 16/P/1987/F). Those parts of the LEMP relevant to the ongoing management, maintenance and monitoring of the site will be subsumed into this overarching Plan. It should be noted that those aspects relating to the delivery of mitigation, compensation and enhancement measures will not be detailed in this Management plan as they will have been delivered prior to its implementation.

<u>Management Objective – Maintain, plant and enhance through appropriate management, the Court House Farm site, its boundaries, the 'Shipway Farm habitat corridor' and enhancement areas.</u>

3.44 The habitats which comprise Court House Farm (grassland, trees, pond/ditches and hedgerows) provide opportunities for a range of wildlife species. Ecological connectivity is an important factor in helping wildlife to adapt to development and climate change pressures by providing dispersal corridors through the landscape. With appropriate management (**Table 7** refers), the wildlife buffer zones (namely the Shipway Farm habitat corridor and the northern boundary of Court House Farm) will significantly enhance the foraging, sheltering and, potentially, nesting opportunities for a range of protected/notable species.

<u>Management Objective – Ensure that mitigation and enhancement planting is subject to appropriate monitoring and aftercare</u>

3.45 As the success of the mitigation scheme is reliant on the success of the new planting, as such aftercare is required to ensure longevity in line with BS8545:2014 (Trees: From Nursery to Independence in the Landscape). Furthermore Establishment and replacement of failed stock in new planting areas is required by Planning Condition 7 of the extant consent.

<u>Management Objective – Provide targeted ecological enhancements for specific species, including amphibians, reptiles and water voles</u>

3.46 Species specific mitigation strategies include enhancement of offsite receptors within the Shipway Farm to receive translocated animals (water vole, GCN and reptiles). These measures are required as stipulated in approved NE European Protected Species mitigation licences (in respect of water vole and GCN) and in line with recognised industry best practice (in respect of reptiles).

[1] Phase 1 of the MetroWest scheme is seeking to reopen the Portishead railway line by 2020.

Management Objective – Implement a programme of ongoing ecological monitoring to ensure the successful implementation of this management plan and to inform future revisions/amendments to the plan

3.47 The successful implementation of a management plan requires ongoing ecological monitoring to inform delivery of objectives and to allow revisions to be made to the management prescriptions (refer to **Section 6**, below).

Portbury Dock Wood

3.48 A small area of remnant broadleaved semi-natural woodland is present in the middle of RPD. The woodland is dominated by mature oak trees (*Quercus robur*) with an understorey of semi-improved grassland, bramble, common reed, blackthorn and hawthorn. It is thought that the woodland can be categorised as 'ancient' is safeguarded by a number of Tree Preservation Orders (TPO's) and is designated as an SNCI.

3.49 Given the favourable condition of the woodland no specific management is suggested for this KMA at this time.

Drove Rhyne corridor and Directors Pool (**Figure 9** refers)

3.50 Drove Rhyne is a large flowing ditch known to support water voles and nesting birds and is also designated as an SNCI. Drove Rhyne, as it is designated as a main drainage route, is itself managed by the Environment Agency who carry out an annual cut in September of the emerging weeds in the river channel along with trimming the non-working bank.

3.51 The Director's Pool is a large freshwater pool located to the north of Drove Rhyne. It supports waterfowl and water vole. A sand martin bank was constructed in one of the banks during the life of the last management plan, however, due to the unstable nature of the soil the bank has since eroded away exposing the tunnel pipes.

Management Objective: – Remediate the defunct sand martin bank and maintain it as an open bank area.

3.52 The redundant pipes in the sand martin bank should be removed and the area in front of the bank should be kept free from reeds.

3.53 The other parts of this area will be managed according to the habitat corridors objectives described below.

Habitat Corridors (**Figure 9** refers)

3.54 While the Port Estate is predominantly characterised by large buildings, large areas of hardstanding and the infrastructure of a busy port, there are extensive areas of retained semi-natural habitats which form a network of green corridors. Many of these habitat corridors are concentrated in RPD and provide a range of habitats including grassland, scrub, woodland, ditches, reedbeds and bodies of standing water, which in turn provide connectivity and opportunities for wildlife.

Management Objective – Ensure Diversity of Habitat Types and Habitat Connectivity and Structure

3.55 The habitat corridors which bisect the Port Estate comprise a diverse range of habitats (as described above). To ensure continued diversity of habitats and associated opportunities for protected species, selective and rotational management should be undertaken to prevent complete ecological succession. Maintenance of areas of open water and

reduction of scrub habitats are critical to these objectives, as these will ensure continued functionality of the corridors and permeability of RPD for protected and notable species.

4.0 FACTORS INFLUENCING MANAGEMENT

4.1 Outline and detailed management prescriptions are given in **Section 5**, below. These describe the aims, location and recommended timing of particular management activities. In advance of implementing any of these prescriptions, the agent responsible for works should note that other factors may affect how the prescriptions are achieved.

4.2 Drove Rhyne is classified as a main river and its management is controlled and implemented by the Environment Agency. Any management prescriptions should, therefore, be agreed with the Environment Agency prior to works commencing.

4.3 The Severn Estuary EMS is afforded legal protection and certain operations within or immediately adjacent to the protected site will require prior approval by Natural England. Prior to any works occurring within or immediately adjacent to the boundary of the Severn Estuary EMS (including Portbury, River Avon, Avonmouth and Chittening Warth foreshores) Natural England must, therefore, be consulted to consider whether the works would compromise the wider conservation objectives for the Severn Estuary or constitute a 'potentially damaging operation'.

4.4 Lack of access to the wildlife corridors and saltmarsh habitats of the River Avon and Severn Estuary may hinder some management activities.

4.5 Management regimes may need to be amended in particular years in response to unforeseen circumstances or a change in conservation objectives. This document is intended to be dynamic with periodic reviews, ensuring that any such changes are accounted for within the Management Plan which will be updated throughout its lifespan as necessary.

4.6 The presence of a range of protected species including (but not limited to) ground-nesting birds, reptiles, water voles and great crested newts will influence the timing of vegetation clearance and/or ground works. Any works in proximity to areas supporting these species must be carefully programmed and TLP contacted prior to commencing any works.

4.7 Consideration will also need to be given during scrub removal operations to the potential presence of badgers. Appropriate checks should be made by an ecologist prior to removal of any scrub with potential to conceal a badger sett. Further advice should be sought from TLP.

5.0 MANAGEMENT PRESCRIPTIONS

Table 1: Vole City (**Figure 3** refers)

Management Prescription Code	Management Prescription	Seasonal Requirement	Frequency	Five Year Management Period				
				2018	2019	2020	2021	2022
VC001	Biennial inspection of ponds and ditches including fixed point photography and survey of floral species. Implementation of recommendations made following annual pond and ditch inspections.	May – Aug	Biennially	✓		✓		✓
VC002	Rotational management of ponds and ditches during the winter, including removal of emergent aquatic vegetation (common reed and bulrush) from c.2/3 of a pond to be cleared every five years. With no more than two or three ponds to be managed in any one year e.g.: year 1: ponds 3 and 4, year 2: ponds 2 and 1, year 3: no works, year 4: ponds 5, 6 and 7, year 5: no works. The ditches should be desilted (where required) every 5 years, without disturbing bankside vegetation and working on small sections of ditch at any one time, from one bank leaving gaps untouched as refuge areas and no more than 2 thirds of the ditch worked at any one time.	Nov - Feb	On 5 year rotation	✓	✓		✓	
VC003	Tree/scrub management around margins of pond to remove cover, focusing on removal of vegetation on the southern margins of ponds to remove shading. Some vegetation can remain on the northern margin where it will cast little to no shade. To be undertaken as required in line with biennial inspections. For mitigation ponds 8, 9 and 10 only.	Nov - Feb	Annually as required	✓	✓	✓	✓	✓
VC004	Remove leaf litter and de-silt of ponds/ditches. To be undertaken as required in line with biennial inspections. For mitigation ponds 8, 9 and 10 only.	Nov - Feb	Annually as required	✓	✓	✓	✓	✓
VC005	Removal of fish species from ponds. Specific methodology to be outlined by Ecologist as required. For mitigation ponds 8, 9 and 10 only.	Nov - Feb	Annually as required	✓	✓	✓	✓	✓
VC006	Other remedial actions as required, informed by biennial pond and ditch inspections. For mitigation ponds 8, 9 and 10 only.	Nov - Feb	Annually as required	✓	✓	✓	✓	✓
VC007	Mow main field areas (avoiding margin areas) to prevent scrub encroachment and maintain height for small mammals. The fields should be cut annually and undertaken prior to the middle	Prior to end Aug	Annually	✓	✓	✓	✓	✓

