Report

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South-east Devon European Site Mitigation Strategy

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Summary

This report provides a strategy to mitigate for the potential in-combination impacts of new housing development on three European wildlife sites within and in the vicinity of East Devon District, Exeter City and Teignbridge District. The concern relates to the Exe Estuary Special Protection Area (SPA) and Ramsar site, Dawlish Warren Special Area of Conservation (SAC) and the East Devon Pebblebed Heaths SAC/SPA. We focus on the likelihood of significant effects to the nature conservation interest of these sites as a result of recreation arising from new residential development.

We draw from a range of studies and existing body of evidence to consider how recreation impacts on the sites, and we consider in detail the recreational access patterns and links with housing. We consider how a 'zone of influence' might be determined, the area within which new development would be likely to be linked to recreational use of the three sites.

Using data provided by the three local authorities, it would appear that around 30,000 new homes are likely to come forward within the zone of influence, as set out in the relevant strategic planning documents. We consider the percentage change in visitor numbers at the three sites and then suggest a suite of mitigation measures that would be necessary to be confident of no adverse effect on the integrity of the European sites. These measures range from soft measures and proactive work with local residents, to enforcement. The measures are costed and options for funding and delivery are discussed.

Our approach within the report is evidence-based and seeks a means of enabling development whilst ensuring adequate protection for the European wildlife interest. The issues relating to recreation impacts are complex. The Exe Estuary, the Pebblebed Heaths and Dawlish Warren are popular local sites, and access to these areas is vital to the local economy and highly valued by local people. Access to such sites has widespread benefits including health, education, inspiration, spiritual and general well-being. While much of the access takes place regardless of the wildlife interest, that wildlife interest is also a part of the specific draw for many people. New housing will increase the number of local residents, many drawn to the area because of the surrounding countryside. Impacts from increased recreation will be gradual and take place over an extended period. Local authorities have a legal duty to ensure no adverse effects occur as a result of their strategic plans and it is therefore necessary to address these gradual changes. While mitigation measures might seek to control or limit access in some areas, the overall aim should be to enhance the existing recreation experience and provide opportunities such that access and nature conservation interests are not in conflict.

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Ross Sutherland (East Devon District Council) collated the GIS data relating to new housing across the three local authorities.

In addition we have drawn on a wide stakeholder consultation that was largely undertaken using the internet and is set out in a separate report.

1. Introduction

Overview

1.1 Within the context of an increasing human population and increasing urban development, there is a growing need to resolve pressures on sites that are important for nature conservation. Development in the wider landscape around important sites brings particular issues, such as increasing the isolation/fragmentation of individual sites and increased levels of recreation. As development levels and the number of people increase, areas that are important for nature conservation fulfil a range of other services, which include providing space for recreation, ranging from the daily dog walk to extreme sports. There is a need to resolve the impacts associated with development, particularly for sites that are afforded legal protection for their nature conservation interest. In this report we focus on three such sites: the Exe Estuary, Dawlish Warren and the Pebblebed Heaths. We consider the importance of the sites, the levels of development likely to occur around them in the future and we consider in detail approaches to resolve the impacts. Our focus is entirely on the impacts of increased recreation arising from residential development.

Purpose of the report

1.2 This report provides a strategy to mitigate for the potential impacts of new residential development and growth on European wildlife sites within and in the vicinity of East Devon District, Exeter City and Teignbridge District. The National Planning Policy Framework (NPPF), published by the Department for Communities and Local Government in March 2012, states that public bodies have a duty to co-operate on planning issues that cross administrative boundaries, particularly those which relate to strategic priorities, with conservation and enhancement of the natural environment being one such strategic priority. Cross boundary co-operation to take forward strategic approaches to the protection of European wildlife sites is a principle that has been established for some time, but the new NPPF now recognises the importance and benefits of such an approach.

1.3 In accordance with NPPF requirements, the three local planning authorities responsible for the East Devon, Exeter City and Teignbridge districts are working in partnership to establish a comprehensive evidence base and strategy to ensure that European sites are adequately protected whilst taking forward sustainable levels of growth, in appropriate locations. This work informs the preparation and review of local plan documents, and the determination of planning applications. This particular report is a mitigation and delivery strategy, and is produced following a number of earlier studies and surveys to gather information and evidence relating to the use of European sites in the area for recreation, and the potential disturbance to European site interest features that could be caused by that recreational use.

1.4 The full set of reports that provide the European site evidence base are:

- A face-face visitor survey on the Exe Estuary
- A household survey (by post, asking about recreational visits to countryside sites)
- The Exe Disturbance Study

- Visitor Survey of the Pebblebed Heaths
- Assessment of ecological impacts to Dawlish Warren SAC
- Exe Interim Report (in place until the full mitigation and delivery strategy is finalised)
- Stakeholder consultation on likely success of mitigation measures for the Exe, Dawlish Warren and the Pebblebed Heaths

1.5 Following the work listed above, this report provides a single overarching document addressing the European sites, the mitigation required for residential development coming forward, and the means to deliver the mitigation, informed by all preceding work. This report addresses the potential for increased recreational pressure on the European sites arising from new residential development across the three administrative areas, the potential impacts on the European sites that could occur as a consequence, and the measures that should be put in place to mitigate for those potential impacts.

1.6 Each local planning authority will still need to consider potential impacts from residential development that are in addition to recreational pressure (such as pollution, hydrological impacts) and the potential impacts arising from non-residential development. Additionally, there will still be a need to check whether any development could affect European sites further afield, which have not been included in this report. Some of the measures proposed to mitigate for the potential impact of recreational pressure arising from new residential development may be equally applicable to the recreational impacts that may occur from increased tourism. The measures proposed have not been designed to mitigate for tourism, as the recreational requirements and use of the European sites may differ, and is likely to be more 'hotspot' focussed.

Legislative, policy and strategy context for the report

Legislation

1.7 The designation, protection and restoration of European wildlife sites is embedded in the Conservation of Habitats and Species Regulations 2010, as amended, which are commonly referred to as the 'Habitats Regulations.' Recent amendments to the Habitats Regulations were made in 2012. However, the recent amendments do not substantially affect the principles of European site assessment as defined by the 2010 Regulations or the focus of this report.

1.8 The Habitats Regulations are in place to transpose European legislation set out within the Habitats Directive (Council Directive 92/43/EEC) and the Birds Directive (Council Directive 2009/147/EC). These key pieces of European legislation seek to protect, conserve and restore habitats and species that are of utmost conservation importance and concern across Europe. Although the Habitats Regulations transpose the European legislation into domestic legislation, the European legislation still directly applies, and in some instances it is better to look to the parent directives to clarify particular duties.

1.9 Within the Habitats Regulations, local planning authorities, as public bodies, are given specific duties as 'competent authorities' with regard to the protection of sites designated or classified for their species and habitats of European importance. In recognition of these

duties, Exeter City Council, East Devon District Council and Teignbridge District Council are working together as 'competent authorities' to secure Habitats Regulations compliance with regard to their planned growth and development.

1.10 Regulation 61 of the Habitats Regulations sets out the Habitats Regulations Assessment process for plans and projects, which includes development proposals for which planning permission is sought. Additionally Regulation 102 specifically sets out the process for assessing emerging land use plans.

1.11 The step by step approach to Habitats Regulations Assessment is the process by which a competent authority considers potential impacts on European sites that may arise from a plan or project that they are either undertaking themselves, or permitting an applicant to undertake. The step by step process of assessment can be broken down into the following stages, which should be undertaken in sequence:

- Check that the plan or project is not directly connected with or necessary for the management of the site
- Check whether the plan or project is likely to have a significant effect alone
- Check whether the plan or project is likely to have a significant effect in-combination
- Carry out an Appropriate Assessment
- Ascertain whether there will be an adverse effect

1.12 Throughout all stages, there is a continual consideration of the options available to avoid and mitigate any identified potential impacts. A competent authority may choose to pursue an amended or different option where impacts are avoided, rather than continue to assess an option that has the potential to significantly affect European site interest features.

1.13 After completing an assessment to the required stage, there are further exceptional tests set out in Regulation 62 for plans and projects and Regulation 103 specifically for land use plans. Exceptionally, a plan or project could be taken forward for imperative reasons of overriding public interest where adverse effects cannot be ruled out and there are no alternative solutions. It should be noted that the three authorities do not intend to take forward any aspects of their plans that would need to meet the exceptional tests set out within Regulations 62 or 103. However, in such circumstances where a competent authority considers that a plan or project should proceed under these Regulations, they must notify the relevant Secretary of State. Normally in these circumstances, planning decisions and competent authority duties then become the responsibility of the Secretary of State, unless the planning authority is directed to authorise the plan or project themselves by the Secretary of state. The decision maker, whether the Secretary of State or the planning authority, should give full consideration to any proposed 'overriding reasons' for which a plan or project should proceed, despite being unable to rule out adverse effects on European site interest features, and ensure that those reasons are in the public interest and are such that they override the potential harm. The decision maker

will also need to secure any necessary compensatory measures if such a plan or project is allowed to proceed.

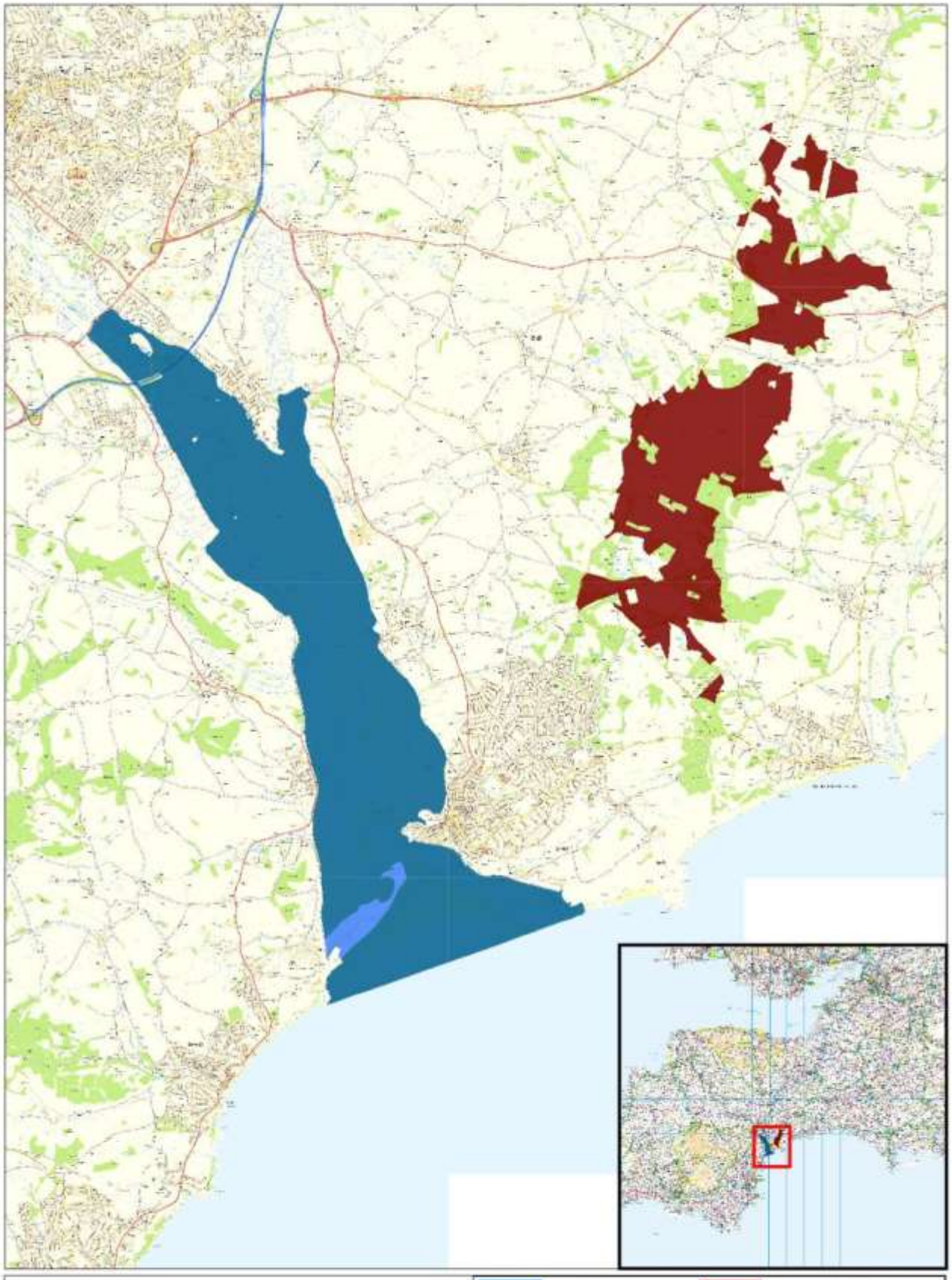
1.14 The step by step process of Habitats Regulations Assessment has been followed by the three local planning authorities for both emerging land use plans and the determination of planning proposals in their respective administrative areas. In undertaking those assessments, and in commissioning specialist ecological survey and assessment work to inform their spatial planning evidence base, the local planning authorities have identified the clear need for a strategic approach to considering potential impacts arising from residential development on the European wildlife sites in close proximity.

1.15 Detailed descriptions of the step by step process undertaken, and conclusions drawn to date can be found within the individual Habitats Regulations Assessment work for each local planning authority, and this is therefore not repeated in any detail here. The purpose of this report is to provide a comprehensive analysis of potential mitigation measures, and provide a robust and consistent mechanism for their delivery going forward. Previous work has progressed through the Habitats Regulations steps to identify the mitigation need. This report therefore aims to provide mechanisms by which sustainable development can proceed at appropriate levels and locations, in accordance with the European and domestic legislation.

European site protection

1.16 The European wildlife sites to which this mitigation and delivery strategy is being applied are the Exe Estuary Special Protection Area (SPA) and Ramsar site, Dawlish Warren Special Area of Conservation (SAC) and East Devon Pebblebed Heaths SAC/SPA. These sites are described in detail in the following section. Map 1 provides an overview of the three sites, which lie in close proximity. It should be noted that whilst the mitigation needs have been identified for these sites, there are other European sites in the wider area. Plans and projects should not proceed without checking for any other potential European site impacts, even if such plans and projects are in accordance with this mitigation and delivery report whereby impacts on the Exe Estuary, Dawlish Warren and East Devon Pebblebed Heaths have been fully considered and ruled out. An assessment of other potential European site impacts has not been commissioned as a part of this study.

1.17 European sites hold the highest level of biodiversity legislative protection. Member states have specific duties in terms of avoiding deterioration of habitats and species for which sites are designated or classified, and stringent tests have to be met before plans and projects can be permitted, with a precautionary approach embedded in the legislation. The overarching objective is to maintain sites and their interest features in an ecologically robust and viable state, positively contributing to the conservation of the species or habitat to enable it to sustain itself and thrive into the long term, with adequate resilience against natural influences. The Habitats Directive refers to this state as being in 'favourable conservation status' for the habitat or species, in the context of its natural range rather than merely just at the individual site level. The status of each site does however contribute to the achievement of overall favourable conservation status of a habitat or species.



Map 1: Overview of the three European sites

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1.18 As required by the Directives, 'Conservation Objectives' have been established, which should define the required ecologically robust state for each European site interest feature. All sites should be meeting their conservation objectives. Where they are not, plans should be in place for adequate restoration. Aproject to renew the European site Conservation Objectives was commenced by Natural England in 2012, in order to give clarity and consistency across all sites. The project is now well underway and European site Conservation Objectives now consist of a set of generic objectives, which should be applied to each interest feature of each European site. The new list of Conservation Objectives for each European site sits under an overarching objective, and whilst the objectives are standardised, they are applied to each interest feature of each European site, and the application and achievement of those objectives will therefore be site specific and dependant on the nature and characteristics of the site.

1.19 For SPAs the overarching objective is to:

1.20 'Avoid the deterioration of the habitats of qualifying features, and the significant disturbance of the qualifying features, ensuring the integrity of the site is maintained and the site makes a full contribution to achieving the aims of the Birds Directive.'

1.21 This is achieved by, subject to natural change, maintaining and restoring:

- The extent and distribution of the habitats of the qualifying features.
- The structure and function of the habitats of the qualifying features.
- The supporting processes on which the habitats of the qualifying features rely.
- The populations of the qualifying features.
- The distribution of the qualifying features within the site.

1.22 For SACs the overarching objective is to:

1.23 'Avoid the deterioration of the qualifying natural habitats and the habitats of qualifying species, and the significant disturbance of those qualifying species, ensuring the integrity of the site is maintained and the site makes a full contribution to achieving Favourable Conservation Status of each of the qualifying features.'

1.24 This is achieved by, subject to natural change, maintaining and restoring:

- The extent and distribution of the qualifying natural habitats and habitats of qualifying species.
- The structure and function (including typical species) of qualifying natural habitats and habitats of qualifying species.
- The supporting processes on which qualifying natural habitats and habitats of qualifying species rely.
- The populations of qualifying species.
- The distribution of qualifying species within the site.

1.25 The Conservation Objectives project will now continue with the production of more detailed and site specific objectives for each site, that will explain in detail the components that make up the quality, extent, supporting processes and typical species for each site.

1.26 This mitigation and delivery strategy aims to provide mechanisms to facilitate an acceptable level of growth without compromising the ability of any European site to meet its conservation objectives for each site interest feature.

National Planning Policy Framework

1.27 In March 2012 the current Coalition Government issued the new NPPF, which provides a full set of national policies within one document, replacing most of the former series of Planning Policy Statements. Of particular relevance to this report is the replacement of Planning Policy Statement 9, which covered biodiversity and geological conservation. Key areas of previous biodiversity policy are however now laid out in the new NPPF, and for a number of aspects, the biodiversity policy has been updated and given greater clarity.

1.28 Paragraph 14 of the NPPF states that there is a presumption in favour of sustainable development, directing local planning authorities to meet the development needs of an area and approve development that accords with the local plan. The presumption in favour of sustainable development does not apply however, where an Appropriate Assessment, the part of the Habitats Regulations Assessment that examines in detail whether an adverse effect on site integrity can be ruled out, is required in accordance with the Habitats Regulations.

1.29 Where there is a likelihood of significant effects arising from a plan or project, full adherence to the step by step approach set out within the Habitats Regulations is therefore necessary. In accordance with the legislation, overriding reasons for which a development should proceed are only considered in the exceptional circumstances where adverse effects on site integrity cannot be prevented, and there are no alternative solutions to the plan or project.

1.30 The NPPF states that listed or proposed Ramsar sites should be given the same protection as European sites. This policy was taken forward from the previous Planning Policy Statement 9. For this reason, the Habitats Regulations Assessment process is equally applied to listed or proposed Ramsar sites.

1.31 The NPPF provides a framework within which sustainable development should be managed, and its principles are therefore applicable to mitigation strategies that may support sustainable growth. Section 5 of this report considers the context for the mitigation proposals, and here there is also consideration of the planning policy principles that are applicable to any strategic mitigation scheme.

Recent changes to the planning system

1.32 The previous Government brought legislation and policy into force that put in place the 'Local Development Framework' concept for local spatial planning. This provided a suite of documents that together would form the framework to direct development in a district or borough. This would include an overarching Core Strategy, and a number of additional development plan documents that would be put in place as required for the specific local area, normally including at least a housing development plan document. Plans adopted during the last Government administration are therefore referred to as Core Strategies and Development Plan Documents.

1.33 The current Coalition Government has brought in further legislative and policy changes that set in place a local spatial planning system that operates with one main plan for a district or borough, the Local Plan. As there is now a steer towards reducing the number of documents relating to local level spatial planning, Local Plans are now incorporating a wider range of policy requirements, which would have previously formed separate development plan documents within a Local Development Framework. Plans coming forward for Examination are now normally referred to as Local Plans.

1.34 As a consequence, there is currently a mixture of adopted and emerging plans across the country that either relate to the previous Local Development Framework System, or the new Local Plan system, with some that have attempted to encompass both due to their recent finalisation during the transition.

1.35 The requirement for Habitats Regulations Assessment remains the same with both systems. East Devon and Teignbridge are bringing forward new Local Plans, whereas Exeter has a recently adopted Core Strategy and is now preparing a development management document known as a 'development delivery development plan document.'

1.36 Some more significant development proposals are now being considered through a new determination process as 'Nationally Significant Infrastructure Projects' or 'NSIPS.' The Planning Act 2008 set in place a new system for determining such proposals, with an Examination process by an independent commission, taking decision making away from local planning authorities or other planning bodies, in order to reduce delays to the determination of important infrastructure projects that could potentially make a significant contribution to the economy. The current Coalition Government has retained this process, but has brought the Examining body back into the Planning Inspectorate, with a special department known as the National Infrastructure Division taking the role of independent examiner. Final decisions, post examination, are then made by the relevant Secretary of State. The Government has recently announced further plans to potentially make it easier for developers to opt for Planning Inspectorate consideration of large scale development proposals rather than the local planning authority.

1.37 In NSIP cases where there is the potential for impacts on European sites, the Secretary of State becomes the competent authority, but all Habitats Regulations Assessment information is to be provided upfront by the applicant, in order to be considered as part of the Examination by the Planning Inspectorate.

1.38 With the increasing focus on getting the economy growing again, it is anticipated that a significant number of proposals will be determined by the NSIP process, and it is quite possible that proposals may come forward within Exeter, Teignbridge or East Devon at some point. In taking forward a strategic approach to mitigating for residential development and avoiding deterioration of European wildlife sites, the three local planning authorities will need to have regard to, engage with, and maintain a full understanding of any decisions made in their local area, including any mitigation (or compensatory provisions where necessary) being made.

1.39 Aside from those proposals of potentially national significance, there has been additional emphasis by the current Coalition Government on the return of decision making powers to the local level, and empowerment of local communities to make decisions about the place in which they live. The Coalition Government is also bringing forward a number of changes that enable more developments to proceed without individual planning permission, under permitted development rights, or through other new initiatives that are intended to streamline the approval process.

1.40 It is important to make clear that the wealth of planning changes do not alter the requirements of the Habitats Regulations and parent Directives, and in each case a plan or project will still have a competent authority charged with making adequate assessment and decisions in accordance with the legislation. Local planning authorities will however need to keep abreast of development that may come forward through other means that the normal local planning authority planning application route in order to maintain an overview of development pressure, European site sensitivities, any in-combination effects (i.e. effects of multiple plans or projects acting together) and mitigation requirements.

Community Infrastructure Levy

1.41 The Community Infrastructure Levy was first introduced by the previous Government in the 2008 Planning Act. Section 205(2) of that Act states that the overall purpose of the levy is to ensure that costs incurred in providing infrastructure to support the development of an area can be funded wholly or partly by owners or developers of land. Specific legislation, the Community Infrastructure Levy Regulations 2010, brought the levy into force, with subsequent amendments made to those Regulations in 2011, 2012, 2013 and further amendments due in 2014. All local planning bodies need to be implementing the Regulations with a charging schedule in place by 2014, although the newly proposed amendments to the Regulations for 2014 will extend this period to 2015.

1.42 The Community Infrastructure Levy places a levy on new development that then provides funding to meet local infrastructure requirements, enabling growth to proceed with adequate and maintained infrastructure in place. As the charging schedule for the levy is a document produced in consultation with the public and taken through an Examination process, and given that the schedule takes into account all infrastructure needs for the local area, the Community Infrastructure Levy is promoted as a fairer, more transparent and consistent way of seeking developer contributions for local infrastructure needs.

1.43 Prior to the Community Infrastructure Levy, all contributions were obtained via Section 106 agreements, which are planning obligations as set out in Section 106 of the Town and Country Planning Act 1990. This legal agreement can be bespoke and specific to an individual proposal, or could form part of a wider agreed strategy with numerous developments contributing. A planning obligation is used to fund requirements that are necessary to make the development acceptable in planning terms. With the introduction of a levy to specifically fund infrastructure, S106 agreements now generally only focus on non-infrastructure requirements.

1.44 Where developer contributions are necessary to fund requirements that do not specifically relate to the provision of infrastructure, contributions can continue to be obtained on a

development by development basis through Section 106 agreements. The difference between the application of the Community Infrastructure Levy and S106 obligations is that the Community Infrastructure Levy is a levy calculated on the basis of a pre-approved schedule, therefore paying a proportionate contribution based on size and nature of the development, whereas S106 agreements can contain specific requirements that relate to the development and any particular requirements at that location that are necessary to make the planning application acceptable in planning terms. There is still provision for very small scale infrastructure to be funded through S106 agreements, if firstly the infrastructure project requires less than five developments to contribute to its funding and if secondly the infrastructure project has not been listed as an infrastructure project for which the authority will be seeking contributions under the Community Infrastructure Levy. There are other exceptions where use of S106 may be the most appropriate means of securing infrastructure funding, particularly where the need is very site specific.

1.45 Although the Community Infrastructure Levy is relatively new and many local planning authorities are yet to put their charging schedule in place, the Government has advised that the levy is appropriate for funding infrastructure required to mitigate for any development impacts on European sites, such as alternative green infrastructure that meets recreational needs of new residents to divert their use away from European sites. The 2012 amendments to the Community Infrastructure Levy Regulations, provided greater clarity regarding the use of the levy, identifying that the provision of infrastructure by the levy includes the provision, improvement, replacement, operation or maintenance of that infrastructure. Critically therefore, the operation and maintenance of alternative green infrastructure, as well as its provision, needs to be included in the levy.

1.46 It is suggested that any non-infrastructure related mitigation could continue to be funded by Section 106 agreements. Later sections of this report consider the options for securing funding for European site mitigation, and what may be classed as infrastructure or non-infrastructure.

Biodiversity policy and strategy

1.47 The Department for Environment, Food and Rural Affairs (Defra) was asked by the current Coalition Government to undertake a review of the implementation of the Habitats Directive, and its findings were produced in March 2012. Whilst the evidence clearly demonstrated that the European legislation precluded development in a very small percentage of cases, the review made it clear that a number of improvements in the application of the legislation still needed to be made, most notably with regard to available evidence for assessment, and the need for more positive and close working between Government, LPAs, developers and nature conservation bodies to collectively seek solutions that enable growth and protect European site interests at the same time, wherever possible.

1.48 The joint approach by Exeter, Teignbridge and East Devon Councils, underpinned by a comprehensive level of evidence gathering and analysis is in accordance with the principles set out in the Habitats Directive Review findings; with evidence based decisions and a

proactive solution seeking an approach wherever possible, without compromising the integrity of European wildlife sites.

1.49 Recent Government led or commissioned publications, such as the Natural Environment White Paper, England Biodiversity Strategy and Lawton's Review of England's wildlife sites and ecological networks, draw together a clear picture of the current state of our biodiversity resource, and an overwhelming message of the need for co-ordinated, landscape scale action. In addition to the harm caused by development, designated sites are under pressure from the effects of climate change and coastal change, and are isolated due to the lack of a functioning wider ecological network outside the designated sites system. Lawton advises that a step change in our approach to nature conservation is required.

1.50 It is within this context that Habitats Regulations Assessment should be considered. Member states have a duty under Article 6(2) of the Habitats Directive to avoid the deterioration of natural habitats and the habitats of species for which sites have been designated. Additionally, European sites are underpinned by the national suite of Sites of Special Scientific Interest, for which local planning authorities and other public bodies are tasked with furthering their conservation and enhancement. Local planning authorities should therefore be seeking to contribute to the protection and enhancement of designated sites, irrespective of the specific need to prevent adverse effects arising from newly proposed development.

1.51 The current state and vulnerability of a site will influence the decisions made with regard to whether a plan or project will adversely affect site interest features. Features already sensitive to other influences are likely to suffer a greater impact than those in an ecologically robust state. This report, and the earlier work that underpins it, has had full regard for the current condition of site interest features, and the wider influences currently affecting site sensitivity.

2. Ecological impacts

Overview

2.1 In this section we summarise the findings of the evidence to date on existing ecological impacts including identifying:

- Why each site is designated;
- Impacts from recreation;
- Activities that result in impacts;
- Areas most affected by these activities and where the special interest is most vulnerable to increased disturbance;
- Areas where there may potentially be 'spare capacity' for increased levels of certain types of recreation without causing increased disturbance;
- Where the majority of visitors originate and how far they are travelling to the sites
- Consideration of other external factors that may influence site sensitivity.

The Exe Estuary

Interest Features

2.2 The Exe Estuary lies between Teignbridge District to the west, East Devon District to the east and Exeter City to the north. It is designated as a Special Protection Area (SPA), Ramsar site, European Marine Site and SSSI.

2.3 The SPA (Map 2) includes the estuary waters, foreshore, saltmarsh and the sand dunes and spit of Dawlish Warren, and extends to Exeter at the top (northern part) of the estuary. The estuary includes a range of intertidal habitats, including mudflats, sandflats, eelgrass *Zostera sp.* beds, mussel *Mytilus edulis* beds and saltmarsh. A number of roost sites at the top end of the estuary are freshwater grazing marsh. Lagoons at Bowling Green Marsh and Exminster Marshes lie within the SPA and are RSPB reserves. Key locations referred to within the text of this report are labelled on Map 2.

2.4 The Exe Estuary qualifies under Article 4.1 of the Birds Directive by supporting overwintering populations of the following species listed on Annex I of the Directive:

- Avocet *Recurvirostra avosetta* (at least 28.3% of the wintering population in Great Britain). The majority of British avocets move from their East Anglian breeding grounds to coastal estuary sites, either in East Anglia or on the south coast. The Exe Estuary is one of only three SPAs classified for non-breeding avocets.
- Slavonian Grebe *Podiceps auritus* (at least 5.0% of the wintering population in Great Britain). The Exe Estuary is one of only three sites in the UK classified as an SPA for non-breeding Slavonian Grebe, with the other two sites being in Scotland. The Exe Estuary is therefore a critical overwintering ground for this species in the UK.

2.5 The Exe Estuary qualifies under Article 4.2 of the Birds Directive for both its overwintering populations of regularly occurring migratory species and also as a site supporting an internationally important assemblage of birds.

- The estuary supports the following migratory species over winter: Dark-bellied Brent Goose *Branta bernicla bernicla,* Dunlin *Calidris alpina alpina,* Oystercatcher *Haematopus ostralegus,* Black-tailed Godwit *Limosa limosa islandica, and* Grey Plover *Pluvialis squatarola*also
- The estuary also qualifies under Article 4.2 of the Directive as it regularly supports an assemblage of at least 20,000 wintering waterfowl, including: Black-tailed Godwit, Dunlin, Lapwing *Vanellus vanellus*, Grey Plover, Oystercatcher, Red-breasted Merganser *Mergus serrator*, Wigeon *Anas penelope*, Dark-bellied Brent Goose, Cormorant *Phalacrocorax carbo*, Avocet, Slavonian Grebe and Whimbrel *Numenius phaeopus.* This list is taken from the site citation where a range of assemblage species is normally quoted, but not the entire assemblage species list. Other species therefore also form part of the assemblage.

Map 2: Exe Estuary SPA and locations referred to in the report

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2.6 In 2001 the Joint Nature Conservation Committee (JNCC) embarked upon a review of the UK SPA network, in order to check full compliance with the requirements of the Birds Directive, and respond to emerging survey information. That review lead to a number of changes to SPA classifications, including new sites added to the network.

2.7 The 2001 review highlighted a number of areas where further work was required, particularly in relation to a need for further comprehensive survey work for some Annex 1 species, in order to ensure that adequate coverage across the SPA network was being provided. A new 2012 SPA review is targeting specific remaining actions from the 2001 Review, with a focus on particular species, in light of additional data that has been gathered since 2001.

2.8 With an ongoing process of review, there remains some discrepancy between the current classified suite of SPAs, their interest features, and matters remaining from the 2001 review that are now being considered as part of the 2012 review. Natural England advises that the Natura 2000 data forms, that form part of the formal classification, remain the official list of interest features, and that any species that do not feature in a site's review information must still be considered to form an interest feature, until such time that final decisions are made and formal changes take place, which would result in a change to the Natura 2000 data form. With respect to the Exe Estuary SPA, it should be noted that the Article 4.2 overwintering migratory species are not listed as qualifying features in the SPA Review of 2001 (i.e. the Review cites wintering Slavonian Grebe, wintering Avocet as Article 4.1 features and the Articule 4.2 assemblage of at least 20,000 waterfowl only).

2.9 The Exe Estuary is also listed as a Ramsar site, due to its estuarine habitats and its overwintering and on-passage waterbirds. In addition, the underlying SSSI designation at a national level reflects not only the wintering bird interest, but also the flora and invertebrates of the surrounding marshes, the saltmarsh, the invertebrate communities within the estuary, the eelgrass beds (*Zostera* spp.) and the geological interest.

2.10 The current environmental condition of the site, as identified by Natural England's SSSI condition assessment,[1] indicates that the site interest features are generally favourable although it should be noted that the SSSI condition assessment relates to all SSSI interest features, including those that do not form part of the SPA interest. The condition assessment notes some declines in the waterbird assemblage generally, and also specifically in oystercatcher, grey plover and dunlin numbers. The SSSI condition assessment is informed by the Wetland Bird Survey (WeBs) counts. Notably, the condition assessment advises that there is insufficient knowledge regarding the causes of declines. Furthermore, it is important to note that SSSI conditions assessments make a judgement at one point in time and do not consider any possible future impacts.

[1] SSSI condition assessment information taken from www.natureonthemap.naturalengland.org.uk

2.11 As noted in the section on Dawlish Warren below, the Dawlish Warren SSSI condition assessment particularly highlights that bird declines at the Warren, previously an important high tide roost, may be the cause of declines across the estuary, thus indicating that suitable, good quality high tide roosting sites may be critical to the ecological integrity of the SPA.

Impacts from recreation

2.12 Impacts relating to recreation on the Exe Estuary SPA primarily relate to disturbance (though note that some activities such as bait collection result in the removal of prey for birds and boats and other craft can cause damage to the habitat, through for example their moorings or wake).

2.13 Recent work reviewing risks to European Marine Sites in England by Natural England has identified disturbance as a generic issue across many sites, including the Exe Estuary (see Coyle & Wiggins 2010). Disturbance to wintering and passage waterfowl can result in:

- A reduction in the time spent feeding due to repeated flushing/increased vigilance (Fitzpatrick & Bouchez 1998; Stillman & Goss-Custard 2002; Bright *et al.* 2003; Thomas, Kvitek, & Bretz 2003; Yasué 2005)
- Increased energetic costs (Stock & Hofeditz 1997; Nolet *et al.* 2002)
- Avoidance of areas of otherwise suitable habitat, potentially using poorer quality feeding/roosting sites instead (Cryer *et al.* 1987; Gill 1996; Burton *et al.* 2002; Burton, Rehfisch, & Clark 2002)
- Increased stress (Regel & Putz 1997; Weimerskirch *et al.* 2002; Walker, Dee Boersma, & Wingfield 2006; Thiel *et al.* 2011)

2.14 It is difficult to determine the extent to which these impacts result in an adverse effect on integrity. Research from other sites clearly demonstrates that the impacts of disturbance can relate to site conditions such as weather conditions or prey abundance, conditions that vary in time (Goss-Custard *et al.* 2006). Birds may also only be vulnerable at particular times, such as staging during migration (Bechet, Giroux, & Gauthier 2004; Yasué 2005). As such, disturbance impacts may therefore occur only at certain times, for example when particular circumstances coincide. Impacts of disturbance may consequently be difficult to pick up.

2.15 It is also hard to record both the level and intensity of disturbance impacts (besides birds simply taking flight) and there is contention about the best approaches (Gill, Norris, & Sutherland 2001; Gill 2007). Recording whether birds take flight or not is an easy measure of disturbance, but whether birds take flight or not, or how often they are flushed, may not necessarily indicate vulnerability to disturbance (Beale & Monaghan 2004; Møller, Nielsen, & Garamzegi 2008; Møller 2008; Møller & Erritzøe 2010).

2.16 There is a body of previously published work relating to waterbirds on the Exe, much of which addresses disturbance issues, some stretching back to the early 1990s (Goss-Custard & Verboven 1993). The most recent work is the Exe Disturbance Study (Liley *et al.* 2011).

2.17 The Exe Disturbance Study considers in detail both recreational access and the response of birds. Taking an overview of access (access patterns and visitor numbers are discussed in detail in section 4), it shows that the estuary is clearly very busy and it is only a small proportion of the perimeter of the estuary where access is limited or difficult. The highest levels of access occur around the lower stretches of the estuary, at Exmouth and also at the very top of the estuary, around Topsham.

2.18 Nine survey locations around the estuary were used to gather bird data (and later visitor work incorporated these same survey points). These locations were selected partly based on recommendations from the steering group and also to ensure a reasonable spatial coverage of the estuary. At each point a focal survey area was used to consider disturbance. The Exe Estuary SPA is 2346ha, of which around 1084ha is intertidal habitat. The survey areas which were included in the Disturbance Study covered 327ha of the estuary below mean high water. This means that around one third of the intertidal habitats within the SPA were included within the focal areas within the survey.

2.19 The Disturbance Study uses data collected in this "third" of the estuary to consider how birds respond to disturbance and explore the factors that result in birds being disturbed. At the nine survey locations:

- Shore based activities accounted for 55% of observed recreation events, mostly involving walkers without a dog (32%) and dog-walkers (9%).
- Activities on the intertidal accounted for 36% of observed recreation events and included dog-walkers (17%), bait diggers/crab tilers etc (7%) and walkers without dogs (7%).
- Water-based activities accounted for 8% of observed recreation events and included a wide variety of different types of activity such as RIBs/small motor boats (3%); kitesurfers (1%) and windsurfers (1%).

2.20 During the Exe Disturbance Study a total of 220 visits were made across the nine different survey locations (survey effort varied between locations). During each visit the surveyors kept a log (referred to as a diary) of groups of people, craft etc. observed around the focal area. Just five of the visits (i.e. around 2%) involved no observations of activities taking place at all. Across all sites and all visits there were 2977 different events logged in the diary – equivalent to around one event every three minutes. This indicates the levels of access and busy-ness of the estuary, but it is important to note that it is not derived from a random sample of observations stratified across tide states, weather conditions, times of year etc.

2.21 There was evidence that bird distributions were related to access. In general terms the numbers of birds appear low at the Duck Pond and at Topsham in relation to adjacent count sectors. The parts of the estuary with the lowest levels of access (such as Shutterton Creek) are also the parts of the estuary with the highest bird counts. At the Duck Pond, Lympstone, Starcross South and Powderham there is evidence that the number of birds varied in response to the levels of access over the previous 45 minutes: i.e. when more people had been present, fewer birds were recorded.

2.22 Around 14% of groups/recreational events observed across the survey locations flushed birds and caused a major flight event (birds flying more than 50m). Just under two-thirds (62%) of events evoked no observable response from the birds.

2.23 Route data were collected for users (mainly using GPS units) and presented for the estuary as a whole. The data on how birds responded to disturbance were used to derive approximate estimates of the amount of habitat lost as a result of disturbance by different users. This approach – showing disturbance in terms of habitat loss – provides a means of considering the overall impact of particular activities/events, of using the data collected at the survey locations and applying them at a wider scale. The calculations of habitat loss suggest that, at intermediate tide stages, the average area lost to a windsurfer or kitesurfer would be around 8ha, while a dog walker on the mudflats at the duck pond results in an area lost of around 3ha (note that this figure is likely to underestimate the impact of dogs as we only have route data for the owners rather than the pet). By contrast the disturbance caused by someone walking along the shore path at Goat Walk at low tide equates to an equivalent impact of the loss of 0.1ha of intertidal habitat to the birds.

2.24 The Disturbance Study was initially commissioned to consider the impacts of disturbance from watersports and the potential for future management of watersports within the estuary. It was recognised by the Exe Estuary Management Partnership that levels of use were increasing, particularly activities such as kitesurfing, and consequently there was recognition that a detailed study was required. The Disturbance Study was therefore not specifically commissioned to examine the need for mitigation linked to new development, and does not consider the implications of new development.

2.25 In respect of new development, the Disturbance Study states[2]

> "*Given the context of an increasing population living in the area and the clear draw of the Exe Estuary, it is important to maintain a strategic perspective in relation to management of access on the site. As access levels increase the estuary will become busier and busier and additional management of access is likely to become more and more important, not only to reduce disturbance, but also to ensure safe and enjoyable use for the different users and types of visitors. It is important that measures are appropriate to the scale of impact and issues of concern, and are implemented in advance of a problem occurring."*

2.26 The Disturbance Study highlights the area 'lost' to the birds as a result of disturbance. Of course in theory birds can move freely and can respond to disturbance by finding alternative places to feed and roost and potentially they can also 'catch up' on lost feeding time, for example by feeding at night and feeding in areas where there is limited disturbance. In light of the Habitat Regulations and the legal requirement for member states to avoid deterioration and disturbance, it is important to recognise that the Exe

[2] Para 7.17 of the Disturbance Study

Estuary is particularly small (i.e. there are limited options for birds to switch), many parts of the site are already busy and as the Disturbance Study shows, there are relatively few areas that are undisturbed. A comparison of the Exe Estuary with other estuary areas is given in Appendix 1. It can be seen that the site is small in comparison and in particular has a particularly small perimeter.

2.27 The options for birds to find undisturbed areas are therefore limited. When considering all activities together – watersports, crab tiling, bait digging, shore-based recreation, fishing etc – the Exe Estuary is a very busy place. The Disturbance Study gives examples of single recreation events that resulted in virtually all birds leaving the estuary – the site is that small. There is limited space, for people and birds.

2.28 Besides the Exe Disturbance Study, other information on disturbance impacts on the Exe Estuary can be drawn from Appropriate Assessments and some modelling of oystercatchers conducted in early 2000. The national cycle trail around the Exe was subject to a detailed Appropriate Assessment (Goss-Custard 2007) which summarises disturbance data for the Exe, including flight distances. Based on the author's considerable data set and experience, the work suggests distances at which activities on the shoreline are considered to have no impact on birds present on the Exe. These distances are 200m for sections of shoreline where the people are not on the skyline and people are simply cycling/walking along a path. For sections on the skyline and for activities that are more irregular a distance of 400m is suggested.

2.29 West *et al.* (2002) used a behaviour-based model to predict the impact of human disturbance on oystercatchers on their intertidal feeding grounds in the Exe Estuary in winter. The modelling results indicated that disturbance could have the potential to be more damaging than actual habitat loss; however, at the levels of access recorded at the time on the Exe, disturbance was not predicted to result in increased mortality. The work also suggested that preventing disturbance during late winter, when feeding conditions were harder, would practically eliminate any predicted population consequences.

2.30 Looking at the species for which the Exe Estuary is important, we can consider how each may be impacted from disturbance and we can check on the status of each species in the estuary. The status of waterfowl on key sites are summarised by the BTO, who issue 'alerts' for species on each SPA across the country. This information is summarised in Table 1 which highlights that there have been alerts issued for five different species on the Exe Estuary, and for four of these species (brent goose, oystercatcher, grey plover and lapwing), the decline potentially suggests site-specific issues on the Exe.

2.31 It is notable that there is relatively little information for Slavonian grebes. This species has, in recent years, only been present in very small numbers on the Exe Estuary. As such any robust fieldwork relating to disturbance is virtually impossible and the very low numbers means the species is excluded from the WeBS alerts. Recent WeBS count data (Holt *et al.* 2012) indicates that Slavonian grebe numbers have been increasing in Scotland, probably involving an increase in the number of Slavonian grebes of Icelandic origin now wintering in UK waters. In contrast numbers wintering on the south coasts of England have declined, probably linked to a decline in the number of birds of Continental origin wintering in the

UK, either as a result of a shift in distribution or an overall population decrease. It is difficult – for this species – to determine the extent that disturbance may be an issue on the Exe Estuary in the future if numbers were to increase again (for example if population declines on the continent are reversed).

Table 1: Key species. Time of year taken from Figure 9 of the Exe Disturbance Study; WeBS alert summary taken from Cook *et al.* (2013). Grey rows indicate species where alerts have been triggered.

	Time of year		Impacts from Recreation
Slavonian Grebe	in low numbers Oct-	Numbers too low to include in analysis	Wash from craft and direct disturbance of foraging by water-based
Brent Goose	Sep-Mar.	Numbers of Brent Goose (Dark-bellied) over-wintering on Exe Estuary SPA have been stable in the short-term having previously declined. Consequently, Alerts have been triggered for the period since designation. Analysis indicates site specific pressures	Disturbance could result in birds avoiding sites, switching to different areas and increased energy expenditure. Birds potentially vulnerable when roosting, feeding on the estuary or feeding on grassland sites
Wigeon	significant numbers Sep-Mar.	No alerts; numbers have increased steadily on the site since early 1990s and numbers appear to be tracking the regional trend	Disturbance could result in birds avoiding sites, switching to different areas and increased energy expenditure. Birds potentially vulnerable when roosting, feeding on the estuary or feeding on grassland sites
Red-breasted Merganser	Winter visitor, present Sept-Mar	Numbers of Red-breasted Merganser over-wintering on Exe Estuary SPA have been decreasing in the medium-term having previously peaked; decline is similar to other sites in region	Wash from craft and disturbance from water-based activities to foraging birds.
Cormorant	Present all year; lowest numbers Jan-June. Peak in Oct	No alerts. Numbers have increased at the Exe in line with national and regional trends	Wash from craft and disturbance from water-based activities to foraging birds. Energetic consequences if flushed during roosting
Avocet	Only present in significant numbers Oct-Mar.	No alerts. Numbers of Avocet over-wintering on Exe Estuary SPA have been increasing long term. The proportion of the regional population supported by this site is decreasing, suggesting the site is at carrying capacity.	Loss of foraging time, increased energy expenditure etc; potential for disturbance both at roost and when feeding. Mostly intertidal areas.
Oystercatcher	Present all year; high numbers Aug-Feb	Numbers of Oystercatcher over-wintering on Exe Estuary SPA have been decreasing in the medium-term having previously been relatively stable. Consequently, Alerts have been triggered for the medium- and long-terms and the period since designation. The decline corresponds to a regional and national decline but has occured more rapidly, suggesting site-specific issues.	Loss of foraging time, increased energy expenditure etc; potential for disturbance both at roost and when feeding. Mostly intertidal areas.
Dunlin	July-May; high numbers Nov-Feb	Numbers have declined over most of the period recorded by WeBS. However no current alerts have been triggered over all time-frames, but analysis does suggest site specific issues.	Loss of foraging time, increased energy expenditure etc; potential for disturbance both at roost and when feeding. Mostly intertidal areas.
Grey Plover	Only present in any numbers Sep-Mar; peaking in Feb.	Steady decline since the mid-1990s, with analysis suggesting site specific issues for this species.	Loss of foraging time, increased energy expenditure etc; potential for disturbance both at roost and when feeding. Mostly intertidal areas.
Lapwing	Only present in any numbers Nov-Feb;	Numbers of Lapwing over-wintering on Exe Estuary SPA have been decreasing in the medium-term having previously peaked. Analysis	Loss of foraging time, increased energy expenditure etc; potential for disturbance both at roost and when feeding. Will use grassland areas for

Black-tailed Godwit			
Whimbrel			Loss of foraging time, increased energy expenditure etc; potential for disturbance both at roost and when feeding.

Activities that result in impacts

2.32 In Table 2 we list the different activities recorded during the Exe Disturbance Study (Liley *et al.* 2011) and the level of occurrence of each activity. We also give the number of times each activity resulted in birds taking flight. It can be seen that there are a wide range of activities/events that were observed, and that for many different kinds of activity the levels of occurrence is relatively low. A wide range of different activities occur, some of which are relatively infrequent. Most flight events (31%) are caused by dog walkers on the intertidal with the dog off the lead. Other activities resulting in a relatively high proportion of flights included bait digging (15%), walking/rambling on the shore without a dog (13%) and walking (without a dog) on the intertidal (13%). From the table, and the more detailed analysis in the Exe Disturbance Study, activities which cause a disproportionate (in relation to the level at which they occur) amount of disturbance (birds taking flight) include dog walking, activities on the mudflats, bait digging, kitesurfing and canoeing.

Table 2: Activities, disturbance and levels of occurrence. Data taken from Exe Disturbance Study. Flights is the number (%) of major and minor flights combined. Observations indicate the level of occurrence of each activity, i.e. the total number of times the activity was observed. Data from nine survey locations across multiple seasons, see Exe Disturbance Study report for details.

Activity	Flights	Observations
Activities taking place on the shore		
Birdwatcher	0 (0)	1 (0)
Cycling	3 (1)	84 (6)
Dog walker, dog off lead	8 (3)	69 (5)
Dog walker, dog on lead	6 (2)	57 (4)
Jogger	5 (2)	44 (3)
Kids playing (with or without parents)	0 (0)	3 (0)
Motor vehicle	0 (0)	6 (0)
Other	4 (1)	5 (0)
Picnic/people sitting	0 (0)	12 (1)
Train	0 (0)	14 (1)
Walking / rambling (without dog)	35 (13)	419 (32)
Total	**61 (22)**	**714 (55)**
Activities taking place on the intertidal		
Bait digger etc.	42 (15)	96 (7)
Birdwatcher	1 (0)	4 (0)
Cycling	0 (0)	1 (0)
Dog off lead	1 (0)	4 (0)
Dog walker, dog off lead	86 (31)	196 (15)
Dog walker, dog on lead	4 (1)	25 (2)
Fishing (from shore)	0 (0)	4 (0)
Horse Riding	0 (0)	1 (0)
Kids playing (with or without parents)	1 (0)	6 (0)
Kitesurfer	5 (2)	5 (0)

Activity	Flights	Observations
Motor vehicle	6 (2)	24 (2)
Person accessing boat or water (inc e.g. windsurfers walking across mudflat)	1 (0)	4 (0)
Person working on boat (boat stationary)	0 (0)	5 (0)
Rib or similar fast small boat	0 (0)	1 (0)
Walking / rambling (without dog)	37 (13)	95 (7)
Windsurfer	1 (0)	2 (0)
Total	**185 (67)**	**473 (37)**
Activities taking place on the water		
Canoe on water	6 (2)	16 (1)
Dog off lead	1 (0)	2 (0)
Kitesurfer on water	8 (3)	9 (1)
Large boat on outboard motor	2 (1)	18 (1)
Moderate – large sailing boat	1 (0)	4 (0)
Other	0 (0)	1 (0)
Person working on boat (boat stationary)	0 (0)	2 (0)
Rib or similar fast small boat	4 (1)	42 (3)
Small sailing boat (e.g. Laser / dinghy)	0 (0)	1 (0)
Windsurfer on water	6 (2)	7 (1)
Total	**28 (10)**	**102 (8)**
Activities taking place in the air		
Air-borne	1 (0)	3 (0)
Total	**1 (0)**	**3 (0)**

Areas most affected by these activities and where the special interest is most vulnerable to increased disturbance

2.33 All parts of the SPA are potentially important: the SPA boundary captures the area considered important at the time of classification in order to support the bird interest features. Within that boundary it is, however, possible to identify areas of particular importance, for example roosting sites or key feeding locations, i.e. sites that can or do hold marked concentrations of birds and support a critical function for their survival. In Map 3 we highlight these areas, building on the map in the Interim Report. The areas highlighted in the map are simply those areas of particular importance or particularly vulnerable to disturbance. Over time these locations may change and different locations may well also become important. Furthermore, there are important areas outside the SPA boundaries that can support the interest features, for example roost sites or grassland areas used by feeding Brent geese. Some of these are indicated on the map.

2.34 Within the estuary most activity is focused around Exmouth, which is a focus for watersports and the seafront and beaches provide popular walks (note that the SPA encompasses the mouth of the estuary and the foreshore at Exmouth). There are also popular areas at the top of the estuary, with high numbers of people walking along the shore at, for example, Topsham. Many craft (there are some boatyards at the top of the

estuary), particularly powerboats, use the top of the estuary, and some watersports, for example canoeing and water-skiing take place in the upper stretches of the estuary. There is relatively good access all-round the foreshore, with the quietest (but by no means undisturbed) areas being Shutterton Creek and the area adjacent to the Marines compound at Exton.

Map 3: Exe Estuary SPA: Key areas for birds

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Dawlish Warren Special Area of Conservation

2.35 Dawlish Warren is an unusual double sandspit located at the mouth of the Exe Estuary, opposite Exmouth. Dawlish Warren SAC includes the vegetated part of the sandspit only, excluding the unvegetated beach where the amusements and car park are situated at the foot of the spit, and also excluding an area of fixed dune grassland known as the buffer zone (see Map 4). Part of the site is owned and managed by Teignbridge District Council as a nature reserve, while the north western section of the site is owned by the Devon Wildlife Trust and leased as a golf course. The information presented here is summarised from Lake 2010. The area designated as SAC is also included within the Exe Estuary SPA.

Interest Features

2.36 Dawlish Warren is designated as an SAC for its habitats and non-avian species of European importance. Qualifying features are its dune habitats (see Table 3) and a population of the liverwort petalwort *Petalopyllum ralfsii*.

2.37 Embryonic dunes are listed on Annex 1 of the Habitats Directive and are therefore a habitat type that could be a qualifying feature of an SAC. While Embryonic dunes are identified as being present in the Natura 2000 standard data form for the site[3], the representivity of this habitat at Dawlish Warren is classed as D, which means "non-significant presence" (see explanatory notes on the data form). Embryonic dunes are therefore not listed as a qualifying interest feature for the SAC. However, at Dawlish Warren, the mobile dunes, which do form a qualifying feature, are likely to be affected if the ecological functioning of the embryonic dunes is compromised. Therefore we have included them in our assessment of recreational impacts on the SAC features at the Warren, because indirect effects upon shifting dunes could constitute an adverse effect on the integrity of the SAC.

2.38 Large populations of petalwort occur in two dune slacks at Dawlish Warren. One of the slacks is on a natural, sandy substrate which is probably affected by the concrete materials used to build the visitor centre foundations. In the other slack, petalwort grows on sand overlying an artificial masonry/stone substrate, which receives run-off from an adjacent limestone gravel track (Holyoak 2003). Both slacks are closely grazed by rabbits *Oryctolagus cuniculus*.

2.39 Sand lizard *Lacerta agilis* is also present on the site following reintroduction in 1994 under English Nature's Species Protection Programme, but whilst a qualifying species, it is not a primary reason for designation at Dawlish Warren.

2.40 The current condition[4] of the site interest features is particulalry concerning on the southern, seaward side of the site, where coastal defences in place (groynes and gabions) are preventing the geomorphological processes necessary to allow dune features to

[3] http://www.jncc.gov.uk/ProtectedSites/SACselection/n2kforms/UK0030130.pdf

[4] SSSI condition assessment information taken from www.natureonthemap.naturalengland.org.uk

establish and evolve. Notably, as highlighted above, condition assessments for Dawlish Warren also highlight the loss of waterfowl here at Dawlish Warren as having a major impact on the Exe Estuary waterfowl assemblage, which is of relevance to the current environmental baselines for the Exe Estuary SPA. The rest of Dawlish Warren site is considered to be in 'unfavourable recovering' condition, with this assessment mainly influenced by the SSSI waterfowl features, rather than the geomorphological features. It is suggested that the current SSSI conditon assessment does not fully take into account the complexities and uncertainties surrounding potential impacts on the dunes and SAC interest that may currently be taking place, and how any impacts may manifest in the future. These are discussed in more detail below. Uncertainties highlight the need for more information and/or a precautionary approach to conclusions drawn regarding current environmental condition.

2.41 Critically, the site is likely to be under significant pressure as sea level changes take place in the coming decades, and this highlights the need for a longer term view when considering the effect of potential impacts and any mitigation required. This issue is discussed in more detail at the end of this section, with regard to both Dawlish Warren and the wider Exe Estuary.

Great Bull Hill
Deck
Pier
Ferry Terminal (foot)
Golf Course Club House
Soft Sand Bay (landing area)
Bird Hide (overlooking wader roost)
Warren Point
Golf Links
Sand
Sand
Mean Low Water
Mean High Water
The Bight
River Exe
Sand
Dawlish Warren
Groyne 9
Sand
Greeland Lake
Groyne 3
Visitor Centre
Welcome Holiday Park
Dawlish Warren Holiday Park (Caravan Park)
Buffer Area
Main (Seaward) Car-park
Amusements arcade
Railway underpass (cars & people)
Further (Landward) parking
Lee Cliff Park
Map 4: Dawlish Warren SAC & Location Names
Contains Ordnance Survey data © Crown copyright and database right 2012.
SAC Boundary
NNR Boundary

Table 3: Annex 1 habitats for which Dawlish Warren is designated a SAC and their representation at Dawlish Warren.

Embryonic shifting dunes (present but not a qualifying feature)	Embryonic shifting dune vegetation colonises areas of incipient dune formation at the top of a beach. It exists in a highly dynamic state and is dependent on the continued operation of physical processes at the dune/beach interface. The predominant plants are strandline species such as sea rocket *Cakile maritima* and the salt-tolerant, sand-binding grasses such as sand couch *Elymus farctur*. In most cases Embryonic shifting dunes are transient and will either be displaced by marram grass-dominated vegetation as the dunes develop or will be washed away by storms. The continued supply of new sand from the beach into the dune system is therefore vital to the continued existence of this community. The habitat type is of exceptional importance as an indicator of the general structural and functional 'health' of a dune system. Creation of new dune habitat, and the long-term survival of the dune system at which it occurs, is often dependent upon the survival of this habitat type.	Sea defence works in the late 1960s or early 1970s at Dawlish Warren have prevented full mobility from occurring (TDC 2010). Storm events in recent years have resulted in the substantial erosion of significant amount of the beach and embryonic dunes (P. Chambers *pers. comm*.). The fixed sea defences mean that there is no possibility for the mobile element of the dune system to migrate inland.	1% of 58.84 (at notification)
Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes")	Shifting dunes encompasses most of the vegetation of unstable dunes where there is active sand movement. Under these conditions sand-binding marram grass *Ammophila arenaria* is a prominent feature of the vegetation and is usually dominant. This is a dynamic vegetation type maintained only by change. It can occur on both accreting and eroding dunes, but will rapidly change and disappear if stability is imposed. It rarely occurs in isolation because of its dynamic nature and because it is successionally related to other dune habitats. The habitat type excludes the low, embryonic dunes where occasional exposure to saltwater flooding constraints the growth of marram grass and where plants of the strandline mingle with salt-tolerant, sand-binding grasses.	Dawlish Warren is considered to support a significant presence of this habitat type.	23.6%
Fixed dunes with herb. vegetation ("grey dunes")	Fixed dune vegetation occurs mainly on the largest dune systems, where there is sufficient width. It typically occurs inland of the zone dominated by marram grass as the dune stabilises and the organic content of the sand increases. At Dawlish this includes both calcareous dune grassland and acid dune grassland with transitions to dune heath and acid grassland.	Dawlish Warren is considered to support a significant presence of this habitat type.	22.6%
Humid dune slacks	Dune slacks are seasonally flooded, low-lying, nutrient deficient areas within dune systems. The range of communities found is considerable and depends on the structure of the dune system, the successional stage of the dune slack, the chemical composition of the sand and prevailing climatic conditions. Dune slacks are characterised by a pattern of pronounced annual fluctuations of the water table, related to the landform of the dune system as well as climate and the nature of the underlying sediment – whether porous shingle or impervious clay. Variations in the extent and duration of flooding of the dune surface are very important in determining the vegetation. While Humid dune slacks may include creeping willow *Salix repens*, the Annex I type excludes those sites where the species is dominant. Dune slacks are often rich in plant species, particularly rare and local species.	The Annex II Petalwort *Petalophyllum ralfsii* is present in this habitat at Dawlish Warren. Dawlish Warren is considered to be one of the best areas in the UK for this habitat type, which is a primary reason for its designation.	1.9%

Dawlish Warren - Impacts from recreation

2.42 The impact of recreational pressure on Dawlish Warren is closely intertwined with other factors operating on the site, most notably coastal erosion, the presence of sea defences, the naturally dynamic state of sand dune habitats and management practices. The role of trampling in particular is ambiguous. In some places it contributes to maintaining the preferred habitat conditions, whereas in other places it is leading to significant erosion problems.

2.43 Embryonic shifting dunes are particularly vulnerable to trampling, and there is evidence that the current visitor levels have negatively impacted on this community (Phil Chambers, Mary Rush *pers. comm*.). Should changes to coastal erosion and coastal management in the future create the potential for the recovery of this habitat, current levels of visitor pressure could have a significant effect in preventing the establishment of functional embryo dunes. Any increase in visitor pressure is expected to further increase the damage to this habitat.

2.44 The impact of trampling on the mobile dunes is exacerbating the effect of coastal erosion on the dune face. Coastal erosion is also changing visitor behaviour, and concentrating visitor pressure on the dune ridge. An increase in visitor pressure is likely to result in an increase in erosion damage in vulnerable areas. However, over-stabilisation of the mobile dunes is also a problem in places, leading to loss of diversity and to scrub colonisation. Trampling on the path along the top of the dune ridge, and small subsidiary paths, may be beneficially increasing the mobility of sand in the system.

2.45 In the absence of significant rabbit grazing, trampling is currently playing a positive role in maintaining the short, open sward required by many of the characteristic plants of the fixed dune grassland at Dawlish Warren. However, the diffuse trampling required to do this is difficult to achieve and the level of visitor pressure which is creating a suitable sward in some places is also leading to significant wear and erosion in other places.

2.46 Trampling plays a similar role in the humid dune slacks, where a level of diffuse trampling is thought to create suitable conditions for petalwort. It appears however that petalwort may be declining at one of its two locations at Dawlish Warren. The cause of this is unknown, although it may be a result of natural successional processes at the site reducing its suitability for this species (e.g. through changes in soil pH, nutrient status or vegetation cover). Insufficient data is available to establish the whether this is the case, or any possible role of changes in visitor pressure.

2.47 Sand dune habitats are naturally very nutrient poor, and any increase in nutrients due to dog fouling will impact negatively on the dune vegetation. Despite a “pick up” policy, nutrient enrichment, presumably from dog faeces, is evident near access points in the fixed dune grassland, where the characteristic dune grassland flora is in places replaced by coarser vegetation.

2.48 High visitor numbers mean there is a high risk of fire in the summer months. When wildfires occur (e.g. as a result of barbeques) they can destroy large areas of dune vegetation. Re-colonising vegetation is generally characterised by a higher percentage of unwanted ruderal species. An increase in visitor numbers will increase the risk of wildfire.

2.49 The effect of trampling on Dawlish Warren Golf Course is perhaps partially obscured by the significant impacts of some of the current management practices on the site. These include fertilisation, irrigation, close mowing and some reseeding of tees and greens, and drainage. However, wear is noticeable on many of the fairways, and sand crocus *Romulea columnae* is thought to have declined on the site. However, trampling along paths is creating areas of bare ground in the otherwise fairly closed and uniform acid grassland / lowland heath transitional communities, and here it may therefore be beneficial.

