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CYNGOR GWYNEDD COUNCIL

Environmental Impact Assessment Screening

Pwllheli Harbour Dredge Disposal

P2843_R6913_Rev1 | 8 May 2026

DOCUMENT RELEASE FORM

CYNGOR GWYNEDD COUNCIL

P2843_R6913_Rev1

Environmental Impact Assessment Screening

Pwllheli Harbour Dredge Disposal

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EXECUTIVE SUMMARY

This Environmental Impact Assessment (EIA) Screening Report has been prepared by Intertek Metoc (Intertek) on the behalf of Cyngor Gwynedd Council (CGC) to request a Screening Opinion from Natural Resource Wales (NRW) under the Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended).

The Proposed Project relates to disposal of maintenance dredging material from Pwllheli Harbour, Gwynedd, north-west Wales to restore and maintain safe navigational depths for marina users. Pwllheli Harbour is an operational marina where dredging is permitted under the Pwllheli Harbour Act 1983; however, existing on-site disposal options are now at capacity. As a result, it is proposed that dredged material is disposed of offshore within the outer bay, approximately 200 metres (m) outside the harbour.

The works comprise a one-off corrective dredge of up to 60,000m³, anticipated in Spring 2027, followed by smaller annual maintenance dredging campaigns of approximately 10,000–20,000m³. Dredging will be undertaken using a cutter suction dredger, producing a slurry that will be transported via pipeline for direct disposal into the marine environment.

The dredged sediments are predominantly fine-grained, comprising mainly silt and clay fractions with smaller proportions of fine sand, consistent with cohesive harbour muds. In contrast, sediments in the outer bay are coarser and sand-dominated, indicating a clear transition between the harbour and receiving environment.

Chemical analysis of Pwllheli Harbour samples indicates generally low to moderate concentrations of heavy metals, including arsenic, cadmium, chromium, copper, mercury, nickel, lead and zinc. While nickel, zinc and some polycyclic aromatic hydrocarbons (PAHs) were occasionally recorded slightly above Cefas Action Level 1, all results remained below Action Level 2, and PAH concentrations were broadly consistent with Irish Sea background levels. Organotins, including tributyltin and dibutyltin, were below detection limits. Further sediment sampling will be undertaken in 2026 to support the Marine Licence Application.

The potential primary environmental effects relate to the physical deposition of sediment at the disposal site. This may result in localised smothering of the seabed and temporary modification of seabed morphology. Finer sediments will disperse within the water column, leading to short-term increases in suspended sediment concentrations and turbidity. These changes may reduce light penetration and temporarily affect primary productivity. However, given the dynamic and tidally influenced nature of the receiving environment, these effects are expected to be short-lived, with natural processes facilitating rapid dispersion and recovery.

Sensitive receptors such as honeycomb worm (*Sabellaria alveolata*) and blue mussel (*Mytilus edulis*) beds are present in the local area. The proposed disposal site lies within a designated Special Area of Conservation (SAC) that supports a range of sensitive habitats and species, including reef systems and eelgrass (*Zostera marina*) beds. Some habitats, particularly eelgrass (*Z. marina)*, are more sensitive to smothering and reduced light availability, whereas others, such as reef and mussel (*M. edulis)* communities, demonstrate greater resilience to temporary disturbance. Overall, the predicted impacts on benthic habitats are expected to be localised and reversible, with recovery occurring through natural recolonisation processes.

Fish species may experience temporary disturbance due to elevated suspended sediments; however, no significant impacts on migration or population viability are anticipated. Marine mammals, including bottlenose dolphin (*Tursiops truncatas)*, may experience minor and short-term disturbance, but these effects are not expected to be significant given the mobility of these species and the availability of alternative habitat.

Similarly, seabirds may experience temporary disturbance and minor reductions in local foraging efficiency due to increased turbidity. However, these effects will be short-term and highly localised, with no anticipated long-term impacts on bird populations or foraging resources.

Potential impacts on water quality are limited to short-term and localised increases in suspended sediment concentration and the possible remobilisation of contaminants, although these are expected to remain within

acceptable limits. No significant cumulative effects have been identified, as there are no concurrent or planned activities in the vicinity that would overlap spatially or temporally with the proposed works. The proposed disposal does not fall within the definitions of projects listed in Schedules A1 and A2 of the EIA Regulations. However, an EIA Screening Opinion is being sought to confirm this. Overall, potential impacts are expected to be localised, temporary and reversible, and are unlikely to result in significant adverse environmental effects at the EIA screening stage.

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GLOSSARY

CCW
Countryside Council for Wales

CD
Chart Datum

CGC
Cyngor Gwynedd Council

CO_2
Carbon Dioxide

EIA
Environmental Impact Assessment

EMP
Environmental Management Plan

HRA
Habitats Regulations Assessment

INNS
Invasive Non-native Species

Intertek
Intertek Metoc

Km
Kilometre(s)

M
Metre(s)

MARPOL
Marine Pollution

MCZ
Marine Conservation Zone

MLA
Marine Licence Application

NRW
Natural Resources Wales

PAH
Polycyclic Aromatic Hydrocarbons

SAC
Special Area of Conservation

SOPEP
Shipboard Oil Pollution Emergency Plan

SPA
Special Protection Area

SSSI
Site of Special Scientific Interest

UK
United Kingdom

UKBF
UK Biodiversity Framework

WFD
Water Framework Directive

1. INTRODUCTION

1.1 Background

This Environmental Impact Assessment (EIA) Screening Report has been prepared by Intertek Metoc (Intertek) on the behalf of Cyngor Gwynedd Council (CGC) to request a Screening Opinion from Natural Resource Wales (NRW) under the Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended). The proposed operation to be licenced is for the disposal of dredging material from the Pwllheli Harbour into Cardigan Bay, Gwynedd, north-west Wales.

This EIA screening document provides supporting information for a formal opinion to determine whether an EIA is required for the proposed deposition of dredging material. This document provides further information on the following:

- A project description;
- The potential issues associated with local ecology and other sensitive receptors;
- Proposed surveys;
- Proposed mitigation; and
- Indicative project timescales.

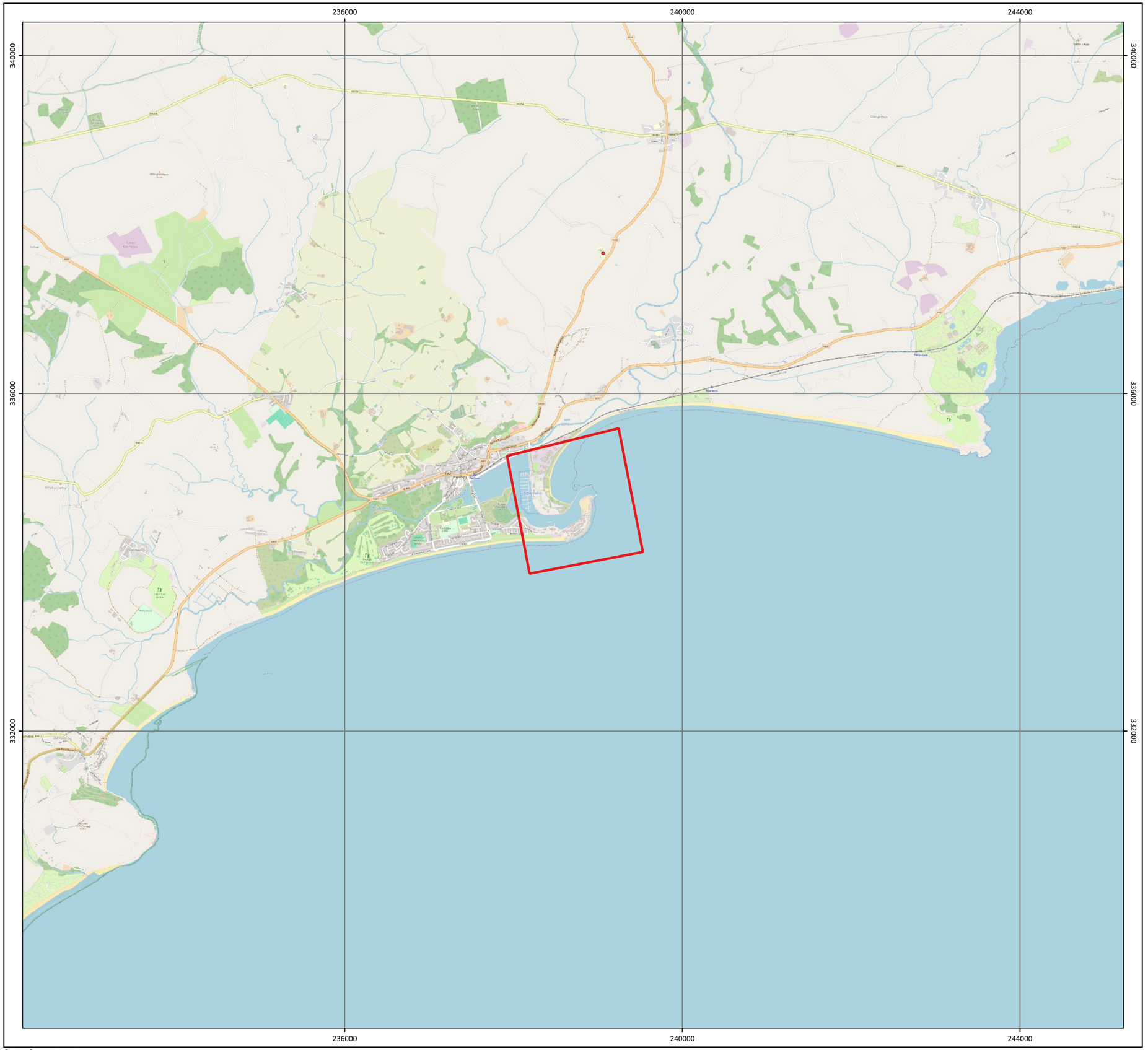
1.2 Project Overview

The Pwllheli Harbour is an operating marina that requires regular maintenance dredging to maintain navigable channels and berthing in the Harbour. The Pwllheli Harbour Act 1983 permits dredging within the Harbour and disposal within reclamations or areas within the defined area. To date, the dredged material has been deposited within the quayside reclamation, used within beach renourishment projects, and deposited within a stilling basin within the Harbour. The latter has been a preferred method for silty material that is unsuitable for use within beach nourishment projects.

However, the stilling basin is now full, and a significant dredge is required to bring the Harbour back in line with design depths which is required to maintain safe and navigable Harbour for its users. The Pwllheli Harbour Act 1983 allows for licenced dredging within the Harbour; however, any disposal of the material within the marine zone outside of the Harbour would require a Marine Licence application.