Management Prescription Code	Management Prescription	Seasonal Requirement	Frequency	Five Year Management Period				
				2018	2019	2020	2021	2022
	of August. The grass height should not be cut to less than 15cm. The use of a topper is recommended to cut the grass. The arisings are to be removed off site (e.g. as hay).							
VC008	Create field margins (of at least 2m wide, wider in places). Field margins to be cut once every three years on a rotational basis, i.e. not all field margins to be cut in the same year. The cutting regime is to include the ditch and ponds banks with either cutting of only one bank in any year or leaving vegetation at intervals as refuges. Sward to be cut to a height of no less than 15cm, the use of a topper is recommended. The arisings are to be removed off site (e.g. as hay) to preserve the structure of the sward and to prevent nutrient enrichment.	September/ October	Rotational, every 3 years			✓	✓	
VC009	Manage hedgerows every three years (when required) on a rotational basis (i.e. not all hedgerows cut in same year). Cut to a winter height of no less than 3m between 1st January and 28th February. Avoid cutting between March and August (inclusive).	1st Jan to 28th Feb	Annually as required on three year rotation			✓		✓
VC010	Selectively cut back tall ruderal/scattered scrub areas when required. Height should not be cut to less than 15cm.	October to February inclusive	Three year rotation	✓			✓	
VC011	All hibernaculum to be checked annually for structural integrity and remedial action undertaken where required	Autumn (before end of October)	Annually	✓	✓	✓	✓	✓
VC012	New planting in receptor area to be inspected, and dead or dying plants recorded & replaced in the next winter planting season, until 100% canopy achieved. During the annual check the planting guards, stakes and ties will be adjusted if required, or removed when no longer required (i.e. after 3 years) and any dead, damaged or dying branches will be pruned. New tree and scrub planting will be regularly watered during extended periods of dry weather (for at least the first three years). Once established all woodland and scrub areas to be managed on a rotational basis.	Autumn	Annually	✓	✓	✓	✓	✓

Table 2: Area East of M5 (Figure 4 refers)

Management Prescription Code	Management Prescription	Seasonal Requirement	Frequency	Five Year Management Period				
				2018	2019	2020	2021	2022
M5001	Mow western grassland area once every three years to a height of no less than c.15cm, with arisings to be removed to prevent an increase in soil fertility. Churning of the soil by heavy machinery to be avoided (cutting to take place ONLY when ground is firm and dry).	Prior to end of August	Years 1 and 4	✓			✓	
M5002	Selectively thin scrub to encourage grassland species to recolonise and open up water bodies. 50% of scrub within the eastern grassland and 50% of scrub around waterbodies to be removed over years 1 and 2, then selective clearance and coppicing of regrowth on an annual basis thereafter. To be undertaken in the winter months on a rotational basis to minimise impacts of wildlife. Cut vegetation should be used to create brash/habitat piles. Scrub control should avoid areas where vegetation has been planted as part of a landscaping/mitigation scheme.	Nov - Feb	Years 1 and 2 then biennially	✓	✓		✓	
M5003	Manage the ponds and ditches. Detailed management prescriptions to be decided once access is gained from planned scrub clearance in year 1. Likely to involve reducing cover of emergent pond vegetation (common reed and bulrush) to create areas of open water.	Nov - Feb	Years 1, 3 & 5		✓		✓	

Table 3: River Avon and Portbury foreshore (Figure 5 refers)

Management Prescription Code	Management Prescription	Seasonal Requirement	Frequency	Five Year Management Period				
				2018	2019	2020	2021	2022
FS001	Alternative saltmarsh management methods (such as mechanical breaking up of sea couch) to be led by Natural England guidance (awaiting).							
FS002	Scrub control on all sea walls/banks. Selective thin of scrub to encourage grassland species to recolonise. Clearing c.75% of all scrub along sea walls/banks, working in c.500m sections years 1 to 4. Work to be undertaken in winter over low tides to prevent disturbance to wintering birds, cut material removed from site.	Winter during low tides	Years 1 to 4	✓	✓	✓	✓	

Management Prescription Code	Management Prescription	Seasonal Requirement	Frequency	Five Year Management Period				
				2018	2019	2020	2021	2022
FS003	Scrub along Chapel Pill sea bank to be cut back by 75% in 300-400m sections over the first three years and stumps treated carefully with herbicide to prevent regrowth. Cut material must be removed and not stacked, chipped or burnt on site. Work to be undertaken in winter over low tides to prevent disturbance to wintering birds.	Winter during low tides	Annually for first 3 years	✓	✓	✓		
FS004	Monitor and control with appropriate treatment any invasive species along sea wall including sea buckthorn, Japanese knotweed and Himalayan balsam.	Year round	Annually	✓	✓	✓	✓	✓

Table 4: Chittening Warth*

Management Prescription Code	Management Prescription	Seasonal Requirement	Frequency	Five Year Management Period				
				2018	2019	2020	2021	2022
CW001	Break up sea couch beds via sheep grazing under guidance from Natural England*.	All-Year	Annually as required	✓	✓	✓	✓	✓
CW002	Continue to monitor the saltmarsh vegetation to inform management. Monitoring will be undertaken by key stakeholders in consultation with Natural England and the Environment Agency. This will include monitoring surveys in 2017 and 2018, surveillance of grazing activity and regular site visits, to inform stocking densities and future management practices.	N/A	Annually as required	✓	✓			

*TBPC is working in partnership with "A Forgotten Landscape Project" to undertake works at this KMA. As such any works will be done under approval of key stakeholders.

Table 5: Avonmouth Railway Sidings (Figure 6 refers)

Management Prescription Code	Management Prescription	Seasonal Requirement	Frequency	Five Year Management Period				
				2018	2019	2020	2021	2022
RS001	Cut the area of unimproved grassland between mid-July and mid-August if the average sward height exceeds 30cm; arisings to be spread and rolled over the 860m2 of cleared ground to aid grassland regeneration, with any excess taken off site.	July-Aug	Annually (as required)	✓	✓	✓	✓	✓
RS002	Maintain grassland area at current size biennially through scrub clearance work (avoid nesting bird season from March to August inclusive). Cut vegetation can be put on existing brash/wildlife piles (not on grassland).	Sep-Feb	Biennially (as required)	✓		✓		✓
RS003	Woodland management through selective thinning of trees to promote quality of woodland to reduce overshading and increase light levels.	Nov-Feb	As required	✓				
RS004	Cut woodland ride in sections on a three year rotation. Arisings to be raked off and heaped away from grassland areas.	Sep-Feb	Sections on a 3 year rotation	✓	✓		✓	✓
RS005	Some trees within the woodland area (avoiding TPO trees) will be 'ring barked' and left allowed to remain as standing deadwood to create habitat for invertebrates and fungi. These will be at a density of circa 3/ha.	None	As required	✓				
RS006	Selectively coppice groups of between 5% and 10% of new shrub planting to create structural diversity.	Winter	Once established					✓
RS007	Health and vigour of planted tree/shrub stock and woodland understorey/ground flora to be checked annually and replaced as necessary. Tree stakes and ties to be removed if no longer contributing to establishment assistance.	None	Annually	✓	✓	✓	✓	✓

Table 6: Avonmouth Pools and Avonmouth/River Avon earth bund (Figure 7 refers)

Management Prescription Code	Management Prescription	Seasonal Requirement	Frequency	Five Year Management Period				
				2018	2019	2020	2021	2022
AF001	Control scrub within Avonmouth Pools area by clearing approximately 30m sections biennially on a rotational basis, to maintain a mosaic of habitats within the site and prevent dominance by bramble scrub. Arisings to be heaped on existing brash piles. Work to be undertaken in winter during low tides to prevent disturbance to breeding and wintering birds.	Winter during low tide	Biennially (as required)	✓		✓		✓
AF002	Scrub control on all sea walls/banks. Selective thin of scrub to encourage grassland species to recolonise. Clearing c.75% of all scrub along sea walls/banks, working in c.500m sections in years 1 to 4. Work to be undertaken in winter over low tides to prevent disturbance to wintering birds, cut material removed from site.	Winter during low tide	Years 1 to 4	✓	✓	✓	✓	
AF003	Monitor and control with appropriate treatment any invasive species along sea walls and banks including sea buckthorn, Japanese knotweed and Himalayan balsam.	Year round	Annually	✓	✓	✓	✓	✓
AF004	Clear debris from inflow pipe to Avonmouth Pools.	None	Every other year		✓		✓	

Table 7: Court House Farm (Figure 8 refers) and Shipway Habitat Corridor (Figure 9 refers)

Management Prescription Code	Management Prescription	Seasonal Requirement	Frequency	Five Year Management Period				
				2018	2019	2020	2021	2022
CHF001	Once established, newly planted hedgerows are to be cut annually between 1 January and 28 February.	1 Jan – 28 Feb	Annually					✓
CHF002	All planted areas will be pruned to promote healthy growth and natural shape, and any dead, dying or diseased wood and suckers will be removed. Pruning will be undertaken annually or as appropriate to each species and in accordance with best practice between October and February inclusive to avoid the main bird breeding season. All arisings will be removed from site.	Oct - Feb	Annual			✓	✓	✓