2.50 The impacts of recreation on SAC interest features identified in 2010 are summarised in Table 4.

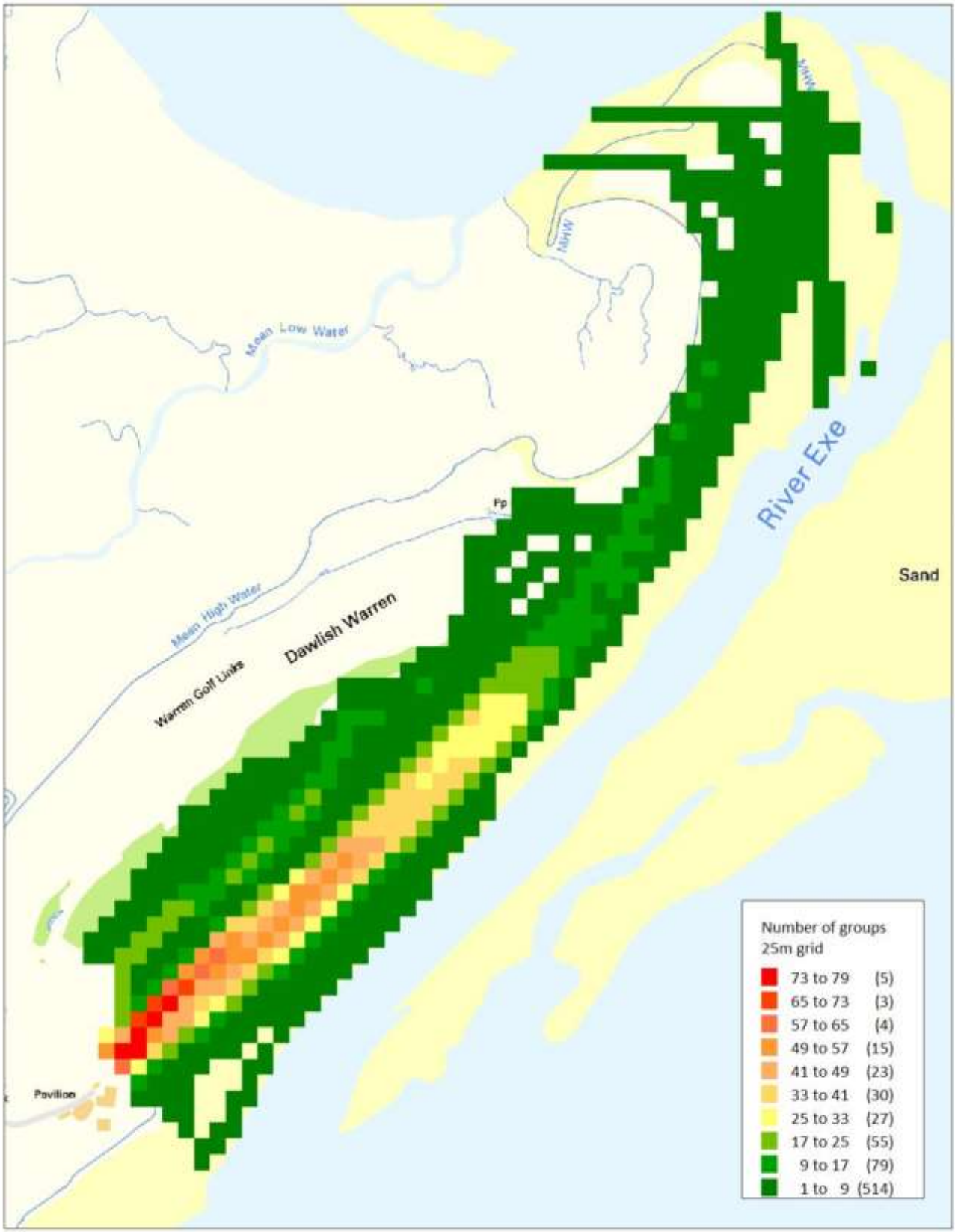
Activities that result in impacts

2.51 Dawlish Warren is an extremely popular seaside resort where human visitor pressure is considerable and a number of recreational activites are undertaken by visitors. The tourist resort on the Warren attracts 480,000 visitors per annum (SWT cited in TDC 2010), the majority of which are summer visitors, although year round tourism is thought to be increasing (see also Section 4.27). The site also forms a valuable resource for the local community. Activities that impact on the SAC features include walking, dog walking and lighting fires (e.g. barbeques which have resulted in damaging wildfires, P. Chambers *pers. comm.*). Vandalism to infrastructure also indirectly impacts on the SAC features, for example, when livestock fences are cut, which then compromises the management of the site. Visitor survey work in 2010 (Liley, Fearnley, & Cruickshanks 2010) showed that in February, the majority of visitors were dog walkers (52%). Around 30% of visitors were walkers, while bird-watchers, cyclists and families on a day out accounted for the remainder. Map 5 gives an impression of visitor density at the site based on survey work carried out over 16 hours in February 2010.

Areas most affected by these activities and where the special interest is most vulnerable to increased disturbance

2.52 Most visitors arrive at the western (proximal) end of the spit where there is a large carpark just outside the SAC plus bus and rail links, and impacts are to some extent concentrated around this area and the surfaced “easy access” route from the car park to the Dawlish Warren Visitor Centre (Map 5). However, in the summer visitors also arrive via water craft at the eastern (distal) end, where embryonic dunes can be present. Map 6 shows where recreational impacts occur in relation to the dune habitats and interest features.

2.53 Although there are no public rights of way through the SAC, the site has largely unrestricted open access at all times, and there are numerous footpaths, the largest of which continues north-east from the visitor centre. There is also a board walk between the visitor centre and the promenade. Many small paths lead from the dunes onto the beach, particularly near the leisure complex where a branch of the main track approaches the dunes. Erosion in the mobile dunes is greatest here.



Map 5: Visitor density within Dawlish Warren SSSI. No. of groups intersecting each cell (from Liley, Fearnley, & Cruickshanks 2010).

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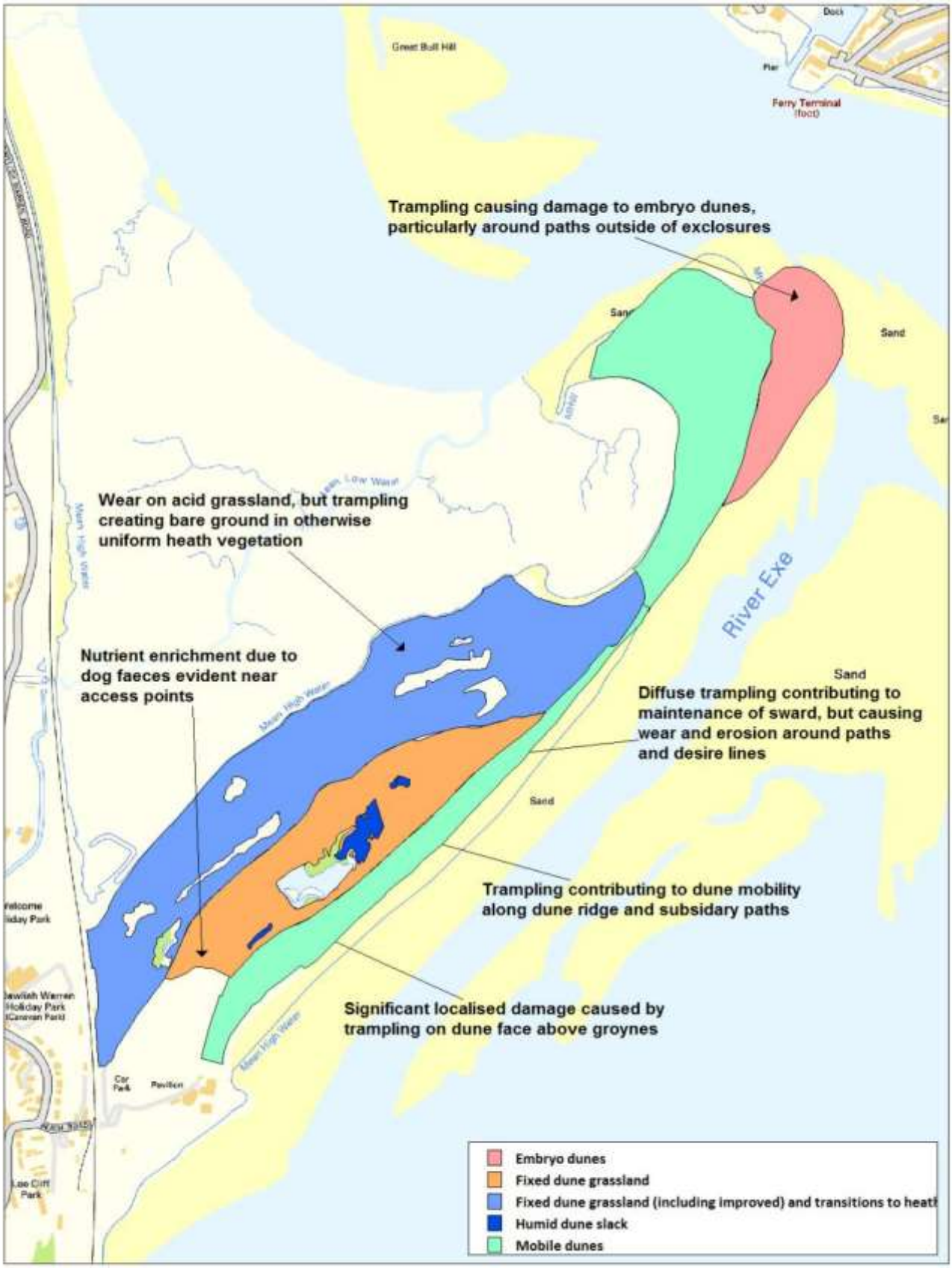

Map 6: Recreational impacts on SAC habitats at Dawlish Warren.

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Table 4 Summary of current impacts of recreational pressure on SAC features

Erosion through footfall	Embryo dunes	Negative impact on existing habitat. Impact would be significant if changes to coastal management allow the recovery of this habitat.		
	Mobile dunes			All year
	Fixed dune grassland			All year, most vulnerable in spring/autumn at emergence/germination, and in very dry weather
	Humid dune slacks			All year, but slacks most vulnerable in very dry or very wet weather. Petalwort most vulnerable autumn to spring.
Wildfire	All habitats			Summer
Nutrient enrichment	All habitats			All year

Indirect effect of visitors presence on management techniques	All habitats			

2.54 The special interest of the site is vulnerable to increased levels of disturbance throughout. Whilst a level of trampling is beneficial to some habitats and species within the SAC, at some point an increase in trampling will cause damage rather than benefit to those mobile dune areas which are currently benefitting from a degree of disturbance. It is not possible to predict the trampling threshold at which this will occur. Coastal erosion is changing visitor behaviour, and concentrating visitor pressure on the dune ridge, which will become increasingly vulnerable to damage. Similarly, beyond a certain threshold, trampling will cause more damage than benefit to the fixed dune vegetation, but it is not possible to quantify at what level of visitor pressure this will happen. Increased visitor pressure will increase wear on already vulnerable swards and cause further damage to the embryo dunes. An increase in visitor numbers will increase the amount of damaging nutrient enrichment from dog-fouling. This is most likely to impact vegetation nearest the main access point and paths. Increased visitor numbers is also likely to increase the number of wildfires, which will damage special interest features in the vicinity. These are most likely to be near the beach in the mobile dune community.

East Devon Pebblebed Heaths SAC & SPA

Interest Features

2.56 The East Devon Pebblebed Heaths are located on the Triassic Budleigh Salterton pebble beds which form a prominent escarpment running some 6km northwards from Budleigh Salterton towards Ottery St Mary, with an altitude range of 70 m to 176 m. They extend some 1.2 km east to west at their widest. The westerly scarp is steep and the majority of the Pebblebed Heaths occur on the gentle easterly dip slope, which has numerous shallow valleys. The easterly flowing streams and associated flushes are often base-rich, issuing from the underlying Permian sandstones and mudstones. The streams flow east as tributaries of the River Otter.

2.57 The Pebblebed Heaths cover some 1400 ha and make up the largest block of lowland heath in Devon. It is a nationally important representative of the inland Atlantic-climate lowland heathlands of Britain and north-west Europe. A significant feature of the site is the diversity of heathland associated communities, related to its large area and the range of substrates and topography. These include dry heath dominated by heather *Calluna vulgaris* with bell heather *Erica cinerea*, western gorse *Ulex gallii* and heathland grasses, grading to wet heath in a series of shallow valleys with mineral rich-flushes on the valley sides, and valley mire in the valley bottoms with cross-leaved heath *Erica tetralix* and a range of characteristic mire and flush species.

2.58 Parts of the Pebblebed Heaths were first notified as aSSSI in 1952, and the various areas of heath were consolidated into the current SSSI of some 1119 ha in 1986. The East Devon Pebblebed Heaths have subsequently been designated as a Special Area of Conservation (SAC) in June 1996 under the Habitats Directive. The designation covered 1119.94 ha with the primary reason for selection being the north Atlantic wet heaths with cross-leaved heath *Erica tetralix*, European dry heaths and the populations of southern damselfly *Coenagrion mercuriale*, for all of which the Pebblebed Heaths were considered one of the best areas in the UK. Both the wet and dry heaths are listed as Annex I in the Habitats Directive and are considered to be of global importance, while the southern damselfly is listed under Annex II and the population is considered to be of national importance. Interest features for the SAC are summarised in Table 5.

2.59 The East Devon Heaths were classified a Special Protection Area (SPA) in 1998 under the Birds Directive[5], qualifying under Article 4.1 as the area regularly supports 2.4% of the UK population of breeding nightjar *Caprimulgus europaeus* (as at 1992), and 8% of the UK population of breeding Dartford warbler *Sylvia undata* (as at 1994). The SPA covers 1119.94ha, matching the SAC boundary.

2.60 Nightjars are summer migrants (arriving in May), breeding in open heathland, clear-fell and woodland edge habitats. They nest on the ground and can have two broods in a season so

[5] Council Directive 79/409/EEC on the Conservation of Wild Birds.

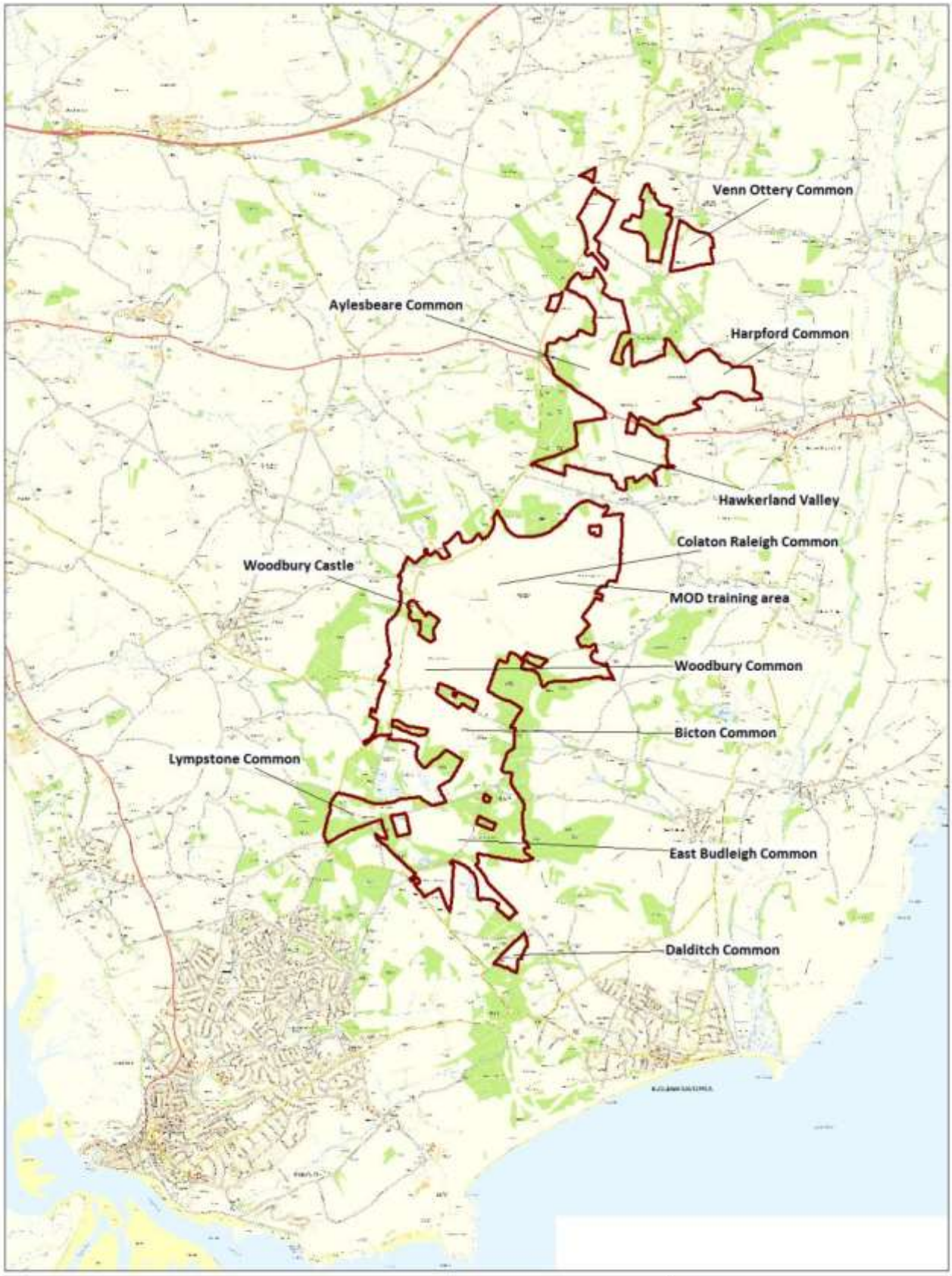
breeding can extend into mid-August. They feed on moths and other aerial insects at night and can forage as far as 7 km from their breeding areas visiting streams, wet grasslands, woodlands, small fields, orchards etc. (Cresswell 1996). Nightjar eggs are pale and easily visible to predators but are covered by the sitting birds, with highly cryptic plumage. If the birds are flushed off the nest, the eggs (but not the young which are also highly cryptic) are vulnerable to predators.

2.61 The Dartford warbler is a heathland specialist, holding a territory on the heaths all year round. Warblers are insectivorous and the availability of foraging sites under thick vegetation, particularly gorse bushes, when there have been snowfalls, is important for their survival in hard winters. This requirement can be achieved by regular management of the gorse (or sometimes fortuitously by small wild fires). In the 1960s, after a series of cold winters, the UK population was down to 10 pairs, but numbers then recovered and the species reached an estimated 3214 territories in 2006. Over the last three winters, hard weather and snow have affected Dartford warbler numbers and there have been substantial declines particularly on the Devon Pebblebeds, Thames Basin and Wealden Heaths. Nests are located close to the ground in heather or gorse. Dartford warblers can have up to three broods per season and, in the absence of external impacts, generally a high proportion of the nests are successful in raising young.

2.62 The Pebblebed Heaths and designated site boundaries are shown in Map 7. Map 8 summarises key locations for the interest features. The map is schematic, drawing on our knowledge of the site to indicate the principal mires and areas of the site that we are aware support high densities of Annex I birds.

2.63 The condition of the SSSI was assessed in October 2012, taking into account both vegetation and ornithological interest that form the designated features of the SAC and SPA.[6] At a SSSI level, the site is predominantly classed as 'unfavourable recovering,' with vegetation management being the most important issue. More appropriate management is being encouraged, but it will take some time to realise the positive benefit of these measures. Large fires in the recent past have set back recovery, and such areas are therefore currently particularly vulnerable to other impacts. The northern end of the site has an ongoing issue relating to habitat destruction as the result of an industrial lorry park. Heathlands will continue to suffer the general effects of climate change over the medium to long term, particularly isolated sites such as the Pebblebeds. There are no known site specific issues regarding climatic changes. Current environmental baseline and site vulnerability is therefore summarised by the SSSI condition assessment as having some sensitivity to recreational impacts, given the range of issues that still remain with regard to habitat management and restoration of unfavourable areas. The majority of the site is considered to be in a state of recovery, albeit over some time, as vegetation management measures are put in place and begin to take effect.

[6] SSSI condition assessment information taken from http://www.sssi.naturalengland.org.uk/Special/sssi/



Map 7: Pebblebed Heaths SPA/SAC & location names

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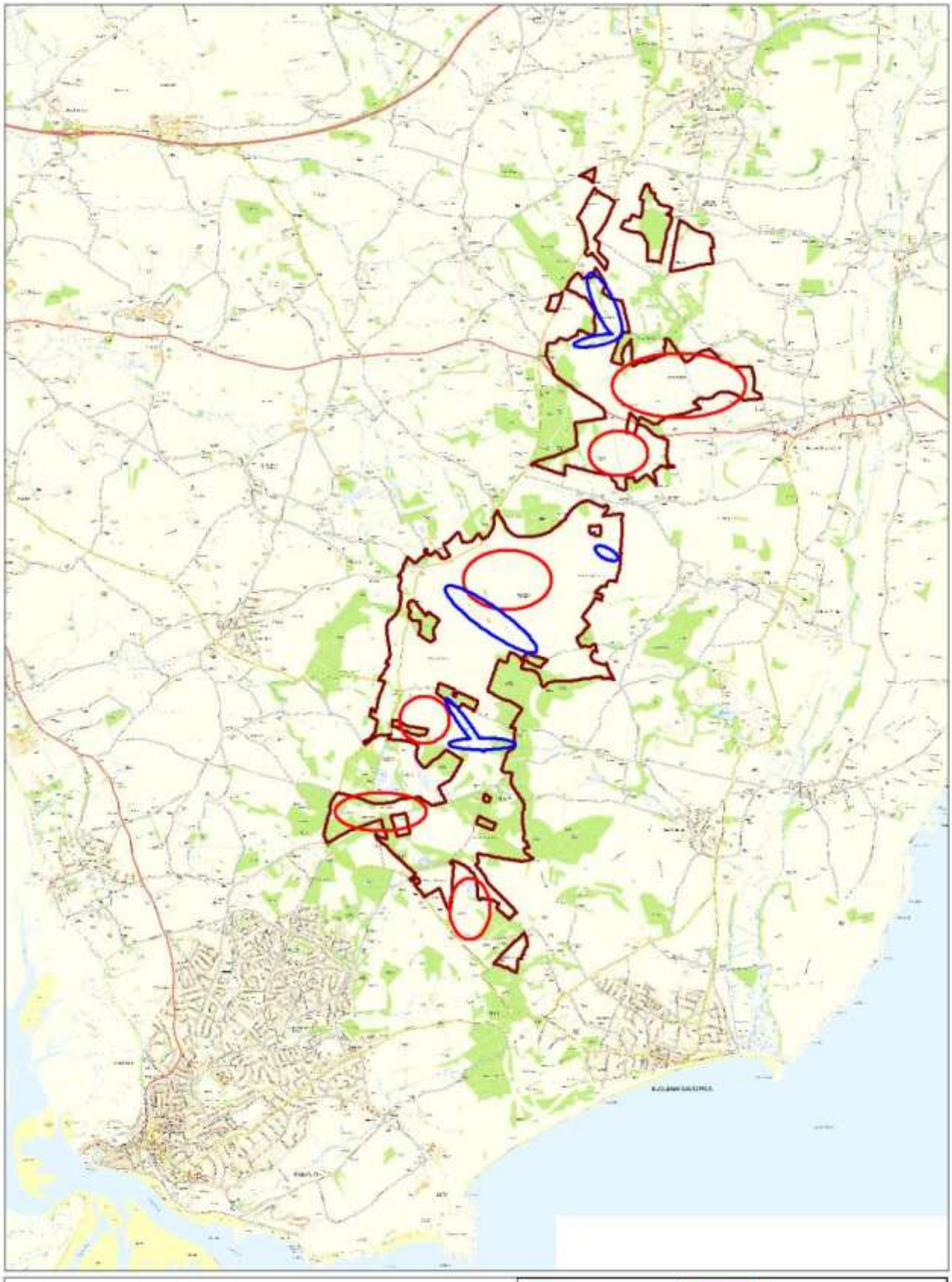

Map 8: Pebblebed Heaths SPA/SAC, key locations

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Table 5: SAC Interest Features for the Pebblebeds SAC

Interest Feature	Description	At the Pebblebeds	Approx. area of SAC (ha)
Northern Atlantic wet heaths with Erica tetralix	Wet heath usually occurs on acidic, nutrient-poor substrates, such as shallow peats or sandy soils with impeded drainage. The vegetation is typically dominated by mixtures of cross-leaved heath *Erica tetralix*, heather *Calluna vulgaris*, grasses, sedges and Sphagnum bog-mosses. M16 Erica – Sphagnum wet heath is usually dominated by mixtures of cross-leaved heath, heaths and purple moor grass *Molinia caerulea*. The bog-moss *Sphagnum compactum* is typically abundant, and species with a mainly southern distribution in Britain, such as marsh gentian *Gentiana pneumonanthe*, brown beak-sedge *Rhynchospora fusca* and meadow thistle *Cirsium dissectum*, enrich the wet heaths. A further very local wet heath type is M14 *Schoenus – Narthecium* (black bog rush *Schoenus nigricans*-bog asphodel *Narthecium ossifragum*) mire, which is mainly associated with transitions from heath to valley bog at a small number of lowland sites in southern Britain. Flushed wet heaths are especially frequent in areas of high rainfall, and occur as topogenous (usually as valley or basin mires) fens, in channels within heath or grassland vegetation.	This is the largest block of lowland heathland in Devon and is associated with various other mire communities. The wet element occupies the lower-lying areas and includes good examples of M16 *Erica tetralix – Sphagnum compactum* wet heath.	20% of 1119.94 (at notification)
European dry heaths	European dry heaths typically occur on freely-draining, acidic to circumneutral soils with generally low nutrient content. Ericaceous dwarf-shrubs dominate the vegetation. The most common is heather, which often occurs in combination with gorse *Ulex* spp., bilberry *Vaccinium* spp. or bell heather *Erica cinerea*, though other dwarf-shrubs are important locally. Nearly all dry heath is semi-natural, being derived from woodland through a long history of grazing and burning. Most lowland dry heaths are managed as extensive grazing for livestock. Dry heaths vary in their flora and fauna according to climate, and are also influenced by altitude, aspect, soil conditions (especially base-status and drainage), maritime influence, and grazing and burning intensity. There is a gradation from southerly to northerly kinds of dry heath, and there are also both western (oceanic) and eastern (more continental) forms. On slightly damp soils in the mild, oceanic climate of south-west England and south Wales, there is the uncommon H4 *Ulex– Agrostis* (Bent grass) heath.	The East Devon Pebblebed Heaths include extensive areas of lowland European dry heaths, with representative examples of H4 *Ulex gallii – Agrostis curtisii* heath, characterised by the presence of heather, bell heather, western gorse *Ulex gallii*, bristle bent grass *Agrostis curtisii,* purple moor-grass, cross-leaved heath and tormentil *Potentilla erecta.* The presence of plants such as cross-leaved heath illustrates the more oceanic nature of these heathlands, as this species is typical of wet heath in the more continental parts of the UK.	50 %
Southern damselfly *Coenagrion mercuriale*	The southern damselfly *Coenagrion mercuriale* has very specialised habitat requirements, being confined to shallow, well-vegetated, base-rich runnels and flushes in open areas or small side-channels of chalk rivers. Most sites are on wet heath. The larvae live in flushes	The East Devon Pebblebed Commons hold two relatively small populations representing southern	

Interest Feature	Description	At the Pebblebeds	Approx. area of SAC (ha)
	and shallow runnels, often less than 10 cm deep, with slow-flowing water. Adults fly from June to August. Females lay eggs onto submerged plants, and the predatory aquatic larvae probably take two years to mature. *Coenagrion mercuriale* is widespread but rare in southern central and south-west Europe, and its range extends to northern Africa. The fairly stable centre of its distribution in the south-west of the UK appears to constitute a major European stronghold of the species. In the UK it occurs mainly in south-west England and in south Wales.	damselfly *Coenagrion mercuriale* in the south-west of its range in England. These populations occur in base rich wet flushes within the site.	

Table 6: SPA Interest Features for the East Devon Heaths SPA

Interest Feature	Description	At the Pebblebeds
Nightjar *Caprimulgus europaeus*	The site supports 2.4% of the Great Britain breeding population as at the national census in 1992.	Nightjar populations on the East Devon heaths have fluctuated as a percentage of national numbers. The survey in 2004 found 64 singing males on the SSSI/Spa representing 1.4% of the national population while a further survey in 2010 found an increase to 78 singing males, at a time when there had been a 15% decrease in nightjar numbers across all major SSSIs (Conway *et al.* 2007, 2010)
Dartford warbler *Sylvia undata*	The site supports 8% of the breeding population as at the national census in 1994	The survey of 1994 found 123 singing males (8% of the breeding population) and the national survey of 2006 found 70 males and estimated 85 males, (2.6% of the estimated national breeding population), a decline of over 40% (Wotton *et al.* 2009). In 2008 a further survey of the heaths found 147 singing males an increase of over 100% Taylor pers. comm.). Since then, hard winters have seriously reduced most Dartford warbler populations and neither national nor local number are known.

Impacts from recreation

2.64 There has been no specific work on the Pebblebeds Heaths to consider the impacts of recreation on the European Site interest features. This is a critical gap in the evidence base. In the absence of such work we can only draw from studies from other locations.

Disturbance to birds

2.65 The Pebblebed Heaths have been open to the public for air and exercise since 1930. The heaths are registered common land and are open to the public on foot under the Countryside and Rights of Way Act 2000 and are used by walkers and dog walkers, horse riders, mountain bikers, model aircraft flyers, fishermen and others. Part of the heaths is also used as a training area by the Royal Marine Commando.

2.66 The Pebblebed Heaths are notably rural in character and are surrounded mostly by farmland with scattered farms and homesteads and no immediately adjoining towns or villages. As such, although they are vulnerable to disturbance, wild fires, nutrient inputs, trampling, litter and fly tipping and other visitor impacts, they are not generally at risk from the impacts associated with housing areas close to the heathland boundary such as dumping of garden waste, cat predation and introduction of alien species from houses and gardens.

2.67 Research on nightjar distribution and visitor numbers on heathland sites in Dorset and on the Thames Basin Heaths, Liley et al (2006) compared predictions of visitor pressures across each site derived from visitor studies with nightjar territory distribution. They found that nightjars were significantly less likely to hold territories in those parts of the sites where visitor pressure was higher, that there was a tendency for nightjars to locate further away from access points than would be expected, and that they were also distributed away from habitat-patch edges. They plotted nightjar density against predicted visitor pressure and found a clear trend for densities to decline with increasing visitor pressure.

2.68 Another study, (Murison, 2002) working on the Dorset Heaths, found that nightjars did not avoid paths when choosing sites for their nests, but predated nightjar nests were significantly closer to the nearest path than un-predated nests, and greater lengths of medium and high-use paths within 500m had a significant negative effect on nightjar nest success. A predictive model used to assess the likelihood of nest success or failure from nest site vegetation and disturbance data found that the proximity of a nest to paths was a significant predictor of nightjar nest success.

2.69 Whilst these measures of disturbance on paths and nightjar nest success show a clear negative relationship, the mechanism for this remains unconfirmed. The suspicion is that disturbance by humans and/or their pets causes incubating or brooding nightjars to leave their nests which are then predated by crows or magpies. Support for this hypothesis is given by the finding that 86% of all nests that failed did so at the egg stage (where uncovered eggs are easily visible to predators but chicks are not), and that of these, 55% were predated (Murison, 2002).

2.70 The Pebblebed Heaths Visitor Survey (Ecology Solutions 2012) found that of 1571 visitors, 666 (42%) were accompanied by one or more dogs and that most of these (78%) were off the lead and 17% were considered not to have their dogs under close control.

2.71 A further study (Woodfield & Langston, 2004) found there was a significant negative relationship between distance to nearest path and daily survival rate of eggs in nightjar nests, but not with chick survival.

2.72 Murison found that where there were greater lengths of path in nightjar territories there was a strongly negative relationship with nest success, suggesting that greater overall recreational activity would have detrimental effects on nightjar breeding success. This was supported by the work of Liley *et al.* (2006a), which found that nightjars avoided areas of high recreational use. Collectively, these studies suggest that if numbers of recreational users increase and raise activity levels (i.e. increasing path use from low to medium or medium to high or create new desire lines and paths) across hitherto less disturbed areas on the SPA, this could affect both the distribution and success of breeding nightjars.

2.73 Recent doctoral research by Murison (2007) found that the higher the disturbance levels, the later Dartford warblers hatched first broods with delays of up to 44 days in heather dominated territories. Late first broods led to fewer broods started, fewer successful broods and significantly fewer fledged chicks per pair. Disturbance reduced overall breeding productivity in all habitat types, but only significantly so in heather territories. Pairs which delayed breeding in disturbed territories hatched chicks later and were less likely to fledge young, and raised fewer successional broods overall.

2.74 Analyses suggested that disturbance both delayed the start of breeding and interrupted adult foraging and chick feeding behaviour. It was found that above a threshold of 13-16 people per hour each day through Dartford warbler heather territories, breeding was delayed sufficiently to prevent multiple broods. Thus, disturbance delayed breeding, and these later nesting birds produced only one brood and had poorer overall breeding success than those nesting earlier.

2.75 Nests located near the edge of the bird's territory in high disturbance areas were significantly more likely to fail. Proximity of territory centres to the nearest access points showed a significant negative relationship with timing of first broods. Recorded disturbance was significantly related to the number of car parking spaces on nature reserve sites.

2.76 All the research has concentrated on breeding season effects. However it is also likely that disturbance can affect wintering birds, particularly during cold weather when the birds may already be under energetic stress (i.e. the quality and quantity of food they can find only just meets their energy requirements for foraging and maintaining body temperature). It is known that Dartford warblers are very vulnerable to cold weather and after periods of hard frosts or snow, populations have dropped in the past. The Pebblebed Heaths Visitor Survey (Ecology Solutions 2012) suggested that there was no effect on nightjars or Dartford warblers from existing visiting levels on the Pebblebed Heaths because no correlation could be found between visitor numbers and either nightjar or Dartford warbler territory

distribution. However, the correlation was between Dartford warbler distribution in 2006, nightjar distribution in 2004 and visitor numbers in 2012, no account was taken of habitat variables, for example the extent of wet heath in the area which would not be suitable for nesting by either species, nor did the analysis allow for path density and distribution and therefore there was no measure of visitor pressure or direction but simply number of visitors to car parks. The report itself acknowledges that with these shortcomings the analysis is incomplete and we would concur with this and suggest that the result does not meaningfully describe the relationship between the bird distribution and visitor pressure, and that further investigation and analysis is needed.

2.77 The research findings also suggest that as additional people use the heaths, a higher and higher proportion of the area of the SPA may become unsuitable or sub-optimal for Annex I breeding birds, leading to an increasing proportion of the population producing too few young for sustainability. There seems little doubt that a clear link exists between higher levels of disturbance from people using the heaths and lower breeding densities or productivities of the Annex I species.

2.78 The results from the research summarised here show clear and unequivocal effects of human activity on breeding nightjars and Dartford warblers. This is based on careful recording of the spatial distribution and quantified activities of recreational users, and, in two of the main studies, the actual nest locations of breeding birds. Effects range from lower densities of breeding birds, to higher failure rates from predation and direct disturbance, as well as later breeding and fewer broods.

Wild fires

2.79 Heathland wild fires are uncontrolled fires that are started accidentally, or deliberately as arson, usually in spring or summer, rather than controlled fires started as part of a management programme in winter.

2.80 On the Pebblebed Heaths all wild fires have been recorded since 2000. There are no discernible trends either in the number of wild fires or in their size. The largest wild fire was 30 ha on East Budleigh in 2003, probably caused by arson, but the majority of the 64 wild fires (49-76%) were less than 0.1 ha. In just over half the wild fires, the cause was unknown, 25% of wild fires were caused accidentally by military activity, 16% by arson and 8% accidentally by others. The impacts of fire on heathland vegetation will depend on the time of year, the severity of the fire (length of burn and temperature) and the weather (mainly wind and humidity). A long, hot fire that burns into the heathland soil, destroying both the plants and the seed bank can have a long term effect and the ground may take years to recover. If wild fires are a regular feature on a heath, this means that a proportion of the heath is effectively permanently unsuitable for breeding birds because it has just been burnt. Regular fires will also keep returning areas of the heath to an early successional phase, often dominated by grasses (Bullock & Webb, 1995) and thus unsuitable for Dartford warblers.

2.81 Burning can also produce more open areas particularly after a year or two when the immediate effects of the fire have softened and the ground is covered with a low carpet of

heather. This can be attractive to people for walking and can lead to desire lines, creation of new paths and an increase in general access and thus an increase in disturbance. Thus in this instance, fires and access are operating synergistically to increase disturbance levels.

2.82 Murison (2007) studied the effect of fires on breeding Dartford warblers. After one year 80% of burnt territories were re-occupied by territorial males but only 46% of these had breeding pairs and by year four, although all territories had been re-occupied by males, 30% of these were un-paired. The highest re-occupancy rates were where the lowest proportion of the territory had been burnt. If less than half a territory was burnt, occupancy by males was over 80% the next season, dropping to 50% occupancy if more than half was burnt and 25% if up to 90% was burnt. There was nil occupancy with a total burn. Pairs on territories that had been part- burnt by a fire raised fewer broods and produced fewer fledged young overall.

2.83 Dartford warblers are faithful to a territory all the year round, so it might be expected that in severe weather, pairs with partly burnt territories might have lower survival rates than pairs with un-burnt territories as there will be less cover against snow and frost and fewer and less variable foraging sites, although this has not been researched. Another side effect may be greater vulnerability to predators if gorse cover is removed from a territory.

2.84 As ground nesting birds, nightjar nests are particularly vulnerable to heathland fires. Any fire that sweeps through an area in which there are nesting nightjars will destroy the eggs or kill unfledged young. As nightjars can have second broods, any fire between June and August could cause mortalities and nest failures.

2.85 It is clear from the above that fire can have serious consequences for the heathland habitat and its dependant birds. Although both nightjars and Dartford warblers will nest in areas damaged by fire following recovery of the vegetation, where fires occur repeatedly on a heath, this results in a proportion of the heath still recovering and being unavailable to the birds at any one time, effectively permanently reducing the available heathland area for nesting. Depending on the nature and extent of the fire and the speed of vegetation recovery, it could be 3-5 years before an area might be re-colonised by nightjars and 4-8 years for Dartford warbler.

Nutrients

2.86 Airborne nitrogen (mostly as ammonia and nitrous oxides) from burning fossil fuels by industry, traffic, shipping and agriculture, now poses one of the greatest threats to heathland in Europe. Heathland systems are generally poor in nutrients and many of the plant species can only survive and compete successfully on soils with low nitrogen availability (Bobbink, Ashmore et al. 2002). Nitrogen compounds also increase acidification in soils. The addition of nitrogen in rain or dust particles results in an increase in the nitrogen in the vegetation, litter and upper soil layers, and this builds up over time.

2.87 The enhanced nutrient levels in the heather plants can speed up the growth cycle so that aging occurs more rapidly, the plants become more vulnerable to cold weather effects or drought and higher nutrient levels can encourage more frequent attacks by insects,

particularly heather beetle (Lee and Caporn 1998; Power, Ashmore et al. 1998; Carroll, Caporn et al. 1999; Kristensen 1999; Lee, Caporn et al. 2000). All these factors can lead to a weakening of the heather, and, as the light penetration increases through weakened or dead heather canopies and levels of nitrogen in the soil from a build-up of airborne nitrogen deposition increase, both these factors encourage the growth of grasses.

2.88 A range of grass species can be involved in this process, and one of these, purple moor grass (*Molinia coerulea*, henceforth referred to as Molinia) has displaced heathland vegetation on many heaths across North-west Europe. On wet heaths, Molinia can oust the typical heathland dwarf shrubs under high nitrogen conditions (Berendse and Aerts 1984; Aerts and Berendse 1988; Uren, Ainsworth et al. 1997; Milligan, Putwain et al. 2004).

2.89 Empirical critical loads for nutrient nitrogen are set under the Convention on Long-Range Transboundary Air Pollution. Critical loads are given as ranges (e.g. for wet and dry heath 10-20 kgN/ha/yr), and were revised in June 2010 at an international workshop. The new values are used in the Air Pollution Information System (APIS)[7].

2.90 The APIS figures for the critical load[8] for nitrogen inputs to dry heathland are 10-20 kg/ha /year and in wet heathland, 10-25 kg/ha/year with the lower end of this range applied to sites with low intensity management.

2.91 In the Pebblebed Heath area, the level of nitrogen deposition has been estimated as 20.02 kg/ha/yr in 2005 dropping to 15.68kg/ha/yr by 2020. The first figure is above both the maximum and minimum critical loads and the second above the minimum.

2.92 While the release of nutrients into the atmosphere is a matter for wider strategic management, at a local scale nutrients are also released onto the heaths by passing road traffic with effects out to some 200m from the road (Angold 1997), and any increase in traffic as a result of additional development can exacerbate this. The Pebblebed Heaths are crossed by the A3052 and the B3180, both of which pass within 200m of stretches of the SAC heathland.

Dogs

2.93 A number of reviews have addressed the impacts of dog fouling (e.g. Taylor *et al.* 2005). The reviews give detail on the chemical composition of faeces, behaviour of dogs and impacts. Dogs will typically defecate within 10 minutes of a walk starting, and as a consequence most deposition tends to occur within 400m of a site entrance (Taylor et al., 2005). This is noticeable on many heaths where the heathland paths are edged with a rich, green flush of grasses, particularly close to entrances, as a result of the nutrients contained

[7] http://www.apis.ac.uk/

[8] Critical loads are defined as the rate of pollutant deposition below which adverse effects do not appear in the ecosystem (Cunha, A., S. A. Power, et al. 2002. Whole ecosystem nitrogen manipulation: An updated review. Peterborough, JNCC Report No. 331).

in dog waste and the habit of dogs relieving themselves at the start of a walk.Whilst dogs will typically urinate at the start of a walk, they will also urinate at regular intervals during the walk too. The total volume deposited on sites may be surprisingly large. At Burnham Beeches NNR over one year, Barnard (Barnard 2003) estimated the total amounts of urine as 30,000 litres and also estimated 60 tonnes of faeces from dogs. The limited information on the chemical composition of dog faeces indicates that they are particularly rich in nitrogen.

2.94 Based on estimates of visitor numbers to the Pebblebed Heaths by Ecology Solutions (2012), and taking a conservative estimate as to the number accompanied by at least one dog (42%), it is estimated that there are currently some 813,000 visits to the Pebblebed heaths each year by dogs. From the Ecology Solutions report it is estimated that this number could increase by 45,000 visits from visiting dog walkers from the proposed development in East Devon District alone.

Trampling vegetation and soils

2.95 Heathland is particularly vulnerable to trampling, which can kill the heather plants and cause soil erosion and path gullying. Trampling causes damage to and loss of plant parts, and the effects on and responses by individual plant species will differ, for example heather may be more damaged by trampling than Molinia (Lake, Bullock, & Hartley 2001).

2.96 Generally, dry heath and its associated vegetation are more resilient to trampling (particularly in winter) than wet heaths, but dry heath vegetation cover can be reduced by 90% by as few as 400 foot passages (Gallet, Lemauviel, & Roze 2004). Most damaging is repeated trampling when heathland vegetation is replaced by common and widespread path species which are more resistant to trampling, or by bare ground.

2.97 In a study on grassland it was found that the reduction in cover of vegetation caused by mountain bikes was estimated to be twice that caused by walkers and approximately half that caused by horse riders. Compared to human access on foot, motor-bikes create between one and 1.5 times more bare ground depending on slope (Liddle 1997). The ground pressure of a horse's hoof when a rider is on its back may be as much as 27 times that of a walkers shoe and equivalent to a four-wheel drive vehicle with four passengers (Liddle, 1997). The impacts to tracks caused by horse-riding may therefore far exceed other users such as cyclists or walkers (Dale & Weaver 1974; Wilson & Seney 1994; Deluca *et al.* 1998; Newsome, Cole, & Marion 2004). Tracks used by horses are likely to be wider, deeper and muddier (Newsome, Cole, & Marion 2004).

2.98 Different types of heathland (and different species) are susceptible to different levels of trampling. Assessments of the impact of heathland trampling on Atlantic heaths in north-west France demonstrated that damp heathlands tended to be more sensitive to trampling than dry heathlands, depending on season and weather conditions (Gallet & Roze 2001, 2002).

2.99 Molinia, wavy hair-grass and bilberry, heather, cross-leaved heath are relatively resistant to trampling (Roovers et al. 2004).

2.100 Repeated trampling affects the recovery rate of different heather species in different ways - for example, the impact on Dorset heath was the same at any trampling rate between one and five passes (Gallet, Lemauviel, & Roze 2004), whereas for bell heather and western gorse, trampling was slightly less damaging when applied once compared to five times. A primary threshold for damage from trampling to heather vegetation has been demonstrated at 20–40 passes, which increased sensitivity to disturbance (Growcock 2005). Another threshold was passed between 200–400 passes, leading to a new level of degradation (Gallet, Lemauviel, & Roze 2004).

2.101 However, a proportion of bare ground and early successional habitats are a very important component of the heathland ecosystem, important for a suite of plants, invertebrates and reptiles (Byfield & Pearman 1995; Lake & Underhill-Day 1999; Moulton & Corbett 1999; Key 2000; Kirby 2001). Bare ground habitats, rather than heather-dominated ones, often support the rarest species (Key, 2000); of the 90 BAP species associated with lowland heathland, 39% depend on bare ground and early successional habitats (Alonso *pers. comm*.). Many small annual and ruderal plants are only associated with such habitats (Lake *et al*., 2001). Such species depend on winter ground disturbance to create suitable habitat for germination.

2.102 Some localised erosion, the creation of new routes and ground disturbance may all contribute to the maintenance of habitat diversity within sites. However, the level of disturbance required is difficult to define and is likely to vary between sites (Lake et al., 2001).

2.103 The habitat for southern damselfly on the Pebblebed Heaths is open wet ground between Molinia tussocks, which in places has been heavily trampled by livestock. Such areas are generally not accessed by the public and if they are, trampling is unlikely to be damaging.

2.104 There is a tendency for people to avoid trampled surfaces, especially if these become loose sand in dry conditions or waterlogged and muddy in the wet. This could result in the creation of new informal routes, avoiding the problem areas by striking out into presently undamaged vegetation. This could lead to penetration further into the site, which would not only threaten more of the limited resource of heathland vegetation, but could also bring disturbance impacts for ground nesting birds like nightjar into areas not currently experiencing such pressures.

2.105 In general, trampling causes compaction and a reduction in soil porosity, which means that there is less space for air and water, and a subsequent reduction in the suitability of the soil to support living processes. The physical action of feet or wheels may also loosen or displace some particles, and this together with the reduction in plant cover, leads to soil erosion and deposition. This can be accentuated by the fact that rainfall cannot easily penetrate the compacted soil and hence a greater proportion flows over the soil surface. Erosion will also occur both during and after recreational activity (e.g. Kuss 1983).

2.106 Detached soil particles are vulnerable to runoff, especially on slopes (Weaver & Dale 1978; Wilson & Seney 1994; Siikamäki, Törn, & Tolvanen 2006) where vegetation is not present (Liddle, 1997). On slopes, the direction of travel, (upslope or downslope) can be important,

with damage greater when travelling downslope due to the 'halting action' used downhill (Weaver and Dale, 1978). Impacts are also likely to be most severe where horses are allowed to stray off trails and / or in environments prone to waterlogging (Landsberg et al., 2001).

2.107 Wheels exert compactive and shearing forces on surfaces and a downward pressure through the tyres. Bike tyres create linear channels that may promote runoff and erosion, and most studies focus on these physical impacts of mountain biking. A range of studies clearly demonstrate that bikes cause incisions (Goeft & Alder 2001), soil compaction (Bjorkman 1996; Goeft & Alder 2001), erosion (Wilson & Seney 1994; Bjorkman 1996; Goeft & Alder 2001; Marion 2006) and reduce vegetation cover (Goeft & Alder 2001; Thurston & Reader 2001).

2.108 Bjorkman (1996) evaluated two new mountain biking trails before and for several years after they were opened to use. Vegetation cover within the tread marks made by the tyres declined with increasing use to negligible levels while trailside vegetation remained constant or increased in areas damaged by the initial construction of the trail. Similarly, soil compaction within the tread rose steadily while compaction of trailside soils remained constant. Vegetation and soil impacts occurred predominantly during the first year of use with minor changes thereafter.

2.109 Spatially, the impact of mountain bikes can be quite limited. For example one study showed that, after a maximum of 500 passes, visible impact from mountain bikes was concentrated within a narrow zone no greater than 30 cm from the track centreline (Thurston and Reader, 2001), suggesting that cyclists tend to steer a similar course. Where cyclists are in groups – such as families – this may of course not be the case as they may ride side by side.

2.110 The contact pressure (the mass divided by the contact area) of a bike is likely to be less than that of motorised vehicles, horses and heavily laden walkers (see Cessford 1995). Comparative research on track impacts by Weaver and Dale (1978) found that motorbikes (the study did not include cyclists) had the greatest effects while going uphill, but that when going downhill, the effects of horses and walkers were greater.

2.111 There is evidence on the Pebblebed Heaths of trampling damage and gullying on some paths (although this has not been quantified) in wetter areas, and steps have been taken to make limited repairs to these or divert users to less damaging routes. One effect of increased numbers of visitors is not only heavier use of existing paths but greater pressure for the opening up of new paths, with a reduction in heathland vegetation and increased fragmentation of areas of heathland vegetation.

Litter and Fly tipping

2.112 The main effects of litter and fly tipping on the habitat and its associated wildlife are through localised nutrient enrichment and animals or birds being trapped or injured by plastic/glass/bottles/tins and other material. Dumped material can also present a fire risk (especially stolen and burnt out cars) and a potential source of pollution to surface or ground water. In most cases fly tipping will take place close to roads, with the main litter problems in and around car parking, picnic sites, seats and other places where visitors stop.

2.113 On the Pebblebed Heaths these are not serious problems but a constant watch is needed by the limited wardening staff to action any serious incidents particularly of fly tipping.

Activities that result in impacts

2.114 Most human activities on heathland will result in impacts, whether it be from localised trampling and nitrogen impacts from dog waste or major impacts such as large fires. Some impacts that result from housing areas adjacent to heathland, such as cat predation, dumping of garden rubbish or introduction of alien plants from gardens, are likely to be insignificant on the Pebblebed Heaths, but others will be important. The range of impacts from visitors to heathland is summarised in Table 6.

Table 6 Summary of key negative impacts from visitors to heathland sites

Disturbance to heathland birds	Reduced nest success through higher predation levels, later nesting , smaller broods and higher nest failure levels	Nightjar and Dartford warbler	Murison (2002); Murison (2007)
Predation and increased mortalities	Disturbance by pet dogs which can lead to predation of nests and young	Birds, invertebrates, reptiles and amphibians	Langston *et al.* (2007) ; Langston, Drewitt & Liley (2007)
	Increase in crows and magpies on sites with greater human activity	Birds, invertebrates, reptiles and amphibians	Marzluff & Neatherlin (2006)
Roads	Road kills from traffic	Birds, invertebrates, reptiles and amphibians	Erritzoe (2002)
	Increased levels of noise and light pollution	Birds, invertebrates	Reijnen *et al.* (1997)
	Roads are barriers to species mobility	Invertebrates	Mader *et al.* (1990)
Pollution / Hydrology	Ground and surface water pollution from roads and hard surfaces, spills and dumping	Vegetation communities, invertebrates in waterbodies	Armitage *et al.* (1994)
	Air pollution from industrial uses, fires and vehicles	Vegetation communities	Bobbink *et al.* (1998); Angold (1997); Bignal *et al.* (2007)
Trampling	Soil compaction	Plant communities and species. Invertebrates	(Taylor et al., 2006)
	Soil erosion from walkers, cyclists and horse riders	Plant communities and species, some invertebrates benefit	
	Damage to breeding and wintering sites	Invertebrates and reptiles	
	Creation of extensive path	Birds, reptiles	

		Examples of species /	
	network increases spatial disturbance		
Eutrophication	Enrichment of soils from dog excreta.	Plant communities and species, invertebrates	Bonner & Agnew (1983); Taylor *et al.* (Taylor et al., 2005)
	Enrichment along road corridors, effects of dust, salt, run-off	Plant communities and species, invertebrates	Angold (1997)
	Fly tipping of rubbish	Plant communities, small mammals, invertebrates	
Fires	Higher fire incidence on more heavily used heaths. Direct mortality of fauna. Temporary removal of breeding and foraging habitat	Birds, invertebrates, reptiles and amphibians	Kirby & Tantrum (1999)
	Long term vegetation change from repeated fires	Vegetation communities	Bullock & Webb (1994)
Vandalism	Damage to signs, fences, gates lead to increased costs and drain on wardens' time	All groups may suffer from reduced warden input to management	
Restrictions on management	Stock grazing: gates left open, dogs chasing/injuring animals, inappropriate feeding or theft of stock		
Public objections to management	Makes correct management harder to achieve e.g. public resistance to tree felling	All groups	Woods (2002)
Negative public perception	Disregard of access and activity restrictions, hence trampling, dog fouling, fire lighting, illegal motorcycling etc.	Vegetation communities, birds, invertebrates, reptiles and amphibians	

Areas most affected by these activities and where the special interest is most vulnerable to increased disturbance

2.115 The areas most heavily affected are those most heavily used. Vulnerable areas are thus those close to car parks, along paths and rides and places where people gather such as look-out points and seats. The incidence of dog waste is higher within about 200m of car parks and along path sides and these are also the areas where trampling with resultant soil erosion and compaction is greatest. Erosion and trampling can also be a problem where paths and rides cross wet areas. For birds which are highly territorial such as Dartford warbler, although the birds can hold territories close to heavily used areas, research has shown that productivity is lower both where paths are heavily used and in areas closer to parking facilities (Murison 2007). Nightjar nests are also more likely to fail if they are close to paths and this effect is highest where the paths are more heavily used (Murison 2002). Murison also looked at the location of fires on the Dorset heaths and found that these were more likely to be started near access points, roads and most frequently in vegetation adjacent to paths. She also found fires were more likely to be started near viewpoints, benches and picnic sites than elsewhere on heaths (Murison 2007). Detailed work assessing the distribution and use of the site by Annex I birds in relation to visitor density,

recreational infrastructure and habitat is a critical gap in our understanding of the issues on the Pebblebed Heaths.

Table 7: Summary of current impacts of recreational pressure on Pebblebed Heaths SPA and SAC features.

Disturbance	Nightjar		All SPA, especially areas of greatest intensity of visitor pressure e.g. adjacent to paths, desire lines, and path nodes	
	Dartford warbler	Negative impact on breeding productivity with greatest effects in most heavily visited areas including vicinity of car parking and main paths	All SPA, especially areas of greatest intensity of visitor pressure e.g. adjacent to paths, desire lines, and path nodes	April-August and during severe weather conditions in winter
	Southern damselfly	No evidence of disturbance but there is a need to maintain vigilance against insect collectors	Two colonies on SAC	
Wildfire	European dry heath	High fire risk due to inflammable nature of vegetation and extensive use by public and military Impact of fire negative due to potential fire size and intensity affecting vegetation and seed banks Fire sites create potential additional desire lines and footpaths causing increased access and disturbance	Dry heathland	Mainly March-September
	Northern Atlantic wet heaths	Moderate fire risk in very hot, dry summers Impact of fire could damage wet heath vegetation and peat soils	Edges of wet heath	Mainly March-September
	Nightjar	Summer wild fires could destroy nests and eggs or unfledged young and leave habitat unsuitable for nesting for several years	Dry heaths, bracken beds	May -August
	Dartford warbler	Summer wild fires could destroy nests and eggs or unfledged young and leave habitat unsuitable for nesting for several years Fire damaged sites could affect survival of wintering Dartford warblers	Dry heaths with old heather and European gorse	March-August Winter
Nutrient enrichment	All habitats	Localised negative impact near access points from dog waste with increase in unwanted competitive species able to benefit from elevated nutrient levels, and declines in heather and associated species Localised negative impacts from road traffic within 200m of heathland	At access points and around car parks and main paths	All year
Trampling	European dry heath		Heavily used paths near access points and car parks	All year

	Atlantic wet heaths		Heavily used paths near access points and car parks	
	Southern damselfly		Existing or new paths within or close to breeding sites	All year
Litter and fly tipping	European dry heaths		Heathland boundaries with car parks or pull-ins	All year
	Atlantic wet heaths		Heathland boundaries with car parks or pull-ins	All year
Indirect effect of visitors presence on management techniques	All habitats and species		All site	All year

Climate change, coastal dynamics and managed re-alignment

2.116 As European sites in a coastal setting, it is particularly notable that both the Exe Estuary and Dawlish Warren are likely to undergo some amount of change in the future, essentially as a consequence of a rising sea level. Dune and intertidal habitats are likely to be lost, and the Environment Agency is currently considering the future flood and coastal erosion risks and available options for continued coastal defence structures, or the managed-realignment of the coast.

2.117 An Exe Estuary Flood and Coastal Erosion Risk Management Strategy has been prepared by the Environment Agency, with the draft strategy most recently updated in August 2013.The Strategic Environmental Assessment Report for that strategy explores the potential environmental issues and opportunities that may arise as a result of any changes to sea levels, coastal processes and decisions around the future management of defence structures currently in place to prevent flooding. This work provides helpful information and predictions for how the estuary will change in future and also the likely future strategy that the Environment Agency will take for the defence structures.

2.118 The Exe Catchment Flood Management Plan in 2009 identified the need to take further action in order to sustain the current level of flood risk over the next 100 years. The South Devon and Dorset Shoreline Management Plan was published in 2011, and this identified a selective holding of the existing defence line as the preferred management option for the Exe Estuary. Recent storm events have highlighted the need to consider the management options for the defences further, and the Exe Estuary Flood and Coastal Erosion Risk Management Strategy now gives more detailed consideration to predicted changes and management required, both of which have implications for the future extent and functionality of habitat within both Dawlish Warren SAC and the Exe Estuary SPA/Ramsar.

2.119 The four main issues relating to European site interest features are the loss of sand dune development processes at Dawlish Warren as a result of defences, the total loss of habitat at Dawlish Warren with sea level rise and increasing storm events, the loss of intertidal habitat used by SPA birds, and the loss of high tide roosting habitat for SPA birds. The Management Strategy has identified the significant risk to European site habitats posed by sea level change, and identifies the need for strategic solutions that facilitate adaptation to climate change by estuarine biodiversity, including a clear need for compensatory habitat provision to offset the predicted losses from the two European sites.

2.120 The proposed strategy for flood risk management, as set out in the draft report, suggests a management option for each of the 18 management units around the estuary. In line with previous recommendations, a selective holding of the line approach has been taken, with an appraisal of the most appropriate option for each unit informing the preferred approach. Some units therefore now propose no active intervention and in some cases, managed re-alignment is recommended. The strategy predicts loss of European site habitat (both site interest features and habitat supporting species interest features), and this therefore triggers the need to consider compensatory habitat provision. For intertidal estuarine habitats, managed realignment presents the favoured approach, allowing

gradual movement of habitats landwards and minimising any risk of biodiversity loss. Where flood defence structures or other structures prevent this, separate compensatory provision will be required. This may not be in the immediate area of loss, and whilst the overall quantity of habitat may be retained, there is greater risk of localised biodiversity impacts.

2.121 At Dawlish Warren, a combination of the retention of defence structures to protect the village, railway, etc, whilst allowing the removal of gabions further along the sandspit, is proposed. This serves to protect the visitor centre and other built assets at the landward end of the sandspit. The Exe Estuary Flood and Coastal Erosion Risk Management Strategy also suggests that the removal of structures in the central and distal sections of the spit will facilitate the development of a more naturally functioning sand system. Whilst it is predicted that some movement of the dune system further up the estuary may take place, there is a risk of significant loss of dune habitat overall.

2.122 The need for a detailed Appropriate Assessment of impacts on European site interest is recognised, and it is understoodis being undertaken prior to the finalisation of the management strategy.

2.123 The Exe Disturbance Study highlights the varying use of the estuary by birds, which can be related to the varying use of the estuary for recreation. Bird densities are not solely dependent on habitat quality, and are highest where recreational activity is most limited. This places additional importance on those areas of the estuary where recreational pressure is low, and the particular locations where future changes to the estuary will take place via habitat loss, managed realignment or compensatory habitat provision. Bird densities and recreational use of these locations is therefore critical to both the implementation of mitigation measures to prevent adverse effects arising from new development, and the identification of potential impacts arising from the Flood and Coastal Erosion Risk Management Strategy in its Appropriate Assessment. Noting that, the Appropriate Assessment and its recommendations will therefore be relevant to this mitigation and delivery report, and it is suggested that there will be a need for the Exe Estuary Flood and Coastal Erosion Risk Management Strategy's final proposals to be reviewed and cross checked with the mitigation programme, to ensure that the two are not in conflict.

2.124 Future loss of estuarine habitats in the coming decades, and the minimal opportunities for in situ managed realignment around the estuary, amplifies the need for careful mitigation of future recreational pressure. The SPA bird interest features will be under additional stress as a result of the habitat changes predicted, and this may affect their resilience against other anthropogenic impacts.

2.125 It is important to note that at this point in time, liability for compensatory habitat provision for losses in the short term (i.e. up to 2030) has been accepted by the Environment Agency. In the medium and longer term, responsibility has not yet been determined, and the management strategy leaves this open for future consideration. This is particularly relevant for Dawlish Warren, because the Flood and Coastal Erosion Risk Management Strategy predicts that the significant sand dune loss will take place after 2030. The

preliminary list of compensatory habitat provision in the management strategy focuses on intertidal habitat. The loss of dune habitat from the SAC must therefore be a focus of the Appropriate Assessment of the Flood Risk and Coastal Erosion Management Strategy proposals.

2.126 Recreational pressure from new development on Dawlish Warren will become increasingly significant if the habitat resource is reduced in future. It will therefore need to be clear in all relevant plans and strategies that the recreational use of Dawlish Warren cannot be assumed into the medium and long term, and alternatives may need to be pursued.

2.127 It is also worth noting that locations for compensatory European site habitat provision brought forward as part of the Flood Risk and Coastal Erosion Management Strategy may also present additional opportunities for both mitigation and enhancement. This mitigation and delivery report includes a recommendation for an Exe Estuary Delivery Officer, as detailed in subsequent sections. The three local planning authorities, and the Delivery Officer once in post, should maintain close working with the Environment Agency to maximise any opportunities.

3. Anticipated Level of Growth within Relevant Districts

3.1 Each of the three planning authorities is responsible for preparing its local plan documents, and gathering evidence to inform the level of growth to be provided for in the local plan allocations. Development across the three authorities is particularly influenced by the identification of Exeter City and East Devon's 'west end' as a New Growth Point, as part of the growth agenda set by the previous Government. The current status of local plans and progress on large development allocations is summarised below.

