

**Carlyon Bay  
Environmental  
Statement (2011)**

Chapter E

Biodiversity

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## E1.0 Introduction

- E1.1 This section of the Environmental Statement ('ES') deals with the potential impact of the proposals at Carlyon Bay upon Biodiversity and Geological Conservation. The work has been compiled by Andrew Baker of Baker Consultants Ltd who has been involved with the projects at Carlyon Bay since 2003.
- E1.2 Carlyon Bay has be subjected to extensive biological recording for many years and this assessment draws upon a wealth of historical data both collected by Mr Baker and provided by other biologists who have lodged data with the Environmental Records Centre for Cornwall and the Isles of Scilly (ERCCIS).
- E1.3 In addition to the historical data the baseline data has been comprehensively updated with new surveys carried out during 2009 and 2010 and these are appended to this Chapter (see specific reference throughout the text). The scope of the new surveys having been agreed with both statutory and non-statutory consultees including Natural England, the Environment Agency, Cornwall Council's natural environment team and Cornwall Wildlife Trust.
- E1.4 Like other sections of the ES, the approach has been to review the baseline data, identify the key ecological receptors and assess their value, assess the likely impact upon these receptors arising from the project and identify mitigation where required. At the end of the process, impacts are reassessed taking into account the likely success of mitigation and any residual impact are identified. As part of the assessment process, the effects of the proposed scheme have been assessed against the extant scheme to show how the two schemes compare in the nature and magnitude of ecological impacts.

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## E2.0 Legislative and Policy Context

E2.1 The purpose of this section is to provide information pertaining to the policy and legislation that form the background to the ecological assessment. A summary of the relevant national and local policy and legislation is set out below.

### **PPS 9**

E2.2 Planning Policy Statement 9: Biodiversity and Geological Conservation (PPS9) (ODPM, 2005a) sets out the Government's national policies on the protection of biodiversity and needs to be taken into account by regional and local planning bodies. It states that:

*"The aim of planning decisions should be to prevent harm to biodiversity and geological conservation interests. Where granting planning permission would result in significant harm to those interests, local planning authorities will need to be satisfied that the development cannot reasonably be located on any alternative sites that would result in less or no harm. In the absence of any such alternatives, local planning authorities should ensure that, before planning permission is granted, adequate mitigation measures are put in place. Where a planning decision would result in significant harm to biodiversity and geological interests which cannot be prevented or adequately mitigated against, appropriate compensation measures should be sought. If that significant harm cannot be prevented, adequately mitigated against, or compensated for, then planning permission should be refused."*

E2.3 Also of particular relevance in PPS9 is paragraph 14 where the following is stated:

*"Development proposals provide many opportunities for building-in beneficial biodiversity or geological features as part of good design. When considering proposals, local planning authorities should maximise such opportunities in and around developments, using planning obligations where appropriate."*

E2.4 PPS9 is accompanied by Government Circular: Biodiversity and Geological Conservation – Statutory Obligations and their Effect within the Planning System (Defra Circular 01/2005 and ODPM Circular 06/2005) (ODPM 2005b). This aims to support PPS9 by 'providing guidance on the application of the law in relation to planning and nature conservation as it applies in England'.

E2.5 In addition, the Government has also produced further guidance to complement these two documents: Planning for Biodiversity and Geological Conservation: A Guide to Good Practice (ODPM 2006). This document provides guidance, through case studies and examples, to achieve the key principles of PPS9 and comply with the legal requirements set out in the Circular. It does not provide additional national policy or provide legal interpretation, but is intended to be used in conjunction with PPS9 and the Circular to further biodiversity and geological conservation.

- E2.6 PPS9, the Circular Defra 01/2005 and ODPM 06/2005 aim to ensure that *'construction development and regeneration should have minimal effects on biodiversity and enhance it where possible'*. The guidance proposes to ensure that planning decisions are made based on up-to-date information and ensure the maintenance, enhancement, restoration or addition of biodiversity within scheme design and ensure planning decisions *'prevent harm to biodiversity and geological conservation interests'* (ODPM 2005a). The government circular makes reference to the UK Biodiversity Action Plan, England Biodiversity Strategy and Local Biodiversity Partnerships. These documents outline strategic action for biodiversity at both the national and local level and are considered further below.
- E2.7 Prior to the 2010 general election the then government consulted on a draft replacement for PPS9 [ref 4]. The progress of the draft is currently unknown and its impact upon the policy framework cannot be assessed at this stage.

### **Cornwall Council**

- E2.8 Until the Cornwall Council Local Development Framework is prepared the policy framework is provided by the Restormel Borough Council Local Plan which was adopted in October 2001. The relevant Nature Conservation and Earth Science policies that are "saved" are listed below along with the supporting text. The policies predate the PPS9 (which replaced PPG9 in 2005) and therefore do not reflect the latest national guidance.
- E2.9 In June 2010 Cornwall Council published a draft topic based issues paper on Biodiversity and Geodiversity as part of the process of developing the Cornwall Local Development Framework Core Strategy (ref 3). This paper sets out the background to the development of policies within the LDF core strategy and considers three issues that should form the basis for these documents:-
- 1 Issue B1 –The Core Strategy should consider how Cornwall's biodiversity might best be protected, enhanced and prepared for adaptation to climate change and how Cornwall's Geodiversity should best be protected.
  - 2 Issue B2– The Core Strategy should consider how to provide for the adaptation and survival of the county's biodiversity in a changing climate, through encouraging opportunities to create new and connect existing habitats through wildlife corridors, both on a small scale and on the larger landscape scale.
  - 3 Issue B3 – Consider how biodiversity can be effectively monitored
- E2.10 Policy SA6 is a designated site policy linked to Policy 23 on the protection of Earth Science sites. SA6 refers to land at the east and west of Carlyon Bay that is designated as a Regionally Important Geological Site ('RIGS').

**PROTECTING THE WIDER COUNTRYSIDE**

Policy 18

Development proposals which would harm the integrity or continuity of the landscape features listed below which are of major importance for fauna and flora will only be permitted if it can be shown that the reasons for the development clearly outweigh the need to retain the features. Management of these features aimed at conserving their wildlife and landscape value will be encouraged generally and particularly by the imposition of conditions on planning permissions, the seeking of planning obligations and by entering management agreements with landowners and developers where appropriate.

List of features:-

Hedges

Stone Walls

Linear tree belts/shelter belts

Plantations and small woodlands

Green lanes/drove roads etc.

Larger semi-natural or ancient woodlands

River corridors

Lakes

Reservoirs

Ponds

Wetlands

Coastal cliff, grassland, heathland and woodland mosaics

Roughlands i.e. the heath, mire and scrub complexes that are characteristic of Cornwall

Development proposals within Areas of Great Scientific Value and Conservation

Corridors will be required to pay particular regard to the conservation of such features.

**EARTH SCIENCES**

Policy SA6

The following sites are proposed as Regionally Important Geological/Geomorphological Sites:

(A) Land at Duporth Beach

(B) Land at Carlyon Bay East/Carlyon Bay West

(C) Land at Blackhead/Ropehaven

(D) Gamas Point

*14.16 The above sites have been identified by the Cornwall RIGS Group and represent important geological/geomorphological features. These sites will be subject to Policy 23 of Part 1 of the Plan. The written justification to that policy sets out the methodology which has been used to identify the sites and explains their importance in general terms. A full schedule and explanation of the importance of the individual Regionally Important Geological Sites (RIGS) is set out in the Background Papers document which accompanies the Plan.*

E2.11 Policy 18 seeks to protect biodiversity in the wider landscape that are associated with key features within the countryside. Of particular relevance is Coastal Cliff, heathland and woodland mosaic.

E2.12 It is increasingly being recognised that to maintain and enhance biodiversity it is important to see the countryside as a whole. The core nature conservation sites such as SSSIs and SINCs do not survive in isolation from the fields, trees, hedgerows and rivers which surround and should properly unite them. Wildlife does not acknowledge boundaries on a local plan proposals map.

5.57 The importance of protecting the wider countryside has been acknowledged in the EC Habitats Directive 1992. Regulation 37 directly transfers the requirements of Article 10 of the Directive to UK Planning Authorities development plans. By this, the Regulations extend the definition of “conservation of the natural beauty and amenity of the land” to also include “encouraging the management of features of the landscape which are of major importance for wild fauna and flora”. The revised PPG 9 (1994) reflects this directive (paragraph 16).

5.58 The above policy identifies the many features and habitats in the wider countryside which deserve protection. Careful planning of development proposals can often avoid harming such features; retaining them within the development proposal or by incorporating mitigating measures which would reinstate the integrity or continuity of the feature.

5.59 Within the Borough, the AGSVs and the Conservation Corridors highlight the areas where the contribution of such features to maintaining links between designated sites is strongest and these areas will represent the priorities for implementing this policy.

5.60 As noted in the EC directive as well as protecting such features, it is also important that they are appropriately managed. Habitat management generally falls outside of the scope of planning control. However, where appropriate, conditions may be imposed on planning permissions or the Council will seek planning obligations to ensure that such features retain their wildlife value. Policy 11 of the Plan similarly will apply where appropriate to designated nature conservation sites.

5.61 The Council will encourage management of such features in general throughout the Borough. The type of management required will vary from site to site depending on its characteristics. The Council will seek advice from English Nature and the Cornwall Wildlife Trust where appropriate.

E2.13

Policy 19 covers the species that are specially protected by wildlife legislation. As the relevant legislation concerned is not specified within policy it is assumed this policy applies to all species that are afforded legal protection. This policy does not reflect PPS9 where it is stated in paragraph 15 that ‘*specific policies in respect to these species should not be included in local development plans*’. Equally the policies do not reflect the guidance on species of principal importance as listed under Section 41 of the Natural Environment and Rural Communities Act 2006 (see below). In Paragraph 16 of PPS9 it is stated that:

*‘Other species have been identified as requiring conservation action as species of principal importance for the conservation of biodiversity in England {NERC Section41 list}. Local authorities should take measures to protect the habitats of these species from further decline through policies in local development documents. Planning authorities should ensure that these species are protected from the adverse effects of development, where appropriate, by using planning conditions or obligations. Planning authorities should refuse permission where harm to the species or their habitats would result unless the need for, and benefits of, the development clearly outweigh that harm.’*

**SPECIES PROTECTION**

## Policy 19

Developments which would have an adverse effect on wildlife species specially protected by law or their habitats will not be granted planning permission unless appropriate mitigation can be achieved.

*5.63 This policy seeks to sustain the habitats of protected species which is identified as a material planning consideration in PPG 9 on Nature Conservation. The species most likely to be threatened by development proposal are Badgers and in buildings, Bats and Barn Owls, however other species may well be encountered and a thorough survey is advisable. Proposals for the conversion of buildings such as barns will particularly need to respond to this policy. Considerable expertise exists in incorporating mitigating measures within developments that could include nesting facilities for birds and access to the roof space of buildings for bats. The Cornwall Wildlife Trust can provide technical expertise on such conservation measures.*

E2.14

Policy 20 seeks to encourage the incorporation of new habitats into development and recognises the value of creating new habitats within the urban environment.

**HABITATS**

## Policy 20

Proposals for habitat creation, or proposals which incorporate habitat creation will be permitted and other measures to create habitats will be promoted and supported where there is no conflict with policies for the countryside and the proposed habitat is appropriate to the landscape and habitats of the area concerned. The benefits of creating new habitats in urban areas will particularly be taken account of in decisions.

*5.64 Development proposals often provide opportunities for positive habitat creation for example in leisure developments, whilst some proposals to create new habitats for their own sake will require planning permission where, for instance, engineering works to construct water features are proposed. This policy supports such initiatives. Clearly any development proposals will need to be acceptable in the context of the planning guidance given in this Plan, particularly those policies to prevent sporadic development in the countryside. The importance of creating new habitats in urban areas should not be overlooked however, as they can make a positive contribution to the quality of life in towns.*

*5.65 The concept of sustainable development recognises the importance of bio-diversity and the Council will support habitat-creating schemes in general.*

*5.66 Large scale tree planting may qualify for grant aid from the Forestry Authority. Farmers may also obtain grants for woodland and shelter-belt planting from DEFRA.*

*5.67 Tree planting is clearly not appropriate everywhere and habitats such as heathlands, wetlands and old meadows should be managed in a way that is sympathetic with their conservation. Generally speaking, sites of nature conservation value or archaeological interest should not be planted on, unless part of an appropriate management plan.*

*5.68 Hedgerows and in particular, Cornish hedges are a feature of the Borough and this Plan intends that these should be constructed/replanted and extended where appropriate. The Countryside Stewardship scheme provides financial assistance for conservation of hedgerows. Within Cornwall, the County Council operates with the Districts a landscape conservation scheme, which provides help towards tree planting (including orchards) and other conservation projects.*

5.69 *There is considerable potential for habitat creation within the Borough. Opportunities for instance may develop in the china clay area as part of the industry's landscaping and reclamation proposals.*

E2.15

Designated Earth Science Sites (RIGS) are protected under Policy 23 which seeks to prevent damage to these sites or balance any damage with the benefits of the development.