Management Prescription Code	Management Prescription	Seasonal Requirement	Frequency	Five Year Management Period				
				2018	2019	2020	2021	2022
CHF003	Selective thinning of all newly planted native trees and shrubs will be regularly undertaken to ensure that overcrowding is reduced. Thinning is to be undertaken between October and February inclusive to avoid the main bird breeding season.	Oct - Feb	Annual	✓	✓	✓	✓	✓
CHF004	All areas where plants or trees have failed will be identified and plants will be removed and replaced with equivalent species to complement adjacent planting for the lifetime of the development.	N/A	Annual		✓	✓	✓	✓
CHF005	Water all new planting during prolonged dry spells to prevent plant failures (during first 2 years following planting).	Summer	First 2 years	✓	✓	✓		
CHF006	Check stakes and ties on new planting and adjust if needed in summer and winter. Remove stakes when no longer required (i.e. after 3 years). Prune dead, damaged or dying branches.	Summer and Winter	First 3 years	✓	✓	✓		
CHF007	Each autumn following practical completion, the new planting scheme will be inspected, and dead or dying plants recorded and replaced in the next winter planting season, until 100 % canopy is achieved and/or hedgerow gaps are filled.	Autumn	Annual	✓	✓	✓	✓	✓
CHF008	Avoid the use of herbicides and artificial fertilisers, hand pulling should be used if possible. Herbicides should only be applied to spot-treat or weed-wipe for the control of injurious weeds or initially to control undesirable species such as dock, thistles and nettle to assist in the establishment of the sward on newly seeded areas.	N/A	Annual	✓	✓	✓	✓	✓
CHF009	Ditch and swale banks to be cut once every three years on a rotational basis, i.e. not all areas at once. With either cutting of only one bank in any year or leaving vegetation at intervals as refuges. Sward to be cut to a height of no less than 15cm, the use of a topper is recommended. The arisings are to be removed off site.	September/ October	Rotational, every 3 years			✓	✓	✓
CHF010	The ditches should be desilted (where required) every 5 years, without disturbing bankside vegetation and working on small sections of ditch at any one time, from one bank leaving gaps untouched as refuge areas and no more than 2 thirds of the ditch worked at any one time.	Nov - Feb	Annually on 5 year rotation					✓
CHF011	Grassland areas in Shipway Habitat Corridor partially mown annually (avoiding margin areas) and undertaken prior to the middle of August. The grass height should not be cut to less than 15cm. The arisings are to be removed off site (e.g. as hay). N.B. mowing not required if grassland is managed by grazing.	Prior to end Aug	Annually	✓	✓	✓	✓	✓

Management Prescription Code	Management Prescription	Seasonal Requirement	Frequency	Five Year Management Period				
				2018	2019	2020	2021	2022
CHF012	Create field margins (of at least 2m wide and larger where possible). Field margins to be cut once every three years on a rotational basis, i.e. not all field margins to be cut in the same year. Sward to be cut to a height of no less than 15cm, the use of a topper is recommended. The arisings are to be removed off site (e.g. as hay). N.B. mowing not required if grassland is managed by grazing.	September/ October	Rotational, every 3 years			✓	✓	

Table 8: Drove Rhyne corridor and Directors Pool

Management Prescription Code	Management Prescription	Seasonal Requirement	Frequency	Five Year Management Period				
				2018	2019	2020	2021	2022
DR001	The redundant pipes in the sand martin bank should be removed.	None	One off	✓				
DR002	The area in front of the old sand martin bank should be kept free from reeds, biennially (when required) after the nesting bird season.	Sep-Feb	Biennially (if required)	✓		✓		✓

Table 9: Habitat Corridors (Figure 10 refers)

Management Prescription Code	Management Prescription	Seasonal Requirement	Frequency	Five Year Management Period				
				2018	2019	2020	2021	2022
HC001	Ditches (other than Drove Rhyne which is managed by the Environment Agency) should be desilted (where required) every 5 years, without disturbing bankside vegetation and working on small sections of ditch at any one time, from one bank leaving gaps untouched as refuge areas and no more than 2 thirds of the ditch worked at any one time.	Nov - Feb	Annually on a 5 year rotation	✓	✓	✓	✓	✓

Management Prescription Code	Management Prescription	Seasonal Requirement	Frequency	Five Year Management Period				
				2018	2019	2020	2021	2022
HC002	Selectively cut back tall ruderal and scattered scrub areas on a rotational basis when required. Height should not be cut to less than 15cm.	October to February inclusive	Biennially as required on three year rotation	✓		✓		✓
HC003	Where not required for amenity purposes, grassland areas cut once every three years on a rotational basis, i.e. not all grassland areas in all corridors to be cut in the same year. The cutting regime is to include the banks of ditches with either cutting of only one bank in any year or leaving vegetation at intervals as refuges. Sward to be cut to a height of no less than 15cm, the use of a topper is recommended. The arisings are to be removed off site, or piled to create refuges.	Prior to end of August	Annually as required on three year rotation	✓	✓	✓	✓	✓

6.0 ECOLOGICAL MONITORING PROGRAMME

6.1 Ecological monitoring at RPD has been ongoing since 1993, with additional areas within the Port Estate subject to monitoring in conjunction with the requirements of various Planning Application conditions and or/protected species licences (as described above).

6.2 Ecological monitoring of key species within Royal Portbury Dock (RPD commenced in 1993 in accordance with the Landscape and Wildlife Masterplan for RPD (Landmark Environmental Consultants Ltd, 1992) and was conducted annually for five years until 1998 when the Masterplan was reviewed. Further monitoring was undertaken five years later in 2003 (Landmark Environmental Consultants Ltd, 2004) to inform the review of the 1998 Masterplan in 2004. Annual monitoring has been undertaken since then, which informed the production of a dedicated Biodiversity Management Plan for the RPD Estate in 2011. The ongoing development of the Bristol Port has resulted in further monitoring requirements in-line with various planning permissions.

6.3 An appropriate monitoring programme is crucial to ensure that the measures developed by TBPC, both through the requirements of various Planning Applications and through its commitment to Corporate Social Responsibility are successful and result in valuable long-term benefits to wildlife.

6.4 The previous monitoring strategies considered the biodiversity value of the habitats and species within the site by study area and made recommendations for appropriate management and monitoring.

6.5 Monitoring typically focuses on the status of 'indicator species'. These are specially chosen plants and animals that are used as a proxy to show the condition and status of the habitats present. As they require specific habitat conditions, they can provide an early warning of inappropriate management and potentially damaging activities, or conversely indicate health and vigour of their environment (i.e. where management is appropriate and beneficial).

6.6 A range of species were selected as indicators of management success and habitat condition, according to the following parameters:

- Indicator species should be accessible to monitor without requiring a high time input or specialised equipment;
- Results gathered should be comparable from year to year;
- Species selected should be indicative of a particular habitat or habitats so that fluctuations in their populations broadly reflect the response of the habitat to management;
- As far as possible, the range of species chosen should reflect the desired range of microhabitats within each habitat type or be the requirement of a planning permission or EPSM licence[2].

6.7 In many cases the species chosen are rare or uncommon, since they are species that have particular habitat requirements. Rarity has not been used as a criterion for selection, however, because populations of many rare species are known to appear and disappear

[2] Those species highlighted within a planning application or under an EPSM licence are for the most part protected/notable species with some level of legal protection. As such those species are typically representative of indicator species for the purposes of this Management Plan.

for reasons unconnected with the condition of the habitat i.e. through natural fluctuations.

6.8 The evidence base collected by a comprehensive monitoring programme provides information regarding the health of habitats and success of mitigation schemes via implemented management prescriptions, and helps to inform potential constraints to the ongoing operation and potential future expansion of the Port Estate. These factors will contribute to informing revisions to the Management Plan throughout its lifespan.

6.9 The frequency of monitoring has been reduced from the biennial monitoring undertaken in previous years to monitoring specific groups every third year. This is with the exception of amphibian monitoring which has specific monitoring requirements dictated by extant NE licence consents. After the obligations under the two current great crested newt licences have been fulfilled the monitoring will return to a biennial programme in order to keep data valid for use to inform any potential future developments/protected species licence applications.

6.10 The monitoring programme described below has also included, for the first time, the annual wintering bird surveys that are undertaken to monitor the wetland birds using the adjacent areas of Severn Estuary foreshore.

