

Mumbles Coastal Protection Project

Preliminary Ecological Appraisal Report

Final Report

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Contract

This report describes work commissioned by Lee Selway, on behalf of AMEY Consulting, Jonathan Harrison of JBA - Consulting carried out this work.

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Purpose

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1 Introduction

1.1 Project background

JBA Consulting (JBA) were commissioned by Amey Consulting to carry out a Preliminary Ecological Appraisal (PEA) to inform the development of the Mumbles Coastal Protection project. This project forms part of the Welsh Governments Coastal Risk Management Programme. The project involves works to improve the of the existing Mumbles seawall to reduce the threat of coastal flooding and erosion risk. There is also the potential for the scheme to provide improvements to the existing promenade and surrounding amenity areas.

The survey was commissioned to update surveys carried out by ARUP at the Project Appraisal Report (PAR) stage and will identify any likely ecological constraint and propose mitigation measures in relation to the ecological receptors likely to be impacted as a result of the works. Furthermore, where applicable, recommendations for further surveys, such as specific species surveys, mitigation and ecological enhancements have been provided.

1.2 Site location

The site is located at Mumbles in the south west of Swansea bay. The proposed site extends from Knab Rock slipway in the southeast to Mumbles Road, Oystermouth Square and the Dairy Car Park to the North, the approximate central grid reference is SS616882 (Figure 1-1). The existing seawall comprises of sections of vertical wall and a sloping revetment and is approximately 1.1km long. The wall is mass concrete, and the revetment is masonry encased in concrete.

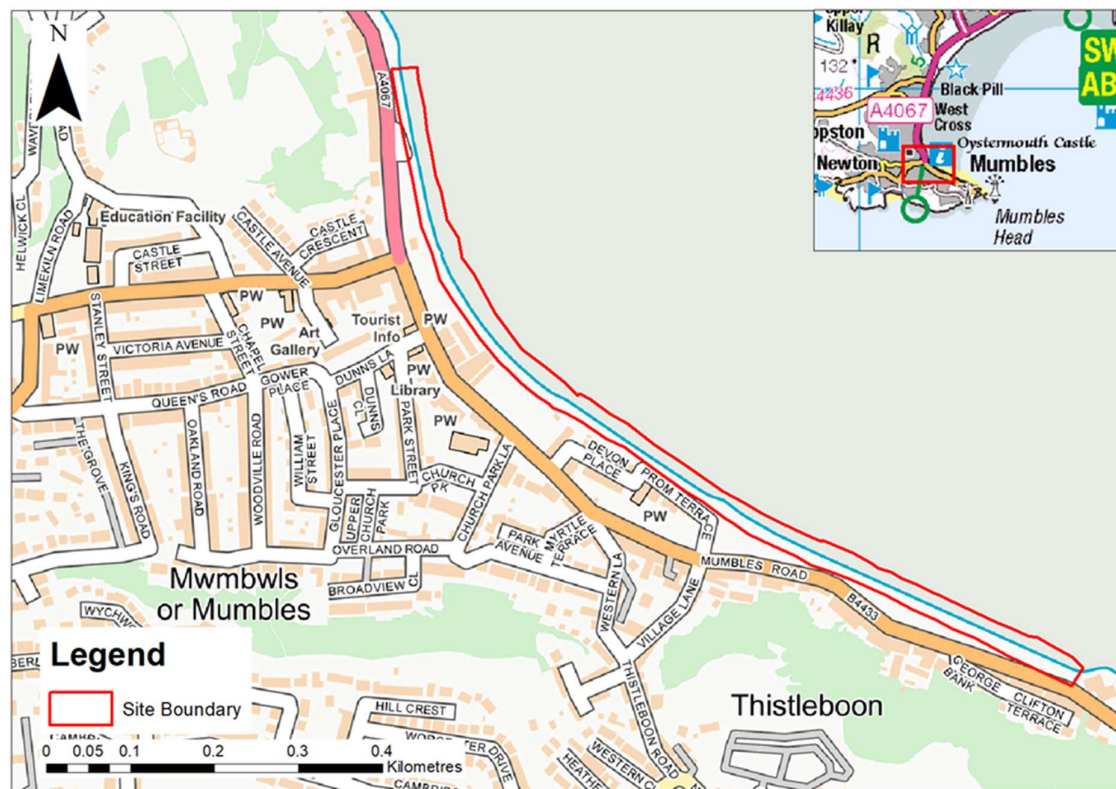


Figure 1-1: Site Location

2 Methods

A PEA of the site has been undertaken in line with current best practice guidance (CIEEM, 2017) and included:

- A desk-based assessment to identify any records of protected and/or notable habitats and species, and designated nature conservation sites in the vicinity of the proposed works.
- A site survey comprising a Phase 1 Habitat Survey including and an assessment of the possible presence of protected or priority species, and (where relevant) an assessment of the likely importance of habitat features present for such species.
- An assessment of the potential impacts of the works on the habitats and species present at the site and the surrounding areas.

2.1 Desk-based assessment

Prior to undertaking the site survey, searches of databases containing ecological records, priority habitats, and information on statutory and non-statutory designated sites were made. The following sources were included in these searches:

- MAGIC mapping service (www.magic.gov.uk)
- Natural England GIS data (www.gis.naturalengland.org.uk/pubs/gis/GIS_register.asp)
- South East Wales Biological Records Centre (SEWBRc)

A standard 2km search area from the works area was used for the desk-based assessment and species records requests. This zone of influence is a method to choose which protected sites to look at within the study area. However, this was expanded where necessary to consider marine receptors in the wider Swansea Bay and Severn Estuary. This was also carried out in line with a coastal processes assessment to assess if impacts further afield of this standard search area were anticipated.

2.2 Site survey

A site survey was undertaken on 3rd July 2020 by Jonathan Harrison MCIEEM. The survey included the length of the proposed scheme.

The PEA was based upon a Phase 1 Habitat Survey, conducted following the Joint Nature Conservation Committee (JNCC) survey methodology (JNCC, 2010). The method was extended to identify any features suitable for use by legally-protected or notable species and locate evidence for their presence or likely absence based on standard techniques.

2.2.1 Habitats

Habitats within and adjacent to the site boundary were surveyed to the Phase 1 Habitat Survey methodology (JNCC, 2010). The Phase 1 habitat survey is a standard technique for classifying and mapping British habitats where the dominant plant species are recorded and habitats are classified according to their vegetation types. All habitats within the site were recorded during the site survey and a description of each habitat type collected. Target Notes (TN) cover additional important features noted during the survey. Botanical names follow Stace (2010).

Where appropriate intertidal habitats were recorded using methods based on procedural guidelines outlined in the Marine Monitoring Handbook (JNCC, 2001), which provides advice on monitoring marine Special Areas of Conservation to assess their condition in accordance with the requirements of the Habitats Directive and UK Common Standards for Monitoring. The aim of the biotope survey is to create maps showing the distribution of biotopes along with associated information, such as the occurrence of rare species, and details of habitat.

