Traeth Crugan

Beach Nourishment

Habitats Regulations Assessment (HRA)

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Approvals

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List of Abbreviations

AA	Appropriate Assessment
AIES	Assessment of Implications on European Sites
cSAC	Candidate Special Area of Conservation
EMS	European Marine Site
ES	Environmental Statement
FCS	Favourable conservation status
HRA	Habitats Regulations Assessment
IEEM	Institute of Ecology and Environmental Management
IROPI	Imperative Reasons of Over-riding Public Interest
JNCC	Joint Nature Conservation Committee
LSE	Likely Significant Effect
OMS	Offshore Marine Site
PEU	Plainly Established and Uncontroversial
PPG	Pollution Prevention Guideline
pRamsar	Possible Ramsar Site
pSAC	Possible Special Area of Conservation
pSPA	Potential Special Protection Area
SAC	Special Area of Conservation
SPA	Special Protection Area

Executive Summary

This report comprises a Habitats Regulations Assessment (HRA) for Beach nourishment activities at Traeth Crugan, Pwllheli, Gwynedd. An HRA is an assessment of impacts on European protected sites of importance for nature conservation.

The proposed works consist of moving sand and gravel (stockpiled dredged material from Pwllheli harbour entrance) along the beach at Traeth Crugan and placing the material at two designated beach nourishment areas to strengthen the flood alleviation capacity of the dune system. The works are required as the beach frontage at Traeth Crugan is actively being eroded due in part to nourishment deprivation.

Works will take place adjacent to a European protected site, and is within the zone of influence for other protected sites.

Following a Screening Assessment, the first stage of the HRA identified that there could be 'Likely Significant Effects' for Pen Llyn a'r Sarnau SAC. Therefore, the assessment progressed to Stage 2 'Appropriate Assessment' stage, which considered the potential for the works to have an adverse effect on the integrity of the sites, taking proposed mitigation measures into account. It should be noted that the information included in this report relating to Stage 2 forms a Statement to Inform an Appropriate Assessment (SIAA), as the Appropriate Assessment itself will be made by the Competent Authority.

The assessment concluded that without mitigation the SAC could be affected, by pollution effects and habitat loss/degradation, but mitigation measures could be implemented that would eliminate the chance of any residual effects on the integrity of the site.

1.0 INTRODUCTION

This Habitats Regulations Assessment (HRA) Report is in relation to proposed works by Cyngor Gwynedd to undertake beach nourishment activities at Traeth Crugan, Pwllheli, Gwynedd. The purpose of this HRA is to assess the impact of the proposals on sites of international importance for biodiversity.

Traeth Crugan is located to the southwest of Pwllheli and is characterised by a barrier beach which extends from the rock out crops at Carreg y Defaid to the west, through to Carreg yr Imbyll at the eastern end of the wider frontage. The beach frontage at Traeth Crugan is actively being eroded due in part to nourishment deprivation. The dune frontage has reduced to a single dune ridge that has been progressively defended by sections of rock revetment since the 1970's. The proposed nourishment is due to take place either side of an existing rock revetment, as shown in figure 1 below. Gwynedd Council have previously been undertaking beach nourishment activities at this location, with nourishment taking place roughly every four to five years since 2002. The most recent nourishment works were undertaken in 2016 and 2020.

The proposals involve using dredged material from the mouth of Pwllheli harbour, comprising of sand and gravel, which is currently stockpiled at Carreg yr Imbyll. The material will be transported to Traeth Crugan where it will be deposited at two designated areas on the upper beach.

This work is required to implement the ongoing beach nourishment operations as set out in the Business Justification Case (YGC, 2022). The Business Justification Case (BJC) investigated the options to implement the conclusions of the Outline Business Case set out in 2017, namely "whilst the long-term strategy for the West catchment at Pwllheli is to implement the Managed Realignment in 2055, it also makes clear that the short-term option (Business as Usual), of nourishing the beach and dune system at Traeth Crugan, is critical".

Method:

- Stockpiled harbour dredged sand and gravel at Carreg yr Imbyll will be transported some two and a half miles west along Traeth Crugan beach to two designated tip areas. (See drawings in figure 1 and Appendix B.)
- A 360 tracked excavator will be positioned at the stockpile at Garreg yr Imbyll with a brief to load 40-ton dump trucks with previously stockpiled sand and gravel from the mouth of Pwllheli Harbour. This sand will then be transported through the Gimblet Rock Holiday Park and on to the beach immediately adjacent.
- It is envisaged that at least ten 40 tonne trucks will be employed on a continuous basis to suit the tidal conditions. Designated lanes restricted to the upper 20m beach ensuring no encroachment onto *Pectenogammarus* habitat.
- The tipped material will then be managed by a bulldozer to ensure that the material is positioned in line with the proposal.
- The duration of the operation is not likely to exceed five weeks, however this is heavily dependent on favourable weather and/or tidal conditions.

The quantity of material to be used during the process of beach nourishment will be a maximum of 30,000m3, which is similar to that used during past nourishment activities. However, the actual quantity is expected to be less than this.

The proposed works are located adjacent to the Pen Llyn a'r Sarnau SAC, and in close proximity to other European protected sites, as detailed further in this report.

1.2 Authors

This HRA has been prepared by:

- Rhys Meilyr Thomas, PGDip, with 5 years of ecological consultancy experience, including HRA and Environmental Impact Assessment (EIA) of large projects;
- David Harries MSc CIEEM CEnv with over 17 years of ecological consultancy experience, including HRA and Ecological Impact Assessment (EcIA) of large projects.

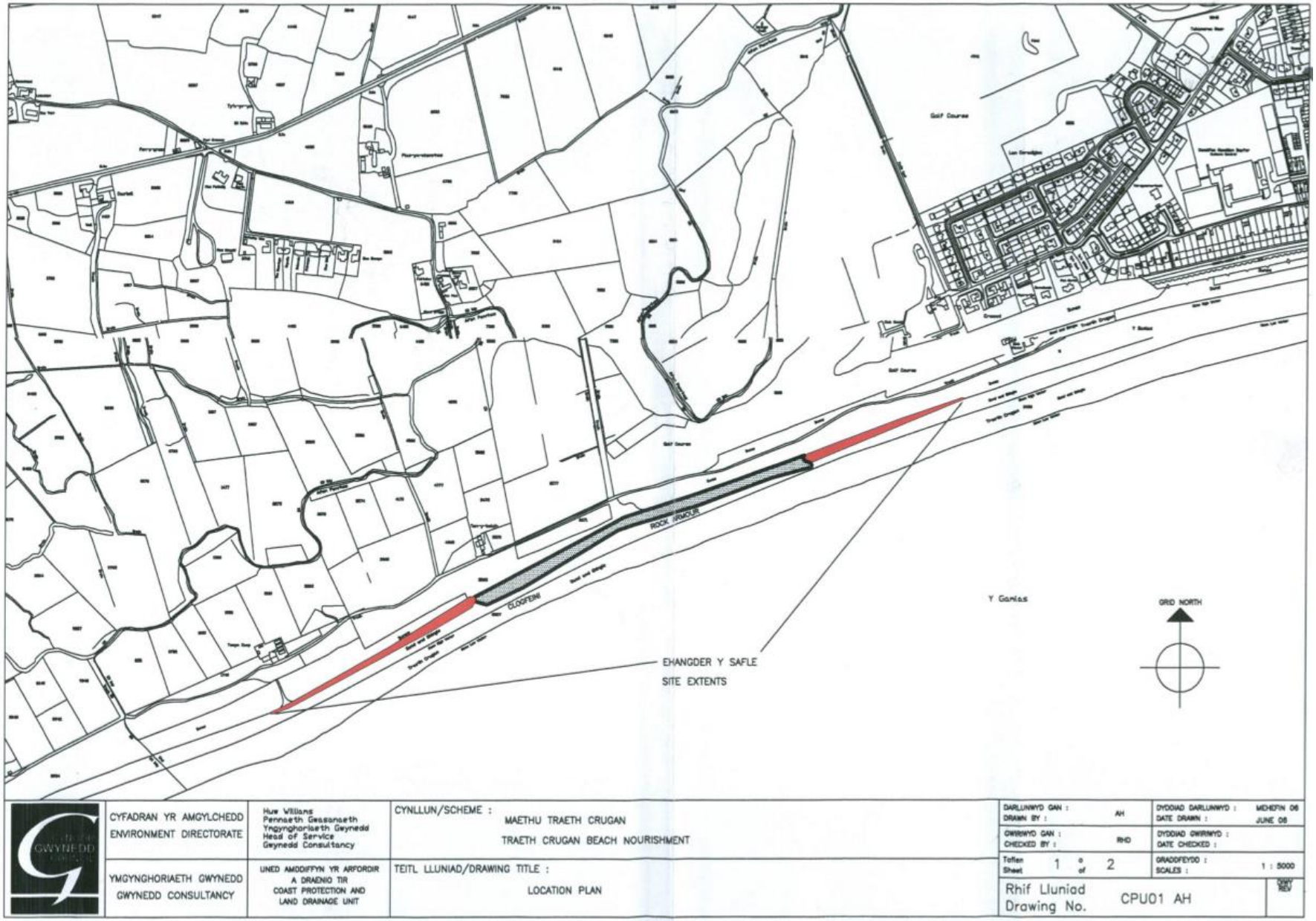

Figure 1: Location of proposed beach nourishment areas (outlined red), with existing rock revetment in between.

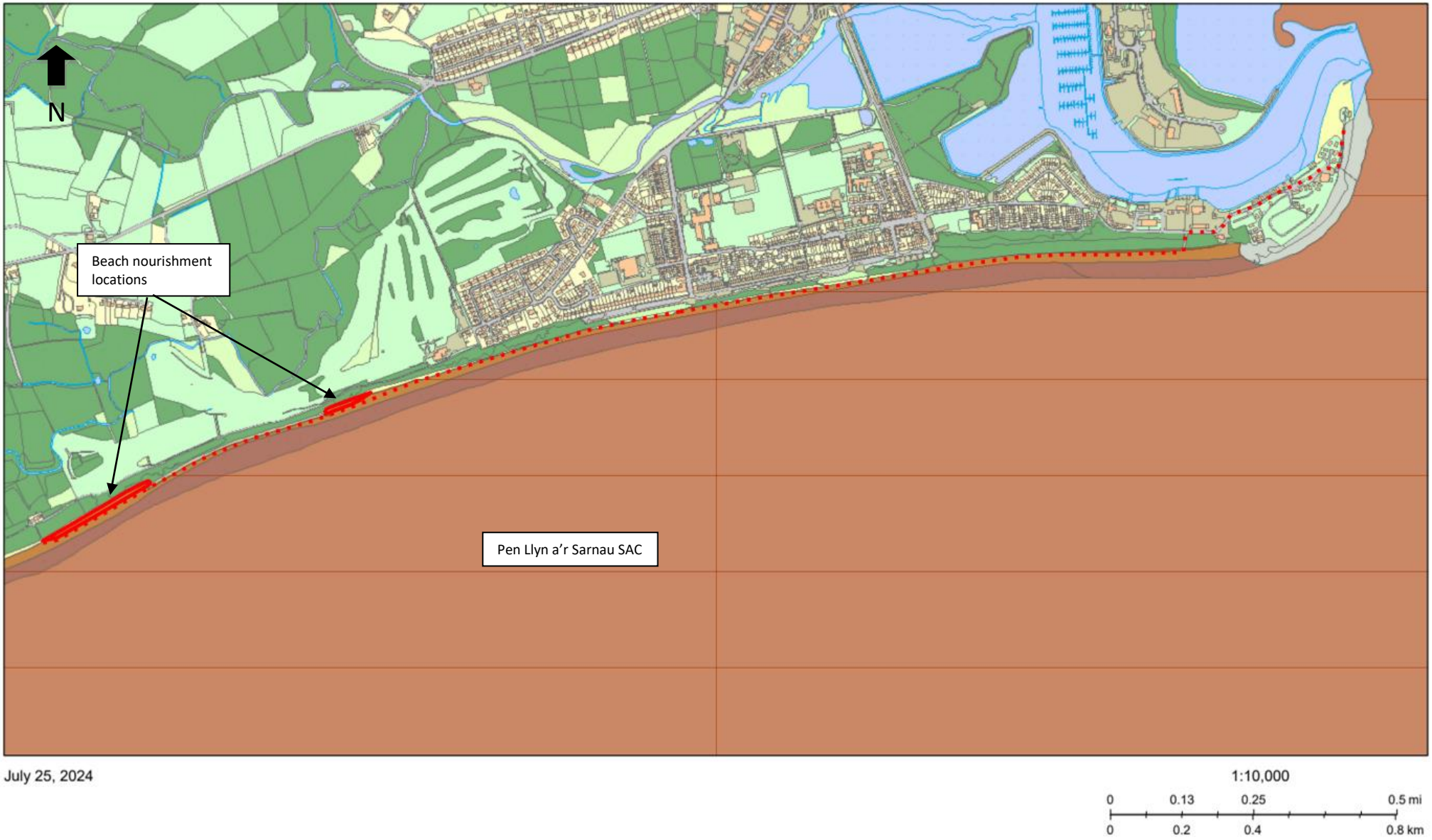

Figure 2: Location of beach nourishment locations (solid red line) and transport route (dashed red line) in relation to Pen Llyn a'r Sarnau SAC (Internationally protected sites, SAC shaded brown).

1.3 European Sites and Ramsars

The EU Habitats Directive requires competent authorities to assess the impacts of plans and projects on the Natura 2000 network of protected sites, including Special Protection Areas (SPAs) and Special Areas of Conservation (SACs). In England and Wales, the Directive is implemented by the Conservation of Habitats and Species and Planning (Various Amendments) (England and Wales) Regulations 2017 (the 'Habitats Regulations'). These set out the requirement for a Habitats Regulations Assessment (HRA) where necessary, comprising a series of mandatory tests.

According to Government policy and advice, 'Wetlands of International Importance' or Ramsar sites, although not subject to the Habitats Regulations, should be treated within the planning system in the same way as SACs and SPAs (or 'European sites'). The same level of protection is also given to potential or proposed sites (i.e. pSPA, pSAC and pRamsar), which have not yet been formally designated.