6.11 The monitoring programme proposed including target habitats/species and the frequency/duration of monitoring is outlined below:

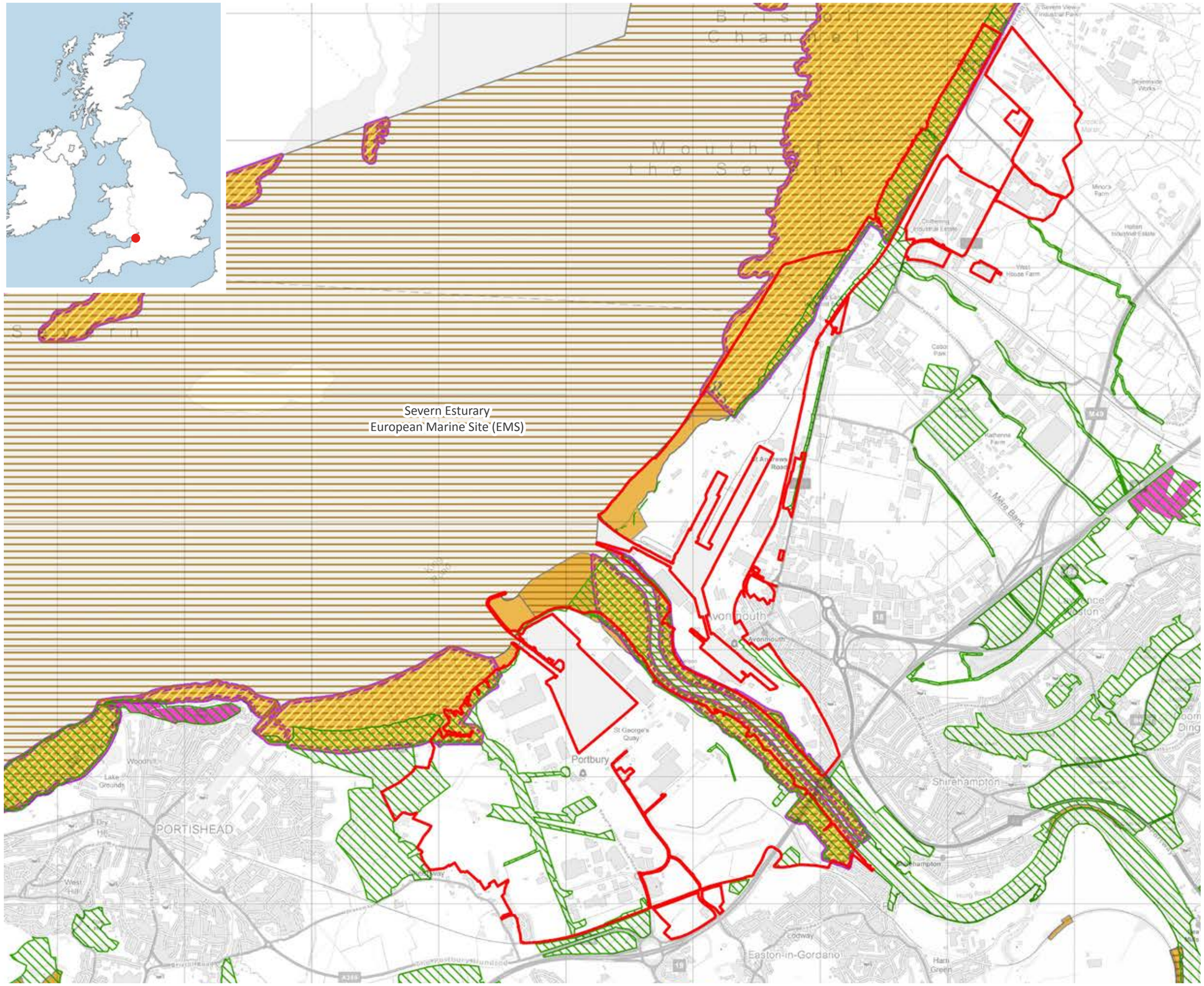
Indicator Habitat/Species	**Frequency/Duration**
Action: Monitor selected species of aquatic and terrestrial plant including: Grass vetchling (*Lathyrus nissolia*) Sea clover (*Trifolium squamosum*) Sea rush (*Juncus maritimus*) Stiff saltmarsh-grass (*Puccinellia rupestris*) Bithynian vetch (*Vicia bithynica*) Grey club-rush (*Schoenoplectus tabernaemontani*) Narrow-leaved bird's-foot trefoil (*Lotus glaber*) Spiny restharrow (*Ononis spinosa*) Incidental sightings of former target species to be noted: Autumn's lady's-tresses (*Spiranthes spiralis*), Brackish water-crowfoot (*Ranunculus baudotii*), Sea barley (*Hordeum marinum*), Slender hare's-ear (*Bupleurum tenuissimum*) and Spiked water-milfoil (*Myriophyllum spicatum*) Invasive species (sea buckthorn, Japanese knotweed etc.) to be noted for management/remediation.	Once every three years (2019 and 2022) Invasive plant species – annually
Action: Monitor status of species-rich grassland at former Railway Sidings.	2018 and 2019 then incorporated into the flora monitoring above
Action: Monitor Water Vole (*Arvicola amphibious*) distribution	Once every three years (2019 and 2022)
Action: Monitor selected species of invertebrates (and general terrestrial invertebrate monitoring)	Once every three years (2020)

General invertebrate surveys also looking for former target species**:** Four-spotted chaser (*Libellula quadrimaculata*) Hairy dragonfly (*Brachytron pratense*) Short-winged conehead (*Conocephalus dorsalis*) A solitary bee (*Hylaeus cornutus*) Record incidental sightings of long-winged conehead (*Conocephalus discolor*), a parasitic solitary bee (*Sphecodes crassus*), and a hoverfly (*Volucella zonaria*	
Action: Monitor selected species of breeding birds Barn owl (*Tyto alba*) Cetti's warbler (*Cettia cetti*) Kestrel (*Falco tinnunculus*) Linnet (*Carduelis cannabina*) Little owl (*Athene noctua*) Long-eared owl (*Asio otus*) Reed bunting (*Emberiza schoeniclus*) Reed warbler (*Acrocephalus scirpaceus*) Ringed plover (*Charadrius hiaticula*) Sedge warbler (*Acrocephalus schoenobaenus*) Short-eared owl (*Asio flammeus*) Tawny owl (*Strix aluco*) Common whitethroat (*Sylvia communis*) Garden warbler (*Sylvia borin*) – woodland only Blackcap (*Sylvia atricapilla*) – woodland only Chiffchaff (*Phylloscopus collybita*) – woodland only Wood warbler (*Phylloscopus sibilatrix*) – woodland only	Once every three years (2018 and 2021)
Action: Monitor wintering wildfowl and waders using adjacent foreshore areas.	Annual wintering bird surveys: high and low tide count each month October to March inclusive.
Action: Monitor amphibian populations, including GCN, in ponds within Vole City	Ponds 1-8 - Biennially Ponds 9 & 10 (EPSM 2017-27673-EPS-MIT) – 2018 & 2019, then biennially with Ponds 1-8.

REFERENCES

The Landmark Practice (2014). *Bleadon Level Farmland Management Plan 2014 – 2019.*

FIGURES



Legend

- Royal Portbury and Avonmouth Docks location
- The Bristol Port Estate
- Local Nature Reserve (LNR)
- Ramsar
- Special Area of Conservation (SAC)
- Special Protection Area (SPA)
- Site of Special Scientific Interest (SSSI)
- Sites of Nature Conservation Interest (SNCI)