3.2 The identification of Exeter City and East Devon's 'west end' as a New Growth Point in 2007, provides the foundation for the level of growth proposed. Exeter City Council adopted its Core Strategy in February 2012. The adopted plan provides for 12,000 houses and 60 ha of employment land across the city's administrative area. It should be noted that Exeter expresses its housing allocation as 'at least' 12,000 houses. Exeter City is now preparing its Development Delivery Development Plan Document, which provides the necessary policies and allocations to deliver the overarching Core Strategy objectives.

3.3 The East Devon plan is also set in the context of Exeter City and East Devon's 'West End' being identified as a New Growth Point. This drives much of the content and focus of the plan, and is the priority for housing and employment allocations. A number of 'West End' proposals already have planning permission and are underway. The plan, with its 15,000 new homes, is currently being considered at Examination, and therefore anticipated to be adopted later in 2014.

3.4 Teignbridge District Council borders the western shore of the Exe Estuary. The Teignbridge Local Plan has proceeded through Examination and the Examining Inspector has confirmed that the plan is 'sound' subject to 12 modifications, that will now be made prior to adoption of the plan. The plan takes forward an overall housing figure of 12,400 new homes, with a focus of new residential growth being at Newton Abbot, but also at the other towns across the District including Teignmouth, Dawlish and south west of Exeter. Employment land across the whole District amounts to 68 ha.

3.5 In summary therefore, the three planning authorities have adopted or are close to adopting plans that propose a total housing growth of approximately 40,000 new homes. East Devon and Exeter plans run from 2006 to 2026 and Teignbridge from 2013 to 2033.

3.6 Each of the three local planning authorities has recognised the additional pressure that their levels of anticipated growth may bring to bear on the European sites. The recently adopted or emerging plans identify the need for large scale, carefully designed green infrastructure, providing a high quality informal recreational experience in locations well placed to attract new residents from the large strategic housing allocations, and at the same time anticipating that the new country parks and enhancement of valleys and ridges of landscape value will also attract some existing visitor use from the European sites.

Exeter City

3.7 In seeking to ensure the sustainable allocation of land for the proposed 12,000 new homes by 2026, Exeter City has identified three strategic housing sites; Monkerton/Hill Barton,

Newcourt and south of Alphington. Further sites are primarily regeneration areas closer to or within the city.

3.8 Provision of green infrastructure to support new and existing development is set out within the 'Green Infrastructure Strategy Phase II, Exeter Area and East Devon Growth Point,' which was published in December 2009. Key green infrastructure for enhancement and expansion are the corridors of the Exe Valley and the ridgelines that encompass the city. In particular, new country parks are linked to the strategic housing sites at Monkerton and to the south of Alphington, and the existing Exe Riverside Valley Park is identified as a strategic project for significant green infrastructure enhancement.

East Devon

3.9 With the Growth Point status shared between Exeter City and East Devon, and considerable housing allocated at the new community at Cranbrook, the 2009 Green Infrastructure Strategy supporting the new Growth Point is logically a joint strategy between the two planning authorities. For the East Devon District, the Clyst Valley Meadows and Lower Clyst Valley are strategic project areas where there is significant enhancement opportunity for these large scale green infrastructure networks.

3.10 Exmouth is also a focus for development, and in particular the regeneration of the town and its waterfront. Whilst new green infrastructure is proposed, here it is the enhancement of existing sites that is the focus for green infrastructure provision and, as set out in this report, is one of the key locations where other non-infrastructure measures will be of primary importance.

Teignbridge

3.11 The majority of housing allocations are situated away from the estuary (around Newton Abbot), but there are significant allocations close to the SPA/SAC at Dawlish and south west of Exeter (near Exminster). Recognising the current draw of Dawlish Warren, the emerging Teignbridge local plan includes commitments to new large scale greenspace that is to be designed to attract users away from the Warren, focusing on being more expansive, more attractive and with new high quality visitor facilities. Policy wording commits to providing two new country parks: one a ridge top park located adjacent to new housing at the south west of Exeter, with varied farmland habitats, topography and view points; and the other on the coast between Dawlish and Dawlish Warren, which will link to the existing coastal path and provide a coastal experience alongside a range of walks through meadows and wooded areas, with more formal play provision, open air amphitheatre and visitor centre.

Summary of local plan provision for growth within local plans

3.12 Section 6 of this report considers the green infrastructure proposed for each of the three administrative areas in further detail, assesses the value of each as part of the overall mitigation strategy and makes recommendations for further improvements.

3.13 This report also gives significant weight to a wide range of other, non-infrastructure measures as, whilst the green infrastructure proposed is of high quality and accords with established recommendations for the provision of alternative greenspaces, the locations,

established use and nature of the European sites are such that diverting extensive use cannot be guaranteed. Additionally, it is widely recognised that the provision of non-coastal greenspace as a realistic alternative to coastal sites is difficult to achieve. The coastal park at Teignbridge has however been specifically designed to go some way to overcome this issue, with the unique benefit of a coastal location for this new country park.

3.14 Of particular note is the use of the waterfront at Exmouth where it will be virtually impossible to divert use elsewhere, especially for watersports. In such cases the reliance on other, non-infrastructure, measures will be essential.

3.15 Whilst the emerging and adopted plans do not detail the comprehensive range of non-infrastructure measures assessed and recommended in this report, each has ensured that clear policy wording is in place to take forward a joint strategic approach to mitigation, in addition to the specific policies and green infrastructure strategies that will put in place the alternative greenspace element of the overall strategy.

Growth in housing around European sites

3.16 The specific housing projections put forward by the three local authorities are considered here with respect to European sites at different distance bands. Spatially referenced data describing potential new housing were provided as point data by the three local authorities and was combined into one GIS layer. The data provide a useful overview of where new development may take place but do need to be treated with some caution. For example a single point – a 'dot on a map' will work well for small developments but for large developments covering a wide area, a single point at the centre of a site will not necessarily portray the distribution of housing well at a fine scale. Windfall developments and the results of appeals etc. are particularly difficult to predict.

3.17 Each local authority provided data in different formats with respect to the stage of the planning process. For Exeter City the data provided includes allocations; permissions and completions since 2010 for developments of 15 or more dwellings; and smaller (i.e. less than 15) permissions and completions in each ward since January 2010. An assumption for windfall housing until 2026 was also included for each ward.

3.18 In East Devon a table was produced for housing projections including allocations, existing permissions and windfall for each settlement between 2011 and 2026 with the first 5 years of development evenly dispersed. Future windfalls were included in the total and are predicted to be 1580 across the period and have been divided equally across the parishes.

3.19 Teignbridge District housing figures were provided as individual allocations and individual permissions for developments of 15+ houses, plus a combined windfall-and-minor-permissions figure for each parish / major settlement. The windfall projection is based on 40 houses per year across the whole district. The windfall figures have been divided between parishes based on historic windfall rates and are for the whole parish. In all cases except the South West of Exeter Urban Extension, allocations and permissions are associated with the major settlement within the parish. The Teignbridge Plan runs to 2033,

but the allocation and windfall figures have been adjusted to show projected housing completions to 2026 to tie in with the Exeter and East Devon timescales.

3.20 Despite the variations in the way the figures were provided, they can be combined to give an indication of the total projected housing increases to 2026 (i.e. the life of the Exeter and East Devon Plans). These can then be used to predict how the numbers of visits to the European sites (described in the next chapter) might change in the future.

3.21 The current housing numbers originated from a Postzon© data set and code point using Royal Mail Postcode Address File and Ordnance Survey Open data (2011)[9]. Table 8summarises the current level of housing between 0 and 1, 3, 5 and 10km from the boundary of each European site. The potential housing development data is presented spatially with the three European site boundaries in Map 9. It is important to note that the distance bands include land outside of the three districts where new housing information is not known. The distance bands for Dawlish Warren and the Pebblebed Heaths were drawn so as they didn't include the opposite sides of the estuary (see maps 11 and 12).

3.22 The number of houses to be built within the timescale of the local authorities' plans is also shown in Table 8. For each distance up to 10km, the percentage increase in the housing on a like-for-like basis is shown i.e. the increase in the number of houses at 1km as a percentage of the existing houses within 1km of each site.

3.23 Within 1km there is potential for the greatest percentage increase in housing around Dawlish Warren, where the number of houses could increase by 69% (Table 8). This potential increase is due to two development sites to the north of Dawlish and two existing permissions at Dawlish Warren (Shutterton Lane 63 houses and Shutterton Park 350 houses). Considering this increase within the context of housing out to 10km to the west of the estuary only, the additional 413 houses within 1km of Dawlish Warren represents a 2% increase. Comparing current housing with potential new housing within the 0-10km band of Dawlish Warren indicates that an increase of around 17% may occur.

3.24 Housing within 1km of the Exe estuary is set to increase by 20% as a proportion of existing housing within 1km (3,138 houses). This represents a 3% increase in the context of all housing out to 10km from the SPA boundary. Looking at all housing within 10km, there will be a 29% increase surrounding the Exe which includes the Cranbrook development.

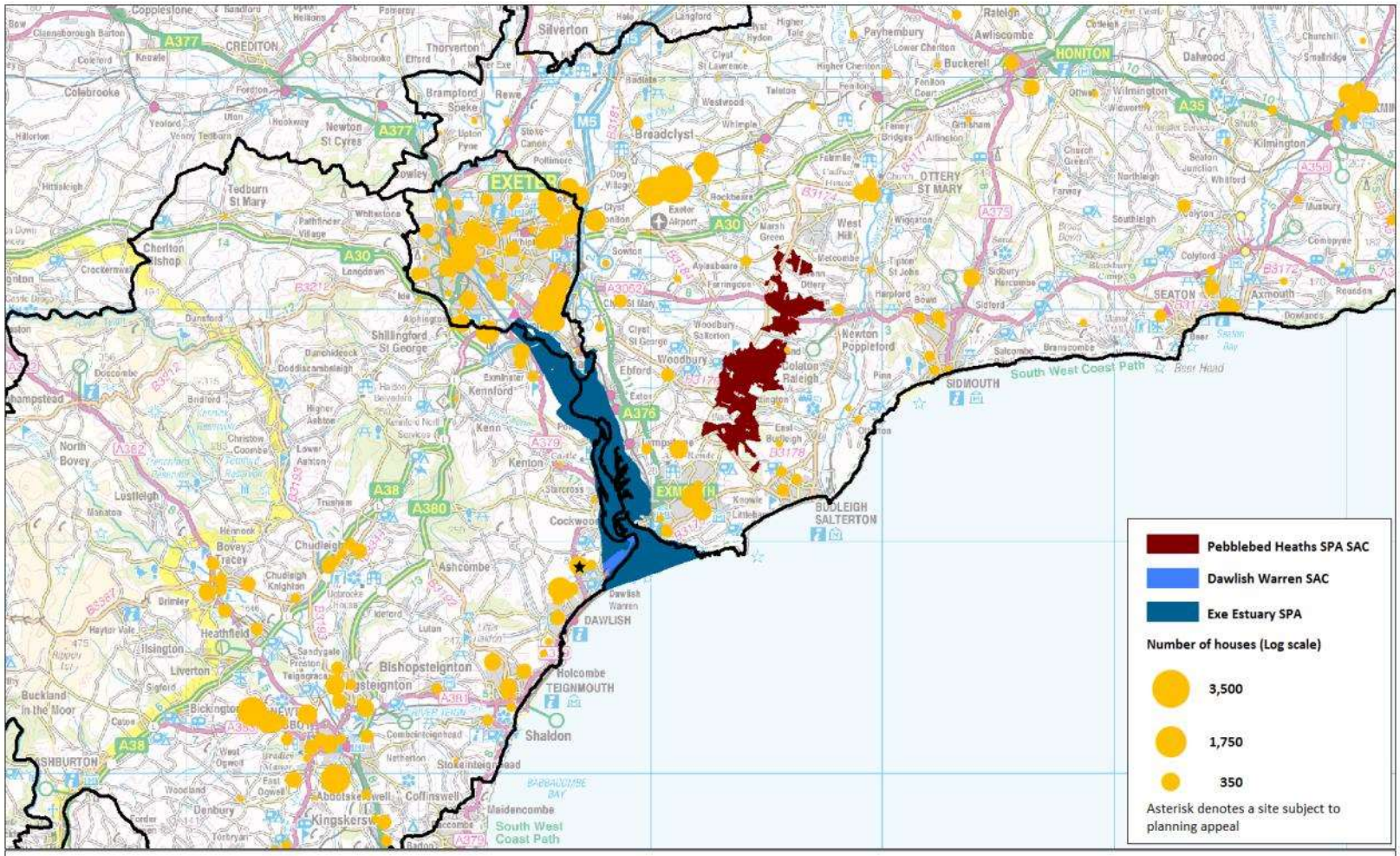
3.25 The lowest increases in housing will be seen around the Pebblebed Heaths with an increase of 8% (120 houses) within 1km. This amounts to 0.2% of the total existing housing within 10km from the heaths. Cranbrook is 3-5km from the Pebblebed Heaths and hence the proportional increase in housing increases noticeably with distance from the site, rising to 35% within 10km.

[9] http://www.bph-postcodes.co.uk/summary.cgi

Table 8: The current and new levels of housing and the percentage change between 0-1km, 0-3km, 0-5km and 0-10km from each European site.

								0-10km				
Exe Estuary SPA	15,395	42,748			3,138	11,376	19,055	28,785	20.38	26.61	24.78	29.04
Dawlish Warren SAC	601	5,522			413	1,898	1,944	3,286	68.72	34.37	25.46	16.54
Pebblebed Heaths SPA SAC	1,492	17,092			120	2,009	3,967	19,309	8.06	11.76	13.39	35.18

3.26 Future housing numbers around the three European sites for each distance band (not cumulative totals) are broken down by local authority in Figure 1 to Figure 3 (note that the scales are not the same). The area covered by the distance bands are shown in Maps 10 (in relation to the Exe Estuary), Map 11 (Dawlish Warren) and Map 12 (the Pebblebed Heaths). Figure 1 shows the contribution of additional housing and existing housing around the Exe which is at the heart of the study area and bounded by all three local authorities. Given that housing density is already relatively high around the Exe Estuary, the respective contributions form a moderate increase. Whilst all three local authorities have plans for significant building near the Exe Estuary, Exeter City is making the largest contribution to housing numbers within 6km of the estuary (Figure 1, Map 10). Within 2km of the estuary, Teignbridge housing predictions represent a notable proportion of the increase. Out to 6km Exeter allocations predominate. At 8km East Devon dominates the housing increase with the inclusion of Cranbrook. Beyond 12km, allocations within Teignbridge District are the highest.



Map 9: The scale and location of development proposals in the three adjacent local authority districts around the three European sites.

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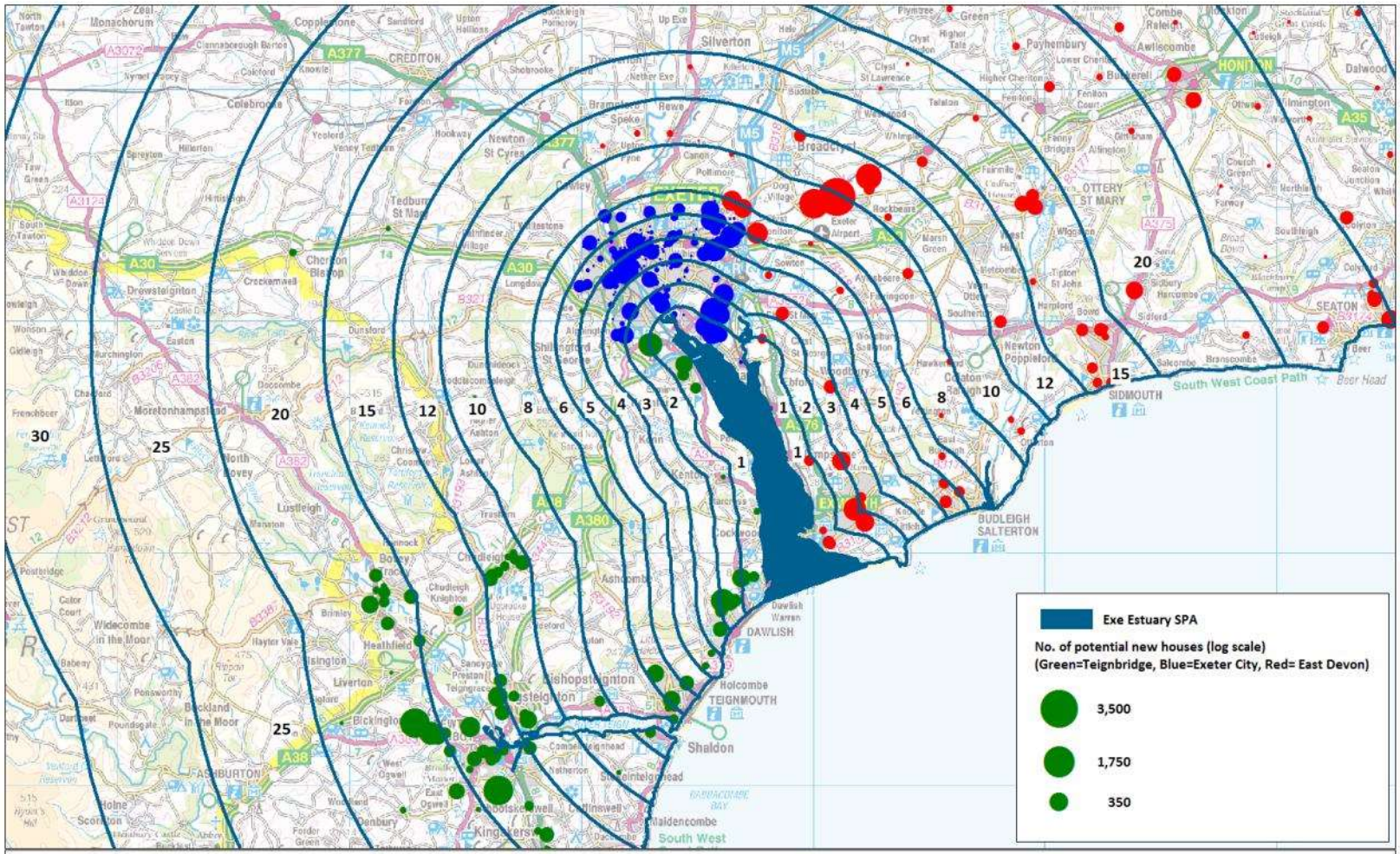

Map 10: The scale and location of development proposals in the three adjacent local authority districts around the Exe Estuary SPA with bands to show distances (km) from the site.

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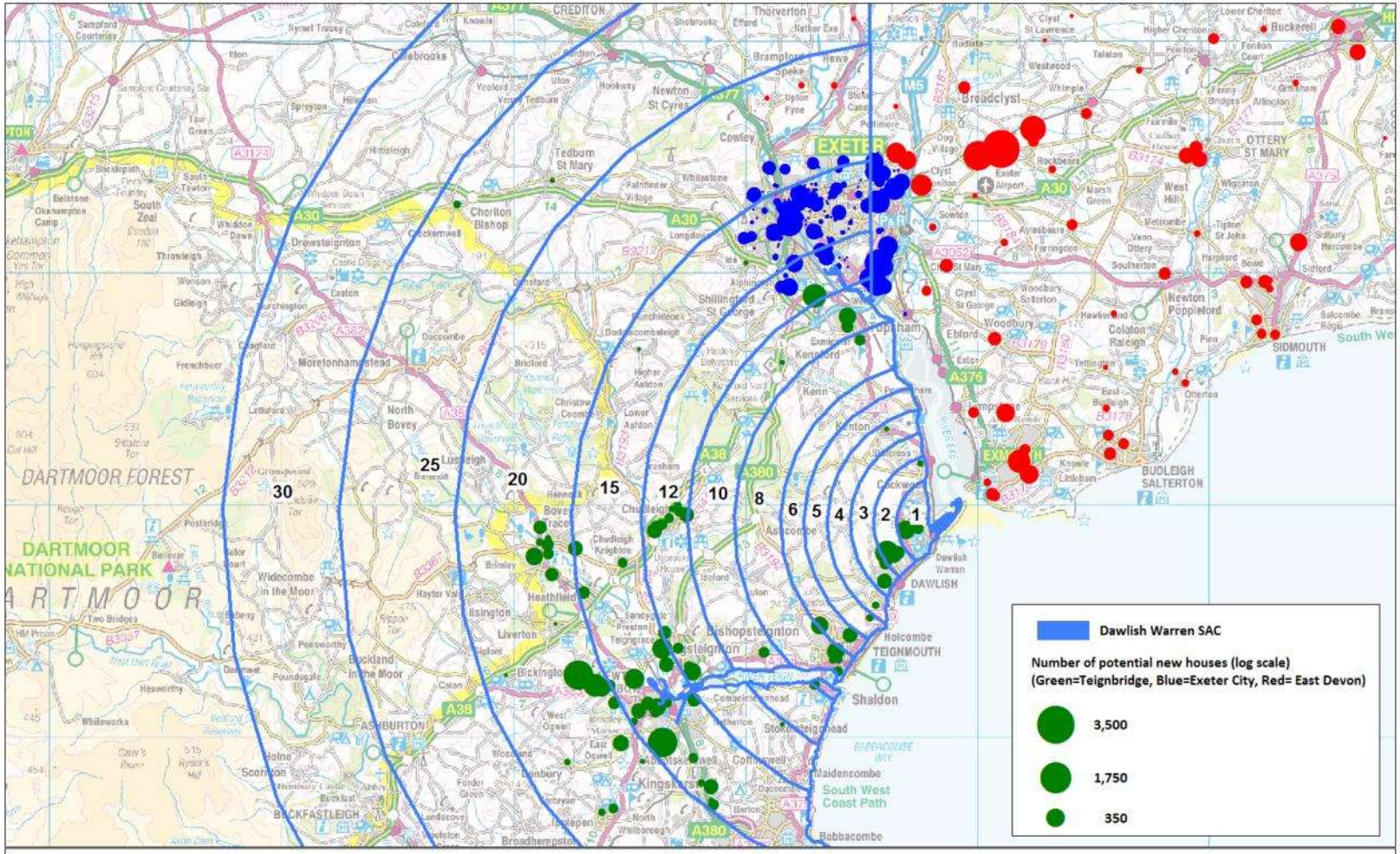

Map 11: The scale and location of development proposals in the three adjacent local authority districts around Dawlish Warren SAC with bands to show distances (km) from the site.

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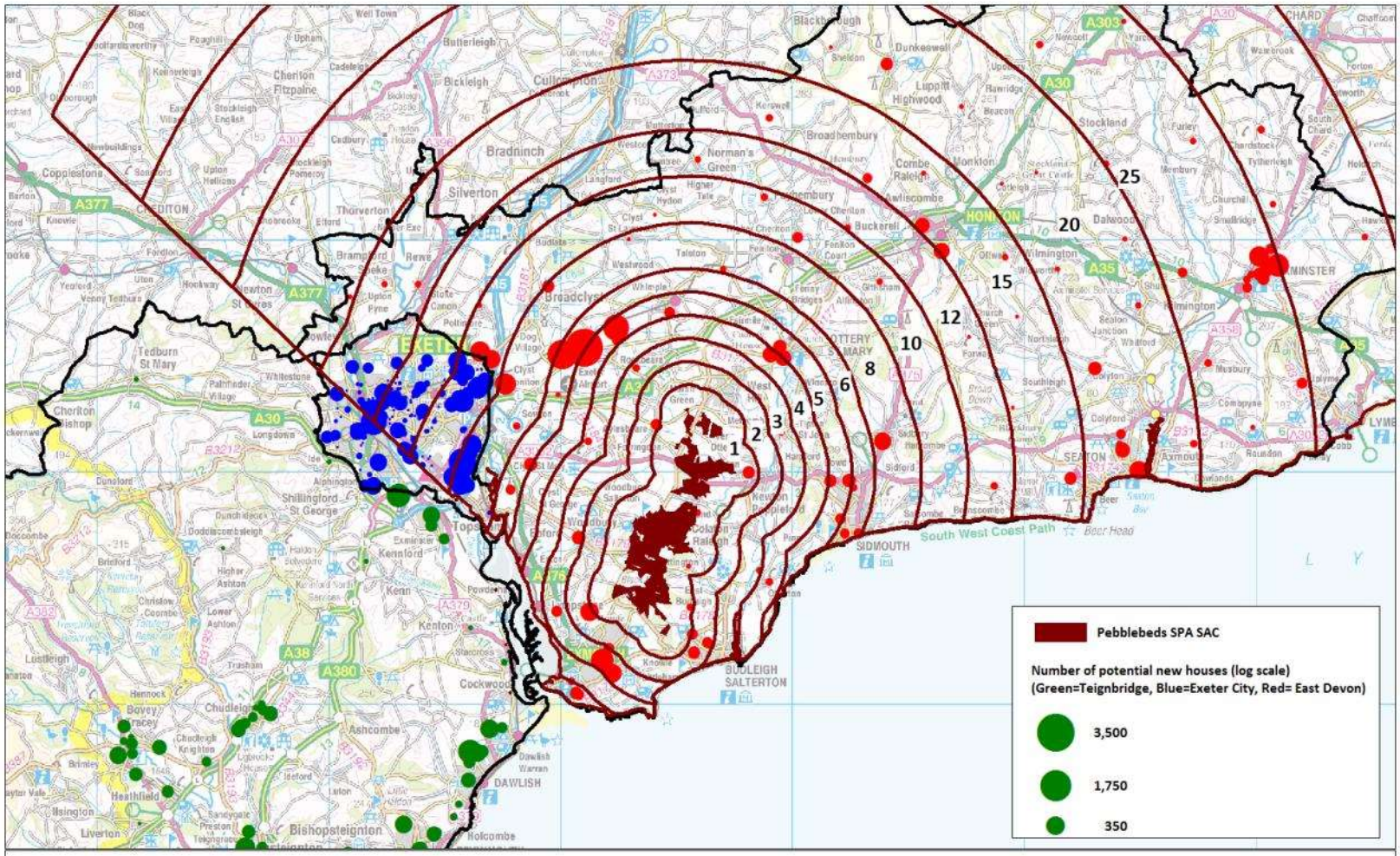

Map 12: The scale and location of development proposals in the three adjacent local authority districts around the Pebblebed Heaths SPA SAC with bands to show distances (km) from the site.

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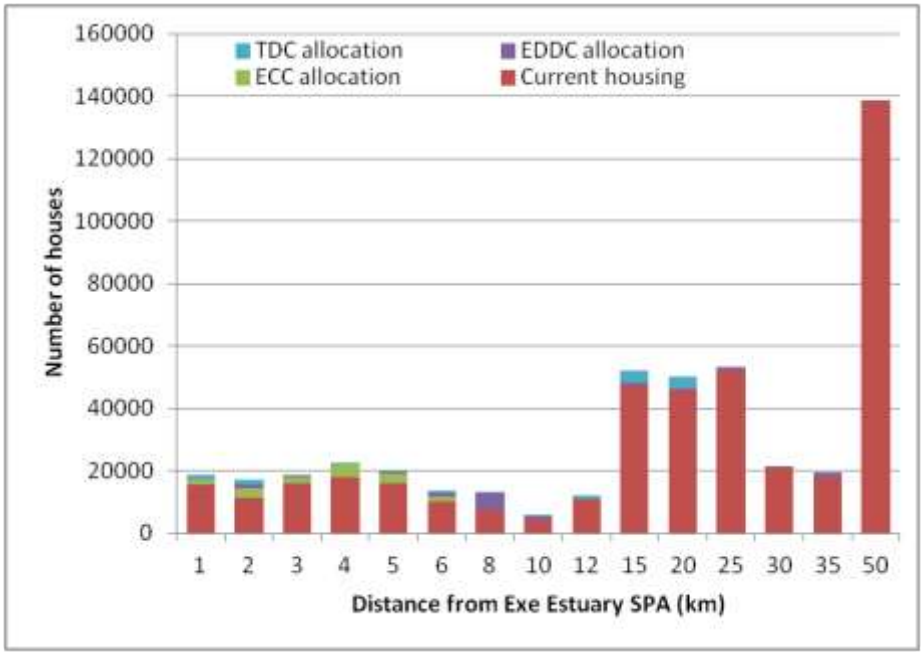


Figure 1: Current and future housing subdivided by the local authority allocation and shown by distance band from the Exe Estuary.

3.27 Housing levels around Dawlish Warren are low compared to the Exe Estuary even when considering that the area of land within 1km on the west of the estuary only is much smaller (Figure 2). Given that the distance bands are limited to the western side of the estuary, future housing falls entirely within Teignbridge District until 12km when Exeter City starts to contribute. East Devon allocations are included from 20km but numbers are less than 20 houses (Figure 2, Map 11). Whilst the level of housing within 1km of the Warren is low, the proportional increase is high with a 69% increase in housing and then a 59% increase within 2km.

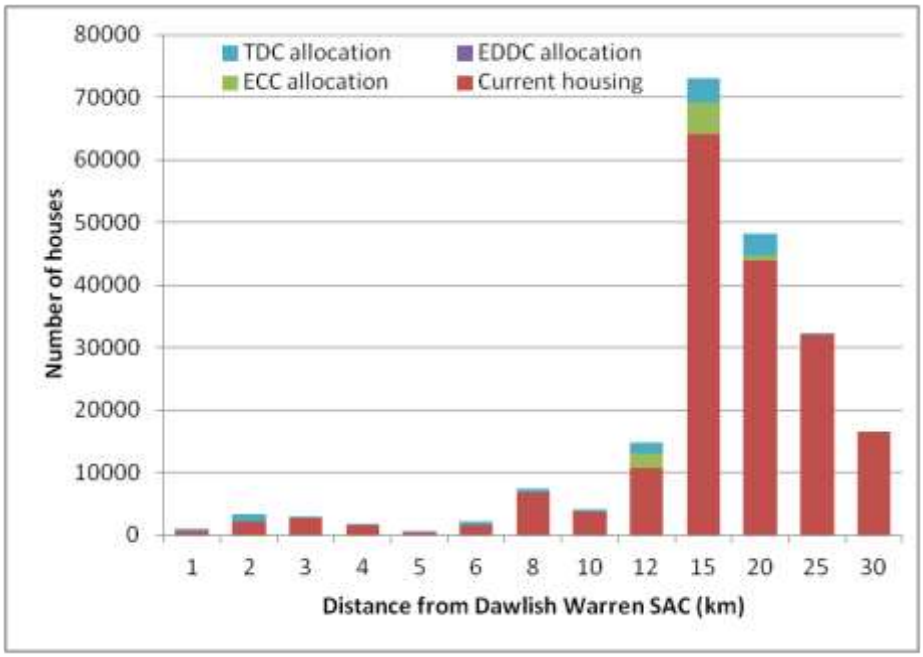


Figure 2: Current and future housing subdivided by the local authority allocation and shown by distance band from Dawlish Warren (on the western side of the Exe only).

3.28 Housing around the Pebblebed Heaths is the lowest in terms of both existing and future houses. Like Dawlish Warren, the distance bands are limited to the east of the estuary rather than all the way around to take into account travel times. On this basis, allocations within Teignbridge District are not considered. Within 6km of the heaths additional housing falls entirely within the East Devon District and the contribution from Exeter City starts at 8km (Figure 3, Map 12). The Cranbrook development increases the housing from 5km with the majority falling within 6km. It is important to note that allocation figures were provided as points rather than polygons so for large developments like Cranbrook the closest part of the development may actually be closer to the Pebblebed Heaths than the point/centroid provided[10].

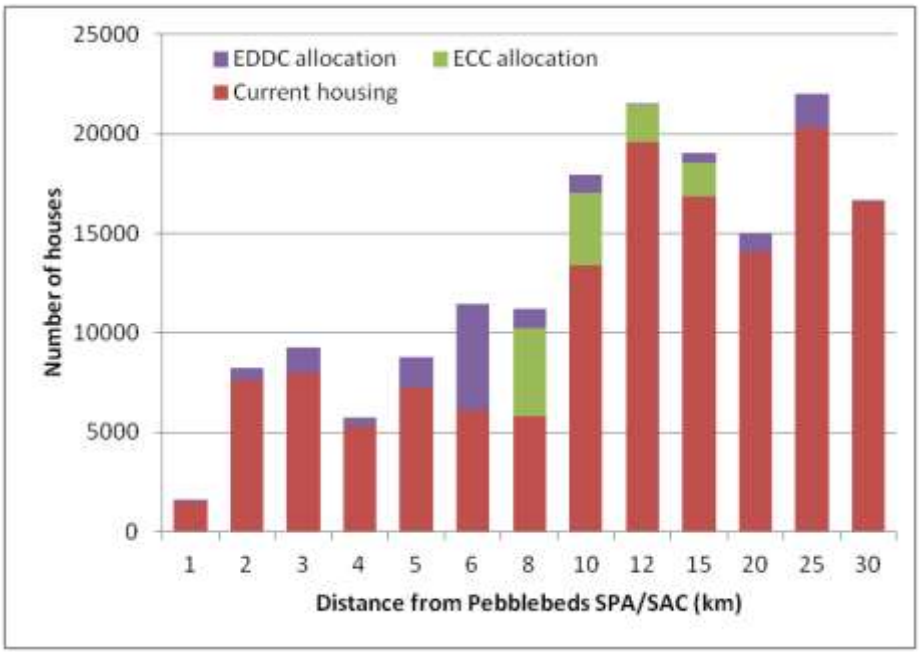


Figure 3: Current and future housing subdivided by the local authority allocation and shown by distance band from the Pebblebed Heaths (on the eastern side of the Exe only).

[10] As the crow flies the nearest point on the Pebblebeds SAC/SPA to the nearest part of the Cranbrook area is around 3.5km

Summary

- Exeter City Council allocates 12,000 homes positioned primarily at Monkerton/Hill Barton, Newcourt and south of Alphington. Within East Devon District the main focus of development is the 'west end' where a large proportion of the proposed 15,000 homes will be located – with a large proportion within the new settlement of Cranbrook. The Teignbridge local plan sets out 12,400 new homes with the focal areas being Newton Abbot and south west of Exeter, but also at other towns across the District including Teignmouth and Dawlish. The combined total for the three local authority plans is approximately 40,000 homes.

- The level of housing around the Exe Estuary is set to increase by 20% within 1km and 29% within 10km. Dawlish Warren has the lowest level of current housing, but the highest percentage increase in housing is planned closest to the site with a 68.7% increase within 1km and 38.7% within 3km (taking into account visits from residents living on the western side of the Exe only). The current level of housing around the Pebblebed Heaths and the planned level of future house building is relatively low. Within 1km of the heaths, the number of houses is set to increase by 8% rising to 11.8% within 3km and 13.4% within 5km. At 10km the percentage increase is 35.2% due to the inclusion of Cranbrook.

4. Recreational Use of the Three Sites and Implications of Development

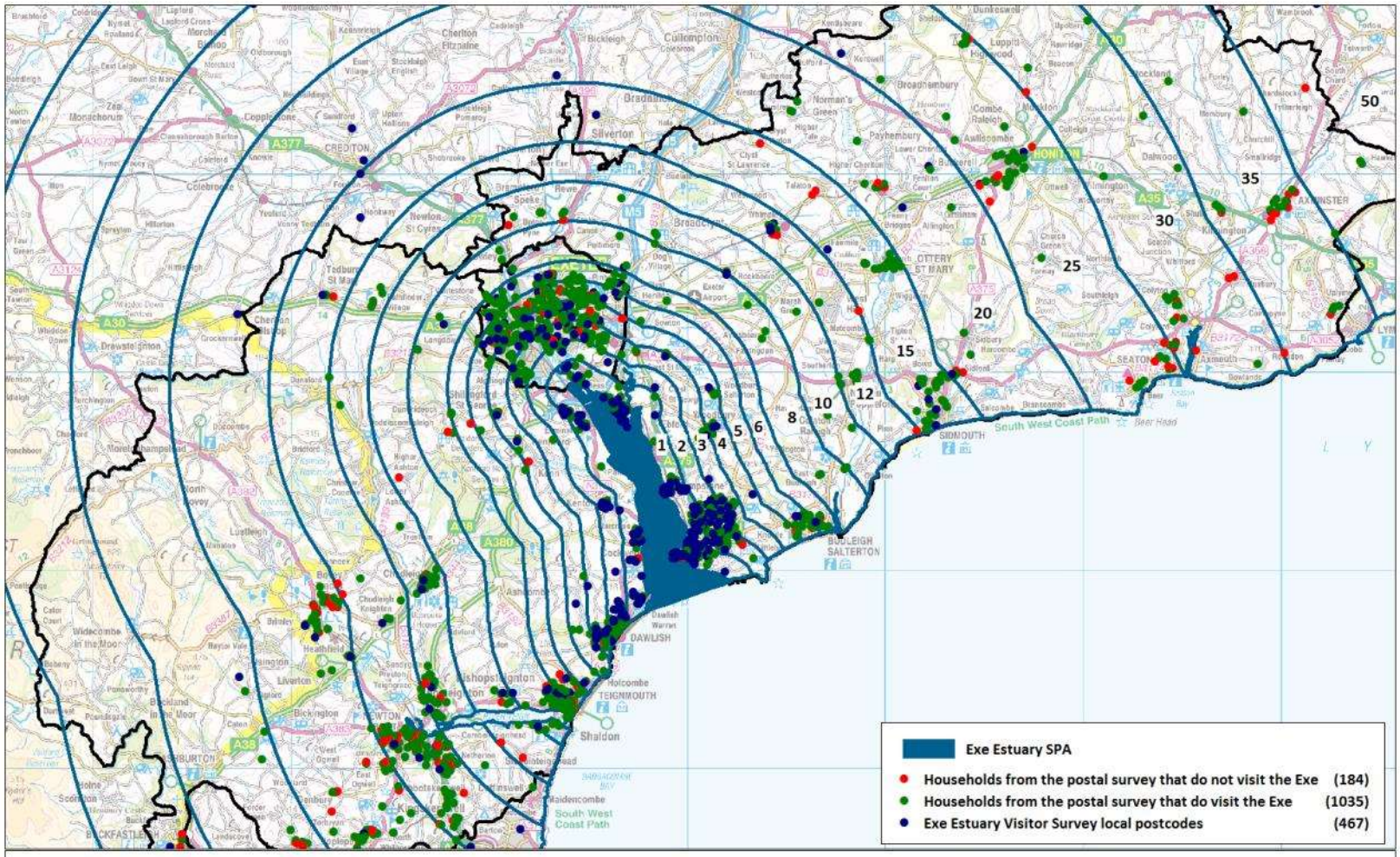
4.1 In this section we summarise information on current access patterns to the three sites. Taking the information we have on the planned levels and phasing of growth over the next 10 to 15 years (previous section), the European site evidence base gathered to date and our understanding of the way in which visitors use the European sites, this section attempts to make predictions of the likely increases in recreational pressure on the European sites.

Current access patterns to the three sites

4.2 Current access patterns for visitors to each of the European sites are described below. On-site visitor survey data were available for the Exe Estuary (including Dawlish Warren) (Liley, Fearnley, & Cruickshanks 2010) and the Pebblebeds Heaths (Ecology Solutions 2012). Data was collected on all three European sites as part of the household postal survey (Cruickshanks & Liley 2012)

Current access patterns on the Exe estuary

4.3 Current access information for the Exe Estuary is taken from the Devon Household Survey (Cruickshanks & Liley 2012) and the Exe on-site visitor survey conducted in 2010 (Liley *et al.* 2010b). The Exe on-site visitor survey focused on eight main sites: Dawlish Warren, Duck Pond, Exmouth Sea Front, Lympstone, Powderham, Starcross, Topsham and Turf. Using the home postcodes, interviewees were categorised as local residents if they gave a valid postcode within East Devon (183 interviews, 31%), Exeter (106 interviews, 18%) or Teignbridge Districts (113 interviews, 19%) (Map 13). Local residents accounted for 69% of the interviews. The remaining 184 interviews were with non-local day visitors that were travelling from outside the three local districts (76 interviews, 13%); tourists (48 interviews, 8%), those visiting friends/family (18 interviews, 3%) and then 'others' (42 interviews, 7%) who did not fall into any these categories (and includes those who were unable to give valid postcodes). In general East Devon residents tend to visit the eastern shore of the estuary and Teignbridge residents tend to visit the western shore. The survey location at Topsham falls within the Exeter district and it received the highest percentage of visitors from Exeter local residents.



Map 13: Visitor postcodes from the Exe Estuary on-site visitor survey and postcodes of respondents to the household postal survey as households who visit the Exe and do not visit the Exe with bands to show distances (km) from the site.

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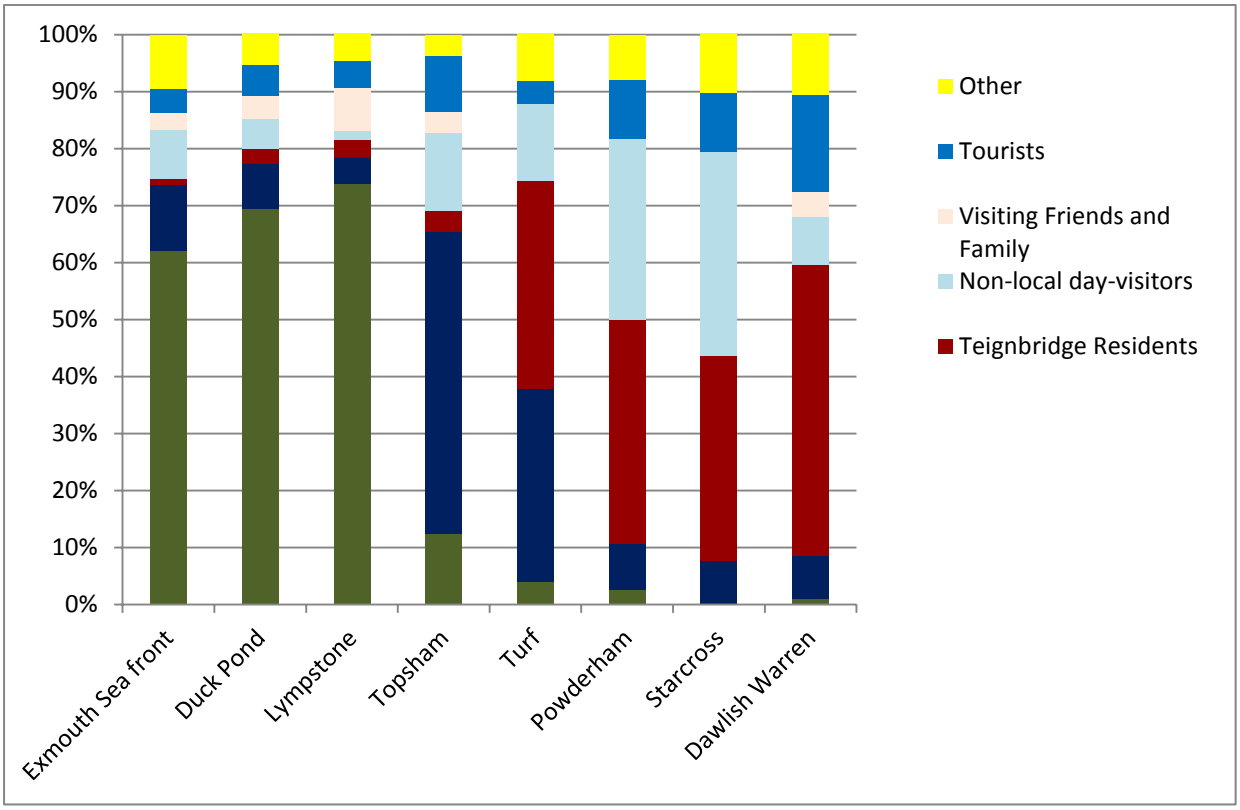


Figure 4: The survey locations visited by different user groups from the Exe visitor monitoring during winter 2009/2010.

4.4 The survey locations on the west side (Teignbridge) of the estuary tended to have a higher proportion of visitors who were categorised as 'non-local day trippers' and 'tourists' in comparison to the survey locations on the east side of the estuary. This suggests that either the locations of the west of the estuary are more popular with non-local day trippers and tourists or that such visitors tend to come from the west rather than the east.

4.5 Dog walking was the most popular activity with interviewees on the Exe (39% of people interviewed), and walking was also popular (38% of interviews). Other popular activities are boating, birdwatching, cycling, kitesurfing, family outings, windsurfing, fishing and jogging. A significantly higher proportion of Teignbridge and East Devon residents visit the Exe Estuary to walk their dog compared to Exeter residents (for which the most common activity is cycling). Exmouth Sea Front, the Duck Pond and Dawlish Warren are particularly popular with dog walkers (Figure 5). Considering specific settlements, the highest number of dog walkers visit from Exmouth; kitesurfers interviewed lived in Axminster, Exmouth, Exeter, Topsham and Teignmouth; cyclists predominantly came from Exeter; and walkers from Exmouth, Exeter and Topsham.

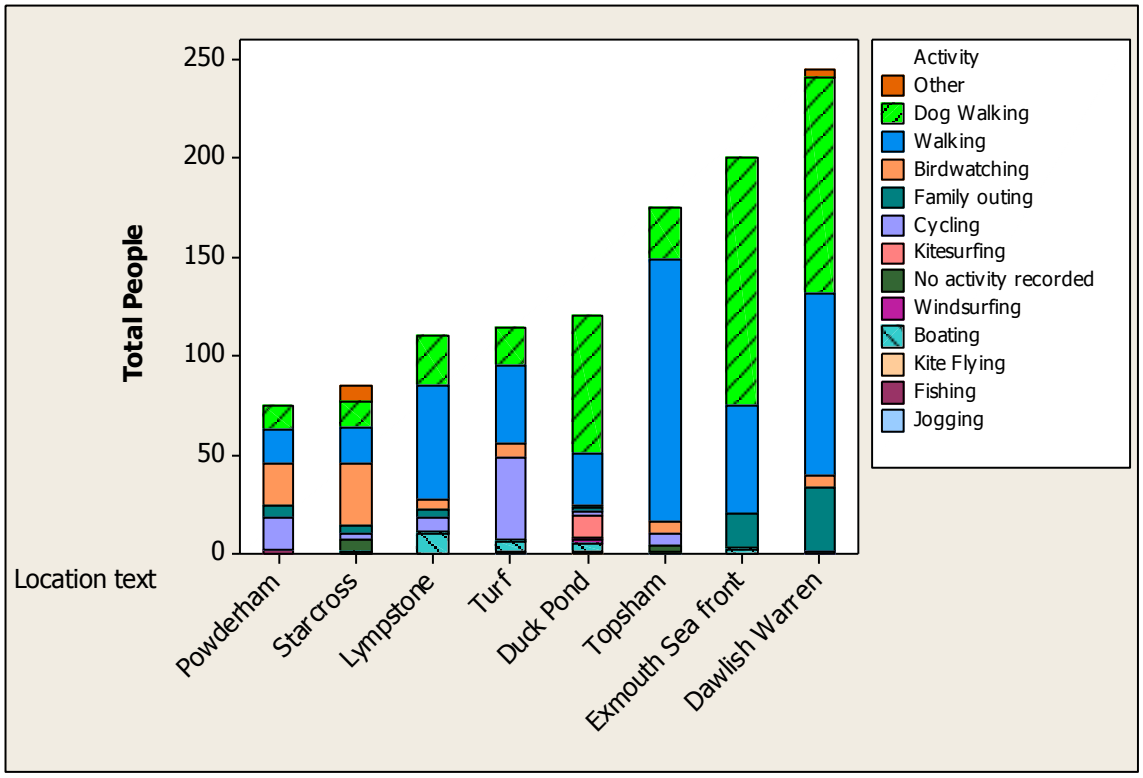


Figure 5: Total people at each site on the Exe (standard survey locations only), according to activity. 'Total people' is the sum of the group size for each of the interviewed groups.

4.6 Most visits to the Exe are short (74% less than 2 hours), with the length of visit varying significantly between activity types. Birdwatchers, windsurfers, kitesurfers, those boating and those fishing all tended to spend longest on site

4.7 Dog walkers in particular tended to visit on a daily basis, but those visiting for activities such as walking, cycling, kitesurfing and boating also tended to visit most days or at least multiple visits per week. Birdwatchers and those undertaking family outings were more likely to visit much more sporadically.

4.8 The household survey reported 67,662 visits per year made to the Exe Estuary by the respondents, 53% of which are undertaken by visitors from East Devon, 28% by Exeter City residents and 19% by Teignbridge residents (Map 13). When factoring in the number of responses to the questionnaire for each local authority area, East Devon has the highest mean visit number per household at 79.4 visits per year compared to 26 by Teignbridge residents and 55.3 visits by Exeter City residents.

4.9 The majority of visits to Dawlish Warren Nature Reserve and beach were undertaken by residents in the nearby Teignbridge area (contributing 64% of visits to the nature reserve) (Figure 6). Similarly due to proximity, most visits to locations around Exmouth (LNR/Duckpond, seafront, the Maer and Imperial Recreation Ground) were undertaken by East Devon residents. Most visits from Exeter residents were to 'Unspecified Exe location' constituting 44% of all visits to the Exe Estuary from Exeter residents.

4.10 The results from the household survey show that the majority of visits to the Exe Estuary were for walking (41% of annual visits to the whole estuary) followed by dog walking (14%) and then wildlife watching (13%). The most popular location for dog walking was the Maer (19% of annual visits to the Maer were made by dog walkers) followed by Dawlish Warren Beach (18% of annual visits made by dog walkers). This pattern is different to that reported in the on-site survey (39% dog walking and 38% walking) mainly because of the time of year of the surveys. Specifically the on-site survey took place in the winter when the seafront is heavily used by dog walkers and as such a higher proportion of dog walkers were interviewed. Furthermore the household survey asked respondents to comment on their use of outdoor spaces for the whole year which results in more responses on walking as it is perceived as more of an activity per se compared to dog walking which may also take place at the same time.

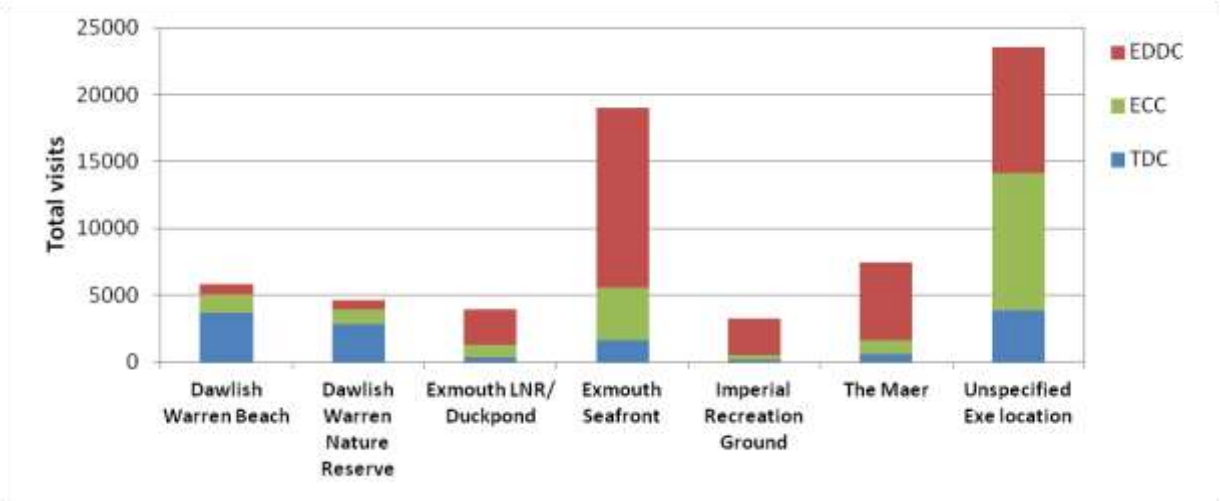


Figure 6: Number of visits to each location on the Exe by respondents from each local authority area.

4.11 Visitor rate curves for the Exe Estuary were generated as part of the on-site Exe Estuary Visitor Survey carried out in February /March 2010 and also from the household postal survey (September-November 2010) (Figure 7). The latter collected annual visit information from 1296 households spread across the three local authorities. Here we have presented the two curves on the same figure with different axes to demonstrate that the overall visit rates collected from the two studies were highly similar although the two curves are generated in slightly different ways. Specifically the on-site visitor survey visit rate represents the proportion of properties in each distance band which were interviewed during the survey period. This is a sample of visitors to the Exe Estuary during the winter and does not represent the visit rate across the whole year. The household postal survey visit rates are an estimate using the number of visits to sites scaled up from frequency categories (e.g. most days, most weeks).

4.12 Both visit rate curves show that residents living within 5km of the Exe Estuary tend to visit disproportionately more than residents which live greater distance away (Figure 7). For all activities and all modes of transport combined, visitor rates to the Exe Estuary decline sharply to 8km and then 'flatten off' at around 10-12km, although this distance is reduced to 5km for foot visitors (from the household data).

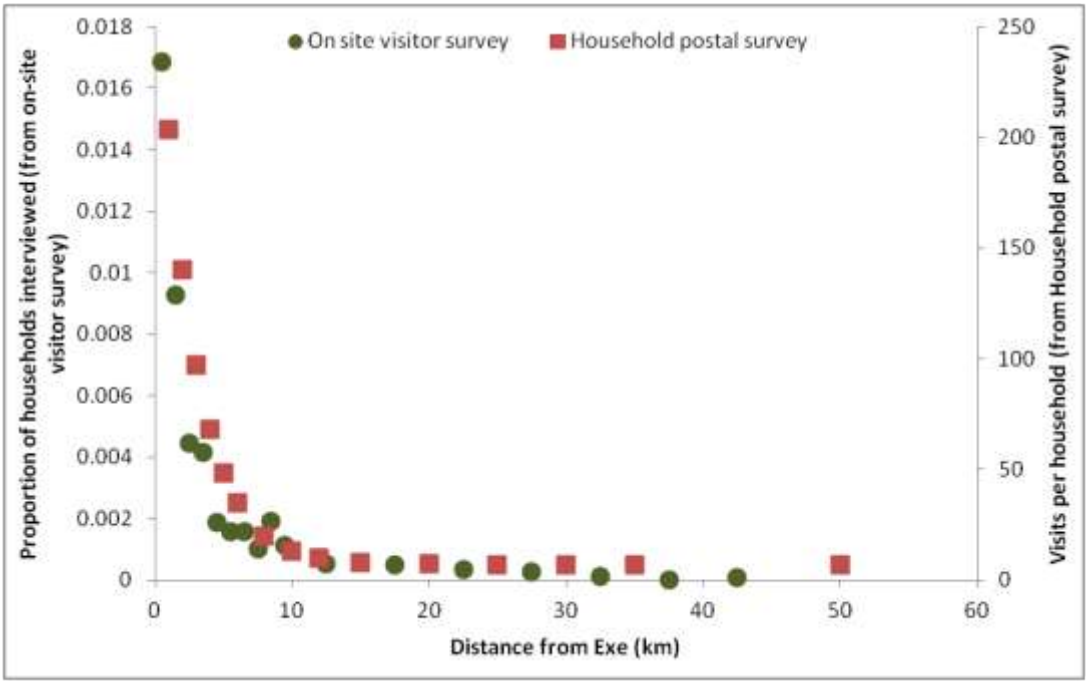


Figure 7: Visitor rates in relation to distance using data collected from the onsite Exe Estuary Visitor Survey and the household postal survey. On-site visitor rates expressed as number of interviews per residential property. Household postal survey visit rates expressed as the number of visits per respondent household.

Current access patterns at Dawlish Warren

4.13 Data on visitor patterns to Dawlish Warren comes from the Devon Household Survey (Cruickshanks & Liley 2012) and the Exe on-site visitor survey conducted in 2010 (Liley, Fearnley, & Cruickshanks 2010). Dawlish Warren was the busiest site in the on-site survey, with a total of 141 groups counted 'entering' the site during the 16 hours of observation. The median distance travelled to Dawlish Warren by visitors was 6.9km. About 50% of visitors had come from within Teignbridge District, while 20% were tourists staying in the area or staying with local friends and family, and 18% were non-local day visitors. Small numbers came from Exeter (7%) or East Devon (2%). The main activities at Dawlish warren were dog walking (54% of interviewees), walking (32%), family outing (7%) and wildlife watching (4%) (Figure 5 showing total number of people from group size data). Indeed, Dawlish Warren was one of the sites, alongside Exmouth Seafront and Duck Pond, where the most dog walkers were interviewed.

4.14 Results of the household postal survey showed that over 60% of visits to Dawlish Warren Nature Reserve and beach were made by Teignbridge District residents, about 25% by Exeter residents and only about 13% by East Devon residents. The household data also showed that Dawlish Warren is the site on the Exe with the highest proportion of car-borne visits. Most of the regular visitors (weekly or more) to Dawlish Warren Nature Reserve lived in Teignbridge District, and in the settlements relatively close to the site, for example in Teignmouth, Dawlish, Exminster and Kenton. There were four regular visitors who lived in Exeter and just one from East Devon (Exmouth). The site does however draw non-regular visitors from a wide area, including East Devon.

4.15 Combining Dawlish Warren Nature Reserve and Dawlish Warren beach, the main activities described by respondents to the household survey were walking (34%), wildlife watching

(19%) and dog walking (16%) (Table 9). At the nature reserve only, over a quarter (27%) of the annual visits made by postal survey respondents were for wildlife watching.

Table 9: Annual number of visits to each location at Dawlish Warren for each activity classified (% for each activity by location shown in brackets).

Activity	Dawlish Warren Beach		Dawlish Warren Nature Reserve		Total	
	Visits	Responses	Visits	Responses	Visits	Responses
Walking	3400 (33)	478	2493 (35)	352	5893 (34)	830
Dog walking	1859 (18)	97	912 (13)	45	2771 (16)	142
Wildlife watching	1342 (13)	113	1952 (27)	203	3294 (19)	316
Pub/cafe	1066 (10)	102	133 (2)	26	1199 (7)	128
Swim/paddle/sit/play on the beach	1091 (11)	147	445 (6)	28	1536 (9)	175
Bicycling	104 (1)	23	39 (1)	9	143 (1)	32
Amusements/kid's playground	693 (7)	60	74 (1)	8	767 (4)	68
Other	483 (5)	36	560 (8)	15	1043 (6)	51
Watersports	19 (0.2)	8	266 (4)	6	285 (2)	14
Fishing/bait collecting	333 (3)	10	256 (4)	3	589 (3)	13
Total	**10389**	**1074**	**7130**	**695**	**17519**	**1769**

4.16 Total estimates of annual visitors to Dawlish Warren have not been produced as part of the on-site survey although figures from the tourist resort on Dawlish Warren state that it receives around 480,000 visitors per year (SWT cited in TDC 2010), the majority of which are summer visitors, although year round tourism is thought to be increasing. Overall the figure is likely to be higher than this when including the nature reserve.

4.17 Visit rate curves (Figure 7) were generated from the household postal survey and like the Exe Estuary, these plots were derived by calculating the number of visits made by all respondents living within successive distance bands around the site (using a central point of the nature reserve as the location), and then dividing this number of visits by the number of respondents. Only data supplied by respondents on the west of the Exe Estuary (using a cut off line north from Countess Wear Bridge to Tiverton) were included as, when looking at visit rates by distance bands, the households to the east of the site will be included despite the fact that they would have to drive all the way around the Exe Estuary to reach Dawlish Warren or use the water taxi (summer only). This plot shows that for all visits (different activities and transport combined), the visitor rate drops off sharply to 31 visits per year at 5km and then flattens off to less than 7 visits per year around 11km indicating the relatively local pull of the site.

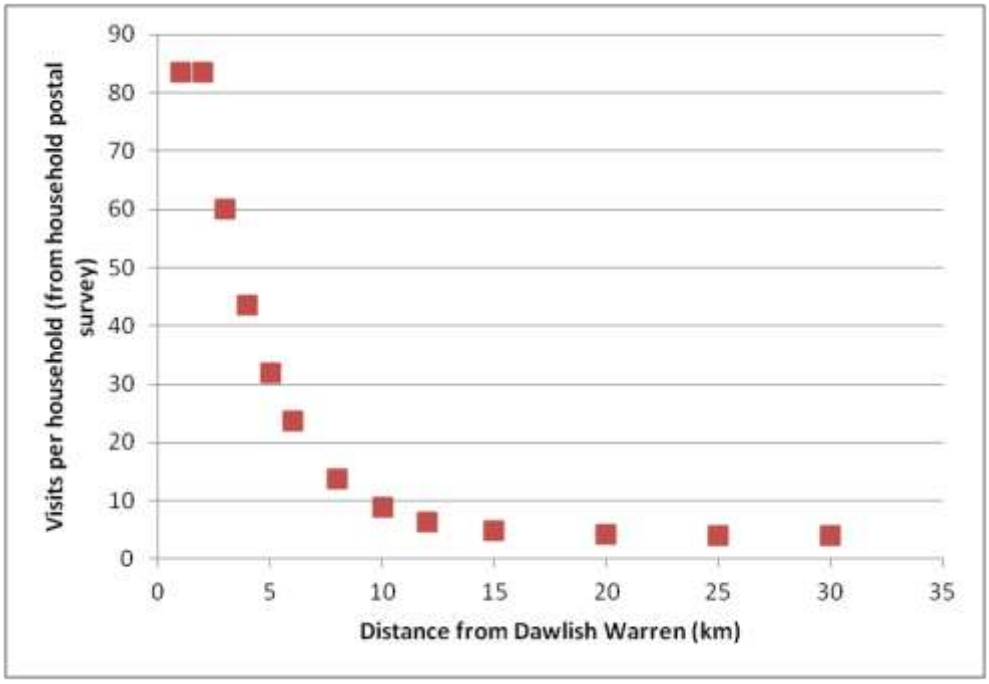


Figure 8: Visitor rates to Dawlish Warren in relation to distance using data collected from the household postal survey expressed as the number of visits per respondent household.

Current access patterns on the Pebblebed Heaths

4.18 Data on visitor patterns to the Pebblebed Heaths comes from the Devon Household Survey (Cruickshanks & Liley 2012) and an on-site visitor survey conducted in 2011 (Ecology Solutions 2012). The household postal survey data showed that most visits to the Pebblebed Heaths (83%) came from East Devon residents, with only 12% by Exeter residents and 5% by Teignbridge residents. There were differences between local authorities in the proportions of visits made to the different sites such that Exeter residents favour Lympstone Common, Colaton Raleigh and Woodbury whereas a higher than expected number of Teignbridge residents stated they visited Venn Ottery. When considering regular visitors to the Pebblebed Heaths they generally live in the surrounding settlements such as Ottery St. Mary, Sidmouth, Budleigh Salterton and Exmouth. Only six regular visitors to the Pebblebed Heaths responded to the survey from Exeter and no regular visitors responded from Teignbridge District. The majority (80%) of visits to the Pebblebed Heaths were made by car, with half of all car drivers living within a distance of 10.6km whereas visitors on foot accounted for only 10% of visits. Dog walking is the most popular activity and accounts for 40% of visits, followed by 34% for walking. Considering dog walking alone, 90% of dog walkers were from East Devon, nine percent were from Exeter city and two percent were from Teignbridge District.