1.4 The HRA of Projects

HRA asks specific, mandatory questions of development projects. Firstly, a pre-screening process establishes whether a project can be exempted, excluded or eliminated, either because it is directly connected with the conservation management of the protected site, or it doesn't qualify as a 'project' (within the meaning and scope of the Habitats Directive), or because it couldn't conceivably affect any protected sites. If it cannot be discounted for these reasons, it has to undergo a process involving the four stages outlined in Table 1 and Figure 2 below.

The first stage is to screen the project to identify if it may result in a likely significant effect, whether alone or in-combination with other plans or projects. Provided that these significant effects can be ruled out, then no further assessment is needed. Following recent case law (People over Wind, 2017), mitigation cannot be taken into consideration at this stage.

If likely significant effects cannot be ruled out, then the project will proceed to the 'Appropriate Assessment' stage which explores the impacts in terms of the site's conservation objectives. This is to identify whether it can be ascertained that *it will not adversely affect the integrity of the European site*. It is only at this stage that mitigation measures can be considered or imposed (such as changes to design or timing of works). If the Appropriate Assessment can rule out any adverse effects on the integrity of the European site (with or without mitigation), the project may then be consented.

If adverse effects cannot be ruled out, then the assessment progresses to stages three and four and specific derogations may be sought. These determine whether alternative solutions exist and if not, whether imperative reasons of overriding public interest apply and if so, whether compensation is feasible. It should be noted that use of the derogations is regarded as a last resort and should be considered only in exceptional circumstances. The majority of projects are resolved during stages 1 and 2 of the HRA process, as few would manage to pass the strict tests of stages 3 and 4.

Table 1: Summary of the four-stage HRA process

Stage	Test	Task
1	Screening	If the project cannot be excluded from the process (pre-screening), this stage determines if the project will lead to a 'likely significant effect' on a European site alone or in-combination with other plans or projects. This stage uses a very precautionary approach, without consideration of mitigation measures. This stage involves gathering information about the protected sites but is not a detailed analysis of the impacts
2	Appropriate Assessment and Integrity Test	If 'likely significant effects' cannot be ruled out, a more thorough 'appropriate assessment' must be carried out to assess whether it is possible to ascertain whether the project will have an 'adverse effect on the integrity of the site' (AEOI) or not. Mitigation can be considered at this stage but not before
3	Alternative Solutions	If 'AEOI' cannot be ruled out, the HRA must explore whether less damaging 'alternative solutions' could deliver the overall objective of the project
4	Imperative Reasons of Over-riding Public Interest (IROPI) and Compensation	If no alternative solutions exist, the project can only proceed if 'IROPI' apply and 'compensatory measures' must be delivered before consent can be granted

This HRA uses guidance provided by the Habitats Regulations Assessment Handbook (DTA, 2013, February 2019 edition), which draws on best practice and case law from the UK and across the EU to inform best practice. The definitions of HRA terminology used in the assessment can be found in the HRA Handbook.

This document contains information for Stage 1 (Screening) - Test of Likely Significant Effects and information to inform Stage 2: Appropriate Assessment – the consideration of the impact of the project on the integrity of the internationally protected sites, either alone or in combination with other projects or plans.

Extent of knowledge, use of professional judgement and the precautionary principal of professional judgment have been used in the gathering of data and in the interpretation of results gained in relation to the potential impacts, mitigation and significance of any residual impacts, and consideration against conservation objectives. If information is unknown about a potential impact on a species, then the precautionary principal has been used.

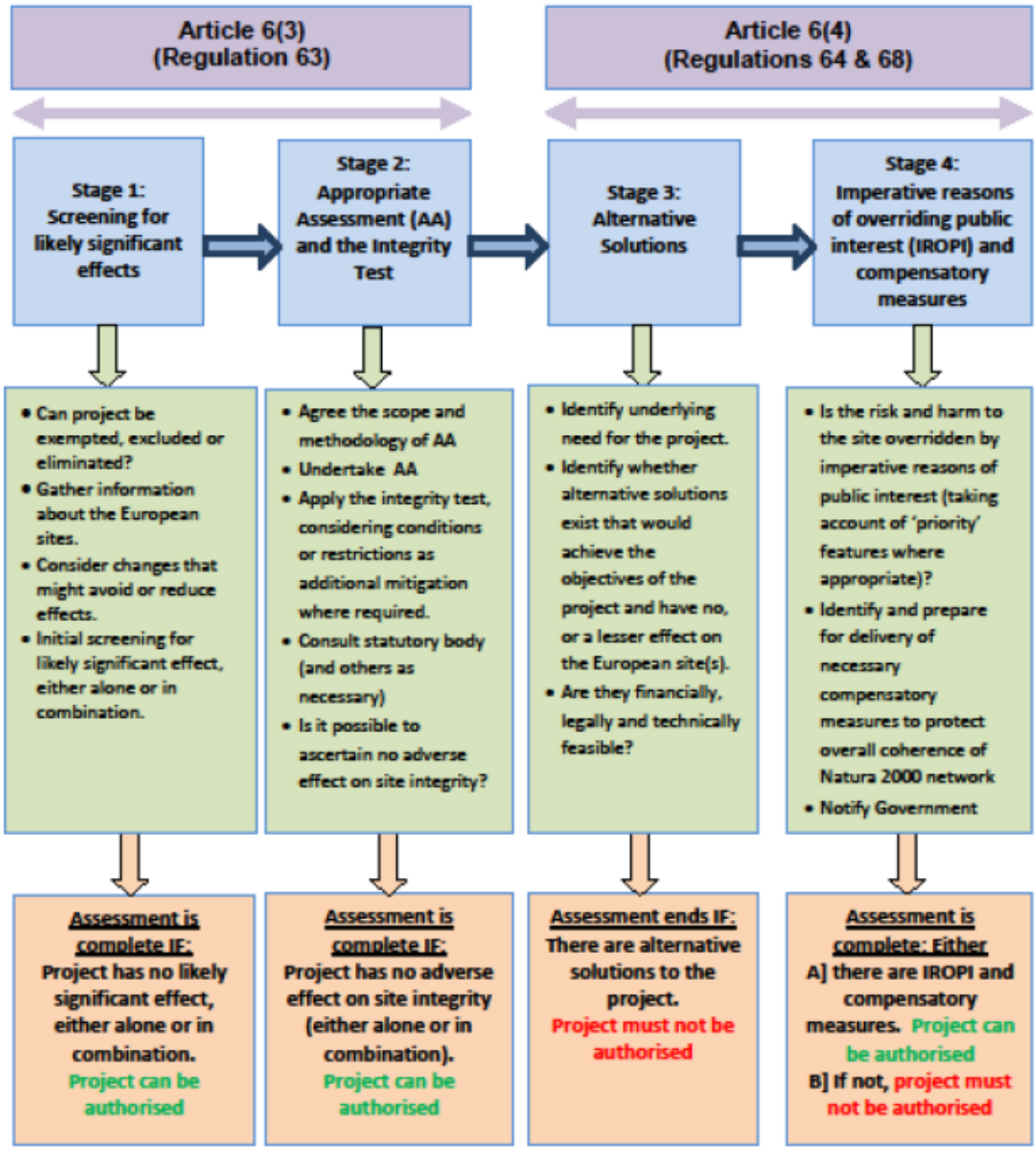

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Figure 4: Outline of the four-stage approach to the Habitats Regulations Assessment of projects

1.5 Definitions, Evidence and Case Law

Stage One – Screening

In the context of a likely significant effect, 'likely' means a possible (or the risk of a) significant effect whose occurrence cannot be excluded on the basis of objective information. 'Significant' means if it is likely to undermine the conservation objectives of a European / internationally important site. 'Objective information' can be defined as a clear verifiable fact rather than a subjective opinion and when carrying out a screening assessment, it is not that significant effects are probable, it is that a risk is 'sufficient'. However, there must be credible evidence that there is a 'real', rather than a 'hypothetical' risk.

An 'in-combination' assessment is only required when an impact is identified as having an insignificant effect on its own (but residual effects remain) that may become significant when taken into consideration with other plans or projects. This type of assessment is only required during the screening stage, although it can be difficult to distinguish between likely significant effects when considered alone or in-combination. Additionally, the rather coarse nature of the screening stage can sometimes preclude or compromise the necessary analysis and an incorrect choice can sometimes prompt extensive and unnecessary work, which is a limitation of this process. Therefore, unless the issues at the screening stage are clear, this HRA assumes that all likely significant effects apply alone with no residual effects. This will ensure all possible effects are considered and assessed for more thorough analysis in the appropriate assessment if required.

Stage Two – Appropriate Assessment and the Integrity Test

Regulation 63 states that where a plan is 'likely to have a significant effect', it can only be consented if the competent authority can ascertain that it 'will not adversely affect the integrity of the European site.' An Appropriate Assessment is defined as "the consideration of the impact on the integrity of the Natura 2000 site of the project or plan, either alone or in combination with other projects or plans, with respect to the site's structure and function and its conservation objectives. Additionally, where there are adverse impacts, an assessment of the potential mitigation of those impacts".

The 'integrity' of a European site is defined as:
'*the coherence of its ecological structure and function, across its whole area, which enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified or listed.'*

The European Commission defined it more recently as follows:
'The integrity of the site involves its constitutive characteristics and ecological functions. The decision as to whether it is adversely affected should focus on and be limited to the habitats and species for which the site has been designated and the site's conservation objectives.'

As the HRA process is an iterative process, further scrutiny during the Appropriate Assessment will inevitably confirm or challenge the outcomes of the screening exercise. As a result, this may result in changes such as the identification of new or removal of existing effects, or the need for an in-combination screening assessment.

In accordance with the principles of the mitigation hierarchy, if mitigation measures are able to remove an adverse effect, the measure should be adopted regardless of the cost or difficulty.

Favourable Conservation Status

The aim of the Habitats Directive is to maintain or restore the habitats and species (or qualifying features) listed in Annex I and Annex II respectively, to favourable conservation status (FCS) to ensure their long-term survival is secured across their natural range within the EU. This is described in Articles 1(e) and 1 (i) of the Directive as follows:

The conservation status of a natural habitat will be taken as favourable when:

- *Its natural range and areas it covers within that range are stable or increasing;*
- *The specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future; and*
- *The conservation status of its typical species is favourable as defined in (i)*;

[and]
The conservation status of a species will be taken as favourable when:

- *Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats;*
- *The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future; and*
- *There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.*

These targets may apply across several member states but are delivered by site-based conservation objectives. Site-based conservation objectives can be defined as *'a set of specified objectives to be met in a site in order to make sure that the site contributes in the best possible way to achieving FCS at the appropriate level (taking into account the natural range of the respective species or habitat types)'.*

Priority features

Some of the qualifying features of the Natura 2000 European sites are listed as 'Priority features'. These are treated in the same way as the other features during Stages 1 and 2 of an HRA, but at Stage 4, Imperative reasons for overriding public interest (IROPI) are restricted to those relating to human health, public safety or beneficial effects on the environment if priority features would or could be adversely affected by a plan or project. In other words, IROPI of a social or economic nature alone cannot be considered sufficient reasons for impacts on 'priority features' when assessing the derogations (Stages 3 and 4 of HRA).

Mitigation and case law

The People Over Wind case provided a new interpretation of when and how mitigation measures should be considered in an HRA. In 2017, the European Court of Justice departed from previous decisions, clearly identifying that measures specifically designed to avoid or reduce likely significant effects should not be evaluated at the screening stage, and should be reserved for the Appropriate Assessment stage.

Role of the competent authority

It is the competent authority's responsibility to decide whether or not to adopt this assessment as part of their duty under the Habitats Regulations.

2.0 THE NEED FOR ASSESSMENT AND IDENTIFYING EUROPEAN SITES AT RISK

2.1 Exclusion, Elimination and Exemption from the Need for Assessment

Prior to the identification of vulnerable European sites, Stage 1 of the HRA process encourages a brief 'pre-screening' exercise to determine whether there is actually a need for an HRA. It decides whether a proposed development can be:

- Exempted from the HRA because it is '… directly connected with or necessary for the management of the … European site';
- Excluded from the HRA because 'it is not a project within the meaning and scope of the Habitats Directive'; or
- Eliminated from the HRA because it can easily be shown that although 'it is a project … it could not have any conceivable effect on any European site'.

Following this pre-screening exercise, it is evident that the proposed development does in fact represent a project within the meaning and scope of the Habitats Directive with the potential to cause harm to European sites. As a result, it can neither be excluded nor eliminated from the HRA. Additionally the purpose of the project is not directly connected with or necessary to the management of European sites, and so it cannot be made exempt from the HRA process. Therefore, the first steps of the Stage 1 assessment will need to commence by identifying which European sites (and associated features) may be at risk. The identification of these sites is outlined in the section below.

2.2 Identification of European sites at risk

This HRA has adopted a precautionary 10km radius from the proposed works to search for European protected sites at risk. This distance is considered to be the maximum extent that a project of this nature and scale could reasonably be expected to generate measurable effects. Using the data from 'Map Gwynedd' (the Gwynedd Council GIS database), the sites within this area are listed in Table 2 below and shown in Figure 1 above.

Table 2. European sites within 10km of the proposed works (or further if mobile species features could be affected)

European site	Distance
Pen Llyn a'r Sarnau SAC	Immediately within / adjacent to the works.
Corsydd Llyn SAC	2km northwest of proposals
Corsydd Môn a Llyn RAMSAR	2.6km northwest of proposals
Northern cardigan Bay SPA	4.7km east from transport route, 7.3km east of beach nourishment
Clogwyni Pen Llyn SAC	7.6 km west of proposals

In some instances, sites require a larger search radius of up to 30km and 25km if they support highly mobile qualifying species such as lesser horseshoe bats or otters (respectively) that could be affected by the proposed works.

It is not considered likely that there would be significant effects on the conservation status of local populations of lesser horseshoe bats that are mobile species features of some SACs leading to such SACs sometimes requiring consideration within a larger buffer distance. The nearest such SACs are 17km east and 20km north east and due to this distance and the minimal impacts anticipated on these species, consideration of these sites has been scoped out.

A buffer zone of 25km is typically applied for assessing impacts on sites with otter as a qualifying mobile species. Other than Pen Llyn a'r Sarnau SAC which is within the footprint of the works, there are no other sites within 25km of the proposals which includes otter as a qualifying species.