#### **EARTH SCIENCE SITES**

##### **Policy 23**

Developments will not be permitted that would cause harm to the features or characteristics of Regionally Important Geological/Geomorphological Sites unless the benefits of the development outweigh the harm. In the instance of the loss of a geological exposure the provision of compensatory exposure of features of equivalent value will be taken into account.

5.81 *Earth Science sites include features of geological or geomorphological importance. Cornwall, with its mining heritage, is particularly rich in such features and has always attracted the interest of geologists and geomorphologists, as well as producing some notable experts in the field itself.*

5.82 *Statutory protection for such sites is provided by the SSSI designation under the auspices of English Nature and in this Plan by Policy 15 which protects all SSSIs. In Restormel, these SSSIs are Carn Grey, St Mewan Beacon, Tregargus Quarries, Wheal Martyn, Trelavour Downs, Luxulyan Quarry and Roche Rock. As well as being worthy of protection in their own right these sites often form the focus for education trips for both local schools as well as schools and colleges throughout the United Kingdom together with the many amateur enthusiasts who holiday in the County. As such earth science sites form an important part of our heritage and provide an underdeveloped tourism asset.*

5.83 *A recent initiative has been the formation of RIGS groups nationally under the leadership of English Nature. RIGS stands for Regionally Important Geological or Geomorphological Sites and is intended to draw attention to and protect sites of local importance which are outside the national statutory protection scheme. The appropriate analogy is with biological SSSIs and SINCs. The importance of RIGS is recognised in PPG 9.*

5.84 *A Cornwall RIGS group has recently been formed, (who can be contacted through the Cornwall Wildlife Trust) which has started to define sites of local importance. Although there are no rigidly imposed national criteria and procedures in selecting RIGS, some broad themes are becoming widely accepted and used. These themes are the value of the site for education, scientific research and study, and its historical and aesthetic importance. The RIGS in Restormel have been identified on this basis. The Borough Council recognises this important work and the above policy seeks to provide an appropriate level of protection from inappropriate development unless mitigating measures can be incorporated or an overriding need for the development exists. The Council will consult with the RIGS group as part of the planning process. Proposals for the interpretation of all earth science sites will be supported under Policy 12. The Earth Science SSSIs and RIGS are identified in the appropriate Town or Parish Chapters and a description of each site is included in Appendix G of the Background Papers document.*

5.85 *Some of the earth science sites identified in Restormel are working china clay pits or quarries where the geological exposures have actually been created through the mining taking place. Normal working practices are not incompatible with the designations although clearly it will be important to retain the exposures in any alternative uses if the pit or quarry closes.*

*5.86 As research continues, it is likely that further RIGS will be identified particularly geomorphological examples. The above policy will apply to any new sites.*

### **Biodiversity Action Plans**

- E2.16 As a direct result of the signing of the Convention on Biological Diversity at the Earth Summit in 1992 the Government has drawn up a national strategy to conserve our threatened native species and habitats - the UK Biodiversity Action Plan (UK Biodiversity Partnership, 2006). This is supported by a series of local Biodiversity Action Plans, usually set up on a county basis; each of which identifies those priority habitats and species considered to be most important in that area.

### **Cornwall Biodiversity Action Plans**

- E2.17 Since 1996 Cornwall Biodiversity Initiative has been developing Local Biodiversity Action Plans for habitat and species within the County. The process is an iterative one that reflects updates to the National BAP and other listings such as the NERC Section 41 lists (see below). Volume 3 of the Cornwall BAP includes action plans for 41 habitats and 370 species (Appendix E8)

### **Habitats and Species of Principal Importance**

- E2.18 Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 requires a list to be prepared of those habitats and species of 'principal importance' for the conservation of biological diversity in England. Under PPS9, local authorities should take measures to protect the habitats and species listed on Section 41 from further decline through policies in local development documents. Planning authorities should ensure that these species are protected from the adverse effects of development, where appropriate, by using planning conditions or obligations. Planning authorities should refuse permission where harm to the species or their habitats would result unless the need for, and benefits of, the development clearly outweigh that harm.
- E2.19 Those habitats and species included on the Section 41 list that have been recorded during the survey work at Carlyon Bay are listed in Appendix E9.

### **Nature Conservation Law**

- E2.20 Wildlife legislation that applies to England is both comprehensive and highly complex. As well as the policies detailed above, many species such as birds, bats, great crested newts and badgers enjoy statutory protection. The impact of the development on protected species has therefore been considered and the relevant legal protection is addressed in detail each section of the assessment.
- E2.21 Land designated as Sites of Special Scientific Interest and European Sites (Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) also

enjoy strict legal protection. The analysis considers if there are any indirect effects on neighbouring sites.

E3.0

## Assessment Methodology & Significance Criteria

### Assessment Methodology

E3.1 The assessment of the potential impacts of the proposed development upon the ecology of the site follows established guidelines for gathering data, establishing the value of the site and assessing the impacts of the development. The assessment has been completed with reference to the Institute of Ecology and Environment Management (IEEM) guidelines (Ref 2). The adopted method is described in more detail below.

### Data gathering and field surveys

E3.2 Carlyon Bay has been the subject of extensive biological recording and significant effort has been put into gathering records for the site since 2004 in the run up to the submission of the 2005 sea defence scheme and the subsequent public inquiry. The data that was gathered previously forms a valuable body of information to help inform the ecological assessment, and reference is made to this data.

E3.3 The 2004-2006 data is however considered to be out-of-date to provide an appropriate baseline for the ecological assessment of the proposed scheme. In order to inform this assessment the previous surveys have been comprehensively updated during 2009 and 2010.

E3.4 The 2005 sea defence scheme included the placement of sand upon the beach front, intruding into the marine environment below mean low water. In order to assess the impact upon the marine environment, extensive sub-tidal surveys were undertaken both using remote cameras and divers. The Inspector's Report on the 2005 sea defence scheme found that the extension of the beach would not significantly affect the marine environment. Importantly the scheme being assessed here does not include the extension of the beach through beach recharge. Surveys of the sub-tidal zone have therefore not been repeated as they are not relevant to this application.

E3.5 The following biological surveys were carried out on the site:-

- 1 Breeding birds
- 2 Bats
- 3 Dormice
- 4 Invertebrates
- 5 Reptiles
- 6 Phase 1 and Phase 2 vegetation surveys
- 7 Intertidal survey

- E3.6 The detailed methods for each survey and the full results are reproduced in Appendices E1-7.
- E3.7 As well as updating previous surveys the local biological records centre has been approached to provide any previously recorded data for the site and its locality. The majority of the results of the data trawl can be found in Appendix E8. Prior to 2003, Carlyon Bay was the site of regular monitoring of invertebrates, in particular moths. Over many years in excess of 20,000 individual species records were collected and passed onto the biological records centre. These records are too numerous to reproduce in full however they are summarised in the section on invertebrates and also in Appendix E9.

### **Significance criteria**

- E3.8 The criteria for the assessment of the significance of impacts used in this chapter are based on the *“Guidelines for Ecological Impact Assessment”* developed by the Institute of Ecology and Environmental Management (IEEM February 2006).
- E3.9 In order to evaluate the importance of ecological features identified in the desk study and field surveys, a set of standard measures are set out. For each site, habitat and species/assemblage, a summary grade is determined using the levels of value recommended in the guidance. This places the importance of each feature in a geographical context, using the following hierarchy:
- 1 International;
  - 2 UK;
  - 3 National (i.e. England, Northern Ireland, Scotland or Wales);
  - 4 Regional;
  - 5 County (or Metropolitan - e.g. in London);
  - 6 District (or Unitary Authority, City or Borough);
  - 7 Local (or Parish); or
  - 8 Site - within immediate zone of influence only (the development site and surrounds).
- E3.10 Where possible, established, formal criteria are used to set features of conservation importance within this geographical context. For example, the Guidelines for the Selection of Biological SSSIs (Nature Conservancy Council, 1989) can be used to assess features at the national level. Similarly, published guidelines for the selection of SINCs are normally used to assess features at a county level.
- E3.11 For additional background, a number of other frameworks have been used to help place designated sites, habitats or species into the geographical hierarchy. These include the legislation, policies and publications listed below:-

- 1 International law – EU Birds and Habitats Directives transposed into UK legislation through the ‘Conservation of Habitats and Species Regulations 2010’.
- 2 National law – Wildlife and Countryside Act 1981, Countryside and Rights of Way Act 2000
- 3 National Policy and Criteria – Planning Policy Statement 9: Biodiversity and Geological Conservation, UK Biodiversity Action Plan, Birds of Conservation Concern
- 4 Local Policy –Local Biodiversity Action Plan, Natural England Natural Areas.

E3.12 Habitats and species of principal importance for nature conservation are referred to under Sections 41-42 of the NERC Act 2006 (also see Policy section E2). In summary, this places a duty on Government Departments to have regard to biodiversity in the exercise of their functions. It is also the duty of the Secretary of State to take, or promote, steps to enhance the conservation of relevant habitats and species. The approach required for Section 41 habitats and species is further developed in PPS9.

E3.13 For each ecological receptor, habitat or species of interest, conservation objectives are then defined at the appropriate geographical scale(s). These are often stated in Biodiversity Action Plans or other relevant documents.

E3.14 Following the evaluation of the importance of the ecological features identified, the significance of predicted potential ecological impacts arising from the development proposals (prior to any mitigation) are considered.

E3.15 The predicted impacts may be direct or indirect in nature and may occur in one or more of the construction, operation or decommissioning phases of the scheme. The impacts identified to be acting on each ecological feature are assessed in terms of the factors listed below:-

- 1 Direction (positive, negative or neutral impact);
- 2 Magnitude (the amount or level of impact);
- 3 Extent (area in hectares, linear metres, etc);
- 4 Duration (in time or related to species life-cycles);
- 5 Reversibility (i.e. is the impact permanent or temporary);
- 6 Timing and frequency (e.g. related to breeding seasons); and
- 7 Cumulative effects (between impacts from a number of sources).

E3.16 These factors provide a means of characterising the impacts on the features identified, thereby allowing significance to be assessed.

E3.17 Where possible, levels of certainty are given to indicate the likelihood that both the predicted activity/impact and the associated ecological effect will occur. The IEEM guidance suggests using the following four-point scale to identify the levels of confidence arrived at by professional judgement:

- 1 Certain/High

- 2 Probable/Moderate
- 3 Unlikely/Low
- 4 Extremely unlikely/Negligible

- E3.18 In IEEM guidance it is stated that impacts should be determined as being significant when they have an adverse or positive effect “*on the integrity of a defined site or ecosystem and/or the conservation status of habitats or species within a given geographical area*”. Such impacts may be significant at the level of importance defined in the Evaluation section or, for habitats and species, at a lesser geographical scale.
- E3.19 Using this information and judgement, it is determined whether the effects will be significant or not for the integrity (of site/ecosystems) or conservation status (of habitats/species) of each ecological feature. The impact significance is determined at the appropriate geographical scale. For sites or ecosystems, the significance of impacts on integrity needs to be assessed at the level of importance that the feature has been given. However, for habitats and species, the impact significance can be assessed against conservation status at a geographical scale at or below that at which the feature has been valued, for example, a minor adverse impact on conservation status may be assessed to be insignificant at a local level but significant at a site level. The significance for the impact would be recorded as significant at a site level. Neutral impacts have no level of significance applied to them.

## **Consultation**

- E3.20 This assessment has been the subject of consultation with Natural England, Cornwall Council ecologists (terrestrial and marine) and Cornwall Wildlife Trust. Consultation with these consultees began early in the assessment process to gain a consensus on the level of survey effort that would be required to inform the EIA. Because of the seasonal nature of biological surveying this initial consultation pre-dated the formal EIA Scoping consultation (July 2010 – see Chapter B). The early consultation informed the preparation of the ecology section of the Scoping Report (July 2010) however further surveys were requested by the ecological consultees in response to the formal submission and these surveys have also been completed.
- E3.21 The local biological records centre was also consulted to establish the nature and extent of any biological records for the site.