1.3 Project Location

Pwllheli Harbour is located on the south coast of the Llŷn Peninsula in Wales (Figure 1-1; Drawing Number: P2843-LOC-003-A). The proposed disposal site is located within the Pen Llŷn a'r Sarnau / Lleyn Pensinsula and the Sarnau Special Area of Conservation (SAC), with several habitats listed under Annex I of the Habitats Directive, which lists species and habitats whose conservation requires designation of SACs. This includes reefs, sandbanks, and others. Two Sites of Special Scientific Interest (SSSI's) are within a 5 kilometre (km) radius; Morfa Abererch (ID: 31WKP) directly east of the Harbour mouth, and Mynydd Tir y Cwmwd a'r Glannau at Garreg yr Imbill (ID: 31WTA) west of the Llŷn Peninsula.



PWLLEHLI MARINA

LOCATION OVERVIEW

Study Area

Drawing No: P2843_LOC_003	A

Legend

Area of Interest

N

NOT TO BE USED FOR NAVIGATION

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Created By	Eloïse Boblin
Reviewed By	Adam Johns
Approved By	Emma Langley

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0 0.5 1 1.5 2 km

2. PROJECT DESCRIPTION

2.1 Overview of the Dredging Activity

The current dredging strategy for the Pwllheli Harbour, prepared by ARUP in 2016 (ARUP, 2016), found that the primary cause of sediment build-up within the Harbour is local coastal processes and not materials carried by the river flows. It also found that the wide entrance and access channel contributes to increased levels of accretion throughout the Harbour. From this original dredging strategy, the design depths for the marine basin were set at 3 metre (m) below Chart Datum (CD) to provide sufficient depth for the majority of vessels. However, previous dredging campaigns provided additional depth beyond what was required. To date, the dredged material has been deposited within quayside reclamation, used within beach renourishment projects, and deposited within a stilling basin. The latter has been a preferred method for silty material that is unsuitable for use within beach nourishments. The area was last dredged in October 2024, with approximately 10,000m^3 of material removed.

However, following the latest maintenance dredging operation (in 2024), the stilling basin is now full, with significant dredging still required to bring back the Harbour back in line with the design depths. CGC are required to continue dredging maintenance to maintain a safe and navigable Harbour for users and are therefore looking for alternative options to dispose of the material. Details of alternative options considered are summarised in Section 2.3 and with the most practical solution identified as disposal of the dredged material into the outer bay.

The material will be dredged using a cutter suction dredger. A cutter suction dredger operates by a rotating cutter head and a pump system that creates suction at the cutter suction head. This reduces the total spill at the cutter suction head but does not eliminate it. The pumped dredged material will typically be a slurry comprising of approximately 20% of solids, and 80% of seawater (pers. Comms. with Royal Smals 28/08/2025). Dredged material will need to be disposed of via a pipeline, of which cannot extend more than 200m from the dredge location due to added stress on the pipeline from oceanographic conditions. Therefore, the practical solution is to dispose of the dredged material into the outer bay.

There are two dredging volumes being considered;

1. A large ‘corrective’ maintenance dredge in the order of up to 60,000m^3; and
2. A smaller annual maintenance dredge in the order of 10,000-20,000 m^3 to maintain design depths.

The ‘corrective’ maintenance dredge is likely to occur in Spring 2027, during the non-bathing season. Exact timings will be confirmed as the project progresses and will be dependent on weather conditions. Approximately 600-700m^3 of sediment is expected to be dredged per day.

Subsequent annual maintenance dredging is expected to occur between October 1st and May 1st to ensure works are undertaken outside of the bathing season. Dredging durations will be based on the quantity of material requiring removal, of which will vary each year. Annual maintenance of approximately 10,000m^3 is expected to require approximately 820 hours of operations over 69 days, depending on weather downtime.

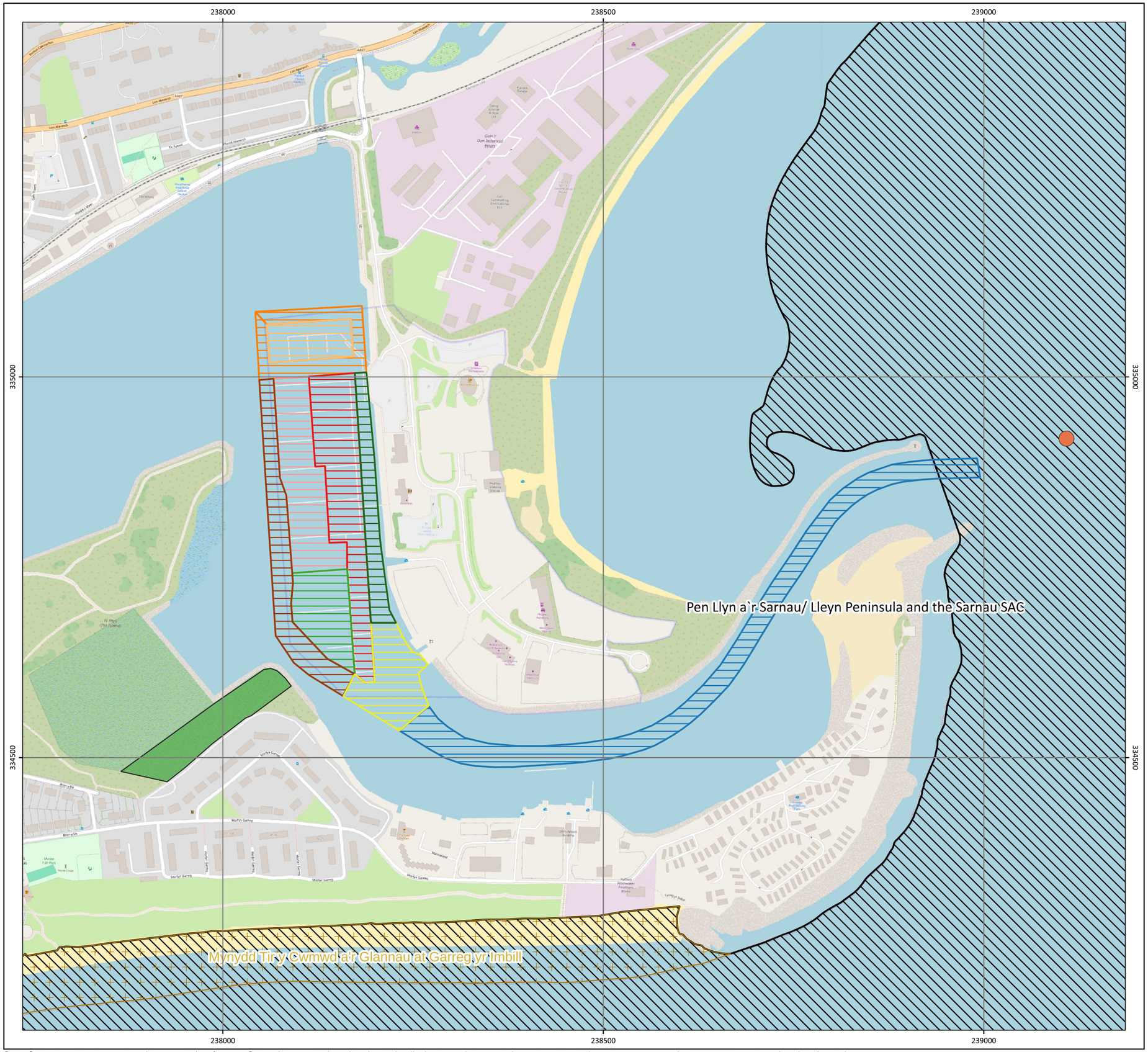
The proposed dredging site is described further in Section 3.2 and shown in Figure 2-1 (Drawing Number: P2843-LOC-004-A). The area will cover up to 101,865m^2. The depth of sediment to be dredged will be a local maximum of 2.8m (average 0.77m).

PWLLEHLI MARINA

LOCATION OVERVIEW

Harbour Oveview

Drawing No: P2843_LOC_004 | A



Legend

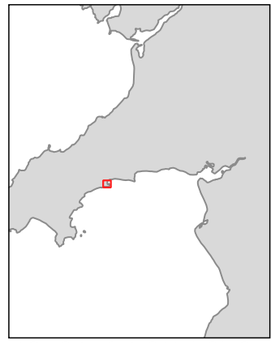
- Indicative Proposed Disposal Location

Dredge Areas

- Area 1 Approach Channel
- Area 2 Fairway East
- Area 2 Fairway West
- Area 2A Marina Basin
- Area 2B Marina Basin
- Area 2C Marina Basin
- Area 3 Marina Approach
- Area 4
- Area 4A
- Recent Stilling Lagoon

Protected Sites

- SAC
- SSSI



NOT TO BE USED FOR NAVIGATION

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Created By	Eloïse Boblin
Reviewed By	Adam Johns
Approved By	Seth Smith

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0 0.1 0.2 0.4 0.5 km

2.2 Sediment Characteristics

Sediment sampling undertaken in 2023 using vibrocore samples across Pwllheli Harbour indicates that sediments within the Harbour are relatively uniform and dominated by fine-grained material (silts and clays), with limited gravel present (Ocean Ecology, 2023). Particle size analysis shows that typical Harbour sediments are made up largely of clay and silt fractions with smaller amounts of fine sand and negligible sand and gravel. A small proportion of colloidal material is also present, which is consistent with cohesive Harbour mud. In contrast, sediments from the Harbour approach are much coarser, consisting mainly of fine sand and sand, with only very small amounts of silt and clay and minimal gravel. This shows a clear transition from fine, cohesive Harbour sediments to sandier material in the outer bay.

Contaminant analysis identified low to moderate concentrations of heavy metals (including arsenic, cadmium, chromium, copper, mercury, nickel, lead and zinc), with fairly consistent levels across the site. Nickel, zinc and Polycyclic Aromatic Hydrocarbons (PAHs) were occasionally slightly above Cefas Action Level 1, but remained below Action Level 2, and PAH concentrations were within 95% of Irish Sea background levels, suggesting contamination is unlikely (Cronin *et al.,* 2006). Organotins (including tributyltin and dibutyltin) were below the limits of detection.

Following the previous maintenance dredging campaigns, the nearby disposal options have been exhausted and disposal of the dredge material elsewhere is required. The nearest recognised open spoil ground for sea disposal is located ~110km at Holyhead, of which would not satisfy the OSPAR guidance for management of dredged sediment which is to "retain dredged material within the same aquatic sedimentary system from where it originated". The suitability for the disposal of the dredge material near to Pwllheli Harbour will be assessed in accordance with the OSPAR guidelines for the Management of Dredged Material at Sea and the Waste Assessment Guidelines under the London Protocol. Due to the proposed location being located approximately 200m outside of the Harbour boundaries, the marine environment would already be influenced by sediment movement from the Harbour during activity. Using OSPAR guidance, it is recognised that retention within the same sedimentary system is generally preferable where it is environmentally acceptable.