Pen Llyn a'r Sarnau SAC is classified as a 'European Marine Site' (EMS). All EMSs are accompanied by bespoke conservation objectives and supplementary advice. The HRA will initially focus solely on the high-level objectives and then, if necessary, further scrutiny of other objectives will be reserved for the appropriate assessment.

The presence of a site on the list in Table 2 doesn't in itself justify its inclusion in subsequent stages of the HRA process, as this depends on the characteristics of the site and the possible impact pathways between the two. Therefore, to encourage a consistent, reliable and repeatable process, the HRA Handbook identifies 22 generic criteria (including sub-criteria) to focus the assessment on relevant sites only, as shown in full in Appendix A. If no European sites are identified in the final column of this table then none will be considered to be at risk and no further scrutiny is needed. In practice, this process can alter the area of search by expanding it (for instance in the case of riverine sites) or shrinking it where the evidence demands that harmful effects are unlikely.

Importantly, although the outcomes of the site identification task will reflect the type and location of the proposed development, and/or the ecological characteristics of the European sites, it does not represent the test for likely significant effect (which follows later).

Of the 22 criteria listed, seven were considered to be a credible threat to European sites in the area and are presented in Table 3 below, with Columns 2 and 3 in Appendix A omitted. The remaining criteria have been removed from any further consideration in this HRA as they are not relevant to the proposed works.

Table 3. Scanning and site selection list for European sites that could potentially be at risk from the proposed works

Types of project (or potential effects)	Sites to scan for and check (and additional context)	List of European sites potentially at risk
(1) All projects (terrestrial, marine, coastal)	**This criterion identifies all the European sites within the footprint of the scheme.** The proposals are directly adjacent to and partly within the boundary of the Pen Llyn a'r Sarnau SAC.	Pen Llyn a'r Sarnau SAC
(2) Projects that could affect wetland features	**Effects considered are those associated with the physical presence of built development and the localised effects on surface/groundwater resources and quality, resulting from changes in run-off, sedimentation, erosion, etc.** The proposed works are partly located adjacent to Pen Llyn a'r Sarnau SAC, a marine site (see Criterion (3) below). Northern Cardigan Bay SPA is hydrologically connected. (see Criterion (3) below) Corsydd Llyn SAC and Corsydd Môn a Llyn RAMSAR are located 2km northwest of the proposed works. Although both sites have wetland features, they are located fluvially upstream from the proposed works therefore there is no fluvial pathway from Traeth Crugan. It is therefore considered highly unlikely that the proposals pose a risk of impacting upon the features of these two sites. Effects on Corsydd Llyn SAC and Corsydd Môn a Llyn RAMSAR are therefore scoped out.	see Criterion (3) below
(3) Projects that could affect the marine environment (Criterion (2): 'Projects that could affect wetland features' is also covered here as the wetland features in this case are all marine)	**Effects considered are those associated with the physical presence of built development and the localised effects on surface/groundwater resources and quality, resulting from changes in run-off, sedimentation, erosion, etc.** There is some potential for the proposed works to cause adverse pollution impacts on the immediate and surrounding Pen Llyn a'r Sarnau SAC habitats during proposed beach nourishment works, due to the requirement for vehicle use. Beach nourishment operations have the potential to affect the hydraulic conditions of the surrounding coastal environment, which could lead to impacts upon coastal processes and long-term impacts upon nearby habitats. In this case, the sand/gravel material is being moved within the same coastal cell, therefore it is not likely that there will be any significant	Pen Llyn a'r Sarnau SAC

Types of project (or potential effects)	Sites to scan for and check (and additional context)	List of European sites potentially at risk
	change in the hydraulic conditions as a result of the works, however this is to be assessed further. Direct damage to SAC habitat, as a result of the sand deposition and vehicle movement, also needs to be considered further given the proximity. Coastal squeeze also needs to be considered due to the nature and location of the proposed works. Northern Cardigan Bay SPA is hydrologically connected, located 4.7km east on the seaward side of the proposals. Due to the scale and nature of the works proposed and the distance of the site from the proposals, any impacts to the marine environment which form a supporting habitat for the SPA features are considered unlikely. **Therefore, at this stage the potential for harmful effects on the Pen Llyn a'r Sarnau SAC and its features cannot be ruled out and further consideration is required.**	
(4) Projects that could affect the coast	**Effects considered are those of a wider, more strategic scale than (2) above. Also see (3) above.** Effects on the coastal features of the Pen Llyn a'r Sarnau SAC are considered in (3) above. Clogwyni Pen Llyn SAC is located 7.6km west of the proposals, along the coastline of the Llyn Peninsula. It is not considered that this site lies within the same coastal 'cell' as where the proposed works are taking place and given the distance of the site from the proposed works it is not anticipated that there will be any impacts upon the features of this site as a result of the works.	See Criterion (3) above.
(5) Projects that could affect mobile species	**Criterion 5 includes sites whose qualifying features include mobile species which may be affected by the project irrespective of the location of the project or whether the species would be in or out of the site when they might be affected.** Mobile species are those considered to spend part of their life-cycle on land, in water or air beyond the designated site boundary. Typically, it focuses on potential impacts on functionally-linked land and water utilised by the birds, mammals and migratory fish associated with the European sites listed.	Pen Llyn a'r Sarnau SAC Northern Cardigan Bay SPA

Types of project (or potential effects)	Sites to scan for and check (and additional context)	List of European sites potentially at risk
	Otter is a mobile species feature of the Pen Llyn a'r Sarnau SAC. This species could utilise land within or adjacent to the area of proposed works for foraging. Grey seal and bottle nose dolphin are also features of the Pen Llyn a'r Sarnau SAC, which could be affected by pollution impacts or disturbance during the works. There is also potential for effect on the foraging habitats of the red-throated diver feature of the Northern Cardigan Bay SPA. Note that 'indirect' effects on mobile species on functionally – linked land or water beyond the development site, are considered under other criteria 14 and 15 below. **Therefore, at this stage the potential for harmful effects on Pen Llyn a'r Sarnau SAC, and the Northern Cardigan Bay SPA and their features cannot be ruled out and further consideration is required.** *Note: There is a close link between criterion 5 and criteria 14 and 15 below.*	
(14) Projects which could introduce or increase, or alter the timing, nature or location of disturbance to species	**Criterion 14 refers to sites whose qualifying features are considered to be potentially sensitive to disturbance, for example as a result of noise, activity or movement or the presence of disturbing features that could be brought about by the project.** There is a small risk of temporary disturbance to otters, a qualifying feature of the Pen Llyn a'r Sarnau SAC, during the nourishment activity. Similarly, the proposed works could lead to temporary disturbance of grey seal and bottlenose dolphin feature of the Pen Llyn a'r Sarnau SAC. **Therefore, effects that include potential disturbance of otters, grey seal and bottlenose dolphin cannot be ruled out for the Pen Llyn a'r sarnau SA, and further consideration is required.** *Note: There is a close link between criterion 14 and criteria 5 and 15.*	Pen Llyn a'r Sarnau SAC

Types of project (or potential effects)	Sites to scan for and check (and additional context)	List of European sites potentially at risk
(15) Projects which could introduce or increase or change the timing, nature of location of light or noise pollution	**Criterion 15 includes sites whose qualifying features are considered to be potentially sensitive to the effects of changes in light or noise that could be brought about by the project.** There would be some localised temporary noise pollution during the short period required to transport material for the beach nourishment activity, which could potentially cause a low level of disturbance to otters, grey seal and bottlenose dolphin features of the Pen Llyn a'r Sarnau SAC. There would be no additional artificial lighting of the site. **Therefore, effects on otters, grey seal and bottlenose dolphin from noise pollution on the Pen Llyn a'r Sarnau SAC cannot be ruled out.** *Note: There is a close link between criterion 15 and criteria 5 and 14 above.*	Pen Llyn a'r Sarnau SAC

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2.3 Initial outcome of site identification exercise

Following the initial high-level preliminary screening exercise provided by Table 3 above and Appendix A (full version including criteria screened out as well as those screened in), the number of potential threats and sites affected is reduced. Despite this, the nature of the criteria results in considerable overlap in some instances, such as in criteria, 14 and 15 which can effectively be represented by 'disturbance / displacement of mobile species'. Criterion 1, 3 and 5 effectively represent the threats caused by 'pollution' and 'habitat degradation'. These terms will therefore be used in any subsequent assessment, in place of the criteria in Table 3 above.

The outcomes of the site identification exercise are therefore shown in Table 4 below.

Table 4. Summary of potential threat mechanisms and European sites at risk

Potential threat	Relevant Criteria from Table 3	European sites
Pollution of marine environment (including foraging habitat for mobile species features)	(1) (3) and (5)	Pen Llyn a'r Sarnau SAC Northern Cardigan Bay SPA
Direct loss of habitat features	(1) and (3)	Pen Llyn a'r Sarnau SAC
Impact of sediment deposition, including alteration of physical processes.	(1) and (3)	Pen Llyn a'r Sarnau SAC
Disturbance / displacement of mobile species feature	(14) and (15)	Pen Llyn a'r Sarnau SAC
Coastal squeeze	(1) and (3)	Pen Llyn a'r Sarnau SAC

Table 4 above demonstrates that potential impacts on three European sites remain and a formal screening assessment is therefore required.

3.0 SCREENING

3.1 Purpose

The purpose of the screening exercise determines whether or not a plan or project will lead to a 'likely significant effect' or, in other words, whether there is a risk that the proposed works will lead to effects that would 'undermine the conservation objectives' of the site and cannot be 'excluded on the basis of objective information'. An Appropriate Assessment is required when likely significant effects (that are credible and not hypothetical) are identified (or cannot be ruled out).

3.2 Approach

In order to complete the screening stage and identify any likely significant effects on site features, additional information is needed for each site at risk. The screening tables (Table 5 - 8) below therefore collate additional information for each site, including a site description and list of qualifying features, and use this to identify any likely significant effects from the proposed works (based on the threats listed in Table 4 above) and the site features potentially affected. The site-specific information provided in these tables has been collated from the Natural Resources Wales and JNCC

websites. If necessary, more detailed descriptions of the sites will be provided at the Appropriate Assessment stage, including the conservation objectives, but the information in Tables 5 - 6 below is sufficient for the screening stage.

In-depth analysis is not required at the screening stage as it should only operate as a 'trigger' to determine if an Appropriate Assessment is needed. Therefore, detailed examination of each of the conservation objectives of each of the features of the sites will not be undertaken at this stage, and is reserved for the Appropriate Assessment stage. Instead, this section only broadly explores whether it is possible that conservation objectives could be undermined and takes into account the risk of a potential significant effect.

As a result of the 'People Over Wind' decision, the screening stage is able to consider the essential features and characteristics of a project but is not able to take bespoke mitigation measures into account. The consideration of all mitigation for this project is therefore reserved for the Appropriate Assessment stage.

Table 5. Screening Assessment for the Pen Llyn a'r Sarnau SAC

Pen Llyn a'r Sarnau SAC (146,010.52 ha)	**UK0013117**
Qualifying features 1110 Sandbanks which are slightly covered by seawater all the time 1130 Estuaries 1150 Coastal Lagoons *****Priority Feature 1160 Large shallow inlets and bays 1170 Reefs 1140 Mudflats and sandflats not covered by sea water at low tide 1310 Salicornia and other annuals colonizing mud and sand 1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae) 8330 Submerged or partially submerged sea caves 1349 Bottlenose dolphin *Tursiops truncatus* 1355 Otter *Lutra lutra* 1364 Grey seal *Halichoerus grypus* Description The Pen Llŷn a'r Sarnau SAC encompasses areas of sea, coast and estuary that support a wide range	

of different marine habitats and wildlife. The nature of the seabed and coast and the range of environmental conditions present vary throughout the SAC. Differences in rock and sediment type, aspect, sediment movement, exposure to tidal currents and wave action, water clarity and salinity together with biological and food chain interactions have created a wide range of habitats and associated communities of marine plant and animal species, some of which are unique in Wales.

Potential Threats / Vulnerabilities

1) *Pollution of habitat features and foraging habitat for mobile species:*

It is possible that plant and machinery used for the proposed works on site could be a source of pollution, which could directly affect the adjacent 'large shallow inlets and bays' habitat feature of the SAC along with the 'reefs' feature also located nearby. The proposals involve the use of 40 tonne trucks to haul the nourishment material across the beach, along with a bulldozer at the deposit site to manage and position the tipped material. Although the risk may be small, there is a possibility of accidental spillage or leaks from such vehicles which could cause a release of polluting material.

Due to the high dilution factor associated with a marine environment and the scale and nature of the proposed works, it is considered unlikely that any habitat further than c.500m away from the proposed works would suffer significant effects from pollution during beach nourishment and transportation. Therefore, potential effects on other SAC habitat features are scoped out.

The movement of sand also has the potential to mobilise any pollutants or contaminants that may unknowingly be contained within the material, releasing it into the environment at the deposit sites. The works are located immediately adjacent to the 'large shallow inlets and bays' and 'reefs' features of the European site creating a potential direct pollution risk.

It is considered likely that the coastal habitat adjacent to the proposed works is used occasionally for foraging by members of the otter population of the SAC. Deterioration in water quality and degradation of habitat could potentially impact on otters and could result in reduction of prey availability (fish). Although this poses a fairly low risk of having a significant effect on the conservation objectives of this feature due to the abundance of suitable foraging habitat elsewhere in the local area and the large range of the otter, it is included here as a likely significant effect on a precautionary basis.

Bottlenose dolphin and grey seal are likely to occasionally use the marine environment adjacent to the proposals as foraging habitat, however both these species will forage widely and any decline in prey species in one area may not immediately impact the populations. As mentioned above, due to the scale and nature of the works proposed and the high dilution factor associated with the marine environment, any pollution impacts are likely to be local. It is therefore not considered likely that there will be significant effect on bottlenose dolphin and grey seal from pollution impacts.

Outcome: It is considered that the threat from pollution during the beach nourishment activities could potentially undermine the conservation objectives of the site for large shallow inlets and bays, reefs and otter features of the SAC and is therefore included as a likely significant effect.

2) Loss / degradation of habitat features

The seabed of Tremadog Bay on the south side of the Lleyn Peninsula, consists of a mosaic of different sediment types, which support a diverse mixture of plant and animal communities. The gravelly beach at Traeth Crugan supports the nationally rare amphipod *Pectenogammarus planicrurus*. This forms part of the SAC's 'large shallow inlet and bays' feature which is located directly adjacent and partly within the scope of the proposed beach nourishment works.