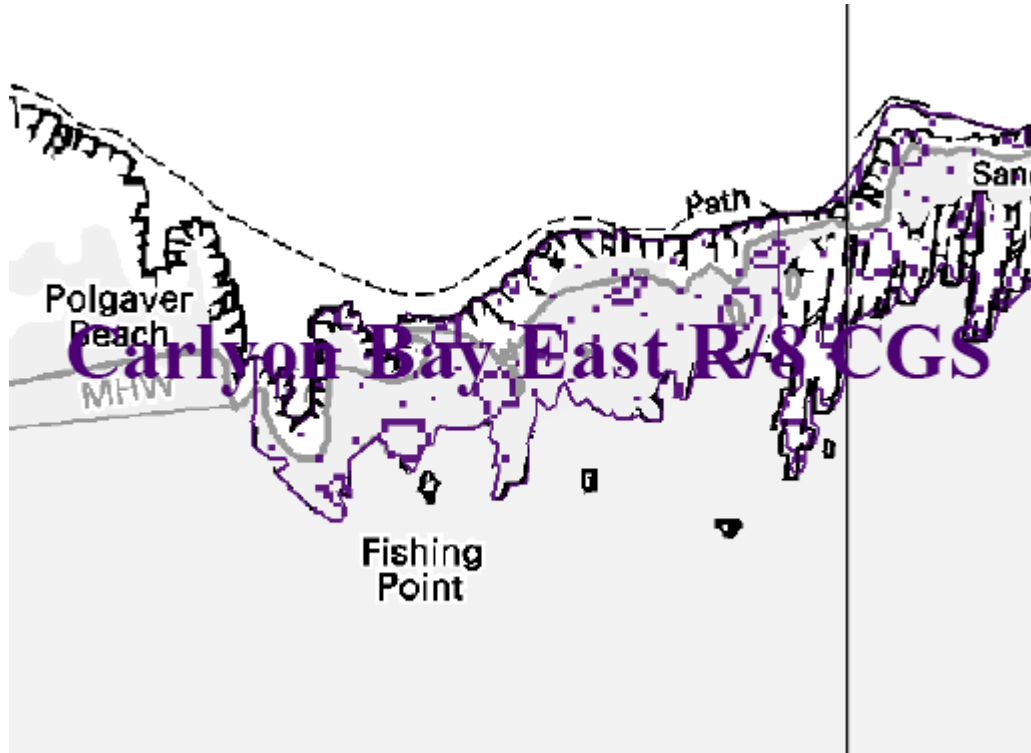
## E4.0 Baseline Conditions

### Desk Study results

- E4.1 The Environmental Records Centre for Cornwall and the Isles of Scilly (ERCCIS) was requested to provide data it holds on habitats and species within the locality. The ERCCIS were asked to provide information of any International Sites within 5 km of the site, and records of any other statutory designed sites within 2km. In addition species information within 2km was requested along with records of BAP habitats. The results of the data trawl are reproduced in Appendix E8.
- E4.2 The data trawl revealed that the nearest European designated site is St Austell Clay Pits Special Area of Conservation (SAC). This site is approximately 4.8km from Carlyon Bay and is designated for Western rustwort *Marsupella profunda*, a small liverwort and would not be impacted by the proposal.
- E4.3 There are no statutory designated sites within 2km of the site.
- E4.4 Within 2km of the site, there are two non-statutory designated sites which are road side verges; biological site number BS90 and BS91. Both sites are designated for their botanical interest and support Red Data Book ('RDB') species. BS90 is approximately 1.5km north-west of the site, whilst BS91 is approximately 900m to the north east. Both sites are road side verges that would not be affected by the proposed development and no impacts are likely. The location of these sites is shown in Appendix E8.
- E4.5 Within the 2km search areas there are 3 Regionally Important Geological / Geomorphological Sites (RIGS). Approximately 1 km to the east of the site boundary is Spit Point (R/19). Two additional sites are located within the boundary of the development site these are named Carlyon Bay West (R/16) and Carlyon Bay East (R/8). The full descriptions of the RIGS are reproduced in Appendix E8.
- E4.6 Within the development area or immediately adjacent there are two Regionally Important Geological Sites (RIGS) or County Geology Sites. The RIGS designation is non-statutory and does not imply any rights of access or management commitment. The two RIGS sites are, however, protected by conservation policies in Restormel Borough Council's Local Plan, and their status is taken into account during the planning process.
- E4.7 Carlyon Bay East RIGS (Number R/8) has the following summary description: '*Lower Devonian slates containing volcanoclastic material. Also, a dolerite sill, and cumbent fold and a raised beach*'. Carlyon Bay East RIGS includes the rock outcrop that forms the eastern end of Polgaver bay and extends from Fishing Point eastwards. The area comprises rocks of the Bovisand Formation. The lithologies are unusual in that they contain substantial volcanoclastic material, and the area is also noted for the outcrop of a dolerite sill, a recumbent fold,

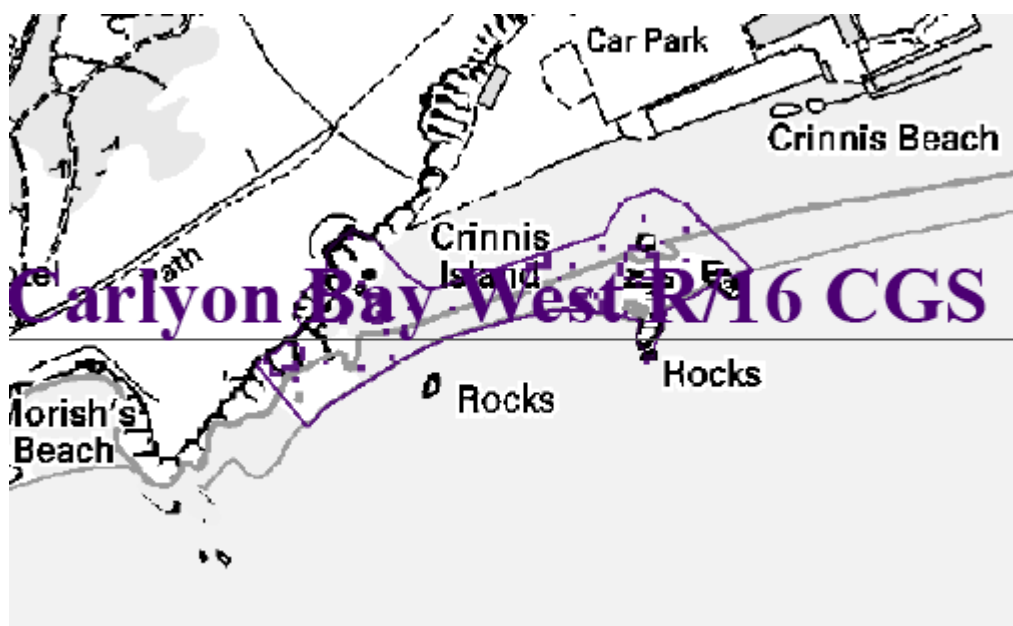
and raised beach material capped by Head. The extent of the RIGS site is shown in Figure E4.1.

Figure E4.1 Extent of Carlyon Bay East RIGS



- E4.8 Carlyon Bay West (number R/16) is described as Fossiliferous Lower Devonian slates with volcanoclastic material, cut by mineral veins. A raised beach caps Crinnis Island. This RIGS site encompasses the west end of Crinnis beach as well as the outcrop at Crinnis Island. Again the rocks are part of the Bovisand Formation and contain fossils and volcanoclastic material. In addition, east-west trending copper and lead veins cut the rocks and, as at the east end of the bay, a small patch of raised beach is exposed at Crinnis Island.

Figure E4.2 Extent of Carlyon Bay West RIGS



- E4.9 These two RIGS are mainly situated in the intertidal zone. Of the two, the westerly is the most significant in that it extends for some 200m along the shoreline to the small rock outcrop known as Crinnis Island (i.e. forms part of the intertidal beach area of Crinnis). It is understood that under the current situation Crinnis Island is exposed to the natural elements, resulting in significant levels of erosion.
- E4.10 The full details of both RIGS are reproduced in Appendix E8.
- E4.11 ERCCIS provided over 27,000 individual species records within a 2km search area. Of these, 22,000 are labelled as being from Carlyon Bay. The majority of the species records were for invertebrates and are a reflection of the survey effort by Dr Adrian Spalding who recorded regularly at Carlyon Bay. Following the receipt of this data, Dr Mark Telfer, who carried out the entomological survey work for this assessment, was asked to assess the historical records that had been provided. His supplementary report on the records can be found in Appendix E9.

### Field Survey Results

- E4.12 Baker Consultants carried out the field surveys between March 2009 and August 2010. While some of the surveys were done by the in-house team, others required the input of specialist biologists who have expertise in a particular discipline. The fact that the surveys were carried out over a period of more than a year meant that each survey could be completed at the optimal time for recording each group. The following is a summary of the survey findings, the methods employed and the level of survey effort. Each section should be read along with the relevant Appendix that provides full details and results for each survey.

### Breeding bird surveys

- E4.13 The site was surveyed for breeding birds during the spring and early summer of 2009. The method employed broadly followed the 'Common Bird Census' (CBC) devised by the British Trust for Ornithology (Ref 5). This technique records the location and behaviour of every bird present within a defined survey area and includes the mapping of breeding bird territories.
- E4.14 Three visits were undertaken to the site during the bird-breeding season in suitable weather conditions and between the hours of dawn and 11am, when birds are most active. The dates and weather conditions during these surveys are detailed in Table E4.1.

Table E4.1 Breeding Birds Survey dates and weather conditions

Survey date	Surveyor	Times	Weather conditions
16.4.09	Susan White	0600-0745	15°C, 80% cloud, moderate SW wind, visibility good
26.5.09	Alec Johnston	0550-0950	17°C, 30%cloud, moderate SW wind, visibility good
2.6.09	Susan White	0830-1030	24°C, 0% cloud, no wind, visibility good

- E4.15 The results of the 2009 breeding bird survey are summarised in Table E4.2. 40 species were recorded on the site with 27 confirmed or considered to be probably breeding. This compares to 56 species recorded in 2004 of which 37 were thought to be breeding.

Table E4.2 Birds observed on site, their conservation and breeding status and estimated number of territories

Species	Breeding status	No. of breeding territories			
		Crinnis	Shorthorn	Polgaver	Total
barn swallow <i>Hirundo rustica</i>	probable	5+	-	-	5+
blackbird <i>Turdus merula</i>	confirmed	3	6	-	9
blackcap <i>Sylvia atricapilla</i>	probable	-	2	-	2
bluetit <i>Parus caeruleus</i>	probable	2	1	1	4
bullfinch <i>Pyrrhula pyrrhula</i>	probable	-	1	-	1
carrion crow <i>Corvus corone</i>	possible	-	-	-	-
chaffinch <i>Fringilla coelebs</i>	probable	-	4	2	6
chiff chaff <i>Phylloscopus collybita</i>	confirmed	1	2	-	3
common gull <i>Larus canus</i>	non-breeding	-	-	-	-
cormorant <i>Phalacrocorax carbo</i>	non-breeding	-	-	-	-

Species	Breeding status	No. of breeding territories			
		Crinnis	Shorthorn	Polgaver	Total
dunnock <i>Prunella modularis</i>	probable	2	-	-	2
gannet <i>Sula bassana</i>	non-breeding	-	-	-	-
goldfinch <i>Carduelis carduelis</i>	probable	-	5	1	6
great tit <i>Parus major</i>	probable	-	11	11	5
greenfinch <i>Carduelis chloris</i>	confirmed	2	2	-	4
fulmar <i>Fulmaris glacialis</i>	confirmed	-	-	11	11
herring gull <i>Larus argentatus</i>	confirmed	-	18	-	18
house martin <i>Delichon urbica</i>	probable	20+	-	-	20+
house sparrow <i>Passer domesticus</i>	probable	2	-	-	2
jackdaw <i>Corvus monedula</i>	confirmed	-	1	4	5
jay <i>Garrulus glandarius</i>	probable	-	-	1	1
kestrel <i>Falco tinnunculus</i>	confirmed	-	1	-	1
long-tailed tit <i>Aegithalos caudatus</i>	confirmed	-	4	-	4
linnet <i>Carduelis cannabina</i>	possible	-	-	-	-
magpie <i>Pica pica</i>	probable	2	-	-	2
mallard <i>Anas platyrhynchos</i>	possible	-	-	-	-
meadow pipit <i>Anthus pratensis</i>	possible	-	-	-	-
pieb wagtail <i>Motacilla alba</i>	probable				1
robin <i>Erithicus rubecula</i>	confirmed	-	1	2	3
sand martin <i>Riparia riparia</i>	possible	-	-	-	-
sandwich tern <i>Sterna sandvicensis</i>	Possible	-	-	-	-
song thrush <i>Turdus philomelus</i>	probable	1	2	1	4
spotted flycatcher <i>Muscicapa striata</i>	non-breeding	-	-	-	-
stock dove <i>Columba oenas</i>	possible	-	-	-	-
stonechat <i>Saxicola torquata</i>	possible	-	-	-	-
tawny owl <i>Strix aluco</i>	probable	-	-	1	1
willow warbler <i>Phylloscopus trochilus</i>	confirmed	1	-	-	1
woodpigeon <i>Columba palumbus</i>	probable	5	1	-	6
wren <i>Troglodytes troglodytes</i>	probable	1	2	2	5

E4.16 Of the 40 species recorded five are “Red List” species that are considered to be of high conservation concern (See Appendix E1 for full details). Nine species are “Amber List” species that are considered to be of medium conservation concern. Seven species have status under either legislation or policy that confers various levels of additional protection. These species are summarised in Table E4.3

Table E4.3 Birds present on the site that are cited with legislation and policy

Species	Birds Directive – Annex 1	Section 41 NERC Act	BAP listed (UK/Local)	Cornwall LBAP
bullfinch		●	●	●
dunnock		●	●	●
herring gull		●	●	●
house sparrow		●	●	●
sandwich tern	●			
song thrush		●	●	●
spotted flycatcher		●	●	●

E4.17 The assessment of the value of the site for breeding birds is based on the published literature in particular Fuller 1980 (Ref 6). These criteria have since been modified to reflect recorded changes in bird populations since 1980 (IEEM 2006 Ref 2) Table 4.4.