Although previous sediment sampling has been undertaken at the site, further sampling will be required as the existing data will be out of date by August 2026, noting that OSPAR requires sampling to be completed every three years. A sediment sampling plan request has been submitted by Intertek, on behalf of CGC, to NRW. Sampling is likely to commence in May 2026 once a sediment sampling plan has been received. Sampling and analysis will be carried out in line with the approved plan, using laboratories from NRW's list of approved facilities and following the defined sample plan process. The material will be analysed for a range of physical and chemical properties in accordance with OSPAR guidance (OSPAR, 2024). The samples will be analysed and sediment analysis data submitted to NRW. These will be assessed against the Cefas Action Levels in order to determine the suitability of disposal at the designated location as part of the marine licensing process. It is noted that disposal will only occur following regulatory approval.

2.3 Overview of Disposal Activity

With the stilling basin at Pwllheli Harbour already at capacity from previous dredging works, CGC now requires all future dredged material to be disposed of at an alternative location. To minimise impacts, CGC's preferred approach is to pump the dredged materials from the cutter suction dredger into the outer bay outside the Harbour mouth at a distance of 200m from the dredge location. CGC have investigated a variety of different disposal methods of which are summarised below in Table 2-1 (YGC, 2023).

Table 2-1 Summary of Options

Option	Summary	Description	Positives	Risks
1	Do nothing	This option would let nature take its course and accept that overtime the navigable and berthing depths would reduce, limiting the use of the marina.	▪ Avoids need for emptying the stilling lagoon; ▪ No dredging costs; ▪ Income may continue if vessel owners accept restricted tidal conditions; ▪ Potential increase in mudflat habitat.	▪ Reduced depths; ▪ Loss of income; ▪ Loss of jobs and businesses associated with the marina; ▪ Loss of boating and sailing events; ▪ Adverse visual; ▪ Loss of reputation.
2	Maintain current arrangement, dredge material into stilling lagoon and empty when required.	Currently, a cutter-suction dredger pumps a seawater–silt mixture into a stilling lagoon, where solids settle and water returns to the Harbour. Once full, the lagoon must be emptied, but the material remains too wet to handle easily. It has previously been spread on Yr Ynys or taken to landfill for capping, both of which depend on available disposal sites.	▪ Dredging can be done under existing rights under the Pwllheli Harbour Act; ▪ Lagoon is an existing asset; ▪ Deposition process if effective when space is available.	▪ Capacity of stilling lagoon is limited; ▪ Stilling lagoon will required regular costly emptying; ▪ Lagoon does not dewater material enough to be handled and transported off-site; ▪ The material is difficult to handle and transport due to its nature and characteristics; ▪ There are limited places to deposit the material; ▪ Not practical long-term; ▪ Disruption to residents.
3	Use geotextile de-watering bags to contain the dredged material, place bags on top of existing lagoon or land nearby.	This option uses a cutter-suction dredger but pumps the material to a flocculant mixing tank before transferring it into large geotextile bags. These bags capture the silts and expel water, which is returned to the Harbour. The bags can be placed in the stilling lagoon or elsewhere around the Harbour. They partially dewater the material, but drying requires time and favourable weather before handling. This option depends on having a suitable disposal site once the material is dry enough.	▪ Avoids need to empty lagoon; ▪ Geotextile bags could be placed on top of the lagoon or on another area around the Harbour; ▪ Short set up time; ▪ Would de-water the material quicker than the lagoon and material could be handled and transported off site.	▪ Lack of locations to dispose of dried material; ▪ Local objection due to disruption to residents, visual effects and potential odour issues; ▪ Planning and a waster permit may not be approved. ▪

Option	Summary	Description	Positives	Risks
4	Empty stilling lagoon and place material at Cae Ceffyl to raise the level of the land for future potential development.	This option would involve emptying the material from the stilling lagoon using traditional methods and transport it to Cae Ceffyl to raise the level of the land. The material would need to be stabilised in layers using lime or cement to increase its bearing capacity.	▪ The material could potentially be made into a construction fill, minimising the use of primary material; ▪ Relatively short haulage distance to Cae Ceffyl; ▪ Potential economic benefit over importing primary materials from local quarries; ▪ Planning Consent for Hotel Development in place.	▪ Material may not be able to meet developer specification; ▪ Not enough capacity at Cae Ceffyl to completely empty stilling lagoon; ▪ Would need lime or cement mixed into material; ▪ Material would need to be dry; ▪ Waste permit may not be approved; ▪ Level of confidence in cost estimate is low.
5	Dredge the material directly onto a barge and dispose at Holyhead Deep.	This option would use a Cutter-suction dredger to remove the material from the seabed. However, the material would be pumped directly onto a barge and taken to Holyhead Deep for disposal once the barge is full. Holyhead Deep is 60 nautical miles from Pwllheli.	▪ Avoid the need for emptying the stilling lagoon; ▪ Avoid all disruption to the local community from hauling tonnes of material through the town; ▪ Could be used as a one-time solution to reset the desired depth of the marina, as it is not limited by capacity.	▪ Highly dependent on weather and tidal conditions; ▪ Tremadog Bay is relatively shallow, limiting the size of barge that can be used; ▪ It would take one whole day for a barge to navigate to Holyhead Deep and return, this causing significant down-time for dredgers; ▪ The silt would have to overflow the barge when filling causing significant sediment plumes; ▪ Contractor availability; ▪ There is a big cost uncertainty associated with this option due to weather related risks.
6	Reclaim additional areas of land from the Harbour (as for Sailing Academy works)	This option involves constructing a new rock-armoured earth bund within the Harbour to contain dredged material. Potential locations include near the existing bund by the stilling lagoon, the northern side of the Ynys, or in front of Gimblet Rock Holiday Park. The exact site would require further assessment, but the approach provides a means of storing dredged material.	▪ Dependent on size, could be used for several dredging campaigns; ▪ Land could be used for future developments subject to all necessary consents; ▪ Potential financial contribution for development in front of Gimblet Rock.	▪ Must demonstrate no significant impact on flooding to Pwllheli and Environmental Designations etc.; ▪ Risk of no consent or timely consent; ▪ Once full, would have to find somewhere else to take the material; ▪ The costs are likely to be high. ▪

Option	Summary	Description	Positives	Risks
7	Dredge and pump material directly out to the bay using cutter suction dredger.	This option would involve using a cutter suction dredger to remove material from the Harbour and marina basin, which would also pump the material via a pipeline out to a designated area in the bay outside of the Harbour. From there on the material would be redistributed by tide and currents. The pipeline would be placed in a strategic location to minimise environmental impact and to minimise the amount of material returning into the Harbour.	▪ Eliminates the need for the stilling lagoon, and eliminates the costs and barriers associated with emptying it. The cost of the dredging itself is likely to remain the same; ▪ Less dependent on tidal conditions and therefore less constrained and with potential cost savings; ▪ Can place pipeline in strategic locations in the bay to minimise environmental impact and minimise amount to material returning into Harbour; ▪ There are various sized vessels to accommodate size of Harbour and the volume of silts to be dredged.	▪ Numerical modelling required; ▪ Requirement for Marine Licence and thorough assessment of effected on Pen Llŷn a'r Sarnau SAC required; ▪ Lengthy pipeline required; ▪ Cutter-suction dredgers less manoeuvrable than water injection-dredger.
8	Use Water Injection Dredger to dredge and flush material out to the bay using tide and currents.	Similar to Option 6; however, the method of dredging is slightly different. The Water Injection Dredger uses pressurised water to resuspend the material on the seabed which in turn allows natural current to redistribute the suspended sediments. This method would need to utilise an ebb tide to ensure material is flushed from the Harbour.	▪ Eliminates need for stilling lagoon, and eliminates the costs and barriers associated with emptying it; ▪ Removes the need for a pipeline, therefore no constraint to Harbour users; ▪ Vessels are usually more manoeuvrable and can work in relatively shallow waters and tight spaces; ▪ The process doesn't require a large amount of crew; ▪ All aspect of the works can be done using existing powers under the Pwllheli Harbour Act.	▪ Numerical modelling required; ▪ Thorough Environmental Assessment to determine the effect of suspended silts on the Pen Llŷn a'r Sarnau SAC required; ▪ Dredging operation would have to be done on an ebbing tide to improve the flushing of sediments from the Harbour. Therefore, the process would likely to take longer; ▪ More difficult to monitor and measure dredging progress; ▪ Little control of the sediment after being flushed out of the Harbour.