As with previous nourishment activities at this location, the material is deemed suitable for its intended use and is from the same coastal 'cell' as stated above. The deposit will be taking place on the same location as previous deposits therefore there will be no alteration of the habitat at the deposit sites. The proposals and methods have been drawn up to avoid potential impacts on the Pectenogammarus habitat, however this needs to be carried forward to Appropriate Assessment for further consideration.

Without appropriate consideration of the location of the beach nourishment activity there is risk of suffocating the Pectenogammarus that inhabits the shingle below the MHWS contour. The transportation along the beach (and SAC boundary) also needs to be considered in terms of potential damage / degradation of SAC habitat. Dredged sand and gravel from the harbour, located approximately two and half miles east, will be transported along Traeth Crugan beach to the beach nourishment deposit area. This will require the use of 40-ton dumper trucks. This transportation activity also has potential to cause damage to the Pectenogammarus habitat that forms part of the SAC's 'large shallow inlet and bays feature'.

For these reasons, it is considered that there is a risk of habitat degradation or loss as a result of the proposed activities, and this needs to be assessed further at the appropriate assessment stage.

Outcome: It is considered that the threat from habitat degradation and loss during the beach nourishment activities could potentially undermine the conservation objectives of the site for large shallow inlets and bays features of the SAC and is therefore included as a likely significant effect.

3) Sediment deposition impacting upon physical coastal processes

According to the West of Wales Shoreline Management Plan (SMP2), there is a general drift to the east along the foreshore in the Traeth Crugan area. The orientation of the eastern side of Carreg y Defaid is such that the headland only provides limited shelter to the western end of Traeth Crugan. As such, the drift along the Traeth Crugan frontage tends to be towards the east. This western end is an area of erosion and is only maintained by the higher foreshore. The areas of higher sea bed to the eastern end of Traeth Crugan do tend to support sediment accumulation in the centre of the bay but this can be variable, and the dunes are vulnerable to erosion. South Beach has tended to be an area benefiting from sediment transported from the west. Particularly to the eastern end there has historically been accretion in this area.

SMP2 also notes that at Traeth Crugan and along the western end of South Beach, there is greater concern that nearshore sediment is less prevalent. The reveting of much of the frontage has constrained the shore's ability to retain sediment as a barrier and fixing the back face of the dune system has stopped the ability of the backshore to develop in land. Conceptual understanding of sediment transport is provided in Appendix D

As previously stated in this report, the beach nourishment material is to be deposited on the upper beach, above the Mean high Water Spring contour, and therefore will only be winnowed naturally by the more extreme events. This is therefore not likely to impact upon the coastal processes at play in the area, with a general foreshore drift from west to east able to continue. This has previously been tested through past beach nourishment activities undertaken in the same location several times since 2002, with no adverse impact on the coastal processes evident. Furthermore, as there is a general drift from west to east along this area, with accumulation taking place at the mouth of the Pwllheli Harbour (which is the source of the nourishment material), the material is retained within the same coastal cell, and is effectively being recycled within this system. As the nourishment is using material from the areas of accretion to the east, and taking it back into the system, it is not deemed that this is affecting any wider areas of the coastline. This has already been

tested over several years.

Outcome:
No Likely Significant Effects

4) Disturbance / displacement of mobile species features:

Otters are a mobile species feature of the Pen Llyn a'r Sarnau SAC. It is highly likely that otters will use this are of the coastline for occasional foraging and commuting. There are no Cofnod records of otter resting sites or holts within or in the vicinity of the proposals. There are records of otter activity along the Afon Penrhos and Afon Rhyd hir areas, to the north of the proposals.

There is likely to be some temporary noise pollution and human disturbance during the nourishment works, above current levels, which could potentially cause a low level of disturbance to foraging otters. This could cause a reduction in foraging opportunities for otter, thus potentially reducing access to food sources. However, such disturbance would be temporary and the works would be undertaken during daylight hours when otter activity is minimal. Beach nourishment works are also going to be subject to tidal conditions which will further reduce the length of time activties will be taking place on site. There would be no additional artificial lighting of the site.

As this risk is so minimal, no resting sites would be disturbed and even if an otter foraging during daylight hours was to be temporarily disturbed within the nourishment period, it is not considered realistic to imagine that this could have a signfiicant adverse effect on the conservation objectives of the otter feature of the SAC, given the availability of suitable foraging habitat elsewhere in the locality. This impact on otters is therefore scoped out of any further assessment.

Increases in noise pollution could also impact upon the bottlenose dolphin and grey seal features of the SAC, if they are found to be present in the vicinity of the proposed works during sand transportation activity. However, as no proposed works are being carried out in the water column (avoiding tidal inundation to the work area), it is not considered likely that the proposal will have a likely significant effect.

Outcome:
No Likely Significant Effects

5) Coastal Squeeze

Coastal squeeze is the loss of natural habitats or deterioration of their quality arising from anthropogenic structures, or actions, preventing the landward transgression of those habitats that would otherwise naturally occur in response to sea level rise in conjunction with other coastal processes. Coastal squeeze affects habitat on the seaward side of existing structures. Coastal squeeze may occur when coastal management activities fix the position of the coast, sea level rise is predicted, there is a designated site with Annex 1 habitats present on the seaward side of the defence, and the habitats would be able to migrate landwards if there was no coastal structure or the management activity was stopped (i.e., the land behind the defence would be susceptible to flooding if the defence failed or would be expected to erode relatively quickly).

Fundamentally, maintaining a particular coastal alignment whilst sea-levels continue to rise will lead to narrowing of the intertidal/coastal zone, and loss of habitat. The Habitats Regulations requires that the extent of designated Annex 1 habitats is stable or increasing. Therefore, projects or activities which prevent the natural ability of habitats to migrate landwards in response to sea-level

rise are likely to lead to adverse effects or deterioration of the National Site Network.

The issue of Coastal Squeeze therefore needs to be considered for the proposals at Traeth Crugan. This has been assessed in line with the Natural Resources Wales Guidance Note GN062 *Assessment of Coastal Squeeze*. In line with this guidance note and the definition above, there is potential for coastal squeeze to occur. However, following screening step 2 of the guidance, the project can be considered to be 'maintenance' as it is a continuation of an ongoing activity at this location and is not a significant alteration of what is already there. Furthermore, the proposals are taking place in a 'hold the line' policy unit, therefore has been included as part of the plan level HRA that was undertaken for the Shoreline Management Plan (SMP).

In line with the NRW Guidance Note, the proposed works could lead to coastal squeeze but are considered to be maintenance, and are in a 'hold the line' policy unit. In line with Welsh Government policy, which applies to works which are within 'hold the line' SMP policy units, no further action is required to assess coastal squeeze within this HRA.

Outcome:
No Likely Significant Effects

Summary of Likely Significant Effects and Features requiring Appropriate Assessment

- Pollution of adjacent large shallow inlets and bays, and reefs habitat, including otter foraging habitat, during beach nourishment activities.
- Loss or degradation of adjacent large shallow inlets and bays habitat as a result of beach nourishment activities.

Table 6. Screening Assessment for Northern Cardigan Bay SPA

Northern Cardigan Bay SPA (82312 ha)	**UK9020327**
Qualifying features Red Throated Diver *Gavia stellata* Description Northern Cardigan Bay / Gogledd Bae Ceredigion SPA, as the name suggests occupies the northern half of Cardigan Bay on the west coast of Wales. Several rivers flow into the northern part of Cardigan Bay including the Dwyfach, Glaslyn/Dwyryd, Wnion, Dysynni, Leri, Mawddach and Dyfi. The coastline is dominated by rocky cliffs and shores with occasional sandy beaches and estuaries. Where estuaries flow into northern Cardigan Bay, the sea quickly becomes more than 20 metres deep, but elsewhere remains shallow (less than 10 m deep) for up to 20 km offshore. These shallow areas are sub-tidal shingle reefs, known as the sarnau. All three of the sarnau lie roughly north-east to south-west and are presumed to be formed from glacial deposits left at the end of the last ice age. Sarn Badrig is the largest and most northerly sarn, running parallel with the Llŷn Peninsula from Harlech up to 24 km offshore. Sarn y Bwlch is the smallest sarn, starting from near Tywyn. Sarn Cynfelyn, the most southerly sarn, starts from north of Aberystwyth. These shallow reefs are important ecological habitats within the Northern Cardigan Bay / Gogledd Bae Ceredigion SPA and are important features of the Pen Llŷn a'r Sarnau Special Area of Conservation (SAC), designated under the EC Habitats and Species Directive.	

The two tidal streams that enter the Irish Sea, from the north near the Isle of Man and the south through the St George's Channel, meet in the vicinity of Cardigan Bay resulting in weak tidal currents in the area. The tidal range in the bay is up to 4m at a spring tide.

Potential Threats / Vulnerabilities

1) *Pollution of marine environment outside SPA (including foraging habitat for mobile species features)*

The SPA is located 4.7km east of the proposals at its nearest point (which is the transportation route), and 7km east of the material deposit site. Although the site is hydrologically connected to the proposed works, given the nature and scale of the proposals and the dilution factor associated with the marine environment, it is considered highly unlikely that a pollution event during the nourishment operation could impact the SPA itself. However, any localised pollution contamination could potentially impact upon the SPA's mobile species feature, the red throated diver, which could potentially be present the marine environment in the vicinity of the proposals for foraging.

It is considered unlikely that any habitat further than c.500m away from the proposed works would suffer significant effects from any pollution during nourishment operation, therefore any such contamination would be localised in nature. This could potentially affect upon feeding grounds and prey availability of the red throated diver, however, given the availability of suitable habitat elsewhere and the large range of this species, it is not considered likely that this poses a significant threat to the conservation objective of this feature.

Outcome: No likely significant effect

Summary of Likely Significant Effects and Features requiring Appropriate Assessment

- None

Evidence provided in Tables 5 – 6 above allows the likely significant effects to European sites to be broken down into threats to specific features of the sites identified, with some features being screened out of any further assessment. Therefore, Table 7 below summarises the results of this screening exercise, listing the European sites identified as being at risk from the proposed works, the likely significant effects and the features of each of the sites that could be affected.

Table 7. Summary of Screening Exercise

European Site	Likely Significant Effects and Features at Risk Likely	
	Pollution of habitat features and foraging habitat	*Degradation and loss of habitat features*
Pen Llyn a'r Sarnau SAC	• Large shallow inlets and bays. • Reefs • Otter	• Large shallow inlets and bays.

4.0 FORMAL SCREENING OPINION

The proposed improvement has been screened according to the statutory procedures laid out in the Habitats Regulations 2017 (as amended) using the methodology outlined in the Habitats Regulations Assessment Handbook.

The screening exercise concluded that likely significant effects (LSE) could not be ruled out for the Pen Llyn a'r Sarnau SAC due to the reasons outlined in Table above and summarised in Table 7 above. Therefore, an appropriate assessment is required for these likely significant effects.

5.0 APPROPRIATE ASSESSMENT

5.1 Purpose

Where a project is likely to have a significant effect, the precautionary principle emphasises that consent can only be granted if the competent authority can ascertain that the proposed improvement will not adversely affect the integrity of the European site, following an appropriate assessment. This is the purpose of the appropriate assessment stage.

In accordance with the 'People Over Wind' ruling, the appropriate assessment takes any incorporated mitigation measures into account that are sufficient to remove the likely significant effect. Conversely, if mitigation measures are not proposed, or prove to be inadequate, they can be imposed by the competent authority via conditions or other planning tools.

The role of mitigation is different to that of compensation. Mitigation measures aim to avoid, remove or reduce significant effects on European sites, whereas compensation is only considered under the derogations at the later stages of the HRA if required.

The HRA Handbook outlines the definition of integrity in contemporary planning policy and states that for a consent-making body to conclude the absence of an adverse effect, then it should be 'convinced' that no reasonable scientific doubt remains. As defined by the CJEU (Sweetman) and European Commission, the integrity of the site is 'the lasting preservation of the constitutive characteristics of the site'. For further definitions see Section 1.5 above.

5.2 Approach

The screening assessment found that likely significant effects could not be ruled out for three features of the Pen Llyn a'r Sarnau SAC.

These issues are individually subject to further scrutiny through an appropriate assessment (Table 8 and 9 below), which considers the site's conservation objectives for the features that have been screened into the assessment (see Table 7 above). Individual effects are assessed with and without mitigation, concluding with an individual Integrity Test including an assessment of whether any residual effects remain with mitigation in place. A list of the mitigation measures proposed is included in Table 10. If no adverse effect on integrity is recorded but residual effects do remain, an in-combination assessment is likely to be required. If an adverse effect on the integrity of the site remains, the assessment would have to proceed to the derogations, or stages 3 and 4 of HRA (see Table 1 and Figure 4 in Section 1 above).

Following an in-combination assessment of any residual effects (if required), an overall Formal Integrity Test for the proposed works will be reported.

Information about the qualifying features of the sites has been obtained from the JNCC and NRW web-sites.

Table 8. Appropriate Assessment for Pollution Impacts

Pen Llyn a'r Sarnau SAC (146,010.52 ha)	Features at risk Large shallow inlets and bays Reefs Otter (*Lutra lutra*)

Assessment without mitigation

The Pen Llyn a'r Sarnau SAC supports a number of estuarine and marine habitats and species, and the proposed works will take place directly adjacent to the SAC. Much of the SAC is marine but extensive intertidal areas are also included. Of the nine habitats for which the site is designated, those in closest proximity to the proposals include 'large shallow inlets and bays' which is present adjacent to the proposed works area, and 'reefs' which are also present nearby (See Appendix C).

The Pen Llyn a'r Sarnau SAC is also designated for a number of qualifying species, including its population of otters, which are known to range far and wide within and beyond the boundaries of the SAC to forage, breed, rest and commute. Whilst predominantly aquatic, they will use riparian land for foraging and resting and are susceptible to disturbance or changes in prey availability. Consequently, the presence and availability of resting places, food and freshwater, are key factors in the maintenance of the overall population.