All biotopes were recorded and classified according to Connor D.W and the JNCC Marine Habitat Classification.

2.2.2 Protected and Notable Species

Habitats were also assessed for their potential to support any legally protected species or species of conservation concern and any incidental faunal sightings, or field signs discovered during the survey, were recorded. The following sections provide further details on the assessments undertaken in relation to specific species. Legislative guidance relating to protected species is outlined in Appendix A, along with details of other relevant policy and legislation.

Birds

Vegetation and habitats around the site were assessed for their suitability to support nesting birds. Special consideration was given to bird species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). Furthermore, any birds seen or heard on site during the survey were recorded as incidental observations.

Badger

The survey area was searched for signs of Badgers *Meles meles*, and where evidence was found details were recorded following Harris *et al.* (1989). In addition to recording the presence of setts and the level of activity at them, the following signs of activity were also searched for: latrines, footprints, evidence of feeding activity and well-worn paths through vegetation. Badgers will use a number of setts throughout their territory at different times of year; any large holes with the potential to be used by Badgers, but not showing obvious signs of recent activity, were therefore also recorded.

Bats

Structures and trees likely to be impacted by the proposed works were inspected to determine the potential for bat roosts to be present, using the methods specified in the Bat Conservation Trust (BCT) guidelines (Collins, 2016).

Buildings, structures and trees on the site were categorised as having either 'negligible', 'low', 'moderate' or 'high' roosting potential and this was determined by applying the definitions given within the BCT Guidelines (see Table 2-1). Evidence of bat activity associated with potential roost sites includes bat droppings, urine staining, feeding remains, scratch marks and dead/alive bats.

Potential Roosting Features (PRF) on trees include cracks/splits, crevices, rot cavities, fluting, loose bark, woodpecker holes and areas of Ivy *Hedera helix*. Evidence indicating the existence of a bat roost may include dark stains running below holes or cracks, bat droppings, odours, or scratch marks. However, roosting bats may still be present without any external evidence being recorded.

Furthermore, the suitability of habitats across the site to support commuting and foraging bats was assessed in terms of habitat type, abundance, connectivity and distribution. These were categorised as having either 'negligible', 'low', 'moderate'

or 'high' suitability for bats which was determined by applying the categories given within the BCT Guidelines (Table 2-1).

Table 2-1: Definitions of roost suitability (From: Collins, 2016)

Suitability	Roosting habitats	Commuting and foraging habitats
Negligible	Negligible habitat features on site likely to be used by roosting bats.	Negligible habitat features on site likely to be used by commuting or foraging bats
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation). A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential.	Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or unvegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitat. Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub.
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).	Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat	Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, treelined watercourses and grazed parkland. Site is close to and connected to known roosts.

Otter

Watercourses and surrounding areas within the site were assessed for their potential to support Otter *Lutra lutra*, based on RSPB (1994) and Chanin (2003). This involved walking the survey section and recording any spraints (droppings), slides, feeding remains and footprints. A search was also made for possible holt and couch (resting) sites. Otters are extremely difficult to observe, and this method provides the most effective and efficient means of investigating presence or absence.

Great Crested Newts

Habitat features with the potential to support Great Crested Newt *Triturus cristatus*, and other amphibians, were recorded. Such features can include: ponds with habitat suitable for breeding newts within 500m of the proposed works; piles of logs, stones or other debris; cracks in the ground; stone or rubble covered ground, and any other features that could support newts.

Where access was possible, any substantial waterbodies within 500m of the site, and which had ecological connectivity to the site, were assessed for their potential to support newts. This assessment was based on the Habitat Suitability Index (HSI) (Oldham *et al.*, 2000; ARG UK, 2010). This system involves assessment of ten suitability indices per waterbody and is an accepted method of assessing the likelihood for a particular pond to hold breeding Great Crested Newts.

Reptiles

As part of the site survey, an assessment of the habitat suitability for common reptiles was made. This involved inspection of the site for key habitat features/microhabitats which may be favoured by reptiles, such as embankments, log, brash or rock piles, dry stone walls, hedgerows, open sandy areas, woodland edges and rides and interfaces between different habitat types (Froglife 1999).

2.2.3 Other notable species and environmental constraints

During the site survey, any signs or sightings of other notable species were also recorded. In addition, any environmental features that might constrain the works were also recorded (e.g. access restrictions).

2.2.4 Invasive non-native species

Any Invasive Non-native Species (INNS) observed during the survey were recorded. For stand-forming plant species, the extents of such stands were noted.

2.3 Limitations

The habitats and species present in a given area are subject to change over time. A single field visit of this nature captures and reports the situation at the time of survey. As such, the advice contained within this report is considered valid for a period of 18 months before a review on the need for an updated survey/assessment must be made by an ecologist (CIEEM 2019).

Data from biological records centres or online databases is historical information, and datasets might be incomplete, inaccurate or missing. It is important to note that even where data is held, a lack of records for a defined geographical area does not necessarily mean that the species is absent; the area may simply be under-

recorded. As such, records cannot be relied on and serve only as an indication of what might/ might not be found.

3 Results and Evaluation

3.1 Desk-based assessment

3.1.1 Statutory designated sites

A search via the MAGIC database showed that there are five statutory designated sites within a 2km search area of the site, all of which are designated Sites of Special Scientific Interest (SSSI). Within a 5km search of the site there is a further three statutory designated sites, designated as Special Areas of Conservation (SAC). These designations and their features are detailed in the Table 3-1: Statutory designated sites within 5km of site below.

Table 3-1: Statutory designated sites within 5km of site

Site Name	Features
SSSI's	
Blackpill, Swansea	Designated as SSSI due to its importance as an overwintering site for large numbers of waders. Of international importance for ringed plover <i>Charadrius hiaticula</i> and sanderling <i>Calidris alba</i> with counts for each species exceeding 1% of both British and Western European populations. Species of local significance include: oystercatcher <i>Haematopus ostralegus</i> , grey plover <i>Pluvialis squatarola</i> , Bar-tailed godwit <i>Limosa lapponica</i> , knot <i>Calidris canutus</i> and Dunlin <i>Calidris alpina</i> .
Oystermouth Old Quarry	Designated due to the Upper Limestone Shales. These Brigantian marine shales and muddy limestones contain a common Carboniferous limestone fossil fauna of brachiopods, corals and the trilobite Griffithides.
Bracelet Bay	Of geological importance due to rock outcrops at the site which provide exposures of structures formed during the Variscan mountain building episode which took place during the Carboniferous Period.
Langland Bay (Rotherslade)	Of geological importance due to well exposed glacial features showing the best evidence available for the limit of Late Devensian glaciation on east Gower
Caswell Bay	Of geological importance with fine cliff sections through Carboniferous Limestone sequence which show evidence of strong earth movements and glacial deposits resting on a raised beach. This site is designated due to the presence of a number of plant species with limited distributions in Britain including, <i>Juniperus communis</i> , <i>Helianthemum canum</i> , <i>Potentilla tabernaemontani</i> and <i>Sorbus rupicola</i> .
SAC's	
Gower Ash Woods	Annex I Habitats: primary feature: - Tilio-Acerion forests of slopes, screes and ravines. Annex II Habitats: Qualifying features: - Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae).
Limestone Coast of South West Wales	Annex I Habitats: primary features: - Vegetated sea cliffs of the Atlantic and Baltic Coasts - Fixed coastal dunes with herbaceous vegetation. Annex II Habitats: qualifying features: - European dry heaths

	- Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) - Caves not open to the public - Submerged or partially submerged sea caves Annex I Species: Primary features: - Greater horseshoe bat (<i>Rhinolophus ferrumequinum</i>) - Early gentian (<i>Gentianella anglica</i>). Annex II Species: qualifying features: - Petalwort (<i>Petalophyllum ralfsii</i>).
Gower Commons	Annex I Habitats: primary features: - Northern Atlantic wet heaths with <i>Erica tetralix</i> - European dry heaths - Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae). Annex II Species: primary features: - Southern damselfly <i>Coenagrion mercurial</i> - Marsh fritillary butterfly <i>Euphydryas aurinia</i>.
Local Nature Reserve	
Mumbles Hill	Habitats present include maritime heath, limestone grassland, limestone scrub and woodland, each supporting different plants and animals. Over 200 species of plants and fungi, 40 species of birds and hundreds of species of butterflies, bees and bugs have been recorded on the hill.

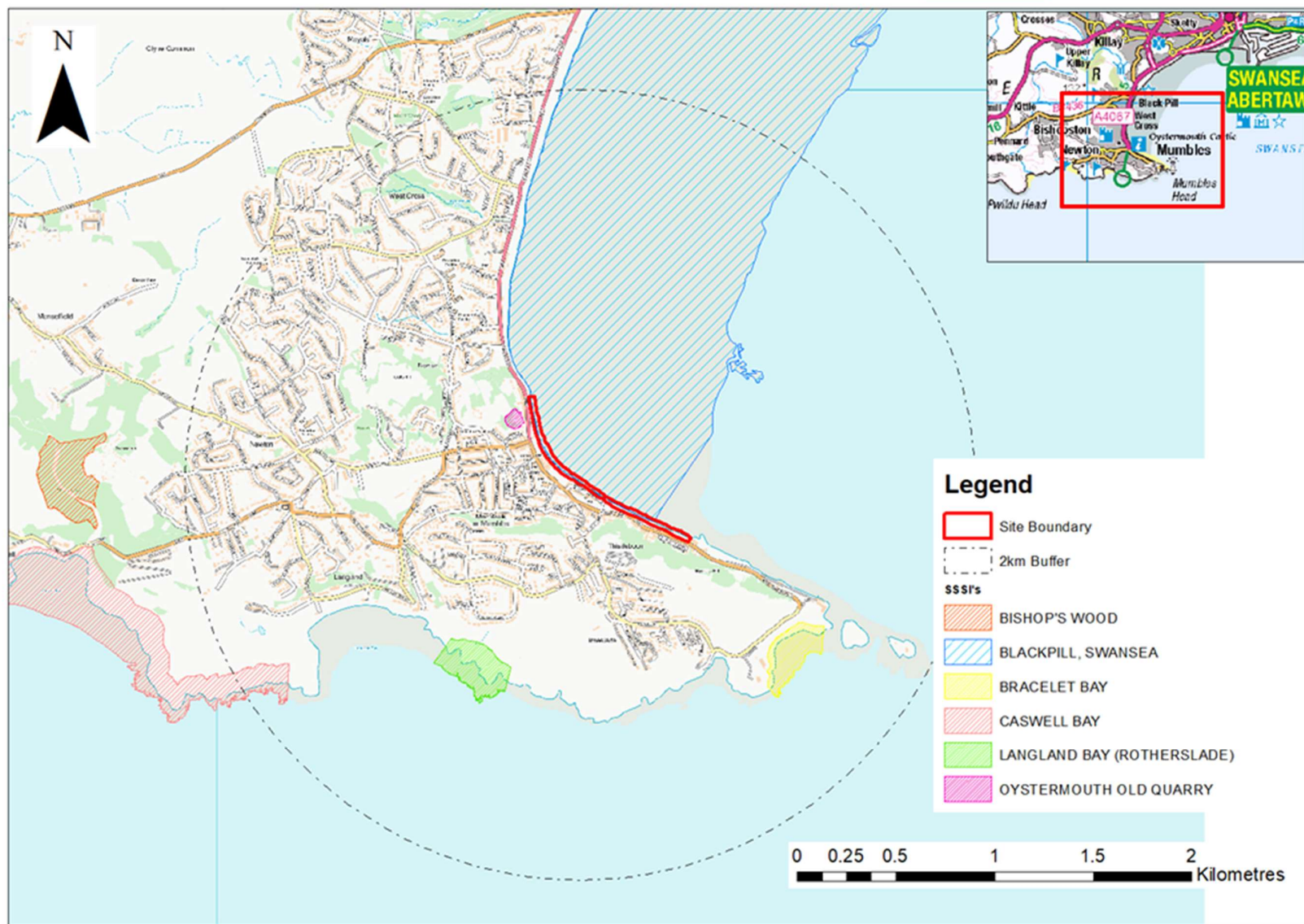


Figure 3-1: SSSI's within a 2km search area

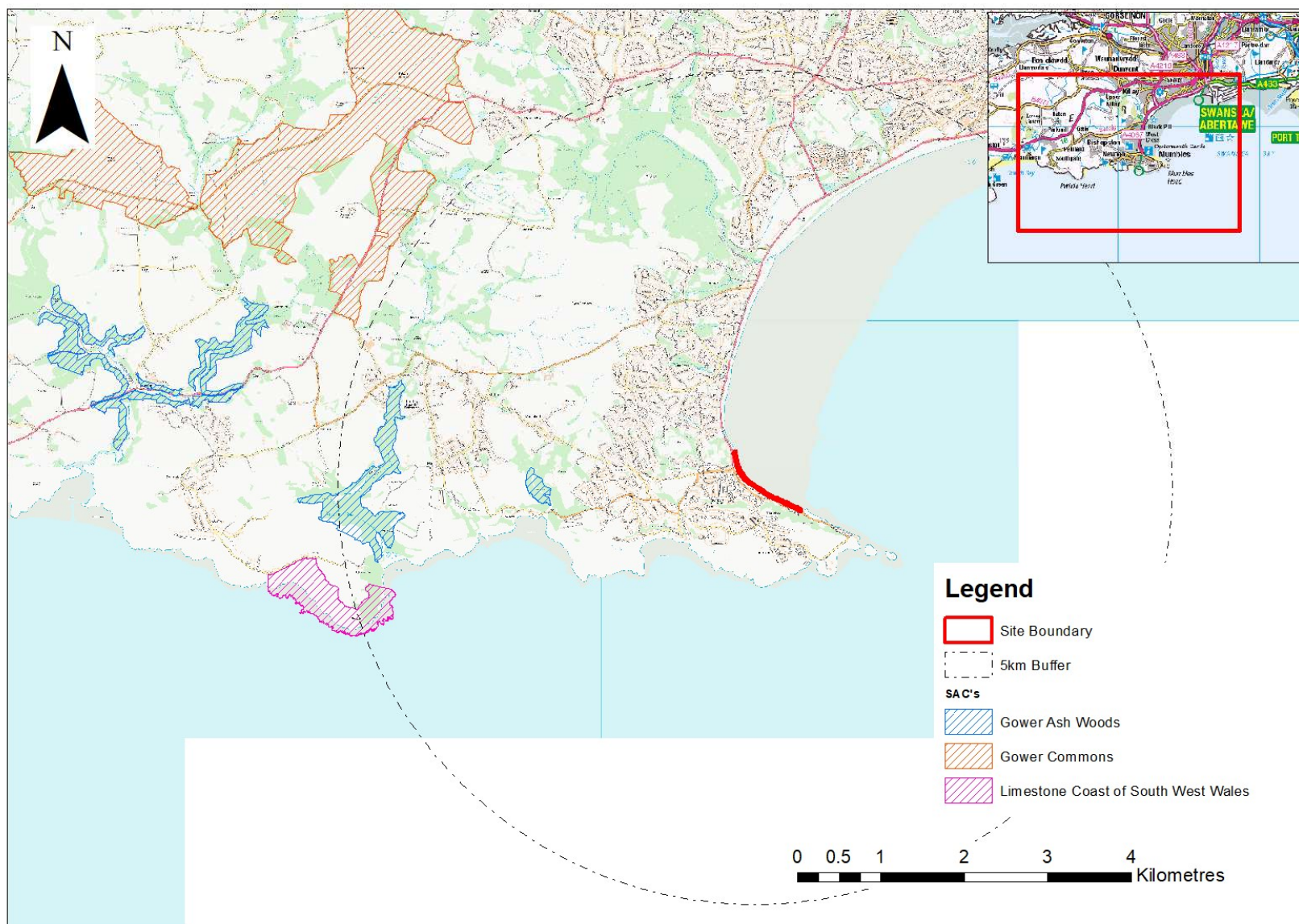


Figure 3-2: SAC's within a 5km search area

3.1.2 Non-statutory designated sites

There are six locally designated non-statutory sites within 2km search boundary of the proposed site. These include Pell Wood Wildlife Trust Reserve and 5 Sites of Importance in Nature Conservation (SINC). The features for which these sites are designated for a listed in Table 3-2: Non-statutory designated sites within 1km of site Table 3-2 below.

Table 3-2: Non-statutory designated sites within 1km of site

Site Name	Features
Wildlife Trust Reserve	
Peel Wood	The reserve consists of broadleaved woodland within a disused limestone quarry. Peel Wood occupies the site of the former Callencroft quarry. The woodland canopy is dominated by sycamore, with ash and oak as a lesser component.
SINC's	
Swansea Bay	Designated for a variety of features, including wading birds, e.g. turnstone, dunlin, knot and ringed plover, as well as passerines, e.g. Linnet. A number of coastal plant species are also featured. Invertebrates are also listed including Dragonflies and butterflies. Key habitat features in the SINC include neutral grassland containing uncommon species, reedbeds, maritime cliffs and slopes, coastal sand-dunes, shingle, seminatural upland block, <i>Sabellaria alveolata</i> reefs, saltmarsh mudflats, muddy gravels, sandy shore and blue mussel beds

3.2 Phase 1 habitat survey

3.2.1 Hardstanding

The majority of the scheme area consists of the existing promenade consisting of the footpath, cyclepath and various seating areas as well as car parks. These areas consist of paved, concrete or tarmacked areas and do not hold any ecological value.

3.2.2 Amenity Grassland

There are a number amenity grassland areas adjacent to the proposed scheme which are utilised as picnic areas or sports areas including the crown green bowling green. These areas are well managed and consist predominantly of few grass species such as Perennial Rye Grass *Lolium perenne*.