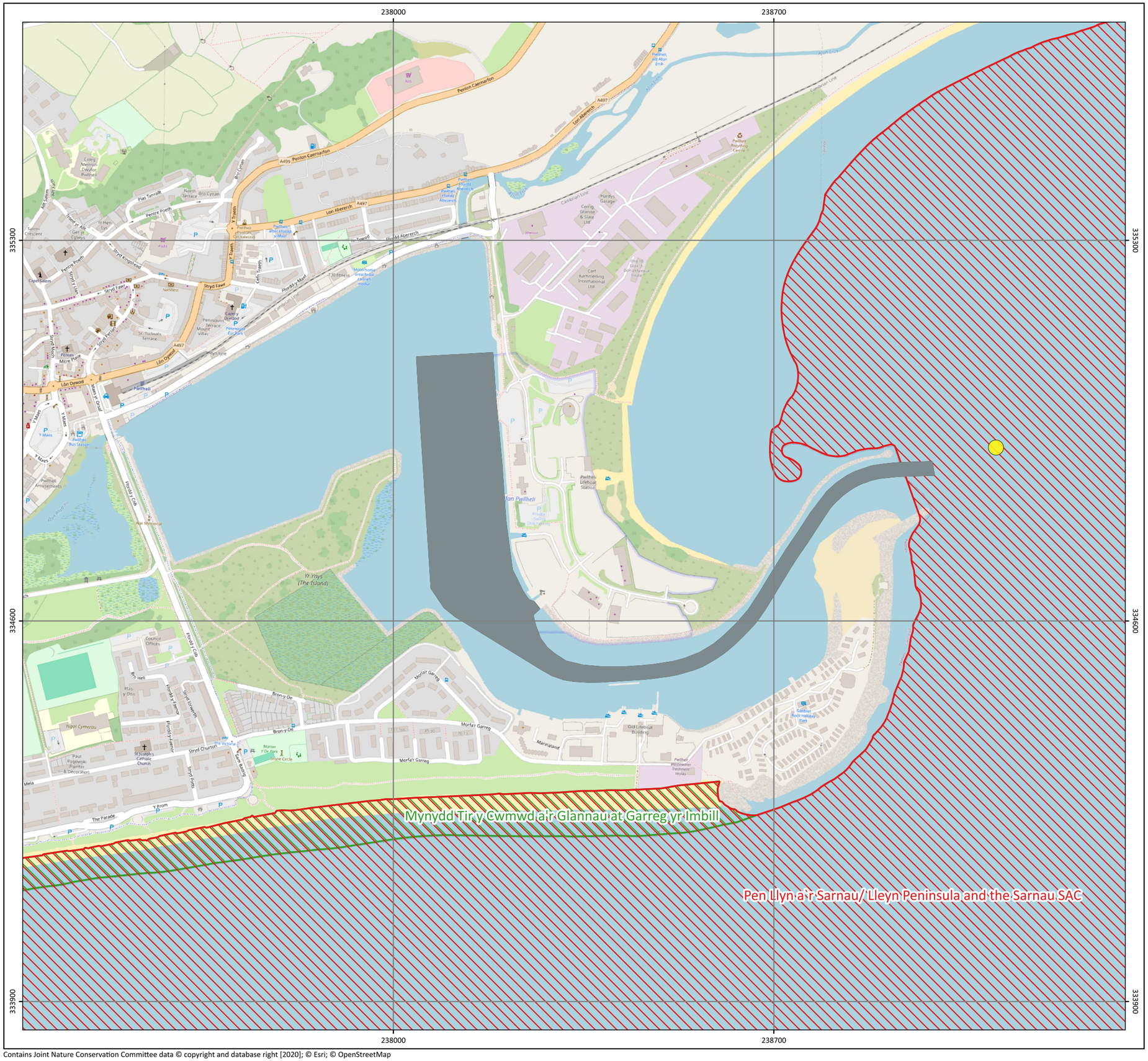
The assessment of options highlighted than Option 7 is the most pragmatic option and has the least amount of risk.

The preferred location for the disposal site using the existing method of a cutter suction dredger is located just outside of the Pwllheli Harbour as seen in Figure 2-2 (Drawing Number: P2843-LOC-002-A). A new disposal site located close to the Pwllheli Harbour would provide sustainability benefits in the long-term and cost savings. This preferred location is approximately 800m South of the Llŷn Peninsula coastline, and approximately 200m outside of the Pwllheli Harbour. As stated in Section 2.2, the sediment in this location consists of predominantly silts and clays. As the Pwllheli Harbour is

located within the Pen Llŷn a'r Sarnau / Lleyn Pensinsula and the Sarnau SAC, the deposition of dredging material would require careful examination, so as not to cause significant impact to the site and its designated features. As stated above there are also two SSSI's within a 5km radius of the Pwllheli Harbour; Morfa Abererch and Mynydd Tir y Cwmwd a'r Glannau at Garreg yr Imbill.

The proposed disposal operations will use a cutter suction dredger. This is typically a slurry, meaning that much of the fine sediment is suspended in the water. A cutter suction dredger can dispose of material pumped through a pipeline into a settling basin/lagoon, or directly into the marine environment. The pumped dredge material is not immediately suitable for reclamation or transport via barge as it requires time for suspended solids to settle out of the water column, and for the subsequent dredge material to become dewatered. When disposing directly into the marine environment, the material is generally deposited at the water surface along a floating pipeline. Disposal is limited by practical considerations such as the maximum length of pipeline, the hydraulic capacity of the pump, and environmental conditions (waves and wind). The pipeline is typically restricted to the Harbour and basins; however, in some cases the pipeline can extend into open coast, but this would require planning and analysis of weather windows, as well as a robust anchor system. A typical range for disposal offshore of Pwllheli is estimated at approximately 200m (pers. Comms. with Royal Smals 28/08/2025).

It is noted that following an initial large corrective maintenance dredge, CGC would require annual maintenance dredging likely to be required in order to keep the Harbour in line with the initial dredging strategy of 3m below CD. The proposed activities involve both a one-off "corrective" maintenance dredge (up to 60,000m³, likely in spring 2027) and ongoing annual maintenance dredging (10,000–20,000 m³ per year) to maintain design depths within Pwllheli Harbour. The initial larger campaign will restore Harbour depths, while smaller annual dredging is expected to be periodic and seasonal, typically occurring outside the bathing season (October to May). Duration and exact timing will vary annually depending on sedimentation rates and weather conditions, with operations continuing as part of routine Harbour maintenance.



Contains Joint Nature Conservation Committee data © copyright and database right [2020]; © Esri; © OpenStreetMap

PWLLEHLI MARINA

LOCATION OVERVIEW

Approximate Dredge and Disposal Location

Drawing No: P2843_LOC_002 | A

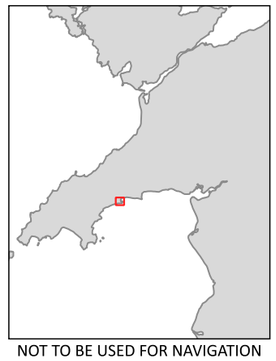
Legend

- Indicative Proposed Disposal Location
- Dredging Area

Protected Areas

- SAC
- SSSI

N



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Created By	Eloïse Boblin
Reviewed By	Adam Johns
Approved By	Emma Langley

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2.4 Regulated Activities

The proposed works comprise of maintenance dredging undertaken within the Pwllheli Harbour, and the disposal of dredged material outside the Harbour limits. Under Part 4 of the Marine and Coastal Access Act 2009, certain activities carried out are classed as marine licence activities. These include (but not limited to):

- Deposition of substances or objects to the sea;
- Removal of materials from the seabed; and
- Construction, alteration, or improvement of works in the marine environment.

The proposed dredging will be undertaken for the purpose of maintaining the function of the Harbour, keeping in line with the dredging strategy. A marine licence is therefore not required for the dredging operations and is exempt under section 75(1) of the Marine and Coastal Access Act 2009 and under the Pwllheli Harbour Act 1983.

Under the Marine and Coastal Access Act 2009, the deposition of substances or objects (including dredged material) in the sea is classified as a marine licence activity. Therefore, based upon both the Marine and Coastal Access Act 2009 and the Pwllheli Harbour Act 1983, only the disposal of the dredged material requires a Marine Licence.

3. LOCATION AND ENVIRONMENTAL SENSITIVITY OF THE PROJECT AREA

3.1 Local Environment

The coastal environment around Pwllheli Harbour is characterised by a shallow embayed system within Cardigan Bay, bounded by headlands and composed of mixed sand and gravel beaches backed in places by dune systems (AECOM, 2007; Gwynedd Council, 1998). The Harbour lies within a dynamic coastal cell influenced by both locally generated wind waves (predominantly from the west–southwest) and Atlantic swell, with wave energy distribution moderated by sheltering from Carreg yr Imbill and Harbour structures (Halcrow, 2006).

The offshore wave climate is predominantly driven by south-westerly Atlantic swell, with secondary exposure to a broader south–south-east to west sector. As waves propagate into Cardigan Bay, their behaviour is strongly modified by refraction across shallow nearshore bathymetry and by diffraction and sheltering effects from headlands and coastal structures. These processes help form the embayed shoreline morphology and control spatial variation in wave energy along the coast. The sediment transport regime is highly sensitive to changes in wave direction, with even small shifts in approach angle influencing the balance and direction of net littoral drift. Within the vicinity of Pwllheli Harbour, Harbour structures further modify wave climate and promote localised sheltering and sediment deposition in lee areas.

Hydrodynamic conditions are generally low energy. Tidal currents across the frontage are typically weak (generally around 0.1m/s or less on spring tides), with slightly higher velocities within and near the Harbour entrance due to constriction effects (AECOM, 2007). Under storm conditions, wave-driven circulation becomes more significant, with localised eddying and recirculation in the lee of Harbour structures influencing sediment movement (Halcrow, 2006).

Sediment transport is primarily wave-driven rather than tide-driven, with net littoral drift varying along the frontage but generally showing an overall easterly tendency across parts of Traeth Crugan, with local reversals caused by Harbour morphology and bathymetry (Halcrow, 2006). The system is therefore sensitive to changes in wave climate, coastal structures, and sediment supply.

Water quality within the Harbour and nearshore waters is generally typical of a semi-enclosed coastal embayment, influenced by tidal exchange with Cardigan Bay and freshwater inputs from the Rivers Erch, Penrhos and Rhyd-hir. Conditions are subject to seasonal variation associated with recreational use and dredging activity but are not typically indicative of heavily polluted conditions (Gwynedd Council, 1998).

The intertidal zone in the local area comprises a diverse mosaic of rocky and sedimentary habitats ranging from upper shore to lower shore environments. Rocky shores support distinct zonation of fucoid algae (e.g. *Fucus, Pelvetia, Ascophyllum*), barnacles and limpets, with lower shore areas supporting red algal communities, kelp fringe species and under-boulder assemblages with sponges and mobile invertebrates. Rockpools, caves and overhangs add further habitat complexity, supporting shade-tolerant algae, bryozoans, sponges and ascidians. Sedimentary intertidal habitats include sand, muddy sand, gravel and shingle, supporting infaunal communities of polychaetes, amphipods and bivalves, with strandline communities of talitrid amphipods on the upper shore. These habitats are highly dynamic and reflect strong gradients in wave exposure, sediment mobility and salinity, supporting both opportunistic and more specialised assemblages adapted to frequent disturbance (EMODnet, 2023).

The subtidal habitats in the local area comprise a diverse mosaic of sedimentary and rocky environments, including fine sand, muddy sand, mixed and coarse sediments supporting infaunal communities such as polychaetes, amphipods and bivalves (e.g. *Amphiura, Abra, Ensis and Echinocardium*), alongside higher-energy sand assemblages of more mobile species. Subtidal rock habitats support extensive kelp-dominated systems (*Laminaria* spp. forests and parks) and diverse red algal communities in infralittoral zones, while deeper circalittoral rocky areas are characterised by faunal turfs dominated by sponges, bryozoans, hydroids and ascidians. Biogenic and more sensitive features include honeycomb worm (*S. alveolata)* where present and sheltered sediments that may support eelgrass (*Z. marina*) beds, both of which are sensitive to changes in sedimentation, turbidity and physical disturbance (EMODnet, 2023).

A variety of surveys have been undertaken in the area, with the most recent benthic survey in 2017 (SeaSearch Survey of the South Llŷn and Tremadog Bay). Sediment sampling has also been undertaken, however further sampling is required as existing data will be out of date by August 2026. Sediment sampling will be undertaken once a sediment sampling plan has been received from NRW.