As reported in the screening stage (Section 3) of this HRA, it is possible that the machinery used for the proposed works on site could be a source of pollution, which could directly affect the habitat and species features discussed above. Such pollution incidents would cause localised pollution of the immediate habitat and water environment, and depending on the scale, flows and tides at the time, could spread locally. There is a risk therefore of pollution causing degradation of habitat features within and adjacent to the works. Likewise, it is possible that any contamination of the intertidal habitat could lead to a reduction in prey availability for the local otter population.

The movement and deposit of sand could also be a source of pollution, should the material be contaminated prior to being moved. To better understand this risk, analysis has been undertaken of the sand that is stockpiled at Carreg yr Imbyll, to identify if the sand can be deposited at the beach safely. Samples were taken of the stockpile during February 2024. The analysis of the samples taken concluded that there were no additional contamination levels found within the stockpiled sand (See laboratory test report Appendix E). It is therefore concluded that the risk of the stockpiled sand at Carreg yr Imbyll being a source of pollution is negligible.

Unmitigated, any pollution release to the environment could potentially undermine conservation objectives of the habitats and otter features of Pen Llyn a'r Sarnau SAC. However, due to the small scale and temporary nature of the work, any pollution incident is likely to be relatively small in scale and there would be a high degree of dilution and dispersion within the marine water environment, particularly during tidal cycles. With this in mind, any effects are likely to be short-term. The likelihood of significant effects on these habitat and species features through contamination is low, however, without mitigation, residual effects could be considered to remain.

Conclusion

Without any mitigation measures in place, there is some risk to the intertidal mudflats and sandflats, estuaries, reefs, and otter features of the identified sites from pollution contamination. Conservation objectives (i)(ii)(iii) (as listed in the table below) of Pen Llyn a'r Sarnau SAC's habitat features could potentially be compromised. Conservation Objective (iii) of Pen Llyn a'r Sarnau SAC's otter feature could also be compromised. Therefore, an adverse effect on the integrity of this site due to pollution

cannot be ruled out without mitigation in place.

Assessment with Mitigation

Given that adverse effects have been identified, this assessment must consider if mitigation measures incorporated within the scheme can provide the competent authority with 'certainty' that no reasonable scientific doubt remains as to the absence of an effect upon the integrity of the European site.

Each of the mitigation measures is considered to cover the criteria identified in the DTA HRA Handbook, namely effectiveness, reliability, timeliness, deliverability, enforcibility and likelihood they will be maintained and persist for however long is necessary. This HRA does not make any distinction between embedded elements of the design that may provide ecological benefits that are secondary to their primary purpose and the bespoke measures specifically designed to avoid, cancel or reduce the impact of the development on site features.

The control of pollution and similar incidents forms a frequent component of most large-scale developments. Consequently, a range of tried and trusted techniques can be adopted to reduce the risk of such events to an acceptably low level or remove them entirely even where sensitive European sites are concerned. This provides a high degree of confidence that they will be successful.

Application of mitigation measures:

Mitigation measures are included in full in Table 9 below, but those involved with reducing or avoiding the potential impact from pollution and habitat degradation can be summarised as follows:

- A Construction Environment Management Plan (CEMP) is to be prepared which will detail what measures will be in place to protect the surrounding environment. Location of adjacent protected sites shall be clearly highlighted.
- Pollution spill kits to be readily available on site within plant/machinery at all times, with staff suitably trained in how to deploy.
- Contractor to have emergency incident response procedure in place in the case of a spillage. Response to include accurate procedure to swiftly remove any contaminated sand/material from site in the case of accidental spillage.
- Contractor to adhere to pollution prevention best practice guidelines, including;
  - PPG1: Understanding your environmental responsibilities.
  - GGP5: Works and maintenance in or near water.
  - PPG6: Working at construction and demolition sites.
  - GPP21: Pollution response planning.
  - GPP22: Dealing with spills.
- Biodegradable lubricant and hydraulic oil to be used in plant machinery where possible. Biodegradable oils are less toxic than most synthetic oil but should still be stored to the same standards as other oils and prevented from entering the water environment.

- No refuelling of vehicles / plant to take place on the shore.
- No material transportation, tipping or profiling works are to take place during high tide. Tidal conditions, including tide tables and tidal ranges are to be monitored by the contractor throughout. Under no circumstance shall vehicle/plant movement take place within the water column.
- All vehicles are to use designated transportation lanes at all times, which will be restricted to the upper 20m of the beach. There shall be no access to mid – to lower shore where trafficking of vehicles may directly impact sensitive marine habitats.
- Contractor to monitor tidal and weather conditions / forecasts and plan work accordingly.

Conclusion

With these mitigation measures in place it is considered that the risk is reduced to the extent that there would be no adverse effect on the integrity of the Pen Llyn a'r Sarnau SAC, with no residual effects on any of the Conservation Objectives of the features of these sites.

Conservation objectives

Impact on Conservation Objectives – Pen Llyn a'r Sarnau SAC	
Conservation Objectives for 'Large shallow inlets and bays' and 'Reefs'. The vision for this feature is for it to be in favourable conservation status, where all the following conditions are satisfied:	**Outcome**
(i) The overall distribution and extent of the habitat features within the site, and each of their main component parts is stable or increasing. For the reef feature these include: - Rocky intertidal reefs - Rocky subtidal reefs - Extensive boulder and cobble reefs – the Sarnau - Biogenic reefs (horse mussel Modiolus modiolus reef / green crenella Musculus discors reef and Honeycomb worm Sabellaria alveolata reef - Carbonate reef formed by methane gas leaking from the seabed. Restoration and recovery As part of this objective it should be noted that; for the estuaries feature, additional land which should form an integral part of the estuarine ecosystem should be restored.	No adverse effect on integrity; No residual effects
(ii) The physical, biological and chemical structure and functions necessary for the long-term maintenance and quality of the habitat	No adverse effect on integrity; No residual

are not degraded. Important elements include: - geology - sedimentology - geomorphology, - hydrography and meteorology - water and sediment chemistry - biological interactions. This includes a need for nutrient levels in the water column and sediments to be: - at or below existing statutory guideline concentrations - within ranges that are not potentially detrimental to the long-term maintenance of the features species populations, their abundance and range. Contaminant levels in the water column and sediments derived from human activity to be: - at or below existing statutory guideline concentrations - below levels that would potentially result in increase in contaminant concentrations within sediments or biota - below levels potentially detrimental to the long-term maintenance of the feature species populations, their abundance or range taking into account bioaccumulation and biomagnification.	effects
(iii) The presence, abundance, condition and diversity of typical species are such that habitat quality is not degraded. Important elements include: - species richness, - population structure and dynamics, - physiological heath, - reproductive capacity, - recruitment, - mobility, - range. As part of this objective it should be noted that; for the reefs feature the potential for expansion of the horse mussel Modiolus modiolus community off the north Llŷn coast is not inhibited.	No adverse effect on integrity; No residual effects
Conservation Objectives for 'Otter' To achieve favourable conservation status, all the following, subject to natural processes, need to be fulfilled and maintained in the long-term:	Outcome

(i) The population is maintaining itself on a long-term basis as a viable component of its natural habitat. Important elements include: • population size • structure, production • condition of the species within the site.	No adverse effect on integrity; No residual effects
(ii) The species population within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future. (iii) As part of this objective it should be noted that for otter: • Their range within the SAC and adjacent inter-connected areas is not constrained or hindered • There are appropriate and sufficient food resources within the SAC and beyond • The sites and amount of supporting habitat used by these species are accessible and their extent and quality is stable or increasing	No adverse effect on integrity; No residual effects
(iv) The presence, abundance, condition and diversity of habitats and species required to support this species is such that the distribution, abundance and populations dynamics of the species within the site and population beyond the site is stable or increasing. Important considerations include; • distribution • extent • structure • function and quality of habitat • prey availability and quality. As part of this objective it should be noted that; • The abundance of prey species subject to existing commercial fisheries needs to be equal to or greater than that required to achieve maximum sustainable yield and secure in the long term. • The management and control of activities or operations likely to adversely affect the species feature is appropriate for maintaining it in favourable condition and is secure in the long term. • Contamination of potential prey species should be below concentrations potentially harmful to their physiological health. • Disturbance by human activity is below levels that suppress reproductive success, physiological health or long-term behaviour • There are sufficient sources within the SAC and beyond of high quality freshwater for drinking and bathing.	No adverse effect on integrity; No residual effects

Populations should be increasing.	No adverse effect on integrity; No residual effects

Integrity Test

Integrity test:	Pollution Impacts: Without mitigation there is a low risk of pollution leading to degradation of habitats and species adjacent to the proposed works area. This could potentially undermine Conservation Objectives of two habitat features and one species feature of the Pen Llyn a'r Sarnau SAC. However, when the proposed mitigation measures are taken into account, it is considered that the risk would be reduced sufficiently to consider that there would be no adverse effect on the integrity of the protected site, with no residual effects.
Residual effects / In combination:	As it is considered that the mitigation measures proposed would reduce the risk to such an extent that there would be no residual effects, there is no need to consider these impacts in combination with other plans or projects.

Table 9. Appropriate Assessment for potential habitat degradation and loss.

Pen Llyn a'r Sarnau SAC (146,010.52 ha)	Features at risk Large shallow inlets and bays
Assessment without mitigation	
The Pen Llyn a'r Sarnau SAC supports a number of estuarine and marine habitats and species, and the proposed works will take place directly adjacent to the SAC. Much of the SAC is marine but extensive intertidal areas are also included. Of the nine habitats for which the site is designated, those in closest proximity to the proposals include 'large shallow inlets and bays' which is present adjacent to the proposed works area, (See Appendix C). The gravelly beach at Traeth Crugan supports the nationally rare amphipod *Pectenogammarus planicrurus*. This forms part of the SAC's 'large shallow inlet and bays' feature. As reported in the screening stage (Section 3) of this HRA, it is possible that the beach nourishment activities could have an impact on the Pectenogammarus habitat in the vicinity of the proposals. Without appropriate consideration of the location of the beach nourishment activity there is risk of suffocating the Pectenogammarus that inhabits the shingle below the MHWS contour. This could be by directly depositing on to such habitat, or through large scale erosion of the nourishment material, and this material subsequently being deposited with the Pectenogammarus habitat, again suffocating this habitat. The transportation along the beach (and SAC boundary) also needs to be considered in terms of potential damage / degradation of SAC habitat. Dredged sand and gravel from the harbour, located approximately two and half miles east, will be transported along Traeth Crugan beach to the beach nourishment deposit area. This will require the use of 40-ton dumper trucks. This transportation	

activity also has potential to cause damage to the Pectenogammarus habitat that forms part of the SAC's 'large shallow inlet and bays feature', through rutting, compactions and physical disturbance of the shingle hanbiat.

Unmitigated, such activity could potentially undermine conservation objectives of the large shallow inlets and bays habitat features of Pen Llyn a'r Sarnau SAC.

Conclusion

Without any mitigation measures in place, there is some risk to the intertidal mudflats and sandflats features of the identified sites from habitat degradation. Conservation objectives (i)(ii)(iii) (as listed in the table below) of Pen Llyn a'r Sarnau SAC's habitat features could potentially be compromised. Therefore, an adverse effect on the integrity of this site due to habitat degradation or loss cannot be ruled out without mitigation in place.

Assessment with Mitigation

Given that adverse effects have been identified, this assessment must consider if mitigation measures incorporated within the scheme can provide the competent authority with 'certainty' that no reasonable scientific doubt remains as to the absence of an effect upon the integrity of the European site.

Each of the mitigation measures is considered to cover the criteria identified in the DTA HRA Handbook, namely effectiveness, reliability, timeliness, deliverability, enforcibility and likelihood they will be maintained and persist for however long is necessary. This HRA does not make any distinction between embedded elements of the design that may provide ecological benefits that are secondary to their primary purpose and the bespoke measures specifically designed to avoid, cancel or reduce the impact of the development on site features.

The following mitigation measures are designed to reduce potential impacts from habitat degradation and loss:

The proposals involve depositing sand and gravels on the upper beach, above mean high water spring (MHWS). The beach nourishment will be carried out at the same locations that nourishment works have previously been taking place in the past, every four to five years since 2002. The nourishment offers some protection to the landward dune system, and therefore will only be winnowed naturally by the more extreme events. This long term winnowing will mitigate the risk of suffocating the Pectenogammarus that inhabits the shingle below the MHWS contour.

The proposals to deposit beach nourishment material above mean high water have been undertaken in the past following advice and recommendations from NRW, and the latest proposals will follow suit. As with previous beach nourishment activities at this location, the deposit will create a raised ridge immediately in front of the dune system to help mitigate erosion. The drift direction at this point is west to east, so effectively the material is being returned to more or less where it originated from.

As well as the deposit of nourishment material, the transportation along the beach (and SAC boundary) also needs to be considered in terms of potential damage / degradation of SAC habitat. Dredged sand and gravel from the harbour, located approximately two and half miles east, will be transported along Traeth Crugan beach to the beach nourishment deposit area. This will require the use of 40-ton dumper trucks.

Designated lanes will be used to transport the material along the beach, and these lanes will be restricted to the upper 20m beach, ensuring no encroachment onto Pectenogammarus habitat. If there are areas along the route where clay horizons are at risk of becoming exposed (and damaged through vehicle movement), the nourishment material will be tipped along the route to protect any such areas.

The above method has been drawn up, and previously tested during past nourishment activity, to ensure that there is no impact on the SAC and SSSI features. It is therefore deemed that the risk of causing loss or degradation to SAC habitat is unlikely and no significant effects are predicted.

Conclusion

With these mitigation measures in place it is considered that the risk is reduced to the extent that there would be no adverse effect on the integrity of the Pen Llyn a'r Sarnau SAC, with no residual effects on any of the Conservation Objectives of the features of these sites.