3.2.3 Broadleaved Trees

There are several areas along the promenade where broadleaved trees have been planted adjacent to the proposed works area, primarily along PRowS. Sycamore *Acer pseudoplatanus* makes up the majority of these trees with Horse Chestnut *Aesculus hippocastanum* and exotic palm tree species also present. These trees provide a habitat for nesting birds. The majority of trees held low to negligible potential for roosting bats.

3.2.4 Buildings

A number of buildings are located within close proximity of the proposed scheme. The club house for the crown green bowling and tennis club was deemed to hold potential for roosting bats.

3.2.5 Sea Wall

For the most part the existing sea wall does not get covered by sea water. The north western section of the wall is vertical and does not support any vegetation cover apart from occasional green algae at the base of the wall which is likely partially covered by seawater at the MHWS but still influenced by freshwater runoff from the promenade.

Starting at the Oystermouth Carpark the south eastern section of the wall includes a concrete slope that slopes down from the promenade to the foreshore. Coastal plant species such as Sea Spurge *Euphorbia paralias* and Babington's Orache *Atriplex glabriuscula* have colonised the gaps and cracks in the wall.

3.3 Marine Biotopes

3.3.1 Sea wall and groynes

Fucoid seaweeds have colonised in a few places at the base of the seawall in areas that are covered with seawater for a suitable length of time. Higher up the seawall green algae has colonised where freshwater has a larger influence.

3.3.2 Intertidal Foreshore

The foreshore in front of the proposed scheme is intertidal up to the sea wall. Although, areas adjacent to the wall will only be submerged for a couple of hours each day. The intertidal area directly in front of the proposed works area consists of a mix of sediments with a range of boulders, cobbles and pebbles on the surface. The following section details the biotopes recorded within the foreshore area directly in front of the proposed scheme.

LS.LCS.Sh.BarSh - Barren littoral shingle

The upper part of the littoral zone comprises a shingle bank, consisting of medium to coarse shingle of small rocks, pebbles, and gravel. The beach material is likely to be unstable, and the coarse nature of the material results in higher rates of drying during low tide. It is therefore unlikely that large numbers of macrofauna are found in this environment, although, a few shrimp species are adapted to this habitat.

LS.LSa.St.Tal - Talitrids on the upper shore and strand-line

Strandlines are present on the shingle in the upper littoral zone, these are located approximately 2m from the eroding cliff face and comprise driftlines of decomposing seaweed and other debris. The decaying seaweed provides cover and humidity for a range of sandhopper species (talitrid amphipods).