3.2 Dredge Site

The Harbour and adjacent outer bay support a range of benthic habitats including intertidal mudflats within the Harbour and subtidal sand and mixed sediments offshore (Countryside Council for Wales (CCW) Phase 1 Intertidal Survey, 2005). These habitats support typical benthic communities and provide feeding grounds for fish and birds. The wider area supports fish species including nursery and spawning habitats, as well as marine mammals such as seals and cetaceans on a seasonal basis. Bird species associated with coastal and marine habitats are also present, using the area for feeding and roosting.

Pwllheli Harbour is an active marina and navigation area, developed in the early 1990s to include a 400-berth marina, with ongoing maintenance dredging required to maintain access. The area supports commercial and recreational fisheries, as well as significant recreational use including sailing activities associated with the Welsh National Sailing Academy. Lifeboat access is maintained from the Harbour, and key infrastructure is located around Morfa Abererch. Pwllheli also has a long maritime history as a fishing port and boatbuilding centre dating back to at least the 13th century, forming an important part of the local cultural heritage.

The proposed dredging areas are shown in Figure 2-1 and will cover up to 101,865m^2. The depth of sediment to be dredged will be a local maximum of 2.8m (average 0.77m).

3.3 Disposal Site

The proposed disposal site (Figure 2-2; Drawing Number: P2843-LOC-002-A) is located approximately 200m outside the Harbour entrance, in the adjacent outer bay. This location has been selected to align with the operational constraints of using a cutter suction dredger, which requires disposal via pipeline and is therefore limited in range. Positioning the disposal area close to the Harbour minimises disturbance by keeping activities within the same local sedimentary system, consistent with best practice. The site is also within an area already subject to natural and operational sediment movement associated with the Harbour, meaning baseline conditions are influenced by ongoing sediment transport and resuspension.

Baseline conditions indicate a dynamic and heterogeneous seabed, comprising mainly coarse sediments with localised patches of rock (Annex I stony/bedrock reef). The area is influenced by underlying geology, glacial deposits and historic channel movements, resulting in variable sediment distribution. Intertidal mudflats occur within 300m. Offshore sediments include a mix of sands, muddy sands, gravels and sandy mud, with finer material in deeper areas. The disposal site is within the Pen Llŷn a'r Sarnau / Lleyn Pensinsula and the Sarnau SAC.

A hydrodynamic and sediment dispersion modelling study is being undertaken by Intertek to assess potential plume behaviour and associated impacts from disposal activities. The results of this study will be reviewed and used to inform the final disposal strategy and any impacts to local receptors.

Intertidal monitoring of the Pen Llŷn a'r Sarnau / Lleyn Pensinsula and the Sarnau SAC has been undertaken with the following findings (Mercer, 2022):

- Local honeycomb worm (*S. alveolata*) reef at Llandanwg is affected by sand inundation at the southern end, due to naturally fluctuating sand levels. Storm in 2018 caused some erosion, but this appears to have been short lived and subsequently recovered.
- Honeycomb worm (*S. alveolata*) reef at West of Afon Dwyfor is highly variable, in part due to some clear declines and subsequent recovery in certain parts of the reef.
- A distinct reduction in the presence of mud in the area is noted. It has been proposed that in 2014, there may have been residual mud from the 2013/14 winter storms, derived from flood alluvium and marine boulder clay deposits.
- Infaunal communities all vary, due to changing sand levels and river channel movements, although distinct, repeatable communities can be identified from stable sediments and more mobile sandy sediments. There are difficulties in comparing paired stations across years, due to the dynamic nature of the river channels in the estuaries.

The data suggests that the conservation objectives for the site have not been undermined and therefore that the features monitored are in favourable conservation condition.

4. SENSITIVE RECEPTORS

The proposed disposal operations have the potential to interact with sensitive receptors, including designated protected sites such as SAC's, Special Protection Areas (SPA's) and SSSI's, protected species and surface water bodies subject to Water Framework Directive (WFD) objectives. These receptors are considered to determine whether the nature, scale, and location of the proposed deposition of material is likely to cause significant effects.

4.1.1 Protected Sites

The following protected sites are within 20km of the proposed disposal location and shown in 0 (Drawing Number: P2843-PROT-001-A):

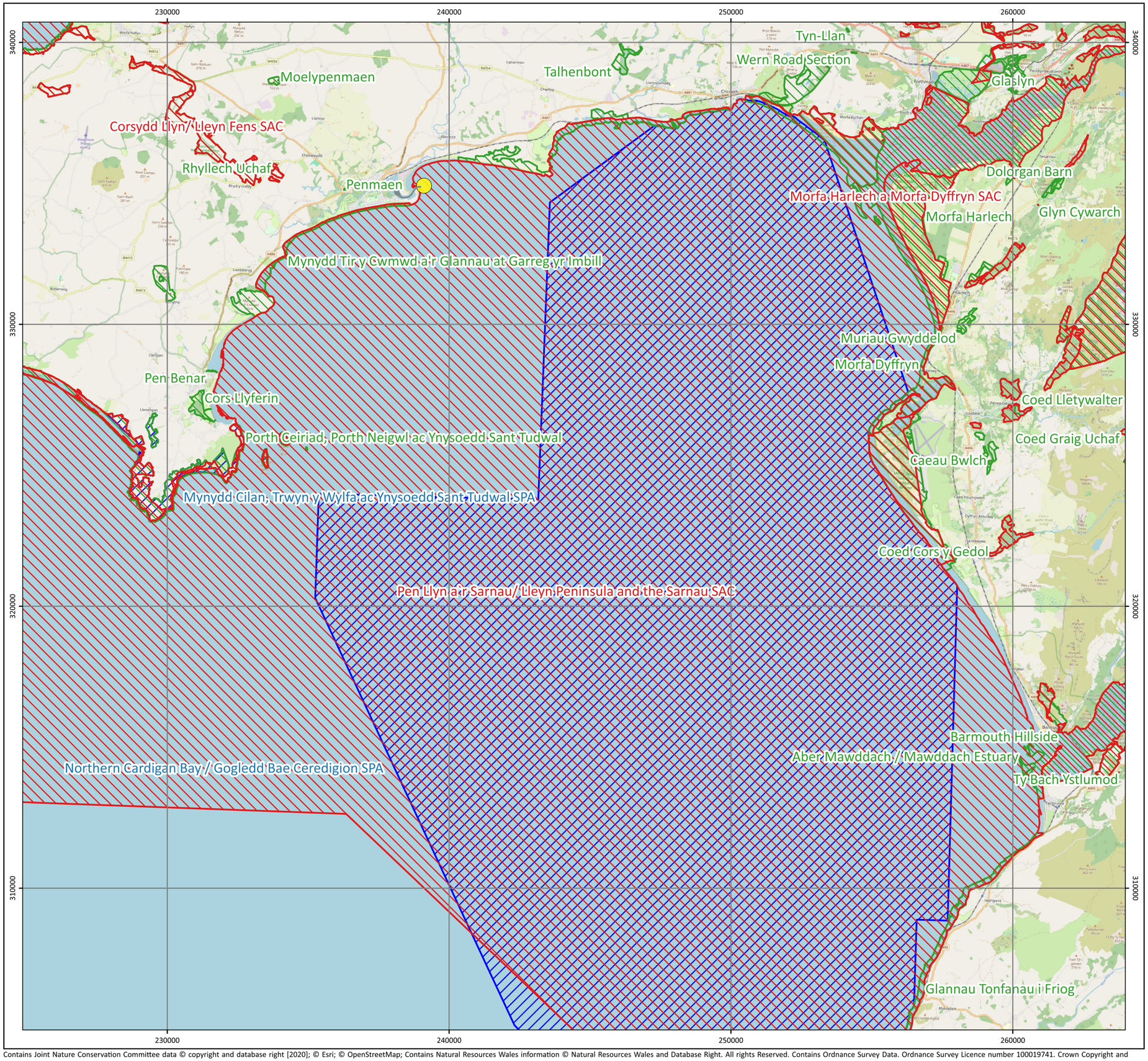
- Pen Llŷn a'r Sarnau / Lleyn Pensinsula and the Sarnau SAC (within);
- Morfa Abererch SSSI (1.5km);
- Northern Cardigan Bay / Gogledd Bae Ceredigion SPA (4.5km);
- GlanLlŷnnau a Glannau Pen-ychain i Gricieth SSSI (4.7km);
- Mynydd Cilan, Trwyn y Wylfa ac Ynysoedd Sant Tudwal SPA (10.2km);
- Clogwyni Pen Llŷn/ Seacliffs of Lleyn SAC (11.2km);
- Tiroedd a Glannau Rhwng Cricieth ac Afon Glaslyn SSSI (12.1km);
- Morfa Harlech SSSI (15.2km);
- Morfa Harlech a Morfa Dyffyrn SAC (16.5km); and
- Morfa Dyffryn SSSI (19.0km).

PWLLEHLI MARINA

Protected Sites

Local Environmental Designations

Drawing No: P2843_PROT_001 | A



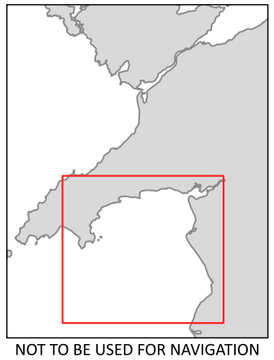
Legend

- Indicative Proposed Disposal Location
- Dredging Area

SAC

- SAC
- SPA
- SSSI

N



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Created By	Eloïse Boblin
Reviewed By	Adam Johns
Approved By	Emma Langley

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4.1.1.2 Pen Llŷn a'r Sarnau / Lleyn Pensinsula and the Sarnau SAC

Of note, the proposed deposition site is located within the Pen Llŷn a'r Sarnau / Lleyn Pensinsula and the Sarnau SAC which is designated for a range of Annex I habitats and Annex II species. The Annex I habitats that are a primary reason for the selection of this site are:

- 1170 Reefs
- 1160 Large shallow inlets and bays
- 110 Sandbanks which are slightly covered by seawater all the time
- 130 Estuaries
- 1150 Coastal lagoons

The Annex I habitats that are present as a qualifying feature, but not a primary reason for election of this site are:

- 1140 Mudflats and sandflats not covered by seawater at low tide
- 1310 Salicornia and other annual colonising mud and sand
- 1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
- 8330 Submerged or partially submerged sea caves

The Annex II species that are present as a qualifying feature, but not a primary reason for election of this site are:

- 1349 Bottlenose dolphin (*Tursiops truncatus*)
- 1355 Otter (*Lutra lutra*)
- 1364 Grey seal (*Halichoerus grypus*)

Of the features protected within the Pen Llŷn a'r Sarnau / Lleyn Pensinsula and the Sarnau SAC, it is noted that Annex I honeycomb worm (*S. alveolata*) reef and bedrock/stony reefs are within the local vicinity and could be impacted by the proposed works.