Impact on Conservation Objectives – Pen Llyn a'r Sarnau SAC	
Conservation Objectives for 'Large shallow inlets and bays'. The vision for this feature is for it to be in favourable conservation status, where all the following conditions are satisfied:	**Outcome**
(iv) The overall distribution and extent of the habitat features within the site, and each of their main component parts is stable or increasing. For the reef feature these include: - Rocky intertidal reefs - Rocky subtidal reefs - Extensive boulder and cobble reefs – the Sarnau - Biogenic reefs (horse mussel Modiolus modiolus reef / green crenella Musculus discors reef and Honeycomb worm Sabellaria alveolata reef - Carbonate reef formed by methane gas leaking from the seabed. Restoration and recovery As part of this objective it should be noted that; for the estuaries feature, additional land which should form an integral part of the estuarine ecosystem should be restored.	No adverse effect on integrity; No residual effects
(v) The physical, biological and chemical structure and functions necessary for the long-term maintenance and quality of the habitat are not degraded. Important elements include: - geology - sedimentology - geomorphology, - hydrography and meteorology	No adverse effect on integrity; No residual effects

	- water and sediment chemistry - biological interactions. This includes a need for nutrient levels in the water column and sediments to be: - at or below existing statutory guideline concentrations - within ranges that are not potentially detrimental to the long-term maintenance of the features species populations, their abundance and range. Contaminant levels in the water column and sediments derived from human activity to be: - at or below existing statutory guideline concentrations - below levels that would potentially result in increase in contaminant concentrations within sediments or biota - below levels potentially detrimental to the long-term maintenance of the feature species populations, their abundance or range taking into account bioaccumulation and biomagnification.	
(vi)	The presence, abundance, condition and diversity of typical species are such that habitat quality is not degraded. Important elements include: - species richness, - population structure and dynamics, - physiological heath, - reproductive capacity, - recruitment, - mobility, - range.	No adverse effect on integrity; No residual effects

Integrity Test

Integrity test:	Pollution Impacts: Without mitigation there is a risk of beach nourishment activities leading to degradation and potential loss of habitats adjacent to the proposed works area. This could potentially undermine Conservation Objectives of the large shallow inlet and bays habitat feature of the Pen Llyn a'r Sarnau SAC. However, when the proposed mitigation measures are taken into account, it is considered that the risk would be reduced sufficiently to consider that there would be no adverse effect on the integrity of the protected site, with no residual effects.
Residual effects / In combination:	As it is considered that the mitigation measures proposed would reduce the risk to such an extent that there would be no residual effects, there is no need to consider these impacts in combination with other plans or projects.

Table 10. Mitigation Measures Proposed to Reduce or Avoid Impacts on European Sites

Mitigation Proposed	Impact Reduced/Avoided	European Site Affected	Site Features Affected
• A Construction Environment Management Plan (CEMP) is to be prepared which will detail what measures will be in place to protect the surrounding environment. Location of adjacent protected sites shall be clearly highlighted. • Pollution spill kits to be readily available on site within plant/machinery at all times, with staff suitably trained in how to deploy. • Contractor to have emergency incident response procedure in place in the case of a spillage. Response to include accurate procedure to swiftly remove any contaminated sand/material from site in the case of accidental spillage. • Contractor to adhere to pollution prevention best practice guidelines, including; - PPG1: Understanding your environmental responsibilities. - GGP5: Works and maintenance in or near water. - PPG6: Working at construction and demolition sites. - GPP21: Pollution response planning. - GPP22: Dealing with spills. • Biodegradable lubricant and hydraulic oil to be used in plant machinery where possible. Biodegradable oils are less toxic than most synthetic oil but should still be stored to the same standards as other oils and prevented from entering the water environment. • No refuelling of vehicles / plant to take place on the shore. • No material transportation, tipping or profiling works are to take place during high tide. Tidal conditions, including tide tables and tidal ranges are to be monitored by the contractor throughout. Under no circumstance shall vehicle/plant movement take place within the water column. • All vehicles are to use designated transportation lanes at all times, which will be restricted to the upper 20m of the beach. There shall be no access to mid – to lower shore where trafficking of vehicles may directly impact sensitive marine habitats.	Pollution of marine environment and otter foraging habitat.	Pen Llyn a'r Sarnau SAC	Large shallow inlets and bays Reefs Otter

• Contractor to monitor tidal and weather conditions / forecasts and plan work accordingly. • Works are to take place during daylight hours only to avoid potential disturbance to nocturnal species.			
• Beach nourishment materials to be deposited on the upper beach, above Mean High Water Spring (MHWS). • Designated lanes to be used to transport material along the beach. These lanes to be restricted to the upper 20m of beach.	Degradation and loss of habitat	Pen Llyn a'r Sarnau SAC	Large shallow inlets and bays

6.0 IN-COMBINATION ASSESSMENT

6.1 Purpose

The test for likely significant effect in Regulation 63(1) of the Habitats Regulations is that effects should be assessed 'either alone *or* in combination with other plans or projects'.

For the avoidance of doubt, the Regulations identify that an in-combination assessment is required only during the screening stage and only where an impact is identified which would have an insignifcant effect on its own (a 'residual' effect) but where likely significant effect may arise cumulatively with other plans or projects.

Cumulative effects are those which make the effect more likely or more significant. Thus, where likely significant effects can be ruled out alone, there is no need for an assessment in combination because if there is no effect, it cannot add anything to an in-combination or cumulative assessment.

At the screening stage of the assessment, however, it can be difficult to distinguish between likely significant and insignificant effects where the exercise is meant to be brief. This HRA therefore assumes that any credible effect identified is assessed *alone with no residual effects.* This allows all possible effects to be captured for more detailed scrunity in the appropriate assessment.

Despite this, further scrutiny may modify this opinion and the need for an in-combination assessment may subsequently be required as described in the Handbook:

'…at a later stage when the appropriate assessment concludes that a plan or project screened as having a likely significant effect alone will not, upon further investigation, be likely to have such an effect alone, but could have such an effect in combination. In (this) situation, the approproate assessment will need to be extended, in order to address in combination effects to inform the intregrity test bearing in mind the potential for cumulative effects.'

As a result, in-combination effects are therefore considered in the appropriate assessment, which has two functions. The first function is to consider whether further scrutiny of the appropriate assessment can identify that an effect, previously identified as significant alone, was not of sufficient magnitude to justify this outcome and should have been identified as a residual effect and considered in-combination.

Secondly, it explores if possible residual adverse effects on the integrity of the site that were ruled out alone could lead to a significant adverse effect when considered in-combination. This employs best practice by considering cumulative effects at all stages of the HRA.

As this HRA concluded that the level of risk associated with each of the identified likely significant effects merited appropriate assessment *alone*, there were *no residual effects* and no need for an in-combination assessment. Furthermore, it found that the outcome of the Appropriate Assessment stage was no adverse effect on site integrity with no residual effects for any of the impacts identified. Therefore, there is no need to carry out the additional in-combination assessment of these potential impacts. The individual Integrity Tests for each issue evaluated in the appropriate assessment therefore stand with no need for further scrutiny and can be carried forward into the Formal Integrity Test in Section 7.

7.0 FORMAL INTEGRITY TEST / CONCLUSION

This HRA subjected the potential effects of the proposed works to an appropriate assessment and integrity test in accordance with the statutory procedures laid out in the Habitats Regulations 2017 (as amended) using methodology described in the Habitats Regulations Assessment Handbook (Tyldsley and Chapman, 2018 edition). As a result of this assessment, it can be ascertained that:

In terms of potential pollution of the adjacent marine habitat during beach nourishment activities leading to degradation of habitat features and of the prey population of the otter feature of the Pen Llyn a'r Sarnau SAC, it was considered that with mitigation in place, there would be no adverse effect on the integrity of these sites, with no residual effects.

Although this HRA has been prepared to help the Authority discharge its duties under the Habitats Regulations, the Authority remains the competent authority and it must decide whether to adopt the conclusions and recommendations of this report, or otherwise, for the purpose of their own assessment. If accepted, consultation with the statutory nature conservation body is required.

8.0 REFERENCES

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APPENDICES

Appendix A: European sites potentially at risk (full table)

Types of project (or potential effect)	Sites to scan for and check	Initial list of potentially affected sites	Additional context	Final list of European sites potentially at risk
(1)All projects (terrestrial, marine, coastal)	Sites within which the project is wholly or partially located	Pen Llyn a'r Sarnau SAC	This criterion identifies all the European sites within the footprint of the scheme. The proposals are directly adjacent to and partly within the boundary of the Pen Llyn a'r Sarnau SAC.	Pen Llyn a'r Sarnau SAC
(2) Projects that could affect wetland features	(a) Sites upstream or downstream of the project location in the case of river or estuary sites (b) Open water, peatland, fen, marsh and other wetland sites with relevant hydrological links to the project, irrespective of distance from the project location	Pen Llyn a'r Sarnau SAC Northern Cardigan Bay SPA Corsydd Llyn SAC Corsydd Môn a Llyn RAMSAR	Effects considered are those associated with the physical presence of built development and the localised effects on surface/groundwater resources and quality, resulting from changes in run-off, sedimentation, erosion, etc. The proposed works lie adjacent to Pen Llyn a'r Sarnau SAC, a marine site (see Criterion (3) below). Northern Cardigan Bay SPA is hydrologically connected. (see Criterion (3) below) Corsydd Llyn SAC and Corsydd Môn a Llyn RAMSAR are located 2km northwest of the proposed works. Although both sites have wetland features, they are located fluvially upstream from the proposed works therefore there is no fluvial pathway from Traeth Crugan. It is therefore considered highly unlikely that the proposals pose a risk of impacting upon the features of these two sites. Effects on Corsydd Llyn SAC and Corsydd Môn a Llyn RAMSAR are therefore scoped out.	See Criterion (3) below
(3) Projects that could affect the	Sites that could be affected by changes in water quality,	Pen Llyn a'r Sarnau SAC	Effects considered are those of a wider, more strategic scale than (2) above.	Pen Llyn a'r Sarnau SAC

Types of project (or potential effect)	Sites to scan for and check	Initial list of potentially affected sites	Additional context	Final list of European sites potentially at risk
marine environment	currents or flows; or effects on the intertidal or sub-tidal areas, or the seabed, or marine species	Northern Cardigan Bay SPA	There is some potential for the proposed works to cause adverse pollution impacts on the immediate and surrounding Pen Llyn a'r Sarnau SAC habitats during proposed works. Beach management operations have the potential to affect the hydraulic conditions of the surrounding coastal environment, which could lead to impacts upon coastal processes and long term impacts upon nearby habitats. In this case, the sand is being moved within the same coastal cell, therefore it is not likely that there will be any significant change in the hydraulic conditions as a result of the works, however this is to be assessed further. Direct damage to SAC habitat also needs to be considered further given the proximity. Northern Cardigan Bay SPA is hydrologically connected, located 4.7km east on the seaward side of the proposals. Due to the scale and nature of the works proposed and the distance of the site from the proposals, any impacts to the marine environment which form a supporting habitat for the SPA features are considered unlikely.	
(4) Projects that could affect the coast	Sites in the same coastal 'cell', or part of the same coastal ecosystem, or where there are interrelationships with or between different physical coastal processes	See (3) above. Pen Llyn a'r Sarnau SAC Clogwyni Pen Llyn SAC	Effects considered are those of a wider, more strategic scale than (2) above. Also see (3) above. Effects on the coastal features of the Pen Llyn a'r Sarnau SAC are considered in (3) above. Clogwyni Pen Llyn SAC is located 7.6km west of the proposals, along the coastline of the Llyn Peninsula.	See (3) above.

Types of project (or potential effect)	Sites to scan for and check	Initial list of potentially affected sites	Additional context	Final list of European sites potentially at risk
			It is not considered that this site lies within the same coastal 'cell' as where the proposed works are taking place, and given the distance of the site from the proposed works it is not anticipated that there will be any impacts upon the features of this site as a result of the works.	
(5) Projects that could affect mobile species	Sites whose qualifying features include mobile species which may be affected by the project irrespective of the location of the location of the project or whether the species would be in or out of the site when they might be affected	Pen Llyn a'r Sarnau SAC Northern Cardigan Bay SAC	This considers direct impacts of the scheme on mobile species within or outside the designated sites. Mobile species are those considered to spend part of their life-cycle on land, in water or air beyond the designated site boundary. Typically, it focuses on potential impacts on functionally-linked land and water utilised by bird, mammals or fish associated with European sites. Note that 'indirect' effects on mobile species on functionally – linked land or water beyond the development site, is considered under other criteria below, such as '6. Recreational pressure', and '14. Disturbance'. Otter is a mobile species feature of the Pen Llyn a'r Sarnau SAC. This species could utilise land within or adjacent to the area of proposed works for foraging. Grey seal and bottle nose dolphin are also features of the Pen Llyn a'r Sarnau SAC, which could be affected by pollution impacts or disturbance during the works. There is also potential for effect on the foraging habitats of the red-throated diver feature of the Northern Cardigan Bay SPA.	Pen Llyn a'r Sarnau SAC Northern Cardigan Bay SPA
(6) Projects that	(a)European sites within which	None	The project is not considered to increase recreational	None

Types of project (or potential effect)	Sites to scan for and check	Initial list of potentially affected sites	Additional context	Final list of European sites potentially at risk
could increase recreational pressure on European sites where qualifying features are sensitive to such pressures	the project would be wholly or partly located (b)Such European sites within an agreed zone of influence or other reasonable and evidence-based travel distance of the project location that may be affected by local recreational or other visitor pressure generated by the project (c) Such European sites within an agreed zone of influence or other evidence-based longer travel distance of the project, which are major (regional or national) visitor attractions such as European sites which are National Nature Reserves where public visiting is promoted, sites in National Parks, coastal sites and sites in other major tourist or visitor destinations		pressure on European sites. Therefore, direct effects on European sites from increased recreational pressure can be ruled out of any further consideration.	
(7) Projects which could increase the amount of	(a) Sites that are used for, or could be affected by, water abstraction irrespective of distance from the project	None	The proposed works would not comprise of any such activities. Therefore, direct effects on European sites from increased development can be ruled out of any further consideration.	None

Types of project (or potential effect)	Sites to scan for and check	Initial list of potentially affected sites	Additional context	Final list of European sites potentially at risk
development	(b) Sites used for, or could be affected by, discharge of effluent from wastewater treatment works or other waste management streams serving the project, irrespective of distance from the project			
	(c) Sites that could be affected by the provision of new or extended transport or other infrastructure			
	(d) Sites that could be affected by increased deposition of air pollution arising from the proposals, including emissions from significant increases in traffic			
(8) Projects comprising linear developments or infrastructure	Sites within a specified distance from the centre line of the proposed route (or alternative routes), the distance may be varied for differing types of site/qualifying features and in the absence of established good practice standards, distances(s) to be agreed by the statutory conservation body	None	This HRA has adopted a 10km radius in which to evaluate the potential impacts of the proposed works. Individual effects are identified in other criteria. This criterion does not identify the types of potential impacts which are, instead, more closely defined by other criteria as listed above or below. Therefore, column 5 has been left blank as attention is drawn to more specific criteria.	See other criteria
(9) Projects that	Sites considered to have	None	The project is not considered to introduce new activities or	None