LS.LMx - Littoral mixed sediment

Generally, this biotope covers most of the intertidal area adjacent to the site. The mixed sediments range from muds with gravel and sand components, to pebbles, cobbles, and boulders. Broad transitions exist between areas of different sediments. Mixed sediments which are generally muddy tend to support infaunal communities similar to that of mud/sandy mud shores. Species identified included Common Cockle *Cerastoderma edule*. Acorn Barnacle *Semibalanus balanoides*, Common Periwinkle *Littorina littorea*, and Topshell species were also present. Stable large cobbles and boulders were present, and support epifauna such as fucoids and green seaweeds. These areas form separate biotopes (see below), though the boundaries of these with littoral mixed sediment are relatively ill defined.

LS.LSa.MuSa - Polychaete/bivalve dominated muddy-sand shores

A narrow area of muddy sand or fine sand exists below the shingle in the upper part of the littoral zone. The sediment remained water-saturated during low water. The infauna generally consists of amphipods, polychaetes, bivalves and gastropods. An anoxic layer is often associated with this biotope, approximately 5cm below the sediment surface, which appeared to be evident in worm casts on the surface. Detailed surveys of this layer were not carried out.

LR.LLR.FVS.FvesVS - *Fucus vesiculosus* on full salinity mid eulittoral boulders and stable mixed substrata

Further into the intertidal area a large section of the mid littoral zone is characterised by locally common areas of fucoids primarily *Fucus vesiculosus*. This biotope is located below the areas of muddy sand, but also extends above these areas, directly below the shingle, towards the west of the site. This is likely due to the presence of larger boulders on the shingle and partially buried wooden structures, providing suitable substrata for attachment. The wrack *Ascophyllum nodosum* was occasionally present, while barnacles *Semibalanus balanoides* were present on cobbles/boulders. *Littorea littorea* and the crab *Carcinus meanas* were also identified. Large matts of ephemeral green seaweeds such as *Enteromorpha intestinalis* were present, which is likely to vary seasonally.

3.4 Assessment for protected and notable species

3.4.1 Invertebrates

The intertidal and subtidal mudflats described provide suitable habitat for a range of macroinvertebrate species. The range of sediment sizes present mean that diverse macroinvertebrate communities will have been able to develop, which in turn provide an important food source for bird and fish species in the area. The biotopes described above provide habitat for a range of invertebrates found in the intertidal zone, such as barnacles, other crustaceans and molluscs.

It is noted that the reef building worm *Sabellaria alveolata* and the subtidal *Sabellaria spinulosa* have both been recorded within Swansea Bay, however, none were recorded during the survey.

Blue Mussel beds and Native Oyster *Ostrea edulis* are also present in the bay but these have not been recorded within close proximity to the proposed scheme and were not noted during the site surveys.

3.4.2 Birds

The desk study provided records for a number of wintering and migratory bird species associated with the intertidal areas including all species that are part of the designation of the adjacent Blackpill, Swansea SSSI.

As such, these wintering bird species listed as features of the SSSI (namely waders) are regarded as of national value due to the population size using the site and potential frequency to use the area.

There is the potential for the broadleaved trees adjacent to the scheme to be used by nesting birds.

The intertidal areas provide foraging opportunities for a range of wintering and migratory bird species.

Wintering Bird Surveys - Arup

Winter bird surveys were carried out along the Mumbles promenade by Arup, once a month, from January to March 2020. Surveys involved monitoring target species, i.e. waders, on the foreshore through the tidal cycle (high, mid and low tide).

A total of six target bird species were recorded: Oystercatcher *Haematopus ostralegus*, Curlew *Numenius arquata*, Bar-tailed Godwit *Limosa lapponica*, Turnstone *Arenaria interpres*, Dunlin *Calidris alpina* and Redshank *Tringa totanus*.

No high tide roosts were identified within the proposed works area, however, a high tide roost was observed on Mumbles Pier, 720m to the SE, with peak counts of 69 Dunlin (January).

The highest count of waders in the survey area was in January 2020 with notable counts of Dunlin (540 individuals), Oystercatcher (171 individuals) and Turnstone (45 individuals)

Numbers decreased over February and March, with the fewest birds observed in March.

The highest number of all target species were recorded at mid-tide, predominantly on Mumbles Pier and to the north-west of the proposed works site, between 500-600m away. There were relatively few birds present at high tide, all of which were on Mumbles Pier. The lowest peak counts of birds recorded was at low tide.

Over Wintering Bird Surveys – JBA

After consultation with NRW further wintering bird surveys were conducted by JBA and monthly vantage point surveys were carried out from October 2020 to April 2021 (JBA 2021). Findings were largely in line with the previous Arup surveys recording low use of the intertidal areas in front of the scheme area by a range of waders and wildfowl. A total of six target bird species were recorded: Oystercatcher *Haematopus ostralegus*, Curlew *Numenius arquata*, Bar-tailed Godwit *Limosa lapponica*, Turnstone *Arenaria interpres*, Dunlin *Calidris alpina* and Redshank *Tringa totanus*.

High tide roosts were not identified within or adjacent to the proposed scheme and for the most part all birds had left the foreshore in front of the scheme area 2 hours either side of high tide.

For the most part relatively low numbers of birds were recorded utilising the extensive mudflats. Peak counts were recorded in December, January and February with Oystercatcher the only species recorded in relatively high numbers with a peak count of 65 and counts of over 20 recorded at every visit. In line with the previous report these were only recorded foraging at mid or low tide.

Bar-tailed Godwits were recorded during the migratory period, however, these were in low numbers (peak count of 9) and recorded approximately 500m from the proposed scheme around the mean low water mark.

3.4.3 Bats

The desk study recorded bats within the 2km search area. Bats have been recorded foraging and roosting within 500m from the scheme boundary. Potential bat roost opportunities within the scheme area was limited to the bowls club house. There is the potential for the intertidal areas to be utilised by foraging bats.

3.4.4 Otter

Records for Otter were provided within the 2km search area. No areas suitable for resting Otter were recorded within the scheme area, however, there is the potential for Otter to commute or forage in the area.

3.4.5 Marine mammals

Marine mammals have been recorded within the 2km search area and there is the potential for a number of species to forage in the area at high tide. The slipways have the potential to be utilised as haul out spots for seals, however, the existing level of use of the scheme area make this unlikely. The rest of the scheme area does not provide suitable haul out areas for seals. This area is not noted to have high seal populations and the high levels of disturbance on this beach make it unlikely that it will be heavily utilised by seals.

3.4.6 Reptiles and amphibians

Reptiles and amphibians have been recorded within the 2km search area. None were recorded whilst on site and terrestrial habitats were considered to hold only limited potential for reptiles and amphibians. These consist predominantly of amenity grassland and scattered broadleaved trees. The isolated nature of these areas further lowers their potential as terrestrial habitat for these species.

3.5 Invasive non-native species

No terrestrial invasive non-native species were recorded within the scheme area. The invasive barnacle *Austrominius modestus* has been recorded within Swansea Bay, however, was not recorded within the scheme area during the survey.

4 Assessment of Impacts and Recommendations

The assessment and recommendations are based on general constraints. Prior to submission for planning this assessment should be reviewed in line with the updated site Masterplan and full details of proposed works.