Table E4.4 Breeding bird species

Number of breeding bird species	Site importance
<25	Local
25 – 49	District
50 – 69	County
70 – 84	Regional
>85	National

E4.18 27 species have been assessed as either confirmed or probably breeding on the site, so using the adapted version of Fuller’s criteria the site is considered to be of District importance. Weight is added to this evaluation by the fact that three of these breeding species are of high conservation concern (herring gull, house sparrow and song thrush) and two are species of moderate conservation concern (bullfinch and house martin).

### Bats

E4.19 The bat surveys completed in 2004 found limited bat activity within Carlyon Bay. Foraging surveys were carried out on four occasions during the summer

months involving walking transects across the site using hand held bat detectors. Three species were recorded foraging within the site, common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*) and Noctule (*Nyctalus noctula*). Myotis species were also recorded during the surveys but these could not be differentiated at the species level. The details of the 2004 surveys can be found at the end of Appendix E3. The adits that arise in Shorthorn Bay were not surveyed as they cannot be accessed however no works are proposed to the adit themselves (only to the entrance to both adits) and therefore this is not considered to be a limitation.

- E4.20 The site was also surveyed for potential roost sites and both the woodland and the derelict buildings were surveyed and no roosts were found. The potential for roost sites was considered to be low.
- E4.21 Since 2004, the Bat Conservation Trust has developed criteria that aim to give guidance on the conditions that would trigger the need for bat surveys (Ref 7). Carlyon Bay does not support habitats that would meet these conditions and thereby trigger the need for surveys. Notwithstanding this, following the formal consultation with Cornwall Council it was agreed that bat activity surveys would be carried out across the site. Also further checks would be made for roost sites.
- E4.22 The 2010 bat surveys were lead by Richard Green who is a highly experienced bat surveyor. Two other ecologists assisted him. The surveys were carried out in early September 2010, which is within the optimum period for bat surveys. Two surveys were carried out one on the evening of September 6<sup>th</sup> which was followed by an emergency survey the following morning. Another activity survey was then carried out on September 8<sup>th</sup>. The dawn survey was limited by heavy rain between 5.00hours and 6.00hours however conditions then cleared. There were no other constraints on the survey conditions.
- E4.23 The bat surveys included the following;
- 1 Inspection of potential roost sites concentrating on the buildings
  - 2 Bat activity transect surveys
  - 3 Placement of remote bat detectors
- E4.24 In addition to these surveys another remote bat detector (Wildlife Acoustics SM2 Bat384) was placed on site between the 6th and 9th October (inc) 2010. The bat detectors were placed at the promontory between Shorthorn and Polgaver bay, recording full nights of bat activity. The detector was fitted with an omni-directional microphone to record 340 degrees of bat activity. Data on the SM2 recorders were analysed using Analook and Songscope software.
- E4.25 The 2010 bat survey report is reproduced in Appendix E3. Three species of bat were found to be roosting within the Coliseum, lesser horseshoe bat (*Rhinolophus hipposideros*), brown long-eared bat (*Plecotus auritus*) and pipistrelle bat (*Pipistrellus sp*). From the number of droppings present it was concluded that the roosts are night feeding roosts but that day roosting cannot be ruled out. None of the roost sites were considered to be maternity roosts.

All species of bats are protected under the Habitats Regulations 2010 and before any work is carried out that may affect the roost sites it will be necessary to secure a European Protected Species licence from Natural England. Further surveys will be required in order to inform this licence application.

E4.26 The manual activity surveys recorded bats foraging throughout the site. Activity was concentrated in the areas of the cliffs and undercliffs with bats hunting along the scrub and woodland habitats on the cliff faces. A total of 8 species of bats were recorded feeding within the site (see table E.4.5 below)

Table E4.5 Bat species recorded at Carlyon Bay

lesser horseshoe bat	<i>Rhinolophus hipposideros</i>
greater horseshoe bat	<i>Rhinolophus ferrumequinum</i>
soprano pipistrelle bat	<i>Pipistrellus pygmaeus</i>
common pipistrelle bat	<i>Pipistrellus pipistrellus</i>
Nathusius' pipistrelle bat	<i>Pipistrellus Nathusii</i>
noctule bat	<i>Nyctalus noctula</i>
long-eared bat	<i>Plecotus sp.</i>
myotis	<i>Myotis sp.</i>

E4.27 The results of the SM2 bat detector survey confirm that that the cliff edge and associated features are being used by common pipistrelle and brown long eared bats as a commuting route. The data gathered shows spikes of activity from these species just after dusk and a little before sunrise, suggesting a potential commuting route between feeding sites and roosts.

E4.28 Other species recorded by the SM2 were lesser horseshoe, greater horseshoe, myotis and soprano pipistrelle bats. These were recorded in very low numbers with only two passes in a full evening and morning survey. These calls were also generally recorded late into the evening suggesting that these bats may not originate from a roost nearby but may be moving towards additional feeding grounds. The results of the SM2 surveys are summarised in Table E4.6.

E4.29 Only 5 nights of recording were undertaken, and these recordings were only undertaken in October, which only gives a snapshot of bat activity within the area. The data does however support the transect data that was collected manually.

E4.30 The results of the 2010 bat surveys differ markedly from 2004. Although the 2004 surveys were carried out during a more favourable time of year (May, June), the surveys recorded lower levels of passes and fewer species than in 2010. No bat roosts were recorded in 2004.

Table E4.6 Summary of remote bat detector surveys

	<b>06/10/10</b>	<b>07/10/10</b>	<b>08/10/10</b>	<b>09/10/10</b>	<b>10/10/10</b>
--	-----------------	-----------------	-----------------	-----------------	-----------------

Pip	54	92	138	136	34
55 pip	1	0	0	0	2
noct	0	0	0	0	0
LHS	1	0	0	0	1
GHS	1	0	2	1	1
BLE	19	6	2	5	0
myo	0	0	0	1	0

Notes: pip = common pipistrelle, 55 pip = soprano pipistrelle, noct = noctule, LHS = lesser horseshoe, GHS = greater horseshoe, BLE = brown long eared, myo = myotis species. Dates shown are the start of the evenings recording.

E4.31 The 2010, surveys were in accordance with BCT guidelines on bat surveys in so far as the survey effort is appropriate and the timing is within the acceptable periods for surveys work. Ideally it would have been better to have a wider spread of surveys throughout the year. These timing constraints however have not limited the surveys as the results have shown significant levels of activity and the presence of 8 species commuting the site.

E4.32 The woodland and scrub habitat along the cliff and at its base is considered to be the highest value habitat for foraging bats and acts as a corridor for bats to fly along the coast. As a foraging habitat it is considered to be of local value but as a corridor it is considered to be of district value.

### **Dormice**

E4.33 Broad-leaved woodland and scrub are the dominant habitats in Polgaver and along the cliffs and undercliffs across the whole site. Woodland habitats consist of damp oakwoods, that dominate the base of cliffs, and willow carr constitutes the main habitat within the central region of Polgaver. Gorse scrub forms a mosaic with the woodland habitats. These habitats are considered to be suitable habitat for dormice (*Muscardinus avellanarius*), despite not containing abundant hazel with which dormice are traditionally associated. Dormice can be found in a wide range of woodland habitats and populations can be present at low densities even in sub-optimal habitats. This is particularly apparent in southern counties in England and in Cornwall dormice are even found in culm grassland close to woodland.

E4.34 In 2004 a dormouse survey by Baker Consultants found no evidence of dormice at Carlyon Bay. The survey used 30 nest tubes and included a search for gnawed hazel nuts.

E4.35 Dormice can be very elusive and current opinion is that nest boxes can yield reliable results when surveying woodland. In 2010, a second dormouse survey was carried out and the woodland at Polgaver Bay was surveyed using nest boxes.

E4.36 In March 2010, 50 nest boxes were set out in the woodland at Polgaver Bay and 10 nest tubes were set out in adjacent areas of scrub/ woodland at the

base of cliffs in Crinnis Bay. The boxes were arranged in a grid and were spaced no further than 20m apart.

- E4.37 The wooden nest boxes were similar in design to that described in the Dormouse Conservation Handbook; the boxes measured 160mm (D) by 160mm (W) and 220mm (H). The boxes attached to the tree using garden wire with the entrance hole (35mm diameter) facing the branch of the tree.
- E4.38 The nest tubes were purchased from the Mammal Society and comprise a plastic tube (50mm x 50mm entrance and 250mm length) with wooden tray insert. The tubes were suspended from horizontal branches with a diameter of approximately 20mm.
- E4.39 Checks of the dormouse boxes and tubes were made by Anton Kattan MIEEM, a Natural England licensed dormouse handler on the 1st June, 2nd July, 31st August and 9th September 2010. On each occasion all nest boxes and tubes were closely examined for signs of occupancy. Searches were also made for woven nests in the surround scrub.
- E4.40 In order to detect significant populations of dormice, good practice guidelines in the Dormouse Conservation Handbook (Ref 12) provide an index for scoring survey effort based on probability of finding animals in given months and given the number of tubes/ boxes at a site (using 50 boxes as a standard). The survey at Carlyon Bay scores a search effort score of 21, and fulfils the minimum search effort score of 20 for determining absence of dormice at the site.
- E4.41 No Evidence of dormice was found from the field survey confirming the results of 2004.
- E4.42 A data search request for records of dormice was submitted to Environmental Records Centre for Cornwall and the Isles of Scilly (ERCCIS) in May 2010. The data request covered a 2km search area from Carlyon Bay.
- E4.43 ERCCIS hold one record of dormice from 1989, approximately 800m north-east of Carlyon Bay. The record is from a small area of woodland off Lamellyn Road.

### **Invertebrates**

- E4.44 Dr Mark Telfer surveyed the invertebrate populations of Carlyon Bay in May, June and July 2009. Dr Telfer is recognised as a national expert in this field and has particular expertise in site evaluation. A variety of techniques were used during the surveys in order to assess as many target groups as possible. Full details of the techniques employed can be found in Appendix E4.
- E4.45 The method employed followed the latest guidance published in 2005 and 2007 (Refs 13 and 14) and as such the survey techniques were different from those used in the previous surveys carried out in 2004 by Colin Plant which relied on more passive sampling (Malaise traps) which are less targeted as they only collect insects that fly into the traps.

E4.46

The invertebrate surveys identified 286 species collected during the three survey days. Of these 286, 11 (3.9%) are categorised as rare or scarce (see Table E4.7 below). A full explanation of the rarity classification and an account of each species can be found in Appendix E4

Table E4.7 Key invertebrate species recorded during 2009

Order	Family	Species: scientific name	Species: English name	Conservation Status
Lepidoptera	Cosmopterigidae	<i>Chrysoclista lathamella</i>	a moth	pRDB1*
Coleoptera	Chrysomelidae	<i>Ochrosia ventralis</i>	a flea-beetle	RDB3
Coleoptera	Chrysomelidae	<i>Calomicrus circumfusus</i>	a leaf-beetle	Nationally Scarce (Na)
Coleoptera	Dytiscidae	<i>Hydroglyphus geminus</i>	a diving-beetle	Nationally Scarce (Nb)
Coleoptera	Staphylinidae	<i>Stenus atratulus</i>	a rove-beetle	Nationally Scarce (Nb)
Coleoptera	Staphylinidae	<i>Lathrobium angustatum</i>	a rove-beetle	Nationally Scarce (Nb)
Coleoptera	Tenebrionidae	<i>Opatrum sabulosum</i>	a beetle	Nationally Scarce (Nb)
Coleoptera	Rhynchitidae	<i>Temnocerus tomentosus</i>	a weevil	Nationally Scarce (Nb)
Coleoptera	Apionidae	<i>Catapion pubescens</i>	a weevil	Nationally Scarce (Nb)
Coleoptera	Curculionidae	<i>Sibinia primita</i>	a weevil	Nationally Scarce (Nb)
Diptera	Syrphidae	<i>Eumerus sabulonum</i>	a hoverfly	Nationally Scarce

E4.47

Surveys from 2004 recorded 649 species of which 19 (2.9%) are categorised as rare or scarce. The difference in overall species numbers recorded reflects the different methods employed however the proportion of rare or scarce species remains similar (3.9% in 2009). Dr Telfer is of the opinion that the difference is not considered significant and that the higher proportion of rare or scarce species recorded in 2009 reflects the more targeted approach employed in the later surveys.

E4.48

The 2009 surveys recorded four species which appear to be first records for Cornwall: *Chrysoclista lathamella*, *Stenus atratulus*, *Carpelimus zealandicus* and *Temnocerus tomentosus*.