4.1.2 Key Sensitive Habitats / Species

The following protected habitats/species that have been found within the local vicinity of the proposed deposition site (Figure 4-2; Drawing Number: Drawing Number: P2843-ENV-003-A):

- Honeycomb worm (*S. alveolata*) – Annex I, UK Biodiversity Framework (UKBF) 2024, Section 7 Environment (Wales) Act;
- Blue mussel (*Mytilus edulis*) beds – Annex I, OSPAR, UKBF 2024, Section 7 Environment (Wales) Act;
- Eelgrass (*Z. marina*) – Annex I, OSPAR, UKBF 2024, Section 7 Environment (Wales) Act;
- Reefs – Annex I, , Section 7 Environment (Wales) Act; and
- Intertidal underboulder communities - Annex I, UKBF 2024, Section 7 Environment (Wales) Act.

It is noted that a variety of fish are present in the area including flatfish along with the migratory Atlantic Salmon (*Salmo Salar*) and sea trout (*Salmo trutta*) that are associated with freshwater catchments in the area, of which the Afon Erch is relevant.

It is also noted that the native oyster (*Ostrea edulis*) has been observed in the local area on occasion (NBN, 2025).

More than 28 cetacean species have been recorded in United Kingdom (UK) waters of which 11 occur regularly. Within the Irish Sea, approximately 12 species have been recorded and therefore may be encountered nearby the Pwllheli Harbour, at least on a seasonal basis. Harbour porpoise (*Phocoena phocoena*), bottlenose dolphin (*T. truncates*), grey seal (*H. grypus*), common seal (*Phoca vitulina*) and otter (*L. lutra*) are listed under Annex II of the Habitats Directive, which lists species whose conservation requires designation of SACs. All cetaceans and marine turtles are also listed as Section 7 Priority Species under the Environment (Wales) Act 2016, which defines species of principal importance for the purpose of maintaining and enhancing biodiversity in Wales. However, it is noted that due to the location and localisation of the dredging disposal site, it is unlikely that marine mammals will be impacted.

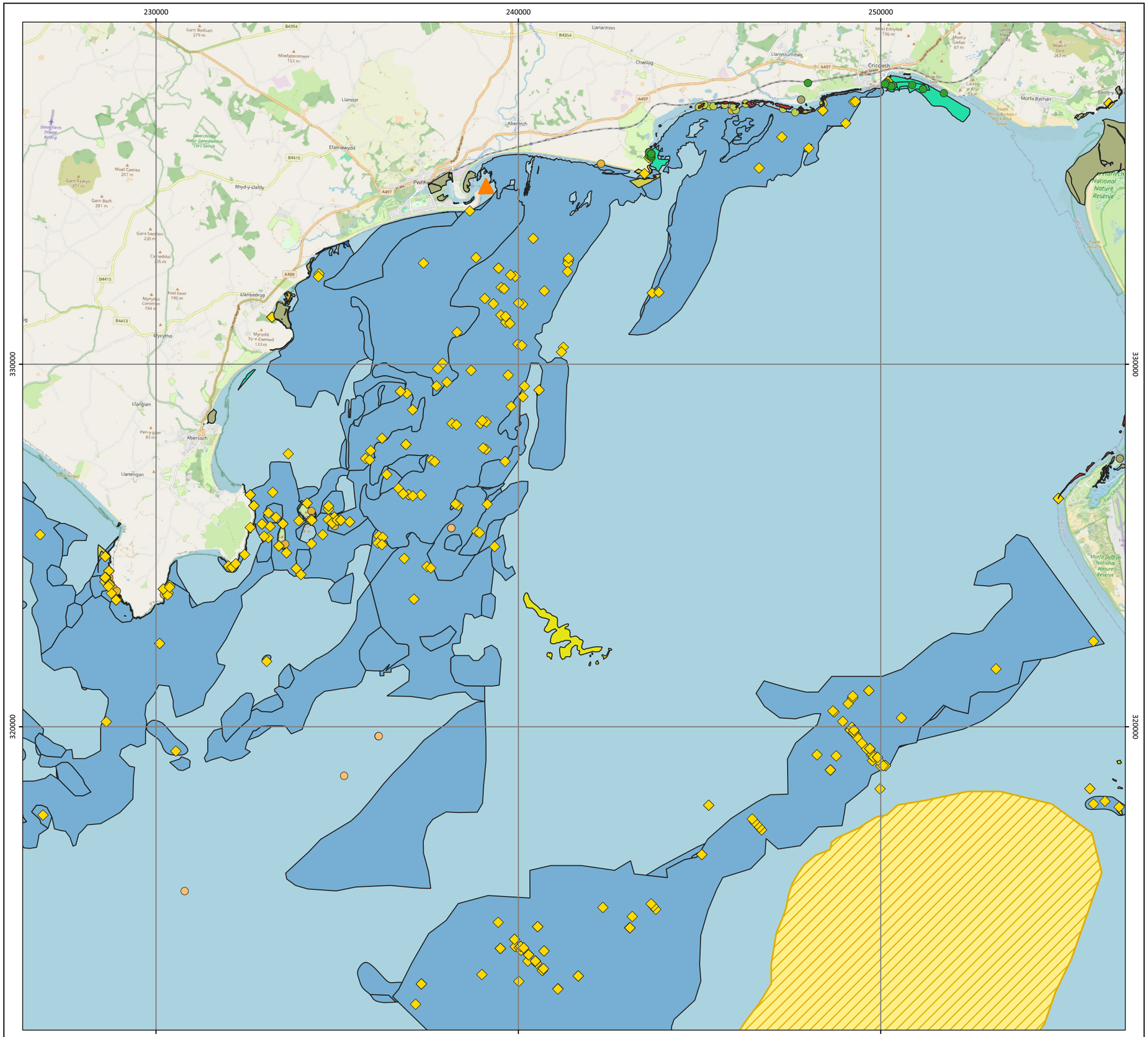
A range of seabirds and waterbirds are recorded in the local coastal and marine environment around Pwllheli and Cardigan Bay, including grebes, great black-backed gull (*Larus marinus*), auk species, herring gull (*Larus argentatus*), shag (*Gulosus aristotelis*), gannet, common gull (*Larus canus*), lesser black-backed gull (*Larus fuscus*), black-headed gull (*Chroicocephalus ridibundus*), kittiwake (*Rissa tridactyla*), red-breasted merganser (*Mergus serrator*), common scoter (*Melanitta nigra*), Manx shearwater (*Puffinus puffinus*), red-throated diver (*Gavia stellata*) and cormorant. These species are associated with inshore waters, offshore feeding areas, intertidal zones and nearby coastal habitats, with some utilising the area seasonally for foraging, passage or over-wintering.

PWLLEHLI MARINA

ENVIRONMENT

Sensitive Receptors

Drawing No: P2843_ENV_003 | A

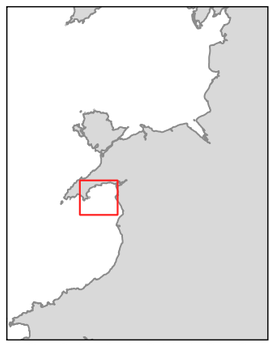


Legend

- Approximate Disposal Location

Sensitive Receptors

- NRW Intertidal Mudflats Points
- NRW Deep Mud
- NRW Reef
- NRW Intertidal Underboulder
- NRW Seal Pupping Sites
- NRW Seagrass Point
- NRW Sabellaria Alevolata
- NRW Intertidal Mudflats
- NRW Common Mussel
- Intertidal mudflats
- OSPAR Seagrass Beds
- OSPAR Intertidal Mytilus edulis beds
- OSPAR Kelp forests
- OSPAR Littoral chalk communities
- Bedrock and/or Stony Reef
- Bedrock Reef
- Stony Reef



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Created By	Eloïse Boblin
Reviewed By	Adam Johns
Approved By	Emma Langley

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4.1.3 Water Framework Directive

The proposed disposal site is located within the Tremadog Bay, a coastal water body forming part of the wider Cardigan Bay. The Cardigan Bay is split into multiple water bodies, as listed in Table 4-1 below, of which the Cardigan Bay North is south of the disposal site, directly adjacent the Tremadog Bay. Further from the disposal site is the Dwyfor Estuary and Glaslyn Estuary. The Dwyfor Estuary is located to the east within the same river basin catchment whereas the Glaslyn Estuary is further east although is significantly beyond the area in which it would be influenced by the disposal operations. All of these water bodies are connected through coastal and estuarine waters, however, the disposal activities are confined to the localised deposition site located in the Tremadog bay, and therefore will not have direct interaction with any additional water bodies.

The operations will take place within the Tremadog Bay coastal WFD water body, which has an overall "Good" status. Given the localised and temporal nature of the deposition activities, it is not anticipated to have a deterioration in status of the Tremadog Bay or other nearby water bodies and therefore considered compliant within the WFD. However a full WFD Assessment will be undertaken later.

Table 4-1 Local Waterbodies

	Tremadog Bay (within)	**Erch Estuary**	**Cardigan Bay North**	**Dwyfor Estuary**	**Glaslyn Estuary**
Water Body ID	GB651009350000	GB521006509600	GB621009600000	GB511006511000	GB511006507300
Water Body Type	Coastal	Transitional	Coastal	Transitional	Transitional
Total Area	239,419 km^2	510 km^2	712,176 km^2	930 km^2	15,669 km^2
Catchment	Llŷn and Eryri TraC	Llŷn and Eryri TraC	Meirionnydd TraC	Llŷn and Eryri TraC	Llŷn and Eryri TraC
Target Water Body Status (and deadline)	Good by 2027	Good by 2015	Good by 2015	Good by 2027	Good by 2015
Overall Status	Good	Moderate	Moderate	Good	Good
Chemical Status	High	Good	Moderate	High	High
Ecological Status	Good	Moderate	Good	Good	Good

https://naturalresources.wales/media/675073/annex-b.pdf

5. LIKELY SIGNIFICANT ENVIRONMENTAL EFFECTS AND PROPOSED MITIGATION

5.1 Potential Impacts from Disposal

The main environmental effects of disposal of dredging material are related to:

- Abrasion/disturbance of the substrate on the surface of the seabed;
- Barrier to species movement;
- Changes in suspended solids (water clarity);
- Deoxygenation;
- Genetic modification & translocation of indigenous species;
- Hydrocarbon & PAH contamination;
- Introduction of other substances (solid, liquid or gas);
- Introduction or spread of Invasive Non-Native Species (INNS);
- Nutrient enrichment;
- Physical change (to another seabed type);
- Radionuclide contamination;
- Smothering and siltation rate changes (light);
- Synthetic compound contamination; and
- Transition elements & organometal contamination (JNCC, 2022).