Types of project (or potential effect)	Sites to scan for and check	Initial list of potentially affected sites	Additional context	Final list of European sites potentially at risk
introduce new activities or new uses into the marine, coastal or terrestrial environment	qualifying features potentially vulnerable or sensitive to the effects of the new activities proposed by the project		uses into the environment.	
(10) Projects that could change the nature, area, extent, intensity, density, timing or scale of existing activities or uses	Sites considered to have qualifying features potentially vulnerable or sensitive to the effects of the changes to existing activities proposed by the project	None	The project is not considered to change the nature, area, extent, intensity, density, timing or scale of existing activites or uses in a way that would pose a threat to any habitat or species features of the protected sites.	None
(11) Projects that could change the quantity, quality, timing, treatment or mitigation of emissions or discharges to air, water or soil harvested, extracted or consumed	Sites considered to have qualifying features potentially vulnerable or sensitive to the changes in emissions or discharges that could arise as a result of the project, over and above those already identified	None	The project is not considered to change the the quantity, quality, timing, treatment or mitigation of any emissions or discharges to air, water or soil harvested, extracted or consumed.	None
(12) Projects	Sites whose qualifying features	None	No such activities are proposed and changes to biological	None

Types of project (or potential effect)	Sites to scan for and check	Initial list of potentially affected sites	Additional context	Final list of European sites potentially at risk
that could change the quantity, volume, timing, rate or other characteristics of biological resources harvested, extracted or consumed	include the biological resources which the project may affect, or whose qualifying features depend on the biological resources which the project may affect, for example prey species or supporting habitat which may be disturbed by the harvesting, extraction or consumption		resources that might affect qualifying features on all European sites listed can be ruled out of any further consideration.	
(13) Projects that could change the quantity, volume, timing, rate, or other characteristics of physical resources extracted or consumed	Sites whose qualifying features rely on the physical resources which the project may affect, for example, as habitat or a physical environment on which habitat may develop or which may be disturbed by the extraction or consumption	None	The proposed works would not cause changes to any physical resources extracted or consumed.	None
(14) Projects which could introduce or increase, or alter the timing, nature or location of disturbance to species	Sites whose qualifying features are considered to be potentially sensitive to disturbance, for example as a result of noise, activity or movement or the presence of disturbing features that could be brought about by the project	Pen Llyn a'r Sarnau SAC Northern Cardigan Bay SAC.	There is a small risk of temporary disturbance to otters, a qualifying feature of the Pen Llyn a'r Sarnau SAC, during the nourishment activity. Similarly, the proposed works could lead to temporary disturbance of grey seal and bottlenose dolphin feature of the Pen Llyn a'r Sarnau SAC. It is not considered likely that there would be significant effects from distubance on the red throatad diver feature of the Northern Cardigan Bay SAC due to there being no	Pen Llyn a'r Sarnau SAC

Types of project (or potential effect)	Sites to scan for and check	Initial list of potentially affected sites	Additional context	Final list of European sites potentially at risk
			activity within the marine environment and the distance of the proposals from the site.	
(15) Projects which could introduce or increase or change the timing, nature or location of light or noise pollution	Sites whose qualifying features are considered to be potentially sensitive to the effects of changes in light or noise that could be brought about by the project	Pen Llyn a'r Sarnau SAC Northern Cardigan Bay SAC.	There would be some localised temporary noise pollution during the short period required to transport material for the beach nourishment activity, which could potentially cause a low level of disturbance to otters, grey seal and bottlenose dolphin features of the Pen Llyn a'r Sarnau SAC. There would be no additional artificial lighting of the site. It is not considered likely that there would be significant effects from noise pollution on the red throatad diver feature of the Northern Cardigan Bay SAC due to there being no activity within the marine environment and the distance of the proposals from the site.	Pen Llyn a'r Sarnau SAC
(16) Projects which could introduce or increase a potential cause of mortality of species	Sites whose qualifying features are considered to be potentially sensitive to the source of new or increased mortality that could be brought about by the project	None	The project would not introduce or increase a potential cause of mortality of species.	None

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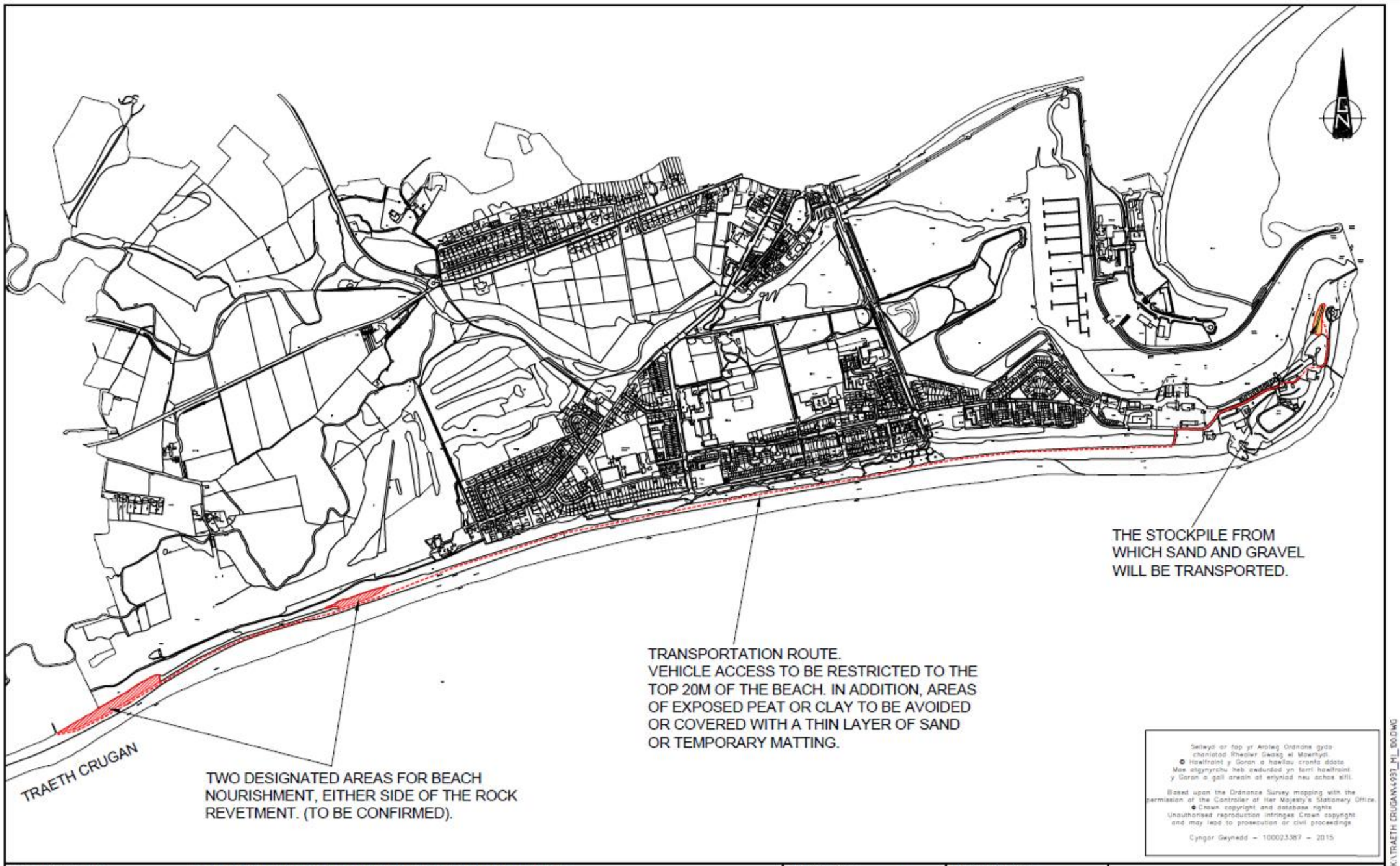
Appendix B: Areas for Beach Nourishment and Transport Route



Seiliwyd ar fap yr Arolwg Ordnans gyda chaniatad Rheolwr Gwasg ei Mawrhydi.
© Hawlfraint y Goron a hawliau cronfa ddata. Mae atgynyrchu neb awdurdod yn torri hawlfraint y Goron a gall arwain at erlyniad neu achos sifil.

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Cyngor Gwynedd – 100023387 – 2015

CYNLLUN / SCHEME: TRAETH CRUGAN BEACH NOURISHMENT	DARLUNWYD GAN: DRAWN BY: EH	DYDDIAD DARLUNWYD: DATE DRAWN: 24/08/2015	
	GWIRIWYD GAN: CHECKED BY: DWC	DYDDIAD GWIRIWYD: DATE CHECKED: 24/08/2015	
TEITL LLUNIAD / DRAWING TITLE: AREAS FOR BEACH NOURISHMENT AND TRANSPORT ROUTE	Taflen Sheet 1 o of 1	GRADDFEYDD: SCALES: 1:10,000@A3	
	Rhif Lluniad Drawing No. 4937/MI/100		CYM REV