4.1 Designated Sites

There is the potential for the construction of the flood defences to impact upon the features of the adjacent protected site through direct loss of habitats, disturbance or changes in water quality. Any impacts to habitats outside of the site boundary also has the potential to impact upon bird features of the site and this should be considered by any subsequent scheme.

By renewing the defence in this area, it can be considered that a 'hold the line' approach is being taken. As sea levels rise intertidal habitats 'migrate' landwards, there is the potential that this will lead to intertidal habitats being 'squeezed' against the hard defence and eventually lost. This potential impact should be considered when planning compensatory or mitigatory measures.

The scheme will result in the small-scale permanent loss of intertidal habitats where the footprint of the new sea defence will be constructed. The previous study carried out by Arup used a worst-case scenario that construction of the new sea defences will encroach up to 7 metres away from the existing sea wall. At the time of survey this area consists of coarse shingle of small rocks, pebbles, and gravel which is only covered at high tide and does not provide a food source for the bird species associated with the SSSI. It is considered unlikely that this size of area will be required and measures should be put in place to minimise the footprint required during construction. However, to demonstrate the potential likely significant impact this footprint has been used. A footprint of this size would result in a total loss of 0.0074km² of intertidal habitat, or 0.163% of the total SSSI area. A test of Likely Significant Effects, usually applied as part of a Habitat Regulations Assessment for European Designated Sites, found that a 1% loss of area triggers a significant effect.

Suggestions for further enhancements are made in the below sections.

It is not considered that there is a pathway for an impact to any of the three SAC's identified within 5km of the proposed scheme. All three sites are over 3km away and not linked to the proposed scheme area, furthermore habitats featured on these site designations are not found on or near the site and, as such, species which are supported by these habitats are also unlikely to exist on or near the site.

4.2 Habitats

Terrestrial habitats identified within and adjacent to the scheme were not considered to be of high value and it is unlikely that the scheme will have a significant negative impact upon terrestrial habitats.

The permanent loss of intertidal sediments within the SSSI are detailed above. However, it is recommended that a more definitive calculation is made when final designs for the scheme are completed. As detailed above it is not considered that the small-scale permanent loss of intertidal habitats will be significant.

However, intertidal habitats are Priority habitat nationally and it is recommended that any loss is compensated for. Potential compensatory measures are detailed below.

Further impacts to coastal habitats are therefore considered to be limited to the construction phase of the scheme.

There is the potential to negatively impact intertidal and subtidal habitats through pollution incidents. Therefore, appropriate mitigation measures should be implemented prior to the construction phase to ensure that the water quality is not adversely affected through pollution incidents and the release of contaminants from the site. This should be recorded in a detailed Construction Environmental Action Plan (CEMP) and agreed with the local authority and NRW prior to works taking place.

Plant movement in the intertidal area also has the potential to negatively impact intertidal habitats through compaction of the foreshore. To minimise disturbance and habitat degradation plant should keep to agreed haul routes and not stray outside of these areas. It is considered that in this case the haul routes will rapidly recover following the completion of the works.

4.3 Protected Species

4.3.1 Invertebrates

The intertidal and subtidal mudflats described provide suitable habitat for a range of macroinvertebrate species. The range of sediment sizes present mean that diverse macroinvertebrate communities will have been able to develop, which in turn provide an important food source for bird and fish species in the area. However, as described above, the area of foreshore that will be directly impacted by the scheme consists of coarse shingle of small rocks, pebbles, and gravel which is not suitable for most benthic infauna species.

The works will impact areas of the sea wall that have been colonised to a small extent by furoid seaweeds and associated infauna, enhancement measures detailed below seek to compensate for the potential small scale loss of habitat for these species.

It is not considered that the replacement of the wall will cause changes in coastal processes that will impact the larger foreshore area or the bay as a whole.

4.3.2 Birds

Wintering bird surveys carried out by Arup found that consideration should be given to timing the proposed works to the period around high or low tide, when birds are either absent or at distance from the proposed works. Working around mid-tide would result in increased localised disturbance to birds, however, the surveys found that numbers are relatively low close to the promenade and there is a large area of alternative foraging locations at distance from the works.

Findings from further surveys carried out by JBA from October 2020 to April 2021 were largely in line with the previous Arup surveys recording low use of the intertidal areas in front of the scheme area by a range of waders and wildfowl. High tide roosts were not identified within or adjacent to the proposed scheme and for the most part all birds had left the foreshore in front of the scheme area 2 hours either side of high tide.

Construction methodology should be specified in consultation with statutory bodies to ensure agreement on the proposed methodology to both avoid and mitigate any potential impact on waders.

To avoid impacts upon other bird species, it is recommended that any vegetation clearance required to permit works and access is carried out outside of the bird breeding season (i.e. avoiding March to September inclusive). If works are proposed for the bird breeding season, or if following initial clearance, it becomes apparent that some further de-vegetation is necessary during the bird breeding

season, an experienced ecologist should first check all areas for the presence of nesting birds. Should any nests be found, they should have an appropriate exclusion zone put in place, to safeguard the nests until the chicks have successfully fledged.

4.3.3 Bats

Impacts to bats arising from the scheme are considered unlikely unless adjacent buildings are impacted upon. Should the scheme require the removal of the lawn bowls/tennis clubhouse a preliminary bat roost inspection of the building should be carried out.

Therefore, it is considered that impacts to bats will be limited to the construction phase of the project and can be mitigated with good construction practices. Where possible, works should be carried out in daylight hours between late March and October to avoid affecting foraging bats. Bats have been shown to be easily disturbed by the use of artificial lights. If works must be carried out during this period at night, any worksite lighting should be minimised. Any floodlights should be fitted with a directional cowl to avoid light-spill

4.3.4 Otter

There is potential that Otter will commute through the works area. However, the scheme area does not hold potential for resting sites for Otter. Therefore, it is considered that impacts to Otter can be managed through appropriate working practices detailed in a construction environmental management plan (CEMP).

4.3.5 Marine Mammals

Records for Common Porpoise and Grey Seal suggest that a limited number of these species commute or forage infrequently in the area of the works, with the potential for other species of marine mammal within the wider Bay area. Although the mudflats have the potential to be utilised by seals for hauling out and basking, this is considered unlikely due to the high use of the area.

Impacts from the works are therefore likely to be restricted to temporary noise and vibration disturbance to a few foraging and commuting individuals. However, research has shown that seals hearing can be damaged by piling operations, it is therefore recommended, should piling operations be carried out, that a 'soft start' carried out each day on any piling works as this will move seals and cetaceans away from the area.