E4.49

The results show that Carlyon Bay has retained its high levels of importance for invertebrates. Dr Telfer has concluded that overall the site is of County

\* The "p" prefix indicates that RDB1 status has been proposed for this species but not yet formally published.

importance with elements that can be considered to be of National importance; this assessment is comparable with that made in 2004.

### **Reptiles**

- E4.50 In 2004 surveys of Carlyon Bay showed that all three bays support adder (*Vipera berus*), common lizard (*Zootoca vivipara*) and slow-worms (*Anguis fragilis*). A similar survey to that carried out during 2004 was carried out during 2009/2010. The survey involved setting out 100 refugia across the site which were placed early in the spring of 2009. In May and June 2009 the refugia were then surveyed on four occasions in the early morning and in the late afternoon. Another four surveys were then completed in August and September 2010. Any species found basking on the mats were recorded as well as any other sightings. The use of refugia is not effective for recording common lizard and so detailed searches were made of likely habitat within the site. Full details of the method employed and the results can be found in Appendix E5.
- E4.51 The results of the reptile survey show that the site still supports significant reptile interest. Slow-worm were found in Crinnis, Shorthorn and Polgaver in sufficient numbers to be considered a 'good' population as defined by current guidance (Ref 18). Although no common lizard were recorded in 2009, one was recorded in 2010 confirming that this species is still present on the site. Adder were not recorded on the site during the 2009/10 surveys. This species had previously only been found in Polgaver. Conversely two adult grass snakes (*Natrix natrix*) were recorded in Polgaver. This species has not been previously recorded on the site.
- E4.52 Compared to the surveys of 2004, the overall numbers appear to have reduced however it is not possible to determine if the differences are significant as the survey method employed does not allow for statistical comparison. In the 2004 surveys, the adder population had been confined to Polgaver. During 2006, some management of habitat was carried out specifically to improve conditions for this species. The management work involved opening up a number of areas within Polgaver by scrub removal to create basking areas for reptiles. These clearings are now entirely overgrown and this may go some way to explaining why adders were not re-recorded on the site. The negative results for adder may not be conclusive and for the purposes of this assessment it is assumed that adder are still present on the site.
- E4.53 The latest published guidance on evaluation of reptile populations is Froglife (1999). Under these criteria set out in this paper Carlyon qualifies as a Key Reptile Site because it supports 3 or more reptile species and/or two species of snake. As a Key Reptile Site, Carlyon must be considered to be of County Importance for reptiles.
- E4.54 Adder, slow worm, grass snake and common lizard are protected under Section 9 of the Wildlife and Countryside Act 1981 protecting them against intentional killing and injuring (but not taking) and against keeping, transporting, selling or exchanging, offering or advertising for sale.

- E4.55 Adder, slow worm grass snake and common lizard are all Cornwall BAP species and listed under NERC Section 41.
- E4.56 In 2006 a survey of reptiles within both Shorthorn and Crinnis was carried out prior to site clearance work. Reptile fencing was installed along the base of the cliffs and any reptiles that were trapped were moved to the cliff side of the fence out of harms way. Allied to translocation, scrub clearance work was carried out in Polgaver to open up basking sites and improve the habitat structure for reptiles. Since 2006 much of the reptile fencing has fallen into disrepair.

### **Phase 1 and Phase 2 Vegetation Surveys**

- E4.57 A full botanical survey was carried out at Carlyon Bay between June 22<sup>nd</sup> and 24<sup>th</sup> June 2009 (inclusive). A Phase 1 survey (ref 8) was completed followed by an assessment of the National Vegetation Communities (Ref 9) present on the site. All plant species recorded during the survey were listed. Further details on the methods employed can be found in Appendix E6 along with the species list, habitat maps and target notes.
- E4.58 The site supports a number of habitats that in turn support a relatively high diversity of plant species that are considered to be important at the Parish level. Much of Crinnis is characterised by bare ground that is regularly disturbed (80-90% bare ground). What vegetation that does occur here is typical of such environments comprising those species that are primary colonisers or are adapted to well drained exposed conditions. Of particular note is Chamomile (*Chamaemelum nobile*), which is a National BAP and Cornwall LBAP species. Chamomile was known to be present on the site as a survey specifically targeting this species was carried out in 2004. Also of interest is the record for Mossy Stonecrop (*Crassula tillaea*), which was locally frequent in the strip of vegetation situated west of the former nightclub buildings. This species is considered to be scarce in Cornwall recorded in between 4-10 tetrads (Ref 10).
- E4.59 Crinnis also supports some highly localised areas of dwarf scrub heath of western gorse (*Ulex gallii*) and bell heather (*Erica cinerea*).
- E4.60 The back of Crinnis supported areas of mature woodland, a mosaic of species rich neutral grassland, heath, scrub, and at the base of the cliff, wet grassland. The cliffs are at various stages of colonisation following previous cliff stabilisation work and natural rock falls further adding to the habitat diversity.
- E4.61 On the disturbed ground along the base of the cliff, Smith's Pepper wort (*Lepidium heterophyllum*) was recorded. This species is a rare native perennial, characteristic of arable land and disturbed ground. Its status in Cornwall is currently unknown.
- E4.62 Shorthorn was substantially cleared of vegetation in 2006 and has now re-colonised with a mixture of sparse acidic grassland and gorse scrub. Significant areas of bare ground still remain, plus an area of bare sand in the

south-west. A sparse sand dune community has started to develop on the landward side of the sheet piling. The Sandy River emerging from the base of the cliff, is substantially canalised throughout its course, having been altered to create an outfall within the piling. The maritime cliffs along the landward side of Shorthorn include a mosaic of scrub, broadleaved woodland, heathland and exposed hard cliff. To the base there are areas of heathland, scrub and bracken.

- E4.63 At the eastern end of Shorthorn is a small area of broad leaved woodland of Pedunculate Oak *Quercus robur*, with frequent trees of Downy and Silver Birch (*Betula pubescens* and *B. Pendula*), occasional Sycamore, plus rare Alder, whilst the shrub layer includes Grey Willow, Dog-rose, Holly, Hawthorn, Hazel and Buddleia. This woodland supports a diverse field layer and includes abundant Bramble and Ivy, locally abundant Common Feather-moss *Kindbergia praelonga*, frequent Honeysuckle, False-brome and Common Valerian, occasional/frequent Broad-buckler Fern *Dryopteris dilatata*, Scaly-male Fern, occasional Common Sorrel, Hart's-tongue Fern, Violet (non-flowering), Enchanter's Nightshade *Circaea lutetiana* and Mouse-tail Moss *Isothecium myosuroides*, plus rare Navelwort *Umbilicus rupestris*, Black Bryony and Soft Shield Fern.
- E4.64 The eastern end of Shorthorn also supports an area of dwarf shrub heath with open ground with areas dominated by mosses such as Springy Turf-moss *Rhytidiadelphus squarrosus*, Juniper Haircap *Polytrichum juniperinum*, Heath Plait-moss *Hypnum jutlandicum* and Neat Feather-moss *Pseudoscleropodium purum*, along with lichens - *Cladonia* spp., and more locally, *Peltigera* sp.
- E4.65 Polgaver is the least developed of the three areas and supports the largest area of woodland/scrub along with well-developed open dune habitat, a dune scrub and a mosaic of maritime cliff habitats. The woodland scrub in this bay was subject to some conservation management in 2006 associated with the reptile translocation (see above). Areas of scrub were opened up to provide improved habitat for the reptile population. These areas are now no longer apparent having become overgrown in the intervening years.
- E4.66 Polgaver was used in the past to store sand that was contaminated with Japanese Knotweed. This flat-topped mound is still evident and has become colonised with acid grassland, gorse scrub and includes populations of Chamomile. Some stands of Japanese Knotweed are still evident and are being treated.
- E4.67 The secondary woodland in Polgaver is made up of Alder and Grey Willow with occasional Pedunculate Oak, Sycamore and Downy Birch. Lichens are frequent on the trees. The field layer is well established comprising Ivy and Wood Dock *Rumex sanguineus*, locally frequent Common Nettle, Cleavers, occasional Black Bryony, locally occasional Yellow Flag and Hemlock Water-dropwort, plus rare Enchanter's Nightshade, Male Fern, Red Champion, Hedge Woundwort *Stachys sylvatica*, Stinking Iris *Iris foetidissima*, Creeping Buttercup, Soft Shield-fern, Lady Fern, Soft Rush, Hart's-tongue Fern and Broad-buckler Fern and Gypswort

*Lycopus europaeus*. Yellow Flag and Hemlock-water dropwort being associated with hollows in the woodland that at times support ephemeral water bodies.

E4.68 Towards the cliff face the woodland becomes more dense to the point of being impenetrable.

E4.69 In the more open areas such as the site of the old Barbecue Hut, there are areas of open acid grassland that support a good diversity of species. Here carpet forming moss are locally abundant along with Chamomile and species such as frequent/abundant Bird's-foot Trefoil, frequent Sweet Vernal-grass, locally frequent Yorkshire-fog, Red Fescue, Chamomile, and Eyebright, White Clover, Sheep's-sorrel, Self-heal and Cypress-leaved Plait-moss *Hypnum cupressiforme*, occasional Ribwort Plantain, locally occasional Crested Dog's-tail *Cynosurus cristatus*, English Stonecrop, Carlina Thistle, Common Sorrel, Trailing Tormentil, Japanese Rose, Field Woodrush *Luzula campestris* and *Peltigera* sp. (a lichen), plus rare Yellow Bartsia, Cock's-foot, Hogweed *Heracleum sphondylium*, Sea Champion, Thrift, Common Centaury, Buck's-horn Plantain, Heather, Lesser Trefoil, Procumbent Pearlwort, Dandelion, Cleavers, Violet (non-flowering), Scarlet Pimpernel, Sheep's-bit Scabious, Common Mouse-ear, Lesser Hawkbit and *Cladonia* sp. (a lichen). Surrounding scrub is largely Gorse-dominated.

E4.70 The results of the Phase 1 and botanical surveys show that the site supports a high diversity of habitats many of which have colonised in response to the various activities that have affected the site over the years.

E4.71 The mosaic of habitat in turn supports a high diversity of plant species and while most of these species are widespread and common the site supports three plants that are considered to be rare in Cornwall; Chamomile, Smith's Pepper wort and Mossy Stonecrop *Crassula tillaea*. All of these species are characteristic of open, disturbed habitats.

E4.72 Given the good diversity of habitat and thereby species found within the site and the presence of three rare species, the site has been assessed as being of County interest for its botanical value.

### **Intertidal survey**

E4.73 Surveys of the inter-tidal habitats (they are between spring low and high tides) extend back to 2003 when assessment was carried out by Cornwall Environmental Consultants Ltd. The surveys were repeated in 2004 by Sarah Welton who established a series of permanent quadrats across the site. These were surveyed again in 2006 and most recently in July 2010. The results of the 2010 surveys are reproduced in Appendix E7.

E4.74 The 2010 survey employed the same methods that were used in previous monitoring. The survey was carried out in accordance with the standardised and nationally accepted protocols (Ref 11).

E4.75 The biotopes (habitats) that were identified in the previous surveys were confirmed as being present by the 2010 survey. An additional lower shore

biotope was also recorded. When compared to the previous surveys some changes in the extent of the various biotopes were found changes that are most likely to be in response to the natural movement of sediment within the beach.

- E4.76 The biotopes assigned to Carlyon Bay are considered to be 'common' or 'very common' with the exception of biotope LR.FLR.Eph.EntPor, which is considered scarce. The LR.FLR.Eph.EntPor biotope is ephemeral in nature influenced by sand scour and its extent was found to have increased when compared to the earlier surveys.
- E4.77 While the inter-tidal habitats have changed in extent, the overall diversity has changed very little and therefore these habitats are assessed as being of District importance only.

### Biodiversity Action Plan habitats and species

- E4.78 Carlyon Bay supports a number of UK Biodiversity Action Plan habitats that are also reflected in the Cornwall Local BAP. For habitats like mixed deciduous woodland, lowland heath and coastal sand dune the extent of these habitats is very limited. The open mosaic habitat on previously developed land comprised the greatest area covering much of both Crinnis and Shorthorn. Likewise the maritime cliff habitat stretches the entire length of the bay.