0 312.5 625 1,250 m N

Scale 1 : 30,000 @A3

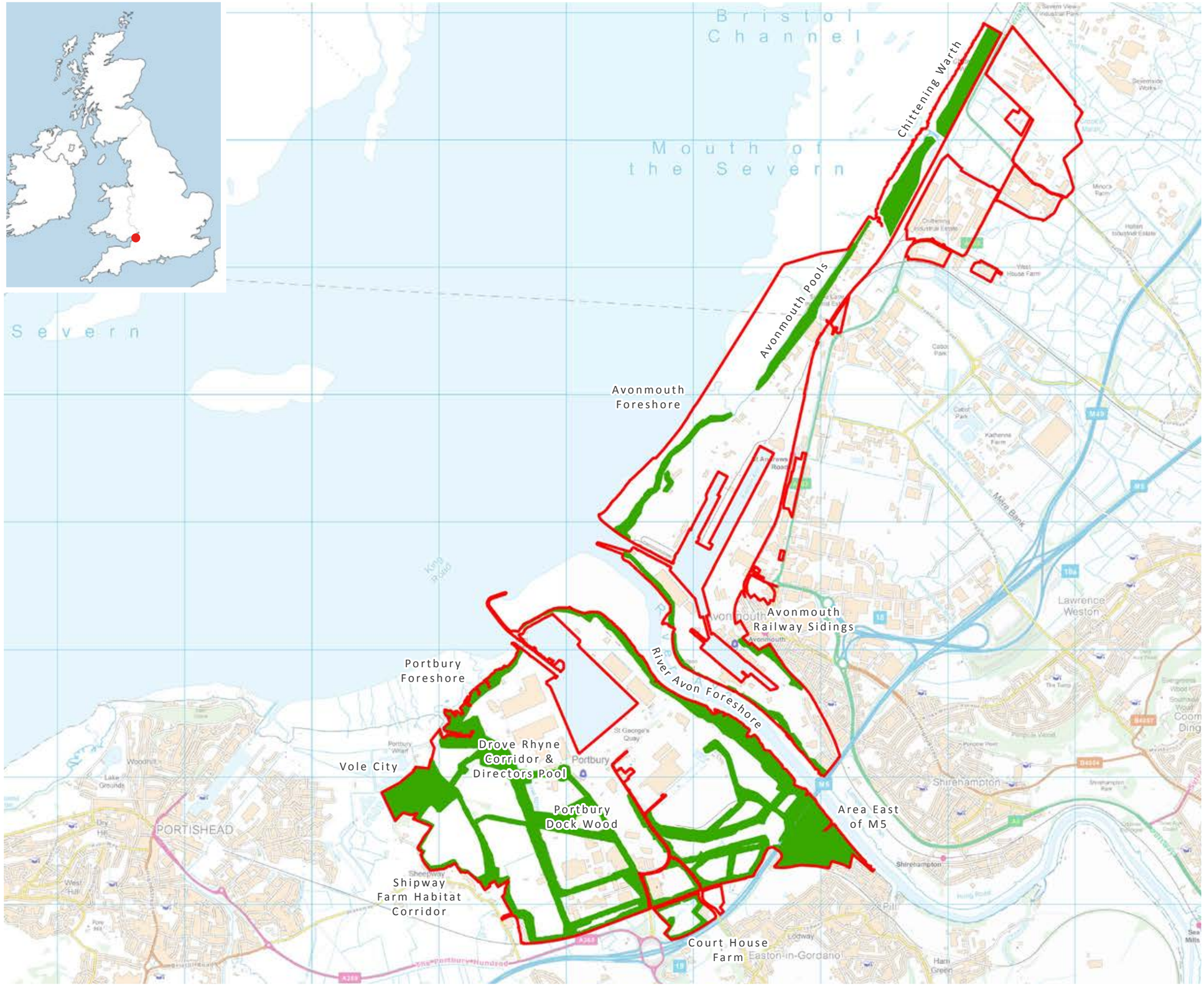
AVONMOUTH & ROYAL PORTBURY DOCKS MANAGEMENT PLAN 2018-2022

FIGURE 1
Designated sites

THE Landmark PRACTICE

Hope Chapel House Hope Chapel Hill Hotwells Bristol BS8 4ND
T: +44 (0)117 923 0455 E: enquiries@thelandmarkpractice.com
www.thelandmarkpractice.com

Drawn: GS Checked: JH Date: 9 Apr 18



Legend

- Royal Portbury and Avonmouth Docks location
- The Bristol Port Estate
- Key management areas

0 312.5 625 1,250 m N

Scale 1 : 30,000 @A3

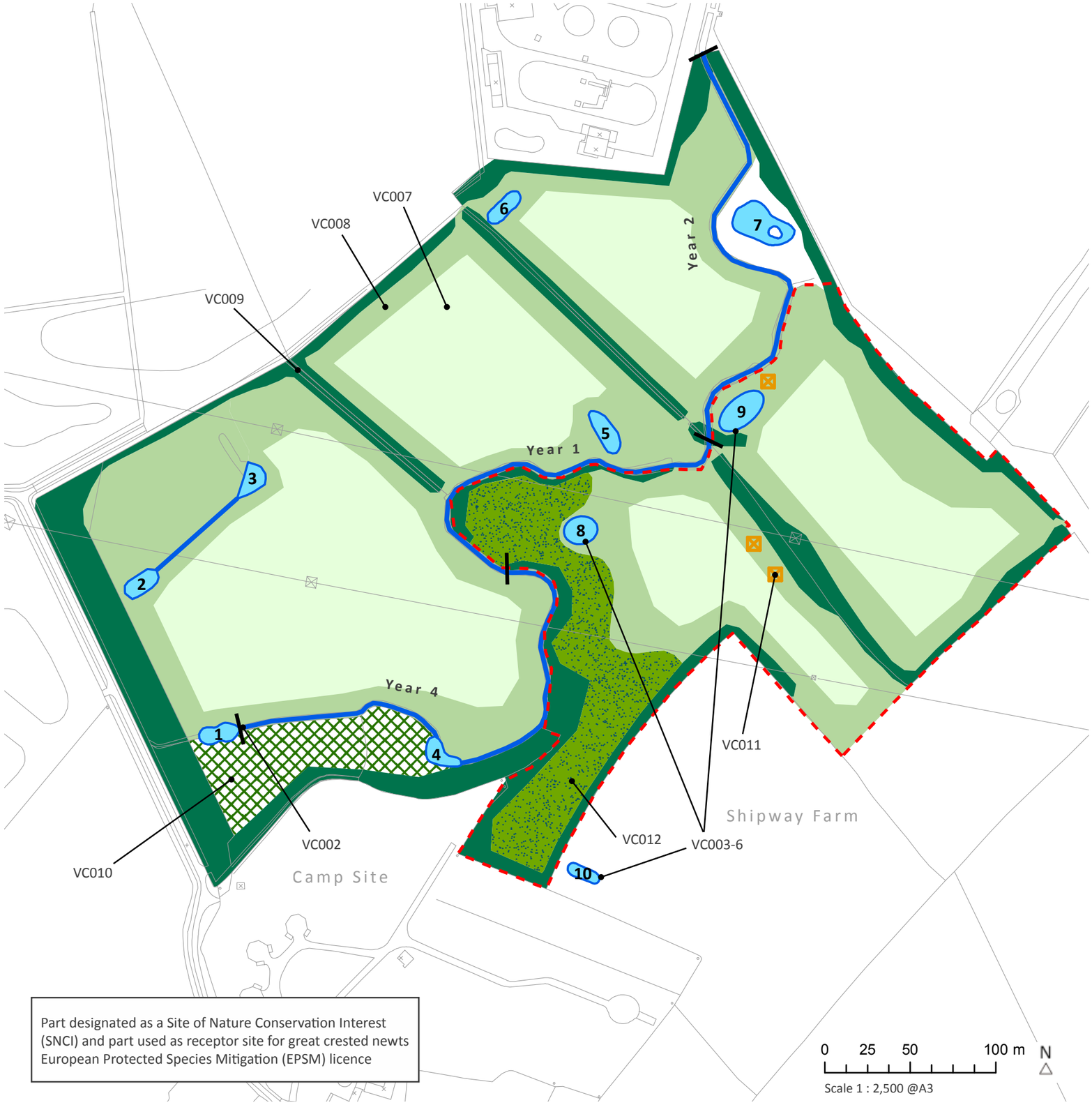
AVONMOUTH & ROYAL PORTBURY DOCKS MANAGEMENT PLAN 2018-2022

FIGURE 2
Key management areas

THE Landmark PRACTICE

Hope Chapel House Hope Chapel Hill Hotwells Bristol BS8 4ND
T: +44 (0)117 923 0455 E: enquiries@thelandmarkpractice.com
www.thelandmarkpractice.com

Drawn: GS Checked: JH Date: 9 Apr 18



Part designated as a Site of Nature Conservation Interest (SNCI) and part used as receptor site for great crested newts European Protected Species Mitigation (EPSM) licence

VC003-VC006: Recently created ponds 8, 9 & 10 to be monitored and managed annually (Sep-Nov) as necessary to ensure high quality habitat for great crested newts is maintained. The following habitat management and site maintenance operations will occur:

- Aquatic vegetation mangement to provide c. 2/3 submerged and 1/4 -1/2 emergent vegetation
- Clearance of tree/scrub cover around margins
- Desilting and clearance of leaf fall
- Checking for fish presence and appropriate removal
- Checking pond condition and remedial action as required

VC007: Field interiors to be mowed (avoiding margin areas) annually prior to the middle of August. Cut to a height of no less than 15cm (the use of a topper is recommended), arisings to be removed off site.

VC008: Field margins cut once every three years on a rotational basis, i.e. not all field margins to be cut in the same year. The cutting regime is to include the ditch and ponds banks with either cutting of only one bank in any year or leaving vegetation at intervals as refuges. Sward to be cut to a height of no less than 15cm, the use of a topper is recommended, arisings removed off site.

VC009: Manage hedgerows every three years (when required) on a rotational basis (i.e. not all hedgerows cut in same year). Cut to a winter height of no less than 3m between 1st January and 28th February. Avoid cutting between March and August (inclusive).

VC010: Tall ruderal and scattered scrub selectively cut back once every three years when required. Cut to no less than 15cm during winter.

VC011: All hibernaculum to be checked annually in the autumn for its structural integrity and remedial action undertaken where required.

VC012: Management of new planting: Each Autumn following practical completion, the new planting will be inspected, and dead or dying plants recorded & replaced in the next winter planting season, until 100% canopy achieved. During the annual check the planting guards, stakes and ties will be adjusted if required, or removed when no longer required (i.e. after 3 years) and any dead, damaged or dying branches will be pruned. New tree and scrub planting will be regularly watered during extended periods of dry weather (for at least the first three years). Once established all woodland and scrub areas to be managed on a rotational basis.