4.19 The on-site survey was conducted between early June and late July 2011 at 11 access points onto the Pebblebed Heaths. The survey noted that there were 13 formal car parks with 296 spaces and 55 informal car parks and pull-ins with a total of 170 spaces, giving 466 car parking spaces in all. There were also a further 31 non-vehicular access points, giving 99 access points in all. The survey covered formal car parks with 123 spaces (42% of total) and informal car parking with 24 spaces (14% of total) so was weighted towards the formal car parks. Of those recorded, 93.4% of visitors arrived by car. A driven transect to count cars parked in all formal and informal car park was carried out 20 times. A total of

1052 vehicles were counted of which 740 (70%) were in the 13 formal car parks. The on-site survey revealed that the main origins of visitors were Exmouth (34%), Exeter (28%), Sidmouth (8%) and Budleigh Salterton (7%). Visitors from all other destinations were less than 2% of the total in each case. Nearly 70% of visitors came at least weekly and some 85% stayed between 1-3 hours. Visitors were attracted, *inter alia*, by the convenience to home, adequate car parking with no charges, the variety of footpaths, no restrictions on dogs and the natural environment of the area. Overall, the majority of visitors were visiting for dog-walking (67.2%) with 23.1% of respondents walking without a dog. All other activities (e.g. jogging / walking, bicycling, etc.) are undertaken at markedly lower levels. Cycling was carried out by 2.5% of respondents, nature study (wildlife watching) carried out by 2% and horse riding 0.5%.

4.20 The results of the onsite survey (Ecology Solutions 2012) estimated that there could be some 5300 visits per day (equivalent to around 1.9 million visits per annum) to the Pebblebed Heaths. This is probably an over-estimate but it does indicate a high level of visitor pressure at least equal to or higher than comparable sites, particularly the Thames Basin and Dorset heaths for which comprehensive mitigation plans are in place (Table 10) (Joint Strategic Partnership Board 2008; Borough of Poole *et al.* 2012).

Table 10: Visitor numbers across a range of different heathland sites. The annual visitor rate was divided by the number of days and the area of the site and the estimated visitors/ha/day relates only to time of year the site was open for visits.

Site	Yearly visitor rate (people per year)	Area (ha)	Visitors per ha per day	Notes / Source
Minsmere (RSPB)	90,000	935	0.26	Personal communication from RSPB at Minsmere (2012)
Arne (RSPB)	80,000	500	0.4	Lake, Liley, & White (2011)
New Forest National Park	13.3 million	30,000	1.2	Sharp et al (2008); area figure from http://www.newforestnpa.gov.uk/index/lookingafter/la-access/countryside_access.htm
Dorset Heaths	5 million	7,348	1.9	Liley *et al.*(2006b), see also Sharp et al (2008). Estimate includes coastal sites.
Thames Basin Heaths	7.5 million	8,906	2.3	7.5 million is crude estimate see Sharp et al (2008).
Pebblebed heaths	1.93 million	1120	4.7	Ecology Solutions (2012)

4.21 Visit rate curves Figure 8 were generated from the household postal survey and figures were generated as per Figure 7 and Figure 8 for the Exe Estuary and Dawlish Warren respectively. The visit rate drops sharply from over 160 annual visits within 1km to 35 per year at 5km and then starts to level off at less than 5 visits per year around 10km.

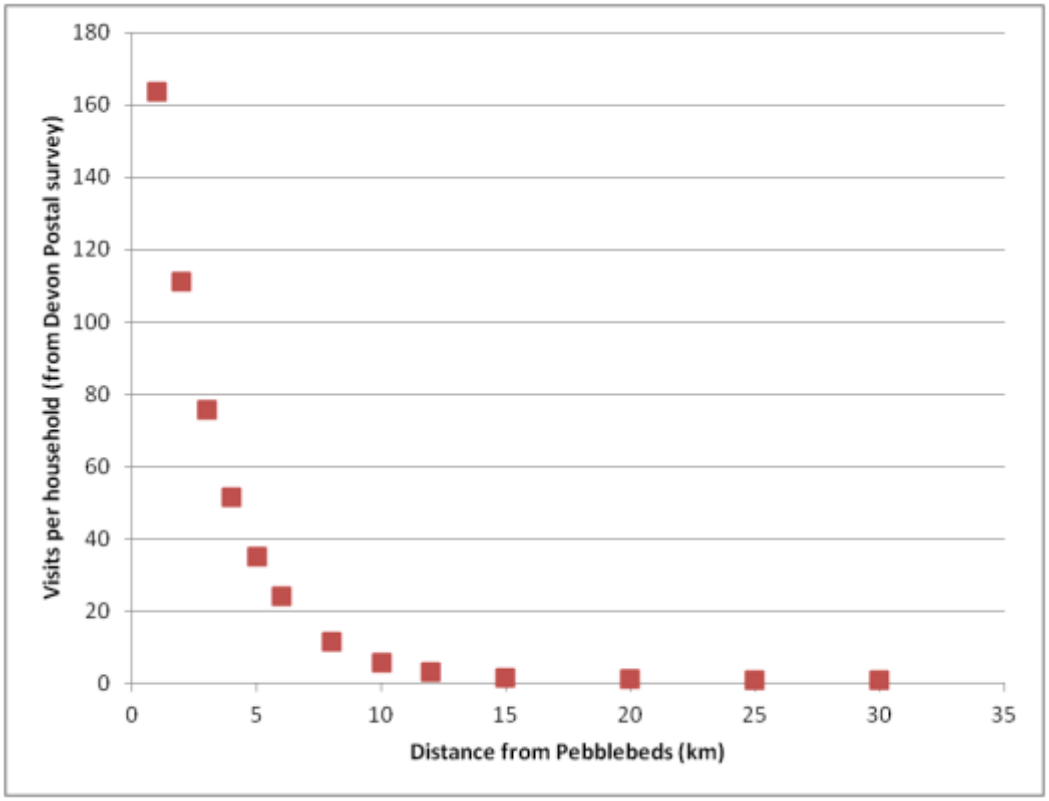


Figure 9: Visitor rates to the Pebblebed Heaths in relation to distance using data collected from the household postal survey expressed as the number of visits per respondent household.

Summary

Information on current access to the three European sites is described using results from on-site visitor surveys and the household postal survey.

- The Exe Estuary is a relatively small and very busy site surrounded by densely populated settlements. The estuary is a popular location for dog walking, walking, wildlife watching and a variety of watersports. The Exe Estuary is used extensively by local residents (69%) with people living within 1km visiting roughly every other day. The majority of regular dog walkers live in Exmouth and cycling is the most popular activity with Exeter residents due to the cycle path. The visitor rate curve generated from the household survey data shows that the visit rate declines sharply to 8km and flattens out around 10km.

- Dawlish Warren was the busiest location in the on-site survey and it attracts local visitors (50%) primarily from Teignbridge for walking, dog walking, family outings and wildlife watching. The site also attracts tourists and non-local day visitors (40%) resulting in a high level of car journeys. The visit rate of residents drops sharply to 5km and then starts to level off around 11km.

- The Pebblebed Heaths are used by local residents and the on-site survey revealed that 80% were local residents and the main origins of visitors were Exmouth (34%), Exeter (28%), Sidmouth (8%) and Budleigh Salterton (7%). Similarly the postal survey showed that 83% came from East Devon, 12% from Exeter and 5% from Teignbridge. The visit rate of residents drops sharply to 5km and then starts to level off around 10km. The on-site survey showed that there could be around 1.9 million annual visits which is considered high when compared with similar heathland sites where comprehensive mitigation plans have been drawn up.

Future access patterns as a result of new housing

4.22 Changes in access patterns at the three European sites have been predicted using housing data and visit rates described in the previous section. Table 11 provides the housing figures between 0-1km, 0-3km, 0-5km and 0-10km of each of the three European sites. These figures are based on postcode delivery point data (PostZon© 2011[11]). The number of additional houses which will be built within these distance bands is also provided based on the housing projection data (including allocations) from each local authority. The household visit rates are estimated from the household postal survey (Cruickshanks & Liley 2012). The number of additional visits based on new housing and the percentage increase is also shown for each European site. The percentage change describes the increase in households and visits within the specific distance band i.e. 120 new houses within 1km of the Pebblebed Heaths represents an 8 % increase in visitors from within 1km. The percentage change in the number of households and visitors from 1km is shown as a percentage of all households and visitors from within 10km.

4.23 The number of household visits has been determined from the visitor rate curves generated in the household postal survey report (Cruickshanks & Liley 2012). Visit rates at different distances from the European sites were estimated from the description of visits provided by the respondents. Respondents were asked how frequently they visited different locations within the European sites and these were converted to numbers of visits per year such that 'most days'=250 visits, 'most weeks'=40, 'most months'=12,'a few times per year or less'=4. The total number of visits to each European site was then divided by the total number of respondents (those who visit and also do not visit the site) to determine the average household visit rate per distance band. An exponential visit rate curve was then manually fitted to the data to maximise R^2 (i.e. the fit).

4.24 Scaling up the frequencies across all households by distance bands is limited in accuracy by a number of factors. Firstly the accuracy of the estimate relies on people's memory recall of how often they visit different sites for different activities. Secondly the accuracy of the estimates of the number of visits per year is reliant on the sample of household respondents being representative in their activities of the whole population. Therefore those responding could actually be people who take a greater interest in the countryside, visit it more and therefore are more likely to fill the questionnaire in. However a high percentage of respondents said they did not visit the countryside at all. Furthermore the scaling up of annual visits to all new houses assumes that the new housing composition (flats, bungalows, detached homes) and the behaviours of people living in different houses is the same as the sample which responded to the household survey.

4.25 It is important to note that the predictions for visits generated from the household survey data provide information on local residents rather than holiday tourists and day visitors. From the on-site surveys, non-residents i.e. visiting on a day trip, visiting friends or on

[11] http://www.bph-postcodes.co.uk/summary.cgi

holiday made up 31% of visitors to the Exe Estuary overall (based on a survey in February-March). On the Pebblebed Heaths, people living outside of the three local authority districts make up less than 20% of visitors based on the on-site survey which took place in May-August 2011.

Future access to the Exe estuary

4.26 The visit rate prediction curve shown in Figure 7 estimates that, based on current houses, there are 8.8 million annual visits to the Exe Estuary from residents within 10km. The visit rate figure of 203 household visits per year within 1km was calculated for the estuary. This implies that households within 1km visit the Exe Estuary roughly every other day throughout the year. Scaling this figure up across all 15,395 homes within 1km gives a total of 3.1 million annual household visits to the estuary from residents within 1km rising to 3.8 million with the addition of 3,138 new houses within 1km. Given the 20% increase in housing planned for the area out to 1km around the Exe Estuary, there will be a 20.7% increase in household visits. The highest level of increase in the number of visits is within 3km and also 10km where a 27% increase in total visits is predicted.

Future access to Dawlish Warren

4.27 The visit rate curves predict that Dawlish Warren receives around 650,000 annual visits from residents within 10km on the western side of the estuary alone (Table 11). The visit rate curve for all visits to Dawlish Warren assigns 83.45 visits per household within 1km and 2km. This estimate is 64% lower than the equivalent estimate for the Exe Estuary. The same figure of 83.45 visits per year is applied to 1km and 2km as very few postal survey responses were received from residents within 1km and therefore the sample size is low. The drop off in the level of future housing is slightly faster than the visit rate such that within 1km the housing increase and visit rate increase is the same whereas at 5km the housing increase is only 25.46% and the increase in visits is still 32.12% (Table 11).

Future access to the Pebblebeds

4.28 The predicted increase in visits is the lowest around the Pebblebed Heaths, as the level of current and future housing is the smallest out of the three sites. Within 1km of the heaths, the average household makes 163.5 visits per year, which is almost double the rate predicted for Dawlish Warren and only 30% lower than local residents adjacent to the Exe Estuary.

4.29 From the predicted visit rate curves, currently the Pebblebed Heaths attract 2.4 million visits per year from within 10km of the site. As the percentage increase in housing rises sharply with distance from the heaths from 8.06% within 1km to 35.16% within 10km, the visit rate rises more gradually to 19.41% within 10km due to the relatively local pull of the site compared to the Exe Estuary (Table 11).

Access rates by settlement

4.30 Visit rate figures per settlement are provided in Table 12 excluding Exeter.

Table 11: The current and new levels of housing and household visits and the percentage change between 0-1km, 0-3km, 0-5km and 0-10km from each European site.

HOUSING	Current Housing				Potential New Housing				% increase			
Site	**0-1km**	**0-3km**	**0-5km**	**0-10km**	**0-1km**	**0-3km**	**0-5km**	**0-10km**	**0-1km**	**0-3km**	**0-5km**	**0-10km**
Exe Estuary SPA	15,395	42,748	7,906	99,107	3138	11,376	19,055	28,785	20.38	26.61	24.78	29.04
Dawlish Warren SAC	601	5,522	7,636	19,866	413	1,898	1,944	3286	68.72	34.37	25.46	16.54
Pebblebed Heaths SPA SAC	1,492	17,092	29,619	54,895	120	2009	3,967	19,309	8.06	11.76	13.39	35.18
VISITS	**Current household visits per year**				**New/additional household visits per year**				**% increase**			
Site	**0-1km**	**0-3km**	**0-5km**	**0-10km**	**0-1km**	**0-3km**	**0-5km**	**0-10km**	**0-1km**	**0-3km**	**0-5km**	**0-10km**
Exe Estuary SPA	3,130,519	6,269,231	8,273,198	8,838,541	647,264	1,697,856	2,152,367	2,385,725	20.68	27.08	26.02	26.99
Dawlish Warren SAC	50,156	395,860	482,564	648,378	34,466	153,256	155,022	175,593	68.72	38.71	32.12	27.08
Pebblebed Heaths SPA SAC	165,638	1,613,169	2,139,581	2,432,653	13,344	177,625	253,443	472,119	8.06	11.01	11.85	19.41

Table 12: The visit rate for residents of each settlement was derived by calculating the average distance from the centroid of each settlement to each location within a site or the centroid of the site where a specific location is not provided. These distances were then inputted into the visit rate equations to estimate a visit rate which is multiplied by the number of delivery points to determine the total number of visits per settlement. Exeter is excluded as a measurement from the centre to each site would be inaccurate due to the size of the city.

Settlement name	Visit rate per household (per year)		
	Exe	Dawlish Warren	Pebblebeds
Abbotskerswell	7	17	1
Axminster	7	37	1
Bishopsteignton	10	10	1
Bovey Tracey	7	17	1
Broadclyst	8	17	4
Buckfastleigh	7	28	1
Budleigh Salterton	26	8	28
Chudleigh	9	12	1
Clyst Honiton	9	14	10
Clyst St Mary	12	11	10
Coldeast	7	17	1
Colyford	7	29	1
Colyton	7	30	1
Dawlish	47	3	2
Dawlish Warren	99	1	4
East Budleigh	18	10	48
Exminster	17	9	4
Exmouth	107	4	19
Exton	32	7	15
Feniton	43	23	17
Heathfield/Bovey Heath	7	5	3
Highwood	7	31	1
Holcombe	26	28	2
Honiton	7	27	1
Ide	9	14	2
Ipplepen	7	20	1
Kennford	14	10	2
Kenton	62	5	6
Kilmington	7	34	1
Kingskerswell	7	16	1
Kingsteignton	8	13	1
Lympstone	76	5	19
Newton Abbot	7	15	1
Newton Poppleford	9	14	43
Ottery St.Mary	7	19	7
Raymond'sHill	7	38	1
Seaton	7	28	1
Shaldon	10	10	1
Sidbury	7	20	6
Sidmouth	8	17	11
Starcross	107	3	7
Stoke Canon	7	19	2
Tedburn St Mary	7	22	1
Teignmouth	16	7	1
Topsham	19	9	8
West Hill	8	16	20
Whimple	7	19	6
Woodbury	28	8	42

Summary

Changes in access patterns at the three European sites have been predicted using housing data and visit rates. Our estimates of visitor numbers are made using the household survey data and relate to local housing only (for example the estimates of visit numbers and change at Dawlish Warren does not take into account holiday makers).

- Based on the current level of housing, there are 8.8 million visits per year to the Exe Estuary from residents within 10km. This is predicted to increase by 2.4 million (27%) as a result of new housing within 10km.
- The visit rate curves predict that currently Dawlish Warren receives around 650,000 visits per year from residents within 10km on the western side of the estuary alone. Considering the 16% increase in housing out to 10km, an additional 175,500 new visits per year could be seen (27% increase in access).
- Based on existing housing, the Pebblebed Heaths attract 2.4 million visits per year within 10km of the site. The anticipated change in the level of housing (35% increase) is predicted to be linked to a 19% change in access, i.e. 470,000 additional visits.

5. Mitigation: Context, Overview and Principles

5.1 The previous sections of this report explore the European site interest, their current environmental baseline and sensitivities, evidence of anthropogenic impacts and calculations of predicted increases in recreational pressure arising from proposed new housing levels for the coming Local Plan period. This section now begins to consider the mitigation requirements by taking an overview of the context in which mitigation is to be applied, and the principles it should adhere to in order to be consistent with the European site legislation and Government planning policy. The types of mitigation that could be applied are introduced, before they are considered in more detail in later sections.

Mitigation context

5.2 The Exe Estuary is predicted to attract significant increases in recreational visits, with Dawlish Warren less so but still having notable increases predicted. The Exe Estuary is subjected to a complex range of uses, and bird interest features are similarly subjected to a complexity of impacts, on and off site, natural and anthropogenic, with population cycles that are still not fully understood. Dawlish Warren is a much smaller site, where a fragile balance between low level disturbance of the dunes and over-use causing habitat damage is difficult to quantify, and even more difficult to achieve. In addition issues at Dawlish Warren are complicated because the site overlaps with the Exe Estuary SPA and Ramsar site and there are bird disturbance issues at the site too. In many ways the Exe Estuary SPA/Ramsar and Dawlish Warren SAC issues need to be considered together rather than as separate sites. Both sites have an added threat of sea level change looming in the coming years, and strategies for their protection, and where necessary restoration, cannot be finalised without factoring in the potentially significant habitat changes, movement and losses that may occur.

5.3 The Pebblebed Heaths SPA/SAC are likely to see an increase in more localised recreational use, and use of the site to meet daily greenspace needs. Against this background, measures will be needed in any event to manage the habitats to aid their restoration to a favourable condition, an objective which needs to be the key focus of any strategy for this site.

5.4 It is apparent therefore that in some ways the three sites have generic needs to secure their protection and future ecological integrity, but in other ways the three are very individual in their needs and potential future impacts, both development and non-development related.

5.5 Changes in recreational use, and the consequential impacts on the European sites in the absence of mitigation, will be gradual. A slow change in numbers over time will occur, and it is therefore difficult to pinpoint specific mitigation needs in response to particular numbers of houses. The overall objective of this and all other mitigation strategies in place to deal with recreational impacts is to ensure that whilst the population increases within the catchment of the European sites, the pressure and disturbance levels on the European sites does not increase. This does not necessarily mean that the levels of access should not increase, as people are visiting the countryside more (e.g. TNS Research

International 2011) and therefore even if the population size was to remain constant, an increase in access levels over time might be expected. Whilst some measures will seek to attract recreational pressure away from the European sites, other measures will seek to appropriately manage recreation on the sites, to minimise potential harm to European site interest features. The mitigation strategy needs to be both robust enough and flexible enough to address the gradual increase in recreational pressure over time, and on-going review of both the emerging growth and the strategy in place will therefore be necessary.

Defining potential effects and meeting legislative requirements

5.6 Before going into the detail of any potential mitigation requirements, it is worth reconsidering the reasoning behind the provision of mitigation, and what may trigger a mitigation need, as this sets the context of the mitigation package proposed, and reiterates the overriding principles of the establishment, maintenance, restoration and protection of a European site network.

5.7 As described earlier in this report, European wildlife sites are afforded the highest levels of protection from harm, and a step by step process is undertaken to assess potential impacts that may occur from a proposed project or emerging plan. Defining potential impacts and making sound decisions relating to when a plan or project is likely to have a significant effect, whether there will be an adverse effect on site integrity and the need to take a precautionary approach whilst not being unjustifiably over precautionary, is a challenging and sometimes very difficult task for both a competent authority and those assisting or advising them. These decisions are important not only because they relate to the highest level of wildlife protection, but also because the conclusions may ultimately determine whether a plan or project should proceed or not. Whilst similarities can be drawn, and principles established from previous cases for European sites in different locations, each new case must be considered individually, as each displays a unique set of available evidence, influencing factors and complex ecological and non-ecological interactions.

5.8 It is particularly difficult to arrive at such definitions and make such decisions when the site in question is an SPA with complex use patterns by the species of interest, such as within an estuary. SPA interest features are birds, which are highly mobile in any habitat, but when considering the use of estuaries by overwintering and passage birds it can be extremely difficult to fully understand the use of the habitat and the reasons for any changes in that use. Birds will favour different parts of an estuary at different times, will switch their use to different estuaries, undergo population peaks and troughs, and be influenced by factors that may even occur in a different country. The dynamic nature of estuaries, with sediment, prey and tide changing over time often means that birds will move considerable distances and the complex factors influencing behavioural decisions mean it can be difficult to predict bird numbers at particular locations.

5.9 Recreational disturbance has the potential to affect estuarine birds in a range of different ways, for example:

- Physiological impacts, such as increased stress

- Redistribution of birds within the estuary, in response to the presence of people. Redistribution can be short-term – response to individual disturbance events – or more chronic, with birds simply avoiding using otherwise suitable habitat
- Reduced intake rate of food as a response to disturbance, and birds having to feed in areas with poorer available food resources
- Increased energy expenditure as a result of birds reacting to disturbance by flying to different areas to feed and being flushed while feeding and roosting. Disturbance may also increase stress levels/heart rate etc, which may also have consequences for energy expenditure

5.10 On a single site, localised disturbance in a small part of the site for a small amount of time is unlikely to result in a likely significant effect, as birds are highly mobile, and on a large site there will be nearby options where birds can feed. Switching to such locations within an estuary might take seconds, and the impact from a single brief event will therefore be negligible.

5.11 However, more chronic disturbance, regularly affecting larger parts of sites, will have more serious effects. Notably, disturbance can be considered as similar to habitat loss (Sutherland 1996) or even worse because the flushing has energetic costs that would not be incurred if the habitat was simply not available to the birds at all (West *et al.* 2002). Thinking of disturbance purely in terms of habitat loss, it follows that if the area available to the birds is reduced, birds are forced to redistribute and it is possible they will end up feeding in locations with reduced amounts of food and possibly more competition and interference from other birds due to the reduced amount of space. They may also be forced to forage in areas which are more exposed to the weather, where they are at greater risk from predators, or where they are further from roost sites. The ability of the site to support a given number of birds is therefore compromised.

5.12 The impact of disturbance is not easy to quantify when increased mortality is not yet apparent or a marked drop in numbers (that can be linked directly to disturbance) recorded. Of course, individual birds may well be able to compensate by modifying their behaviour (Swennen, Leopold, & Bruijn 1989), for example feeding for longer (Urfi, Goss-Custard, & Lev. Dit Durell 1996), feeding at night (Burger & Gochfeld 1991; McNeil, Drapeau, & Goss-Custard 1992) or temporarily switching to other estuaries/sites. In such cases the birds may still survive, but with increased pressure put on the system it is likely to be more vulnerable in the long-term, and the 'slack' in the system greatly reduced. There is evidence that bird breeding success and migration patterns are linked to the quality of the wintering sites (Gill *et al.* 2001) so gradual deterioration on wintering sites might link to reduced breeding success, or even to reduced numbers of birds able to migrate back to the breeding grounds at the end of each winter. Such changes will only be apparent over long time periods and may not necessarily be apparent at all if other factors are also suppressing bird numbers at a particular site. Changes in disturbance levels as a result of new housing will be gradual, and there is unlikely to be any sudden influx of visitors at a given moment in time. A gradual and progressive impact to the site is therefore to be expected.

5.13 The key objectives of the Habitats Directive include the preservation, protection and improvement of the quality of the environment, taking measures to conserve deteriorating habitats and creating a coherent European ecological network of sites in order to restore or maintain those habitats and species of community interest as a priority. Article 6(2) of the Habitats Directive, which applies to SPAs classified under the Birds Directive as well as SACs designated under the Habitats Directive, requires member states to take appropriate steps to avoid deterioration of natural habitats and the habitats of species, as well as disturbance of the species for which the site has been designated or classified in so far as such disturbance would be significant in relation to the objectives of the Directive, which includes the maintenance of a coherent European ecological network. Whilst the specific steps required for the consideration of plans and projects that may affect European sites does not make reference to the earlier duties and overall purpose of the Directive, it is helpful for those involved in Habitats Regulations Assessment to be reminded of these objectives, as we are often so focused on the specific steps set out within Regulation 61 of the Habitats Regulations for new plans and projects, that we forget the wider picture and the duties applied irrespective of new proposals.

5.14 It is clear from the Directive that the purpose of the legislation is not only protective, but also about the restoration of habitats that may be damaged, and the establishment of measures that avoid any future deterioration, conserving sites as part of a bigger functioning network across Europe.

5.15 With this in mind when making decisions about the likely significant effect, whether adverse effects can be ruled out, and whether the precautionary approach is a justified one, such decisions should be made with a wider and more long term view. A plan or project may not create an immediate and obvious impact, but if it compromises the ability of the site to meet its conservation objectives, it will make it more vulnerable to external factors or hinder the restoration of the site from a deteriorated state, bearing in mind the fact that a considerable number of our European sites were already in a deteriorated state at the time of designation or classification. Finally, what is the impact on the overall ecological network? Birds in particular are European site interest features that are often reliant on multiple parts of the network rather than just one site, and whilst birds may move to another site on a regular basis, their temporary absence at one European site should not mean that its capacity to support those birds can be allowed to deteriorate, as this would be a loss to the network as a whole upon which those birds rely.

5.16 Having considered the wider objectives of the Habitats Directive, it is also important to state that a precautionary approach should never be so over-precautionary that it is not based on sound justification or common sense. A precautionary approach should be taken when there is the lack of information to rule out significant effects, and there is also sound justification for assuming that an impact could potentially occur, i.e. the impact is capable of having an effect because there is a logical pathway between impact and receptor. The combination of a proper regard for the wider objectives of the Habitats Directive, a thorough gathering and examination of available evidence and the proper application of the precautionary approach should enable competent authorities to come to the right

conclusion with regard to the specific steps set out in Regulation 61 of the Habitats Regulations.

5.17 In considering the potential impacts of any plan or project, the basic principles of the 'mitigation hierarchy'[12] (which should be applied to any assessment of impacts on the natural environment) in many ways relate to the specific steps in the Habitats Regulations Assessment process. Avoidance of any impact should always be the first option. To completely avoid an impact could result in the re-siting of a particular plan allocation from an area where impacts could not be ruled out, to one where there is a good level of certainty that impacts would no longer occur. Where significant effects cannot be ruled out or avoided, measures to mitigate for any potential impact are required. The following sections of this report set out the detailed mitigation measures that are recommended to prevent adverse effects on the integrity of the three European sites, having acknowledged that the likelihood of significant effects arising from the growth planned in the three administrative areas cannot be ruled out or avoided. Whilst the mitigation hierarchy goes on to recommend the use of compensation as a last resort, when considering the steps in the Habitats Regulations Assessment process, as set out in Section 2, the use of compensation specifically for European site interest is restricted to exceptional circumstances.

5.18 In the case of the Exe Estuary SPA, Dawlish Warren SAC and the Pebblebed Heaths SAC/SPA, the evidence demonstrates:

- Interest features that are vulnerable to recreation
- Where dedicated projects have considered recreation impacts (Exe and Dawlish), evidence of existing impacts from recreational use
- A link between houses and the recreational use of the sites

5.19 It is therefore necessary to consider what measures could be established as mitigation for a marked increase in housing proposed in the surrounding areas (the 'visitor catchment').

5.20 Mitigation measures enable a competent authority to permit development with certainty that adverse effects on the integrity of the European sites will not occur. As new residential development is permanent in nature, the mitigation secured should equally provide lasting protection for the European site interest features. Mitigation measures will therefore include measures that will need to fulfil their function in-perpetuity. Additionally, the mitigation strategy should include the necessary level of monitoring to be certain that measures are working and importantly provide an early trigger for the adaption of the mitigation strategy if any potential issues are highlighted. Monitoring

[12] The mitigation hierarchy concept of avoid before mitigate, and mitigate before compensate, whilst at the same time seeking enhancements, is an established process in the assessment of impacts on the natural environment, promoted in the Royal Town Planning Institute publication 'Good Practice Guide - Planning for Biodiversity' 1999, republished in 2001. It is now also incorporated into the NPPF.

should result in changes to the mitigation strategy prior to any impacts, i.e. the strategy should continue to prevent impacts from occurring.

Mitigation principles

5.21 As noted in the introductory section of this report, the NPPF provides a framework within which sustainable growth should come forward. It therefore includes relevant principles for a mitigation strategy that will be in place to support sustainable growth whilst protecting the integrity of European wildlife sites. The following principles have been adapted and expanded from those used to shape the strategic mitigation strategy for the Solent (Liley & Tyldesley 2013), which includes three SPAs, and are equally applicable to this mitigation strategy. It is advised that the mitigation strategy should adhere to the following principles:

- **Necessary**: the measures within the strategy should be essential in order to enable planning permission to be granted in light of the requirements of the Habitats Regulations, the Community Infrastructure Levy Regulations and paragraph 204 of the NPPF (which relates to planning conditions and obligations).

- **Relevant to planning**: the measures should not constitute those which are required irrespective of new growth in order to meet duties relating to the maintenance and restoration of European sites, as required by Article 6(2) of the Habitats Directive or Article 4(4) of the Birds Directive.

- **Relevant to the development**: the strategy should only be applied to developments of a kind, scale and location that have the potential to affect the European sites (alone or in combination with other plans or projects), again in accordance with the Community Infrastructure Levy Regulations and paragraph 204 of the NPPF.

- **Effective**: the strategy should provide certainty that development can proceed without adverse effects on the European sites arising from recreation. Measures should avoid impacts, or reduce the effects to levels which could not possibly undermine the conservation objectives of the European sites, thus meeting the requirements throughout Section 11 of the NPPF.

- **Cost efficient**: the strategy should be cost effective in terms of management, collection, fund-holding, distribution and accounting. It should seek to put in place measures that are required, but not those that are over and above that which is necessary to give certainty that the European sites will be adequately protected, and not those that deliver other objectives for the local area. Requirements should be fairly and reasonably related in scale and kind to the development, as required by paragraphs 204 and 206 of the NPPF.

- **Flexible**: the strategy should be robust enough to give certainty that European site interest will be protected, but at the same time flexible enough to be reviewed and modified over time, as may be indicated by monitoring. The strategy should be sufficiently flexible to ensure that planned development that is capable of being

mitigated for is not impeded by the implementation of the strategy, in accordance with paragraphs 19, 190 and 205 of the NPPF.

- **Fair**: the strategy should be applied fairly to development, proportionate to the potential impact that will be generated. Measures should not target particular types of development and leave other types free to proceed without adequately contributing to the mitigation for their impacts. Equally, the measures should be fair in respect of the sources of increased recreational pressure. It is important to note that the local planning authorities, as competent authorities are responsible for securing the necessary mitigation and funding for some measures may need to be raised from other sources (this accords with the solutions focussed approach advocated in paragraph 187 of the NPPF).

- **Evidence-based**: the measures within the strategy should be included on the basis of evidence to justify their need and their appropriateness and likely effectiveness, and therefore in accordance with the requirements of paragraph 158 of the NPPF. The strategy should not include measures that may be considered desirable to achieve other objectives.

- **Timely and implementable**: the strategy should be implementable with a good degree of certainty that the required measures can be delivered in a timescale that is related to the commencement of the development and the avoidance of potential impacts, taking account of the gradual change in recreational use over time. This will require considerable forward planning for the strategy to be implemented in a timely manner. Some measures will need to be secured in-perpetuity to ensure that impacts are avoided into the long term.

- **Compliant**: with planning law and policy, including the Habitats Regulations and parent European Directives, the NPPF, the Community Infrastructure Levy Regulations and the planning legislation and policy relating to the use of Section 106 Planning Obligations.

5.22 This report sets out a strategy that seeks to achieve these principles. There is however considerable responsibility placed on the three local planning authorities in the implementation of the mitigation strategy, to continue to ensure that these principles are adequately met.

Mitigation measures

5.23 A range of measures can be used to minimise the potential negative impacts of recreation. These include careful location of development, influencing which sites people visit, where people go within sites and how they visit. We set out a summary list of possible options in Table 13. These options range from soft measures and proactive work with local residents, to enforcement. Conclusive evidence that the different measures will work is limited, but within the text we summarise examples and, where available, reference studies showing the effectiveness of the different options.

5.24 It is essential to recognise that access to the countryside is important, bringing widespread benefits including health, education, inspiration, spiritual and general well-being (English Nature 2002; Bird 2004; Pretty *et al.* 2005, 2007; CABE Space 2010; Moss 2012). In fact access is likely to be important in the management of the sites for nature conservation, as people are more likely to want to be involved with and protect local sites if they have close links with these sites. While mitigation measures might seek to control or limit access in some areas, the overall aim should be to enhance the existing recreation experience and provide opportunities such that access and nature conservation interests are not in conflict.

5.25 Some mitigation measures can be described as either off-site or on-site measures. However, others such as the promotion of visitor awareness of issues, or habitat creation, may fall into both categories. Therefore this distinction is only made where useful in organising the measures presented in Table 13.

Table 13: Potential measures to reduce disturbance and recreation impacts (note that not all of these could be necessarily considered as mitigation options relating to new development).

	Management option	Description
1b	Habitat management	To improve existing habitat to provide alternative/more suitable breeding/roosting/feeding sites beyond that required to achieve favourable conservation status.
2. Planning & Off-site Measures		
2a	Locate site development away from sensitive sites	
2b	Management of visitor flows and access on adjacent land (outside European site)	
2c	Provision of suitable alternative natural greenspace sites ('SANGs')	
2d	Provision of designated access points for water sports	
2e	Enhance access in areas away from designated sites	

	Management option	Description
		wardening, etc.
3. On-site Access Management		
		Potential to restrict access at particular times, e.g. high tide and particular locations (roost sites). Temporary fencing, barriers, diversions, etc are all possible.
3b	Provide dedicated, fenced dog exercise areas	For example, allowing dogs off leads in particular locations that are not sensitive for nature conservation (or other reasons) may increase their attractiveness to dog walkers. Considered as an onsite measure as may be provided in locations with a direct access link from the sites but not necessarily within the European site boundary
3c	Zoning	Designated areas for particular activities. Often zones are set out in a code of conduct, with compliance enforced through byelaws.
3d	Infrastructure to screen, hide or protect the nature conservation interest	Screens, hides, embankments, etc are commonly used to direct visitors along particular routes and screen people from birds or other features vulnerable to disturbance. Such infrastructure can also provide enhanced viewing facilities and opportunities for people to get close to wildlife without causing disturbance. Path design can enhance the extent to which people stray or roam from the path. Boardwalks etc. can protect vulnerable habitats.
3e	Management of car-parking	Car-park spaces can be redistributed around a site, parking closed in some areas, parking fees modified (e.g. encouraging people not to stay too long) or a permit system be instigated to limit use of car-parks.
3f	Path design and management	Surfacing, path clearance and other relatively subtle measures may influence how people move around a site and which routes they select.
4. Education and Communication to Public/Users		
4a	Signs and interpretation and leaflets	Provision of informative and restrictive signs, and interpretive boards. Directions to alternative less sensitive sites. General information on the conservation interest to highlight nature conservation interest/importance.
4b	Codes of Conduct	
4c	Wardening	
4d	Provision of information off-site to local residents and users.	
4e	Contact with relevant local clubs	
4f	Establishment of Voluntary Marine	By agreement of interested parties.

	Reserves (VMRs)	
4g	Off-site education initiatives, such as school visits etc	Raising awareness with local people through face-face contact off-site
5. Enforcement		
		Covenants prohibiting the keeping of cats and / or dogs for example in circumstanes where the restriction can be fully enforced
5b	Legal enforcement	Byelaws can be established by a range of bodies including local authorities, Harbour Authorities, the MOD, National Trust, Parish Councils, etc. Other options include special nature conservation orders, dog control orders or prosecution under SSSI legislation.
5c	Wardening	Wardens have both educational (see 4c above) and enforcement roles. With respect to the later, wardens can provide direct contact and intervene when they observe particular activities (such as dogs off the lead on mudflats). The ability of a warden to control disturbing activities is clearly related to whether control measures are in place, and their nature. The more specific and statutory in nature the control, the greater the potential for enforcement by a warden.
5d	Limiting visitor numbers	Visitor numbers capped, for example through tickets, permits or a similar system.

5.26 A strategic approach to mitigation and avoidance measures has been established at a range of other European sites (these are considered in more detail in later sections of this report). In general for coastal sites there is less information on what measures may be effective (but see Saunders *et al.* 2000; Liley *et al.* 2012). To help inform our recommendations we therefore circulated a list of measures relating to resolving bird disturbance impacts on coastal sites to a range of 'experts', including site managers, national policy advisors, academic ornithologists and professional ornithologists. The poll was circulated via the internet, and each expert was asked to identify which measures s/he considered to have some likelihood of reducing disturbance. The details and results of the poll are summarised in Appendix 2 and we draw on the results throughout the rest of this report.

6. Habitat Management Measures

New habitat creation

6.1 Many specific habitat features or types of habitat can be created through targeted works on sites, and such approaches are commonplace within the UK, for example, in the wider countryside agri-environment schemes provide dedicated plots for farmland birds, beetle banks and other such features. The potential for such approaches within European sites is limited, as of course such sites are already important for existing habitats/areas or key species that are rare or vulnerable in a European wide context. Furthermore creation of new habitat outside a European site to mitigate for impacts to the site is not likely to comply with the Habitat Regulations as there is a net loss in protected area as a result. There are however two 'within site' options relevant to the Devon sites:

- The creation of artificial roost sites for waders or additional lagoons/feeding areas
- The creation of scrapes for petalwort at Dawlish Warren

Creation of additional sites for wintering and passage waterfowl on the Exe Estuary

6.2 Waterbirds generally tend to prefer larger, open roost sites (Banks *et al.* 2003) close to foraging areas (Dias *et al.* 2006). The quality and availability of roosting habitat may limit population size (see Colwell 2010 for discussion) and there are examples where the creation of roosting habitat was linked to an increase in the local population of wintering shorebirds (Furness 1973). The design and management (primarily vegetation removal) are discussed by Ausden (2007). An example of the successful creation of an artificial roost site is provided by Burton *et al.* (1996), who describe the loss of a roost site at Hartlepool (an old pier) and the replacement with an artificial site. The artificial site was a steep-sided, kidney shaped island that worked well for species such as turnstones, but there were issues relating to disturbance from a new marina. The authors suggest that open, flat topped islands with gently sloping sides would work for species such as oystercatchers. The existing shingle island in front of the hide at Dawlish Warren was created to provide a roost site easily viewable from the hide.

6.3 Use of roost sites by birds is typically dependent on tide conditions, weather conditions and a range of factors, and use of individual roost sites can often be highly variable (Colwel *et al.* 2003; Dias *et al.* 2006). Within the Exe Estuary SPA/Ramsar there are relatively few roost sites. Birds roost at Bowling Green Marsh and at Exminster Marshes (both at the northern end of the estuary), and at Dawlish Warren at the southern end of the estuary. The Dawlish Warren roost is the most important (largest) and birds use different parts of the Warren depending on the tide and weather conditions. Oystercatchers and a range of other larger waders tend to roost on the north side of the Warren, and depending on the tide the roost can be concentrated in front of the hide. Smaller waders such as dunlin and ringed plover tend to gather in the Bight (where they are vulnerable to disturbance), but high spring tides and certain weather conditions make this area unavailable. In the past they tended to move onto the southern side of Warren Point to roost on the beach on higher tides, but this happens less frequently now due to beach erosion. Small waders also occasionally use the beachfront at Exmouth. Most of the roost sites at Dawlish Warren are

potentially vulnerable to disturbance, particularly the smaller waders, and when high spring tides occur the number of sites available to the birds can be very limited.

6.4 The creation of a safe, disturbance free roost site at a location around the Dawlish Warren spit would be likely to be effective in resolving many of the disturbance impacts relating to the roost sites. A safe roost site would reduce the energetic costs for waterfowl and provide a roost site close to key feeding areas.

6.5 Proposed future changes to the sea defences at Dawlish Warren could result in significant changes to the geomorphology of the area, and adding artificial roosts is likely to be a costly procedure. Detailed consideration of this option will be necessary in the longer term once it is clearer how the sea defences will be managed at Dawlish Warren. One option raised by the Dawlish Warren site staff is to relocate the bird hide at Dawlish Warren to the centre of the Bight shore. The old hide location could then be modified to produce a better roost area, available on most or all high tides. This would require grading to flatten the area and removal of vegetation. The new hide would be set slightly further back from the main roost but would provide good views of the roost and of birds gathering in the Bight. Re-locating the hide would reduce disturbance from birdwatchers walking along the shore of the Bight to access the hide, and focus access back onto the dune ridge for walkers returning from Warren Point. Any relocation of the hide would need to be accompanied by changes to the layout of the Warren Golf Course. Modifications at the golf course (also part of the SAC) would need to reduce disturbance from golfers breaking the skyline close to the hide, or coming down onto the shore to collect lost golf balls (see also Screening).

6.6 There may also be other opportunities around the estuary to create additional habitat. For example managed retreat may provide additional roost or even feeding sites, while lagoons/scrapes in low-lying ground outside the estuary may provide off-site roost/feeding areas. Such opportunities will depend on land management around the estuary and particular circumstances in the future.

The creation of scrapes for petalwort at Dawlish Warren

6.7 Habitat creation could also be used to provide suitable habitat for petalwort to mitigate for damage to existing populations through increased trampling pressure. Problems in monitoring the petalwort (for which expert help is required) and uncertainty over the impacts of coast realignment on Dawlish Warren make it difficult to predict the effectiveness of this measure at this point in time.

6.8 Petalwort requires relatively high levels of calcium. On most coastal sites this is usually provided by recently blown calcareous sand. At Dawlish Warren the calcium is thought to have derived from calcareous materials used in construction of the visitor centre and tracks, which have influenced the pH of the substrate. The thallus (above ground part) of petalwort is tiny and requires very open, short vegetation. At many petalwort sites this vegetation is a feature of young dune slacks, and is often also related to trampling or rabbit grazing pressure. The Dawlish Warren dune system is no longer mobile due to the current hard sea defences and gabions between groynes three and ten, so there is not the potential for new slacks to be created naturally.

6.9 Proposed managed realignment work at Dawlish Warren is likely to allow a dynamic dune system to redevelop, potentially creating suitable new early successional slacks. As petalwort at Dawlish Warren is dependent on artificial materials influencing the pH of the substrate, it is not necessarily the case that any new slacks that develop will be suitable for petalwort (although recent survey results suggest that the species is found in more acid habitat than was previously assumed (P. Chambers, *pers. comm*.)). If the beach rolls back, one of the current petalwort slacks may become inundated with seawater, destroying the existing population and decreasing the chance of natural regeneration through spore dispersal. Changes in the area of dune grassland available to visitors and access patterns to the beach may result in increased trampling pressure at the remaining petalwort location. A comprehensive monitoring programme has not yet been agreed with Natural England, but available evidence (J. Jasper, pers. comm.) suggests that this population may currently be declining. An increase in visitor pressure due to increased housing may contribute to detrimental over-trampling at this site, particularly if changes due to coastal realignment cause changes in access patterns.

6.10 Habitat creation, combined with translocation of a number of plants to establish a new population, may therefore help safeguard the species at Dawlish Warren. A decision will need to be made once a coastal realignment strategy has been adopted, and any necessary mitigation for this has been established.

6.11 A suitable monitoring methodology is currently being investigated for petalwort at Dawlish Warren. This needs to be finalised and implemented with some urgency, so that baseline monitoring can be put in place to monitor the perceived decline. If the population is reducing, a measure of footfall should be made, to allow an exploration of any possible interaction. This will not however prove a causal relationship as decline could also be associated with leaching causing a gradual decline in pH, increasing in shading through scrub proliferation, or successional changes in the grassland.

6.12 The feasibility of translocating petalwort would need to be explored. There is some literature available (see Plantlife's Petalwort Dossier13) suggesting that temporary translocations have been carried out for research purposes, but the long-term viability is not known.

[13] http://www.plantlife.org.uk/wild_plants/plant_species/petalwort

Recommendations: New Habitat Creation

- A scoping study for creation/modification of a viable, disturbance free roost site at Dawlish Warren is recommended, and should consider relocation of the bird hide and provision of a suitable area for birds to roost adjacent to the existing hide location. Access restrictions along the Bight shore and screening from the golf course will be necessary. As there may be losses in intertidal foraging areas within the SPA careful consideration is necessary.
- The creation of artificial scrapes for petalwort should be considered, but needs to be assessed in the context of potential significant changes to the site if proposed managed realignment goes ahead.

Habitat management

6.13 Designated sites are managed routinely for their nature conservation interest, and in general such habitat management will fall outside of any mitigation strategy as it is necessary regardless of new housing development. However, there are a few cases where habitat management may be used very specifically for mitigation.

Dawlish Warren

6.14 In addition to its use in meeting conservation objectives (e.g. achieving the desired area of scrub), habitat management is currently used at Dawlish Warren to help influence visitors' choice of routes. Walkers tend to avoid areas of longer vegetation and scrub, so new paths can be created by cutting vegetation, which walkers then follow. This can be used to encourage visitors away from sensitive areas such as in close proximity to wader roosts, but is difficult as visitors tend to be drawn to beach areas and have a preference to walk along the shore. This may be an on-going part of the management regime at Dawlish Warren, and will need to be used flexibly in response to increases in visitor numbers, particular if visitor behaviour changes due to coastal realignment.

6.15 Removal of scrub or woodland could potentially be used to diffuse pressure on the dune habitats. Recent scrub management has decreased the area of scrub to around 5%, the recommended level for the site according to SSSI condition assessment monitoring, and further scrub removal would have a very limited impact. The removal of an area of woodland around the pond adjacent to the visitor centre would increase the area of grassland available. However, the use of large equipment at the site is not possible or very difficult (mainly due to the problems of the narrow railway tunnel), and the extraction of material would be costly for a relatively small gain in area. The resulting habitat would not be of high nature conservation value, so the gain would simply be in terms of reducing pressure on the existing dune grassland.

6.16 Proposed coast realignment work may have a profound impact on the area and location of existing habitat at the Warren, and plans for habitat management on the existing site will not necessarily be relevant in five years' time, when the proposed staged removal of the

gabions could start. It is therefore recommended that use of habitat management to maximise the area of open grassland available to visitors is reassessed at a later date.

6.17 Should coastal realignment result in the (re)inundation of Greenland Lake, one option would be to consider opening up the golf course to visitors to reduce pressure on the remaining land within the NNR. This would not necessarily be compatible with its on-going use as a golf course. The golf course has a long history (having been created in 1892), and negotiations to re-locate it may be sensitive. The land is owned by the Devon Wildlife Trust, who might wish to see it open to the public, or at least its members, if its use changed. It would be necessary to restrict access to the northern shore to limit disturbance to roosting and feeding waders and wildfowl. Any such change of use would be likely to be in combination with similarly large-scale changes on the Dawlish Warren reserve.

The Pebblebed Heaths

6.18 In heathland areas, allowing gorse to develop in certain areas may reduce impacts of disturbance for Dartford warblers (Murison 2008) and possibly nightjars. A gorse management programme should include consideration of disturbance to Dartford warblers and nightjars through maintenance of gorse screening to paths in sensitive area, and the management of gorse stands to create optimum conditions for warblers in quieter areas. Cutting could be used to improve views and access in less sensitive parts of the common.

Recommendations: Habitat management

- A gorse management programme to screen paths in sensitive areas for nightjar and Dartford warbler and optimise conditions for Dartford warbler in quiet areas while improving views and access for visitors in less sensitive areas

7. Planning & Off-site Measures

Site development away from sensitive sites

7.1 Ensuring development does not take place in the immediate proximity of sensitive sites can be effective in avoiding issues relating to the impacts of development. There are now precedents around the UK where SPA and SAC sites have a development exclusion zone clearly set out within land use plans. For example local authorities around the Dorset Heaths, Thames Basin Heaths, Breckland, Ashdown Forest and Wealden Heaths have all included 400m zones around their heathland sites. Such a zone has been included within the East Devon Local Plan in order to provide protection for the Pebblebed Heaths.

7.2 The problem with this approach is that the impacts of built development can extend over considerable distances, particularly with recreational access. The choice of 400m for the heathland sites discussed above has been a pragmatic one, recognising that urban impacts relate to a combination of factors that are impossible to mitigate for at very close proximity, which include cat predation, increased fire incidence and increased recreational pressure (leading to disturbance, trampling, dog fouling etc). Options for mitigation within 400m are limited as it is impossible to divert or limit the impacts, for example by providing alternative access sites, etc.

7.3 In fact visitor data for heathland sites shows that people travel considerable distances (Clarke *et al.* 2006; Clarke, Sharp, & Liley 2010; Liley, Jackson, & Underhill-Day 2006; Cruickshanks, Liley, & Hoskin 2010) and the visitor survey data from the Pebblebed Heaths (Ecology Solutions 2012) shows that visitors come from a wide area (41% of visitors within 5km). For coastal sites the catchment may be much more than for heaths (see Clarke, Sharp, & Liley 2008; and Liley, Sharp, & Clarke 2008 for discussion) due to the particular draw of estuaries and the sea. Visitor survey data collected on-site at the Exe Estuary (Liley *et al.* 2010b) and through postal surveys (Cruickshanks & Liley 2012) shows a broad geographic area from which people travel. Such distances mean that development exclusion zones that stretch to the full extent necessary to remove impacts from recreation are impractical. Zones encompassing the immediate vicinity of sites (in particular 400m around the Pebblebed Heaths) are necessary because mitigation is potentially impossible in such areas, but development exclusion at bigger distances seems impractical. The 400m development zone around the Pebblebed Heaths is referred to within the East Devon Local Plan and associated Habitats Regulations Assessment (Liley & Underhill-Day 2012).

Management of visitor flows and access on adjacent land (outside European site)

7.4 This approach is relevant where access and visitor flows around the boundary of the European site can be managed in such a way as to minimise disturbance impacts, for example by setting parking back, or creating physical barriers. The approach is most relevant around the Exe Estuary where consideration of visitor access and movement around the shoreline might be influenced by measures taken inland.

Exe Estuary

7.5 The Exmouth Town Centre and Seafront Masterplan[14] contains recommendations to enhance activity at the Imperial Recreation Ground, and other elements relating to the regeneration of Exmouth, which may well influence visitor flows around the town, potentially directing more people to the Recreation Ground area. If mitigation measures are implemented at and around the Recreation Ground there may be the potential to reduce disturbance on the estuary. Low barriers, planting etc. around the edge of the Recreation Ground would create a physical barrier between the road/parking areas and the shore, ensuring people and dogs kept back from the shore and potentially allowing birds to feed closer to the shore area within the Duck Pond. Such opportunities could be directly linked to development associated with Exmouth and the regeneration of the Estuaryside area.

Dawlish Warren

7.6 There is potential to manage the area of land immediately west of Dawlish Warren, National Nature Reserve, to reduce pressure on the designated site. Part of this area, known as the 'buffer zone' comprises fixed dune grassland and scrub crossed by two board walks facilitating access to the beach. The other part is a large, surfaced car park. Although degraded in parts, due to excess trampling pressure and dog fouling, the buffer zone includes plant species of interest e.g. bulbous and early meadow grasses *Poa bulbosa* and *Poa infirma*, and is designated a County Wildlife Site. There is the potential for the buffer zone and car park to be enhanced. This could make the SAC more robust by enhancing the quality of the adjacent habitat, relieving pressure on the SAC itself, and allowing access onto the SAC to be better managed. Measures would include:

- Relocating the visitor centre to the north-eastern edge of the buffer zone. This would improve its "visibility" and thus increase the proportion of visitors to the SAC who use it and are exposed to appropriate information on the special nature of the site, its vulnerabilities, and codes of behaviour. A redesigned visitor centre which does not always need staff present to be open (as is currently the case) would also be beneficial. Current considerations for a new visitor centre include proposals for an on-site classroom. Where such initiatives are for wider benefit and do not relate to mitigating for impacts, there will need to be alternative funding for those elements of the overall project (as development should only fund measures to mitigate for its impact) , but they should be incorporated as they will strengthen the project as a whole.
- Remove the dog control order in the buffer zone, which is unrealistic to enforce. Introduce a byelaw here preventing the lighting of fires, including the use of barbeques.

[14] http://www.exmouthmasterplan.co.uk/wp-content/uploads/2011/06/2919_Exhibition-Summary-lowres.pdf

- Erecting a boundary between the buffer zone and the SAC – this could be a fence or a bank and ditch. Access would then be channelled through specific points, reducing the permeability of the current boundary. This would focus pressure on existing surfaced paths/boardwalks, and again increase visitors' exposure to appropriate information e.g. in the form of display boards or visitor centre at access points.
- Create a new surfaced path leading from the small volunteers' car park in a seaward direction to the existing surfaced path leading onto the reserve. This would reduce the number of visitors dissipating onto the site from the existing access at the northeast end of the car park, and increase exposure to appropriate information on entry into the reserve.
- Removing the car park and recreating grassland in its place. This would provide an additional area for dog walkers and picnickers. Visitors would need to use the landward car park on the other side of the railway (part of which is also a County Wildlife Site for its fixed dune grassland plants), and walk under the railway bridge. Information would need to be obtained as to the extent to which users of the current car park use the retail facilities in the resort area, and whether they would do so if walking from the landward car park. This measure could be combined with a local transport link for visitors staying within Dawlish Warren village to reduce the need for car parking spaces. It is noted that loss of revenue through car park ticket sales would be an issue for Teignbridge Council. An alternative would be to reduce car park capacity by closing the existing gates.

7.7 The above options would depend on the consequences of the longer term changes at Dawlish Warren (see changing coastal dynamics section) and how visitor pressure and behaviour change on the site. There are significant cost implications. As the site changes, visitors may wish to go to different areas and access management will need to adapt. It is therefore a long-term measure. However, a number of the component proposals would still be partially effective in isolation e.g. establishing a physical boundary along the edge of the existing car-park, focussing access at the existing boardwalks and creating a new path leading more directly to the main gravelled path to the existing visitor centre.

Pebblebed Heaths

7.8 A review of the existing footpath and bridleway network adjoining the Pebblebed Heaths SAC/SPA is recommended to assess their potential to attract people away from the SAC/SPA. Signs, waymarking and other facilities should be included within the review, and the potential for waymarked routes and accompanying information (e.g. leaflets) assessed.

Recommendations: Management of visitor flows and access on adjacent land (outside European site)

- Low fencing or planting around the edge of the car-park (near the train station) and around the edge of the Recreation Ground at Exmouth could reduce disturbance e.g. from dogs running directly from cars across the intertidal areas.
- Redesigning the buffer zone /seaward car park at Dawlish Warren could improve visitor management and decrease pressure on the adjacent SAC. Measures could include removing or reducing the car park, relocating the visitor centre, adding a physical boundary, creating a new path and changing byelaws. The major measures would need to be part of a wider vision for the site, and should be assessed in the context of changes to the site due to proposed coastal realignment
- A review of footpaths and bridleways adjacent to the Pebblebeds SAC/SPA

Provision of suitable alternative greenspace sites ('SANGs')

7.9 The creation of alternative sites to divert visitors from sensitive sites has been widely promoted as a means to resolve issues relating to new housing development and impacts from access. It would seem intuitive that by increasing the amount of green infrastructure in an area, and providing sites designed to be welcoming and attractive to particular users, the levels of visitor use on nearby sensitive sites such as SPAs and the SAC would decrease. In the Thames Basin Heaths and the Dorset Heaths these alternative sites are referred to as SANGs ('Suitable Alternative Natural Greenspace) and have become a key component in a suite of mitigation measures designed to ensure no adverse effect on the integrity of the European Sites as a result of new development (Liley et al. 2006; Burley 2007; Thames Basin Heaths Joint Strategic Partnership Board 2009).

7.10 The use of alternative sites to detract recreational pressure is the subject of monitoring programmes such as for the Thames Basin Heaths. Guidelines and recommendations for site design are available (Liley, Mallord, & Lobley 2006; Liley et al. 2009) and a set of criteria, produced by Natural England, has been incorporated in some strategic planning documents[15].

7.11 The concept of SANGs is still relatively new as a mitigation measure, and there are few studies that provide any confidence that SANGs will work. There is evidence that the greater the availability of green space sites, the more they are used (Maat & de Vries 2006). Work in Dorset however suggests that while a larger area of greenspace around where they live does not result in residents visiting heathland less, the overall number of

[15] For example Purbeck District Council's Local Plan, see http://www.dorsetforyou.com/local-plan/part-1/purbeck

greenspace sites does (Clarke et al. 2008). This suggests that having a choice of nearby alternative greenspaces may be important in reducing pressure or designated sites. The issues are complex because:

- People will visit heaths and other semi-natural sites because such sites offer a particular experience (large spaces, wild feel etc) that are potentially hard to replicate (e.g. Liley et al. 2006).
- The presence of significant green infrastructure may mean that new housing is occupied by people attracted by the presence of the greenspace – for example dog owners – who then visit nearby sites (potentially including designated sites).
- People may have a particular affinity to visit sites they know well – access patterns may then take a long time to change.

7.12 Alternative sites are therefore most likely to be successful if very carefully designed and tailored to particular areas and types of use. In terms of visitors to the coast, alternative sites are most likely to work (if not on the coast) for types of access that are not dependent on particular coastal features – for example visitors who are simply drawn to sites because it is the nearest open space to their home, or because it is a convenient place to walk the dog and let the dog off a lead. The options to create alternative sites that provide alternative dramatic coastal scenery or beautiful beaches are likely to be limited.

7.13 The current guidance provided by Natural England (taken from the Purbeck Local Plan and therefore relating to heathland sites)[16] suggests that SANGs may be created from:

- existing open space of SANGs quality with no existing public access or limited public access, which for the purposes of mitigation could be made fully accessible to the public
- existing open space which is already accessible but which could be changed in character so that it is more attractive to the specific group of visitors
- land in other uses which could be converted into a SANGs

7.14 Within the same guidance, Natural England provides a range of criteria relating to the quality of SANGs. The guidelines suggest that specific facilities such as those for adventurous play, bike jumps, etc should be designed and considered on a case by case basis. Much of the context of the guidance is relevant to Devon and we summarise key characteristics of SANGs below:

- Sites of high nature conservation value which are likely to be damaged by increased visitor numbers will not be suitable SANGs;
- Sites must have adequate parking for visitors, unless the site is intended for local pedestrian use only, i.e. within easy walking distance (400m) of the developments

[16] See Appendix 5, http://www.dorsetforyou.com/media.jsp?mediaid=173966&filetype=pdf

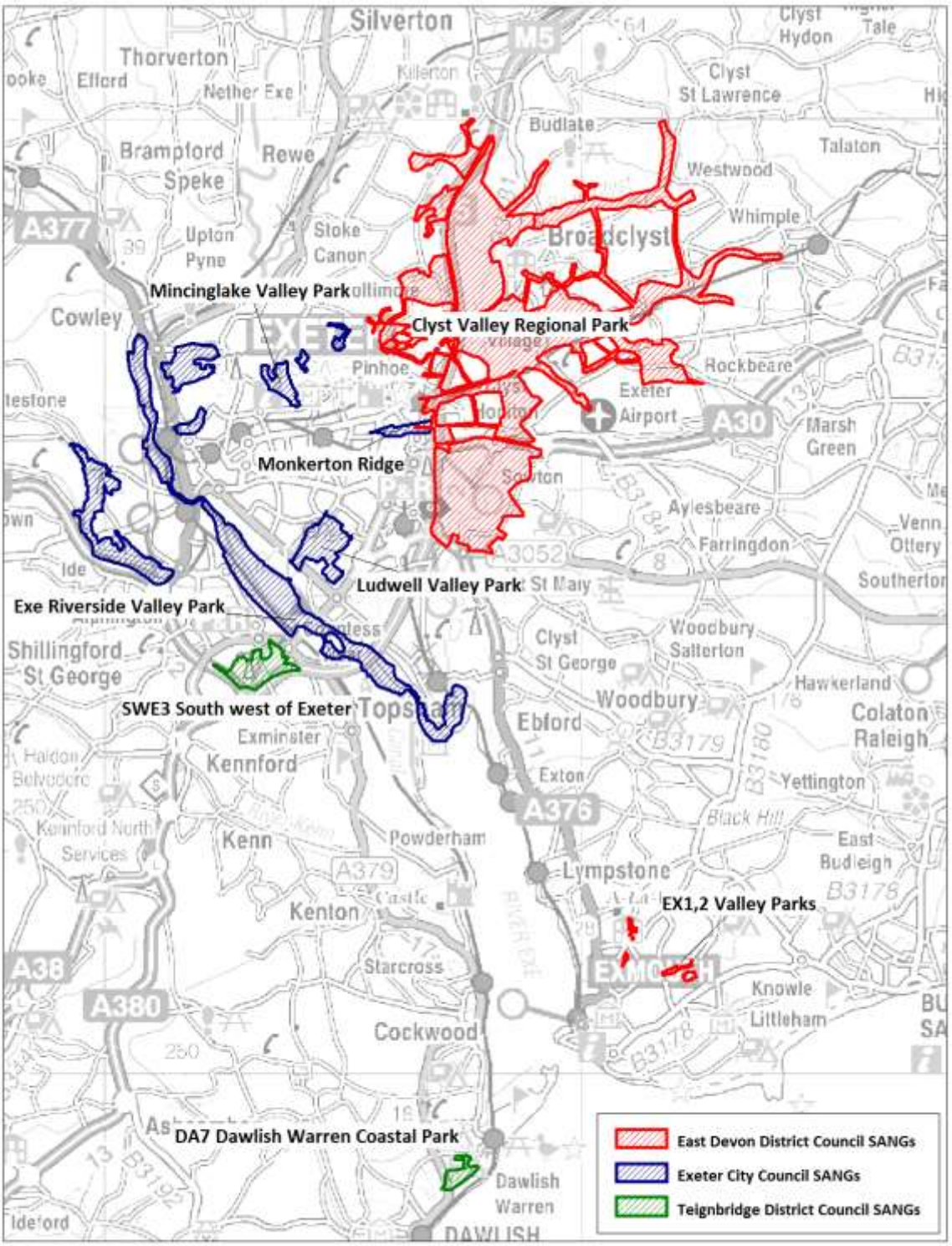
linked to it. The amount of car parking space should be determined by the anticipated numbers using the site and arriving by car;

- Car parks must be easily and safely accessible by car, be of an open nature and should be clearly sign posted;
- There should be easy access between the car park or housing and the SANGs with the facility to take dogs safely from the car park to the SANGs off the lead;
- Access points should have signage outlining the layout of the SANGs and the routes available to visitors;
- SANGs must be perceived as natural spaces without intrusive artificial structures, except in the immediate vicinity of car parks, and the site should not become too urban in feel. Visually appropriate way-markers and some benches are acceptable.
- However, the majority of paths should be suitable for use in all weathers and all year around. Boardwalks may be required in wet sections;
- All SANGs with car parks should have a circular walk which starts and finishes at the car park;
- It should be possible to complete a circular walk of 2.3-2.5km around the SANGs, and for larger SANGs a variety of circular walks;
- SANGs must be designed so that visitors are not deterred by safety concerns;
- SANGs should be clearly sign-posted and advertised;
- SANGs should have leaflets and/or websites advertising their location to potential visitors. It would be desirable for leaflets to be distributed to new homes in the area and be made available at entrance points and car parks;
- Ideally SANGs will offer a variety of habitats for visitors to experience (e.g. some of: woodland, scrub, grassland, heathland, wetland, open water).
- Access within a SANG must be largely unrestricted with plenty of space provided where it is possible for dogs to exercise freely and safely off lead.
- SANGs must be free from unpleasant visual, auditory or olfactory intrusions (e.g. derelict buildings, intrusive adjoining buildings, dumped materials, loud intermittent or continuous noise from traffic, industry, sports grounds, sewage treatment works, waste disposal facilities).