Table E4.8 Table 7, Section 41, National BAP and Local BAP habitats and species

Habitat/species	National/Local BAP habitats	National/Local BAP species	NERC Section 41 Habitats and species
Coastal Sand Dunes	√		√
Maritime cliffs and slopes	√		√
Lowland heath	√		√
Open mosaic habitat on previously developed land	√		√
Mixed deciduous woodland	√		√
Rivers	√		√
<i>Armeria maritime</i> Thrift			√
<i>Chamaemelum nobile</i> Chamomile CLBAP		√	√
<i>Anguis fragilis</i> Slow-worm		√	√
<i>Vipera berus</i> Adder		√	√
<i>Zootoca vivipara</i>		√	√

Habitat/species	National/Local BAP habitats	National/Local BAP species	NERC Section 41 Habitats and species
Common Lizard			
<i>Natrix natrix</i> Grass snake		√	√
<i>Nyctalus noctula</i> Noctule		√	√
<i>Rhinolophus hipposideros</i> Lesser horseshoe bat		√	√
<i>Rhinolophus ferrumequinum</i> Greater horseshoe bat		√	√
<i>Pipistrellus pygmaeus</i> Soprano pipistelle bat		√	√
<i>Plecotus auritus</i> Brown long-eared bat		√	
<i>Pyrrhula pyrrhula</i> subsp. <i>Pileata</i> Bullfinch		√	√
<i>Prunella modularis</i> subsp. <i>occidentalis</i> Dunnock		√	√
<i>Larus argentatus</i> subsp. <i>argenteus</i> Herring gull		√	√
<i>Passer domesticus</i> House Sparrow		√	√
<i>Turdus philomelos</i> subsp. Song Thrush		√	√
<i>Muscicapa striata</i> Spotted flycatcher		√	√

### Baseline Summary

E4.79

The ecological interest of Carlyon Bay is summarised in Table E4.9 below. This assessment is based upon the significance criteria set out above and where applicable the published literature.

Table E4.9 Ecological summary

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<b>Ecological Receptor</b>	<b>Value</b>
Breeding birds	District
Bats	District
Invertebrates	National
Reptiles	County
Habitats/botanical interest	County
Intertidal habitats	District
Habitat and species assemblage	County
Regionally Important Geological Sites	Regional/County

E5.0

## Potential Effects

### Introduction

E5.1

In the following sections the potential impacts of the development are considered for each ecological receptor identified in the baseline summary. The impacts are broken down into those that will be apparent during the construction process and those arising during the operational phase, post construction. The potential impacts are considered in the **absence** of mitigation which is detailed in the next section.

### During construction

#### Breeding birds

E5.2

There is the potential to disturb or injure breeding birds during construction and thereby commit an offence. In the absence of mitigation and avoidance the potential impact must be considered to be high. Table E5.1 shows the potential impact for the key species that have been recorded on the site.

Table E5.1 Potential Impact for key Breeding birds

Herring gull	Confirmed breeding High/medium conservation status Section 41 NERC Act, UK Biodiversity Action Plan	18 breeding territories rocky cliffs above Shorthorn. Potential for temporary disturbance during construction phase. Potential for a more significant impact should the works be proposed to stabilise the cliffs affect their breeding habitats. Impacts are considered avoidable.
House sparrow	Probable breeding High/medium conservation status Section 41 NERC Act, UK Biodiversity Action Plan	Two probable breeding territories in Crinnis Bay. Potential for disturbance during the construction phase. Impact is considered to be avoidable. Permanent loss of habitat would be considered to be significant and permanent.
Song thrush	Probable breeding High conservation status Section 41 NERC Act, UK Biodiversity Action Plan	This species was observed in all areas of the site with four probable breeding territories being found, one in Crinnis, two in Shorthorn and one in Polgaver. Potential for disturbance during the construction phase. Impact is considered to be avoidable. Permanent loss of habitat would be considered to be significant and permanent.

Bullfinch	Probable breeding Medium conservation status Section 41 NERC Act, UK Biodiversity Action Plan	Another species whose primary breeding habitat on the site is in woodland and dense scrub. A probably breeding site was identified in Shorthorn Bay. Potential for disturbance during the construction phase. Impact is considered to be avoidable. Permanent loss of habitat would be considered to be significant and permanent.
House martin	Probable breeding Medium status	20+ breeding territories on the semi-derelict buildings in Crinnis. These buildings will be lost to the development; there is the potential for disturbance to nest sites during the construction phase which could be avoided. Without mitigation/compensation there is a potential impact through the permanent loss of breeding habitat
Dunnock	Section 41 NERC Act, UK Biodiversity Action Plan	Two probable breeding territories in Crinnis. Potential for disturbance during the construction phase, or clearance of scrub or woodland. Impact is avoidable.
Sandwich tern	Birds Directive – Annex 1	Sandwich terns were observed along the beach and foreshore. Breeding considered very unlikely. No significant impact.
Spotted flycatcher	Section 41 NERC Act, UK Biodiversity Action Plan	Observed in woodland at Polgaver but not holding a breeding territory. No impact is anticipated.

- E5.3 The level of scrub clearance associated with the development is minimal and will not result in significant loss of breeding bird habitat. The woodland and scrub is mainly associated with the cliff and undercliff areas which in most areas will be maintained. The largest area of woodland scrub is within Polgaver and a significant proportion of this will be retained and managed in the long term for nature conservation purposes.
- E5.4 The main loss of breeding habitat will be for house-martin that currently nest in the derelict buildings within Crinnis. This impact is unavoidable however compensation is possible and success highly likely (see mitigation section).
- E5.5 Those species associated with the cliff habitats have the potential to be affected by the cliff stabilisation works. Works involving netting will be minimised. In the absence of mitigation the works may have an impact upon breeding sites depending upon the extent and the location of the works. The breeding bird populations are considered to be of District importance and include eight species that are either of conservation concern/Section 41 of the NERC Act 2006. Furthermore all species of bird are protected under the Wildlife and Countryside Act 1981 while nesting. In the absence of mitigation the potential impact upon the breeding bird assemblage is considered to be Substantial adverse. The impact identified here can be mitigated or compensated for (see mitigation section).

**Bats**

- E5.6 The bat roosts that are currently present within the Coliseum will be lost when the structure is demolished. The structure of the building is already in poor condition and rapidly deteriorating. It is therefore likely that these roosts will be lost in the near future whether or not the site is re-developed. None the less the demolition of the Coliseum will need to be justified under the terms of the tests contained within Section 53 of the Habitat Regulations 2010 (ref 12) and a European Protected Species license will need to be secured from Natural England.
- E5.7 The re-development of Carlyon Bay has the potential to affect the use of the cliffs as commuting routes by bats. There is evidence in the literature to show that commuting routes can be disrupted as a result of habitat severance. Some observations have shown that removal of only small gaps in hedgerows can prevent some species from using the feature as a commuting route. In this case the cliffs are a topographical feature in the landscape and it is unlikely that changes in vegetation will have such a severe impact as the example quoted, as the topographical features will remain. So, for example the clearance of an area of cliff during cliff stabilisation work may result in changes to vegetation but the feature that is used for pilotage (the cliff face) will remain intact and can still be used by bats for navigation.
- E5.8 At this stage, it is not proposed to place any buildings directly against the cliff face and the current ribbon of vegetation will remain along the cliff face and the under cliff area. Therefore no impact is anticipated arising from the construction of buildings.
- E5.9 It is likely that areas of the construction site may require lighting at night for reasons of health and safety. Bats are known to be susceptible to light pollution. While some species are attracted to lit areas, feeding on insects that are attracted to lights other species appear to avoid artificial lighting. Horseshoe bats are considered to be species that generally avoid areas that are lit at night – however the effect has not yet been quantified and research is currently being carried out at the University of Bristol into the effect.
- E5.10 In the absence of mitigation there is the potential that roosting opportunities could be lost and that feeding and/or commuting behaviour could be affected. Given that the site is considered to be of District level importance for bats and the loss of roosts are not likely to affect breeding success in the locality the impact upon bats during construction is categorised as being Minor Adverse.

**Invertebrates**

- E5.11 A number of habitats are considered to be of importance for the invertebrate populations. The stands of willow in Polgaver support the moth *Chrysoclista lathamella* (proposed for Endangered (RDB1) status) and the weevil *Temnocerus tomentosus* (Nationally Scarce (Nb)). Both are new records for Cornwall. The moth requires trunks of mature willows whereas the weevil requires foliage and branches.

- E5.12 The open grassland mosaic that has developed in Shorthorn now supports three beetles (flea-beetle *Ochrosis ventralis* (RDB3)), and the Nationally Scarce (Nb) weevils *Catapion pubescens* and *Sibinia primita*) as well as other species that are of infrequent occurrence. As well as needing their host plants these species require open, sunny, well-drained soils with extensive bare ground.
- E5.13 Heathland is also considered to be an important component and the leaf-beetle *Calomicrus circumfusus* (Nationally Scarce (Na)) was recorded on gorse associated with the cliffs.
- E5.14 The small areas of wetland within Crinnis and Shorthorn and other ephemeral pools across the site are also considered important. These areas will be lost during the construction period. The wet area in Crinnis supports the Nationally Scarce (Nb) beetle *Lathrobium angustatum*. While the ephemeral pools in Shorthorn do support the Nationally Scarce (Nb) diving-beetle *Hydroglyphus geminus*, these habitats are considered to be less important as this species is, despite its designation, widespread and fairly common.
- E5.15 In the absence of mitigation where no avoidance of key habitats were considered and no compensatory habitat were put in place the development of Carlyon Bay would be likely to have a Substantial adverse impact upon the invertebrate interest of the site.

### **Reptiles**

- E5.16 The reptile populations within Carlyon Bay are concentrated within the undercliff area and within Polgaver. Nonetheless reptiles are present within the open mosaic habitat which has developed within Shorthorn and to a lesser extent within Crinnis.
- E5.17 During the construction period, there is the potential for reptiles to be killed or injured which would be contrary to the protection they receive under the Wildlife and Countryside Act 1981. Mitigation measures will be required in order to prevent an offence being committed (see Mitigation section below). In the absence of mitigation the impact upon the reptile assemblage is like to be Substantial adverse.

### **Maritime Cliffs**

- E5.18 Works are required to areas of the cliffs in order to ensure that they are safe and stabilised. During the stabilisation process the cliffs will be stripped of vegetation, loose material removed and netting placed over the cliff and bolted into position. Much of the vegetation within the areas will be lost during this process but netting areas will be hydro seeded to promote new growth.
- E5.19 By definition the cliff stabilisation works will be required on those areas which are unstable. These areas suffer from frequent rockfalls and movement of the substrate, which causes continual disturbance to the vegetation. These unstable areas are often bare of vegetation or support vegetation that is in the early stages of colonisation. The cliff stabilisation works would therefore have

a similar impact to the natural processes that occur continually within the less stable areas of the cliffs. Unlike natural falls, the works can be timed and carried out in such a way as to minimise the impact upon the flora and fauna of the cliffs (see Mitigation below).

- E5.20 In the absence of mitigation the likely impact upon Maritime Cliff habitats is considered to be Moderately adverse.

### **Habitat Mosaic and Botanical interest**

- E5.21 The construction process will result in the loss of much of the open mosaic habitat that currently occupies much of both Crinnis and Shorthorn. These habitats support a number of rare or scarce species that in the absence of mitigation will also be lost during the construction phase.
- E5.22 The main impact will be apparent within Shorthorn where the footprint of the development will result in the loss of a small section of broad-leaved woodland and heathland. While the extent of the impact is limited, both of these habitats are National BAP Habitats.
- E5.23 The construction will also require the realignment of the course of the Sandy River and the loss of the existing habitat and species that are currently present. This loss is not considered significant as this habitat comprises species that are adapted to change and the species that are currently present are likely to rapidly recolonise the new course of the River.
- E5.24 In the absence of mitigation, the overall impact upon the mosaic habitat and the botanical interest across the site can be considered to be Moderately adverse as the works will result in the loss of a significant area of National BAP habitat.
- E5.25 Within Polgaver, impacts associated with construction are limited to the area associated with the Japanese Knotweed storage pile where the tennis courts will be sited. Other construction works associated with the provision of low-level recreation for example introduction of board walks will be integrated in the proposed management of Polgaver for nature conservation and will therefore be designed to have minimal negative impact upon the habitat structure. Where habitat structure is changed it will be to achieve ecological management objectives, for example creating clearings to improve habitat for reptiles. (see Mitigation below).

### **Intertidal Habitat**

- E5.26 There are no works associated with the proposal that will extend into the intertidal zone and therefore no direct impact upon these habitats is anticipated.
- E5.27 During the construction period there is a risk of sediment or accidental contamination reaching the marine environment from, for example, works to the Sandy River or accidents with, for example, fuel oils or other hazardous materials. While these impacts, if they were to occur, would be considered to

be Substantially adverse, they are unlikely given modern working practices. The Construction Environmental Management Plan will cover such eventualities to prevent contamination. Such an impact would require the breakdown of protocol and systems designed to protect the wider environment and would likely to be short-lived, as mitigation measures would also be put in place to reduce the impact of such an occurrence.

- E5.28 Impacts upon the inter-tidal habitats during construction are considered to be Neutral.

### **Geological interest**

- E5.29 Of the two RIGS, only the westerly one is likely to be affected by the proposed development. The impact will however be limited to the effects of cliff stabilisation works which will be required in the area of the western RIGS. This will cause some damage to the RIGS as the work will require loose material to be removed. Whilst this may cause new areas of rock to be exposed, it will not damage the interest of the RIGS.
- E5.30 The impact on the RIGS is likely to be short term and can be mitigated (see below). In the absence of mitigation there is likely to be a Minor adverse impact upon the Western RIGS during construction. Crinnis rock will not be affected by the works.