Legend

- Receptor areas
- Reptile hibernacula
- Main ditches
- Ditch managed on a rotational basis in sections per year
- Ponds
- Trees and hedgerows
- Trees and shrub planting
- Tall ruderal /scattered scrub
- Field margins
- Field interiors

Notes:

VC002: Rotational management of ponds and ditches during the winter, including removal of emergent aquatic vegetation (common reed and bulrush) from c.2/3 of a pond to be cleared every five years. With no more than two or three ponds to be managed in any one year e.g.: Year 1: pond 3 and 4. Year 2: ponds 2 and 1. Year 3: no works. Year 4: ponds 5,6 and 7. Year 5: no works. The ditches should be de-silted (when required every 5 years), without disturbing bankside vegetation and working on small sections of ditch at any one time, from one bank leaving gaps untouched as refuge areas and no more than 2 thirds of the ditch worked any one time.

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FIGURE 3
Vole City

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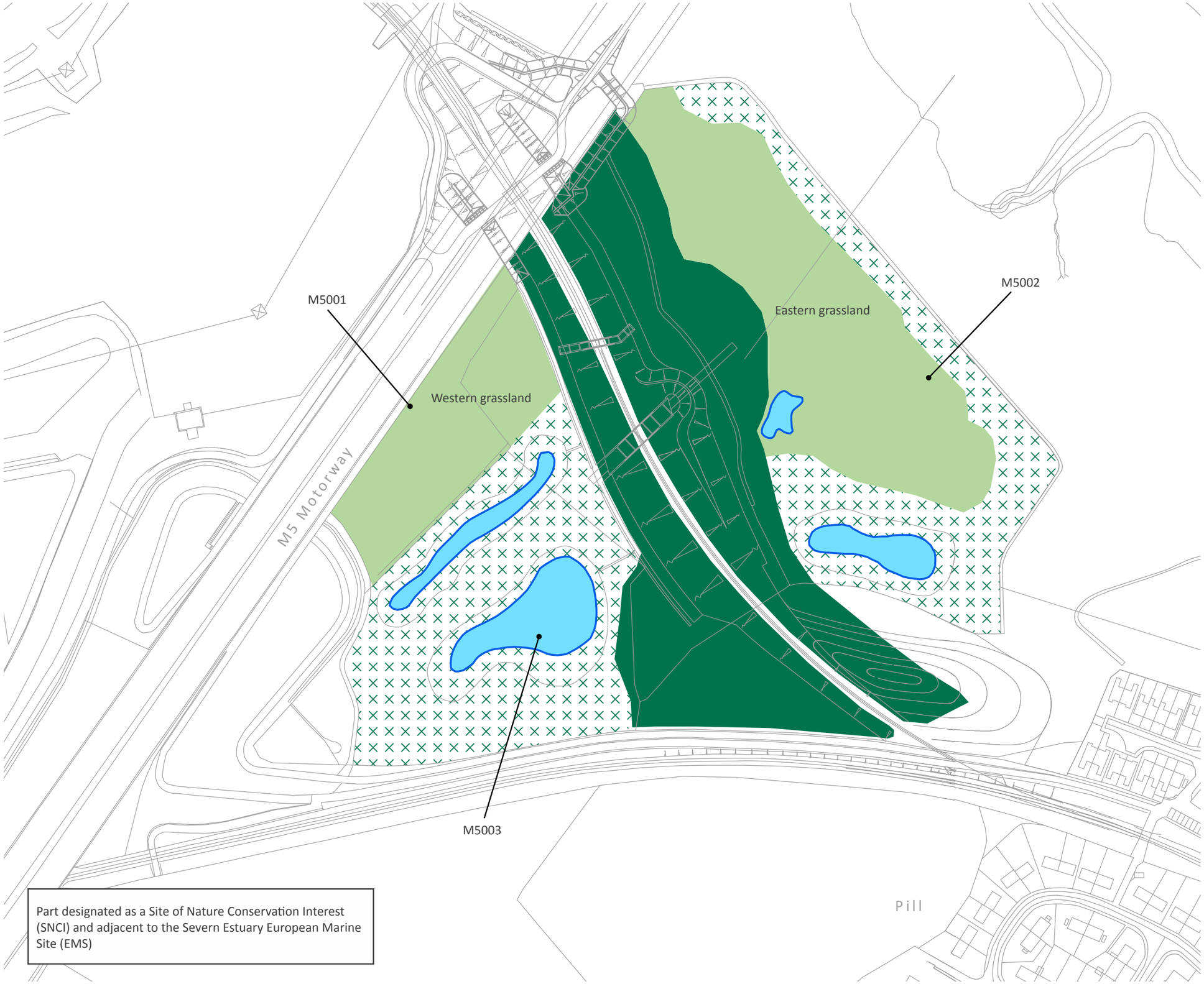

Part designated as a Site of Nature Conservation Interest (SNCI) and adjacent to the Severn Estuary European Marine Site (EMS)

Legend

- Waterbodies
- Woodland & planting
- Grassland areas
- Scattered scrub

Notes:

M5001: Mow western grassland area once every three years to a height of no less than c.15cm, with arisings to be removed to prevent an increase in soil fertility. Churning of the soil by heavy machinery to be avoided (cutting to take place ONLY when ground is firm and dry).

M5002: Selectively thin scrub to encourage grassland species to recolonise and open up water bodies. 50% of scrub within the eastern grassland and 50% of scrub around waterbodies to be removed over years 1 and 2, then selective clearance and coppicing of regrowth on an annual basis thereafter. To be undertaken in the winter months on a rotational basis to minimise impacts of wildlife. Cut vegetation should be used to create brash/habitat piles. Scrub control should avoid areas where vegetation has been planted as part of a landscaping/ mitigation scheme.

M5003: Pond and ditch management to be decided after year 1 scrub clearance.

0 12.5 25 50 m

N

Scale 1 : 2,000 @A3

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FIGURE 4
Area to East of M5

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Legend

Seabank and adjacent coastal area

Seabank/wall managed in sections per year

Notes:

FS002: Scrub control on all sea walls/ banks. Selective thin of scrub to encourage grassland species to recolonise. Clearing c.75% of all scrub along sea walls/banks, working in c.500m sections years 1 to 4. Work to be undertaken in winter over low tides to prevent disturbance to wintering birds, cut material removed from site.

FS003: Scrub along Chapel Pill sea bank to be cut back by 75% in 300-400m sections over the first three years and stumps treated carefully with herbicide to prevent regrowth. Cut material must be removed and not stacked or burnt on site. Undertaken in winter months over low tides.

FS004: Monitor yearly and control with appropriate treatment any invasive species along sea wall including sea buckthorn, Japanese knotweed and Himalayan balsam.

0 50 100 200 m N

Scale 1 : 5,000 @A3

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FIGURE 5
Portbury Foreshore

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RS004: Cut woodland ride in sections on a three year rotation. Arisings to be raked off and heaped away from grassland areas.

RS005: Some trees within the woodland area (avoiding TPO trees) will be 'ring barked' and left allowed to remain as standing deadwood to create habitat for invertebrates and fungi. These will be at a density of circa 3/ha.

RS006: Selectively coppice groups of between 5% and 10% of new shrub planting to create structural diversity

<u>All new planting:</u>

RS007: Health and vigour of planted tree/ shrub stock and woodland understorey/ ground flora to be checked annually and replaced as necessary. Tree stakes and ties to be removed if no longer contributing to establishment assistance.

Legend

- Existing woodland (with supplementary tree and shrub planting)
- Areas of new shrub and tree planting
- Grassland areas
- Woodland ride
- Woodland ride managed in years 1 & 4
- Woodland ride managed in years 2 & 5
- Retained trees (TPO)

<u>Notes:</u>

RS001: If average sward height of grassland exceeds 30cm area is to be cut between mid-July and mid-August with arisings spread and rolled over woodland ride and/or other cleared areas to the south to aid grassland regeneration (any excess taken off site).

RS002: Maintain grassland area at current size biennially through scrub clearance work (avoid nesting bird season from March to August inclusive). Cut vegetation can be put on existing brash/wildlife piles (not on grassland).

RS003: Woodland management through selective thinning of trees to promote quality of woodland to reduce overshading and increase light levels.

0 12.5 25 50 m

N

Scale 1 : 5,000 @A3

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FIGURE 6
Railway Sidings, Avonmouth

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Legend

Avonmouth Foreshore Wetlands

Notes:

Avonmouth/River Avon earth bund:

AF001: Control scrub within Avonmouth Pools area by clearing approximately 30m sections biennially on a rotational basis, to maintain a mosaic of habitats within the site and prevent dominance by bramble scrub. Arisings to be heaped on existing brash piles. Work to be undertaken in winter during low tides to prevent disturbance to breeding and wintering birds.

AF002: Scrub control on all sea walls/ banks. Selective thin of scrub to encourage grassland species to recolonise. Clearing c.75% of all scrub along sea walls/banks, working in c.500m sections in years 1 to 4. Work to be undertaken in winter over low tides to prevent disturbance to wintering birds, cut material removed from site.

AF003: Monitor and control with appropriate treatment any invasive species along sea walls and banks including sea buckthorn, Japanese knotweed and Himalayan balsam.