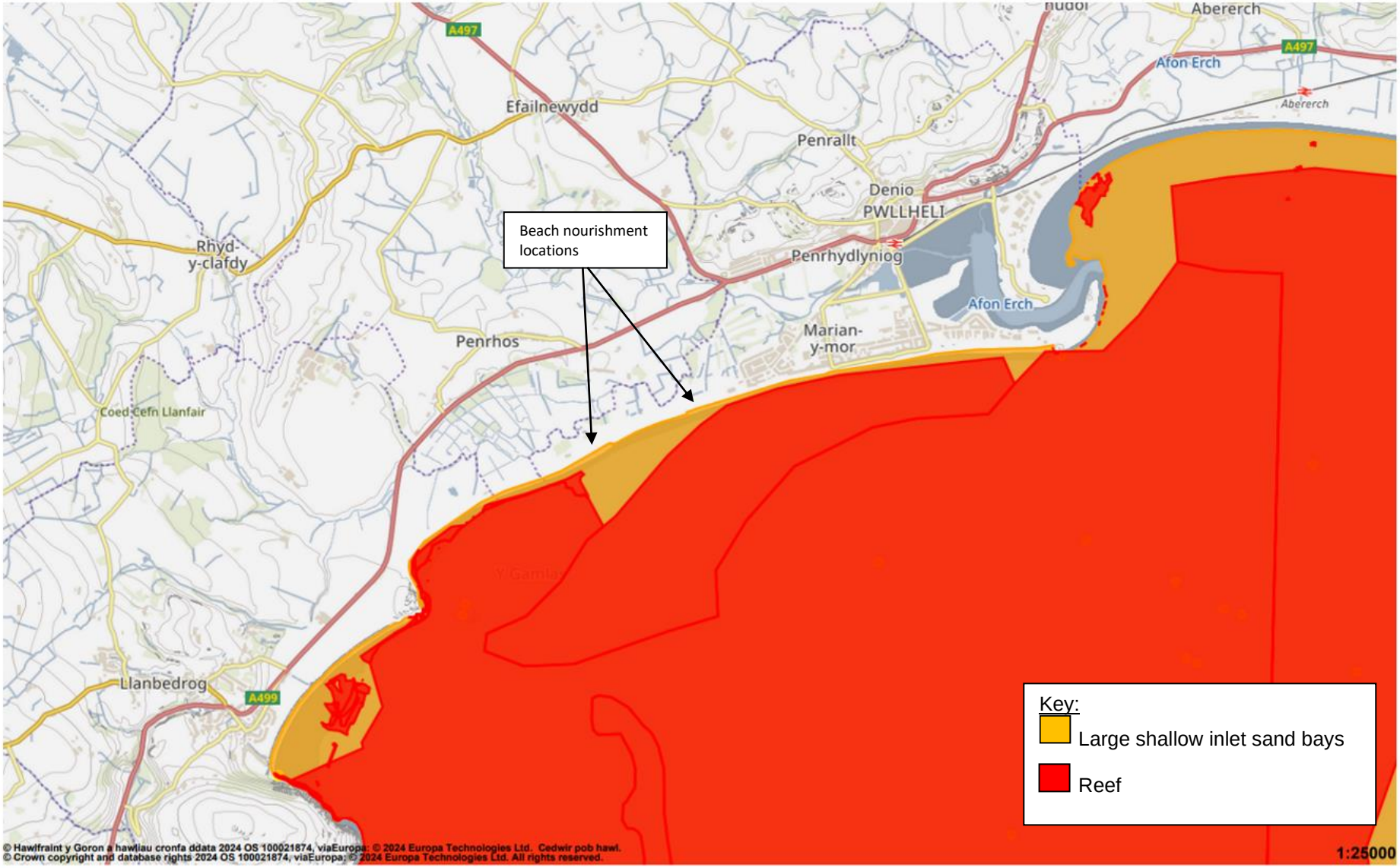
YGC RRLEA FCERM

CYNGOR GWYNEDD COUNCIL

K:\TRAETH CRUGAN\4937_MI_100.DWG

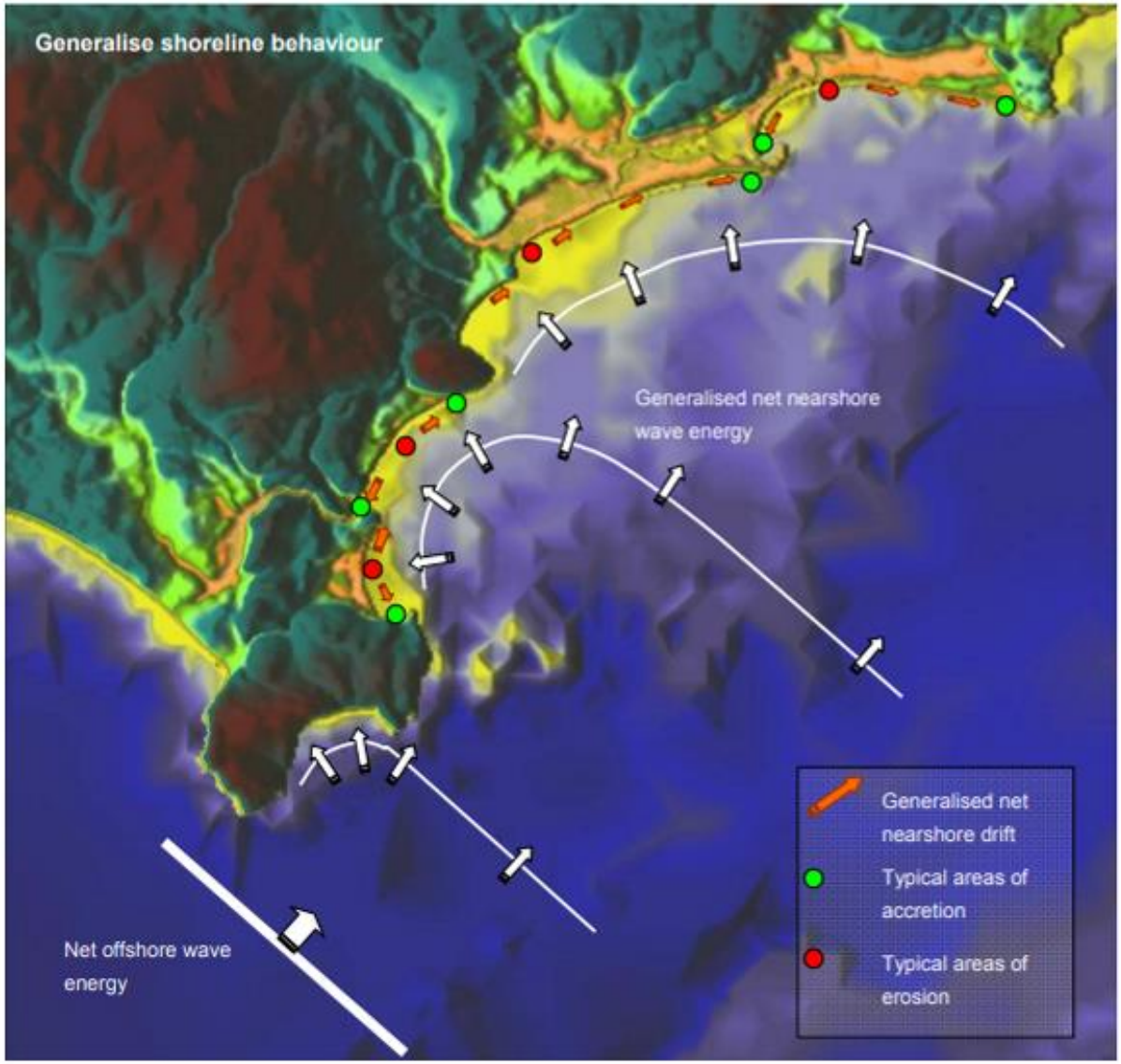
24/08/2015 11:07:47

Appendix C – SAC Features (Data Map Wales)



06/08/2024

Appendix D – Coastal processes



Generalise shoreline behaviour. Source: SMP2

Conceptual understanding of sediment transport

Source: ABPmer 2022 R.4115

Appendix E – Stockpile analysis

SOCOTEC
Environmental Chemistry

Certificate of Analysis

Client: YGC

Project: 24022057

Quote: BEC240133694 V1.1

Project Ref: 8603

Site: Pwllhfli Harbour Stockpile

Contact: Eifion Glyn. Davies

Address: Council Offices
Ffordd y Cob
Pwllheli
Gwynedd
LL53 5AA

E-Mail: eifionglyndavies@gwynedd.llyw.cymru

Phone: 07920577054

No. Samples Received: 6

Date Received: 19/02/2024

Analysis Date: 28/02/2024

Date Issued: 28/02/2024

Report Type: Final Version 01

This report supersedes any versions previously issued by the laboratory

S. Edwards.

Reported by Customer Service Co-Ordinator
Samantha Edwards

SOCOTEC

Client: YGC
Project Name: 8603-Pwllhfli Harbour Stockpile
Project No: 24022057
Date Issued: 28/02/2024

Samples Analysed

Text ID	Sample Reference	Sampling Date	Sample Type	Sample Description
24022057-001	SP1	15/02/2024 14:00:00	SOLID	Soil Sample
24022057-002	SP2	15/02/2024 14:05:00	SOLID	Soil Sample
24022057-003	SP3	15/02/2024 14:07:00	SOLID	Soil Sample
24022057-004	SP4	15/02/2024 14:15:00	SOLID	Soil Sample
24022057-005	SP5	15/02/2024 14:23:00	SOLID	Soil Sample
24022057-006	SP6	15/02/2024 14:29:00	SOLID	Soil Sample

SOCOTEC

Client: YGC
Project Name: 8603-Pwllhfli Harbour Stockpile
Project No: 24022057
Date Issued: 28/02/2024

UKAS TESTING 1252

mCERTS

Analysis Results

Analysis	Method Code	MDL	Units	Accred.	001 SP1 SOLID 15/02/2024	002 SP2 SOLID 15/02/2024	003 SP3 SOLID 15/02/2024	004 SP4 SOLID 15/02/2024	005 SP5 SOLID 15/02/2024	006 SP6 SOLID 15/02/2024
Arsenic as As	ICPMSS	0.3	mg/kg^	UM	3.4	3.7	3.9	3.8	5.3	3.4
Cadmium as Cd	ICPMSS	0.2	mg/kg^	UM	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Copper as Cu	ICPMSS	1.6	mg/kg^	UM	3.4	3.2	6.4	3.2	3.0	2.9
Lead as Pb	ICPMSS	0.7	mg/kg^	UM	4.3	4.0	3.7	3.8	3.6	4.2
Mercury as Hg	ICPMSS	0.5	mg/kg^	UM	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nickel as Ni	ICPMSS	2	mg/kg^	UM	6.4	6.9	6.7	6.4	7.5	7.0
Selenium as Se	ICPMSS	0.5	mg/kg^	UM	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total Chromium as Cr	ICPMSS	1.2	mg/kg^	UM	7.1	7.6	7.3	7.8	7.6	7.7
Zinc as Zn	ICPMSS	16	mg/kg^	UM	20.4	23.8	22.0	21.2	23.0	20.8
Boron as B	ICPBOR	0.5	mg/kg^	UM	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	PAHMSUS	0.08	mg/kg^	UM	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Acenaphthylene	PAHMSUS	0.08	mg/kg^	U	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Anthracene	PAHMSUS	0.08	mg/kg^	U	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Benzo[a]anthracene	PAHMSUS	0.08	mg/kg^	UM	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Benzo[a]pyrene	PAHMSUS	0.08	mg/kg^	UM	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Benzo[b]fluoranthene	PAHMSUS	0.08	mg/kg^	UM	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Benzo[g,h,i]perylene	PAHMSUS	0.08	mg/kg^	UM	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Benzo[k]fluoranthene	PAHMSUS	0.08	mg/kg^	UM	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Chrysene	PAHMSUS	0.08	mg/kg^	UM	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08

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Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	001	002	003	004	005	006
					Customer ID	SP1	SP2	SP3	SP4	SP5	SP6
					Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
					Sampling Date	15/02/2024	15/02/2024	15/02/2024	15/02/2024	15/02/2024	15/02/2024
Dibenzo(a,h)anthracene	PAHMSUS	0.08	mg/kg*	UM		<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Fluoranthene	PAHMSUS	0.08	mg/kg*	UM		<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Fluorene	PAHMSUS	0.08	mg/kg*	UM		<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Indeno(1,2,3-cd)pyrene	PAHMSUS	0.08	mg/kg*	UM		<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Naphthalene	PAHMSUS	0.08	mg/kg*	UM		<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Phenanthrene	PAHMSUS	0.08	mg/kg*	UM		<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Pyrene	PAHMSUS	0.08	mg/kg*	UM		<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Total PAH 16	PAHMSUS	1.28	mg/kg*	U		<1.34	<1.32	<1.34	<1.34	<1.33	<1.35
PCB 101	PCBECD	5	µg/kg*	UM		<5.25	<5.15	<5.22	<5.24	<5.20	<5.27
PCB 118	PCBECD	5	µg/kg*	UM		<5.25	<5.15	<5.22	<5.24	<5.20	<5.27
PCB 138	PCBECD	5	µg/kg*	UM		<5.25	<5.15	<5.22	<5.24	<5.20	<5.27
PCB 153	PCBECD	5	µg/kg*	UM		<5.25	<5.15	<5.22	<5.24	<5.20	<5.27
PCB 180	PCBECD	5	µg/kg*	UM		<5.25	<5.15	<5.22	<5.24	<5.20	<5.27
PCB 28	PCBECD	5	µg/kg*	UM		<5.25	<5.15	<5.22	<5.24	<5.20	<5.27
PCB 52	PCBECD	5	µg/kg*	UM		<5.25	<5.15	<5.22	<5.24	<5.20	<5.27
Dibutyltin as Sn	OGSNMS	1	µg Sn/kg*	N		<1	<1	<1	<1	<1	<1
Tributyltin as Sn	OGSNMS	1	µg Sn/kg*	N		<1	<1	<1	<1	<1	<1
Triphenyltin as Sn	OGSNMS	1	µg Sn/kg*	N		<1	<1	<1	<1	<1	<1
Total Moisture at 35°C	CLANDPREP	0.1	%	N		4.7	2.9	4.2	4.6	3.9	5.1

SOCOTEC

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mCERTS

Analysis Results

Analysis	Method Code	MDL	Units	Accred.	Sample ID	001	002	003	004	005	006
					Customer ID	SP1	SP2	SP3	SP4	SP5	SP6
					Sample Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
					Sampling Date	15/02/2024	15/02/2024	15/02/2024	15/02/2024	15/02/2024	15/02/2024
Colour of Material	CLANDPREP		-	N		Brown	Brown	Brown	Brown	Brown	Brown
Major Constituents	CLANDPREP		-	N		SAND	SAND	SAND	SAND	SAND	SAND
Minor Constituents	CLANDPREP		-	N		Gravel	Gravel	Gravel	Gravel	Gravel	Gravel
Miscellaneous Constituents	CLANDPREP		-	N		n/a	n/a	n/a	n/a	n/a	n/a

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Deviating Sample Report

All samples received in an appropriate condition with no deviancies noted with the samples.

Analysis Method

Method Code	Method Description	Analysis Method
CLANDPREP	DW35 - CLand Prep and Dry Weight Correction to 35°C	As Received
CLANDPREP	Solid Material Description	As Received
ICPBOR	Boron (Water Soluble) by ICPOES	Air Dried & Ground
ICPMSS	Arsenic in Solids by ICPMS	Air Dried & Ground
ICPMSS	Cadmium in Solids by ICPMS	Air Dried & Ground
ICPMSS	Chromium in Solids by ICPMS	Air Dried & Ground
ICPMSS	Copper in Solids by ICPMS	Air Dried & Ground
ICPMSS	Lead in Solids by ICPMS	Air Dried & Ground
ICPMSS	Mercury in Solids by ICPMS	Air Dried & Ground
ICPMSS	Nickel in Solids by ICPMS	Air Dried & Ground
ICPMSS	Selenium in Solids by ICPMS	Air Dried & Ground
ICPMSS	Zinc in Solids by ICPMS	Air Dried & Ground
OGSNMS	Organotins Suite (DBT, TBT, TPhT)	As Received
PAHMSUS	16 PAHs by GCMS	As Received
PCBECD	PCBs, ICES 7 Congeners	As Received

Result Report Notes

Letters alongside results signify that the result has associated report notes.
The report notes are as follows:

Letter	Note
A	Due to the matrix of the sample the laboratory has had to deviate from our standard protocols to be able to process the sample and provide a result. Where applicable the accreditation has been removed and this should be taken into consideration when utilising the data.
B	The QC associated with this result has not wholly met the QMS requirements, the accreditation has therefore been removed. However, the Laboratory has confidence in the performance of the method as a whole and that the integrity of the data has not been significantly compromised.
C	Due to matrix interference, the internal standard and/or surrogate has not met the QMS requirements. This should be taken into consideration when utilising the data.
D	A non-standard volume or mass has been used for this test which has resulted in a raised detection limit.
E	Due to the parameter value being beyond our calibration range (and following the maximum size of dilution allowed, where applicable), the result cannot be quantified and as such the result will appear as a greater than symbol (>) with the accreditation removed. This data should be used for indicative purposes only.
F	Based on the sample history, appearance and smell a dilution was applied prior to testing. Unfortunately, the result is either above (>) or below (<) our calibration range. Results above our calibration range have accreditation removed. The data should be used for indicative purposes only.
G	The day 5 oxygen reading was below the capability of the instrument to detect, and therefore the calculated BOD has been reported unaccredited for guidance purposes only.

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HWOL Acronym Key

Acronym	Description
HS	Headspace Analysis
EH	Extractable Hydrocarbons - i.e everything extracted by the solvent(s)
CU	Clean up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
+	Operator to indicate cumulative e.g. EH_CU+HS_1D_Total

Additional Information

This report refers to samples as received. SOCOTEC UK Ltd takes no responsibility for accuracy or competence of sampling by others.

Results within this report relate only to the samples tested.

The accreditation codes are as follows:
U = UKAS accredited analysis
M = MCERT accredited analysis
N = Unaccredited analysis

Any units marked with ^ signify results are reported on a dry weight basis of 35° c.

All Air Dried and Ground Samples (ADG) are oven dried at less than 35° c.

This report shall not be reproduced except in full, without written approval of the laboratory.

Opinions and interpretations given are outside the scope of our UKAS accreditation.

Any samples marked with * are not covered by our scope of UKAS accreditation. If applicable, further report notes have been added.

Any solid samples where the Major Constituents are not one of the following (Sand, Silt, Clay, Made Ground) are not one of our accredited matrix types.

Any samples marked with ‡ have had MCERTS accreditation removed for this result

Any samples marked with a tick in the deviant table is deviant for the specific reason.

Any samples reported as IS, NA, ND mean the following:

IS = Insufficient Sample to complete analysis
NA = Sample is not amenable for the required analysis
ND = Results cannot be determined

Items listed with a 'SUB' method code prefix have been carried out by an external subcontracted laboratory.

Our deviating sample report does not include deviancy information for Subcontracted analysis. Please see the report from the subcontracted lab for information regarding any deviancies for this analysis.

Summaries of analysis methods are available upon request.

End of Certificate of Analysis