### **After Completion**

#### **Breeding Birds**

- E5.31 The breeding bird populations are mainly associated with the cliffs and the woodland/scrub of Polgaver. Post construction there is the potential for continued disturbance from increased numbers of people accessing the beach. Due to the design of the site the increase in human activity will tend to be focused on the beach-front. Activity close to the cliffs will tend to be limited to service vehicles rather than being a public thoroughfare. Disturbance will therefore be limited. Within Crinnis the taller buildings will be situated towards the north of the site and will shelter the cliffs in much the same way as the existing Coliseum does now. Balconies from the taller buildings will face towards the sea rather than the cliffs and will not cause any additional disturbance to nesting birds.
- E5.32 In Shorthorn the density of development is much lower than in Crinnis and again human activity will generally be focused on the sea front rather than the cliff area.
- E5.33 Polgaver is likely to see the lowest level of change, as this area will be used for low level recreation only and through public access is likely to increase, the impacts are likely to be localised.
- E5.34 Lighting associated with the development may also cause long-term impacts upon nesting birds. While some species habituate to increased illumination,

other species are less tolerant and there can be impacts upon mating behaviour, feeding and crepuscular activity. The precise level of impact is unknown as full data is not available for each species found within the site. Mitigation through good lighting design however is likely to be successful (see below).

- E5.35 The close proximity of building to the cliff face in Shorthorn is likely to cause permanent changes to the use of the cliffs by marine birds that nest in this area. The buildings will cause shading to the cliffs that could affect the breeding environment. The presence of the buildings close to the nest sites may also affect flight paths into nest sites that could deter sea birds from nesting in this area. In addition (depending upon the precise layout for these buildings) there may be disturbance that would also affect breeding birds on the cliffs.
- E5.36 In the absence of mitigation the long-term impact upon the nesting bird assemblage is like to be Moderately adverse.

### **Bats**

- E5.37 The long-term impact upon bats is likely to be associated with changes to lighting levels and habitat structure. In the long term, the area of cliff stabilisation works will re-colonise with new vegetation maintaining feeding habitats within the site. Equally the landscape planting will provide new habitats that in turn will provide feeding habitats for bats.
- E5.38 The commuting corridor along the cliffs and the undercliff area will be maintained and potentially improved by the landscape planting that will increase the width of the corridor in places (see mitigation below).
- E5.39 In the absence of mitigation, the long-term impact upon bats is likely to be neutral/negligible as the landscape will continue to provide the structure and function for these species.
- E5.40 In the long term it is likely that the new structures that will be introduced as part of the development and the associated mitigation for bats (see mitigation below) will provide additional roosting sites for bats that will compensate for the loss of the current roost site.

### **Invertebrates**

- E5.41 The impact upon invertebrates arising from the operation of the site is likely to be limited. Polgaver, which will be largely managed for nature conservation, is likely to retain its invertebrate interest. Increased lighting levels may have some impact upon some groups particularly night flying species. This may cause a shift in invertebrate populations present on the site however the nature and degree of such shift is uncertain.
- E5.42 Given that the level of impact is uncertain, and given the high value of the site for invertebrates, it is considered appropriate that a worse case be assumed in line with the "precautionary principle". Therefore in the absence of mitigation it

is assumed that the impact upon invertebrates from the operation of the site is considered to be Moderately adverse.

### **Reptiles**

- E5.43 The operational phase of the project is unlikely to present additional risk to the reptile populations on the site. While increased disturbance can have an adverse impact upon reptiles the fact that the reptile populations are concentrated along the cliff and under-cliff area and human activity is focused on the beachfront means that disturbance is unlikely to be significant.
- E5.44 Within Polgaver, however, there is a greater risk of disturbance of reptiles because of the emphasis on low-level recreation within this bay. Slow worms can be vulnerable to repeated handling as the loss of the tail (as a defence mechanism) can affect survival and breeding success. Common Lizard are less vulnerable as they are much more difficult to catch.
- E5.45 While vehicular traffic will be limited within the site to certain routes, there is the potential for reptiles to be killed or injured on the road network within the site. In the absence of mitigation there is the potential that over time road kill could adversely affect reptile numbers particularly in Crinnis where the majority of traffic will be concentrated.
- E5.46 In the absence of mitigation the impact of operational phase upon reptiles is considered to be Moderately adverse.

### **Maritime Cliffs**

- E5.47 The main impact upon the maritime cliffs during the operation phase is likely to be within those areas that are subject to cliff stabilisation works. Following stabilisation the cliffs will progress through serial succession from open ruderal grassland comprising primary coloniser species, to more stable acid grassland and through to vegetation that is typical of more stable cliff environments. Each of these successional stages has ecological value. The initial stages are generally more dynamic and this is where the highest species diversity generally occurs. Later as the system becomes more stable the species diversity is likely to fall. On the stabilised area the climax community is likely to be a heath-dominated community modified by the exposed maritime conditions.
- E5.48 Under natural conditions the maritime cliffs would be subjected to frequent disturbance by rock falls that would reset the successional process. This will no longer occur in the stabilised areas.
- E5.49 The extent of this impact will be confined to the stabilised areas which may be significant in the context of the beach, but is not significant when considered in the context of the parish or the district. These habitats are widespread within the locality.
- E5.50 Within Shorthorn, changes to the maritime cliff habitats are likely to arise from the increased shading created by the taller buildings that will be sited in front of the cliffs. The increase in shading will lead to changes in micro-climate which

will cause a shift in the plant communities within this locality. It is likely that the increased shade will result in a shift in community structure towards those communities that are more adapted to shade and higher humidity levels and, for example, conditions that are more suited to mosses or ferns are likely to prevail. While the plant communities may change it does not follow that their ecological value will be diminished. This impact is considered to be Neutral.

- E5.51 Overall, the impact of the development upon the Maritime Cliffs during the operational phase is considered to be Minor adverse.

### **Habitats/botanical interest**

- E5.52 The main influence on habitats associated with the post construction phase will be the colonisation of newly created habitats associated with the new development and management of these habitats in the long term (see Mitigation). In the absence of mitigation these habitats will progress through a serial succession as described above. Much of the current botanical interest is associated with those habitats that have recently been colonised. Similar habitats will be created as part of the development, however as these become established and stable it is likely that species diversity will start to decline.
- E5.53 The habitats present within Polgaver have already become less suitable for certain species due to the lack of active conservation management. The dense woodland/scrub for example has few areas within it that are suitable basking sites for reptiles. In the absence of mitigation the situation will decline further as the scrub spreads through the bay.
- E5.54 The creation of the soft sea defences in Shorthorn and Polgaver will result in additional areas of sand dune being created. It is an integral part of these sea defences that these dunes are stabilised using Marram grass (*Ammophila arenaria*) and other species will colonise naturally. The extent of sand dunes within the site will therefore be expanded as a direct result of the development.
- E5.55 In the absence of mitigation some habitats will decline in ecological value during the operational stage of the scheme. Other habitats however will expand and become established. Balancing these two effects it is likely that in the absence of mitigation the post construction impacts will be Minor adverse or Neutral.

### **Intertidal zone**

- E5.56 The post construction phase of the project is unlikely to create any additional impacts upon the intertidal habitats. There will be no discharges to the marine environments and there are no anticipated changes to the coastal processes arising from the sea defences.
- E5.57 The increase in visitors to the beach arising from the scheme may have impacts upon the rocky habitats found along the beach arising from, for example, 'rock pooling' by children. These habitats are currently subjected to such activities, and they are by their nature habitats that are adapted to high

levels of natural perturbation. The additional impacts upon the inter-tidal habitats are therefore not considered to be significant.

E5.58 As part of the management of the site, the beach will be managed more closely than it currently is. Litter will be removed from the beach more frequently and disposed of accordingly. There is, however, no plan to regularly sweep the beach and therefore the strandline habitats will not be affected by the development.

E5.59 In the absence of mitigation the impact upon inter-tidal habitats are considered to be Neutral.

### **Geological Interest**

E5.60 No long term impacts upon the RIGS are anticipated. The impact is therefore considered to be Neutral.

## E6.0 Mitigation Measures

### Introduction

- E6.1 Mitigation is defined as those measures that are designed to reduce or avoid an impact. Mitigation measures can be wide ranging from changes to the design to simply carrying out certain activities at specific times of year, for example, avoiding the bird breeding season. Compensation involves measures that are required to balance residual impacts that remain once mitigation has been taken into account.
- E6.2 Ecological mitigation and compensation are an integral part of the design, construction and implementation of the new scheme. A comprehensive ecological mitigation strategy will be developed in accordance with the landscape and ecology parameters as detailed proposals are brought forward for the outline part of the site and to address each of the impacts that have been identified. The key to the approach has been to design biodiversity into the masterplan for the scheme as part of an iterative process and to ensure that newly created habitats are managed in the appropriate way to maintain high levels of biodiversity.
- E6.3 As well as designing biodiversity into the fabric of the development, ecological mitigation will be provided by the production and implementation of a Construction and Environmental Management Plan ('CEMP') and a Landscape and Ecology Management Plan ('LEMP'). A framework for the ecological aspects of the LEMP is set out in Appendix E10.
- E6.4 The CEMP will ensure that ecological and other environmental protection is integrated into the construction process. The CEMP will include details on ecologically sensitive areas and how they are to be protected, procedures for site clearance, specification for ecological fencing (e.g. reptile fencing), etc. The CEMP procedures will be supervised by an Ecological Clerk of Works ('ECoW') who will be integrated into the construction team.
- E6.5 The LEMP will set out the long-term management of the landscape and habitats that will be created within the development. For example, the LEMP will set out the ecological management of Polgaver that will ensure appropriate management for invertebrates and reptiles. The LEMP will be subject to periodic review based on monitoring of habitats and species.
- E6.6 Specific mitigation relating to each receptor is detailed below.

### Breeding Birds

- E6.7 In almost all cases, the impact on breeding birds can be avoided by ensuring that all works to clear vegetation including grassland, dunes, scrub and woodland or works that will affect rocky cliffs, streams and banks are undertaken in the autumn and winter outside the bird breeding season (generally March to September). All breeding birds are protected under the

Wildlife and Countryside Act 1981 and avoidance of the breeding season would be required.

- E6.8 Works to cliffs, for the purpose of stabilisation for example, will be planned to both avoid an impact during the breeding season and to retain suitable breeding sites.
- E6.9 In the event that clearance works cannot avoid the breeding season the area affected will be searched for signs of nesting activity by suitably qualified ecologists. Works will not proceed until any nesting activity is deemed to be over.
- E6.10 In this way the impacts upon breeding birds can be avoided and the impact is therefore considered to be Neutral.
- E6.11 As part of the development new nesting opportunities will be incorporated into the design of the new buildings. In this way the loss of nest sites from the demolition of the Coliseum will be compensated for and nesting opportunities for species like house martin will be maintained and opportunities for species such as house sparrow will be increased.
- E6.12 The sustainable approach to the design of the scheme will also ensure that lighting is designed in such a way as to ensure that key nesting sites such as the cliffs are not illuminated and the scheme generally is subject to only low level lighting. Any impact upon the breeding bird assemblage will therefore be avoided.
- E6.13 The potential loss of sea bird breeding sites in Shorthorn due to the close proximity of the buildings to the cliffs is likely to preclude nesting of the birds from this area permanently. Compensation for the loss of these nesting areas can be provided by creating appropriate nest sites on the new buildings in areas that are not subject to disturbance and will not cause a nuisance to residents. Such compensation is likely to be successful and will fully compensate for the loss of nest sites on the cliffs. This impact can therefore be made Neutral.
- E6.14 The impact upon nesting birds from increased visitor pressure is not considered to be significant and new habitats created as part of the development will increase the carrying capacity of the site for certain species. Furthermore, any impact from disturbance of nesting birds can be compensated for by the provision of interpretation boards which will increase visitor awareness of the importance of the site for these species and the legal protection they receive. Within Polgaver access will be zoned so those areas toward the cliffs remain undisturbed.
- E6.15 Taking into account the proposed avoidance, mitigation and compensation there is likely to be a Minor short-term impact upon breeding birds associated with the loss of nest sites within the existing buildings. Post Construction the impact is likely to be Neutral as new nest sites are created as part of the development.