AF004: Clear debris from inflow pipe to Avonmouth Pools.

0 25 50 100 m N

Scale 1 : 2,500 @A3

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FIGURE 7
Avonmouth Pools and Avonmouth/ River Avon earth bund

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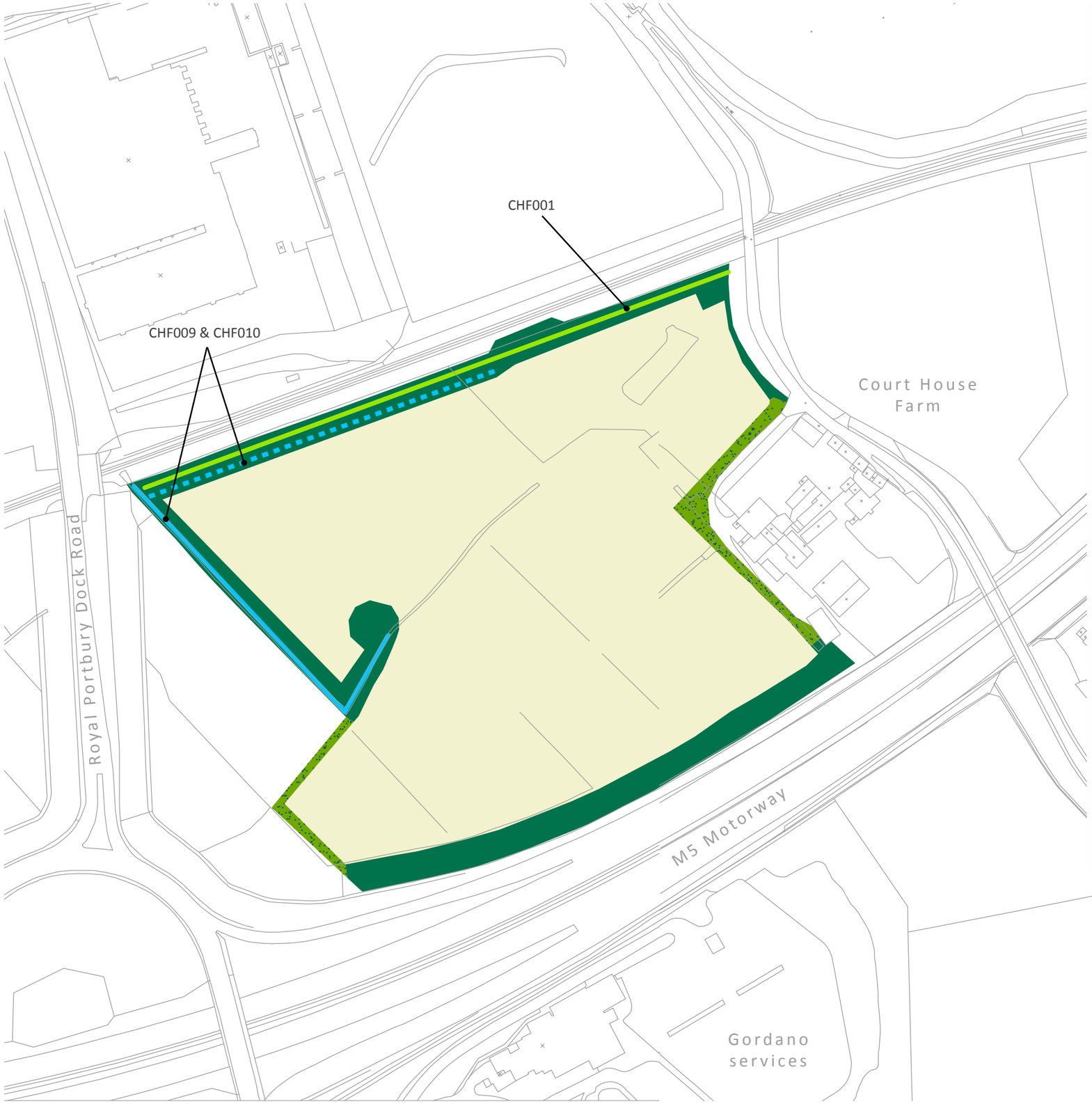

All new planting:

CHF002: All planted areas will be pruned to promote healthy growth and natural shape, and any dead, dying or diseased wood and suckers will be removed. Pruning will be undertaken annually or as appropriate to each species and in accordance with best practice between October and February inclusive to avoid the main bird breeding season. All arisings will be removed for composting.

CHF003: Selective thinning of all newly planted native trees and shrubs will be regularly undertaken to ensure that overcrowding is reduced. Thinning is to be undertaken between October and February inclusive to avoid the main bird breeding season.

CHF004: All areas where plants or trees have failed will be identified and plants will be removed and replaced with equivalent species to complement adjacent planting for the lifetime of the development.

CHF005 Water all new planting during prolonged dry spells to prevent plant failures (during first 2 years following planting).

CHF006: Check stakes and ties on new planting and adjust if needed in summer and winter. Remove stakes when no longer required (i.e. after 3 years). Prune dead, damaged or dying branches.

CHF007: Each autumn following practical completion, the new planting scheme will be inspected, and dead or dying plants recorded and replaced in the next winter planting season, until 100 % canopy is achieved and/or hedgerow gaps are filled.

CHF008: Avoid the use of herbicides and artificial fertilisers, hand pulling should be used if possible. Herbicides should only be applied to spot-treat or weed-wipe for the control of injurious weeds or initially to control undesirable species such as dock, thistles and nettle to assist in the establishment of the sward on newly seeded areas.

Legend

- Development area
- Existing trees and vegetation
- Areas of new shrub and tree planting
- Planted native species hedgerow
- Created linear swale
- Ditch

Notes:

CHF001: Once established, newly planted hedgerows are to be cut annually between 1 January and 28 February.

CHF009: Ditch and swale banks to be cut once every three years on a rotational basis, i.e. not all areas at once. With either cutting of only one bank in any year or leaving vegetation at intervals as refuges. Sward to be cut to a height of no less than 15cm, the use of a topper is recommended. The arisings are to be removed off site.

CHF010 :The ditches should be desilted (where required) every 5 years, without disturbing bankside vegetation and working on small sections of ditch at any one time, from one bank leaving gaps untouched as refuge areas and no more than 2 thirds of the ditch worked at any one time.

0 25 50 100 m N

Scale 1 : 2,500 @A3

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FIGURE 8
Court House Farm

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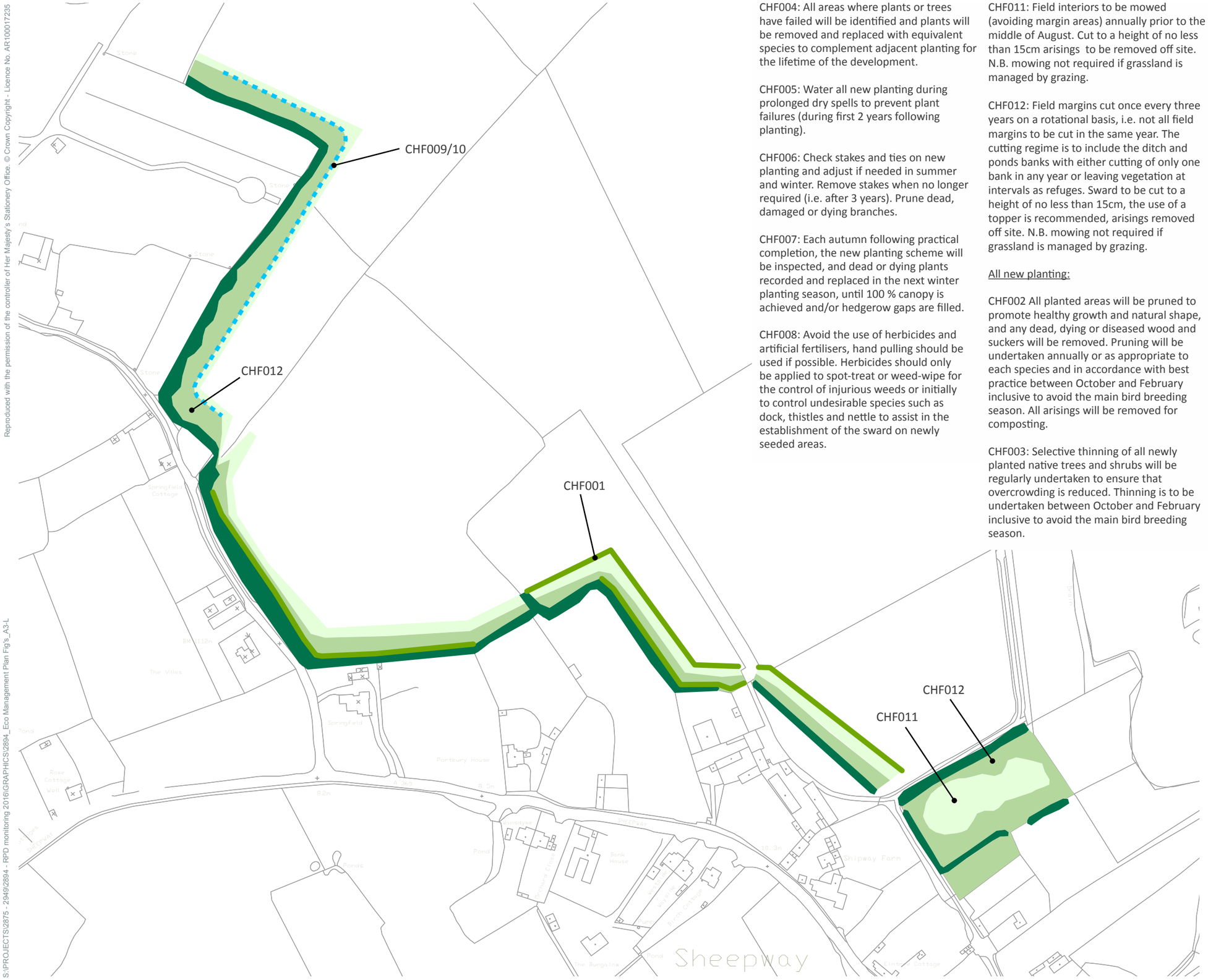