The disposal of dredging material is listed as operations which may cause deterioration or disturbance within the Pen Llŷn a'r Sarnau / Lleyn Pensinsula and the Sarnau SAC (NRW, 2018). Pressures from disposal operations that have potential to impact the structure and function of qualifying features include:

- Structure and function:
  - Local changes of sedimentology, topography, sediment transport processes, suspended particulates/turbidity, water and sediment chemistry;
  - Remobilisation and redeposition of contaminants; and
  - Far-field effects (e.g. elevated suspended sediments) depending on scale of operation and hydrodynamic regime at disposal point.
- Conservation status of typical species and species features:
  - Modification of species composition including shift toward more disturbance tolerant species; and
  - Effects on population sizes, physiological health, reproduction, biomass.

The disposal of dredged material has the potential to result in short-term physical, chemical and biological effects within the marine environment. The primary impact pathway is the deposition of material at the disposal site, resulting in localised smothering of seabed habitats and temporary modification of seabed morphology. Additional effects may arise from the dispersion and

redeposition of finer sediments, leading to short-term increases in suspended sediment concentrations and turbidity (Halcrow, 2006; AECOM, 2007). These changes may reduce light penetration and temporarily affect primary productivity (Davison & Hughes, 1998).

Given the dynamic, tidally influenced nature of the receiving environment, these changes are expected to be temporary, with natural processes promoting sediment reworking and recovery (Halcrow, 2006). There is also some potential for the remobilisation of contaminants, where present, although this would be localised and short-term. Sediment sampling has also been undertaken, however further sampling is required as existing data will be out of date by August 2026. Sediment sampling will be undertaken once a sediment sampling plan has been received from NRW.

The deposition of dredged sediment may potentially disturb and abrade seabed habitats. Abrasion effects are typically most pronounced when coarser materials, such as gravel, are deposited onto the seabed (JNCC, 2022). However, the sediments expected in this case are predominantly composed of clay, silt, and sand. As a result, the potential for abrasion is considered to be minimal.

Benthic habitats within the wider area, including those associated with the Pen Llŷn a'r Sarnau / Lleyn Pensinsula and the Sarnau SAC, may be sensitive to smothering, increased suspended sediments and changes in sediment characteristics. Annex I reef (stony and bedrock reefs) communities can be relatively robust and can re-colonise relatively quickly. Minor temporary modifications of suspended sediments can occur within the SAC due to local activities. Increases in suspended sediments may reduce light penetration, affecting algal communities, while sediment deposition may alter habitat structure. Recovery potential varies, with some reef communities relatively robust, while others (e.g. horse mussel assemblages) are more sensitive and slower to recover. Large shallow inlets and bays and mudflats and sandflats not covered by seawater at low tide may be subject to smothering of associated communities, although effects will be short lived.

Biogenic habitats show varying tolerance to these pressures. Honeycomb worm (*S. alveolata*) reefs are generally tolerant of short-term increases in turbidity and sedimentation, although feeding and growth may be temporarily reduced (Jackson, 2008). Blue mussel (*M. edulis*) beds are relatively tolerant of elevated turbidity but may experience some mortality under sustained smothering, with recovery dependent on recruitment (Tyler-Walters, 2008a). Light smothering (up to 5cm) is unlikely to cause significant mortality, although deeper burial may increase mortality due to limited ability to emerge from sediments exceeding 2cm; however, given the localised nature of deposition and the influence of wave and tidal processes, significant effects are unlikely (Tyler-Walters, 2008a). Eelgrass (*Z. marinus*) is more sensitive, with potential effects from both smothering and prolonged turbidity due to reduced light availability (Tyler-Walters, 2008b).

Native oyster (*O. edulis*) beds show some tolerance to temporary disturbance. Individuals can recover from minor shell damage and are able to expel limited amounts of sediment, so short-term increases in turbidity or light sedimentation are likely to result in reduced feeding and growth rather than significant mortality. However, tolerance is limited; under more sustained or higher levels of sedimentation, mortality may occur and recruitment may be hindered, particularly where deposited sediment persists in low-energy environments. Overall, temporary and low-level impacts are unlikely to cause major declines, with prolonged or intense pressures leading to more significant effects (Perry *et al.,* 2023).

The wider benthic community is expected to be comprised of species that are characteristic to the Pwllheli Harbour and surrounding habitats. These communities are likely to adapt to short-term sediment disturbance and are likely to recolonise the area following the completion of sediment deposition. As such, effects on the wider benthic ecology is expected to be temporary and highly localised, therefore no significant impacts are likely.

Fish species, including migratory Atlantic salmon (*S. salar*) and sea trout (*S. trutta*), may experience short-term disturbance from elevated suspended sediments; however, significant effects or barriers

to migration are not anticipated. River and sea lamprey (*L. fluviatilis* and *P. marinus*) may also utilise the coastal waters in the vicinity of Pwllheli Harbour as part of the species migratory lifecycle. Similarly, the deposition of dredged material is unlikely to have significant impacts due to localised nature of the deposition.

Marine mammals, including bottlenose dolphin (*T. truncatus*), grey seal (*H. grypus*) and otter (*L. lutra*), may experience minor, short-term disturbance but are highly mobile and unlikely to be significantly affected. Seal pupping sites occur in the wider region, and individuals may be present in coastal waters around Pwllheli on a seasonal basis. Potential impacts are limited to temporary disturbance from suspended sediment. Given the localised nature of the works and the availability of alternative habitat in the wider Cardigan Bay area, no significant effects on seal pupping sites are anticipated.

Disturbance to coastal birds is also expected to be temporary and limited. The bird assemblage recorded in the wider area (including grebes, gulls species, auk species, shag (*G. aristotelis*), gannet, kittiwake (*Rissa tridactyla*), red-breasted merganser (*M. serrator*), common scoter (*M. nigra*), Manx shearwater (*P. puffinus*), red-throated diver (*G. stellata*) and cormorant) are typically associated with foraging in coastal and inshore waters rather than being dependent on the immediate disposal footprint (DataMapWales, 2025). Potential impacts are primarily limited to short-term, localised disturbance and temporary increases in suspended sediments during disposal events, which may slightly reduce local foraging efficiency in the immediate vicinity. However, these effects are expected to be temporary, intermittent and highly localised, with birds readily able to avoid disturbed areas and utilise the wider available foraging resource across the surrounding coastal waters. No significant displacement, barrier effects or loss of functional foraging habitat are anticipated, and therefore no significant effects on seabird populations are likely.

The local marine environment supports fish resources including sole nursery grounds and sprat spawning grounds, which may be sensitive to temporary increases in suspended sediments, turbidity and localised seabed disturbance associated with disposal activities. These effects can temporarily reduce water clarity and feeding efficiency and may affect eggs and larvae where present. However, impacts are expected to be short-term, highly localised and reversible, with no barrier to fish movement or significant effects on wider fish populations.

There are no Annex I Submerged or partially submerged sea caves within the local area, however several Sandbanks which are slightly covered by seawater all the time are present. These are however located over 20km from the proposed disposal location. The Annex I habitat Large shallow inlets and bays is present at Tremadog Bay however any impacts are expected temporary.

Cumulative effects with other dredging and disposal activities have been considered. Based on available information, there are no other concurrent or planned dredging or disposal operations within the local area that would overlap spatially or temporally with the proposed works. As such, no cumulative impacts are anticipated in relation to sediment plumes, seabed disturbance, or water quality. The proposed disposal activities are therefore expected to result only in localised and temporary effects, with no significant cumulative impacts identified.

Overall, potential impacts are expected to be localised, temporary and reversible, and are unlikely to result in significant adverse environmental effects at the EIA screening stage.

5.2 Screening Against EIA Regulations

5.2.1 Schedule A1 and A2

The Marine Works (EIA) Regulations 2007 (as amended) transpose the European EIA Directive into UK law. The Directive is intended to ensure that decision-making authorities are informed of any likely significant environmental effects before granting consent for a project. The EIA process involves assessing the potential for significant environmental impacts arising from a proposed development.

Under the Marine Works (EIA) Regulations, an EIA must be undertaken to support applications for consent for projects falling within the categories listed in Schedules A1 and A2 of the Regulations.

Schedule A1 projects include, but are not limited to:

- Energy and extractive industries including oil refineries, power plants, nuclear facilities, commercial oil/gas extraction, large dams/reservoirs, Carbon Dioxide (CO_2) capture and geological storage;
- Industrial production including iron/steel and non-ferrous metal production, asbestos processing, large integrated chemical plants, pulp, paper, and board production;
- Transport infrastructure long-distance railways and airports, motorways/express roads, inland waterways and ports, large pipelines, high-voltage power lines;
- Waste & water management including hazardous waste disposal, wastewater plants, large groundwater abstraction/recharge, inter-basin water transfers; and
- Agriculture & land use including intensive livestock/poultry installations, quarries, open-cast mining, peat extraction.

The proposed disposal does not fall within Schedule A1 of the EIA Regulations, within which an EIA would be mandatory.

Schedule A2 project include, but are not limited to:

- Agriculture, silviculture and aquaculture;
- Extractive industry;
- Energy;
- Production and processing of metals;
- Mineral industry;
- Chemical industry;
- Food industry;
- Textile, leather, wood and paper industries;
- Rubber industry;
- Infrastructure projects;
- Tourism and leisure; and
- Changes and extensions.

The proposed disposal does not fall within Schedule A2 of the EIA Regulations, within which an EIA would be required if Marine Licensing concludes that the project is likely to have significant effects on the environment.

The proposed disposal does not fall within the definitions of projects listed in Schedules A1 and A2 of the EIA Regulations. However, an EIA Screening Opinion is being sought to confirm this.

5.2.2 Characteristics of the Project

The proposed works comprise disposal of dredged material from maintenance dredging at Pwllheli Harbour to restore and maintain design depths for safe navigation. Two dredging scenarios are considered: a one-off corrective dredge of up to 60,000m³, and annual maintenance dredging of 10,000–20,000m³.

Dredging will be undertaken using a cutter suction dredger, producing a sediment–water slurry. Material will be transported via pipeline (≤200m) and disposed within the outer bay.

The works are temporary and intermittent, with the main campaign anticipated in Spring 2027 and future annual maintenance campaigns undertaken outside the bathing season (October–May). Key potential impact pathways include increased turbidity, sediment deposition, and disturbance to the seabed.