7.15 The information currently available on SANGs criteria should be used to develop the SANGs based element of the mitigation strategy for the Exe, Dawlish Warren and Pebblebed Heaths, whilst mindful of the need for a careful approach to planning such sites as an alternative to coastal European sites. This background provides the context for the consideration of potential SANGs options below.

Overview of potential relevant SANGs

7.16 Each of the three local planning authorities has given significant consideration to where and how they might be able to provide alternative and high quality open spaces to attract some of the recreational pressure away from the European sites, and key locations have now been included in emerging or adopted land use plans. Assessment of the proposed SANGs, as provided in this section, is based on both the information given by each of the local planning authorities and assessments undertaken on site at each location. The SANGs proposed by East Devon District Council (EDDC), Exeter City Council (ECC) and Teignbridge District Council (TDC) are listed in Table 14 and discussed below. The locations are also shown in Map 14. On this map it should be noted that the Valley Parks and the sites within Exeter are existing sites (rather than new sites) with potential for enhancement to draw additional visitors. Both the sites within Teignbridge District are new sites. The large area shown within East Devon – the Clyst Regional Park is different in that it relates to a landscape enhancement project rather a specific site, focusing on increasing the capacity and use of an area of existing countryside.



Map 14: The location of Suitable Alternative Natural Greenspace provision proposed within each local authority district

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Table 14: Suitable Alternative Natural Greenspace proposed by East Devon and Teignbridge District Councils and Exeter City Council.

Exmouth Valley Parks (EX1 and EX2)	South West of Exeter Ridge Top Park (SWE3)	Exe Riverside Valley Park and Ludwell (ERVP)
Clyst Valley Regional Park (CVRP)	Dawlish Warren Coastal Park (DA7)	Mincinglake Valley Park (MVP)
		Monkerton Ridge (MR)

EDDC: Exmouth Valley Parks (EX1 and EX2)

7.17 East Devon District Council has put forward initial plans for expansion and enhancement of the 'Valley Parks' within Exmouth. The strategic housing allocation for Exmouth is 837 homes split between two sites (to the north at Goodmores Farm and the South at Littleham – Plumb Park site). The plans for the Exmouth Valley Parks are in the development phase and will require refinement and have not had any public/landowner consideration. Two park areas are considered which follow the Littleham and Withycombe Brooks but they also include links to the South West Coast Path and the surrounding countryside (including East Devon Way and proposed cycle way routes towards Budleigh Salterton).

7.18 At the time of finalising this report, it has transpired that planning permission for residential development has been given by East Devon District Council on land that forms part of the the Exmouth Valley Parks. This matter requires urgent resolution with the identification of alternative SANGs provision for the Exmouth area to replace that now being lost to development. The alternative provision will need to be identified and costed in order to finalise the overall calculations for SANGs provision and the resultant tariff placed on new development.

EDDC: Clyst Valley Regional Park (CVRP)

7.19 The Clyst Valley project is a plan led approach to greenspace provision, and has been designed by East Devon District Council to deliver a wide range of objectives, including those relating to provision of SANGs, meeting Water Framework Directive (WFD) requirements, biodiversity offsetting, the health and well-being agenda, education and training opportunities. The project is being driven forward by East Devon District Council in close partnership with the Environment Agency and National Trust. Natural England funding through Higher Level Stewardship (HLS) agreements has secured management for the next 10 years. Essentially therefore, the proposal is a landscape enhancement project with SANGs provision incorporated within the wider project objectives. New and purposefully designed green space will be made available within the wider landscape and improved countryside access and links out from the new greenspace will be delivered throughout. As an existing project, any funding drawn from developer contributions will need to be carefully allocated to further enhancements over and above those already proposed for the project, and with clear relevance to the objective of attracting recreational use away from the European sites.

7.20 Aims include strengthening the landscape character and habitat potential of the Clyst Valley from Broadclyst to Clyst St Mary and to improve access to the countryside and promote environmental research and education. Areas of currently inaccessible farmland should be opened up as a result of the project. A number of project areas are the focus for investment:

- landscape restoration and enhancement - A low key, naturalistic approach is desirable, and all developments should be compatible with its function as a fluvial floodplain;
- conserving and restoring boundaries through improved maintenance of hedgerows and ditches and to discourage further enclosure of the floodplain, except temporary fencing for biodiversity conservation;
- strengthening habitat potential and biodiversity interest. This may include restoring unimproved permanent pasture, wet grassland and other wetland habitats along watercourses and retaining semi-improved parkland-grasslands, bodies of standing open water, parkland trees, woodland, copses and tree belts;
- promoting the management and restoration of orchards and riparian trees, encouraging woodland management for age and species diversity and promoting locally indigenous wetland species. Coniferous plantations should be discouraged;
- maintaining the inherent absence of settlement and development;
- improving access to the countryside and improving river and road crossing points to give improved access to the river valley from local villages;
- delivering the Clyst-Killerton Greenway between Broadclyst and Clyst St Mary;
- opportunities to address environmental research and education agendas. This may include establishing a 'Studies Centre' from which school visits can undertake field studies or other activities. It may also be possible to treat parts of the project area as a 'living laboratory' to observe the local effects of climate change, or test different methods and approaches to habitat enhancement or creation, flood management or river bank stabilisation;
- establishing a programme of environmental activities and training events based on traditional skills such as coppice management, pollarding, and hedge laying;
- Establishing a 'Friends of the Clyst Meadows' group.

TDC: South West of Exeter Ridge Top Park (SWE3)

7.21 This site is bordered by the local authority boundary to the north and has been put forward by Teignbridge District Council together with plans for 2000 homes along the northern boundary of the site, but it is also linked to a development proposal within the Exeter City Council area, south of Alphington. There are also permissions for a development of 297 houses at Milbury Barton on the north edge of Exminster and 65 houses on the south edge. These are on the other side of the M5 but close to the proposed ridge top park.

7.22 The currently inaccessible site of up to 70 hectares to the south of the A379 south west of Exeter is allocated as a 'ridge top park.' This site will provide a SANGs function and will include a mix of facilities for recreation purposes. It will be managed as a country park and will be delivered by a number of measures including the Community Infrastructure Levy (CIL). The land is predominately farmland but also incorporates an inert landfill site. The

area holds a Scheduled Ancient Monument and is part of a County Wildlife Site designated for cirl buntings *Emberiza cirlus*, although currently cirl buntings seem to be confined to the part of the site south of the M5. In planning for the ridge top park, Teignbridge Council considers that the site could provide a SANGs function without detriment to the County Wildlife Site and its interest features. The plan text commits to providing suitable on-site mitigation measures to mitigate any impact on protected species including the cirl bunting in the development of the ridge top park, and commits to provision of habitat compensation if required.

7.23 The draft policies for the local plan state that the ridge top park's main purpose will be to attract much of the new day-to-day recreation pressure away from the European sites, especially Exminster Marshes, the Exe Estuary SPA/Ramsar site and Dawlish Warren SAC. As such it is over and above that normally required by development.

7.24 The vision for the ridge-top park is to 'ensure that development is set within a high quality and diverse green space protecting the green ridge of the city. It will meet the needs of new residents as well as providing an asset for existing residents. The park, close to new development will improve leisure opportunities and should cater for frequent, regular uses such as dog walking, older children playing, and 'play park' trips. It should also be large enough, have sufficient facilities and be attractive enough to attract a significant amount of 'family trip' use.

TDC: Dawlish Warren Coastal Park (DA7)

7.25 The Dawlish Warren Coastal Park has been put forward to attract recreation pressure away from European sites with a particular focus on Dawlish Warren (and the Exe Estuary). Details about the 22.3 hectare site are set out in Teignbridge District's local plan (policy DA7) and justification for the selection of the site is given in Teignbridge District Council (2013). The Coastal Park will include multi use tracks and trails and open space for informal recreation providing an alternative destination for walkers and dog walking, with connection to the route of the South West Coastal Path and National Cycle Network Route 2. It will also serve as a locally important visitor attraction and support tourism through the inclusion of recreation facilities; potentially a children's adventure/sheltered play area, outdoor amphitheatre, and visitor centre. The Council plans to work with landowners, agencies and other partners towards the successful delivery of the Coastal Park in perpetuity through management agreements or potential land acquisition, funded through CIL and other potential sources.

ECC: Exe Riverside Valley Park (plus Ludwell) (ERVP)

7.26 Within Exeter City the current proposals state enhancement of seven existing Valley Parks with a focus on Exe Riverside and Ludwell Valley. These locations are highlighted in the Green Infrastructure Strategy: Phase 2 with particular focus on the Exe Riverside Park and Ludwell Valley due to its proximity to the Exe. Work on these parks is outlined as a strategic project to '... raise the profile and enhance the landscape, recreational and wildlife value of the sequence of parks and open spaces along the Exe Valley from Cowley to Countess Weir and including Ludwell Valley Park.'

ECC: Mincinglake Valley Park (MVP)

7.27 Mincinglake Valley Park is located to the north of the city and is not connected to the Exe Estuary. This site has been identified as having particular opportunities as it is partly owned and partly leased by the council and there may be the chance to acquire the northern extension at Drake's Meadow on a perpetuity basis. The site is not adjacent or nearby to a particular development area, but it has the potential, with enhancements, to attract recreational users from further afield as well as attracting more use from local residents.

ECC: Monkerton Ridge (MR)

7.28 Exeter City Council is proposing the creation of a ridge top park at Monkerton to function as a link to the proposed Clyst Valley Regional Park (EDDC). Negotiations regarding land acquisition have not commenced and the local authority wishes to confirm the importance of this site. The site is located near to a proposed urban extension of Monkerton/Hill Barton which consists of 2500 houses close to business parks and the Meteorological Office headquarters.

Site assessments and identification of further measures to improve suitability

7.29 The following tables set out the findings of the on-site assessments undertaken for each of the proposed SANGs. Table 15 identifies key physical visitor infrastructure that is either present or could potentially be added and Table 16 assesses the sites against key criteria for SANGs provision.

7.30 Table 17 then provides some additional site specific information on issues and opportunities. The proposals for SANGs are incorporated to varying degrees into emerging and adopted land use plans, and are committed to in greenspace strategies. The information within these three tables should be used to add to current policies, strategies and commitments to SANGs provision. It is advised that the additional measures are necessary, and work to secure them should be committed to, in order to maximise the potential of each to function as an attractive alternative greenspace, thus reducing European site recreational pressure.

7.31 An additional consideration for SANGs provision is the local, daily dog walking use of the Pebblebed Heaths. From the Ecology Solutions Report (2012) about 60% of visitors to the Pebblebed Heaths come from Exmouth and the Exeter area with other notable origins being Sidmouth (c 8%) and Budleigh Salterton (c 7%). Whilst these results should be treated with some caution as they represented only some 36% of those counted during the visitor survey, it is important to note that SANGs provision to serve these locations needs to have a particular focus on dog walking facilities. SANGs provision in both Exeter and Exmouth should ensure free parking and a suitable length dog walk, including circuits over 2km, and long circuits for those looking for a longer walk, plus a relaxed and welcoming feel for dog walkers, without dogs-on-lead constraints. There may be a need to consider additional specific dog walking provision, which should take into account the recommendations made below for dedicated dog walking areas within European sites.

Table 15: Summary of features of the SANGs proposed by each local authority. X indicates absence of feature and lack of suitability, ✓ indicates current presence and P = Potential to develop a feature. .

	EX1, 2				**ERVP**	**MVP**	
	20				400	38	34
	P				40 (Countess Weir and Salmon Pool)	15 (potential for more)	P (limited)
	Some footpaths and access tracks. Adjacent playing fields, playground links to Liverton Copse and countryside.	PROW throughout the farmland but not well linked. Various National Trust properties within the area. Train stations Pinhoe, Whimple and Cranbrook. Parking at Danes Wood	Tracks, PROW, narrow road (Matford Lane) through site	SW Coast Path, access tracks, hotel, campsite, Dawlish Warren train station nearby, local accommodation	Extensive canal and riverside walks and cycle routes, canoe loops, playing fields, Pubs	An established recreational open space with footpaths and limited facilities	Footpath between two main roads, nearby Pinhoe train station
	X	X	X	X	X	X	X
	P	P	P	P	✓	P/✓	P
	N/A	P (linked with NT sites)	P	P	P	P	N/A
	P	P	P	P	✓	P/✓	P
	✓(Greenfingers Garden Centre)	P (linked with NT sites)	P	P/✓	P/✓	P	N/A
	P	P	P	P	P/✓	P/✓	P
	P/✓	P/✓	P	P	✓	✓	P
	P	P	P	P	✓	P	N/A
	P/✓	P/✓	P	P/✓	P/✓	P/✓	P/✓
	P/✓	P/✓	P	P	✓	P	P/✓
	✓	✓	✓	✓	✓	✓	X
	✓	✓	✓	✓	✓	✓	✓
	P	✓	X	P	✓	✓	X
	X	X	X	X	✓	X	X
	✓	✓	✓ (spring)	X	✓	✓	X
	X	✓	X	X	✓	X	X
	X	X	X	X	X	X	X
	X	?	X	X	X	X	X
	X	?	X	X	✓	X	X
	X	X	✓ (views)	X	X	X	X
	X	X	X	✓	X	X	X
	Withycombe: horse paddock Greenfingers garden: wooded valley	Over large area PROW will be locally used and NT properties will attract visitors from further	Only PROW through.	SW Coast Path	Exe Valley Way, Exeter Green Circle, 26 dog walkers, 27 walkers, 20 canoeists, 30 cyclists, 14	Exeter Green Circle, 7 dog walkers seen	Cycle route used by walkers (many workers from adjacent business

Feature	East Devon		Teignbridge District		Exeter City		
	EX1, 2	CVRP	SWE3	DA7	ERVP	MVP	
		afield			joggers, 1 angler		parks), joggers, cyclists and dog walkers
Notes	Suitable for link between other POS and creates a green corridor to open countryside	Mainly farmed land surrounding villages and along river and stream valleys. Future link to Cranbrook.	Mix of arable and cattle grazed fields, large hedges, small wooded area, County Wildlife site, SAM, inert landfill	Grazing, arable farmland, show ground, caravan touring. Hedgerows, mature trees in places	Gradual change from semi-natural in the south and formal recreation near the city. Many opportunities for enhancement and links.		The land either side of the PROW is clearly owned by developers and it is adjacent to business parks and industrial units.

Table 16: Assessment of sites against SANGs criteria.

	East Devon		Teignbridge District		Exeter City			East Devon		Teignbridge District		Exeter City		
		CVRP		DA7			MR		CVRP		DA7			
High Nature Conservation Value?	X	✓	✓	X	✓	X	X	X	✓	✓	X	✓	X	X
Adequate parking? (or local, on-foot visitors only). Amount of car parking space should be determined by the anticipated numbers using the site and arriving by car.	X	X	X	X	X		X		✓	✓	✓		✓	X
Car parks must be easily and safely accessible by car, be of an open nature and should be clearly sign posted.	X	X	X	X	X	X	X	Local use	✓	✓	✓	✓	✓	✓
Easy access between car park/housing and the SANGs with facility to take dogs safely from the car park to the SANGs off the lead.	✓	X	X	X	X	✓	X	✓	✓	✓	✓	✓	✓	X
Signage outlining the layout of the SANGs and the routes available to visitors.	X	X	X	X	X	X	X	✓	✓	✓	✓	✓	✓	✓
Urban feel avoided? A majority of paths should be suitable for use in all weathers and all year around. Boardwalks may be	✓	✓	✓	✓	✓		?	✓	✓	✓	✓	✓	✓	✓
All SANGS with car parks must have a circular walk which starts and finishes at the car park.	X	X	X	X	✓	✓	X	✓	✓	✓	✓	✓	✓	Unsure
It should be possible to complete a circular walk of 2.3-2.5km around the SANGS, and for larger SANGS a variety of circular walks.	X	✓	X	✓	✓	✓	?	✓ (with extra paths)	✓	✓	✓	✓	✓	✓ with CVRP link
SANGS designed so that visitors are not deterred by safety concerns.	X	X	X	X	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SANGS should be clearly sign-posted and advertised.	X	X	X	X	X	X	X	✓	✓	✓	✓	✓	✓	✓
SANGs should have leaflets and/or websites advertising their location to potential visitors. It would be desirable for leaflets to be distributed to new homes in the area and be made available at entrance points and car parks.	X	X	X	X	✓	✓	X	✓	✓	✓	✓	✓	✓	✓
SANGs must be perceived as natural spaces without intrusive artificial structures. Visually-sensitive way-markers and some benches are acceptable.	X	✓	X	X	X/✓ (different areas)	✓	X	✓	✓	X	X	X/✓	✓	X
SANGs must aim to provide a variety of habitats for visitors to experience (e.g. some of: woodland, scrub, grassland,	✓	✓	✓	✓	✓		X			✓	✓			?
Access within the SANGS must be largely unrestricted with plenty of space provided where it is possible for dogs to exercise freely and safely off lead.	X	X	X	X	✓		X		X	✓	✓		✓	✓
SANGS must be free from unpleasant visual, auditory or olfactory intrusions (e.g. derelict buildings, intrusive adjoining buildings, dumped materials, loud intermittent or continuous	X	✓	X	✓	✓	✓	X	✓	✓	✓	✓	✓	✓	X?

SANGs criteria	Currently present							Future Potential						
	East Devon		Teignbridge District		Exeter City			East Devon		Teignbridge District		Exeter City		
	EX1, 2	CVRP	SWE3	DA7	ERVP	MVP	MR	EX1, 2	CVRP	SWE3	DA7	ERVP	MVP	MR
noise from traffic, industry, sports grounds, sewage treatment works, waste disposal facilities).														
Links to surrounding greenspace? Footpath networks etc.?	X	✓	X	✓	X	X	X	✓	✓	✓	✓	✓	✓	✓
Dog friendliness – water, dog bins, suitable terrain for dogs to enjoy	X	X	X	X	✓	✓	X	✓	✓	✓	✓	✓	✓	✓
Interesting scenery? Topographical variation within site? Expansive and feels relevant to nearby European site? Potential to enhance landscape?	X	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Table 17: Current concerns, recommendations and comments regarding SANGs provision.

SANGS Site	LPA	Current concerns	Recommendations for additional measures	Other comments
Exmouth Valley Parks (EX1 and EX2)	EDDC	These areas are small and the information about their plans is limited. Lack of facilities at present.	In order to overcome the small scale of the sites, the key to the success of these sites will be to create a permissive path which links into the adjacent countryside and Liverton Copse.	EDDC could also investigate wihether some of the adjacent school land could be incorporated – retained as part of the playing field but also available for wider use at weekends.
Clyst Valley Regional Park (CVRP)	EDDC	Expansive valley farmland that is not obviously identifiable as a greenspace resource. Needs visitor infrastructure.	A notable opportunity for the Clyst Valley would be to work closely with the National Trust to ensure that their properties and the cultural heritage (farming, landscape, architecture) form an important part of the design. Honey pot locations such as a tea room, small visitor centre/information points, as well as significant promotion should overcome current lack of awareness.	The assessment of this site was more challenging due to the nature of it as a landscape enhancement project rather than a specific SANGs, but its potential is evident if an ambitious vision can be realised.
South West of Exeter Ridge Top Park (SWE3)	TDC	This site may not attract existing visitors away from the Exe and Dawlish Warren, but it does have the potential to intercept visitors from the new homes proposed on the south west of Exeter. Concerns regarding recent historic records of Cirl Bunting on site could be alleviated by enhancement of the CWS and restriction of public access in sensitive areas.	This site is well located to function as a high quality local greenspace for the new housing allocations, and so its use on a very regular/daily basis should deflect use from the European sites. However, it may not detract all use, as the unique coastal expereince cannot be fully replicated here. Cirl bunting (and other imporant local wildlife) should be the focus of habitat creation and restoration, as part of a wildlife habitat focus for the site. The large size of the site should enable the design to incorporate willdife sanctuary zones where access is prevented, and incorporate significant habitat corridors to link the site to wider countryside. Naturalness and habitat variety should be key.	The size, location and expansive views are obvious benefits
Dawlish Warren Coastal Park (DA7)	TDC	Potential is clearly evident but visitor infrastructure will be critical for attacting visitors. Currently lacking in varied topography. Links back to Dawlish Warren must be prevented. It is unlikely to prove attractive to users such as bird watchers, walkers and beach users, and on site	The site lends itself to small scale woodland planting to provide variation and a more natural feel. There is also opportunity for pond creation. Some innovative design is required to make the site more varied in topography, with good use of planting as screening. The site's success will be in its ability to provide excellent visitor	The initial plans for the site are well matched to its form. The site is well placed with foot, rail and road links for visitors. Location will make the site easy to promote. A cafe and play park for children might prove additional

SANGS Site	LPA	Current concerns	Recommendations for additional measures	Other comments
		mitigation at Dawlish Warren will therefore still be required.	facilities whilst critically retaining a feeling of naturalness, seeking to capture some of the unique coastal experience. Attractive coastal views will be important for this site. An additional focus should be the provision of local dog walking facilities, in order to draw dog-walkers away from Dawlish Warren SAC. To maximise its potential, it would need to offer free parking and a suitable length dog walk, including 2km circuits for daily walks, and longer circuits for those looking for a longer walk. It will be important to provide a relaxed and welcoming feel for dog walkers, without dogs-on-lead constraints. There is also the possibility of a "no pick-up" area where owners are not required to remove dog waste	draws, but are not essential.
Exe Riverside Valley Park and Ludwell (ERVP)	ECC		The park is nestled into the city and is used mostly by visitors arriving by foot, but greater parking provision would help to attract visitors from the edge of the city – or better public transport links. Salmon Pool Bridge seems like a good location for enhancement of facilities and parking. There is a changing room block in a state of decline which could become a cafe/toilet block/visitor centre/ education-eco centre. Better promotion of walking links in the southern half of the site, which has a natural, spacious feel and could be promoted as a wildlife watching area. The Double Locks Inn provides a focal visitor facility, and proportion of the site could include the combination of waterside walks and pub lunches. Ludwell Park could be joined to the Exe Valley Park using a green way.	The park is a fantastic resource for Exeter City residents and changes its character from the city southwards. The cycle route is very well used already and there may be options to extend this as part of the site enhancement programme.
Mincinglake Valley Park	ECC		The middle/landfill area has potential for a diverse parkland with areas of scrub and open grassland, and could possibly could be grazed. The top meadow creates a great link to Drakes Meadow, but this is clearly under-used and therefore requires parking and visitor information. This would also help those unable to reach this area by foot up the hill. Stoke Hill Community Centre could be brought into the porposals as a focal vistor facility. This site has the potential for additional local community links.	The top of the site has good views and in the valley there are good surfaced paths, benches, dog waste bins, circular routes, a variety of access points and routes takiing visitors through different areas – open grass, woodland, bridges over the stream, ponds. The top meadow is a fantastic mix of woodland edges, copses and (cattle-grazed) grassland. Good views. Creates a great link to Drakes Meadow.
Monkerton Ridge	ECC	Potential for airport disturbance as only 2.5km away. Circular walks within the site may not be possible	Significant screening of existing development would be required, along with Cumberland way and the M5. A circular walk of 2.5km would need to be developed with the use of adjacent path links, and the potential to link into the Clyst Valley from here has already been noted by ECC, which could provide an excellent link between urban and wider rural greenspace.	The views are extensive due to the height but they are not particularly attractive. Careful thought needs to be given to how visual attractiveness can be improved.

Recommendations: Provision of SANGs throughout all three local planning authorities

- The three local planning authorities have put in place planning policy commitments to providing mitigation measures, including extensive new, or significantly enhanced existing, greenspaces to attract some of the recreational pressure away from the European sites. Extensive and informed consideration of the requirements for alternative greenspaces has already taken place. This report does not rule out any of the proposed SANGS being used to offset the recreational pressure that may otherwise be directed to the European sites. Rather, the assessment of SANGs suitability undertaken here seeks to add to each site's proposals, in order to maximise their potential through additional recommendations.

- Overall we suggest that SANGs in four broad locations should form part of the mitigation 'package': in the vicinity of Dawlish Warren; around the south-west of Exeter/north-east of Teignbridge District; to the east of Exeter/north-west of East Devon District and around the edge of Exmouth (towards the Pebblebed Heaths). The proposed SANGs provide opportunities in these broad locations, although there seems to be need to secure additional SANGs around Exmouth and there are a range of options for the area around the south-west of Exeter/north-east of Teignbridge District.

- Provision of SANGs is a significant, long-term investment and commitment. The SANGs proposed by the three local planning authorities are an integral part of their plan led approach to supporting growth, and a number of proposed SANGs also perform wider green infrastructure and tourist functions. SANGs can be expensive in comparison to other measures, but have the potential to be highly effective in the right situations, and here the delivery of large scale urban extensions provides a good opportunity to add to the function of the new greenspaces. Wider green infrastructure and tourist benefits should not form part of any European site mitigation proposals or costings.

- We recommend that whilst they are an important aspect of the proposed measures here (and that the potential of each SANG should therefore be maximised), an extensive suite of other mitigation measures should also be in place to have certainty that the overall package of measures will meet its required objective (e.g. on-site measures, education, communication and enforcement). The suite of measures proposed here is broader than in other places, for example the Thames Basin Heaths. Recommendations reflect the complexity of impacts and measures required, particularly in a coastal location.

Provision of designated access points for water sports

7.33 For many watersport users, easy access to the water is fundamental to their enjoyment. Requirements differ with activities. For example, personal watercraft ("jet skis") need to be transported on trailers and launched from slipways where the craft can be easily manipulated on a trailer. For most activities, good parking, ideally close to the water is preferred, and some users require space to be able to park their trailer and vehicle whilst out on the water. Some users may be attracted to particular locations if these can provide car key storage, washdown facilities or easy parking. The provision and design of access points for watersport users therefore provides a means of potentially drawing users to particular locations. Water sports are relevant only to the Exe Estuary SPA/Ramsar site.

7.34 Existing slipways and access points onto the water are shown in Map 4 of the Exe Disturbance Study (Liley *et al.* 2011). Drawing from these data and our own experience we summarise key locations where members of the public can launch or land craft such as rowing boats, canoes or other small craft in Map 15. We have not included privately owned slipways or slipways where use is restricted to club members (such as the sailing clubs). The 21 locations shown in Map 15 are summarised in Table 18. It can be seen that parking is difficult at many locations and the main locations with easy parking and access are around Exmouth.

Map 15: Exe Estuary SPA, Public slipways

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Exe Estuary SPA

Table 18: Public launch points for small craft, canoes etc.

Map Ref	Name	Notes
1	Topsham Rec. Slipway	Small slipway. Limited parking
2	Topsham Ferryman Slipway	Launching point for small passenger ferry. No formal public use
3	Topsham Church Steps Slipway	Small uneven slipway. Some parking in area, but difficult with boats
4	Topsham Strand Slip	Small slipway usable on most tide states. Limited parking
5	Topsham Goat Walk	Slipway at end of lane. Access to water only at high tide. Limited parking
6	Bowling Green Road	Jetty at end of lane (past RSPB reserve). No parking
7	Lympstone Port	Very sheltered, small harbour. Very muddy at low tide
8	Lympstone Beach	Very muddy at low tide. Limited parking
9	Lympstone Courtlands Slipway	No parking. Not accessible at low tide
10	Exmouth Rec. Slipway	Only accessible at high tide. Pay and display car-park nearby
11	Exmouth Gut Head Slipway	Only accessible at high tide. Pay and display car-park nearby
12	Exmouth Camperdown Slipway	No/v. limited motor vehicle access
13	Exmouth Belshers Slipway	Slipway useable at all states of tide. Parking limited.
14	Exmouth Mamhead Slipway	Can be busy. Leads into sea and currents can be difficult. Some parking nearby. Currently deemed structurally unsafe so therefore closed
15	Exmouth Carlton Hill Slipway	Pay and display car park. Strong currents
16	Exmouth ILB Slipway	Primarily used for Lifeboat and rowing club. Pay and display parking available in area
17	Exmouth Orcombe Point Slipway	Sheltered area to launch, but above normal tide range. Pay and display parking nearby
18	Cockwood Harbour Slipway	Slipway only accessible during spring tides. Difficult parking
19	Starcross Southern Slipway	Narrow access under railway and only usable at high tide. Limited parking in residential area (Generals Lane)
20	Starcross Northern Slipway	Only accessible at high tide. Can be difficult to use
21	Turf Jetty	Jetty accessed on narrow gangway. Also beach nearby with access to water at high tide

7.35 In order to minimise disturbance it would make sense for most watersport use to be focused at Exmouth seafront or along the coast, rather than in the estuary. Many of the existing slipways and access points around Topsham, at Lympstone and at Starcross are relatively small with limited parking. To minimise disturbance in the long term, these should remain relatively low key and not be enhanced or promoted.

7.36 There has been much recent discussion and concern raised about slipways and access to the water around Exmouth. A detailed appraisal of the slipways (Teignbridge District Council Design and Property Services 2010) sets out the issues. Belsher's slipway has the best tidal range and is relatively sheltered, but there is no parking and the new residential development in this area means little can be done to enhance the slipway. The restrictions at Belshers slipway and the closure of the Mamhead slipway has resulted in additional beach front parking: these issues need to be resolved to prevent vehicles parking on the foreshore.

7.37 The slipway at the Imperial Recreation Ground provides access to the Duck Pond area. Here the slipway is useable only at high tide on spring tides. There has been a suggestion to enhance the slipway here by extending access across the intertidal area with a flexible slipway surface, to allow direct access into the channel (Teignbridge District Council Design and Property Services 2010). This would allow the slipway to be used at all tide states and would greatly increase the levels of disturbance if people were regularly launching craft here at low tide. In order to reduce disturbance in the long-term it would be ideal to close this slipway, to gate it so that it is only accessible for emergency services, or possibly to allow minimal public use in the summer only.

7.38 The Mamhead slipway provides good access to the water, but access onto the slipway is from a busy public highway and the nearest parking suitable for trailers is 400m away. The slipway is also very steep and too short. Detailed inspection of this slipway in 2012 indicated that it had failed structurally (Royal Haskoning Ltd 2012) so it was closed off. Given the importance of the slipway in providing direct access to the water (most tide states), it would seem likely that it will be reinstated. This area features in the Exmouth Town Centre and Seafront Masterplan and regeneration of the general area is proposed. This slipway 'works' to focus water-based access off Exmouth seafront. Long term plans for this area should potentially include provision for personal watercraft and other users to be able to park and launch in this area.

7.39 Kitesurfing and windsurfing do not require dedicated slipways. There are two key areas for these activities. The seafront is used by experienced practitioners. There is a voluntary launch area opposite the Queens Road car park and along from the green number 11 buoy. The Duck pond area is more sheltered, shallower and provides a safer environment, particularly suited to beginners. Users here tend to launch from the beach, or walk out across the mudflats to launch from the sand bars.

7.40 The water conditions and geography mean that these two areas will be the primary focus for kitesurfers and windsurfers. In terms of provision of designated access points there is relatively little scope for improvement.

Recommendation: Provision of Designated Access Points for Watersports Users

- Ensure Mamhead slipway developments provide for a slipway that will draw users and promote access directly out to the sea rather than into the estuary. This slipway should be promoted and be a focus for users rather than the other slipways inside the estuary (see also Codes of Conduct and Zoning)
- The Imperial Recreation Ground slipway should ideally be closed, or at least not be further enhanced or promoted. It should be gated such that it is only used for emergency access.

Enhance access in areas away from designated sites

7.41 At a large, regional or landscape scale, access management planning can strategically focus access provision away from sensitive areas. For example at the scale of a national park it is possible to ensure access provision meets demand yet sensitive locations are not allowed to get too busy. Such an approach is difficult where multiple bodies are responsible for managing sites and access. The provision of new green infrastructure and enhancement of existing open space are relevant here, but are considered in the SANGs section above.

7.42 Other options are relatively limited. The Teignbridge Local Plan (policy TE5) includes enhanced mooring facilities and slipway access on the Teign, potentially drawing some watersports use away from the Exe Estuary. There may be opportunities in the future to enhance watersports facilities and access to the water further east from the mouth of the Exe Estuary, put potential is probably limited.

8. On-site Access Management

Restrict/prevent access to some areas within the site

8.1 There are numerous examples from around the UK where temporary or fixed exclosures are set up to restrict access to areas with sensitive nature conservation interests. Examples include:

- Temporary fencing to provide safe nesting areas for terns and breeding waders exists at numerous sites such as Holme NNR, North Denes SPA (Great Yarmouth), Scolt Head NNR, Dawlish Warren NNR, Pagham Harbour LNR and Walberswick NNR.
- Fencing to protect rare plants from trampling at numerous sites, for example Browndown SSSI, Dawlish Warren (sand crocus).
- Chestnut paling and other fencing is used to protect dune systems from erosion and trampling damage at many sand dune sites.
- Protection of wader roost sites. For example at Dawlish Warren a warden is present through the winter at high tide and visitors are redirected according to where the birds are.

8.2 Published evidence on the efficacy of such approaches is relatively limited, however if fences are well maintained and adequate they should reduce visitor use in particular areas. The approach was scored relatively high by our expert panel (Appendix 2). There is however little guidance on what size exclosures should be to be effective and there are a range of options in the design and permanence of any fencing.

8.3 There is evidence that fencing roost sites can be effective, with before and after comparisons showing a reduction (but not cessation) in disturbance and an increase in birds (Lafferty, Goodman, & Sandoval 2006). Comparison of the distances at which birds respond to people also suggests that fencing can be effective in reducing disturbance (Ikuta & Blumstein 2003).

8.4 The design of hunting (wildfowling) refuges are considered by Fox & Madsen (Fox & Madsen 1997), who advocate that the size of refuge could be determined by the flight initiation distance ('FID' – the distance at which birds respond to people) of the most sensitive species, with three times the FID being the minimum diameter.

8.5 The use of FID to define the 'set-back' distance at which people should be kept back from roost sites has been advocated by a number of authors (e.g. Erwin 1989), yet there is contention regarding this approach and it is also clear that often buffers are established without empirical data on the distances at which the birds in question might respond (for example see Whitfield, Ruddock, & Bullman 2008). FID is not necessarily a good indication of birds' sensitivity to disturbance as, for example, birds taking flight may simply indicate that suitable alternative roost/feeding sites are available nearby (Gill, Norris, & Sutherland 2001). Gill argues that birds that do not take flight at large distances, but remain in situ longer when people approach, may be more vulnerable to disturbance, for example through greater interruption of their feeding time. Some authors advocate that the

distance at which birds become alert or change behaviour is a better measure to use to identify set-back distances (Fernandez-Juricic, Jimenez, & Lucas 2001). On the Exe Estuary, Goss-Custard (2007) used FID to estimate the area that might be disturbed by users on the National Cycle Network and (based on experimental fieldwork) he suggests that, where the cycle path would take people against the skyline, birds could be disturbed at distances of up to 400m if some very noticeable activities (such as gesticulating) were performed.

8.6 Examples of set-back distances are given below and it can be seen that a wide range of distances are suggested and there is much variation in how they are measured and the recommendation suggested:

- The majority of marbled murrelets waited until boats were within 40m before reacting, with 25% of the population reacting at 29.2 m (Bellefleur, Lee, & Ronconi 2009)
- 180m as the 'safe' distance for approach for pedestrians and boats for tern colonies, based on work in Florida (Rodgers & Smith 1995)
- 118m as a recommendation for zoning around Black Skimmer colonies in New Jersey (118m representing the distance within which 95% of flushing events occurred) (Burger *et al.* 2010)
- 70m as a recommended distance to protect roosting cormorants, gulls and oystercatchers from disturbance from kayaks and motorboats off Vancouver Island (Chatwin 2010)
- 200m as the necessary zoning required to protect common tern colonies from disturbance (people on foot) at colonies in Virginia and New Carolina (Erwin 1989)
- 100m as the necessary zoning required to protect least (very similar to little) and royal tern colonies from disturbance (people on foot) at colonies in Virginia and New Carolina (Erwin 1989)
- 100m as the necessary distance to protect nesting common terns from disturbance effects of personal watercraft in New Jersey (Burger 1998)
- 200m as the approximate distance at which curlews roosting on saltmarsh in Holland could be approached before taking flight (Smit & Visser 1993)
- 25-550m as the distance at which different wader species and brent geese were recorded taking flight when approached by someone walking across mudflats at two different sites in Holland (Smit & Visser 1993)
- 260m (range 32-675m) the mean approach distance for black guillemots (foraging on the sea in Canada) in relation to boats (Ronconi & St. Clair 2002).
- Scottish Natural Heritage guidance for people watching wildlife around Scotland's coast is to remain at least 50m away from birds foraging/roosting on the shore or on the water at sea (Scottish Natural Heritage undated).

8.7 On heathland sites, there is evidence that Dartford warblers suffer significant disturbance from people and dogs passing through heather dominated territories, but also that the disturbance is not significant in those territories dominated by gorse (Murison *et al.* 2007), with the implication being that where gorse dominates, people (and dogs) may well

behave differently, with the gorse effectively restricting access or screening visitors. Restricting access to areas may therefore not necessarily involve elaborate and visually intrusive fencing, but could simply be achieved by allowing dense gorse cover to grow in certain areas.

8.8 On the Exe Estuary there is an existing exclusion zone for kitesurfing. The approach is also likely to be relevant to the wader roost at Dawlish Warren. As the Pebblebed Heaths are common land and largely heathland, the public have full rights of access on foot to all parts of the commons under the access provisions included within the Countryside and Rights of Way Act 2000. While there are options within the Act for exceptions due to nature conservation interest these would be difficult to enforce where the birds are at low density and spread over a wide site. Restricting access is therefore not appropriate within the Pebblebed Heaths.

The Exe Estuary

8.9 There is an existing exclusion zone for kitesurfing on the Exe Estuary in the Duck Pond area. This is a voluntary exclusion zone applicable during October, November and December, with the aim of protecting the eel grass beds and to reduce disturbance for feeding wildfowl. The zone is not clearly mapped, for example the existing code of conduct for kitesurfers[17] shows a markedly different zone than that mapped on the Exe Kiteboarders website[18]. However, there are large yellow buoys that provide a clear boundary for users, and reminders to avoid the area are posted on the local kitesurfer forum each year (E. Bridges *pers. comm*.). There are no other 'exclusion' zones for other watersports and the existing exclusion zone partly contains a powerboating zone, which would seem to contradict the general message relating to disturbance. We therefore suggest that the exclusion zone should be discontinued in the future, and instead dedicated zones established within the estuary. These are discussed in a later section of the report (see zoning).

Dawlish Warren

8.10 The wader roost at Dawlish Warren may change over time, and is particularly important, as bird populations limited to only a few roost sites may be especially vulnerable to disturbance (see Conklin, Colwell, & Fox-Fernandez 2008 for discussion). Access restrictions relating to the roost should continue, and will require additional wardening time (see Wardening)

8.11 Access to areas of Warren Point is currently restricted with temporary fencing if breeding waders (not an SPA interest feature) are present. This will be even more important should visitor numbers increase. There is currently a voluntary restriction for water users on landing at Warren Point and guidance requesting visitors not to explore the dunes[19], with a

[17] http://www.exe-estuary.org/kitesurfers_coc.pdf
[18] http://www.exe-kiteboarders.co.uk/Locations/duckponds.html
[19] http://www.exe-estuary.org/dw_water_users_guide.pdf

defined landing place which can be used in the summer only[20]. Water users are asked to keep at least 100m from the shore in the restricted area.

8.12 Access to some areas of the mobile dunes at the proximal end of site is also currently restricted, to allow regeneration of marram dominated vegetation. Additional fencing would allow protection of other degraded areas of the mobile dunes. However, this is not a recommended mitigation action at this point in time. The mobile dunes are currently eroding significantly. Erecting fencing is difficult on the unstable substrate (a problem compounded in places by the presence of gabions), and it is likely to be damaged by storm events. Any fencing on the seaward side of the dunes is likely to collapse, making it both ineffectual and a health and safety concern. In addition, the extent of erosion of the beach means it is no longer possible to walk along the beach at high tide. Visitors walking out along the beach could find themselves unable to return on a rising tide and on the wrong side of the fence to return along the dunes.

8.13 It is likely that the geography of the site will change at a faster rate should proposed coastal realignment work go ahead. Embryo and mobile dunes may be created through natural geomorphological processes facilitated by beach recharging operations. These habitats will be vulnerable to trampling pressure, which will no longer have the advantage of increasing the mobility of the sand, as it will be naturally mobile. Therefore, depending on visitor access patterns to the site, it may be necessary to fence areas off to ensure they are not damaged. In the case of the embryo dunes, trampling pressure may prevent typical embryo dune flora from becoming established at all. Therefore it will be necessary to fence areas of accreting sand to allow vegetation to become established. Locations cannot be predicted in advance, but fencing should be in areas were accretion appears to be an establishing process, which are not too vulnerable to storm events. Trial areas are recommended to establish the success of the measure before significant fencing is carried out.

8.14 Depending on how Dawlish Warren SAC develops over the next decade, it may at some point be necessary to significantly change public access to part of, or indeed the whole, site. The creation of significant areas of mobile and embryo dunes which cannot be protected through visitor management (e.g. temporary or small exclosures, path management etc.) due to their location or extent would require more drastic measures to regulate visitor numbers. These could include allowing access via permit or fenced paths only, or discontinuing public access altogether in vulnerable parts of the site.

8.15 A live visitor management plan is recommended to allow staff to collate relevant information, review it on a regular basis (e.g. annually) and plan appropriate measures as required. The information required will include:

[20] http://www.dawlishwarren.info/content/doc/lib/640/Dawlish_Warren_Waterusers_Guide.pdf

- A measure of visitor pressure. We would recommend the installation of counters in at least three locations, e.g. the gate by the visitor centre; where the dunes narrow at the Bite; and a mobile unit which could be placed depending on need at Warren Point at the distal end of the dunes.
- A review of changes in the geography and habitat composition of the site due to coastal erosion or accretion. This will be relevant whether or not the proposed managed realignment takes place, but will be a considerably larger job should it do so. We recommend regular aerial photographs, if realignment takes place.
- Existing vegetation and species data in the context of visitor management, including further monitoring as required.

8.16 It is noted that measures to protect mobile and embryo dunes (should they become re-established) will be needed without the added impact of increased visitor pressure as a consequence of housing development. The likely increase in visitor pressure will however increase the need for these measures.

Pebblebeds

8.17 The approach is not really applicable to the Pebblebed Heaths where there is an existing statutory right of access under CRoW and the interest features are widely dispersed at low density. Access restrictions under CRoW are unlikely to be possible at a site level. Options to allow gorse to grow to create natural barriers to visitor movements are considered in the habitat management section.

Recommendations: Access Restrictions

Restricting access to parts of sites where sensitive features are present is relatively cost effective (depending on the fencing and practicalities) and relatively easy to establish. It is most appropriate where there is an easily defined and relatively discrete area to exclude people from.

- The existing exclusion zone for kitesurfing on the Exe Estuary around the Duck Pond should be discontinued and a series of dedicated areas established for particular watersports during the winter. These are discussed in the zoning section.
- The access restriction at the Dawlish Warren roost site should be continued and enhanced, with funding ensuring staff availability and resources to erect temporary (and more permanent) fencing as best suited each winter.
- A live visitor management plan for Dawlish Warren should be created and used to collate and regularly review information relating to visitor patterns and impacts such as footfall, vegetation changes and the consequences of geomorphological changes. This will be critical should coastal realignment go ahead.

Provide dedicated fenced dog exercise areas

8.18 Dog walkers are the key users at many of the individual locations around the Pebblebed Heaths, the Exe Estuary and Dawlish Warren. Dog walkers accounted for 39% of visitors interviewed in the Exe Visitor Survey (Liley, Fearnley, & Cruickshanks 2010) and 67% of those interviewed on the Pebblebeds (Ecology Solutions 2012) .

8.19 General studies of dog walkers indicate that preferences and needs of dogs influence where people choose to walk. Favourite sites are those where dogs are perceived as most happy; where they are permitted to run off lead, can socialise with other dogs, and where there is little danger of road traffic (Edwards & Knight 2006). The Pebblebed Heaths Visitor report indicates some 61% of visitors would visit less if they had to keep their dog on a lead (Ecology Solutions 2012) and 36% of interviewed groups on the Exe would visit less if they had to keep their dog on a lead (Liley, Fearnley, & Cruickshanks 2010). Furthermore on the Exe Estuary, the study indicates that enhancing another site to make it more 'dog friendly' would result in 38% of dog walkers who currently use the estuary switching to the alternative. Drawing from the comments in the Exe Estuary work that relate to 'dog friendliness' it is clear that safe areas to let dogs off leads was important (see para 3.35 in Liley, Fearnley, & Cruickshanks 2010).

8.20 Dedicated fenced areas for dogs to be let off lead are relatively common within the UK, and they vary markedly in size, shape and design: some examples are illustrated in Figure 10. Guidance on design and size are provided by Jenkinson (2013). There is scope to provide agility areas (for both owners and their dogs: Jenkinson 2009). As a mitigation measure fenced areas have the potential to draw dog walkers away from sensitive locations, reduce the numbers of dogs off leads outside the fenced area by providing a safe location for dog walkers to exercise their dog safely off-lead, and reduce impacts from dispersed dog fouling.

Figure 10: Examples of fenced dog exercise areas, from left to right: Sutton Heath (Suffolk); Kinewell Lakes (Northamptonshire); Rothiemurchus Estate (Speyside). All three examples are within or adjacent to SPA sites.

8.21 As a mitigation measure this approach was considered in the expert scoring exercise to have a relatively low likelihood of success for coastal sites (see Appendix 2). The Exe Estuary Visitor Survey results indicate that some dog walkers will walk over 6km and the mean length of walk was over 1800m (Liley, Fearnley, & Cruickshanks 2010). A fenced area would have to be very large to replicate the experience gained by many dog walkers using the estuary or Pebblebed Heaths.

8.22 While fenced areas may draw dog walkers, it is not clear whether they actually help reduce disturbance. For example the dedicated dog exercise area at Sutton Heath shown in Figure 10 provides a circular walk of around 500m, adjacent to a large car-park within the Suffolk Sandlings (an SPA). The exercise area lies outside the SPA, but is accessed from the car park, which is popular with dog walkers who walk on the SPA. Discussion with visitors using the area indicates that users from a very wide radius specifically travel to use the fenced area, which provides a particularly good environment to train dogs and exercise unruly dogs or ones which do not return when called. It is clear many users who visit also walk on the SPA – albeit with the dog on a lead once the dog has been exercised in the fenced area. The enclosure therefore serves as an attraction to dog walkers who might otherwise have not visited this area and it is not clear whether there is any reduction in off-lead walking on the heath as a result (Liley *et al.* 2010).

8.23 Dog walkers are one of the main user groups at all three sites and dogs off leads is a particular cause of disturbance to nesting and wintering birds. Fenced areas to exercise dogs may be popular with dog walkers, but there is relatively little evidence that through providing such features, a net reduction in disturbance can be achieved. Areas would need to be large to be effective, and as such this approach can only really be used as part of new, alternative green infrastructure. SANGs (see above) should be dog friendly and ideally would be fenced around their perimeter.

8.24 At Dawlish Warren there is not the potential to offer increased facilities for dog walkers. Similarly at other sites around the Exe Estuary opportunities for such provision are limited.

Zoning

8.25 Zoning partitions different types of access, determining the overall distribution of visitors on land and water, in both time and space. Zoning is positive in that it creates dedicated areas for particular activities, rather than limiting access (in contrast to restricting access entirely, see para 8.1).

8.26 There are numerous examples from around the UK coast of zones for particular water-based activities, such as water-skiing or kitesurfing. These zones are often set out in codes of conduct, usually developed with local users and user groups. The codes of conduct are sometimes also linked to byelaws, and the implementation of the zones is often driven by safety issues rather than with the aim to minimise disturbance.

8.27 Clubs can address a wide range of issues and adapt quickly to change, particularly where members communicate through forums and electronic discussion rooms. Working with local groups or clubs is a good way to resolve a lack of awareness or to highlight conservation issues or coastal byelaws. Clubs can provide a means for getting information across and help implement any zoning if they have been involved from the outset.

8.28 Zones are usually established to reflect local conditions, safety issues and site specific factors, and there appears to be little information available to recommend sizes of zones, the space needed for particular activities, etc.

Exe Estuary

8.29 There are existing zones for particular activities on the Exe Estuary. Details of these zones can be found on a range of different websites, leaflets and signs and we summarise some of them in Map 16. They include:

- A powerboating zone in the Duck Pond area, where the 10 knot speed restriction does not apply (on particular high tides only – above 3.8m). This is set out in the River Exe and Exe Estuary Byelaws (see Appendix 3).
- A dedicated area for water skiing, again defined in the estuary byelaws.
- A personal watercraft zone to the south-east of Maer rocks. This is shown differently on some of the maps available on the internet and from 2012 a new zone has been created east of the Exe Buoy.
- A wind/kitesurfing zone that is shown on the Exe Activities[21] leaflet, but does not seem to be mapped or recognised anywhere else.
- A wind/kitesurfing exclusion zone in the Duck Pond area.
- A zone for crab collecting that lies south of Lympstone/Starcross and down to Shutterton Creek and is mapped and set out within the Devon and Severn IFCA byelaws.

8.30 There are a number of issues with the current zones:

- They are mapped differently on the web and in various leaflets. For example the existing code of conduct for kitesurfers[22] shows a voluntary exclusion zone. between Exmouth and Lympstone that is markedly different from the zone mapped on the Exe Kiteboarders website[23].
- They are not communicated to users very well. There is little information available as to how and why the zones have been established, meaning users have relatively little understanding of why they are there.
- There appears to be relatively little enforcement of the use of particular zones, for example water-skiing frequently takes places in the upper parts of the estuary.
- There are some overlaps with different zones which creates a potential conflict between users, for example the dedicated wind/kitesurfing area shown in the Exe Activities leaflet[24] overlaps with a powerboating zone (with both mapped zones also in part covering the buoyed exclusion area for kitesurfing)[25].

[21] http://www.exe-estuary.org/activities_on_the_exe-web_version.pdf
[22] http://www.exe-estuary.org/kitesurfers_coc.pdf
[23] http://www.exe-kiteboarders.co.uk/Locations/duckponds.html
[24] http://www.exe-estuary.org/kitesurfers_coc.pdf
[25] http://www.exe-kiteboarders.co.uk/Locations/duckponds.html

- Some of the zones are voluntary and others are not[26]. This creates some potential for confusion among users.

8.31 We suggest that the zoning should be revised for the Exe Estuary, and this be linked to a review of the byelaws and codes of conduct. Ideally each activity would have a code of conduct that was similar in appearance, easily accessible, widely promoted across the user groups and clearly sets out particular zones for different activities. These codes should form a coherent package and dovetail. They should be available on the Exe Estuary Management Partnership website and a range of other websites as well as in print.

8.32 The zones should be backed up within the byelaws and clear explanation provided for why they are necessary. The zones should be marked with buoys in the estuary and details of the locations circulated among estuary users (we note the dissemination of existing data through for example the Exepert website[27]).

8.33 Revising the zoning such that it can be incorporated within revised byelaws and comprehensive codes of conduct is beyond the scope of this document. Further work is necessary as part of the review of codes of conduct, and would form part of the role for a dedicated post overseeing the progression of the elements set out in this report (see Wardening).

8.34 We provide a map showing suggested zones in Map 17. This will require further work to develop and detailed work with user groups is required. The map includes the following:

- A dedicated kitesurfing/windsurfing zone off the Duck Pond. The zone would ensure kite/windsurfers were not going up the river and ensure the area disturbed by such activities is minimised.
- The powerboating zone is shrunk to ensure no overlap with the kite/windsurfing zone. The use of the powerboating zone should be for the period 1 April to 1 September only.
- The existing waterskiing zone positioned in approximately the same place, slightly modified to fit alongside the kite/windsurfing zone.
- Off the Exmouth Seafront a line indicating a western limit for all watersport/ personal watercraft/boating activities, ensuring the areas around Dawlish Warren/Warren Point and off-shore are undisturbed.
- A dedicated zone (all year round) for personal watercraft remaining in the current location.

8.35 These zones, as mapped in Map 17, can be shown clearly on a single map and can be designed so as to provide space for users while also ensuring key areas for birds (such as

[26] Zones for waterskiing, powerboating and pwc are set out in the byelaws: http://www.exe-estuary.org/ecc_-_navigation.pdf
[27] http://www.exepert.co.uk/locations.html

the mussel beds, zostera beds and freshwater channel near the Duck Pond) are outside the zones. With a focus off the Exmouth seafront a large proportion of access (including the PWC zone) is outside the SPA/Ramsar. In Map 17 we also show GPS data collected as part of the Exe Disturbance Study. We show all the routes collected for the activities listed in the legend. These maps provide an indication of where users tend to go within the estuary and are helpful in showing that the zones do cover the main areas for activities.

Dawlish Warren

8.36 A voluntary landing zone is currently used at Warren Point to restrict visitors to Soft Sand Bay, and is discussed in section 8.11. The water users' code of practice at Dawlish Warren should be included in the review recommended in 8.31.

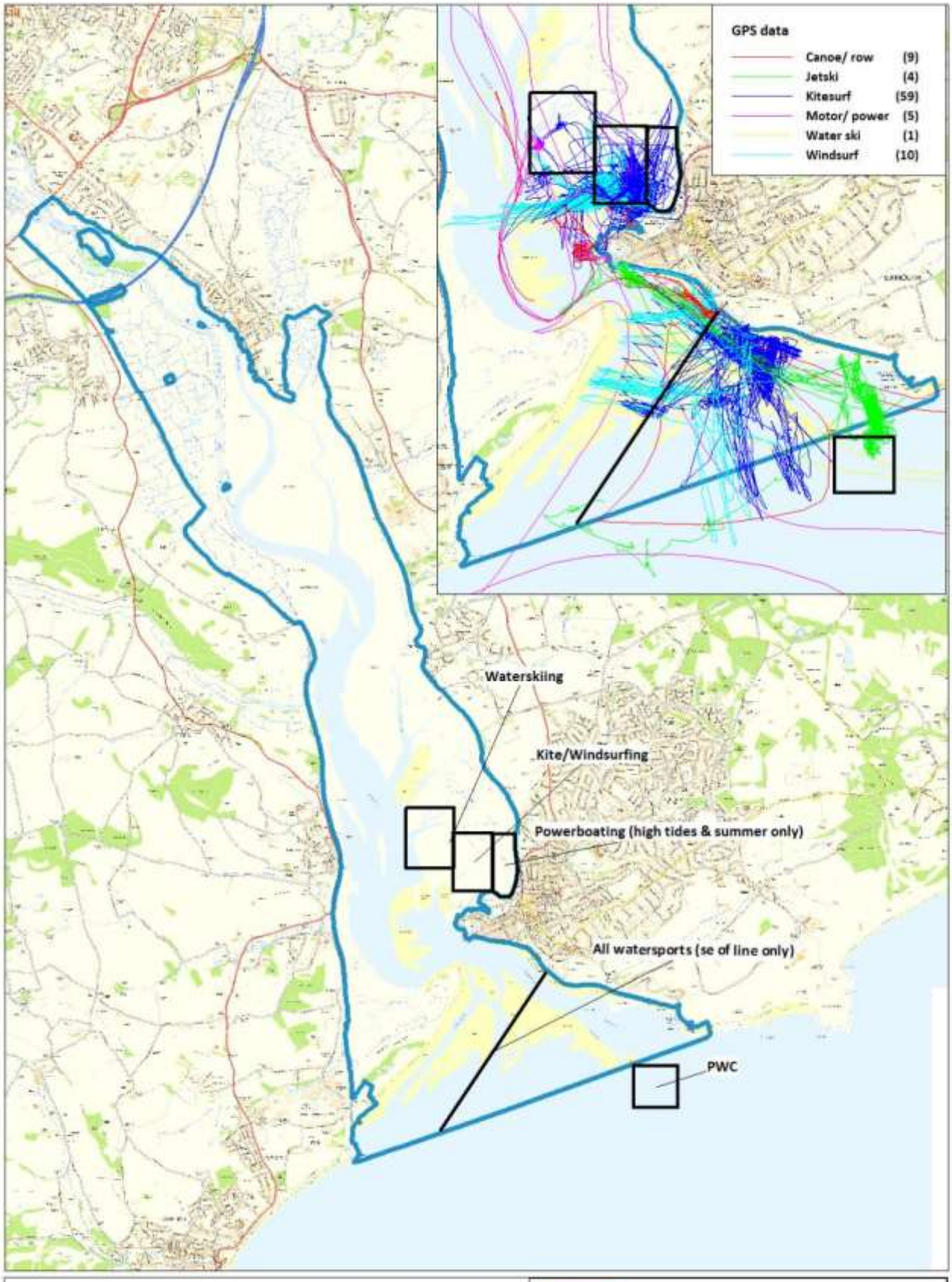
Pebblebeds

8.37 The visiting levels and size of the Pebblebed heaths, combined with the overall open access provisions probably makes this an unsuitable area for a zoning approach for general users. However some zoning is already in place for Royal Marine training and model aircraft flying and this approach might prove useful for future specialist users.

Recommendations: Zoning

- Current zones on the Exe Estuary are confusing, not necessarily clear to users and, while some are enforced with byelaws, others are not. We recommend a review of zones in line with codes of conduct and byelaws relating to the Exe Estuary.

Map 16: Current Zones
Contains Ordnance Survey data
© Crown copyright and database right 2012.
Exe Estuary SPA
current pwc zone
No kite surfing (current buoys)
old pwc zone
Powerboat area (Exe byelaws)
Ski area (Exe byelaws)
Wind/kitesurfing (vol. - from Exe Activities lea



Map 17: Suggested zones and GPS data (from Exe Disturbance Study)

Contains Ordnance Survey data © Crown copyright and database right 2012.

Infrastructure to screen, hide or protect the nature conservation interest

8.38 A wide range of different approaches are used on nature reserves across the UK to screen, hide or protect the nature conservation interest. Landscaping with banks or bunds, solid fencing, reed screens and careful planting/management of vegetation all serve to create barriers which mean people and wildlife are separated and the people hidden from view to the birds. In many instances hides or similar infrastructure allows people to view the wildlife while minimising disturbance. Infrastructure can also help to reinforce to visitors that they are entering am area important for wildlife – for example gateways can be designed to ensure dogs cannot run ahead and to provide a sense to the visitor of moving into a different 'zone'.

8.39 The limitations with these various approaches are that they tend to work best where people wish to be close to the wildlife or are sympathetic to the wildlife interest. Where visitors wish to see a particular view, be on the shoreline or out on the water then screening etc. may simply be walked round. Hides and viewing shelters are unlikely to work at all for those not interested in the wildlife.

8.40 In heathland areas, gorse management may be used to develop screening for Annex 1 birds (see habitat management section).

Exe Estuary

8.41 There is a clear opportunity to reduce disturbance through screening in the area around the Bight at Dawlish Warren, where reed screens or some kind of bank would ensure golfers are not visible to the birds and could also potentially limit golf balls going out onto the estuary (where golfers will often go to retrieve them).

8.42 Other opportunities for screening include Exminster Marshes where vegetation and/or physical screens could be set up along Station Road, carefully sited to allow some viewing of wildlife for those interested. Gates in this area could also be modified to ensure dogs cannot run ahead of their owner.

8.43 Other opportunities for new/modified infrastructure may arise over time. Such other opportunities should be assessed by the Delivery Officer and implemented as necessary – circumstances and access patterns may change over time, meaning different opportunities.

Recommendations: Screening

The options for screening are limited, but the following locations/opportunities exist:

- At Dawlish Warren, reed screening or a bank between the north-eastern most green on the golf course and the Bight would minimise disturbance from golfers for birds gathering in the Bight or roosting in that area. Any such infrastructure would need to be consistent with the site's conservation objectives.
- At Exminster Marshes screening along Station Road and modifications to gates.
- Other locations around the Exe Estuary as required and as opportunities arise.

Management of car parking

8.44 On sites where a large proportion of people visit by car, modifying the distribution, cost and ease of parking is a means of managing visitor flows. There are examples of sites where the careful review, assessment and management of parking provision has led to a marked change in how people use sites.

8.45 For example at Burnham Beeches, an SAC near Slough, the Corporation of London (responsible for managing the site) have created a car-free zone in the northern part of the site and then closed part of Lord Mayor's Drive (which allowed vehicular access through the middle of the site). In total three car parks have been closed and roadside parking has been restricted on roads around the site through signage, ditches, banks and dragon's teeth. In parallel with these changes, the Corporation of London relocated the main visitor facilities to provide a central focus of activity slightly away from sensitive SAC features and adjacent to open grassland which did not contain the SAC interest features and was not particularly sensitive to recreation pressure. Car park charges have been introduced, with ticket machines and the requirement to pay for parking at the busier times, at weekends and bank holidays. Outside these times parking charges are not compulsory, but visitors are encouraged to pay to park and a series of information boards explain about the parking charges. This system is intended to encourage people not to visit at busier times and makes it clear to visitors that they are visiting somewhere special where there are costs involved in management and maintenance. This helps to convey the idea to visitors that Burnham Beeches is more than a local greenspace or park.