CHF004: All areas where plants or trees have failed will be identified and plants will be removed and replaced with equivalent species to complement adjacent planting for the lifetime of the development.

CHF005: Water all new planting during prolonged dry spells to prevent plant failures (during first 2 years following planting).

CHF006: Check stakes and ties on new planting and adjust if needed in summer and winter. Remove stakes when no longer required (i.e. after 3 years). Prune dead, damaged or dying branches.

CHF007: Each autumn following practical completion, the new planting scheme will be inspected, and dead or dying plants recorded and replaced in the next winter planting season, until 100 % canopy is achieved and/or hedgerow gaps are filled.

CHF008: Avoid the use of herbicides and artificial fertilisers, hand pulling should be used if possible. Herbicides should only be applied to spot-treat or weed-wipe for the control of injurious weeds or initially to control undesirable species such as dock, thistles and nettle to assist in the establishment of the sward on newly seeded areas.

CHF011: Field interiors to be mowed (avoiding margin areas) annually prior to the middle of August. Cut to a height of no less than 15cm arisings to be removed off site. N.B. mowing not required if grassland is managed by grazing.

CHF012: Field margins cut once every three years on a rotational basis, i.e. not all field margins to be cut in the same year. The cutting regime is to include the ditch and ponds banks with either cutting of only one bank in any year or leaving vegetation at intervals as refuges. Sward to be cut to a height of no less than 15cm, the use of a topper is recommended, arisings removed off site. N.B. mowing not required if grassland is managed by grazing.

<u>All new planting:</u>

CHF002 All planted areas will be pruned to promote healthy growth and natural shape, and any dead, dying or diseased wood and suckers will be removed. Pruning will be undertaken annually or as appropriate to each species and in accordance with best practice between October and February inclusive to avoid the main bird breeding season. All arisings will be removed for composting.

CHF003: Selective thinning of all newly planted native trees and shrubs will be regularly undertaken to ensure that overcrowding is reduced. Thinning is to be undertaken between October and February inclusive to avoid the main bird breeding season.

Legend

- Existing trees and vegetation
- Planted native species-rich hedgerow
- Seasonal ditch
- Grassland margins
- Grassland interiors

<u>Notes:</u>

CHF001: Once established, newly planted hedgerows are to be cut annually between 1 January and 28 February.

CHF009: Ditch and swale banks to be cut once every three years on a rotational basis, i.e. not all areas at once. With either cutting of only one bank in any year or leaving vegetation at intervals as refuges. Sward to be cut to a height of no less than 15cm, the use of a topper is recommended. The arisings are to be removed off site.

CHF010 :The ditches should be desilted (where required) every 5 years, without disturbing bankside vegetation and working on small sections of ditch at any one time, from one bank leaving gaps untouched as refuge areas and no more than 2 thirds of the ditch worked at any one time.

0 25 50 100 m N

Scale 1 : 2,500 @A3

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FIGURE 9
Shipway Habitat Corridor

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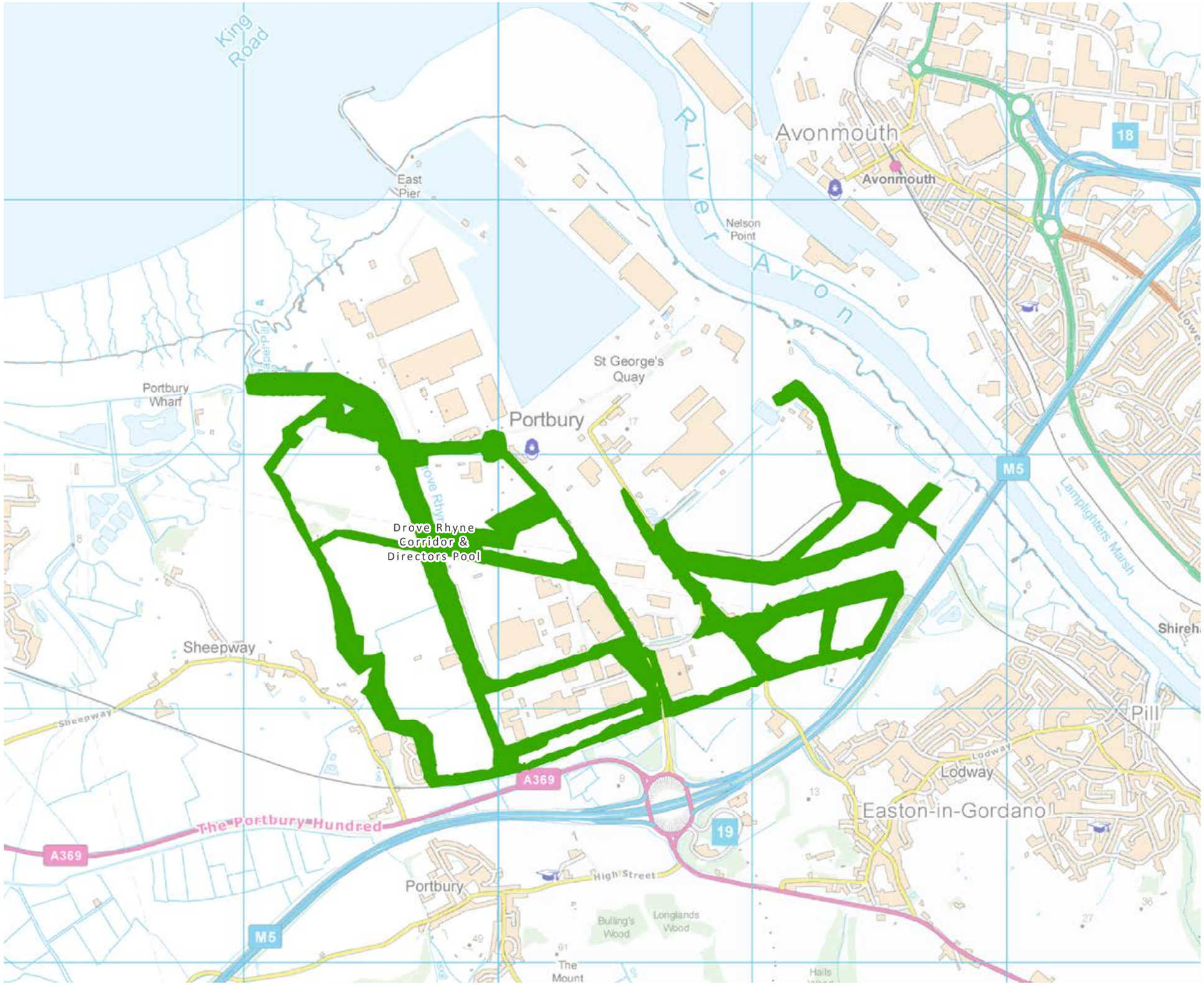

Legend

Habitat corridors

Notes:

HC001: Ditches (other than Drove Rhyne which is managed by the Environment Agency) should be desilted (where required) every 5 years, without disturbing bankside vegetation and working on small sections of ditch at any one time, from one bank leaving gaps untouched as refuge areas and no more than 2 thirds of the ditch worked at any one time.

HC002: Selectively cut back tall ruderal and scattered scrub areas on a rotational basis when required. Height should not be cut to less than 15cm.

HC003: Where not required for amenity purposes, grassland areas cut once every three years on a rotational basis, i.e. not all grassland areas in all corridors to be cut in the same year. The cutting regime is to include the banks of ditches with either cutting of only one bank in any year or leaving vegetation at intervals as refuges. Sward to be cut to a height of no less than 15cm, the use of a topper is recommended. The arisings are to be removed off site, or piled as refuges.

0 125 250 500 m

N

Scale 1 : 15,000 @A3

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FIGURE 10
Habitat Corridors

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