The project is a continuation of established maintenance activities within an operational marina, although disposal to the outer bay represents a change from previous practice.

5.2.3 Magnitude and Significance of Effects

Overall, the magnitude of effects arising from disposal activities is expected to be low and highly localised, with impacts largely confined to the immediate vicinity of the disposal site and short-term in duration. Potential effects such as temporary increases in suspended sediments, localised seabed disturbance, and minor smothering are anticipated to be rapidly dispersed or reworked by tidal and wave action within the dynamic coastal environment.

Sensitive receptors, including fish nursery and spawning areas and marine mammals such as seals, are unlikely to experience more than short-term behavioural disturbance or minor, reversible effects, given the absence of physical barriers and the availability of extensive alternative habitat in the wider area. As such, the overall significance of effects is considered to be negligible to minor adverse at the site level, and not significant in the context of the wider marine and coastal system.

5.3 In-Combination Effects

In-combination effects have also been considered in relation to other plans and projects within the surrounding area. There are no mapped cables, wind farms or oil and gas assets within the vicinity. At present, there are also no known or proposed dredging or disposal activities in the immediate vicinity of the Pwllheli Harbour outer bay that would act cumulatively with the proposed works. As such, no spatial or temporal overlap with similar activities has been identified that could give rise to additive increases in suspended sediment, deposition, or disturbance effects. Given the absence of other relevant ongoing or planned marine disposal operations in the area, in-combination effects are considered highly unlikely, and the proposed activity is not expected to contribute to any significant cumulative impact marine environment.

5.4 Mitigation Measures

A range of embedded and additional mitigation measures will be implemented to avoid, reduce, or prevent significant environmental effects associated with disposal activities. These measures include best practice techniques, control of sediment dispersion, contamination management, vessel management, and environmental monitoring. Measures will be secured through an Environmental Management Plan (EMP) and any relevant licence conditions.

5.4.1 Embedded mitigation

An EMP will be developed and implemented. This will include:

- Pollution prevention measures and spill response procedures;
- Roles and responsibilities of personnel;
- Emergency response protocols; and
- Compliance with relevant legislation and guidance.

All personnel will receive site inductions and toolbox talks to ensure awareness of environmental sensitivities and required mitigation measures.

Ongoing stakeholder engagement will be maintained throughout the works, including communication with Harbour users and relevant authorities.

Dredged material will be tested and classified in accordance with guidance from NRW prior to disposal to confirm suitability for reuse or disposal. This will include contaminant testing. All operations will be undertaken using best practice dredging techniques to minimise sediment suspension and plume formation. Mitigation measures will include, where practicable:

- Timing dredging and disposal to favourable tidal conditions (e.g. ebb tide only where feasible);
- Avoiding dredging during slack water periods;
- Intermittent dredging and disposal to allow suspended sediments to settle within the tidal cycle; and
- Limiting daily disposal volumes to manage suspended sediment concentrations.

Turbidity and water quality will be monitored during operations, with works adjusted, reduced, or temporarily suspended if trigger levels are exceeded. Additional sediment control measures will be implemented as required to minimise dispersion of fine materials.

All vessels will operate in accordance with relevant maritime legislation, including the Marine Pollution (MARPOL) Annex I, and will have Shipboard Oil Pollution Emergency Plans (SOPEP) in place. Standard spill prevention and response procedures will be followed at all times. Navigation safety will be maintained through coordination with the Harbour authority, appropriate marking of works areas.

Dredging and disposal activities will be scheduled, where practicable, to avoid the bathing water season (May to September) to reduce potential interaction with recreational users and minimise temporary water quality impacts during peak amenity periods. Works will, where practicable, avoid sensitive ecological periods such as bird breeding seasons and fish spawning periods. Disturbance will be temporary and limited to clearly defined working areas. Working hours will be agreed in advance with stakeholders and, where possible, restricted to minimise noise impacts.

A Traffic Management Plan will be implemented for any land-based movements associated with the scheme to define haul routes, manage delivery schedules, and ensure safe vehicle operations while minimising disruption to local receptors. Appropriate signage and public safety measures will be in place to restrict access to operational areas. Project details, including timing and location of dredging activities, will be communicated in advance via Notices to Mariners. This will include local ports, operators, fishermen, recreational users, and transport services to ensure safe navigation and minimise disruption.

Monitoring of water quality, turbidity, and general site conditions will be undertaken throughout the works. An adaptive management approach will be applied, allowing mitigation measures to be modified if monitoring identifies unexpected impacts.

The risk of introducing INNS via contaminated plant and equipment is low.

A hydrodynamic and sediment dispersion modelling study is being undertaken by Intertek to assess potential plume behaviour and associated impacts from disposal activities. The results of this study will be reviewed and used to inform the final disposal strategy and any required mitigation measures, including adjustments to timing, location, or methodology of works to ensure environmental impacts are minimised.

6. OTHER ASSESSMENTS

The proposed disposal activities will require a number of supporting environmental assessments to ensure compliance with relevant legislation and policy. A Habitats Regulations Assessment (HRA) screening will be undertaken and submitted to NRW as part of the Marine Licence application to determine whether the disposal is likely to have a significant effect on any European site or protected features, either alone or in-combination with other plans or projects. The HRA will be informed by outputs of the hydrodynamic and sediment dispersion modelling study.

There are no Marine Conservation Zones (MCZs) within 100 km of the proposed disposal area, therefore a MCZ assessment is not considered necessary.

A WFD assessment will also be required to consider potential effects on waterbody status and relevant quality elements, including physico-chemical conditions and biological quality elements. In addition, waste hierarchy considerations will be addressed in line with OSPAR and Welsh policy requirements, demonstrating how prevention, reuse, recycling, recovery and disposal principles have been applied in determining the most appropriate management for the dredged material.

OSPAR guidance emphasises effective waste management to prevent leakage of materials to the marine environment, applying the waste hierarchy (prevention, reuse, recycling, recovery and disposal) and requiring that unavoidable wastes be managed within controlled systems to minimise environmental impact and avoid contributing to marine litter (OSPAR, 2021). This approach will be applied to dredged material through appropriate characterisation and controlled pipeline disposal in line with OSPAR requirements. The method also reflects OSPAR Regional Action Plan for Marine Litter principles by reducing the potential for uncontrolled releases, recognising that poor waste handling practices can contribute to marine litter inputs if not properly managed.

The disposal of dredged material will be undertaken in accordance with the OSPAR Guidelines for the Management of Dredged Material and in line with the waste hierarchy set out in OSPAR guidance and Welsh Government policy, which prioritises prevention, reuse and recycling prior to disposal. The OSPAR framework requires appropriate characterisation of dredged sediments and assessment of disposal options, with preference given to beneficial use where practicable, and sea disposal only where material is demonstrated to be suitable and environmental impacts are considered acceptable.

Sediment sampling and analysis have been undertaken and will be updated as required, with results assessed against Cefas Action Levels to confirm suitability for disposal. In this case, beneficial reuse options within the immediate area are limited due to previous disposal activity and the operational requirement to maintain navigational depths within Pwllheli Harbour. The proposed offshore disposal location, approximately 200m outside the Harbour mouth, is within a dynamic, sediment-influenced environment, and therefore represents a controlled continuation of established dredging and disposal practice. This approach remains consistent with OSPAR principles, including the management of dredged material within the same sedimentary system where environmentally acceptable.

7. CONSULTATION

NRW have been made aware of the proposed project. A sediment sampling plan has been requested, and a meeting with NRW marine advisors (coastal specialists) took place in July 2025 to discuss dredge plume and dispersion modelling, including methodology, data requirements, and dredged material disposal options.

A further meeting with NRW marine advisors was held in January 2026 to discuss the proposed approach to the Marine Licence Application (MLA), including guidance and sediment sampling requirements.

A pre-application meeting will also be held with NRW prior to submission of the MLA.

An early engagement email was sent to relevant stakeholders on behalf of CGC on 28th April 2026. The email and covering letter detailed the proposed disposal of dredging material, history, MLA process and a request for any comments regarding local environmental sensitivities, local concerns, navigation, access or operational considerations, upcoming local activities and preferred methods of ongoing communications as the project progresses. All correspondence and any meetings will be documented and undertaken in Welsh if required.

This stakeholders included in the early engagement included:

- Cyngor Gwynedd;
- Cyngor Gwynedd Biodiversity;
- Clwb Hwylio Pwllheli Sailing Club;
- Pwllheli Marina Berth Holders Association (Cymdeithas Deiliaid Angorfeydd Marina Pwllheli);
- Pwllheli Maritime Merchants Association (Cymdeithas Masnachwyr Morwrol Pwllheli);
- Pwllheli Lifeboat Station (Bad Achub Pwllheli);
- Natural Resource Wales, including:
  - Marine Licencing
  - Marine Area Advice
- Trinity House;
- Crown Estate;
- Maritime and Coastguard Agency;
- Gwynedd Archaeology Service;
- Royal Commission on the Ancient and Historical Monuments of Wales;
- Welsh Fishermen Association; and
- Project Seagrass.

Intertek have not received any responses to date, however we anticipate feedback as the project progresses, and all comments will be addressed and incorporated accordingly.

Intertek have also made contact with Project Seagrass of whom have recently undertaken seagrass restoration in the local area.

8. CONCLUSION

The disposal of dredging material is associated with a variety of short-term physical, chemical and biological effects including changes in suspended solids, smothering and siltation rate changes and abrasion. As the proposed disposal location is within the Pen Llŷn a'r Sarnau / Lleyn Pensinsula and the Sarnau SAC, protected receptors such as honeycomb worm (*S. alveolata*), bedrock and stony reefs and bottlenose dolphins (*T. truncatus*) could be impacted. Other sensitive receptors include eelgrass (*Z. marina*) and blue mussel (*M. edulis*) beds. Honeycomb worm (*S. alveolata*) and blue mussel (*M. edulis*) beds are relatively tolerant, however eelgrass (*Z. marina*) are more sensitive. Marine mammals and local fish species may experience short-term disturbance from elevated suspended sediments; however, significant effects or barriers to migration are not anticipated. Disturbance to coastal birds is also expected to be temporary and limited. The wider benthic community is expected to be comprised of species that are characteristic to the Pwllheli Harbour and surrounding habitats. These communities are likely to adapt to short-term sediment disturbance and are likely to recolonise the area following the completion of sediment deposition. Given the dynamic, tidally influenced nature of the receiving environment, these changes are expected to be temporary, with natural processes promoting sediment reworking and recovery. Overall, potential impacts are expected to be localised, temporary and reversible, and are unlikely to result in significant adverse environmental effects at the EIA screening stage.

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