8.46 The Burnham Beeches example illustrates how managing parking has the potential to influence access and redistribute visitor pressure. Closing car parks can however be contentious; for example proposals to close car-parks in the New Forest National Park have

been strongly opposed by local dog walkers[28]. Closures should only be undertaken after careful consultation and survey work to ascertain people's reactions and where access might be deflected to. Evidence from Cannock Chase in Staffordshire suggests that results can be unpredictable (Burton & Muir 1974), for example people may still choose to visit favoured areas, but are prepared to park further away and walk further. In general, preventing parking in lay-bys, on verges and other informal parking locations may be easier to achieve than closing formal car-parks.

8.47 Of all the groups interviewed in the Exe Estuary Visitor Survey (Liley, Fearnley, & Cruickshanks 2010), 60% had travelled by car. Around 70% of the people interviewed at Dawlish Warren had travelled by car. On the Pebblebed Heaths, on-site visitor data indicates that a high proportion (over 93%) of people travel by car. Managing car parking therefore has the potential to influence a high proportion of visitors to the European sites.

Exe Estuary

8.48 There are a range of parking locations around the Exe Estuary that include large formal car parks, lay-bys and more informal parking locations such as road verges. There are a number of locations around the Exe where relatively small changes could be made that would reduce disturbance levels. These are:

- Near Cockwood, access levels on the shore could be reduced markedly by closing the railway crossing just to the south of the village (which is not a Public Right of Way) and/or by closing the adjacent roadside parking.
- At the Imperial Recreation Ground in Exmouth, some bait diggers and dog walkers park on the upper beach or drive vehicles down the slipway and onto the intertidal. Dogs often run straight out onto the intertidal zone from here. Measures to deflect these users to official car parking facilities are recommended.

Dawlish Warren

8.49 Car parking fees at Dawlish Warren currently do not apply on Sundays and are lower during the winter. Raising the winter parking fee could deflect regular dog walkers who currently choose the site for longer weekend dog walks, and may reduce use of the site by daily dog walkers. Any rise in parking fees should be timetabled to coincide with the opening of free parking at the proposed Coastal Park.

8.50 At Dawlish Warren, one long term option could be to set back parking entirely from the current car-park, as discussed under Off-site measures. This is unlikely to be viewed favourably (e.g. local retailers could be concerned about loss of revenue through lack of convenient parking). An alternative would be to close the existing gates, significantly reducing the size of the car park.

[28] http://www.bournemouthecho.co.uk/news/districts/newforest/888601.Dog_owners___fury_over_car_park_closures/

Pebblebeds

8.51 Management of car parking is likely to be the single most effective visitor management measure on the Pebblebed Heaths where over 90% of visitors recorded by Ecology Solutions (2012) arrived by car and where some 60% said they would visit the site less if there were car parking charges.

8.52 The Ecology Solutions survey noted that there are 13 formal car parks and 55 informal car parking places (lay-bys, pull-ins etc.) with an estimated 296 car parking spaces in formal car parks and 187 spaces elsewhere. The unofficial car parking spaces had capacities ranging from one to twelve and based on 20 counts, only 20 had an average occupancy of spaces of more than 10% with 16 having no cars observed.

8.53 Any policy towards managing visitors through car parking would need to start with a programme of planned closures of the majority of unofficial car parking points and an assessment of formal car parks. Ecology Solutions found that there were wide differences in the use of the existing car parks with the heaviest use being at Woodbury Castle, model plane airfield, The Warren and Joney's Cross, and the lightest at Venn Ottery and East Budleigh Common (from car park vehicle counts).

8.54 Nearly half those who responded to a question about alternative sites visited in the Ecology Solutions questionnaire gave an alternative location on the Pebblebed Heaths suggesting that many visitors know the site well and are highly mobile. Thus it could be expected that measures to close, restrict, improve or enlarge car parking provision could change visitor patterns around the site but will not necessarily reduce visitor numbers. However, the introduction of car parking charges across the car parks on the Pebblebed Heaths could reduce numbers.

8.55 There is no existing overall visitor management plan for the Pebblebed Heaths although site managers are well aware of the issues and visitor management is addressed in the RSPB management plan. However, any measures which relate to the whole of the Pebblebed Heaths, such as management of parking, will need to consider the issues across the whole site if a strategic approach is to be inclusive and holistic. If not, then measures taken in one part of the site such as closing casual parking areas, will impact somewhere else as visitors move to park on another part of the site. Any visitor management plan will therefore be concerned with measures to manage access, not restrict it. Moreover, public access can provide wider benefits, not only in health and welfare (see above) but also in engendering interest in the site and its wildlife, a concern for the condition of the site with visitors reporting fires, vandalism and other damage, and if managed appropriately, additional benefits such as the creation of bare ground areas which can benefit invertebrates and reptiles.

8.56 A strategic visitor management plan will need to be led by the Pebblebed Heaths Conservation Trust with inputs from RSPB and other owners. Information on both official and casual car parking with respect to size and use is available from the Ecology Solutions report (2012), but additional information on the ownership and condition of car parks and parking spaces will be needed together with further information on the visitor patterns within the site.

8.57 As part of the long term strategy for car parking across the Pebblebed Heaths, it is recommended that a five year programme is instituted to close most of the casual roadside and other parking around the heaths. Existing car parks should be reviewed, including existing car park safety, condition, signage, use and capacity, together with on-site path network and use from car parks (via visitor survey as above) and comparison with the distribution of Annex I breeding birds and recommendations for mitigating disturbance. A review of the scale, desirability, costs and implications of introducing charges for car parking should also be undertaken.

Recommendation: Management of Car Parking

The high proportion of visitors arriving at the Pebblebed Heaths by car suggests that management of car parking may be most effective here. However, there are also options to use car parking restrictions or charges to influence the number of people visiting sites around the Exe Estuary.

- Control of parking on the beach at Exmouth by the Recreation Ground. This area is part of the East Devon District Council's freehold and parking could be controlled by gating the slipway.
- Closing the railway crossing and adjacent lay-by to the south of Cockwood.
- Review the car parking charges and car park use at Dawlish Warren as part of a Visitor Management Plan.
- Review car parking as part of a wider Pebblebed Heaths Management Plan. This to consider in detail the potential to close lay-bys/informal parking, enhance/modify existing car-parks and consider the introduction of parking charges.

Path design and management

8.58 Here we consider the effect of resurfacing or modifying how paths look and therefore the extent to which people use them. The use of screening along paths is discussed in the section on screening above.

8.59 The surfacing, design and maintenance of paths can affect how people use them and as a result reduce the impacts from recreation, without any change in visitor numbers. A much quoted example from the Pennines demonstrated that path resurfacing resulted in a change in people's behaviour (people stayed on the surfaced path rather than spread out to avoid the mud patches) and as a resulting there was a change in the distribution of birds adjacent to the path (Pearce-Higgins & Yalden 1997).

8.60 Path design can therefore be used to help focus visitor flows and how people move within a site. It is a relatively 'soft' approach in that it is possible to influence people's behaviour without people feeling their access is being restricted. Path surfacing was scored

moderately in the exercise to gauge expert opinion (see Appendix 2), and on coastal sites is most likely to be effective in drawing cyclists onto a clear route away from the shore.

Exe Estuary

8.61 The National Cycle Network route around the Exe Estuary provides a clear route around much of the estuary, and this has been subject to Appropriate Assessment and careful planning to minimise disturbance (Goss-Custard 2007). In many places the cycle route is set back from the estuary, thereby directing visitors away from the shoreline. The extent to which the route has resulted in a net increase in people visiting the estuary and in particular parts of the site is however unknown. Given the presence of the cycle route, options for this approach to be further applied around the Exe Estuary are limited.

Dawlish Warren

8.62 Dawlish Warren currently has a number of board walks and surfaced paths mainly in the buffer zone and in the vicinity of the visitor centre. Potential to decrease trampling through the creation of further surfaced paths is limited.

8.63 Relocating paths or creating new paths offers potential to lead walkers away from vulnerable areas (e.g. bird breeding and roosting sites), and is already used on site. For example, during the 2012 season, a new path was created inland of the roost site on Warren Point to reduce disturbance from visitors walking along the foredune. The vegetation was cut along the path route, which was marked with painted posts. It is recommended that path re- location is included in the proposed visitor management plan (see 6.16) as an action to be reviewed annually as the exact location of paths will depend on the location of the birds, and any changes to the site consequent on proposed coastal realignment.

8.64 It is recommended that the paths leading from the car park are rationalised, encouraging people to use the main gravelled track behind the dunes leading to the visitor centre. This will reduce the number of people dissipating from the path currently used leading north-west from the top of the car park (see section 7.6, as the proposed new route is outside of the SAC).

Pebblebed Heaths

8.65 Damage to paths from erosion and compaction, particularly in wetter areas, is occurring on the Pebblebed Heaths, although on drier areas the nature of the soil makes such damage unlikely except on steep slopes. Some management work has been carried out with footpath repairs, boardwalks and bridges installed in some areas. An assessment of further measures that could improve the existing path networks and reduce habitat damage would be useful and could then be used to encourage visitors to use less sensitive areas of the heaths.

Recommendation: Path design and management

The existing National Cycle Network route around the Exe Estuary already directs visitor flows around the estuary and in many places this route is set back from the shore. There is therefore little scope for path modification around the Exe Estuary.

- At Dawlish Warren, rationalisation of the paths leading from the main car park is recommended (see also Off site measures). Path locations on Warren Point will need to be reviewed depending on changing coastal dynamics.
- On the Pebblebeds, an overall assessment of path condition is recommended together with an annual programme of repair to eroded tracks and paths (including the installation of bridges and boardwalks as appropriate) to encourage use of less sensitive areas and to mitigate against trampling that would result in soil erosion and compaction of wet heath and mires.

9. Education and Communication to Public/Users

9.1 Education is widely regarded as crucial to reducing impacts by visitors to natural areas(Newsome, Moore, & Dowling 2002). Education initiatives, such as interpretation, guided walks, wardening, school visits, community events, etc, are widely used and accepted as they do not overtly regulate or control visitors. Such approaches are proactive, rather than reactive, but clearly they are unlikely to solve problems in the short term and depend largely on the audience and style of communication. Good communication and education measures can ensure users understand the importance of the site and why it is managed in a particular way and may also help local people and visitors to develop stronger connections with local sites.

9.2 Tests of the effectiveness of education and interpretation in reducing visitor impacts are limited (Newsome, Moore, & Dowling 2002), but studies would seem to indicate that they can be effective if targeted and well designed (Littlefair 2003). Studies have shown that tourists undertaking particular wildlife watching trips are keen to learn more about the environment around them (e.g. Lück 2003).

Signs, interpretation and leaflets

9.3 Interpretation boards, signs and leaflets are widely used around the UK at nature reserve sites.

9.4 Signs are an important means of conveying information to visitors. Considerable guidance is available, for example describing design principles, wording, etc for signs and interpretation (Mcleavy 1998; Kuo 2002; Hall, Roberts, & Mitchell 2003; Littlefair 2003; Bell 2008; Kim, Airey, & Szivas 2010). Provision of signage and wardening has been shown to result in enhanced breeding success for little terns in Portugal (Medeiros *et al.* 2007). Signs can ask visitors to behave in different ways. Interpretation provides information for visitors, enhancing their understanding of the site and its importance. Signs are also important to give the information to users that would be necessary to enable a conviction to be taken in relation to visitors knowingly causing harm to any of the features for which the site is notified.

Exe Estuary

9.5 There are existing interpretation and signs setting out information for users, byelaws, etc. around the estuary. These include signs setting out beach safety information and have (in the past) included information relating to codes of conduct for activities such as kitesurfing.

9.6 It would seem appropriate to establish up-dated signs at strategic points around the estuary, in line with the revised codes of conduct section. The signs should clearly set out how users should behave, with maps indicating particular zones, launching points, etc. These signs should match the code of conduct leaflets/web pages in terms of style, branding, etc. Particularly important locations would include:

- Each of the public slipways with general signage relating to speed, zones, etc. These should indicate no-landing zones and show the roost areas at Dawlish Warren as a 'no go' area.
- Dedicated signs relating to kitesurfing and windsurfing at the Imperial Recreation Ground and at the Maer.

9.7 New interpretation boards would also be useful at the Imperial Recreation Ground, at Lympstone (by Courtlands slipway), at Exton, Topsham (Goat Walk) and possibly at the Turf. These signs should highlight the importance of the estuary and the wildlife present in an inspiring way, and also provide information on what (in general) people can do to help protect the site, for example through keeping dogs off the mudflats and not driving below the seawall.

9.8 There are some excellent existing leaflets for the Exe Estuary, including the Exe Explorer, an Exe Activities leaflet and an Exe Wildlife leaflet, and these are widely distributed and available for download from the Exe Estuary Management Partnership Website[29]. These leaflets are scheduled to be updated by the Management Partnership in 2013. They all include a map of the estuary and information on where to go, sources of additional information and guidance. The Activities leaflet includes a map of the zones and a section on avoiding disturbance to wildlife. There is cross reference to codes of conduct (where they exist) and information for users wanting to undertake particular activities. This leaflet seems to work particularly well as an overview and has a good balance of promoting the estuary, providing information and guiding visitors on how to behave to minimise their impacts. Future updates will need to cross reference to codes of conduct and revised zones and it will be necessary to ensure the leaflet stays 'live'. Much of the information within the leaflet could be promoted more actively within the Exe Estuary Management Partnership website and made both interactive and more accessible. Further discussion relating to websites/on-line information can be found within the section on the provision of information off-site for local users and residents.

Dawlish Warren

9.9 There are currently a number of different information boards at Dawlish Warren, including those for the reserve, and those for the whole site, which offer visitors rather piecemeal information. An audit of all boards is recommended as part of the proposed Dawlish Warren visitor management plan (see 8.15). Ideal locations should be identified, and will depend on how access into the reserve is managed. All key access points should have an information board (including boat access at Warren Point). All boards should convey accurate information about the reserve, buffer zone, golf course and clearly show where the resort area ends and the areas important for wildlife start. The boards should indicate where byelaws operate. Information on the special interest of the site and codes of

[29] https://www.exe-estuary.org

behaviour should be included. The boards could be styled to match the ones for the Exe Estuary (see above).

9.10 Leaflets about the reserve are currently available. It is possible that the bulk of site users (dog walkers and beach users) are unlikely to pick up a leaflet, and additional use of leaflets is not recommended as mitigation.

Pebblebed Heaths

9.11 There are some existing interpretation panels on the Pebblebed Heaths, particularly at the most heavily used car park at Woodbury Castle. The visitor survey by Ecology Solutions found that the provision of better interpretation was likely to increase visiting, so for mitigation purposes, a strategy of warning against damaging behaviour and the steering of visitors away from sensitive or vulnerable areas might be the best approach. In particular, information and reporting procedures for the public in relation to wildfires should be improved, with new permanent signs and temporary notices at times of high fire risk. It is also recommended that waymarks are used on bridleways on the SAC/SPA to encourage horse-riders and mountain bikers not to stray from them.

Recommendations: Signs, Interpretation and Leaflets

- Up-dated signs at strategic locations around the Exe Estuary, that dovetail with the revised codes of conduct and zones. Key locations/content include:
    - Each of the public slipways with general signage relating to speed, zones, etc. These should indicate no landing zones and show the roost areas at Dawlish Warren as a 'no go' area.
    - Dedicated signs relating to kitesurfing and windsurfing at the Imperial Recreation Ground and at the Maer.
- New interpretation boards at the Imperial Recreation Ground, at Lympstone (by Courtlands slipway), at Exton, Topsham (Goat Walk) and possibly at the Turf to highlight the importance of the estuary and the wildlife present in an inspiring way, and also provide information on what (in general) people can do to help protect the site.
- Updates of the existing Exe Estuary leaflets (in particular the Exe Activities leaflet) to provide an overview of the estuary and various codes of conduct, zones and contacts for particular activities.
- An audit of information boards at Dawlish Warren. All boards should convey accurate information about the reserve, buffer zone, golf course and resort boundaries, and should indicate where byelaws operate.
- Provision of permanent warning signs and temporary signs during high fire risk periods on the Pebblebed Heaths.
- Provision of waymarking on bridleways on the Pebblebed Heaths

Codes of Conduct

9.12 Codes of conduct set out clearly how users undertaking a particular activity should behave, and are most relevant to sporting activities, including watersports. Where there is plenty of space, relatively few users and few conflicts, there is unlikely to be a need for any agreed code of conduct. Developing good, clear codes with user groups ensures that safety issues, insurance, consideration of other users and nature conservation issues can be accommodated, ensuring users can enjoy their chosen activities while minimising any impacts. Codes of conduct are particularly relevant where there are a wide range of users, potentially not linked to a particular club, and a range of complicated issues, or where multiple activities overlap. Casual visitors, which visit a location sporadically, are unlikely to be fully informed of all local issues and politics. A code of conduct serves to set out where there are particular issues and provides the user with all the information they need

to undertake their chosen activity safely, within the law and without creating conflict with others.

9.13 Codes of conduct can be established by directly working with local users, even by the users themselves. Codes are likely to be most effective where they are developed with stakeholders and are not overly restrictive. One of the key issues with codes is ensuring that they are read and circulated widely and that visitors are aware of them. Getting people to 'sign up' to voluntary codes of conduct is potentially tricky and may be difficult to achieve where many users are ad hoc, casual visitors and where there are multiple access points (i.e. no central location at which users can be intercepted).

9.14 There are a range of examples from around the UK where codes of conduct have been developed to resolve particular concerns. Those relating to water use include the following:

9.15 An example of voluntary codes of conduct is the Thanet area of Kent, where a series of codes of conduct have been brought together in a single document for a stretch of coast[30]. The document sets out the bird roosts and European Marine sites, and provides an easily accessible overview for users. The individual codes of conduct include dog walking, horse riding, bait collection, wind-powered activities and powercraft.

9.16 A second good example comes from Pembrokeshire, where the Outdoor Charter Group is a collection of outdoor activity businesses, environmental education centres, conservation groups and other organisations that have come together to ensure that adventure activities such as coasteering, kayaking, surfing and cliff climbing, do not impact on the environment and wildlife. Activity providers and conservationists meet routinely, and have been working together to develop adventure activities in a way which is sustainable for the environment. The website[31] provides a range of detail on best practice for each activity. The strength of the approach in Pembrokeshire is the way the charter group acts as an umbrella body. The Pembrokeshire Outdoor Charter Group (POCG) was developed by local activity centres and conservation bodies working closely with the National Park, National Trust, local activity centres, and conservation and education organisations. This Charter group represents a commitment by all members to good practice. All those who sign up to the Charter Group agree to conform to appropriate safety legislation, avoid damaging sites and to minimise disturbance. The group members liaise closely with the National Park Authority, attend regular meetings and annually attend training events.

9.17 On the Sefton Coast, at Ainsdale, a code of conduct has been developed with kite boarders in response to safety concerns[32]. Sefton Council introduced the code as owner/occupier of the land; the Council were aware of increasing levels of use by a range of users and users

[30] http://www.thanetcoast.org.uk/pdf/ThanetCoastalCodes.pdf
[31] http://www.pembrokeshireoutdoors.org.uk/
[32] http://www.sefton.gov.uk/pdf/KiteZone%20Permit%20FORMS%20oct%2009.pdf

undertaking a range of 'new' activities including parakarting. It is clear that there has been resistance to the code of conduct from some users, many of whom are drawn to the sport for the exhilaration and sense of freedom. The code requires users to register for permits, which are only issued on proof of valid insurance and evidence of club membership. Users sign that they have read the code of conduct when they are issued with the permit. Checks are made on the beach in suitable weather conditions (such as onshore SW winds) to ensure users hold permits, which are encapsulated and provided in a plastic waterproof pouch. In practice the checks are often made when people are heading out onto the water and permits are often left on the car dashboard (cars parked on the beach). The number of permits that has been issued is approaching four figures (G. White, *pers. comm.*) and there are instances where users have had their permits suspended. While safety has been the primary driver to the code of conduct at this site, the example is highly relevant as the code clearly sets out a no go area for birds and blends safety concerns with reducing disturbance. The code of conduct sets out a large, dedicated area for practitioners and there is also a kite-zone users'-panel, which meets two to three times a year to provide a platform for discussion.

9.18 Other examples of particular codes of conduct specifically relating to watersports such as kitesurfing and requiring users to get a permit and sign-up to a particular code of conduct include the Hayle Estuary[33] and Hayling Island. At Hayling Island there are currently two areas where kitesurfing is permitted – one is a free area promoted by Havant Borough Council where kitesurfers are self-policing, following a code of conduct that includes specific nature conservation requirements[34].

Exe Estuary

9.19 There are existing codes of conduct for the Exe Estuary, these include (as of January 2013):

- A general code of conduct for shore users and visitors[35], which is well over 10 years old and dated in appearance (for example it includes the English Nature logo)
- A kitesurfing code of conduct ("fowl play")[36] produced by East Devon District Council which simply provides a map of the Duck Pond and an exclusion zone.
- Kitesurfing codes of conduct on the Exe Kiteboarders website[37] and on the South Devon Kitesurf Club website[38]. Both of these are different. The Exe Kiteboarders site has content relating to disturbance at Dawlish Warren: *"Dawlish Warren is a National Nature Reserve and has a Guide for Water Users. Kiteboarders are asked*

[33] http://www.kernowkitesurfclub.co.uk/safety.htm#CodeOfConduct
[34] http://www.hka.org.uk/join.html
[35] http://www.exe-estuary.org/eemp_-_shore_and_water_code.pdf
[36] See http://www.exe-estuary.org/kitesurfers_coc-2.pdf and http://www.exe-estuary.org/kitesurfers_coc.pdf
[37] http://www.exe-kiteboarders.co.uk/code-of-conduct.html (accessed 3/12/2012)
[38] http://www.sdkc.co.uk/exmouth.php

to follow this voluntary code and observe Nature Reserve byelaws". It does not mention the Exclusion Zone at the Duck Pond (which is shown on a separate page of the site[39]). On the South Devon Kitesurf Club site there is no mention of the exclusion zone, but the code does ask users not to disturb birds as the Duck Pond area is a nature reserve.

- A draft code of conduct for personal watercraft being prepared by East Devon District Council. This includes a requirement to have an ID number on the craft, to *"stay away from areas where you may cause disturbance to wildlife"* and not to go up river from the launch point. A dedicated area for pwc use is mapped to the east of the Exe Buoy.
- A guide to the 'canoe loops' that includes a code of conduct (with a specific point about not disturbing wildlife).
- A crab collector's code[40] which is dated in that it refers to Devon Sea Fisheries and English Nature. It contains a clear map showing the crab tiling zone and instructions to reduce disturbance (e.g. dogs on leads) and ensure no net increases in levels of use.

9.20 Reviewing these existing codes of conduct shows a clear opportunity to produce a new set of codes of conduct. The existing information (bullets above) for particular users is not easily accessible and there is relatively little guidance on how to reduce disturbance. In some instances the guidance available to users is such that disturbance impacts to birds may be exacerbated. For example the Edge Watersports website[41] suggests:

> *"The 'Duck Pond' works best on a NW because the wind funnels from the direction of Exeter and cleans up as it comes down the estuary. Plan your kiteboarding to avoid disappointment and arrive 2-3 hours before high tide (except neap tides). The Duck Pond has good parking and a green where you can prepare your kit, then you can walk up the estuary and launch from one of the sand banks, giving yourself an upwind advantage and space.*
> *It is possible to launch from the green and many people do this, but it is best to plan your trip and arrive early and get the best of the tide - conditions are much better when the tide is on the push and still fairly shallow. If you don't plan your trip you are forced to launch on the grass, navigate through parked cars, hop over a fence - down a slip way, then start power stroking with your kite over land with a wall facing you - a recipe for a kitemare and worse."*

9.21 While the above is likely to ensure kitesurfers are safe, by crossing the intertidal areas and setting up their kites on the sandbars while mud is still exposed, large areas of mudflat are potentially disturbed.

[39] http://www.exe-kiteboarders.co.uk/Locations/duckponds.html
[40] http://www.exe-estuary.org/crab_code.pdf
[41] http://www.edgewatersports.com/kitesurfspots.php (accessed 3/12/2012)

9.22 For kitesurfing/windsurfing, jet skiing, sailing, power boating, water skiing, canoeing, crab tiling, bait collection/shellfishing, and dog walking clear codes of conduct are required for the Exe Estuary and offshore area. The codes should be established through close working with the local clubs, thereby requiring someone in post to undertake this work (we discuss the need for a delivery officer in the section on liason with clubs and groups). The codes will need to be reviewed regularly. The codes will need to be clearly set out, available through local clubs, incorporated into club websites, circulated to all relevant forums/new members of clubs, etc and set out on signs and other material (e.g. leaflets) as necessary. Ideally all the codes will be consistent in how they look and in their content, so it is clear they are fair and instantly recognisable. They should have a brief section on the bird interest and other relevant background so it is clear to users why they are expected to behave in a particular way. The codes should also include information relating to safety, other users, etc. For guidance we suggest the following information relating to disturbance should be included:

- Kite/windsurfing: details of zones, a requirement to only use the Duck Pond zone from 1 September to 1 April so that kite/windsurfing does not take place in the rest of the estuary during this period; to maintain distance from Dawlish Warren all year round; a requirement to only use the Duck Pond area 2 hours either side of high tide; clear guidance on where users should set up their equipment; and a requirement to not be out on the water in prolonged cold weather.
- Jet skiing/pwc use: a requirement to keep outside the estuary, launching from Exmouth and staying at sea or around the mouth of the estuary; no use of the area around Dawlish Warren and no landing within the NNR; promotion of the dedicated zone; and requirement to keep below 10 knots within the harbour limits.
- Sailing: clear guidance on location of roosts and a requirement to avoid sailing close to roost sites (we suggest a 200m buffer drawn around roost sites); a requirement for all races and events between September and March to take place only at high tide.
- Powerboating: clear guidance on zoning, with the existing powerboat zone boundary modified to ensure no conflict with kite/wind surfing; a requirement to use only at high tides (above 3.8m) and during the period 1 April to 1 September; at all other times within the estuary a requirement to be below the 10 knot speed limit; clear guidance on the location of roosts and a requirement to avoid roost sites (we suggest a 200m buffer drawn around roost sites).
- Waterskiing/wakeboarding: clear guidance on zoning, with the existing zone boundary modified to ensure no conflict with kite/wind surfing; a requirement that waterskiing/wakeboarding only takes place within the dedicated zone; for use of the zone to only take place 2 hours either side of high tide; with the time restriction only applied from 1 September to 1 April.
- Canoeing: guidance on where to canoe, requesting users to stick to the main channel within the estuary and a map shaded to show the main channel; the map should show the Clyst, the Bight, Shutterton Creek, Cockle Sand and Lympstone Lake as areas which canoeists should avoid between 1 September and 1 April; the

map should highlight areas where canoeists can launch/land without likely disturbance; a requirement to avoid roost sites (we suggest a 200m buffer drawn around roost sites).

- Crab tiling: as with the existing code, a requirement not to increase the number of tiles; to ensure tiles are low; not to undertake with a dog; and only to operate within the current zone (shown on a map).
- Bait digging and cockle raking: the code should require bait diggers to back-fill and dogs to be on leads; and should give a map/guidance on where to go with digging/raking allowed in areas away from the Duck Pond (i.e. avoiding the *zostera* beds), away from the Bight/Shutterton Creek and away from the north of the estuary above Starcross Yacht Club.
- Dog walking: a requirement for dogs to be on leads below MHWM inside the estuary during 1 September to 1 April; requests that dog walkers keep to the back of the shore/avoid key areas for birds (a map should be included); guidance that dog walkers should avoid roost areas and take note of signs, etc around roosts; a requirement that dog walkers should not let their dogs chase birds or other wildlife. Messages within this code should be consistent with other local sites (Pebblebeds and Dawlish Warren) and also should link with the dogs project and byelaws.
- A general code of conduct for all users could also accompany the above, and provide further general guidance such as avoiding putting birds to flight, avoiding activities (1 September 1 April) around the shore/foreshore that will cause disturbance, such as kite flying, model aircraft flying and driving on the foreshore. This guidance could also provide a more general environmental section, promoting environmental awareness and sustainability issues, e.g. not leaving litter, helping with beach cleans, etc.

9.23 We suggest that the codes of conduct are developed and closely monitored to ensure they are working. Once the codes are completed, and alongside the monitoring data, it should be possible to review the byelaws and ensure a mechanism is in place for the codes of conduct to be enforced.

9.24 If monitoring data reveals that codes of conduct are not working then enforcement would be necessary. At the same point it would be necessary to consider whether a permit system should be established for particular activities such as kitesurfing and personal watercraft use. The permit system would provide a means to ensure users sign up to the code and would allow recognition of particular individuals that fail to follow the guidance. Similar systems are in place at some sites in the UK, such as the Hayle estuary where a permit system is in place for kitesurfers. Permits would need to be free or cheap to obtain and widely available. Systems should be in place where local clubs or shops are able to give out day passes, ensuring visitors who come on spec/on an ad hoc basis are not turned away. The permit system also provides a means of checking that all users hold valid insurance and are aware of site specific safety issues.

Dawlish Warren

9.25 What is in effect a code of conduct for the reserve is published on the internet[42] together with a guide for water users, a guide for anglers and information for dog walkers, all in leaflet form. It would be beneficial to create a specific code of conduct for the reserve and increase the prominence of this information with the aim of increasing visitors' awareness of the vulnerability of the site and the measures they are personally responsible for to help safeguard it. The code should:

- Highlight areas where particular activities are/are not permitted (such as dogs of leads)
- Highlight activities which are not permitted (e.g. barbeques)
- Explain temporally variable requests (e.g. avoiding walking along the shoreline at high tide)
- Include specific requirements such as not feeding livestock and not leaving litter

9.26 Sufficient information should be included within the code for visitors to be able to understand the requirements. For example, wardens on site have become aware that visitors are not necessarily aware of the tidal cycles and so do not recognise the state of the tide during their visit. Therefore information needs to include visual aids e.g. "...at high tide when the water is at or above the fenceline indicated on the map" (referring here to the fences used to deter visitors from walking along the shore at high tide around the western side of Warren Point).

9.27 Written in a friendly style, and briefly explaining the reason behind each point, the code of conduct should be included on interpretation panels, the website, in the reserve leaflet, and in the proposed Dawlish Warren newsletter (see 9.45) as a reminder for regular users. It should also be made available on the ExePlorer water taxis[43] that run trips to Warren Point in the summer to ensure that visitors who may not reach the visitor centre are aware of it. As part of the visitor management plan, it will need regular reviewing depending on changes at the site brought about by coastal geomorphological processes.

9.28 We suggest that the Dawlish Warren Code of conduct is included with the ones for the Exe Estuary, such that there is a specific general code for Dawlish Warren, that includes a detailed map of the site and site specific information, but that is produced in the same style as the Exe Estuary codes.

Pebblebeds

9.29 In line with the above a code of conduct for dog walkers, cyclists and horse riders on the Pebblebed Heaths would potentially be effective. For dog walkers, such a code should require dogs to be on leads or under close control between 1 March and 31 July , and require users to always pick up, and should give the reasons for this. The code should

[42] http://www.dawlishwarren.info/things-to-do-at-dawlish-warren/dawlish-warren-nature-reserve/
[43] http://www.exeplorer.co.uk/exeplorer_water_taxis_004.htm

explain how loose dogs can cause disturbance or predation to wildlife. Messages should be consistent across sites and also link to the dogs project discussed in the provision of information off-site section.

9.30 A code for horse riders and cyclists should include a map showing the official bridleways and any permissive routes and explain the reasons for asking users to stick to the defined routes, including disturbance to wildlife and soil erosion and compaction. The wording/style should match the codes for the other two sites. Currently a regular series of talks to new groups of marines arriving to train on the Pebblebed Heaths has given out a message to avoid damage and disturbance and the starting of accidental fires. This has not always been successful, but as a face-to-face exercise has been an excellent initiative. The production of a more formal code of conduct as a follow up to the talks and for guidance to other specialist users such as the model aircraft fliers could be a useful adjunct to the existing measures and is worth considering.

Recommendations: Codes of Conduct

Revised codes of conduct should be produced in a consistent way for all main activities on the Exe Estuary, Dawlish Warren and the Pebblebed Heaths. These codes should be similar in design and wording, and should work together (but not necessarily be branded in the same way). They should address safety issues, consideration for other users and conservation issues and be developed with users. Monitoring of behaviour should take place after the codes are established and byelaws and zones should also be revised to ensure they fit together.

- For the Exe Estuary and Dawlish Warren, we suggest the following separate codes which together form a pack: kitesurfing/windsurfing, jet skiing, sailing, power boating, water skiing, canoeing, crab tiling, bait collection/shellfishing, dog walking, angling, Dawlish Warren and a general code covering all users.
- For the Pebblebed Heaths codes of conduct are recommended for dog walkers, horse riders and cyclists, and in addition a more general, umbrella code that would include mention of specific specialist activities.

Wardening

9.31 Many sites have wardens who fulfil a range of roles, including interacting with the public and education. Such wardens can work both on-site and off-site, playing an outreach role (e.g. undertaking visits to schools and liasing with local communities). There is relatively little evidence for how successful such approaches are, but the provision of signage and wardening have been shown to result in enhanced breeding success for little terns in Portugal (Medeiros et al. 2007). In this section we consider the potential for wardens in an 'information' role rather than an enforcement role. Please see the section on enforcement for further discussion of this topic.

Exe Estuary

9.32 There would be scope for a warden post to communicate directly with users during the autumn, winter and spring. We believe such a role would be most effective to coincide with pulses in new development and in the early years, as codes of conduct are being developed, promoted and their effectiveness monitored. Such a post holder could therefore be mobile, moving around the estuary, talking to kitesurfers and windsurfers in suitable wind conditions and during low tide conditions meeting and talking to dog walkers, for example at the Duck Pond.

9.33 Such a post should have a clear, recognisable presence around the estuary – for example a vehicle with clear logos and local authority branding. The post-holder should be good at engaging with people and able to also undertake outreach work alongside the Exe Estuary Management Partnership, for example working with local schools and community groups. The post-holder could potentially run the patrol boat too (see enforcement section).

Dawlish Warren

9.34 In order to mitigate for the impact of increased visitor numbers due to development, extra wardening capacity will be needed. The site currently has three full time wardens, who work on a rota at weekends. Due to the geography of the site and number of visitors, much of their time is take up redirecting visitors who have strayed into vulnerable areas, preventing barbeques, and dealing with inappropriate landing at Warren Point. This significant work load reduces the wardens' capacity to carry out proactive visitor engagement (and practical management work).

9.35 An additional warden should be employed to undertake public engagement activities. The post-holder would need to fit with – and compliment – the existing warden team at Dawlish Warren. This should include wardening at weekends and undertaking visitor events during the week plus liaison with the local community (e.g. distributing information to local retailers see 9.46). Such a post would be required all year round, but could be fulfilled through a single post that included a mobile role across the Exe Estuary (see also paragraphs 9.33 and 9.36).

Pebblebed Heaths

9.36 Given the size of the Pebblebed Heaths and the multiple responsibilities of the wardening staff, there is currently limited capacity for dealing with visitor issues other than those of a major nature or in emergencies. Additional wardening would be a powerful way of mitigating impacts particularly with staff having specific responsibilities for visitor management and local community liaison. Such a warden role would be particularly important during the bird breeding season and when fires were a risk, and therefore would complement neatly with the requirements for on-site wardening on the Exe Estuary and at Dawlish Warren. We therefore suggest a mobile warden post with a remit for public engagement and an onsite presence, with the post-holder predominantly based on the Pebblebed Heaths and working closely with a second mobile warden whose role covered Dawlish Warren and the Exe Estuary. There would be potential for both posts to dovetail, doubling up when particular circumstances mean additional support is required in a

particular location. With two wardens in post it would also mean that there is cover at weekends and holiday periods.

9.37 We suggest that the post with the Pebblebed focus should involve very close working with the local landowners, with the Clinton-Devon Estates having an input into the day-day work of the post-holder.

Recommendations: Wardening

- Two (possibly more) warden/ranger posts should be created to engage with visitors around the Exe Estuary, Pebblebed Heaths and Dawlish Warren. We envisage that two posts should be adequate, but it may be that additional levels of wardening are required at certain times, for example in early years. Each warden would cover multiple sites. We suggest one post should have a focus on the Pebblebed Heaths and work closely with the Clinton Devon Estates and other landowners. The other post would have more of a focus on the Exe Estuary and Dawlish Warren. The posts would involve an on-site presence, communicating the nature conservation interest of the sites and also directly approaching users causing disturbance or other issues. The posts could also involve some monitoring (maintaining details of people approached, activities observed etc.). The post holders would be flexible and able to focus time and effort in areas with particular issues. For example during hot, dry spells they may both focus on the Pebblebed Heaths, watching for fires.

Provision of information off-site for local residents and users

9.38 There are various approaches used to communicate widely with people living around important sites and with people planning visits. Websites, leaflets, and direct contact (people answering emails and other inquiries) provide detailed information for sites around the UK. Organisations with a national profile, such as the RSPB have used a tiered approach for their sites, with certain sites particularly promoted because they have the facilities, infrastructure and staff levels to cope with large numbers of visitors. National Parks and AONBs have a duty to promote and provide access alongside nature conservation duties and therefore in such areas there is often excellent communication with residents and more widely: highlighting where to visit, how to plan visits and how to behave responsibility.

9.39 It is not just areas such as National Parks where we can draw examples of information provision. Many estuaries have management partnerships that host regular forum meetings, estuary festivals and other events that bring local users together and can provide a means of conveying information. In Dorset, there is a project called Dorset Dogs[44] which has been part funded through developer contributions. The project includes a dog-users' website which gives information to dog walkers, it includes codes of conduct and highlights

[44] http://www.dorsetdogs.org.uk/

places to walk, indicating which sites require dogs to be on a lead and when. Membership is free and members gain information, free gifts (dog tags, dog bags, stickers, etc) and access to information such as directories of local vets, etc. Such an approach provides a means of establishing positive communication with local dog walkers, enables direct contact with dog walkers and offers information – for example when livestock are present on sites or there are other issues which may mean dog walkers should avoid a particular area.

9.40 In considering the provision of information for the Exe Estuary, Dawlish Warren and the Pebblebed Heaths there are therefore clear links with previous recommendations, such as the codes of conduct that should be made widely and easily accessible and the wardens with an outreach role.

The Exe Estuary

9.41 The Exe Estuary Management Partnership website already acts as a hub for the Exe Estuary, and provides leaflets and other information for residents and visitors, including a website with a range of reports, leaflets and other information. The Partnership has an outreach role, running an estuary forum each year and running large events, festivals etc. in some years. While there are some doubts as to the general effectiveness of such partnerships in promoting sustainable and integrated coastal zone management (see Stojanovic & Barker 2008 for discussion), their strengths lie in their locally adaptable approach and neutrality, bringing together a wide range of different stakeholders.

9.42 The Exe Estuary Management Partnership could provide a means of delivering some of the communication required as mitigation. It may however function better if entirely independent, not funded through developer contributions or linked to mitigation delivery. The partnership's role is to bring together the organisations that have a responsibility for managing the Estuary to form a coordinated approach. Current funding is from a range of sources including different local authorities. As such the partnership is already active in ensuring that pressures arising from existing users are not harming the special features of the SSSI/SPA/Ramsar site/SAC.

9.43 We recommend that a local project similar to the Dorset Dogs project is established. The project should provide information and resources to local dog owners (including professional dog walkers), enabling them to understand where they can walk without causing problems to wildlife. It could also recruit volunteer dog wardens from the local dog walking community. The project would cover the Exe Estuary, the Warren and the Pebblebed Heaths, and potentially further afield. Promoted sites for dog walking could include some of the SANGs discussed in previous sections. The project would require a web presence and on-site events. We suggest the on-site events would involve a gazebo or similar that could be set up on local sites and allow direct contact with local dog walkers. The face-to-face contact would provide a means of engaging with local walkers, quickly building membership and interest in the project as a means of disseminating literature. The Dorset Dog project provides an excellent example of best practice and as an on-going project is continually refined to improve its effectiveness and join up.

Dawlish Warren

9.44 The dog project discussed above would also apply to Dawlish Warren.

9.45 A Dawlish Warren newsletter distributed to local residents, accommodation and tourist outlets is proposed as a means of educating potential users about the special nature of the site and codes of conduct. It will be a means of disseminating information about changes to the site and how they are being managed plus forthcoming events. The newsletter should be short (e.g. two sides of A4) and a summer and winter edition produced. The Exe Estuary Management Partnership already produce a newsletter – the Exe Exepress. The Dawlish Warren newsletter we suggest should be very different, and rather than the glossy, magazine like style of the Exepress, should be a short, brief document circulated very locally around Dawlish Warren. The newsletter should aim to provide a means of communicating changes (for example relating to realignment) and engender local support and connection with the site.

9.46 It may be possible to approach local retailers to assist with communication with specific user groups. For examples, asking outlets in Dawlish Warren village stocking barbeques to display a sign alerting customers that there are byelaws in place preventing the use of barbeques at Dawlish Warren.

Pebblebed Heaths

9.47 The Pebblebeds Conservation Trust and the RSPB already carry out educational and public relations work with respect to the Pebblebed Heaths as well as liaison with the Royal Marines, Fire and Emergency Services, AONB, Natural England and others. A discussion with the Trust and RSPB could establish existing activities and link into these with additional measures. An annual or bi-annual newsletter could be part of this link between the managers of the Pebblebed Commons and local communities, backed up by events and talks about the history and wildlife of the heaths. Such a newsletter would give updates on wildlife, management work, grazing animals and other initiatives on the Pebblebed Heaths. This could be distributed via local shops and other outlets, through local organisations and through local literature. The dog project discussed above would also apply to the Pebblebed Heaths.

Recommendations: Provision of information off-site to local residents and users

- The Exe Estuary Management Partnership should continue to function, bring stakeholders together and provide information relating to the Exe Estuary. It's work is therefore linked to this strategy but it should retain independence and funds collected to resolve impacts arising from new development not be used to core fund an existing and long running project.
- A dog project, based on a project in Dorset (funded in part as mitigation relating to the Dorset Heaths) should be established for the wider area encompassing the Exe Estuary, Pebblebed Heaths, Dawlish Warren and further afield.
- A short newsletter should be produced for Dawlish Warren, providing local tourist outlets, local residents, etc with information regarding the site, management issues and news.
- A similar newsletter should be produced for the Pebblebed Heaths.
- Relevant retailers in Dawlish Warren should be approached with the request that information on where barbeques are/are not permitted is displayed alongside barbeques for sale.

Contact with relevant local clubs

9.48 Direct contact with local clubs is important as it provides a means for users to communicate issues and for bodies responsible for management to discuss issues. Such contact ensures conflicts can be resolved easily. Communication with local clubs is most relevant on the Exe Estuary, where there are numerous clubs and groups involved with watersports. Direct contact with these is discussed in previous sections relating to codes of conduct and provision of information to local residents and users. Liaison with local clubs and groups is also relevant on the Pebblebed Heaths, where existing contacts (model aircraft, marines) should be maintained, and further contacts (e.g. horse-riders, mountain bikers) should be explored. This should facilitate the exchange of relevant information and develop understanding.

9.49 It seems that the most cost-effective and coherent approach to achieving regular contact with local clubs is for there to be a dedicated delivery officer employed with an 'overarching' role to establish many of the projects and work threads. This delivery officer post would be largely office based and would oversee a range of the recommendations set out in this report, such as the review of byelaws, production of management plans and other significant elements of the mitigation that are required initially. The delivery officer post would potentially be required for a fixed period and then subject to review, potentially initially running for five years, and would commission specialist additional input/help as required. It would make sense that the post holder was 'hosted' by one of

the local authorities, as much of their work would involve close liaison with local authority staff. After the five years, the regular contact with local clubs and the focal contact point role could potentially be fulfilled by the two wardening posts we have recommended (see wardening section).

Recommendations: Contact with local clubs

A delivery officer post is required, as a fixed term post, to act as a point of contact with local clubs and also to oversee the implementation/delivery of many of the recommendations in this report. The post-holder would work closely with the Exe Estuary Management Partnership, local authorities, landowners and local businesses. Recommendations relating to liaison with local clubs in the Exe Estuary is discussed in more detail under codes of conduct and provision of information to local residents and users.

With the Pebblebed Heaths the delivery officer should also:

- Continue existing contacts with model aircraft club and Marines on the Pebblebed Heaths
- Make contact with horse riding and mountain biking groups to facilitate the exchange of relevant information and increased understanding of each parties interests.

Off-site education initiatives, such as school visits

9.50 Provision of information off-site is discussed in previous sections. Here we consider the role to which off-site education initiatives, such as a programme of visits made to local schools, may have a role in a mitigation strategy. There is increasing recognition that children are less 'connected' to the natural world (e.g. Moss 2012) and that this has implications for nature conservation (Pyle 2003; Moss 2012). While there may therefore be clear broad benefits for a wide education programme relating to nature conservation and environmental issues, there is little evidence to indicate that such a programme might be effective in resolving specific local issues associated with new development. The scoring by the expert panel scored off-site education initiatives relatively low, however this measure has a particularly long term focus, and relates to the need to mitigate for the lifetime of the potential impact.

9.51 One area where an increase in work with schools and other organisations connected with young people might be valuable as a mitigation measure is on the Pebblebed Heaths where arson, vandalism, dumping and litter are all threats to the habitat and its wildlife. Liaison with local schools could therefore be included within the remit of the warden/ranger post, outlined in the wardening section above.

10. Enforcement

10.1 In general, voluntary approaches working with local users and groups are likely to be better received and possibly easier to implement. A range of different options are however available to provide enforcement and these are considered below.

Covenants regarding keeping of pets in new developments

10.2 Restrictions on keeping pets in new development has previously been suggested as a way of reducing disturbance, as dog walkers are one of the main recreational user groups at each of the three European sites. However, in the main those involved in mitigating for recreational impacts have concluded that such an approach is not really feasible, as there is no confidence that such measures can be established or enforced in perpetuity for a particular development or dwelling.Given the range at which people are travelling to visit the three European sites, such an approach would be impractical. Covenants have been dismissed or challenged as ineffective avoidance measures in a range of cases. For example, in a review of planning appeal decisions in the Thames Basin Heaths SPA (Hoskin & Tyldesley 2006), a number of cases rejected the use covenants as ineffective and / or unenforceable. In ten appeals such covenants were found to be insufficient (to avoid harm to the SPA) because they would not deter other recreational visits unrelated to dog walking. In a more recent case regarding a development adjacent to Talbot Heath, in Dorset (see Burden 2012), the inspector found it "*quite impossible to give the pet covenant any credence as an effective element of … the mitigation package*"[45].

Legal enforcement

10.3 Various statutory mechanisms exist for prohibiting activities or tackling activities that are causing disturbance. These include:

- Habitats Regulations
- SSSI legislation
- Byelaws
- Special Nature Conservation Orders
- Dog Control Orders

10.4 **Habitats Regulations**: The Habitats Regulations provide protection for European wildlife sites from activities that may adversely affect such sites and the ability to meet their conservation objectives. Where a new activity is being proposed that may cause disturbance to a species that forms the interest feature of a European wildlife site, and that activity requires some form of permission, the authority charged with granting the permission, 'the competent authority,' must firstly consider the activity's potential for

[45] Application by Talbot Village Trust (TVT), ref 00/08824/084/P, Land South Of Wallisdown Road, Poole, Dorset. Inspectors report para 7.38.

harm by taking it through a number of steps set out within the Regulations. Competent authorities include public bodies, local planning authorities and statutory undertakers.

10.5 All competent authorities are required by Regulation 9(3) of the Habitats Regulations to have regard to the requirements of the Habitats and Birds Directives in the exercise of their functions, i.e. in any role that they undertake. In consideration of European wildlife sites, this charges competent authorities with both assessing the implications of their own actions for European wildlife sites, and also undertaking a proper assessment of the implications of any activity for which they give permission.

10.6 Natural England itself is a competent authority under the Habitats Regulations. Natural England issues consents to SSSI landowners or occupiers to enable them to undertake activities that have the potential to damage an SSSI, after full consideration of potential impacts and how harm to the SSSI can be prevented. In issuing consents where the site also holds a European designation, in accordance with Regulation 21 of the Habitats Regulations, Natural England must also consider whether the activity will significantly affect the European site interest features, and if so, must undertake a more detailed assessment, an 'Appropriate Assessment,' to establish whether the site interest features will be adversely affected and what measures could be put in place to prevent such effects. Natural England regularly restricts activities that may cause disturbance following assessment under Regulation 21, with such activities including sporting events such as horse trials, model aircraft flying and wake board competitions.

10.7 If the activity requires permission from a competent authority other than Natural England, then that competent authority is similarly required under Regulation 61 to consider whether the permission would be likely to have a significant effect upon a European site's interest features and the ability to meet its conservation objectives.

10.8 A further requirement of the Habitats Regulations at Regulation 63 is the review of any existing permission given by a competent authority prior to the date upon which a site became a European site. In accordance with Regulation 63 of the Habitats Regulations, a competent authority must make an Appropriate Assessment of any existing permission that is not yet complete where it is determined that the activity is likely to have a significant effect upon the European site now in place. The competent authority must modify, or if necessary revoke any such permission where it cannot be ascertained that adverse effects upon the integrity of the European site are not occurring, or will not occur.

10.9 The Habitat Regulations therefore provide a mechanism to ensure that new proposals do not cause damage to a site, and existing permissions/consent can be removed.

10.10 **SSSI legislation**: As noted above, activities that may potentially damage a SSSI should not be carried out without firstly notifying Natural England of the intention to undertake such activities. Section 28 of the Wildlife and Countryside Act, as amended by the Countryside and Rights of Way Act 2000, sets out such requirements for both land owners and occupiers, and also for public bodies wishing to undertake such activities. Natural England issues consents (for owners and occupiers) and assents (for public bodies) once satisfied

that appropriate measures are in place to protect the notified features of the SSSI from harm.

10.11 Enforcement against individuals for disturbance under SSSI legislation is difficult due to the level of evidence required to take forward a successful prosecution. Resulting fines can be low. Where damage is caused to a habitat (for example damaging operations by an owner) it is generally easier to gain evidence. SSSI legislation has been used in relation to disturbance from dogs. For example, a successful prosecution was brought by Natural England in January 2008 against an individual for recklessly causing disturbance to birds on the Hayle Estuary, in Cornwall. This was the first time Natural England had used the provisions under section 28P(6A) of the Wildlife & Countryside Act 1981 (as substituted by Schedule 9 to the Countryside and Rights of Way Act 2000 and amendments made by the Natural Environment and Rural Communities Act 2006) and was seen as a landmark case. The prosecution was brought against a man whose dogs were witnessed by a member of the public running loose on an RSPB reserve and were seen to attack some mute swans. The SSSI is designated for it's wintering bird assemblage, and the judge accepted the evidence that the swans were part of the wintering assemblage. The man pleaded guilty to the offence ("recklessly disturbing birds") and was fined £250 and ordered to pay £250 costs. Natural England agreed to accept the guilty plea in relation to reckless disturbance [to the Feature] in return for dropping the charge of reckless damage [to the swan]. Whilst this resulted in a small fine it did ensure that there was a conviction in a case where 'recklessness' may have been difficult to prove.

10.12 **Byelaws**[46]: A byelaw is a local law that is made by a statutory body, such as a local authority, under an enabling power conferred by an Act of Parliament. It is not just local authorities that can create byelaws, other bodies such as harbour authorities, the National Trust, the MOD and parish councils can also create them. The Marine Management Organisation (MMO) has the ability to make byelaws, including emergency byelaws under Regulation 38 of the Habitats Regulations in conjunction with Part 5 of the Marine and Coastal Access Act 2009, if necessary for the protection of European sites. The MMO website includes a flowchart setting out options for byelaws[47].

10.13 Byelaws are not normally considered to be a suitable regulatory mechanism in cases where there are express powers in primary legislation. Defra advises that they should be considered only when all other means of control (such as voluntary schemes) have been tried and failed, or are not considered appropriate.

10.14 Generally, byelaws regulate rather than prohibit activity, and are a means of reflecting the needs and circumstances of a particular area. The process of making or updating byelaws can be slow as they require confirmation and approval by the relevant government department.

[46] See defra guidance at: http://www.defra.gov.uk/rural/documents/countryside/byelaw-cr1.pdf
[47] http://marinemanagement.org.uk/protecting/conservation/documents/byelaw_options.pdf

10.15 **Special Nature Conservation Order (SNCO):** Under Regulation 22 of the Habitats Regulations, Natural England can apply to the Secretary of State for a SNCO to be put in place to restrict activities that might otherwise affect the interest features of a European wildlife site. SNCOs are infrequently used, but enable Natural England to regulate activities that may affect a European site where the normal consenting process described above cannot be applied to the associated SSSIs. Natural England may use SNCOs where the activity requiring regulation is being undertaken by a third party and not the SSSI owner/occupier. In some limited cases, SAC's below mean low water do not have associated SSSIs, and in the absence of powers to regulate activities under SSSI legislation, Natural England may use an SNCO for activities such as power boat or jet ski use, for example. Defra will generally only use SNCOs in the marine environment if the new powers under the Marine and Coastal Access Act 2009 to make byelaws are deemed inadequate. The maximum fine for breaching a stop notice issued under an SNCO is £5,000 on summary conviction, or unlimited on conviction on indictment.

10.16 A SNCO was introduced to prevent commercial bait digging within Fareham Creek (Solent European Marine Site). Despite its introduction and efforts by the Police to enforce it, the SNCO is considered to be ineffective as it is difficult to prove that the collection is for commercial purposes rather than personal use.

10.17 **Dog Control Orders**: The Dog Control Orders (Prescribed Offences and Penalties, etc.) Regulations 2006 and the Dog Control Orders (Procedures) Regulations 2006, implement sections 55 and 56 of the Clean Neighbourhoods and Environment Act 2005. Dog Control Orders replace the previous system of byelaws for the control of dogs, and also the Dogs (Fouling of Land) Act 1996, which has been repealed.

10.18 The Dog Control Orders Regulations provide for five offences which may be prescribed in a Dog Control Order: failing to remove dog faeces; not keeping a dog on a lead; not putting, and keeping, a dog on a lead when directed to do so by an authorised officer; permitting a dog to enter land from which dogs are excluded; and taking more than a specified number of dogs onto land. A Dog Control Order can be made in respect of any land which is open to the air and to which the public are entitled or permitted to have access (with or without payment).

10.19 Both primary (e.g. District Councils) and secondary authorities (such as Parish Councils) may make Dog Control Orders, provided that they are satisfied that an order is justified and have followed the necessary procedures.

10.20 It is important for any authority considering a Dog Control Order to be able to show that it is a necessary and proportionate response to problems caused by the activities of dogs and those in charge of them. The authority needs to balance the interests of those in charge of dogs against the interests of those affected by the activities of dogs, bearing in mind the need for people, in particular children, to have access to dog-free areas and areas where dogs are kept under strict control, and the need for those in charge of dogs to have access to areas where they can exercise their dogs without undue restrictions.

10.21 If an authority is considering making a Dog Control Order which would affect open access land it must consult the appropriate access authority and the local access forum. There are already comprehensive dog control provisions which may be applied to access land, including if necessary the banning of dogs. An authority should therefore pay particular attention to the views of these bodies in deciding whether any proposed Dog Control Order affecting open access land is necessary.

10.22 Fixed penalties for offences under Dog Control Orders may be issued by authorised officers. Authorised officers are employees of primary and secondary authorities who are authorised for this purpose and any person authorised (including employees of that person) in writing by a primary or secondary authority in pursuance of arrangements made by that person and the relevant authority.

10.23 Experience to date of obtaining Dog Control Orders has shown that it can be difficult for conservation bodies to persuade primary or secondary authorities of the need to make Orders. Opposition from dog walkers can be high. However, by collecting appropriate evidence, it is possible to make a persuasive case and there are some good examples from around the UK, including Stanpit (Christchurch Harbour) and the Hayle. On the Hayle Estuary in Cornwall, the RSPB collected eye-witness reports of all disturbances on the estuary over a 12-month period. This showed that, of the 262 recorded instances of disturbance during the year, 67% were dog-related. The public consultation period resulted in Cornwall Council receiving 109 letters in support of the Order and 18 in opposition. The RSPB sought and won the help of the police to enforce the Order (which excluded dogs from part of the Reserve and SSSI) once implemented via the Fixed Penalty Notice system.

The Exe Estuary

10.24 Local legislation relating to the Exe Estuary includes Section 27 Exeter City Council Act 1987 (which is a power to make byelaws to control navigation on the Exe) and the River Exe and Exe Estuary Byelaws 1976 (which prohibit speeds in excess of 10 knots, water skiing outside prescribed areas and promotes safe navigation in general). The latter byelaws are reproduced in Appendix 3. Collection of shore crabs and other fisheries issues are controlled within the Devon and Severn IFCA byelaws[48]. Crab tiling is restricted to the lower part of the estuary, south of Starcross and north of Dawlish Warren.

10.25 The three district councils are also responsible for the creation and enforcement of byelaws relating to the regulation of the Exe Estuary. These are predominantly concerned with regulating public behaviour on beaches and protecting swimmers, but exceptions include byelaws relating to Exeter City Council in its role as Port of Exeter (see above) and Teignbridge District Council byelaws relating to the protection of wildlife at Dawlish Warren. In some cases the local authorities' byelaws overlap the powers of the Port of

[48] http://www.devonandsevernifca.gov.uk/sitedata/Misc/byelaws.pdf

Exeter, for example both East Devon District Council and Port of Exeter have the powers to enforce the 10 knots speed limit off Exmouth Beach in the harbour entrance.

10.26 The Exe Disturbance Study contains sufficient evidence to justify Dog Control Orders to ensure dogs are kept on leads while on the intertidal areas during the period 1 September to 1 April. We suggest that such an order should be applied to the estuary as a whole (excluding the seafront areas and Dawlish Warren). The alternative would be to have multiple orders applying to different locations around the estuary, with important locations being Exmouth (around the Duck Pond), Lympstone, Topsham and Powderham.

10.27 The process of establishing the Order(s) would take some time and potentially would require close liaison with the local community of dog walkers. We recommend that the Dog Control Orders are therefore established once a Delivery Officer is in place and once the dog project has been set up (see 9.43).

10.28 Options to enforce restricting landing of craft on Warren Point should be explored.

Dawlish Warren

10.29 A Dog Control Order is currently in place at Dawlish Warren. Dogs are not permitted between Groynes 0-3 in summer and from Groyne 9 to Warren Point (on the dunes, beach and mudflats) all year. Dogs must be kept on leads (<2m) and waste must be picked up throughout the site. This policy has seen a reduction in the number of visitors to Warren Point.

10.30 There is little scope for further dog restriction to mitigate for the impact of an increase in dogs due to housing development. However this will need to be reviewed if the site changes significantly due to coastal realignment.

Pebblebed Heaths

10.31 A Dog Control Order covering the Pebblebed Heaths and requiring picking up would be a valuable mitigation measure. Heathlands are habitats of low nutrient systems and dog fouling leads to the replacement of heathland species with plants tolerant of high nutrient levels, usually coarse grasses. A requirement to pick up would benefit the SAC features of the site, but would need to consider measures for enforcement, particularly during the first few months.

Recommendations: Enforcement

Enforcement measures will be necessary alongside other, more positive measures, but in general enforcement should act as a deterrent/last resort and be implemented gradually, with clear warning and communication with the relevant users. We recommend the following:

- A review of the byelaws relating to the Exe Estuary is necessary and should be undertaken in conjunction with the development of the codes of conduct and zoning to ensure the byelaws support and dovetail with the relevant codes and zones. Options to restrict landing of craft on Warren Point should be explored.
- Dog Control Orders to ensure dogs are not exercised off-lead on the mudflats within the Exe Estuary between 1 September and 1 April.
- Dog Control Orders requiring users to pick up all year round and across all areas of the Pebblebed Heaths.
-

Wardening

10.32 A previous section considered the role of wardens in terms of education, awareness raising and direct engagement with users. In this section we continue the role of wardens with an enforcement role, specifically patrolling the particular locations to deal with problem activities. The approach is widely used and many sites have wardens who fulfil such roles.

The Exe Estuary

10.33 Although a bylaw relating to speed restrictions is in place, it is not an easy task to enforce on the Exe Estuary. One way of enforcing the speed restrictions is through the use of the patrol boat. There is an Exeter City Council Harbour Patrol Boat which was crewed by the police. In more recent years it has been operated by volunteers who take on the role as Harbour Authority Officials. The fuel for the last two seasons has been paid for through contributions from local sailing clubs, local business and local authorities and the boat has been operational primarily during the summer months.

10.34 Ensuring people remain within the speed limit and are following agreed codes of conduct will form a key element of any long-term strategy to reduce disturbance on the Exe Estuary. The patrol boat is a necessary element within this and as such will need to be operational regularly during the winter. An up-to date, fast and well-equipped patrol boat is now required, with an appropriate level of staff resources made available. Increasing the time the patrol boat is on the water and ensuring the boat crew have the power to enforce bylaws is an element of the strategy that can be established reasonably quickly and simply.

10.35 The patrol boat should therefore be operational through the winter, and be responsive to weather conditions (i.e. able to go out when the estuary is likely to be busy or particular

activities are taking place). It should be able to patrol the entire estuary, have the power to enforce, and in particular be able to focus on:

- Ensuring all craft within the estuary remain within the speed limit
- Personal watercraft users, kitesurfers and windsurfers are following agreed codes of conduct
- Particular activities are taking place within designated zones
- Providing a clear presence that may deter particularly anti-social or unusual events that may have particular disturbance implications, such as hovercraft use, testing of model planes, etc

10.36 In combination with the patrol boat, we recommend that the wardens discussed in under Wardening also have a policing role, so that they can respond to persistent offenders and problem individuals and enforce byelaws.

Dawlish Warren & Pebblebed Heaths

10.37 As indicated in section 9.35, extra wardening capacity will be needed at Dawlish Warren and the Pebblebed Heaths and these wardens should in part have a policing role to ensure that visitors are adhering to byelaws, dog control orders and codes of conduct while also able to undertake public engagement and other duties.

Recommendations: Wardening

In this section we considered wardens with an enforcement/policing role. There is overlap with previous recommendations and we recommend that the wardening posts described in Wardening also fulfils an enforcement role. We also recommend:

- The purchase of a new patrol boat, with resources made available to ensure it is adequately staffed and available throughout the winter (able to respond to weather conditions). The boat should ensure users remain within speed limits and follow codes of conduct and the craft should provide a clear presence on the estuary.

Limiting visitor numbers

10.38 Limits (or caps) on the numbers of visitors entering particular sites was commonly used in the past at various nature reserves around the UK such as Minsmere, where visitors had to apply in writing in advance for a permit to visit on a particular date. Such systems are rarely seen within the UK now, but are widely used in other countries, for example many American National Parks have a cap on the number of cars or people allowed into the park per day. We see little opportunity for such approaches on the Exe Estuary, Dawlish Warren or the Pebblebed Heaths at present.