4.3.6 General avoidance measures

General avoidance measures that should be incorporated within the scheme include:

- Limit the hours of working to daylight hours, to limit disturbance to nocturnal and crepuscular animals;
- Due to the potential presence of bats and Otters the use of lighting at night should be avoided. If the use of lighting is essential, then a directional cowl should be fitted to all lights to prevent light spill and to be directed away from the foreshore.
- Contractors must ensure that no harm comes to wildlife by maintaining the site efficiently and clearing away materials which are not in use, such as wire or bags in which animals can become entangled; and

- Any pipes should be capped when not in use (especially at night) to prevent animals becoming trapped. Any excavations should be covered overnight to prevent animals from falling and getting trapped. If that is not possible, a strategically placed plank should be placed to allow animals to escape.

4.3.7 Biosecurity

Measures will need to be put in place to ensure that there is no spread of invasive non-native species or diseases. The Check-Clean-Dry approach should be followed, ensuring that all PPE and equipment is cleaned before leaving site. For more information go to: www.nonnativespecies.org/checkcleandry.

4.3.8 Pollution Prevention Measures

Appropriate mitigation measures should be implemented prior to the construction phase to ensure that the water quality is not adversely affected through pollution incidents and the release of contaminants from the site.

4.4 Compensatory and Enhancement Measures

4.4.1 Intertidal Habitats

The scheme has the potential to result in the small-scale loss of intertidal habitats close to the existing sea wall. Whilst this is not considered to be a significant impact upon the SSSI it is still recommended that enhancement measures are built into the scheme with the aim of the scheme having a net-gain on biodiversity at the site.

It is recommended that the following options are explored further.

Enhancements to the sea wall should be made that encourage growth of algae and colonisation by marine invertebrates such as periwinkles. Ruth Callaway a Senior Research Scientist at Swansea University has carried out a study investigating options for enhancement of the Swansea Sea Wall (Callaway, 2020). Recommendations made include;

- Placing large rocks at foot of seawall;
- Textured formwork for concrete surfaces;
- Adding water retaining features to vertical walls;
- Constructing gentle slopes where possible;
- Allowing community produced tiles or other diversity enhancing features to be added to the flood defences.

It is considered that there is merit in investigating all of these enhancements and that all have the potential to provide a biodiversity net gain.

The placement of features should be properly designed in order to gain the maximum enhancement value. For example, placing water retaining features too high up the tidal cycle has the potential to create hypersaline conditions and decrease the value of the habitat for most species.

Agreement has been reached to add a range of textured formworks to the sea wall and these have been included in the final design. The installation will be monitored by Swansea University and the project will help to inform a study into which texture allows the greatest colonisation.

4.4.2 Terrestrial Habitats

Existing terrestrial habitats do not hold high biodiversity value and there is the potential to enhance green spaces adjacent to the promenade and sea wall to provide further biodiversity value. Landscaped areas should consider native planting and the addition of bird and bat boxes. In some areas coastal plant species have colonised cracks and gaps in the existing wall and it is recommended that areas with space available for natural colonisation of coastal plant species is built into the scheme.

Appendices

A Relevant policy and legislation

The legislation discussed below is intended as a guide only and does not replace formal legal advice.

A.1 National Planning Policy Framework (NPPF)

The National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how these are expected to be applied with a presumption in favour of sustainable development a core element of the framework.

Of relevance to the proposed works in this report, the document states in relation to conserving and enhancing biodiversity, that: "If significant harm resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused" Ministry of Housing, Communities and Local Government (2019).

It also states that: "development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest" Ministry of Housing, Communities and Local Government (2019).

A.2 Natural Environment and Rural Communities (NERC) Act 2006

Section 40 of the Natural Environment and Rural Communities Act (2006) states that 'Every public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity'. Section 40(3) also states that 'conserving biodiversity includes, in relation to a living organism or type of habitat, restoring or enhancing a population or habitat'.

Section 41 of the NERC Act requires the Secretary of State to publish a list of species of flora and fauna and habitats considered to be of principal importance for the purpose of conserving biodiversity. To meet this requirement, the England Biodiversity List (the S41 list) has been developed. Species and habitats listed under Section 41 of the NERC Act 2006, whilst not necessarily being legally protected, can be a material planning consideration.

The S41 list, which replaces the list published under Section 74 of the Countryside and Rights of Way (CROW) Act 2000, should be used to guide decision-makers such as public bodies, including local and regional authorities, in implementing their duty under section 40 of the NERC Act 2006 'to have regard' to the conservation of biodiversity in England, when carrying out their normal functions.

A.3 Statutory designated nature conservation sites

Sites with statutory designations receive varying degrees of legal protection under UK statute and European Directives. There are several statutory designations used for sites of high nature conservation value in the UK, which are applied depending

upon the importance of the site in a local, regional, national or international context. This includes:

- Ramsar Sites (International designation)
- Special Areas of Conservation (SAC) and Special Protection Area (SPA) (European designations)
- National Nature Reserves (NNR) and Site of Special Scientific Importance (SSSI) (National designations)
- Local Nature Reserves (LNR) (Local designation)

A.4 Non-statutory designated sites

Non-statutory sites are afforded no statutory legal protection, but are normally recognised by local planning authorities and statutory agencies as being of local nature conservation value. The protection afforded to such sites is usually discretionary, through Local Plan policies. Non-statutory sites are designated by the local authority, usually in partnership with the County Wildlife Trust (or equivalent).

A.5 Marine and Coastal Access Act 2009

The Marine and Coastal Access Act 2009 presents a strategic marine planning system to agree and clarify marine objectives and priorities for the future and to steer sea users and decision-makers towards more efficient, sustainable use and protection of our marine resources.

Part of this strategic process is the designation of Marine Conservation Zones (MCZs) in the territorial waters adjacent to England and Wales and in UK offshore waters. The purpose of this is to provide an ecologically coherent network of protected marine and coastal sites with the aim of providing protection to species and habitats of national importance.

A.6 Protected species

Several species are protected under UK and international legislation. In the UK, primary protection is provided under the Wildlife and Countryside Act 1981 (as amended). Species of European importance receive additional protection in England under the Conservation of Habitats and Species Regulations 2017 (as amended); others may receive protection through specific legislation. Further details on specific species and their levels of protection are provided below.

A.6.1 Birds

All wild birds are protected under the Wildlife and Countryside Act 1981 (as amended). This makes it an offence to:

- intentionally take, damage or destroy the nest of any wild bird whilst it is in use or being built
- take, destroy or possess the egg of any wild bird.

Certain species, such as the Barn Owl *Tyto alba*, receive additional protection under Schedule 1, which makes it an offence to intentionally or recklessly disturb birds and also their young at, on or near an active nest.

A.6.2 Badger

Badgers *Meles meles* are protected by the Protection of Badgers Act 1992 and the Wildlife and Countryside Act 1981 (as amended), Schedule 6. Under the Protection of Badgers Act, it is illegal to intentionally kill, capture, injure or ill-treat any Badger. It is also an offence to obstruct, destroy or damage a Badger sett or disturb Badgers within a sett. Disturbance is defined, for development purposes, as any activity that could damage a sett or be greater than what Badgers commonly tolerate.