**Bats**

- E6.16 The impacts that have been identified for bats are loss of roosts within the Coliseum, potential impact on commuting routes and impact of lighting. The loss of the roosts can be mitigated by the provision of new roosting opportunities within the new structures. Provision of new roost sites is common practice and the subject of various pieces of guidance from organisations such as the Bat Conservation Trust (e.g. Ref 16). The loss of a roost site will need to be the subject of a European Protected Species license from Natural England that will allow derogation from the protection that these species enjoy. The licence application must include full details on how the loss will be mitigated. The mitigation will create new bats roost sites that will be maintained in the long term and not subject to the continual degradation.
- E6.17 Other impacts on bats will be fully mitigated by careful design of the development and associated landscaping. The commuting corridor that comprises the cliffs and the under-cliff area will be maintained by a stand off zone at the base of the cliff. This corridor will not be a regular thoroughfare and will therefore be left undisturbed allowing bats to continue to use it as a commuting route.
- E6.18 The lighting of the site will be designed to minimise the impact upon bats (and invertebrates, see below). The cliff face and the under-cliff area will be kept dark and will not be lit artificially except where absolutely necessary. Lighting design will follow the guidance set out by the BCT and the Institute of Lighting Engineers (Ref 17) and will be in accordance with the lighting strategy.
- E6.19 It is anticipated that the impact upon bats can be fully mitigated and the impact upon these species will be Neutral.
- E6.20 Bats and their roosts are protected under the Habitat Regulations 2010 (Ref 19) and Wildlife and Countryside Act 1981 (Ref 20). Regulation 9 of the Habitats Regulations place a duty upon the local authority in exercising its duties to have regard to the Habitats Regulations. The duty has been clarified by case law (Ref 21). In order to assist Cornwall Council in meeting the duty a regulatory assessment has been produced that sets out the legal requirements for the protection of bats and how these can be met in this case. The assessment is to be provided under separate cover.

**Invertebrates**

- E6.21 The key habitats associated with the invertebrate populations such as those at the woodland within Polgaver, the wetland habitats along the under-cliff and the areas of heathland will be retained and protected during the construction period. Impacts upon invertebrates within these areas will therefore be avoided.
- E6.22 The development of the design included the creation of significant areas of brown and green roofs that are designed to compensate for the loss of the open mosaic habitat. The same substrate that currently supports the mosaic

habitats will be used to form the brown roofs. The substrate will contain an existing seed-bank that will allow for rapid re-colonisation of the substrate. The brown roofs provide ideal conditions for those invertebrates that have been identified as being of high conservation value. Other habitats at ground level such as the soft sea defences and formal landscaping will also provide habitat for invertebrates.

- E6.23 The management of the brown roofs will be included within the LEMP and as the roofs become colonised they will be managed to ensure the optimal conditions for invertebrates.
- E6.24 The overall landscape design has been led by the need to maintain and enhance the biodiversity. The habitats that will be created and managed such as wetland and standing water, heathland and willow scrub will maintain the interest of the site for some of the key invertebrates.
- E6.25 Given the value of the site for invertebrates one of the main objectives of the LEMP will be to maintain and enhance the invertebrate diversity within the site and management of retained habitats will reflect this objective.
- E6.26 The likely success of the proposed compensation and mitigation is considered to be high. Many of the important species that have been identified during the surveys are primary colonisers and are likely to become quickly established on new habitats. The phased nature of the building programme will mean that new sites can be colonised from areas that are yet to be built upon.
- E6.27 While it is possible that there could be some changes in the invertebrate assemblages arising from the scheme it is considered likely that the current level of interest found within the site will be maintained. Taking into account the proposed mitigation/compensation the likely impact upon the invertebrate assemblage is likely to be Minor adverse.

### **Reptiles**

- E6.28 The three reptiles present on the site are all protected under the Wildlife and Countryside Act 1981 for killing and injuring only. In order to avoid an offense under the Act it will be necessary to repeat the reptile translocation that was carried out on 2006. While the reptile fencing is partially intact much of the fencing is damaged and therefore not effective. The fencing will therefore be reinstated and a translocation carried out.
- E6.29 Allied to the translocation, retained habitat will be managed to improve condition for reptiles. For example the LEMP will include targeted clearance of some of the dense scrub in Polgaver to create the basking sites that have been lost over the past 4 years. Once the construction phase is complete selected areas of the reptile fencing will be removed to allow reptiles to colonise the newly created habitats such as the sand dunes associated with the soft sea defences.
- E6.30 As part of the LEMP, interpretation information to explain to visitors the importance of the site ecology and how the site is being managed for

biodiversity will be established. The interpretation will include information on the reptiles and the need to avoid disturbing them as much as possible.

- E6.31 With the proposed mitigation and compensation ensuring the protection of the existing population, improving and managing habitat in the long term the impacts upon the reptile population are considered to be minor adverse during the construction phase and Neutral in the long term.

### **Maritime Cliffs**

- E6.32 As identified in the impacts section, the cliff stabilisation works will result in changes to the maritime cliff habitats. For the most part these changes mimic the natural processes that occur on unstable cliffs. Mitigation of the impact is based on ensuring that post construction the cliffs are allowed to re-colonise naturally. This will ensure that the plant communities currently present on the cliffs are maintained in the long term.
- E6.33 As for previous cliff stabilisation, the clearance work will be carried out to avoid the bird breeding season. The construction team will be briefed by the ECoW to look out for reptiles during the work and where necessary remove the reptiles from harms way.
- E6.34 Long-term changes to vegetation have been identified associated with the impact of shading and change to microclimate associated with the construction of the buildings within Shorthorn. These changes to vegetation are not considered to be significant and therefore mitigation is not considered necessary.
- E6.35 Taking into account the mitigation, the cliff stabilisation works are considered to have a Moderate negative impact during the construction phase and be Neutral in the post construction phase.

### **Habitats**

- E6.36 The habitats that will be lost to the development, in particular the open mosaic communities will be partially compensated for by the creation of brown roofs on the buildings. Creation of sand dunes associated with the soft sea defences, soft landscaping and other habitats within the built environment will also further compensate for the loss of habitat.
- E6.37 The newly created habitats will be managed under the terms of the LEMP, which will ensure that the biodiversity of each of the habitats will be maximised in the long term. Where natural colonisation causes the interest of the site to decline such as the invasion of unwanted scrub within Polgaver the long-term management will correct this.
- E6.38 With mitigation/compensation the construction impacts are considered to be Moderate adverse however in the long-term impact upon habitats is considered to be Neutral.

### **Inter- tidal**

- E6.39 The impacts upon the inter-tidal habitats are not considered to be significant and therefore mitigation/compensation is unnecessary. The intertidal area will however be included within the LEMP and this will ensure that the interest is maintained and, for example, the strandline is not over managed. Ecological interpretation will include the inter-tidal habitats and will provide information on how to enjoy the activities such as rock-pooling without causing damage to the resource.
- E6.40 The impact upon the inter-tidal habitat is considered to be Neutral.

### **Geological interest**

- E6.41 Where works will affect the western RIGS site and new areas are exposed a geological survey will be carried out before and after the works to record the existing exposure and any new geology that is revealed. The Cornwall RIGS group will be invited to keep a watching brief during the works.
- E6.42 Access to the RIGS will be maintained for the purposes of study and recording and the impact upon the interest is considered to be Minor adverse.

## E7.0 Residual Effects

### Introduction

E7.1 The mitigation and compensation proposed for the site is, in most cases, able to ensure that any ecological impacts are minimised to such a level that are Neutral or beneficial. Those impacts that are still present following mitigation/compensation are the residual impacts that will act upon the ecology of the site.

### During construction

E7.2 It is during the construction phase that the majority of the residual impacts are manifest. Most of these are short-term impacts associated with the site clearance and construction process.

E7.3 Minor residual impacts are anticipated for breeding birds arising from the loss of nesting sites within the Coliseum; in the long term however these nest sites will be replaced and expanded. Likewise the translocation of the reptiles will have a minor negative impact simply because the act of translocation will effect the population during the process.

E7.4 The main residual impact during construction is associated with the loss of the open mosaic habitat and the associated invertebrates. In the short-term this impact is considered to be a Moderate adverse impact; in the long-term however, the impact upon the habitat mosaic is considered to be compensated for by the creation and management of new habitats within the site.

E7.5 The cliff stabilisation works will also cause short-term impacts that cannot be fully mitigated. In the long term the natural colonisation of the sites will mean that the impact is Neutral.

### After Completion

E7.6 The area where there is the potential for residual impacts which could be apparent in the long term is the effect upon invertebrates. The habitat creation works, in particular the brown roofs and the new dune areas, will provide significant compensatory habitat. The management of the site through the LEMP will also ensure that interest areas for invertebrates are maintained. There is however an element of doubt as to where these measures will fully protect and enhance the value of the site for invertebrates. While it is considered likely that mitigation/compensation will work, because of the element of doubt, it has been assumed that there will be a Minor negative impact upon the invertebrate interest of the site.

E7.7 Ecological monitoring will be an integral part of the LEMP and through survey work the ecological management of the site can be refined to ensure the maximum gains for the invertebrate interest. This process of monitoring and

review offers the opportunity to ensure that any residual impacts are addressed as much as possible over time.

E8.0

## Summary & Conclusions

### Impact summary

- E8.1 The biodiversity interest of the site has been thoroughly assessed by extensive surveys carried out during 2009 and 2010. The value of each ecological receptor on the site has been assessed and quantified in accordance with published guidelines. Where assessment criteria are not available the professional judgement of ecology team has been called upon to provide an evaluation based upon their extensive experience.
- E8.2 Significant ecological interest has been identified ranging from Nationally important invertebrate assemblages to receptors that are considered to be of local or district interest.
- E8.3 For each receptor the likely impacts arising for the construction and operational phases have been assessed and where possible mitigation and compensation suggested that can fully offset the identified impact. In all but one case mitigation/compensation is considered to be possible with a high likelihood of success.
- E8.4 In the case of the invertebrate interest, a precautionary approach has been adopted, as it is not known if the proposed mitigation can fully mitigate the potential impacts. While mitigation proposed is comprehensive the complex nature of the assemblage and the rarity of the species present means that a residual impact remains. Monitoring will be required to assess the overall success of the mitigation measures. The impact upon the biodiversity of the site are summarised in Table 8.1.

Table E8.1 Ecological Impact Summary

Ecological receptor	Value Identified	Impact before mitigation	Impact with mitigation	Long term residual impact.
Breeding birds	District	Substantial adverse	Neutral	None
Bats	District	Minor adverse	Neutral	None
Invertebrates	National	Substantial adverse	Minor adverse	Precautionary assessment of minor adverse impacts as the likely success of mitigation is unknown.
Reptiles	County	Substantial adverse	Neutral	None
Habitats/botanical	County	Moderate	Neutral	None

Ecological receptor	Value Identified	Impact before mitigation	Impact with mitigation	Long term residual impact.
interest		Adverse		
Intertidal habitats	District	Neutral	Neutral	None
Geological Sites	Regional/County	Minor adverse	Minor adverse	None

### Comparison with the extant permission

- E8.5 The 1995 extant permission has a larger footprint to the proposed scheme. The extant permission does not, however, include any mitigation or compensation measures to balance the impact upon biodiversity nor does the extant permission include a landscape and habitat management plan. The ecological impact of the extant scheme is therefore considered to be far greater than the proposed scheme.
- E8.6 One of the key differences between the proposed scheme and the extant permission is the position and nature of the sea defences. The extant permission included the placement of exposed rock armour on the beach that would extend to within the boundary of the Western RIGS obscuring some of the geological interest. The proposed scheme offers a sea defence design that is set back away from the high water mark and also included more 'soft' defences that include creation of sand dunes and other habitats that will contribute to the maintenance of the biodiversity interest of Carlyon Bay. The extant scheme requires work below the mean high water line.
- E8.7 The proposed scheme includes a landscape design that had been primarily led by the need to mitigate and compensate the ecological impact. The proposed landscape scheme is comprehensive and aims to be an exemplar for combining biodiversity gains into the build environment. Furthermore the Landscape and Habitat Management Plan will ensure that the management of the site maintains the ecological interest and that through monitoring the site management is responsive to the changing ecology of the site.
- E8.8 The proposed scheme also allows for the implementation of a Construction Environmental Management Plan to ensure the implementation of mitigation measures during the period of construction.

E9.0

## Abbreviations

- 1 PPG - Planning Policy Guidance
- 2 PPS – Planning Policy Statement
- 3 BAP - Biodiversity Action Plan
- 4 ERCCIS - Environmental Records Centre for Cornwall and the Isles of Scilly
- 5 RIGS – Regionally Important Geological and geomorphological Sites
- 6 SSSI – Site of Special Scientific Interest
- 7 SINCS - Sites of Importance for Nature Conservation
- 8 AGSVs – Area of Great Scientific Value
- 9 NERC - Natural Environment Research Council
- 10 SAC – Special Area of Conservation
- 11 SPA – Special Protection Area
- 12 IEEM - Institute of Ecology and Environment Management
- 13 RDB - Red Data Book
- 14 CBC - ‘Common Bird Census’
- 15 CEMP - Construction and Environmental Management Plan
- 16 LEMP - Landscape and Ecology Management Plan
- 17 ECoW - Ecological Clerk of Works

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E10.0

## References

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- 2 Guidelines for Ecological Impact Assessment (IEEM February 2006)
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- 21 Judicial Review Judgment 5th June 2009: Woolley v Cheshire East Borough Council and Millennium Estates Limited