10.39 We therefore refrain from making specific recommendations in relation to limiting visitor numbers, but suggest that should particular watersports (such as kitesurfing) reach very high numbers meaning the existing zones become too busy to be safe, then a system that sets a limit on the number of users at any one time may be necessary. At Dawlish Warren

it is recognised that limiting visitor numbers could be controversial. It may however be necessary to explore limiting visitor numbers should the geography of the site change significantly following proposed coastal realignment work (see section 8.14). Controlling the amount of car-park spaces in the future may be the best way of achieving this. With public access to the Pebblebed Heaths safeguarded by law, the only way of limiting visitor numbers would be through car parking restrictions, which are considered in the parking section.

11. A Mitigation Strategy: Summary of Recommendations

11.1 We bring together our recommendations from the previous sections of the report to produce a summary of actions which are set out in Table 19. These form the basis of a mitigation strategy. The measures in Table 19 are drawn from the recommendation boxes, and we summarise the measures by site, and also group those measures that apply across sites.

11.2 The table is also repeated in Appendix 3, where we include details of phasing and other details relating to implementation.

Table 19: Summary of recommendations. Recommendations are grouped into cross-site measures and then by individual sites. We have placed mitigation measures that relate to the Exe Estuary SPA only, but take place at Dawlish Warren, under the Exe Estuary heading. The order that the measures are listed (by site) reflects an approximate order in which measures should be sequenced – with the initial measures in each case representing 'quick wins'. Grey shading highlights measures that (to some extent or some part) are already in place but require adapting or renewing.

Measure	Activity	Justification
Cross-site Measures		
1. Delivery officer	All	Delivery officer post required to coordinate projects, including purchase of patrol boat, revision of codes of conduct on the Exe, revision of zones and byelaws on the Exe, the dog project, new interpretation and leaflets across sites, visitor management plan for the Pebblebeds. Also overseeing monitoring
2. Two wardens	All	Face-face contact with users. Fulfilling a liason, outreach and enforcement role.
3. Dog walking project	Dog walking	Dedicated project working with dog walkers, membership, newsletters, website etc. Will allow promotion of sites (e.g. SANGs), and codes of conduct
4. SANGs	Walking, dog walking, informal recreation	Increasing area of countryside for people to visit and drawing particular groups away from sensitive locations. Four key locations envisaged.
Exe Estuary		
5. Close railway crossing and/or lay-by south of Cockwood	Walking, dog walking, crab tiling, cockling and bait collection	Reduction in use in Shutterton Creek area, ensuring this area is largely free from disturbance and a can be a 'refuge'. May not be necessary to both close crossing and remove lay-by removed.
6. Low fencing/planting around edge of the car parks and the Recreation Ground	Walking, dog walking	Reduce disturbance from walkers and stop dogs going straight out onto the intertidal area at the Duck Pond from these locations
7. Screening and modifications to gates at Exminster Marshes	Walkers, dog walkers	Screens along station road to hide people from birds. Modifications to gates to prevent dogs running ahead of owners.
8. Gate slipway at Exmouth Imperial Recreation Ground from 1 September to 1 April	Vehicles on intertidal; reduced access onto water in estuary	Gating the slipway would ensure people do not routinely drive onto mudflats from here
9. Continuation/adaptation as necessary of access restrictions (temporary fencing, etc) to prevent access along shore near roost at	Walking, bird watching	Reduce disturbance to roosting birds at high tide in the Bight

Dawlish Warren		
10. Reed screening or landscaping between north-eastern most fairway on the golf-course and the Bight	Playing golf	Screening should reduce disturbance to pre roost and roosting birds in the Bight from golfers at this fairway, and discourage golfers from venturing out onto the shore and intertidal to collect stray golf balls
11. Limited, localised changes to layout of golf course at Dawlish Warren	Playing golf	Reduce disturbance to birds from golfers breaching skyline; reduce need for golfers to walk down onto the shore to collect golf balls
12. Modifications of slipway at Mamhead to encourage users not to enter the estuary	All water users	Improvements to the slipway when it is being repaired could result in users being more likely to remain along the seafront or go out to sea rather than enter the estuary, thus reducing disturbance within the estuary
13. New interpretation boards (five boards)	All activities, particularly shore based	Raise awareness of and interest in the wildlife of the Exe, helping to increase appropriate behaviours
14. Updates of the Exe Estuary leaflets	All activities	Reduce disturbance through increasing users' awareness and understanding of zoning, codes of conduct and the wildlife of the Exe
15. Improved codes of conduct for specific user groups	kitesurfing/windsurfing, jet skiing, sailing, power boating, water skiing, canoeing, crab tiling, bait collecting/shellfishing, dog walking	Codes of conduct will help ensure activities take place within clearly defined windows (temporal and spatial and including tide state). Mechanisms should be in place (staff time in particular) to ensure enforcement if necessary in the long term
16. Review and revision of byelaws relating to the Exe Estuary	All activities, including powerboating, waterskiing and pwc	10 knot speed limit is important to retain. Some of the zones set out in the byelaws are confusing and were established many years ago without consideration of disturbance issues
17. Revised zoning	Powerboating, water skiing, use of personal watercraft, windsurfing, kitesurfing	Rationalising zoning will increase effectiveness and ensure easy to follow and monitor
18. Install dedicated signs relating to kitesurfing and windsurfing at Imperial Recreation ground and the Maer	Kitesurfing, windsurfing	Decrease disturbance by increasing users' awareness of code of conduct
19. Update signs at public slipways with zones and speed limits	All water users	Decrease disturbance by increasing users' awareness of zoning and speed limits
20. Dog control order to control dogs off leads on the mudflats	Dog walking	Reduction in disturbance due to dogs of leads on intertidal

Measure	Activity	Justification
21. Purchase and run a new patrol boat	All water users	Reduction of disturbance by decreasing incidence of inappropriate behaviour (incorrect use of zoning, etc) without necessarily curtailing use
22. Carry out scoping study for creation/ modification of a viable disturbance-free roost at Dawlish Warren	Walking, bird watching	Establish feasibility of creating an artificial roost
23. Create new/improved high tide roost on site of old bird hide at Dawlish Warren	All	Reduce disturbance to roosting birds at high tide in the Bight and elsewhere
24. Relocate bird hide onto the shore of the Bight at Dawlish Warren	Bird watching	Reduce disturbance to birds from bird watchers accessing the bird hide along the shore
Dawlish Warren		
25. Create a live visitor management plan including a regular review of visitor access patterns.	All	An overview of all factors will enable sound decisions to be made on individual issues, leading to a co-ordinated approach to changes that are likely to occur as a result of changing coastal dynamics (see section on climate change)
	All	
27. Improved codes of conduct for specific user groups	Dog walking, angling, water craft use, etc	Codes of conduct will help ensure activities take place within clearly defined windows (temporal and spatial and including tide state). Mechanisms should be in place (staff time in particular) to ensure enforcement if necessary in the long term
28. Rationalisation of path network	All	Focus access at key points to increase exposure to relevant information on the wildlife interest of the site and codes of conduct
29. Make information available in local retail outlets selling barbeques so that potential buyers know they cannot use them at Dawlish Warren	Picnicking	Help decrease instance of wildfire on Dawlish Warren SAC
30. Establish regular Warren Newsletter to be distributed locally	All	Increase overall awareness of special features of Dawlish Warren and how visitors can help safeguard them, plus publicise appropriate events in the local community and to tourists
31. Review and modify parking charges e.g. re-	Dog walking	Discourage use of SAC by dog walkers looking for a location for a long

Measure	Activity	Justification
instate Sunday car parking charges, increase all car parking charges		weekend dog walk and decrease use by regular dog walkers respectively
32. Remove dog control order (use of leads) in buffer zone outside Dawlish Warren SAC	Dog walking	Current byelaw is not considered enforceable by wardens, and detracts from other duties
33. Adopt byelaw preventing fires and barbeques in buffer zone	Picnicking	Help prevent wildfires in buffer zone which may spread into Dawlish Warren SAC
34. Carry out translocation of petalwort to created scrapes	All	Safeguard population of petalwort by creating suitable habitat and assisting colonisation in areas not vulnerable to excess trampling pressure
35. Create banks or fencing around existing car park with gateways at board walks and path to visitor centre	All	Decrease the permeability of boundaries by focussing access points, ensuring increased exposure to relevant information
36. Re-site visitor centre at edge of buffer zone, ensuring main access point is via centre. Redesign to allow unstaffed opening	All	Increase proportion of visitors who use visitor centre and gain increased enjoyment and understanding of the site including: its wildlife interest, potential conflicts, boundaries, byelaws and codes of conduct
Pebblebed Heaths		
38. Production of visitor management plan including review of car-parking and an assessment of path network, path management and signage	All users	
39. Closure of lay-bys in line with visitor management plan	All users	Reduction of diffuse access onto heaths (which is difficult to manage) from the 55 laybys/informal parking locations that currently exist
	All users	

Measure	Activity	Justification
41. New signs and waymarking in line with guidance in management plan	All	Signage will help direct activity and new visitors to less sensitive areas
42. Maintain existing contacts with user groups and improve contacts with others (horse riders, mountain bikers)	All	Contacts which facilitate exchange of information on stakeholders' interest and help find solutions to any conflicts
43. A rotational annual programme of repair to eroded tracks and paths (including the installation of bridges and boardwalks as appropriate). In line with visitor management plan.	All users	To encourage use of less sensitive areas and to mitigate against trampling that would result in soil erosion and compaction of wet heath and mires . Will influence where visitors go, see 17 and 18 above.
44. Gorse management, implemented in line with visitor management plan	Walking, dog walking, other activities	Rotational gorse management implemented to provide natural cover/screening to reduce disturbance to Darford warblers
45. Review path and bridleway network adjoining the Pebblebeds (potentially as part of visitor management plan)	Walking, dog walking, horse riding, mountain biking	To encourage use away from sensitive areas. Enhancement and promotion of routes outside SPA will help focus access away from sensitive areas
46. Improve information on, and reporting procedures for, fires	All	Measures should reduce the incidence of fire and ensure a rapid response if wildfires occur
47. Codes of conduct for dog walkers, horse riders, cyclists and other users	Dog walking, horse riding, cycling, specialist users	Increase appropriate behaviour by dog walkers to reduce disturbance to breeding bird and vegetation change through eutrophication. Reduce trampling/erosion and disturbance impacts from other users.
48. Dog control order (dogs on leads 1 March – 31 July, picking up)	Dog walking	Increasing the instance of "picking-up" will help reduce the degree of vegetation change due to eutrophication from dog waste. Keeping dogs on leads in the breeding season will reduce disturbance to nesting birds.

12. Monitoring Plan

12.1 Monitoring is essential to ensure the successful delivery of the mitigation work. Monitoring is necessary to ensure approaches are working as anticipated and to identify whether further refinements or adjustments are necessary. As the individual projects take off, monitoring will inform where resources can best be allocated, for example it may be that once codes of conduct are in place and working efficiently, wardening presence can be reduced or scaled back. In addition it is difficult to be confident of how access patterns may change over time, for example in response to new activities, changes in climate, and changes on the sites themselves. The monitoring is therefore aimed at ensuring mitigation effort is focused and responsive to changes in access, and that money is well-spent and correctly allocated. The monitoring is integral to the mitigation 'package'.

12.2 Two elements are currently missing from the evidence base, and are effectively stand-alone research projects. As such they are not 'mitigation', but we mention them here for completeness, as they relate to the monitoring and overall understanding.They are gaps in our understanding and are necessary to inform the overall strategy, and would therefore contribute to the effectiveness of measures and inform future refinement of the strategy. The two elements are:

- An understanding of the distribution of Annex I birds on the Pebblebed Heaths in relation to visitor levels within the site. This will inform the visitor management plan for the Pebblebed Heaths and the scale or pattern of car-park management, etc that might be required.
- Home postcodes from on-site visitor work on the Pebblebed Heaths. These are necessary to inform the zone of influence (see section on zones for developer contributions).

12.3 Specific monitoring requirements are set out in Table 20. Many of these are already undertaken (at least in part) or there are existing protocols in place (for example the WeBS counts for birds).

Table 20: Monitoring elements required as part of the mitigation strategy

Monitoring	Justification	Approach
Visitor numbers at set locations on all three sites	Repeat monitoring will inform how use is changing over time	Car-park counts, spot counts of people, mapping of people on the site (from vantage points); automated counters. Undertaken at a sample of locations and repeated annually
Visitor activities, motivation, profile and behaviour at all three sites	Provides information on what people do, why they visit and how they behave	Questionnaires at a sample of access points repeated every 5 years. Questionnaires including home postcode, route on site, etc
Fires, vandalism and other incidents at all three sites	Provides a check as to whether such incidents are increasing over time and if so where	Standardised incident reporting. All fires carefully mapped using GPS
Enforcement at all three sites	Provides a record of how many	Record of time spent on site

	times byelaws/codes of conduct are contravened	(patrol boat and wardens) and number of incidents dealt with
Monitoring of vegetation change at Dawlish Warren	As the tipping point at which trampling will negatively impact cannot be predicted, ongoing monitoring will provide an early warning	Fixed point photography and more detailed quadrat sampling
Monitoring of accretion and erosion at Dawlish Warren	The dynamic nature of the site and likely future changes mean accurate information is essential to inform management	Use of aerial imagery, eg by drone, at regular intervals. May be required to inform sea defence works
Regular monitoring of petalwort	Necessary to check on changes of distribution over time and any implications for visitor management	Reliable monitoring protocol established and repeated over time
Regular monitoring of breeding Annex I birds on the Pebblebeds	Necessary to check for changes in distribution allowing management to be modified if required	Standard bird surveys, undertaken every 3 years
Southern damselfly monitoring	Key locations may change over time	Regular transects and counts, repeated annually
Continued monitoring of wintering waterfowl on the Exe	Ensures any changes in bird use of the site are picked up	WeBS
Disturbance monitoring on the Exe	Checks to monitor response of birds and levels of disturbance	Repeat of approach in Exe Disturbance Study, potentially at 5 year intervals.
Continued monitoring of crab tiles	Ensures crab tillers are following byelaws	Counts of tiles, already undertaken/overseen by IFCA

13. Mechanisms for Delivering Mitigation Measures

Strategic approach to European site mitigation schemes

Examples of strategic approaches

13.1 The Habitats Regulations require that each plan and project, either being undertaken by a competent authority or being permitted/given effect by a competent authority, is assessed through the step by step tests set out within the Habitats Regulations. In areas where there is significant development, the individual assessment of each development is inevitably likely to repeat itself and cover many of the same issues each time. In response to this, the concept of a strategic approach to mitigation enables an agreed and consistent method to be applied to each case. Potential impacts and options for solutions to remove potential impacts are considered collectively upfront, and an agreed mechanism is then put in place to cover new development coming forward, and this is also secured in policy wording within relevant land use plans. In summary, a strategic approach means that the assessment work has already been undertaken and projects that can be fully mitigated for within the strategic approach need not proceed through lengthy individual assessment, but rather they sign up to the agreed approach. This is usually through financial contributions towards pre-agreed mitigation projects.

13.2 The need for and benefits of joint strategic approaches (i.e. more than one local planning authority) to mitigating for potential impacts on European wildlife sites was first looked at on a large scale for both the Thames Basin Heaths and Dorset Heathlands. Increasing evidence was indicating that in these locations, residential development in close proximity to the European heathlands would be likely to add to recreational and urbanisation pressure on the heaths and was therefore likely to result in increased disturbance to the bird interest features. With significant pressure for growth, particularly around the Thames Basin Heaths, it was apparent that a consistent way forward was required, rather than detailed consideration of each new development proposal every time, with mitigation at the individual project level being difficult to achieve.

13.3 The strategic mitigation strategies for the Thames Basin Heaths and Dorset Heathlands were ground-breaking, involving extensive evidence gathering, and considerable partnership work to get a multi-authority joint approach in place. Both now provide successful examples of strategic mitigation for European sites, and of how to embed such approaches into the planning system.

13.4 The principal elements of mitigation for both the Thames Basin Heaths and Dorset Heathlands are twofold; provision of alternative greenspace for recreation in order to reduce pressure on the European sites, and management and monitoring of access on European sites, to minimise the pressure exerted by recreation that is not diverted by alternative greenspace provision.

13.5 The Thames Basin Heaths has a partnership of 12 local planning authorities, which includes 11 boroughs and districts and the county council. The delivery of necessary mitigation to prevent an increase in recreational pressure is overseen by a joint strategic partnership,

which has representation from each of the local planning authorities, with additional input from Natural England, Forestry Commission, RSPB, Wildlife Trusts, the Open Spaces Society, Ministry of Defence, and the development sector.

13.6 The Thames Basin Heaths Joint Strategic Partnership is responsible for overseeing financial matters, reviewing the findings of the monitoring programme and ensuring continued implementation, which may include overseeing matters such as cross boundary provision of alternative greenspace where one district is not able to provide land, for example. In addition, subgroups take forward specific matters where required. Whilst there is an overall partnership board in place, each local planning authority will set in place its own planning documents to take forward the strategic approach, as the situation for each is slightly different. For example, variations such as the area within each local authority that falls into the mitigation zone, and the fact that each local authority has varying ability to provide alternative greenspace within its own boundaries, means that individual approaches to contributing to mitigation need to be put in place whilst maintaining consistency across the entire partnership in terms of the mitigation provided for development coming forward.

13.7 The Dorset Heathlands has five local authorities and Dorset County Council within its partnership. In this case, the smaller group of local planning authorities and greater consistency across each has enabled the local planning authorities to take forward one jointly agreed strategy without the need for individual planning documents. The strategy was initially an 'Interim Planning Framework' until its recent adoption as a Supplementary Planning Document within each local planning authority. Until the current Government's change in focus from the multiple document, Local Development Framework approach to the single Local Development Plan, it was anticipated that the framework would eventually become a Development Plan Document, again to be adopted by each local planning authority. The Dorset scheme is overseen by the Joint Dorset Heathland Executive Group, with representation from each local planning authority, the RSPB, Natural England and the Home Builders Federation. An officer group regularly meets to review the practical elements of the implementation and monitoring, and reports to the Executive Group.

13.8 There are very few other strategic mitigation schemes in place for coastal European sites. However, there are a number of schemes currently being developed, in light of gathering evidence of potential recreational impacts. We are aware that such initiatives are being taken forward for the North Kent Marshes and Poole Harbour and a strategy has been prepared for the Solent (Liley & Tyldesley 2013). As with any strategic mitigation scheme, regular review and updating in light of new evidence is essential and as other approaches develop it is recommended that each should inform the other in terms of emerging best practice.

13.9 Potential impacts on the Plymouth Sound and Estuaries SPA/SAC/European Marine Site, arising from future growth in the Plymouth and South Hams area, were highlighted in the respective emerging local plans and their associated Habitats Regulations Assessments. With a predicted population increase of 25% over the plan periods, it was concluded that potential adverse effects on site integrity, arising from increased recreational pressure,

could not be ruled out and mitigation measures have therefore been committed to. Plymouth City Council and South Hams District Council have a joint Green Infrastructure Delivery Plan, with specific mitigation measures incorporated, which include a combination of access management and the provision of strategic greenspaces that incorporate a SANGs function. Links are made within the Plymouth City Council's Planning Obligations and Affordable Housing SPD, and the main thrust of the on site management measures are incorporated into the Tamar Estuaries Consultative Forum's recently updated Management Plan. This forum includes all relevant local planning authorities, Harbour Authorities, Natural England, the Environment Agency, Inshore Fisheries and Conservation Authorities (IFCAs), the Marine Management Organisation (MMO), the Crown Estate and South West Water. Options for external funding for some mitigation projects are also actively being considered, for example through a European Union INTERREG bid.

Suggested approaches to strategic mitigation for the Exe Estuary, Dawlish Warren and the Pebblebed Heaths

13.10 Where multiple local planning authorities and/or other competent authorities are working together to deliver a strategic mitigation scheme, decisions need to be made regarding the administration of the scheme and the extent to which the scheme is managed jointly, by an elected lead authority, or more through a more loosely tied partnership with individual variation.

13.11 The extent to which the practical implementation of this recommended strategic approach for the Exe, Dawlish Warren and the Pebblebed Heaths is managed jointly or individually is a decision for the three authorities involved. The mitigation package proposed by this report includes a combination of on and offsite measures, which are a combination of European site specific measures, alongside measures that mitigate for impacts on all European sites, and are therefore strategic measures relevant to all local planning authority areas. There is the additional proposal for dedicated staff across all sites as part of the mitigation package. Staff could be employed in and focus on individual authority areas, or could work across all three areas. The latter clearly has benefits in terms of cost effectiveness and coordinated delivery if employed to cover the area as a whole. The provision of SANGs is dealt with in four zones, so that the SANGs element of the contribution is an additional and separate calculation, depending on the relevant SANGs zone (i.e. the cost of the SANGs provision that will be delivered in each zone).

13.12 Dividing or combining the administration and management of the mitigation could potentially be achieved by a number of options. The options available are to either implement delivery individually, funded by developer contributions obtained within each administrative area; to pool all contributions and implement the entire mitigation package jointly; or an approach that is partially individual and partially collective.

13.13 If the entirely individual approach was taken, the implementation of measures would become the responsibility of the administrative area in which they needed to be put in place. Given that the responsibility for mitigation relating to the Exe Estuary lies with all three authorities, that the strategic measures are a collective responsibility, and that the SANGs zones cross administrative boundaries, an entirely individual approach does present

considerable difficulties in administration. A competent authority's duty to secure the necessary mitigation measures for the development projects they are permitting may not be met with reliance on the implementation of measures in a different area by another competent authority in the absence of any joint commitment. This approach is therefore not recommended as it may be difficult to secure adequate mitigation for the full impact of all development in the three administrative areas.

13.14 A partial approach would be for the on and off site mitigation measures that relate to the Pebblebed Heaths to be taken forward by East Devon District Council, those relating to Dawlish Warren by Teignbridge District Council, and for a joint approach to be put in place for the Exe Estuary and the strategic measures. A joint approach to some extent would also be needed for SANGs provision, as the SANGs zones cross boundaries. A per-house contribution could still be made to a joint fund to implement those joint measures, with the remaining elements of mitigation being the individual authority's responsibility to deliver. This approach would include some additional costs of administering a partial approach with funding moving between the three authorities for various different measures, and the local planning authorities would therefore need to give further consideration to the cost and practicalities of a partially joint approach.

13.15 An entirely joint approach is suggested as the most appropriate way of delivering the package of mitigation measures as this would maintain an overview of the entire project, thus ensuring consistent and timely implementation. The burden of mitigation delivery would be shared in proportion with the growth taken forward in each area, and also all three local planning authorities, as competent authorities, would be securing and taking responsibility for the mitigation necessary for the development they are permitting. This approach would be likely to be the most resource efficient method as it is the least administratively complicated.

13.16 An entirely joint approach would ideally require one authority to administer the funding, with contributions paid into the fund on a per house basis. The fund would be used to pay for the full suite of mitigation measures, irrespective of which area they need to be implemented in. This would still allow for 'in kind' contributions from larger developments able to directly provide some or all aspects of mitigation as part of their development proposal. It would be sensible for the delivery officer to be hosted by the same authority as the one administering the funding, as the delivery officer role would include overseeing and reporting on the financial aspects of the strategy.

13.17 It is recognised however that the three authorities may consider the partial approach to be the most appropriate option, and ultimately it is for the three authorities to decide which best fits their internal processes. It will be important however for there to be continued monitoring of numbers of houses coming forward and the income they are generating. The per house contribution to be made into the mitigation fund needs to continually be calculated on a per house basis, as this is the measurement unit by which potential impacts are calculated and mitigated for. Particularly because of the way in which the Community Infrastructure Levy is generated, contributions will differ. However, whilst each house may generate differing levels of funding, via its CIL and/or S106 contributions, a consistent

per house contribution needs to be made into the European site mitigation funding pot and expenditure out of the pot needs to equate to the number of houses that have come forward.

13.18 Whether the administration of the strategy is a full or partial approach, it is strongly advised that a partnership or board needs to be established, to maintain transparency, make democratic decisions, and benefit from a range of expertise when reviews, monitoring and future options are being considered. The delivery officer would make reports and recommendations to the board for their final democratic decision on important matters relating to mitigation delivery.

13.19 It is also advised that, as with the Plymouth approach, some mitigation measures will be most appropriately overseen and delivered by the Exe Estuary Management Partnership. Closer working with this group, and its dedicated Officer, will be required. Additionally, again drawing on the Plymouth approach, there should be active pursuit of any external funding opportunities for some of the measures, and again this may be best undertaken by the Exe Estuary Management Partnership. Competent authorities are responsible for securing any mitigation necessary to prevent adverse effects on European site interest features, but the mechanisms by which such measures are funded is a decision for the competent authorities, and there may be a range of options for funding some of the initiatives.

Review of potential administrative models

Developer Contributions

13.20 The administration and funding of European site mitigation strategies has until recently primarily been through the use of Section 106 agreements. As explained earlier, the recent introduction of the Community Infrastructure Levy has removed the use of S106 for infrastructure related requirements (unless small scale as explained below). This now creates a level of uncertainty with regard to the most appropriate mechanisms for funding a European site mitigation strategy.

13.21 Section 106 of the Town and Country Planning Act allows for legal agreements to be put in place to set out obligations that must be fulfilled as part of a planning permission. The agreement is normally between developer and local planning authority, and can be used to put in place any requirement that is deemed to be necessary to make a development sustainable, and in accordance with planning legislation and policy. Section 106 agreements can cover a wide range of requirements and have successfully been used for European site mitigation for some time.

13.22 The new restrictions on the use of S106 agreements do still allow non-infrastructure requirements that are directly related to the development to be funded through this mechanism. The restriction also still allows for development site specific infrastructure projects to be funded, if the total funding can be obtained from less than fivedevelopments and if the infrastructure project is not listed by the local planning authority as a project to be delivered by CIL. This therefore provides opportunities for obtaining funding for European site mitigation from developments that may be specifically excluded from CIL,

but still have a potential impact. This could for example be used for the types of affordable housing that are currently excluded from the levy (current proposals for changes to the planning system also now include exclusions for 'self build' houses). The local planning authorities would need to agree the approach taken for development exempt from the levy, and any mitigation that is either not classed as infrastructure, or is locally specific infrastructure that can be funded by less than five developments, ensuring that a S106 funding mechanism would be put in place for such developments.

13.23 It is worth noting that guidance regarding the use of the CIL is very clear about its targeted use for infrastructure needs that are cumulative across an area, and not maintaining existing infrastructure or remedying pre-existing problems or deficiencies (except to the extent that they could be aggravated by new growth), and that there is still a legitimate role for planning obligations to operate alongside CILto address site specific impact mitigation requirements[49].

13.24 As the Government has indicated that provision of alternative greenspace does come under the umbrella of infrastructure to be funded by CIL, there is no longer the option of funding the entire mitigation package proposed in this report through S106. The options are therefore to either split the mitigation between the two mechanisms for obtaining the funds, with infrastructure paid for by the levy and non-infrastructure elements paid for by S106 obligations, or to fund the entire package through the levy.

13.25 The decision rests on what is included in the definition of infrastructure, and ultimately each local planning authority must decide how to interpret the Community Infrastructure Levy Regulations. The mitigation package proposed in this report, and likewise for a number of strategic European site mitigation schemes across the country, contains measures that could fit into the definition of infrastructure (and its maintenance and operation), i.e. the SANGs provision, and also those that could potentially be considered to be outside the definition of infrastructure, i.e. the non-SANGs strategic measures, and the European site specific measures.

Consideration of whether measures implemented on European sites constitute infrastructure

13.26 The definition of infrastructure, as set out in the Planning Act 2008 (with the definition slightly amended by the Community Infrastructure Regulations 2010), is roads and other transport facilities, flood defences, schools and other educational facilities, medical facilities, sporting and recreational facilities and open spaces. It should be noted however that in defining infrastructure, the Planning Act states that infrastructure 'includes' the above list, not that the list is exhaustive.

[49] Department for Communities and Local Government. Community Infrastructure Levy – Detailed proposals and draft regulations for reform. October 2011.

13.27 It may be helpful to refer to dictionary definitions of infrastructure. The internet based English Oxford Dictionary[50] defines infrastructure as 'the basic physical and organisational structures needed for the operation of a society or enterprise.' Here the word 'infrastructure' is said to relate to that which is needed for the operation of society, and it could therefore be argued that this could be taken to exclude the consequential use of structures already present, but which are not necessarily needed by society and are not in place with the primary objective of providing infrastructure. However, it should also be noted that in specifically defining 'green infrastructure,' the internet based encyclopaedia Wikipedia[51] focuses on the life support function of natural ecosystems, including the provision of clean air and soils, as well as their recreational purpose. The designation of European sites for their natural ecosystems, could therefore potentially be included as a structure providing an infrastructure function, if definitions are taken in their very widest sense.

13.28 In considering these definitions and putting forward a justification to exclude on-site measures from the definition of infrastructure, it would be argued that European sites themselves are not infrastructure that is necessary to support the development of an area. They may, by their nature and accessibility, be used for recreation, and that use may increase as an unavoidable consequence of new development. The mitigation necessary to prevent adverse effects on the European site as a consequence of growth, which could include prevention of pollution, prevention of disturbance or measures to manage access to a European site, should not therefore constitute infrastructure because the use of European sites themselves as infrastructure is an unintended consequence of development rather than a requirement of development.

13.29 In putting forward a justification to include on-site measures in the definition of infrastructure, the argument would take the definition in its widest possible sense. A European site will contribute to meeting the needs of a community by the services it provides. A site with access provides recreation and enjoyment of a natural and wildlife rich space, but a site without access can still provide visual amenity, and ecosystem services such as a carbon sink or flood management, and its preservation and management secures its resources for future generations. This is not infrastructure provision that is necessary for development, but rather it is the fabric of an area that contributes to quality of life.

13.30 Our recommended approach is to confine the definition of infrastructure for the purposes of implementing the Community Infrastructure Levy Regulations to that which is necessary for development, and to follow the advice given by Government that alternative greenspaces constitute infrastructure to be funded by the levy, but not to take such a wide interpretation that includes any aspect of the fabric of an area with indirect quality of life

[50] http://oxforddictionaries.com
[51] www.wikipedia.org

benefits. However, this recommendation is currently not supported by any guidance from Government on this matter, rather it is based on interpretation, and the fact that Government has only given a direction for alternative greenspaces, not on-site measures. Again therefore it is open to the three local planning authorities to take either approach, as definitive guidance is not yet in place. Internal administration processes and plans for the delivery of European site mitigation and other strategic green infrastructure may be such that an entirely CIL funded approach is the preferred option. As guidance does not exist to the contrary, it is suggested that there is currently no reason not to proceed with an entirely CILfunded approach.

13.31 There is potentially greater flexibility in an approach that allows for S106 funding as by including all measures under the CIL places there is potentially greater strain on a potentially already constrained fund. With the demands that will be placed on it and its restricted finances given that it is founded on viability, it is recognised that local planning authorities may face challenges from communities and their elected members who may feel that the CIL is not the most appropriate mechanism to meet 'on-European site' requirements to secure compliance with Habitats Regulations duties. A worst case scenario would be where the levy does not fund the European site mitigation requirements, and alternative sources of funding need to be found in order for development to be permitted.

13.32 If on-site mitigation is not taken to be infrastructure that should be funded under the CIL, this requires European site mitigation strategies to be split, in terms of their funding, into levy and S106 agreement projects, with SANGs provision funded by the levy and other measures (such as on-site wardens, information boards, etc needed to manage the consequences of development) funded by S106 obligations. Alternatively, the three local planning authorities may decide to fund some of the site specific and strategic measures through the CIL and a smaller proportion of such measures through S106.

13.33 The discussions and concerns regarding the delivery of European site mitigation through the CIL is a very current debate, and one which is not yet fully resolved. Precedents set by the few charging schedules currently coming forward with references to European site mitigation are limited and not necessarily consistent.

13.34 Poole Borough Council is part of the partnership of local planning authorities with a strategic mitigation scheme in place to prevent impacts on the Dorset Heathlands SPA, and they have recently progressed their charging schedule through examination. The Inspector gave time at the Examination to considering whether the principle of the use of the CIL was appropriate for European site mitigation, concluding that it could be used, but notably did not explore the nature of the mitigation package in place. It is understood that with this endorsement, Poole Borough Council is proceeding with the continued delivery of its strategic mitigation package entirely through the levy, including the significant element of on-site measures in the mitigation scheme.

13.35 In contrast, the partnership of Thames Basin Heaths authorities has made a clear division between provision and maintenance of alternative greenspace and the measures to

manage access on the European heaths, concluding that the latter is not infrastructure. It is understood that the on-site measures will continue to be funded via S106 agreements.

13.36 This debate essentially concerns compliance with the requirements of the Community Infrastructure Levy Regulations, and what is most suitable for the individual authority circumstances. Compliance with the Habitats Regulations requires competent authorities to secure the necessary mitigation to prevent adverse effects on European site integrity. How that is achieved is the responsibility of the competent authority. It is recognised that whilst recommendations are in this report, those recommendations are made in the absence of a full appreciation of individual authority circumstances. This report provides a strategic approach to ensuring that when giving permission for a development with the potential to affect a European site, the three competent authorities are able to secure the necessary mitigation to prevent the impact, and although the report advises on options, it is for the authorities to finalise how there will be certainty in the adequate and timely delivery of that mitigation.

Securing certainty of mitigation delivery with the Community Infrastructure Levy

13.37 Whether all or some of the mitigation package is funded through the CIL, there are matters relating to the use of the levy for funding European site mitigation that need to be considered by each of the local planning authorities. Funding mitigation through the CIL is not as straightforward as the use of S106 agreements. There are two fundamental issues; firstly the degree of certainty of implementation with the removal of the direct link between the individual development and the infrastructure measures it is funding; and secondly, the practical application of the levy to adequately cover all development that potentially results in increased pressure on the European sites. Each of these issues is considered in more detail below.

13.38 As described earlier in this report, growth in the vicinity of the Thames Basin Heaths Special Protection Area is wholly reliant upon the strategic mitigation strategy which is in place to ensure the delivery of sustainable development, whilst adequately protecting the heaths from harm. The introduction of CIL has therefore raised a number of questions for the local planning authorities in the Thames Basin, who need to continue to have confidence that they, as competent authorities under the provisions of the Habitats Regulations, are fully meeting their duties if the infrastructure related elements of their mitigation strategy are to be funded by CIL, rather than the S106 obligations that have been used since the strategy was put in place.

13.39 In particular, the key concern relating to the proper application of the Habitats Regulations, relates to the certainty of funding for European site mitigation. The CIL is a pre-set contribution, detailed in the adopted charging schedule that covers all infrastructure needs. Infrastructure related European site mitigation is one of a number of infrastructure needs for a development, alongside roads and community facilities, for example. Natural England advises that a competent authority should have a sufficient level of certainty in the delivery of any package to avoid or mitigate for the potential impacts of development on European site interest features. With one ‘pot’ for all infrastructure needs, it is perceived

that there could be a risk that the European site mitigation part of the pot could be lost to other infrastructure demands.

13.40 Natural England has been working with the local planning authorities in the Thames Basin Heaths to resolve this issue. Natural England has advised the Thames Basin Heaths local planning authorities that there may be a number of ways of increasing the level of certainty that adequate funding will be secured from the CIL for the required infrastructure element of the European site mitigation strategy, i.e. for the delivery of SANGs to the required quality, and also that money is secured to continue that delivery and management in perpetuity.

13.41 Currently there are two potential ways in which a local planning authority can secure greater certainty in the prioritisation of the CIL funding pot for European site mitigation. These are not necessarily all options available, but rather they are two ways that have been proposed by local planning authorities and have been agreed by Natural England.

13.42 Firstly, the 'Poole Approach', as taken forward by Poole Borough Council in order to implement its European site mitigation strategy for Poole Harbour SPA, is simply the inclusion of additional policy wording within an examined and formally adopted plan, either the local plan or a development plan document. Poole included a policy that was described by the Inspector for their charging schedule as *'a clear policy that placed mitigation at the top of the infrastructure hierarchy,'* essentially ensuring that European site mitigation is prioritised in the use of the CIL funding pot. Prioritisation in the charging schedule itself, backed up by formal policy, is supported by Natural England as a means of securing certainty in accordance with the duty of a competent authority within the Habitats Regulations. It should be noted that any non-statutory plan or document would not give the required certainty.

13.43 Secondly, the 'Bracknell Approach, ' as currently proposed by Bracknell District Council, places additional burden on the local planning authority itself to adequately deliver the necessary European site mitigation prior to the occupation of new development, i.e. to use the CIL money provided, before the potential impact occurs. This is in the form of a planning condition, preventing occupation until confirmation that the mitigation arrangements have been provided by the local planning authority, and secondly a legal agreement in place between the local planning authority and the developer that commits to the use of the money provided within a given timescale. The latter is an agreement put in place under the 'general power of competence' in the new Localism Act 2011. Again this approach is supported by Natural England as it appears to secure certainty in accordance with the duty of a competent authority within the Habitats Regulations, and certainly ties the competent authority to the delivery of the mitigation measures.

13.44 The practical implementation of the CIL for European site mitigation is complicated by the fact that the levy is on a per m^2 of floorspace basis. This raises difficulties in calculating a potential impact that is proportionate to the development. Most mitigation strategies considering the impacts of increased recreational pressure or urbanisation are founded on an individual dwelling being the basic unit of impact, i.e. each new dwelling makes a contribution. When calculations are made on a floorspace basis, the basic unit of impact is

not clear. A further difficulty is the exclusion of those developments that have a potential impact, but do not result in an increase in floorspace, such as conversions. Additionally, a small number of development types are excluded from the levy, for example particular types of affordable housing and potentially some self-build projects.

13.45 In order to ensure that the charging schedule for the CIL adequately covers the necessary mitigation requirements, local planning authorities will need to make calculations based on the quantum of development coming forward, i.e. that allocated in their local plan and the cost of the measures required to mitigate for the predicted impact. The cost will then need to be related to the floorspace levy, taking a precautionary approach to have confidence that development coming forward will make adequate contributions and that the potential impact will be adequately mitigated for.

13.46 In the absence of the direct link, the quantum of development coming forward, the levy paid and fulfilment of mitigation will need to be closely monitored, with provision for revising the CIL charging schedule put in place and/or seeking alternative funding sources should there be any shortfall identified.

13.47 As noted above, those developments that fall outside the levy could potentially still contribute to more site specific infrastructure projects under a S106 agreement if the project could be funded by five or fewer developments.

Suggested mechanism to secure certainty of delivery in accordance with the Habitats Regulations

13.48 It is suggested that in line with the endorsed approaches already being undertaken elsewhere, that East Devon District, Teignbridge District and Exeter City Councils all secure appropriate policy wording in their planning documents, to demonstrate absolute commitment to the prioritisation of funding for European site mitigation, and the collaborative approach. For relevant plans and documents already in place, the earliest and most appropriate opportunity for commitments to be added needs to be taken.

13.49 In addition to this, it is further recommended that the partnership/programme board all commit to a legally binding document. This could essentially be a very short resume of this comprehensive and detailed mitigation and delivery report, incorporating the mitigation costings table and required developer contributions tariff, as set out in the following section, to give further certainty to the joint commitment. It is recognised that as this report is very detailed, key aspects of it will be taken and used in a number of ways, and it is clear that a simplified costings and tariff document will also serve to inform developers of their expected contributions and the reasons for the requests being made.

13.50 As there may or may not be funding sources from both the CILand planning obligations, the latter are also included below in the suggested commitment wording, for completeness. Suggested policy wording for planning documents is as follows:

'The Council commits to working jointly with XXX council and XXX Council for the collective protection of European Wildlife Site assets within and in close proximity to our administrative areas, in accordance with the XXX mitigation strategy and XXX partnership agreement. The Council commits to ensuring that the required Community Infrastructure Levy monies are collected and directed to the

delivery of necessary European site mitigation projects as a priority above other infrastructure demands, in accordance with the XXX mitigation strategy and XXX partnership agreement. Furthermore, the Council commits to securing, collecting and directing the necessary planning obligation funding for the delivery of necessary European site mitigation projects as a priority above other infrastructure demands, in accordance with the XXX mitigation strategy and XXX partnership agreement. These commitments secure the delivery of development that is in accordance with the requirements of European wildlife directives and the Conservation of Habitats and Species Regulations 2010, as amended.'

13.51 The suggestion above for policy wording is simply provided to guide each local planning authority. It is suggested text only. The commitment does not need to be exactly replicated across the three authorities. Each should check emerging and/or adopted wording in relevant plans and ensure that the prioritisation commitment is in place, in the most appropriate place and in the most appropriate way for that plan.

14. Recommendations for mitigation delivery

Central administration and expenditure of funds between all three local authorities

14.1 This report sets out a comprehensive range of mitigation measures, for implementation both within and outside the European sites, including the provision of SANGs; alternative off site greenspaces. Residents and developers within the three local planning authority areas share the benefits of the landscape, wildlife, ecosystem services, tourism, open space and economic benefits that the Exe Estuary, Dawlish Warren and the Pebblebed Heaths bring to the local area. Each now has the opportunity to preserve these outstanding places into the long term whist benefitting from the opportunity to take forward new development, with a joint approach to protection and mitigation.

14.2 The mitigation package set out within this report is a wide ranging proposal for mitigating for the potential effects of new development within the three planning authority areas. The package of measures that will now form a strategic mitigation strategy have been developed following extensive research and consideration of the specific nature of the sites in question, their features, their use by the public, and the predicted increases in use based on locally specific information. Most of the measures have cost implications, and funding of those measures will need to be through developer contributions in order to implement the measures proposed. Whilst the primary funding source will be via developers, the three local planning authorities should continue to seek opportunities to secure other funding sources or ways in which to deliver some of the measures, if and where possible, providing that certainty of delivery can still be assured. Additionally, some measures do not have significant costs attached, and are more reliant upon strong partnerships, the successful co-ordination of new projects and also slight amendments to or enhancement of measures currently in place or proposed.

14.3 Whilst some measures recommended in this report are very localised and specific, many are relevant to the protection of all three European sites from potential impacts that originate in any of the three local planning authority areas. It is recommended therefore that the most appropriate, and most straightforward mechanisms for implementing the strategy should be sought wherever possible, primarily maintaining consistency across the three administrative areas. The recommendations for a joint approach focus on ease of implementation and fairness to developers who will be asked to make financial contributions towards the delivery of mitigation, preventing the need for a complex set of rules and criteria governing the contributions made. As discussed in the previous section an individual authority approach, in a situation where residents from each of the three administrative areas are responsible in some way for the recreational pressure on each of the European sites would result in complicated calculations of proportional impact, and funding crossing between all three authorities in order to fund measures and implement measures where source and receptor fall at different sides of the administrative boundary. By collectively recognising responsibility, and collectively implementing the required measures, through the recommended joint approach or partially joint approach, the strategy's administration will be more effective and more resource efficient.

14.4 Recommendations have been made for a centrally held funding pot, delivery officer overseeing the use of the funding pot, and a partnership/programme board overseeing implementation with a democratic approach to critical decision making. There continues to be an option for a partially joint approach, and the three local planning authorities would need to consider how the detail of funding would be managed if this partial option is chosen.

14.5 Actual delivery of the mitigation on the ground may mean that funding is returned from the central funding pot to relevant departments within the three authorities, where delivery responsibility may lie. Parks and estates departments may be taking forward a number of measures around visitor facilities, for example.

14.6 The partnership/programme board must provide full representation of all authorities, but retaining an independent and democratic process for decision making. Board members will impartially oversee the implementation of the strategy and maintain full partner involvement in any decisions taken or updates proposed. Board decisions would provide direction for the authority holding the funding pot and managing finances. As seen in other partnerships for European site mitigation, it is commonplace for external key organisations such as Natural England to be represented on the board, and this is recommended here, particularly as some measures will be delivered by external partners. The RSPB, Clinton-Devon Estates and developers (for example the House Builders Federation or other organisations from the building sector) should also be considered for inclusion, along with relevant bodies involved in the day to day management of the Exe Estuary.

14.7 This section now considers the collection of contributions and practical delivery of the mitigation measures, including recommendations for development zones where contributions are collected, mechanisms for securing the necessary funding, bodies that may be involved in the delivery of measures, and then indicative costs for the measures recommended and how those costs can then be translated into a financial contribution with a tariff for new development.

Zones

Defining charging zones

14.8 Using the information and evidence available, the aim is to define a zone of influence within which mitigation will be required (i.e. where residential development is clearly linked to recreation use). In order to define a fair, workable and administratively straightforward charging zone, we have undertaken a full analysis of options. The starting point for this analysis was the methods used in the Thames Basin Heaths and Dorset Heaths. In both of these cases, the data used to define the zones was produced by a single on-site visitor survey looking at visits to a single European protected site. In both cases, the charging zone was set at 5km, a distance that was approximately equivalent to the distance within which 75% of visitors had originated from. The distances were the distances from home postcode to survey point and were from on-site visitor surveys.

14.9 In this study, we are considering three separate European sites with household postal survey data available for all sites and onsite data for the Exe and Dawlish Warren but not for the Pebblebeds Heaths. Therefore the available visitor data and site geography are more complex than the Thames Basin and Dorset Heaths requiring further investigation into zone options. The options and their description are provided in Appendix 4. The options are summarised in Map 18 and are drawn from the household data, household survey visit rate curves and the onsite visitor survey data.

Suggested zoning

14.10 From the range of options described in Appendix 4 (summarised in Map 18) and following considerable discussion with Natural England and representatives from the local planning authorities, we recommend zones as set out in Maps 19 and 20. Within these zones all residential development mitigation would be expected to provide funding contributions. Other zone options are however possible and are fully described in Appendix 4; the geography, range of visitor data and inclusion of multiple European sites means that the zoning is complicated. We have included Appendix 4 to allow all options to be considered and compared.

14.11 The distances proposed are 10km for all three sites based on the flattening off distance of the visit rate curves derived from the household survey data. 10km has been selected as it is a fair, simple and administratively straightforward distance and is supported by the visitor data. Aligning the zones for the Exe Estuary and Dawlish Warren at the same distance would seem appropriate and clear. The choice of 10km is supported by the different methods, such as method 2b in Appendix 4.

14.12 Using the household survey data, we have calculated the cumulative percentage of visits that originated within 10km for each site – similar to the approach used to calculate the 5km zone in the Dorset Heaths and Thames Basin Heaths. As there are a range of different ways to do this using the household survey data, a range of percentages are possible (see Appendix 4):

- Exe Estuary: 72.7-84.2%[52] of the visits from the household survey originated from distances up to 10km.
- Pebblebed Heaths: 70.8-86.5% of the visits from the household survey originated from distances up to 10km.
- Dawlish Warren: 54.7-55.8% of the visits from the household survey originated from distances up to 10km.

14.13 Alternatively, the proportion of visits simply captured within 10km of each site (Exe Estuary, Dawlish Warren and Pebblebed Heaths) can be calculated geospatially i.e. a line drawn within the GIS at 10km from each site and then the percentage of the total visits

[52] A range of percentages is provided as three different methods of calculating the cumulative total have been carried out. Details are provided in Appendix 4.

derived from postcodes within 10km of each site calculated. These results are displayed in Table 21 and are broadly similar to those above, suggesting that 10km does encompass the majority (but not all) visits for the Exe Estuary and the Pebblebed Heaths. For Dawlish Warren less than half of visits (47%) came from within 10km.

Table 21: The number of visits derived from household respondents within 10km of each European site.

Exe	66114	60314	91.2
Dawlish Warren	10384	4856	46.8
Pebblebeds	20432	16880	82.6

14.14 The zone maps can therefore be summarised as follows:

Map 19

1) Exe Estuary zone (blue line, 10km): development within this zone would contribute to on-site management measures specific to the Exe Estuary SPA/Ramsar
2) Pebblebed Heaths zone (brown line, 10km): development within this zone would contribute to on-site management measures specific to the Pebblebed Heaths (SAC/SPA)
3) Dawlish Warren (green line, 10km): development within this zone would contribute to on-site management measures specific to Dawlish Warren (SAC)
4) Strategic measures (excluding SANGs): all development within any of the above zones will contribute the same per dwelling cost to strategic measures that apply across all the European sites.

Map 20

5) SANGs contribution: four different SANGs tariffs apply (a-d), depending on which SANG location is closest to the development location.

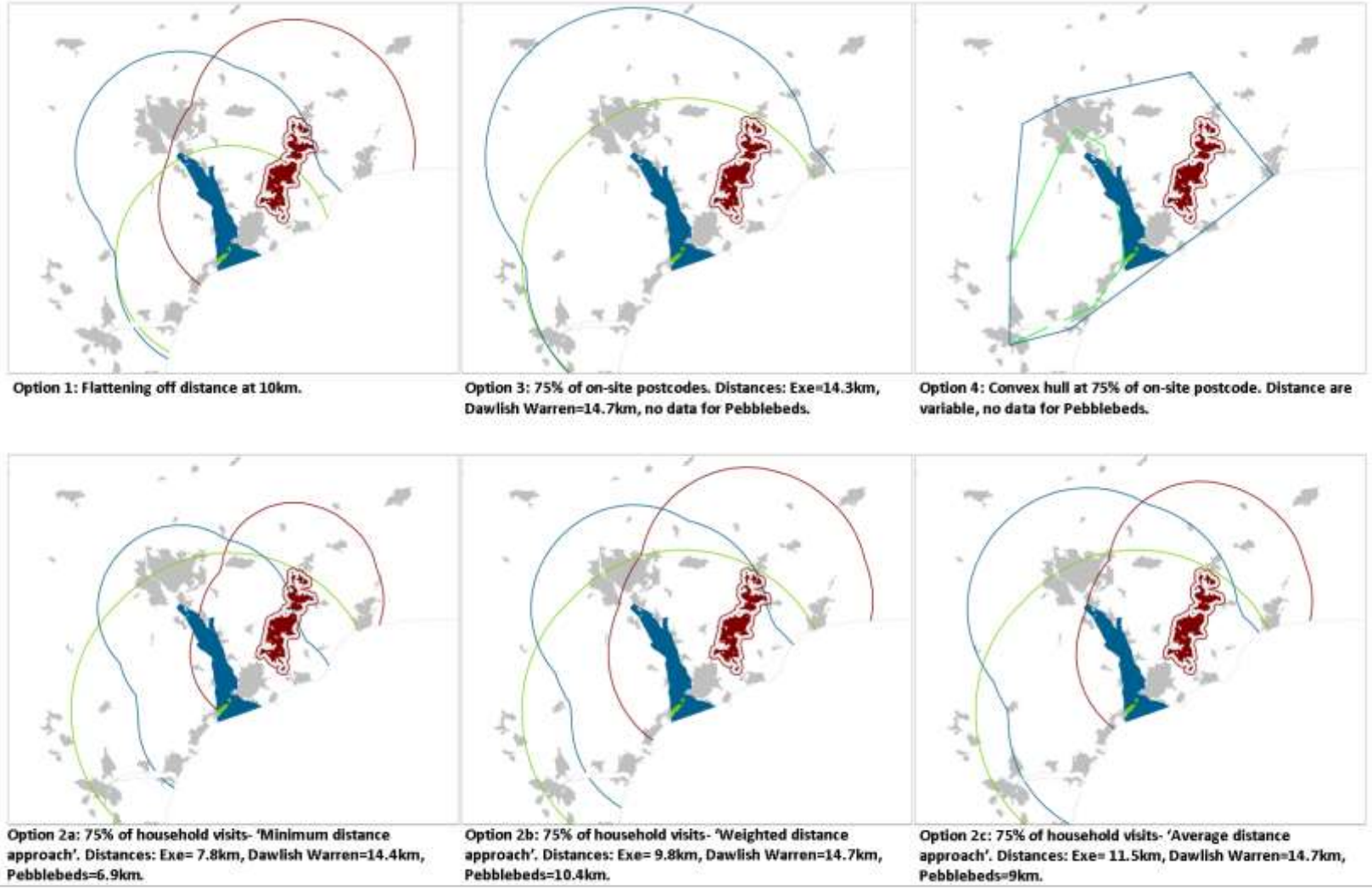
14.15 All residential development coming forward within the mitigation catchment will need to make a contribution towards some combination of 1-3. In addition there will be a standard contribution (the same for all locations) towards 4 and a variable contribution towards 5 (depending on the location).

14.16 The zones have also been adjusted to account for the practicalities of travel around the estuary. The Pebblebed Heath zone and Dawlish Warren zone are each clipped to the top of the estuary, in recognition that the estuary creates a physical barrier and affects travel distances. The area at the top of the estuary is complex as – in theory – residents in the area around Countess Weir have equally easy access down each side of the estuary. We recognise that there could be justification for zones overlapping in this area, but for simplicity and ease of application we have not overlapped the Pebblebed Heaths and Dawlish Warren zones. We have also ensured that there are no 'triple charge zones'. The Pebblebed Heaths zone has been clipped at the point at which it meets the Exe Estuary north of the A3015 at Countess Weir. The Dawlish Warren zone has been clipped at the

point at which it meets the River Exe north of the M5 crossing. The 10km buffer for Dawlish Warren has been aligned with the Exe Estuary 10km zone from the point at which it crosses the A380 at Ideford to the coast south of the Teignmouth Estuary. This alignment was made as the two zones differed only by 700m at the widest point.

14.17 In order to assign areas to SANGs (a-d), we assumed that four strategic SANG sites could potentially come forward: one between Dawlish and Dawlish Warren; one around the south-west of Exeter; one around the Clyst Valley/Cranbrook and one or more on the north-east edge of Exmouth (or a combination of linked SANGs to serve Exmouth, noting that Exmouth SANGs provision is yet to be finalised). We then divided the combined area into four, apportioning the area to the nearest potential SANG (Map 20). This was achieved within the GIS by drawing a single point at each of the potential SANG locations and generating voronoi polygons[53] using these points and clipped to the combined zones. These voronoi polygons were tweaked to align with the Exe Estuary (i.e. realigning the boundaries so that polygons did not cover both sides of the estuary) and with the East Devon boundary just around the edge of Exeter such that SANG zone B did not include any of East Devon District. The resulting Map 20 therefore indicates zones rather than specific locations for green infrastructure. The dots that indicate approximate SANGs locations are deliberately broad and were simply used to create the zones shown – they are not definitive SANGs locations.

[53] Voronoi polygons are zones whereby an area is divided into non-overlapping zones based on proximity to a series of points, for example mapping areas according to the nearest fire station or supermarket.



Map 18: Developer contribution zone options. In each map, settlements are displayed in grey and the 400m exclusion zone around the Pebblebed heaths is also shown. The buffers in these maps have not been clipped to prevent triple charge zones, or aligned to each other.

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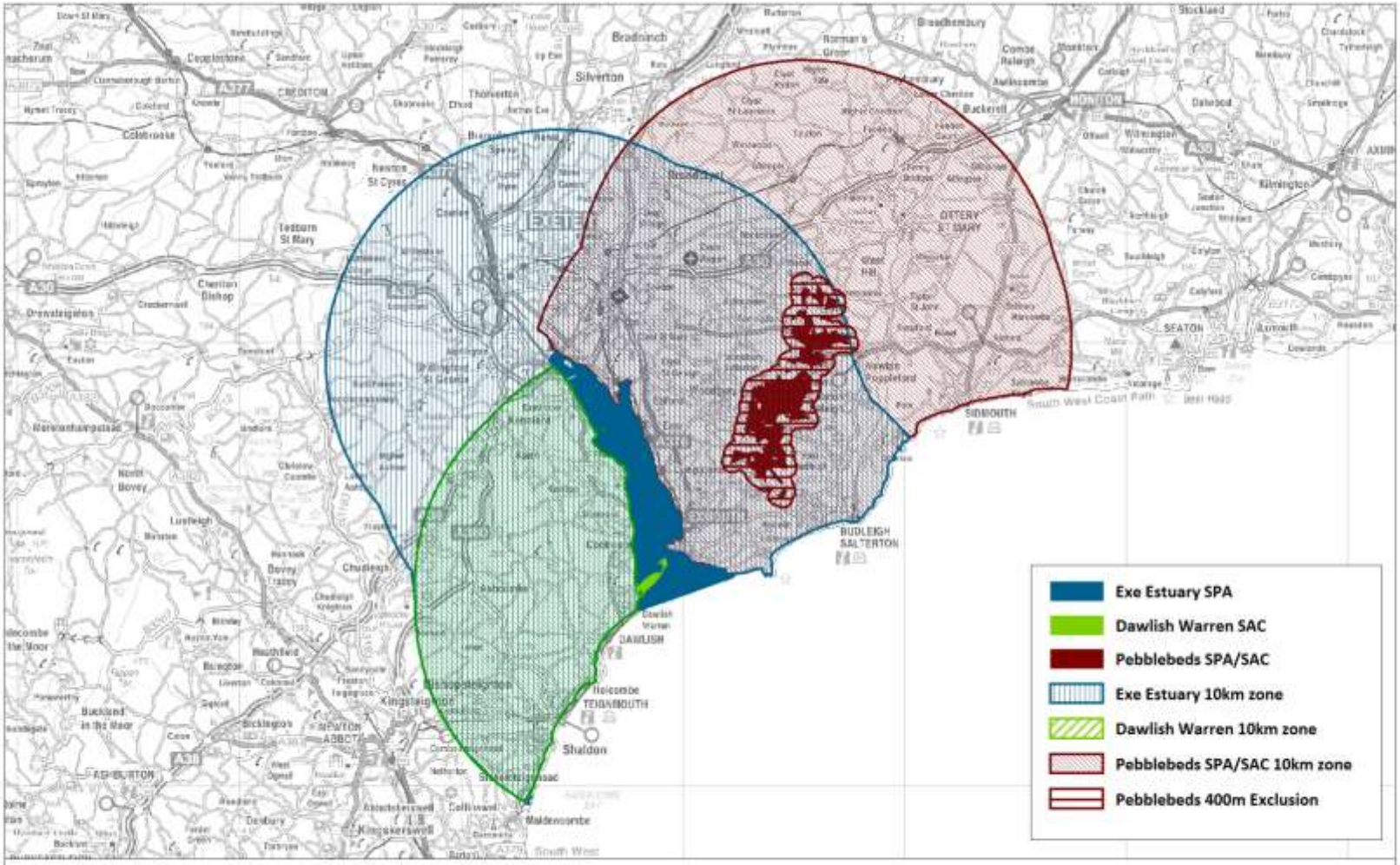

Map 19: Suggested Zoning for Developer Contributions

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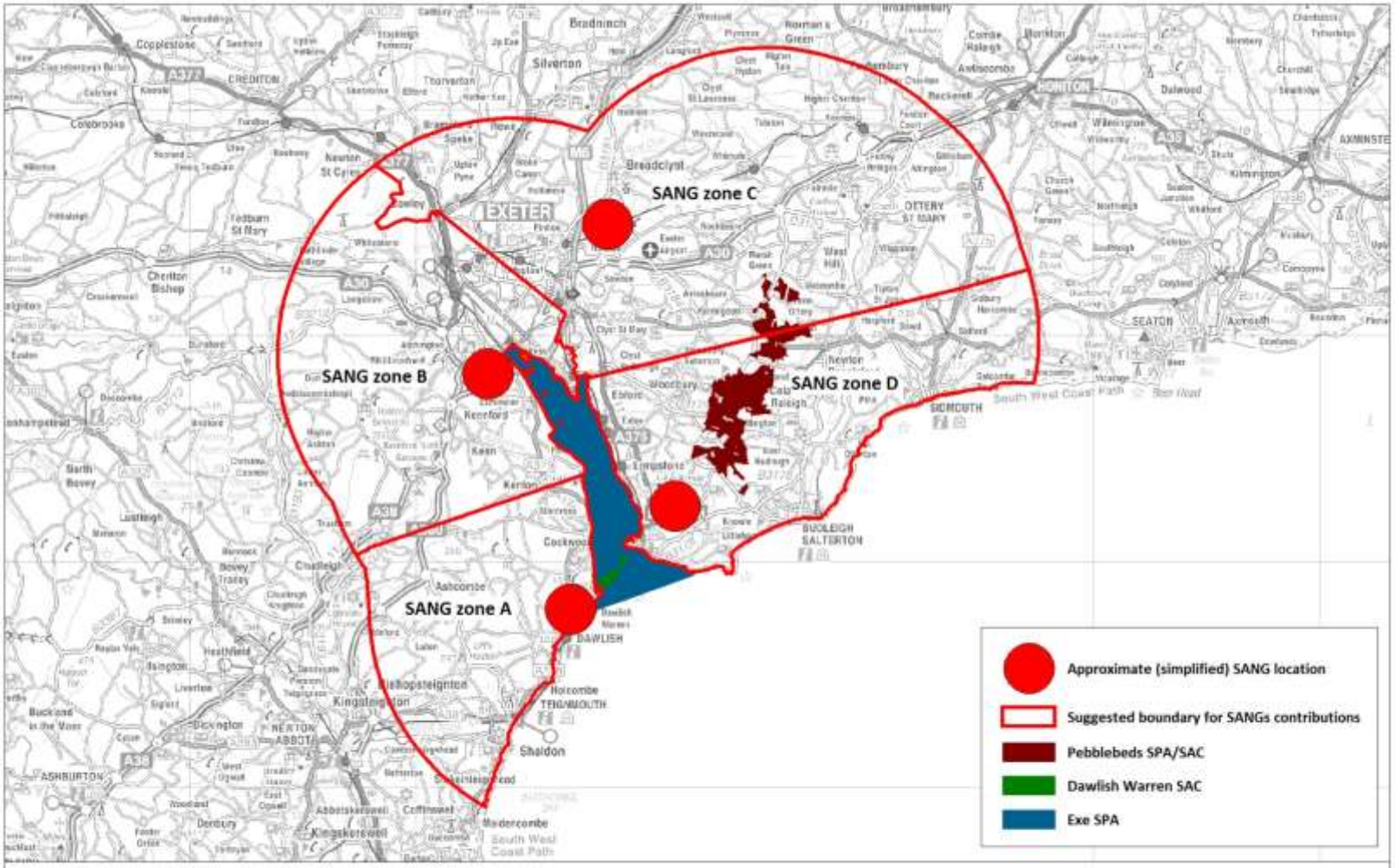

Map 20: Geographic breakdown of areas for SANGs contributions

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Estimating Contributions per Dwelling

14.18 Whilst the money collected through CIL will not relate to a per house monetary figure, whether the money comes entirely from the levy, partially or in some cases entirely though S106 (in the case of those developments exempt from paying the levy), the calculation of what is required per dwelling must be made in order to ensure that the correct amount of money is put into the European site mitigation 'funding pot' in line with the numbers of houses coming forward in each administrative area. There may therefore be a per house contribution made by the local planning authority entirely from money obtained from developers through the CIL, or there may be a combination of direct funding from the developer with the use of S106, along with additional money added by the local planning authority from the CIL to equate in total to the required per house contribution to be made.