A.6.3 Bats

All UK bat species are European Protected Species (EPS), protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitat and Species Regulations 2017 (as amended). This makes it an offence to:

- deliberately capture, injure or kill a bat
- intentionally or recklessly disturb a bat in its roost or deliberately disturb a group of bats
- damage or destroy a bat roosting place (even if bats are not occupying the roost at the time)
- intentionally or recklessly obstruct access to a bat roost.

A.6.4 Otter

The European Otter *Lutra lutra* is an EPS protected under the Conservation of Habitats and Species Regulations 2017 (as amended), making it an offence to:

- deliberately capture, injure or kill an Otter
- deliberately disturb an Otter such as to affect local populations or breeding success
- damage or destroy an Otter holt, possess or transport an Otter or any part of an Otter
- sell or exchange an Otter.

Otters also receive protection under the Wildlife and Countryside Act 1981 (as amended), this makes it an offence to:

- intentionally or recklessly disturb any Otter whilst within a holt
- intentionally or recklessly obstruct access to a holt.

A.6.5 Great Crested Newt

The Great Crested Newt *Triturus cristatus* is a EPS under the Conservation of Habitats and Species Regulations 2017 (as amended). This makes it an offence to:

- kill, capture or disturb a Great Crested Newt
- take or destroy the eggs of a Great Crested Newt
- damage or destroy the breeding or resting places of Great Crested Newt.

It also receives additional protection under the Wildlife and Countryside Act 1981 (as amended) making it illegal to possess or control any Great Crested Newt, living or dead.

A.6.6 Reptiles and other amphibians

Legal protection varies considerably for different species. Smooth Snake *Coronella austriaca*, Sand Lizard *Lacerta agilis* and Natterjack Toad *Epidalea calamita* are EPS, and it is an offence to:

- deliberately kill, capture or disturb these species
- deliberately take or destroy the eggs of these species
- damage or destroy the breeding or resting places of these species.

Under the Wildlife and Countryside Act 1981 (as amended) Adder *Viperus berus*, Grass Snake *Natrix natrix/Natrix helvetica*, Common Lizard *Zootoca vivipara* and Slow Worm *Anguis fragilis* are protected from intentional killing or injuring, additionally Common Frog *Rana temporaria*, Common Toad *Bufo bufo* and other newt species are prohibited from sale.

A.6.7 Fish

The Salmon and Freshwater Fisheries Act (1975) affords protection to fish and to the spawning grounds of fish. Section 2(5) makes it an offence to wilfully disturb spawning fish or the spawn of fish. Section 4(1) makes it an offence to knowingly permit the introduction of material to a watercourse such that it becomes injurious to fish, the spawn of fish or the spawning grounds of fish

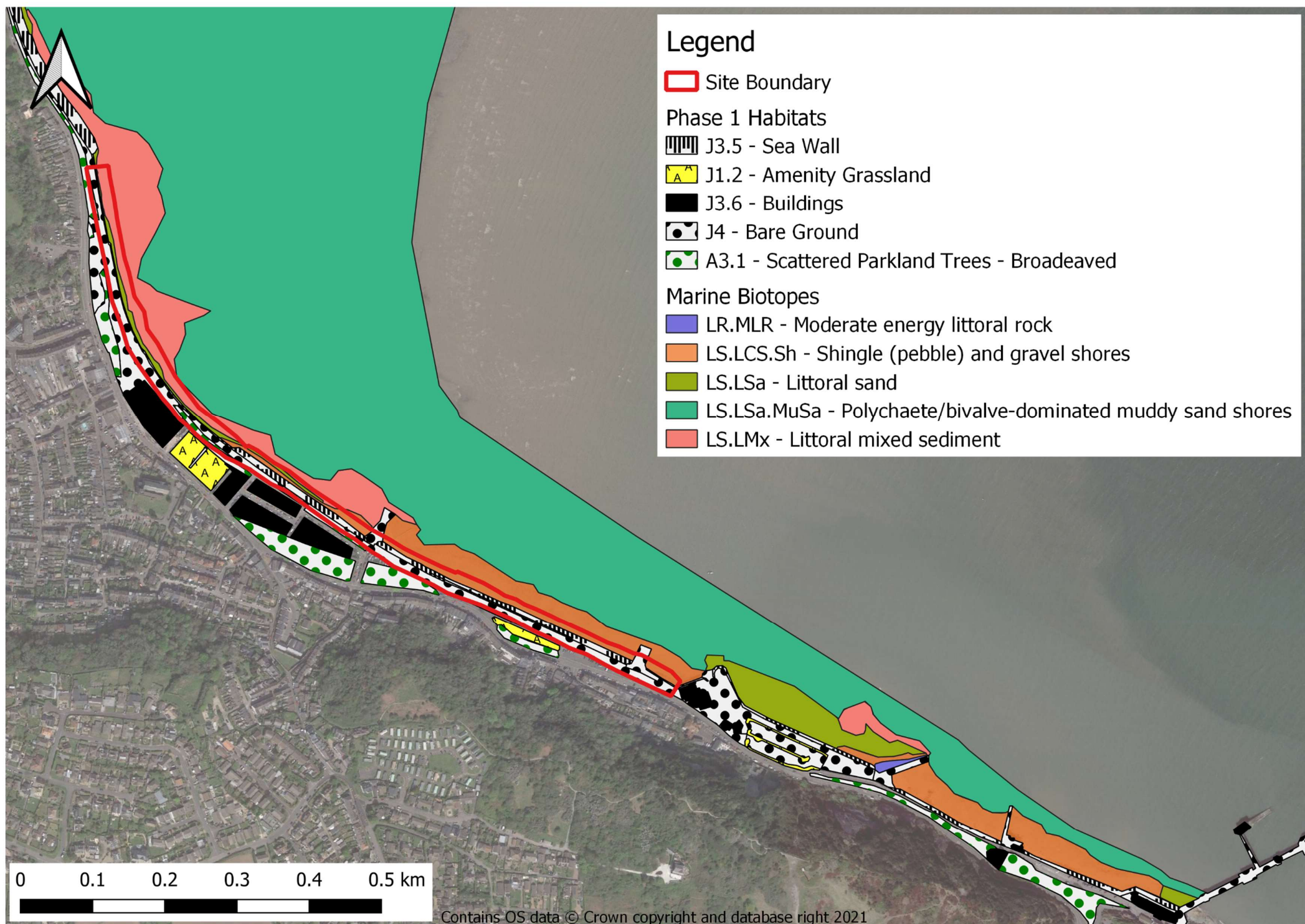
A.7 Invasive non-native species

Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) lists plant species, groups of plants and animal species for which it is illegal to plant, release, allow to escape or cause to spread into the wild.

Some species are also classed as 'controlled waste' under the Environmental Protection Act 1990 and must be disposed of properly (i.e. Japanese Knotweed and Giant Hogweed). These provisions mean that, if these species occur on a site proposed for development or other work which may disturb the ground, control of these species is likely to be required.

Appendices

B Phase 1 Habitat Plan



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