14.19 The level of housing within each local authority district which falls within the suggested zone of influence is shown in Table 22. The number of new dwellings that may come forward within each zone is shown in Table 23. Dwellings in relation to the SANGs zones are summarised in Table 24 and Table 25.

Table 22: Number of new dwellings within each zone. New dwellings derived from data provided by local authorities and will include some existing permissions. The lower three rows represent the total number of dwellings which might be expected to contribute to the particular European Site. For zones see Map 19.

Exe only	7,350	756	6,568	
Pebblebeds only	1,385			1,385
Pebblebeds and Exe overlap	18,144		8,344	9,800
Dawlish and Exe overlap	3,291	3,291		
TOTAL DWELLINGS	**30,170**	**4,047**	**14,912**	**11,211**
Exe Total	**28,785**	**4,047**	**23,256**	**9,826**
Dawlish Total	**3,291**	**3,291**		
Pebblebeds Total	**19,529**		**8,344**	**11,185**

Table 23: Current and new dwellings (see Table 22) for each area.

Exe only	39,007	7,350	
Pebblebeds only	14,519	1,385	10
Pebblebeds and Exe	40,542	18,144	45
Dawlish and Exe	19,558	3,291	17
TOTAL DWELLINGS	**113,626**	**30,170**	27
Exe Total	**99,107**	**28,785**	29
Dawlish Total	**19,558**	**3,291**	17
Pebblebeds Total	**55,061**	**19,529**	35

Table 24: Number of current and new dwellings within each SANG zone. New dwellings derived from data provided by local authorities and will include some existing permissions.

A	2,842	2,842		
B	12,183	1,205	10,978	
C	12,430		3,934	8,496
D	2,715			2,715
TOTAL DWELLINGS	**30,170**		**14,912**	**11,212**

Table 25: Number of current and new dwellings in each SANG Zone and percentage change.

A	17,410	2,842	
B	30,809	12,183	40
C	22,565	12,430	55
D	42,842	2,715	6
TOTAL DWELLINGS	**113,626**	**30,170**	**27**

Funding

14.20 As discussed in section 13 of this report, there currently remains an element of choice in the route taken to fund European site mitigation and the three local planning authorities are yet to finalise the detail of how funding will be obtained. There are clear benefits, and some potential issues with both the use of the Community Infrastructure Levy and Section 106 obligations. In order to initiate the delivery of the strategy, the three local planning authorities should use the information provided here to inform discussions with relevant planning and biodiversity officers/wardens within each authority, to set out the detail of the most appropriate and suitable funding plan, upon which all three authorities will need to agree. Acknowledging that decisions between and within the three local planning authorities are currently being finalised, this report presents options and the breakdown of mitigation costings, leaving the authorities to determine the detail of how the money will be collected to secure a per house contribution in accordance with the tariff.

14.21 For all measures with cost implications, the apportionment of costs to each individual measure needs to be clear so that its necessary funding can be obtained. This is also important if a Section 106 and CIL split is to be implemented, so that all infrastructure related measures can be separated from the rest of the mitigation package, to be taken forward under CIL once charging schedules are in place in each of the three authorities. Until charging schedules are in place, some infrastructure requirements may need to be funded through S106 obligations, alongside the non-infrastructure elements of the mitigation package. Costings for mitigation measures have been carefully considered based on all information available and our experience of strategic mitigation schemes elsewhere. It is anticipated that the costings provided in the section will provide the information necessary to finalise the approach to be taken. However, some elements of the costings will need refinement from the local planning authorities and this may be necessary in order to inform the detail of the three individual charging schedules in the near future.

14.22 Each of the three local planning authorities has already made notable progress or nearly finalised on their charging schedules, and decisions on the use of the Community Infrastructure Levy for some or the entire mitigation package is therefore a matter of urgency. Whilst it is the viability of charging that determines the levy and not the infrastructure needs, the accompanying Infrastructure Delivery Plan details projects for funding, and prioritisation of European site mitigation above all other infrastructure requirements will need to be factored into the Infrastructure Delivery Plan, which will then identify the remaining money available to meet other infrastructure needs, which in turn may inform any consideration of alternative funding sources that may be available. For example there may be opportunities through the various Government and European schemes for sustainable growth, regeneration and affordable housing provision, bids to external funding sources such as the National Lottery, or delivery of some mechanisms within Council services or via other stakeholders/partners.

14.23 The funding of measures for this strategy needs to include in the necessary monitoring and possible modification of mitigation in light of monitoring findings. Monitoring is a significant but essential cost in the strategy. It is essential in order to establish whether

the entire strategy is succeeding in its objectives, i.e. whether the money spent is securing compliance with the legislation, and to give early warning of any issues before impacts on the European site interest features occur. The overall cost of mitigation therefore needs to ensure some flexibility is available to respond to circumstance and changes. . The monitoring programme must factor in the need for continued input from Natural England in order to inform any refinements.

14.24 It is advised that the implementation of the strategy requires dedicated staff to oversee delivery, monitoring and review. The use of a delivery officer, costed in and funded by the developer contributions, is common practice for European site and other developer-funded delivery programmes, and has been recommended in the suite of measures presented in this report. The use of a delivery officer provides one point of contact for all matters relating to the strategy, enabling an overview of all implementation across all three administrative areas and therefore ensuring rapid response to and effective management of all elements of delivery as well as informed monitoring design and continued revision of the mitigation strategy over time.

14.25 Natural England, the local planning authorities and the authors of this report have already recognised the benefits of a dedicated officer to oversee the delivery of the mitigation strategy across the three districts and it is understood that the scope of the role has already been discussed. There is also a requirement for two warden/ranger posts to be established. These posts would provide the 'on the ground' aspects of the mitigation plan. These posts could potentially be line-managed by the delivery officer, and they could potentially cover multiple sites, being flexibly deployed as required through the year. We would see one post to be largely based on the Pebblebed Heaths and working very closely with the Clinton-Devon Estate and other landowners, who would clearly need a direct input into duties and work undertaken. The other post could be focused more on the Exe Estuary (patrol boat and shore-based) and also at Dawlish Warren.

Dawlish Visitor Centre

14.26 As explained earlier in this report at 7.6, there is a significant opportunity at Dawlish Warren to take a whole site approach to managing and educating visitors differently. The way in which the site is accessed, the location of the visitor centre and the way in which its location exacerbates damaging access patterns, could all be re-designed to create a positive solution for visitors and for the European site.

14.27 As described in Section 4, Dawlish Warren is the most visited site of the three European sites that form the subject of this report, with 650,000 annual visits made per year to this small site from residents living within 10km. This is predicted to rise by 27% as a result of the planned growth within the local plans. There is clearly a significant existing issue on the site, and the increased visitor levels predicted raise considerable concern for the future of the site, especially when the proposals within the Environment Agency's Flood and Coastal Erosion Risk Management Strategy, as summarised in Section 2 of this report, are also taken into account.

14.28 The overarching objectives of the European Directives (and the requirements on each Member State of the European Union) are to maintain and restore the European sites

within their own administrative areas, in order to collectively contribute to overall favourable conservation status of the habitats and species of European importance across their natural ranges. For Dawlish Warren, there is a need to restore existing damage and prevent currently damaging activities from causing further deterioration, and this duty exists regardless of whether there are additional future pressures or not. It is therefore advised that the planning authorities, in partnership with all other public bodies with an interest in and responsibility for the site under their own functions, should work together to seek all possible opportunities to fund and co-ordinate a whole site approach.

14.29 Developing a new access and education strategy for the site would primarily involve the provision of a new visitor centre, along with access management to maximise use of land outside the site boundary and divert visitors away from sensitive areas of the SAC; and significant interpretation material. This has the potential to dramatically improve the overall visitor experience whilst ensuring much better protection for European site interest.

14.30 The need for the whole site approach to visitor access and the benefits it would bring are both very apparent, but could involve significant costs. It is recommended, particularly in light of the current issues at the site, that the approach to mitigation at Dawlish Warren should look wider than just developer contributions to mitigate for new development. A proportionate approach to funding should take into account the existing pressure, theresponsibilities for removing impacts and restoring the site, and also the wider community benefits that a whole site access project may bring.

14.31 A location adjacent to the existing seaward car park would be ideal to provide environmental education, both formal and informal, and to change people's perception of the site as first and foremost a nature area, rather than simply a place to walk the dog. A number of public bodies and potential additional partners have started to discuss the possibility of a new visitor centre that provides classroom facilities for a local college, as well as providing a focal point for informal environmental education provided by the District Council. The relocation of the visitor centre and associated re-design of access across the site could most beneficially tie in with the realignment work to be undertaken by the Environment Agency, and could also involve other bodies such as Natural England, the Devon Wildlife Trust and RSPB.

14.32 Whilst the proposals are in the early stages of development, and potentially represent significant costs, it is recommended that they are pursued as part of the mitigation package for new growth that may affect Dawlish Warren. However, they should be progressed as a project with the wider benefits below, and therefore a range of funding sources should be sought:

- Preventing further deterioration of the Site and restoring European site interest features, in recognition of current impacts
- Mitigating for the potential impact of future growth
- Taking a strategic and long term view of access management for the site
- Improving the overall visitor experience

- Providing formal and informal education opportunities
- Greater recognition of the site as a nature area

14.33 To ensure that new growth makes a proportionate and fair contribution to the new visitor centre project, an overall developer contribution of £500,000 has been included within the costs table (Table 26) and additional costs must be met from other funding sources.

14.34 Implementation of the overall suite of measures will proceed in accordance with mitigation priorities and the development of detailed proposals for implementation. The relocation of the visitor centre is a medium term project; with notably more work to be undertaken before it can be brought forward. Whilst contributions should not simply be held indefinitely by the local planning authorities until the visitor centre project is ready to commence, in order to make the project implementable the right amount of money needs to be available at the right time. The District Council therefore needs to plan for the funding of the project in terms of the timing of significant blocks of growth coming forward in the plan period that could provide a larger sum of developer contributions in a short space of time. At the same time, the other funding sources that will contribute towards the overall project need to be aligned. Other mitigation priorities should be funded in the immediate term, until the Dawlish Warren visitor centre is ready for implementation and the developer funding can be primarily directed to the project.

Delivery bodies

14.35 There are a range of ways in which the different mitigation measures and monitoring requirements could be implemented. For example, some elements are discrete projects that could be undertaken by external consultants or incorporated into existing work undertaken by local planning authority staff or existing site owners and managers. The approach to delivery needs to be flexible. The level of funding available at any one time will be dependent upon the level of new development, and as such will fluctuate. The projects and different elements of the work will need to take place as funding allows, and we have suggested in Appendix 5 an approximate order and timescale for the different recommendations. We suggest that the costings set out in this report provide a means of estimating a level of contribution per house and consequently the use of a per house unit to continue to be certain through monitoring the volume of housing coming forward that adequate funding is available for mitigation. The details in the projects and actual costs will depend on circumstances at the time. It may be that, in time, opportunities will arise for different approaches and there should be a suitable structure for additional or different projects to come forward without putting the implementation of the strategy on hold and therefore temporarily impeding development.

Costings

14.36 We give indicative costs for the various elements of the mitigation package we have proposed in Table 26. The table provides a breakdown of the cost of each mitigation measure, in order to calculate the overall cost of the mitigation strategy, which in turn can be used to calculate a per house contribution to be made. The costings table does not take account of inflation or discounting and is approximate, the intention to provide an overall indicative cost for the different elements proposed. The table is split into cross-site

measures (that apply to all sites) and then by site, however for some of the measures listed under the Exe Estuary SPA/Ramsar and for some listed under Dawlish Warren SAC, it is difficult to justify that they entirely relate to a single European Site. For example a visitor centre at Dawlish Warren would engage with visitors that might cause disturbance to the bird interest or damage to the SAC interest or both. Such measures that apply to both sites are shaded in grey.

14.37 These costs come to a total of £23,553,767 and can be broken down such that:

- SANGs: £14,400,000
- Other Cross-site:£5,985,500
- Exe Estuary SPA, on site mitigation: £1,361,100
- Pebblebed Heaths SPA/SAC on site mitigation: £756,000
- Dawlish Warren SAC[54] on site-mitigation: £501,500
- Monitoring: £549,667

14.38 The calculated costs include an estimate of the cost of SANGs provision, which is based on the information provided by the three local planning authorities at the time of finalising this report. This is an estimate of costs based on relatively limited information, generic set costs that we have applied to all SANGs. The SANGs element of the costings therefore may need to be revised in light of more detailed consideration of the actual cost of measures to create or enhance greenspace that meets the objective of attracting visitors away from the European sites. Additionally, as noted earlier in the report, SANGs provision will need to be amended in light of any changes and the current need for additional SANGs provision in light of the loss of the Valley Park site in East Devon District to development should to be addressed as soon as possible.

14.39 The cost of SANGs provision includes an ongoing maintenance cost, which needs to be in-perpetuity in order to provide alternative greenspace that continues to attract visitors away from the European sites into the long term. A calculation has been made on the basis of ongoing maintenance of £1500 per ha on an annual basis over 80 years[55].

14.40 A competent authority is responsible for securing the necessary mitigation to enable development to be permitted with certainty that adverse effects on the integrity of European sites will not occur. The responsibility of the competent authority therefore lies in securing the mitigation and how that mitigation is secured or funded is a matter for the competent authority. As new development is the reason for the strategy, and mitigation is being put in place to enable that development to proceed, it is clearly appropriate for

[54] See Table 26 re apportioning costs at Dawlish Warren as some measures at Dawlish Warren relate to the SPA and some to the SAC.

[55] Note that 80 years is potentially an underestimate and costs could be considerably higher if perpetuity is taken at 125 years, for example as defined in the Perpetuities and Accumulations Act 2009

developers to pay for the mitigation required. However, noting the cost of some of the measures that form part of the strategy, and the thrust of current Government policy and guidance that encourages local planning authorities to seek solutions to support sustainable development, the three local planning authorities may wish to consider other funding sources, or other delivery mechanisms, that if available and viable could reduce some of the burden of the mitigation provision on developers. The visitor infrastructure at Dawlish is one element we have suggested could be part funded through other means. The cost of SANGs provision, including maintenance in-perpetuity, equates to nearly 60% of the overall strategy. This may therefore be one area where alternative means of delivering some aspects of this part of the strategy could be considered. For example, it may be possible for a proportion of the on-going maintenance to be committed to by the relevant departments or services within the three authorities.

14.41 The delivery of the various mitigation measures should be in accordance with the suggested phasing indicated in Appendix 5.

Table 26: Costs table. Indicative/approximate costs for the various elements. We have assumed mitigation will need to cover eighty years, though not all measures will be required to run for eighty years.

Measure	Capital cost	Annual Cost	Cost period (years)	Total Cost	How cost calculated	Delivery
Cross-site Measures						
1. Delivery officer		£42,700	5	£213,500	5 year post. Salary £28,000 plus nat. ins. (£3500), plus 40% overheads (£11200). Costs shared equally across the 3 sites.	Local authorities
2. Two wardens		£70,000	80	£5,600,000	Salary £20,000 plus nat. ins. (£2500), plus vehicle costs (£4500) and 40% overheads (£8000). 2 posts costed. May need additional staffing to start with or at certain times during mitigation delivery. Costs shared equally across the 3 sites.	Delivery Officer
3. Dog walking project	£12,000	£2,000	80	£172,000	Estimated costs based on Dorset Dogs project. Costs shared equally across the 3 sites.	Delivery Officer
4. SANGs	£2,400,000	£150,000	80	£14,400,000	We assume capital costs for land purchase of 100ha at £10,000 per ha; additional capital costs for site infrastructure (parking, landscaping, planting, trails etc.) at £350,000 per site (four sites) , and then £1500 annual maintenance/management costs;	Delivery Officer/Local Authorities
Exe Estuary						
5. Close railway crossing and/or lay-by south of Cockwood	£2,000		1	£2,000	Estimated cost to remove gate and signs or to close off lay-by	Delivery Officer/Network Rail/Highways Agency
6. Low fencing/planting around edge of the car parks and the Recreation Ground	£10,000	£1,000	80	£90,000	Estimated costs: £1000 capital cost and £1000 per annum for maintenance	Delivery Officer/Local Authorities/Landowners
7. Screening and modifications to gates at Exminster Marshes	£6,000			£6,000	pproximate costs provided by RSPB and rounded up to nearest £1000	RSPB
8. Gate slipway at Exmouth Imperial Recreation Ground from 1 September to 1 April	£1,000		1	£1,000	Estimated cost	Delivery Officer/EDDC
9. Continuation/adaptation as necessary of access restrictions (temporary fencing, etc) to prevent access along shore near roost at Dawlish Warren		£2,000	80	£160,000	Estimated annual cost for maintenance and repairs	TDC

Measure	Capital cost	Annual Cost	Cost period (years)	Total Cost	How cost calculated	Delivery
10. Reed screening or landscaping between north-eastern most fairway on the golf-course and the Bight	£10,000	£1,000	80	£90,000	Estimated annual cost for maintenance and repairs	Golf club/DWT/TDC
11. Limited, localised changes to layout of golf course at Dawlish Warren	£5,000	£500	80	£45,000	Estimated costs	Golf club/DWT/TDC
12. Modifications of slipway at Mamhead to encourage users not to enter the estuary	£7,500		1	£7,500	Estimated cost	Delivery Officer/EDDC
13. New interpretation boards (five boards)	£12,500	£1,250	80	£112,500	£2,500 for each A0 outdoor panel; annual fee allows for maintenance/replacement	Delivery Officer/EDDC
14. Updates of the Exe Estuary leaflets	£6,000	£200	80	£22,000	Assume £3000 per leaflet, and two leaflets produced; £200 annual fee allows for reprints/future updates. Possibly doesn't require additional funding as conducted by EEMP	Delivery Officer/EDDC
15. Review and revision of byelaws relating to the Exe Estuary	£10,000		1	£10,000	Fees for consultancy support, legal advice, administration etc.	Delivery Officer/Local Authorities
16. Improved codes of conduct for specific user groups	£11,500		1	£11,500	10 codes produced as a pack for printing and as interactive document; cost estimated at £10,000. £2,500 additional cost for revision and futher print runs. Total cost of £12,500 largely relates to Exe Estuary, but some (£1000) attributed to measure 27.	Delivery Officer/EEMP
17. Revised zoning	£5,000		1	£5,000	Fees for consultancy support, legal advice, administration etc.	Delivery Officer/EEMP
18. Install dedicated signs relating to kitesurfing and windsurfing at Imperial Recreation ground and the Maer	£5,000	£500	80	£45,000	£2,500 for each A0 outdoor panel; £500 annual cost for maintenance/replacement	Delivery Officer/EDDC
19. Update signs at public slipways with zones and speed limits	£40,000	£1,000	80	£120,000	£2,000 for each sign, 20 signs; £1000 annual cost for replacement/maintenance	Delivery Officer/Local Authorities
20. Dog control order to control dogs off leads on the mudflats	£7,500		1	£7,500	Evidence base from disturbance study should be sufficient. Cost required for legal advice, administration etc.	Delivery Officer/Local Authorities
21. Purchase and run a new patrol boat	£22,600	£7,000	20	£162,600	Costs from TDC: ourchase of second-hand RIB; annual costs of fuel, storage, insurance, training etc.	Delivery Officer/Local Authorities

Measure	Capital cost	Annual Cost	Cost period (years)	Total Cost	How cost calculated	Delivery
22. Carry out scoping study for creation/ modification of a viable disturbance-free roost at Dawlish Warren	£2,500		1	£2,500	Estimated one-off cost for specialist advice	TDC
23. Create new/improved high tide roost on site of old bird hide at Dawlish Warren	£15,000		1	£15,000	Estimated one-off cost. Overall cost depends very much on results of scoping study	TDC
24. Relocate bird hide onto the shore of the Bight at Dawlish Warren	£50,000		1	£50,000	Estimated one-off cost	TDC
Dawlish Warren						
25. Create a live visitor management plan including a regular review of visitor access patterns.	£12,000	£500	80	£52,000	Estimated cost for consultancy support; annual cost to ensure update/live document. Costs relate to both Exe Estuary SPA and Dawlish Warren SAC interest, so split equally between two sites.	Delivery Officer/TDC
26. Carry out audit of information boards over whole of the Dawlish Warren area. As necessary re-design and add new boards	£7,500	£750	80	£67,500	£2,500 for each A0 outdoor panel; 3 panels; annual fee covers maintenance/replacement. Costs relate to both Exe Estuary SPA and Dawlish Warren SAC interest, so split equally between two sites.	Delivery Officer/TDC
27. Improved codes of conduct for specific user groups	£1000			£1000	Could be combined with measure 16 (overall cost of £12,500), so some of that cost included here	Delivery Officer/TDC
28. Rationalisation of path network		£2,000	80	£160,000	Estimated cost for annual management/maintenance of path network. Costs relate in part to Exe Estuary SPA as well as Dawlish Warren SAC interest, so split 25%/75% between two sites.	Delivery Officer/TDC
29. Make information available in local retail outlets selling barbeques so that potential buyers know they cannot use them at Dawlish Warren	£2,000	£50	80	£6,000	Estimated cost of design and print of small poster; annual cost allows for reprints and redesign	Delivery Officer/TDC
30. Establish regular Warren Newsletter to be distributed locally		£1,000	80	£80,000	Estimated cost for A4 newsletter printed and circulated locally twice p.a. Costs relate to both Exe Estuary SPA and Dawlish Warren SAC interest, so split equally between two sites.	Delivery Officer/TDC
31. Review and modify parking charges e.g. increase winter fee				£0	undertaken as part of 29	TDC

Measure	Capital cost	Annual Cost	Cost period (years)	Total Cost	How cost calculated	Delivery
32. Remove dog control order (use of leads) in buffer zone outside Dawlish Warren SAC	£2,000		1	£2,000	Fees for consultancy support, legal advice, administration etc.	TDC
33. Adopt byelaw preventing fires and barbeques in buffer zone	£2,000		1	£2,000	Fees for consultancy support, legal advice, administration etc.	TDC
34. Carry out translocation of petalwort to created scrapes	£2,000		1	£2,000	Estimated cost, assumed undertaken in one year only	TDC
35. Creating banks or fencing around existing car park with gateways at board walks and path to visitor centre, close existing car-park gates to reduce capacity	£25,000		1	£25,000	Estimated one-off cost. Costs relate in part to Exe Estuary SPA as well as Dawlish Warren SAC interest, so split 25%/75% between two sites.	TDC
36. Re-site visitor centre at edge of buffer zone, ensuring main access point is via centre. Redesign to allow unstaffed opening	£500,000		1	£500,000	Estimated one-off cost for relocated visitor centre and interpretation. Additional funding from other public bodies (e.g. for classroom facilities) will be required. Costs relate to both Exe Estuary SPA and Dawlish Warren SAC interest, so split equally between two sites.	TDC
Pebblebed Heaths						
37. Establish a regular newsletter to be distributed locally		£1,000	80	£80,000	Estimated cost for A4 newsletter printed and circulated locally twice p.a.	Delivery Officer/EDDC
38. Production of visitor management plan including review of car-parking and an assessment of path network, path management and signage	£12,000	£500	80	£52,000	Estimated cost for consultancy support; annual cost to ensure update/live document	Delivery Officer/Landowners/EDDC
39. Closure of lay-bys in line with visitor management plan	£4,000		5	£20,000	Estimate of closure of 50 lay-bys at £400 per site	Delivery Officer/Landowners/EDDC
40. Changes to car-parks, potentially including improvements, changes in capacity and introduction of parking charges. In line with visitor management plan	£15,000		1	£15,000	Estimated one-off capital cost. It would be hoped car-park revenue would fund on-going maintenance	Delivery Officer/Landowners/EDDC
41. New signs and waymarking in line with guidance in management plan	£10,000	£500	80	£50,000	Estimated costs; £500 annual costs allows for maintenance/replacement	Delivery Officer/Landowners/EDDC

Measure	Capital cost	Annual Cost	Cost period (years)	Total Cost	How cost calculated	Delivery
42. Maintain existing contacts with user groups and improve contacts with others (horse riders, mountain bikers)					No cost as undertaken by warden staff	Delivery officer/warden
43. A rotational annual programme of repair to eroded tracks and paths (including the installation of bridges and boardwalks as appropriate). In line with visitor management plan.		£5,000	80	£400,000	Estimated cost	Landowners
44. Gorse management, implemented in line with visitor management plan		£1,000	80	£80,000	Annual management	Landowners
45. Review path and bridleway network adjoining the Pebblebeds (potentially as part of visitor management plan)						Delivery Officer/Landowners/EDDC
46. Improve information on, and reporting procedures for, fires	£1,500	£500	80	£41,500	Estimated costs	Delivery Officer/Landowners/Fire Brigade
47. Codes of conduct for dog walkers, horse riders, cyclists and other users	£6,000		1	£12,500	4 codes produced as a pack for printing and as interactive document; cost estimated at £4,000. £2,000 additional cost for revision and futher print runs	Delivery Officer
48. Dog control order (dogs on leads 1 March – 31 July, picking up)	£5,000		1	£5,000	consultancy/legal support	Delivery Officer/Landowners/EDDC
Monitoring						
49. Visitor numbers at set locations on all three sites	£7,000	£1,000	80	£87,000	Most of the counts every five years, undertaken by warden staff. Budget for automated counters and casual staff/consultancy support as required and included as an annual figure	Warden staff/volunteers/LPAs/Delivery Officer
50. Visitor activities, motivation, profile and behaviour at all three sites		£5,000	80	£80,000	Questionnaire work undertaken every 5 years	Warden staff/volunteers
51. Fires, vandalism and other incidents at all three sites					no cost as undertaken by warden staff	Warden staff
52. Enforcement at all three sites					no cost as undertaken by warden staff	Warden staff

Measure	Capital cost	Annual Cost	Cost period (years)	Total Cost	How cost calculated	Delivery
53. Monitoring of vegetation change at Dawlish Warren		£5,000	80	£133,333	Fixed point photographs every 3 years accompanied by detailed quadrat sampling	Specialist consultancy/TDC
54. Monitoring of accretion and erosion at Dawlish Warren		£1,000	80	£26,667	Aerial surveys, e.g. with drone, every 3 years	Specialist consultancy/TDC/potential links with sea defence works etc
55. Regular monitoring of petalwort		£1,000	80	£26,667	Targeted specialist monitoring every 3 years	specialist/TDC
56. Regular monitoring of breeding Annex I birds on the Pebblebeds		£2,000	80	£16,000	Surveys every 10 years to supplement national surveys. Might be possible with volunteers. Cost assumes undertaken by consultants	Volunteers/RSPB?/consultancy/EDDC
57. Southern damselfly monitoring		£1,000	80	£80,000	Surveys already undertaken and may be possible for this to continue without additional funding or with volunteer support. £1000 per annum.	Volunteers/RSPB?/consultancy/EDDC
58. Continued monitoring of wintering waterfowl on the Exe		£250	80	£20,000	Undertaken already as part of WeBS. Small annual fee to ensure data collated by local co-ordinators	WeBS/BTO/Natural England/RSPB
59. Disturbance monitoring on the Exe		£1,000	80	£80,000	Could be undertaken at set intervals - e.g. every 10 years or on an annual basis	Natural England/RSPB/Delivery Officer
60. Continued monitoring of crab tiles					Already undertaken by IFCA	IFCA
Totals						
Cross-site measures (exc. SANGs)	**£5,985,500**					
SANGS	**£14,400,000**					
Exe Estuary measures	**£1,361,100**	NB/ These totals are not derived directly from the figures above, but include costs split between Exe and Dawlish Warren for the measures highlighted in grey. The figures here therefore match appendix 6 and the totals in paragraph 14.37				
Dawlish Warren measures	**£501,500**					
Pebblebeds measures	**£756,000**					
Monitoring	**£549,667**					
Overall Total	**£23,553,767**					

Per dwelling costs

14.42 Finally, it is advised that following a careful check of the costings table provided, and revisions made if necessary in light of more detailed consideration of SANGs costs, the three local planning authorities will be able to use the overall cost of mitigation to calculate the necessary per house contribution, i.e. the developer contributions tariff, which should be based on the total number of houses to come forward within the three administrative areas over the plan periods. A per house contribution, even if taken from the CIL pot rather than from individual developments coming forward, should secure the correct amount of money for funding the strategy in its entirety, but recognising the need for on-going review to take account of changing circumstances.

14.43 As a guide (recognising that the SANGs costs are not yet finalised), we have summarised the costs in Appendix 6, indicating how the costs for each measure could be linked to each site. Following from this, we can estimate the per dwelling costs that are required based on the current figures. These are estimates and do not include any discounting, and are summarised in Table 27.

Table 27: Per dwelling costs. Cross-site measures are split evenly between the sites. This would mean a dwelling that fell in two zones would pay twice as much for the cross-site measures, but this is sensible as – for example – delivery officer time would be required to address measures at two sites rather than one. Monitoring that is cross-site has been apportioned in the same way. SANGs (total cost approximately £14,400,000) have been omitted from the table as the costs are not available to allow them to be incorporated into the costs at this stage.

Site	Exe Estuary	Dawlish Warren	Pebblebeds	Total
Cross-site measures	£1,995,167	£1,995,167	£1,995,167	£5,985,500
On-site mitigation	£1,401,100	£461,500	£756,000	£2,618,600
Monitoring	£155,667	£242,333	£151,667	£549,667
Total Cost	£3,551,933	£2,699,000	£2,902,833	£9,153,767
Number of dwellings within zone	28,875	3,291	19,529	
Per dwelling cost	£123	£820	£149	

The figures in Table 27 can also be summarised by zone (see Table 28).

Table 28: Summary by zone. The mismatch in total figures between the totals in this table and table 27 are as a result of rounding to the nearest pound to give the per dwelling costs

Zone	Per dwelling cost	Number of dwellings	Total raised
Exe only	£123	7,350	£904,050
Pebblebeds only	£149	1,385	£206,365
Pebblebeds and Exe	£272	18,144	£4,935,168
Dawlish and Exe	£943	3,291	£3,103,413
Total		**30,170**	

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Appendix 1: Comparison of housing levels with other SPAs

Number of residential delivery points within 5km of the SPA boundary for estuarine SPA sites in England. Sites are ranked according to the number of delivery points per km of shoreline. Note that the Exe Estuary SPA boundary (Map 2) encompasses water outside the mouth of the estuary, which is not necessarily the case in many of the other sites listed.

SPA name	SPA area (hectare)	SPA perimeter length (km)	Delivery points within 5km of SPA boundary		
			Number of residential delivery points	Number of residential delivery points per km of shore	Number of residential delivery points per ha of estuary
Portsmouth Harbour	1246	52	162036	3116	130
Exe Estuary	**2360**	**43**	**76047**	**1769**	**32**
Chichester and Langstone Harbours	3722	94	159034	1692	43
Ribble & Alt Estuaries	12408	148	205570	1389	17
Mersey Estuary	5007	212	265512	1252	53
Breydon Water	1198	34	35858	1055	30
Stour and Orwell Estuaries	3658	94	98464	1047	27
The Dee Estuary	11990	72	74013	1028	6
Pagham Harbour	636	36	36840	1023	58
Tamar Estuaries Complex	1939	114	96090	843	50
Humber Estuary	37494	284	231315	814	6
Solent and Southampton Water	5387	433	303880	702	56
Deben Estuary	977	46	30786	669	32
Thames Estuary & Marshes	4785	144	92003	639	19
Crouch and Roach Estuaries	1739	196	113924	581	66
Medway Estuary and Marshes	4670	214	113005	528	24
The Swale	6486	133	69503	523	11
Severn Estuary	17550	360	150479	418	9
Duddon Estuary	6756	95	38461	405	6
Morecambe Bay	36859	461	169233	367	5
The Wash	61817	122	43889	360	1
Poole Harbour	2308	272	91836	338	40
Colne Estuary	2709	160	44044	275	16
Upper Solway Flats & Marshes	43494	188	26975	143	1
Dengie	3122	43	5706	133	2
Foulness	10901	280	34953	125	3
Alde-Ore Estuary	2393	99	9617	97	4

Appendix 2: Effectiveness of Different Measures to Reduce Disturbance to birds at Coastal Sites

Effectiveness was scored by a group of different 'experts' that included academics, site managers, conservation advisors, policy makers, consultants and professional ornithologists. The poll asked users to consider an (unnamed) estuary on the south coast where there were concerns relating to increased access as a result of new housing development. The poll included a list of measures and each person was asked (for each measure) whether there was:

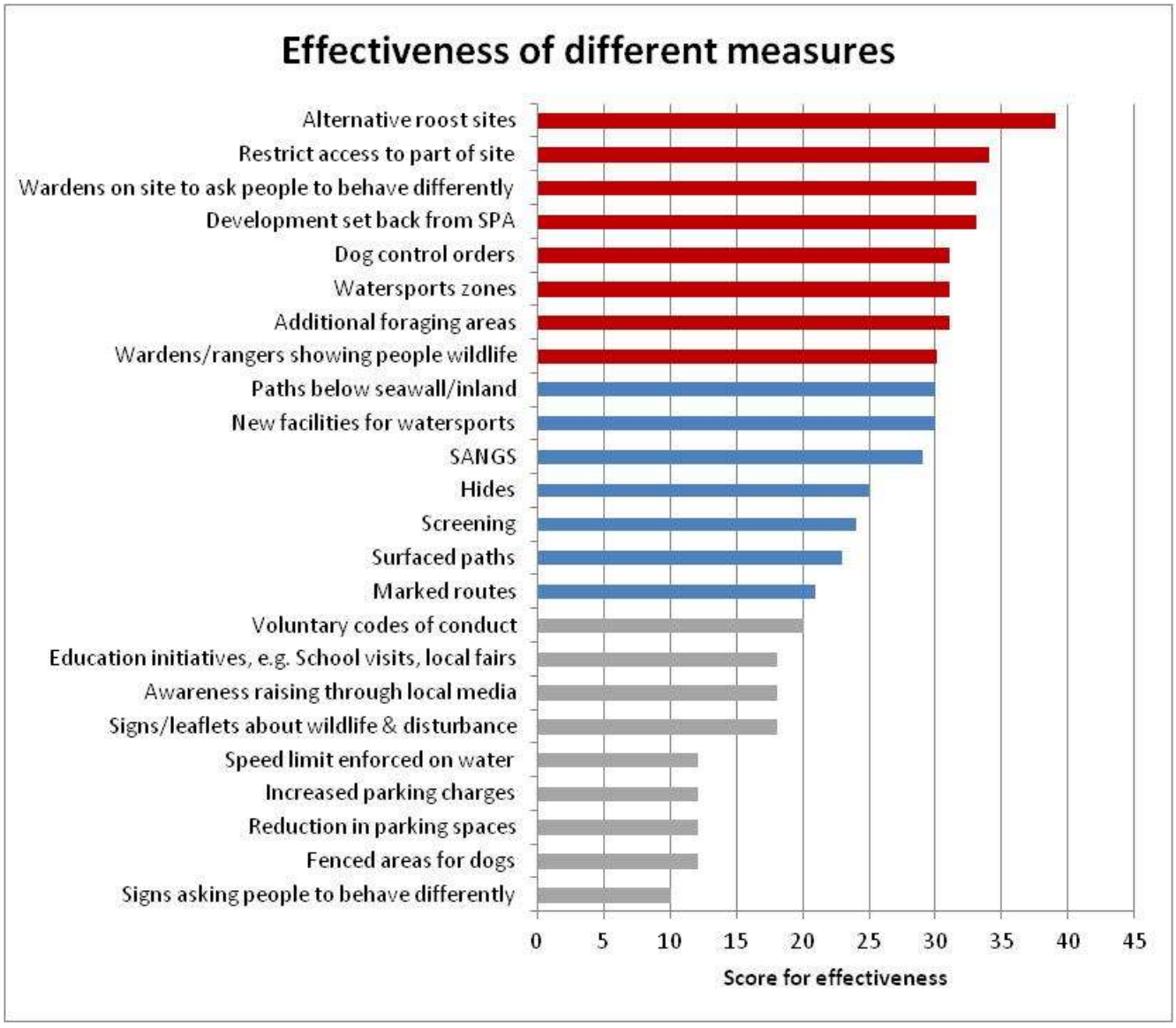
- Some likelihood that measure will reduce impact/levels of disturbance
- Small likelihood that measure will reduce impact/levels of disturbance
- Unlikely to reduce disturbance impacts at all
- Unsure/Don't know/Can't tell

A total of 19 responses were received. An overall, cumulative score was derived by giving those responses with "some likelihood" of success a weighting of 3 and those responses indicating a "small likelihood" a weighting of 1. From 19 responses the maximum score for each measure would therefore be 57.

Measure	OVERALL SCORE
Habitat Management Measures.	
Creation of alternative roost sites where no disturbance	39
Creation of additional foraging habitat (e.g. managed retreat)	31
Planning and Off-site Measures.	
Ensure development set well away from SPA boundary	33
Provision of alternative sites for recreation activity "SANGs"	29
Provision of new facilities for watersports away from the estuary	30
On-Site Access Management.	
Restrict access to parts of site (e.g. temporary fencing around roost sites)	34
Provision of fenced areas for dog exercise	12
Dedicated zones for watersports	31
Marked routes on shore/inland for particular activities (dog walking, horse riding, cycling etc)	21
Hides for people to view wildlife	25
Screening (vegetation or e.g. wooden panels) along shoreline paths to hide people/dogs from birds	24
Paths routed below and inland of seawall or shoreline	30
Reduction in car-park spaces in areas where disturbance may occur	12
Increase car parking charges at targeted car parks to reduce their use	12
Surfaced paths to draw people away from shore/redirect people	23
Wardens on site to ask people to behave differently	33
Dog control orders to keep dogs on leads in targeted areas	31
Speed limit (10 knots) on water enforced with byelaws	12
Education and Awareness Raising	
Signs and leaflets about wildlife interest and impacts of disturbance	18
Signs asking people to behave differently to reduce disturbance	10
Voluntary codes of conduct developed with local user groups	20
Wardens/rangers on site to show people wildlife	30
Raising awareness of wildlife interest and disturbance impacts through local media (press etc)	18
Education initiatives such as school visits, attending local fairs etc to raise awareness of	18

Measure	OVERALL SCORE
wildlife interest	

Measures are ranked and scores shown graphically below



Appendix 3: Byelaws relating to the River Exe and Exe Estuary

The Exeter City Council in exercise of their powers under Section 31 of the Exeter Corporation Act 1971 and re-enacted under Section 27 of the Exeter City Council Act 1987 and all other enabling powers hereby made the following byelaws on 26th May 1976.

Citation and Commencement

These byelaws may be cited as the River Exe and Exe Estuary Byelaws 1976 and shall come into operation one month after the date of confirmation thereof by the Secretary of State for the Environment.

Application

These byelaws shall apply to the River Exe and its Estuary above an imaginary line projected in an easterly direction from Langstone Point to the Exe Fairway Buoy (at 50° 35.9'N3°22.1'W) and thence in a north easterly direction to Straight Point as shown for the purposes of identification only on the plan annexed to these byelaws.

Interpretation

In these byelaws except so far as the context otherwise requires the following expressions have the meanings hereby respectively assigned to them that is to say:-

"the Council" means the Exeter City Council

"vessel" means every description of vessel howsoever navigated or moved.

Byelaws Limiting Speed and Relating to Water Skiing and Other Similar Activities

No person in charge of a vessel shall cause or suffer a vessel to proceed at a speed greater than ten knots through the water provided that this byelaw shall not apply:-

(a) to that part of the estuary of the River Exe within an imaginary line extending due east (true) from a position Lat. 50°37'25" North-Long 3°25'20" West to the high water mark of ordinary spring tides; an imaginary line extending due south (true) from the said position for a distance of 366 metres; an imaginary line extending thence due east (true) to high water mark of ordinary spring tides and for the purposes of identification only shown edged with a broken line and cross-hatched on the map annexed hereto between 0800 hours and 2100 hours Greenwich Mean Time and between 0900 hours and 2200 hours British Summer Time in any day if the predicted tidal height at any time during that period is 3.8 metres or more above chart datum as predicted by the Institute of Oceanographic Sciences; or

(b) insofar as a speed of ten knots or more through the water is necessary to facilitate water skiing or any similar activity permitted under Byelaw 5; or

(c) to any person taking part in any event organised by the Council or by any other person with the consent of the Council in writing; or

(d) to any person (hereinafter called the hirer) using a vessel hired for a continuous period not exceeding two hours from a person (hereinafter called the proprietor) who with the consent in writing of the Council provides the same for hire in the course of a trade or business provided that the hirer uses the vessel within the area to be specified by the Council in the consent issued to the proprietor; or

(e) to any person testing a vessel or equipment connected therewith with the consent of the Council in writing for the purposes of or in connection with a trade or business of manufacturing vessels or equipment connected therewith.

5. No person shall participate in the sport of water skiing or any similar activity provided that this byelaw shall not apply:-

(a) to an area bounded on the north side by an imaginary line drawn east (true) for a distance of 1097 metres from a point 137 metres measured in a south easterly direction from River Exe Buoy Station numbered 21 along an imaginary line joining River Exe Buoy Stations numbered 21 and 19; on the east side by an imaginary line drawn due south (true) for a distance of 622 metres from the terminal point of the eastern boundary to the point of its intersection with the imaginary line between the said River Exe Buoy Stations; and on the west by the imaginary line last mentioned between its intersections with the northern and southern boundaries aforesaid; or

(b) to any person taking part in an event organised by the Council or by any other person with the consent of the Council in writing.

6. No person in charge of a vessel shall cause or suffer a vessel to be navigated without due care and attention or without reasonable consideration for other vessels or for the public using the water.

7. No person in charge of a vessel shall cause or suffer a vessel to be navigated in such a manner as to hamper the safe passage of:-

(a) a ferry of the Devon Dock, Pier and Steamship Company Limited plying between Starcross and Exmouth;

(b) the South West Water Authority's sludge disposal vessel plying between the sewage works at Countess Wear in the City of Exeter and the high seas;

(c) Commercial Shipping under pilotage

Penalties

8. Any person who without reasonable excuse offends against any of these Byelaws shall be liable on summary conviction to a fine, not exceeding one thousand pounds (£1000).

Revocation of Byelaws

9. The Byelaws with respect to navigation in the River Exe and Exe Estuary made by the Major Alderman and Citizens of the City and County of the City of Exeter on the 14th day of November 1973 and confirmed by the Secretary of State for the Environment on 8th May 1975, are revoked. The foregoing Byelaws were confirmed by the Secretary of State for Transport on the 12th day of July 1977 and came into operation on the 12th day of August 1977.

Notes Not Forming Part of the Byelaws

(1) The imaginary line referred to in Byelaw 2 is shown by the broken line on the attached map for the purposes of identification only.

(2) The area in which water skiing is permitted is shown by a continuous line and stipple shading on the attached map.

(3) Every person causing or suffering a vessel to be navigated on the water shall comply with such collision regulations made pursuant to Section 418 of the Merchant Shipping Act 1894 as may be applicable to him (the current collision regulations are The Collision Regulations (Ships and Seaplanes on the Water) and Signals of Distress (Ships) Order 1965 SI 1965 No. 1525).

(4) The penalty provided by the Byelaw is that imposed under Section 57 of the Criminal Justice Act.

Appendix 4: Analysis of different options for defining developer contribution zones

15.2 This section provides additional detail and information relating to the calculation of zones. Four different main options are considered to define possible zones.

Option 1: Distance at which visit rate is low and constant

15.3 Visit rates decline with distance, such that people who live near sites will tend to visit more often than people who live further away. For example someone living adjacent to the shore of the Exe would be expected to visit much more often than someone living in Crediton. The household postal survey visit rate curves for each European site presented in section 4 identify 10km as a distance at which the visits per household level out to a low level. Beyond 10km, households tend to visit the three sites less than 10 times a year each (and less than 6 times per year for the Pebblebed Heaths). The 10km zones for each site are shown in Map 18 and Table 29. This represents a maximum distance at which a developer contribution could be established and be fair.

Option 2: 75th percentile based on cumulative ranking of household survey data

15.4 Using the household postal survey data, zones have been created using the distance which incorporates 75% of the household visits for each European site (ref to Map 18 and Table 29). This is similar to the approach used to define the 5km zone used in the Thames Basin Heaths and the Dorset Heaths. In those two cases however the data were on-site data rather than off-site (household survey).

15.5 There are in fact a number of ways that a distance around a site could be determined to incorporate 75% of visits to a site in the household survey. The data from the household survey were filtered to include records where a respondent had recorded visits to a site from a geocoded post code location (N.B. due to errors in the administration of the survey, some respondents could not be assigned to postcodes). Each respondent could potentially make visits to different locations within a site and visit these sites with varying intensity. For example a respondent living in between Exton and Woodbury might visit Exmouth LNR 250 times per year (travelling 3km straight line distance), may also visit an 'Unspecified location on the Exe' mapped to the centroid of the Exe SPA polygon 4 times a year (travelling 2km straight line distance) and may also visit the Maer 20 times per year (5km distance).

15.6 In option 2a we assign the total annual visits per respondent postcode to the shortest travel distance therefore treating each household as an individual point and pragmatically assigning the visits to the nearest location visited. Therefore in the example above, 274 annual visits to the Exe Estuary would be originating from 2km.

15.7 In option 2b we use an alternative approach, treating each location visited by each household as an independent point. The calculation of the distance is effectively the same as Option 2a with one step omitted. Instead of summing all visits to a European site made by one respondent and then assigning them to the shortest distance, instead all separate

entries for different locations (and thus different distances) remain in the data set when the 75% level of visits is extrapolated. Using the example above, the respondent living in between Exton and Woodbury that visits Exmouth LNR 250 times per year (travelling 2km straight line distance), visits 'Unspecified Exe location' 4 times a year (travelling 3km straight line distance) and also visits the Maer 20 times per year (5km distance) contributes 250 visits from 2km and 4 visits from 3km 20 visits from 5km.

15.8 In option 2c we take an average distance for each household to the given European site, based on the locations that were visited.

15.9 The differences between these three approaches (2a, 2b and 2c) can be understood with reference to Figure 11, a schematic diagram to demonstrate the three options. The hypothetical postcode point shown in red makes 4 annual visits to 'Unspecified Exe location' (A: distance 2km), 250 annual visits to Exmouth LNR (B: distance 3km) and also makes 20 annual visits to the Maer (C: distance 5km).

- Option 2a: assigns the total visits $A_N+B_N+C_N= 274$ (where $_N$= visits) to the nearest location visited in the site, 3km (B).
- Option 2b: treats each set of visits to the individual sites separately: 4 visits from 2km (A), 250 visits from 3km (B) and 20 visits from 5km (C).
- Option 2c: assigns the total visits $A_N+B_N+C_N= 274$ to the average distance $(A_D+B_D+C_D)/3= 3.33$km (where $_D$= distance).

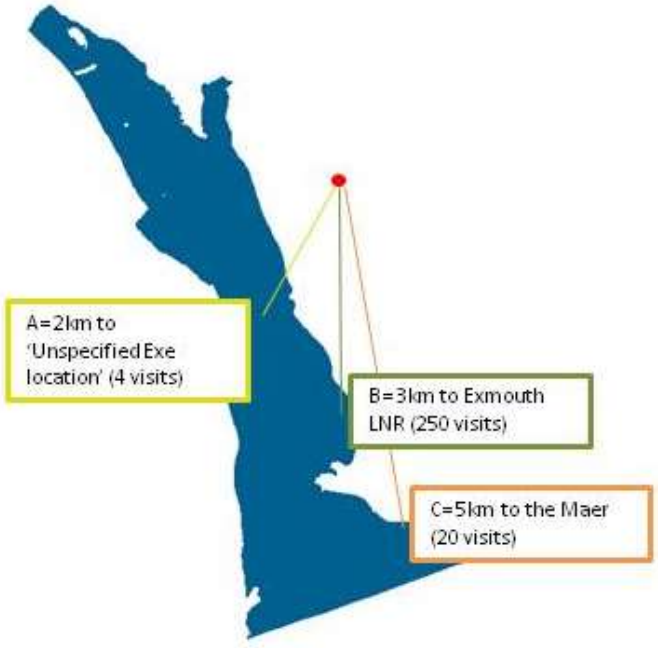


Figure 11: Diagram to explain the difference between the three options for calculating the distance at which 75% of visits originate using the household survey data. The red point is a hypothetical postcode to the east of the Exe SPA (shown in Blue).

Option 2a: 75% of household visits (minimum distance)

15.10 For the Exe this distance is 7.8km which incorporates Exeter, most of Teignmouth in the west and Budleigh Salterton in the east. For Dawlish Warren this distance is 14.4km which

is almost double the distance defined for the Exe. The reason the 75% zone is so large for Dawlish Warren is that there was a low response rate close to the site combined with very low density of housing between 3-10km. The distance at which 75% of the household visits originate for the Pebblebed Heaths is 6.9km. This is the lowest distance and incorporates Exmouth, Ottery St Mary and Sidmouth in the east and Cranbrook in the north.

Option 2b: 75% of household visits ('weighted distance approach')

15.11 Using this approach the distances at which 75% of visits are captured increases for the Exe to 9.8km, to 10.4km for the Pebblebed Heaths and only increases slightly for Dawlish Warren to 14.7km.

Option 2c: 75% of household visits taking the average of all distances to locations visited ('average distance approach')

15.12 Using this approach the distances at which 75% of visits are captured increases for the Exe to 11.5km, to 9km for the Pebblebed Heaths and remain the same for Dawlish Warren at 14.7km.

Option 3: 75% onsite data

15.13 On-site visitor survey data was used to look at the area within which 75% of the interviewees lived for the Exe Estuary as a whole and also for Dawlish Warren (beach and nature reserve). This made use of postcodes of people travelling from home rather than tourists or people staying with family or friends. Using the on-site data, the 75th percentile for the Exe equates to 14.3km and for Dawlish it is 14.7km. No data are available for the Pebblebed Heaths.

Option 4: Convex hull of 75% of the on-site postcodes by distance

15.14 In this option we created zones by using the convex hull function within MapInfo to enclose the closest 75% of the postcode points within the smallest area, as shown in Map 18. An alternative to convex hull of the points is to calculate the distance which 75% of the local resident interviewees lived within. This approach generates a zone that is not an even shape or a consistent distance from the given European site boundary.[56]

15.15 The different options are summarised in Table 29.

[56] Convex hull could not be used for the household data as this recipients were already predefined from a random selection within the district.

Table 29: Distances, percentage of visits and percentage of postcodes from on site-surveys captured by different developer contribution zone options using the flattening off distance, three methods of determining the 75th percentile distance, 75th percentile local onsite survey postcodes, and 75th percentile convex hull.

	Exe	**Dawlish Warren**	**Pebblebeds**	**Exe (total N= 66,114)**	**Dawlish Warren (total N= 10,384)**	**Pebblebeds (total N= 20,432)**	**Exe**	
1: Distance from site at which visitor rate curve flattens off to a low constant	10	10	10	72.7-84.2%	54.7-55.8%	70.8-86.5%	91.3%	71.6%
2a: 75% of household survey visits	7.8	14.4	6.9	75%	75%	75%	90%	86.6%
2b: 75% of household survey visits to each location	9.8	14.7	10.4	75%	75%	75%	91.3%	87.6%
2c: 75% of household survey visits to average location	11.5	14.7	9	75%	75%	75%	93%	87.6%
3: 75% of on-site survey postcodes	14.3	14.7	No data	86.2-92.9%	74.9-76.8%	No data	75%	75%
4: Convex hull of 75% of the on-site postcodes by distance	Variable	Variable	No data	90.3%	48.4%	No data	75%	75%

Appendix 5: Mitigation Measures: instigation, phasing and related measures.

In this appendix we repeat the main mitigation measures table, but provide additional information relating to implementation.

Cross-site Measures			
1. Delivery officer	1	On-going (5 years)	involvement in a range of measures
2. Two wardens	1	On-going	involvement in a range of measures
3. Dog walking project	1	On-going	
4. SANGs	1(2)	On-going; large initial investment	
Exe Estuary SPA			
5. Close railway crossing and/or lay-by south of Cockwood	1	One-off	
6. Low fencing/planting around edge of the car parks and the Recreation Ground	1	One-off	
7. Screening and modifications to gates at Exminster Marshes	1	One-off	
8. Gate slipway at Exmouth Imperial Recreation Ground from 1 September to 1 April	1	One-off	could be linked with other works here such as 6
9. Continuation/adaptation as necessary of access restrictions (temporary fencing, etc) to prevent access along shore near roost at Dawlish Warren	1	On-going	may link with 10

Measure	Instigation (1=immediate-3yrs; 2=3-10 years; 3=longer term/dependent on circumstances/outcomes of further work)	One-off or on-going?	Links to other measures and possible wider links
10. Reed screening or landscaping between north-eastern most fairway on the golf-course and the Bight	1	One-off to set up	may link with 9 and 11
11. Limited, localised changes to layout of golf course at Dawlish Warren	1	One-off	may link to 10
12. Modifications of slipway at Mamhead to encourage users not to enter the estuary	1	One-off	depends on major works to slipway and what is undertaken
13. New interpretation boards (five boards)	1	One-off	
14. Updates of the Exe Estuary leaflets	1	One-off	
15. Review and revision of byelaws relating to the Exe Estuary	1	One-off	will inform revision and improvements to codes of conduct (16)
16. Improved codes of conduct for specific user groups	1	One-off	will depend on outcomes of 15
17. Revised zoning	1	One-off	will depend on outcomes of 15 and 16
18. Install dedicated signs relating to kitesurfing and windsurfing at Imperial Recreation ground and the Maer	1	One-off	will link to 15,16,17
19. Update signs at public slipways with zones and speed limits	1	One-off	will link to 15,16,17
20. Dog control order to control dogs off leads on the mudflats	1	One-off	will link to 15
21. Purchase and run a new patrol boat	1	On-going	enforcement role may change over time depending on 15,16 and 17
22. Carry out scoping study for creation/ modification of a viable disturbance-free roost at Dawlish Warren	1	One-off	

Measure	Instigation (1=immediate-3yrs; 2=3-10 years; 3=longer term/dependent on circumstances/outcomes of further work)	One-off or on-going?	Links to other measures and possible wider links
23. Create new/improved high tide roost on site of old bird hide at Dawlish Warren	3	One-off	will depend on outcomes of 22
24. Relocate bird hide onto the shore of the Bight at Dawlish Warren	3	One-off	will depend on outcomes of 22 and 23; plus links to 9,10 and 11
Dawlish Warren SAC			
25. Create a live visitor management plan including a regular review of visitor access patterns.	1	one-off (plus on-going live element)	
	1	One-off	will link to live visitor management plan (25)
27. Improved codes of conduct for specific user groups	1	One-off	will link to live visitor management plan (25) and also potentially be completed as part of 16
28. Rationalisation of path network	1	One-off (plus on-going maintenance)	will link to live visitor management plan (25)
29. Make information available in local retail outlets selling barbeques so that potential buyers know they cannot use them at Dawlish Warren	1	On-going	will link to 33, may be necessary to wait for byelaw to be in place
30. Establish regular Warren Newsletter to be distributed locally	1	On-going	links to live visitor management plan (25)
31. Review and modify parking charges e.g. re-instate Sunday car parking charges, increase all car parking charges	1	One-off	will link to live visitor management plan (25)
32. Remove dog control order (use of leads) in buffer zone outside Dawlish Warren SAC	1	One-off	

Measure	Instigation (1=immediate-3yrs; 2=3-10 years; 3=longer term/dependent on circumstances/outcomes of further work)	One-off or on-going?	Links to other measures and possible wider links
33. Adopt byelaw preventing fires and barbeques in buffer zone	1	One-off	link to review of byelaws (15)
34. Carry out translocation of petalwort to created scrapes	1	One-off	
35. Re-design buffer zone, removing current car park (requiring consultation with retail outlets in resort, etc)	2	One-off	will link to live visitor management plan (25)
36. Creating banks or fencing around existing car park with gateways at board walks and path to visitor centre	2	One-off	will link to live visitor management plan (25)
37. Re-site visitor centre at edge of buffer zone, ensuring main access point is via centre. Redesign to allow unstaffed opening	3	One-off	will link to live visitor management plan (25)
Pebblebed Heaths SPA/SAC			
39. Production of visitor management plan including review of car-parking and an assessment of path network, path management and signage	1	One-off	
40. Closure of lay-bys in line with visitor management plan	1	One-off	will depend on visitor management plan (39)
41. Changes to car-parks, potentially including improvements, changes in capacity and introduction of parking charges. In line with visitor management plan	1	One-off	

42. New signs and waymarking in line with guidance in management plan	1	One-off	will depend on visitor management plan (39)
43. Maintain existing contacts with user groups and improve contacts with others (horse riders, mountain bikers)	1	On-going	will link to visitor management plan (39)
44. A rotational annual programme of repair to eroded tracks and paths (including the installation of bridges and boardwalks as appropriate). In line with visitor management plan.	1	One-off	will depend on visitor management plan (39)
45. Gorse management, implemented in line with visitor management plan	1	One-off	will depend on visitor management plan (39)
46. Review path and bridleway network adjoining the Pebblebeds (potentially as part of visitor management plan)	1	One-off	will depend on visitor management plan (39) or could be part of plan
47. Improve information on, and reporting procedures for, fires	1	One-off	will depend on visitor management plan (39) or could be part of plan
48. Codes of conduct for dog walkers, horse riders, cyclists and other users	1	One-off	will depend on visitor management plan (39) or could be part of plan
49. Dog control order (dogs on leads 1 March – 31 July, picking up)	1	One-off	link to review of byelaws around Exe Estuary (15)

Appendix 6: Mitigation Measures: overall costs allocated to SPA

This table replicates Table 26, with the costs shown being the total costs for each measure. Here those costs are split to reflect how they have been allocated to derive the per dwelling costs for each zone.

	Cross-site	Exe	Dawlish	Pebblebeds
Cross-site Measures				
1. Delivery officer	£213,500			
2. Two wardens	£5,600,000			
3. Dog walking project	£172,000			
Cross-site total	**£5,985,000**			
4. SANGs	£14,400,000			
SANGs total	**£14,400,000**			
5. Close railway crossing and/or lay-by south of Cockwood		£2,000		
6. Low fencing/planting around edge of the car parks and the Recreation Ground		£90,000		
7. Screening and modifications to gates at Exminster Marshes		£6,000		
8. Gate slipway at Exmouth Imperial Recreation Ground from 1 September to 1 April		£1,000		
9. Continuation/adaptation as necessary of access restrictions (temporary fencing, etc) to prevent access along shore near roost at Dawlish Warren		£160,000		
10. Reed screening or landscaping between north-eastern most fairway on the golf-course and the Bight		£90,000		
11. Limited, localised changes to layout of golf course at Dawlish Warren		£45,000		
12. Modifications of slipway at Mamhead to encourage users not to enter the estuary		£7,500		
13. New interpretation boards (five boards)		£112,500		
14. Updates of the Exe Estuary leaflets		£22,000		
15. Review and revision of byelaws relating to the Exe Estuary		£10,000		
16. Improved codes of conduct for specific user groups		£11,500		
17. Revised zoning		£5,000		
18. Install dedicated signs relating to kitesurfing and windsurfing at Imperial Recreation ground and the Maer		£45,000		
19. Update signs at public slipways with zones and speed limits		£120,000		
20. Dog control order to control dogs off leads on the mudflats		£7,500		
21. Purchase and run a new patrol boat		£162,600		
22. Carry out scoping study for creation/ modification of a viable disturbance-free roost at Dawlish Warren		£2,500		
23. Create new/improved high tide roost on site of old bird hide at Dawlish Warren		£15,000		
24. Relocate bird hide onto the shore of the Bight at		£50,000		

	Cross-site	Exe	Dawlish	Pebblebeds
Dawlish Warren				
25. Create a live visitor management plan including a regular review of visitor access patterns.		£26,000	£26,000	
26. Carry out audit of information boards over whole of the Dawlish Warren area. As necessary re-design and add new boards		£33,750	£33,750	
27. Improved codes of conduct for specific user groups			£1,000	
28. Rationalisation of path network		£80,000	£80,000	
29. Make information available in local retail outlets selling barbeques so that potential buyers know they cannot use them at Dawlish Warren			£6,000	
30. Establish regular Warren Newsletter to be distributed locally		£40,000	£40,000	
31. Review and modify parking charges e.g. increase winter fee				
32. Remove dog control order (use of leads) in buffer zone outside Dawlish Warren SAC			£2,000	
33. Adopt byelaw preventing fires and barbeques in buffer zone			£2,000	
34. Carry out translocation of petalwort to created scrapes			£2,000	
35. Creating banks or fencing around existing car park with gateways at board walks and path to visitor centre, close existing car-park gates to reduce capacity		£6,250	£18,750	
36. Re-site visitor centre at edge of buffer zone, ensuring main access point is via centre. Redesign to allow unstaffed opening		£250,000	£250,000	
37. Establish a regular newsletter to be distributed locally				£80,000
38. Production of visitor management plan including review of car-parking and an assessment of path network, path management and signage				£52,000
39. Closure of lay-bys in line with visitor management plan				£20,000
40. Changes to car-parks, potentially including improvements, changes in capacity and introduction of parking charges. In line with visitor management plan				£15,000
41. New signs and waymarking in line with guidance in management plan				£50,000
42. Maintain existing contacts with user groups and improve contacts with others (horse riders, mountain bikers)				
43. A rotational annual programme of repair to eroded tracks and paths (including the installation of bridges and boardwalks as appropriate). In line with visitor management plan.				£400,000
44. Gorse management, implemented in line with visitor management plan				£80,000
45. Review path and bridleway network adjoining the Pebblebeds (potentially as part of visitor management plan)				
46. Improve information on, and reporting				£41,500

	Cross-site	Exe	Dawlish	Pebblebeds
procedures for, fires				
47. Codes of conduct for dog walkers, horse riders, cyclists and other users				£12,500
48. Dog control order (dogs on leads 1 March – 31 July, picking up)				£5,000
On-site Total		**£1,401,100**	**£461,500**	**£756,000**
Monitoring				
49. Visitor numbers at set locations on all three sites	£87,000			
50. Visitor activities, motivation, profile and behaviour at all three sites	£80,000			
51. Fires, vandalism and other incidents at all three sites				
52. Enforcement at all three sites				
53. Monitoring of vegetation change at Dawlish Warren			£133,333	
54. Monitoring of accretion and erosion at Dawlish Warren			£26,667	
55. Regular monitoring of petalwort			£26,667	
56. Regular monitoring of breeding Annex I birds on the Pebblebeds				£16,000
57. Southern damselfly monitoring				£80,000
58. Continued monitoring of wintering waterfowl on the Exe		£20,000		
59. Disturbance monitoring on the Exe		£80,000		
60. Continued monitoring of crab tiles				
Monitoring Total	**£167,000**	**£100,000**	**£186,667**	**£96,000**
Overall Total	**£20,552,500.00**	**£1,501,100.00**	**£648,167**	**£852,000.00**