

Cyngor Gwynedd

Barmouth North Promenade FAS

Water Framework Directive Screening for GI

Reference: BMTH-ARP-EWE-ZZ-RP-OE-000001

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Llywodraeth Cymru
Welsh Government



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1. The Project

1.1 Scheme Overview

- 1.1.1 Cyngor Gwynedd, supported by YGC, propose to carry out coastal flood and erosion risk management works on a 1.2km length of frontage at the North Promenade region in Barmouth, Gwynedd. The 1.2km scheme area comprises of a mix of hard coastal defences (sheet piled wall, concrete revetment, and wave recurve wall, with masonry setback walls). The defences run parallel with the promenade and adjacent to Marine Parade.
- 1.1.2 The preferred option will reduce the long-term flood risk to both people and properties along the Barmouth seafront, bringing the area in line with its SMP2 policy of 'hold the line', with the longer-term considerations towards 'managed realignment'. The project will contribute towards managing flood risk, coastal erosion, and structural failure of the primary coastal defences, adapting to the increasing pressures associated with coastal erosion and climate change.
- 1.1.3 An Outline Business Case (OBC) was submitted by Cyngor Gwynedd in 2021 to seek approval and funding from Welsh Government for the design development and consenting of the project (Stage 1). YGC appointed Alun Griffiths (Contractors) Ltd, with Arup (the 'AGC Team') to progress Stage 1 of the project, which includes developing the outline design, undertake an Environmental Impact Assessment (EIA), Consenting, Detailed Design and Full Business Case.
- 1.1.4 The preferred option outlined in the OBC comprised of the elements listed below, which are to be refined and developed through Stage 1. These elements are collectively referred to in this report as 'the Scheme'.
- Alternative primary wall to be rebuilt structurally and increased by +600mm (from 5.65mOD to 6.25mOD) over a length of approximately 1.2km.
 - Tertiary flood wall to be re-built structurally and increased by +450mm (from 6.4mOD to 6.85mOD) over a length of approximately 1.1km.
 - Existing sheet piles to be refurbished over approximately 515m length.
 - Additional 300m of rock toe armour to be provided to protect the primary sea wall and revetment.
 - 560m of shingle beach profile to be built out to protect the primary sea wall and revetment. Extents to be defined during detailed design. Dependant on stability of shingle material as a result of coastal processes.
 - Refurbishment of culverted outfall and reinstatement of flap valve.
 - Demountable flood defences to be installed with the arrangement to be confirmed during the detailed design.

1.2 Scheme Objectives

- 1.2.1 Cyngor Gwynedd seek a solution to reduce coastal flood and erosion risk to Barmouth North Promenade, whilst improving the amenity and environmental value of this section of coastline. Placemaking opportunities such as beach access, dwell spaces and facilities, and improved connectivity and wayfinding have the potential to leverage the less-used asset, broadening the appeal of Barmouth and reducing pressure on the popular South Promenade area.

- 1.2.2 The following Investment Objectives have been identified in the OBC:
- To reduce the threat of coastal flood and erosion risk to people and property with due consideration of SMP2 policy to ensure the long-term resilience and vitality of the community;
 - To support, and where possible enhance, recreation and amenity value of the local area;
 - To maintain, and where possible enhance, natural and historic environments;
 - To ensure marine amenity activities can continue to grow; and
 - Ensure an affordable and deliverable whole life option through a partnership approach and contributions.

1.3 Proposed investigation

- 1.3.1 The ground investigation works that are subject to the assessment within this report are the Phase 2 intrusive geotechnical combined geoenvironmental investigation of the site (henceforth referred to as 'the Proposed investigation'), centred around National Grid Reference SH 60441 16890, (henceforth referred to as 'the Proposed investigation area'). The Proposed investigation comprises two key elements; a geophysical investigation and an intrusive ground investigation.
- 1.3.2 The purpose of the geophysical investigations is to provide a continuous section of the stratigraphy along the front of the promenade in particular, if access constraints prevent or limit the scope of intrusive investigation. The geophysical investigation aims to investigate the following key aspects (to a depth of at least 20m below existing ground level) to inform design and construction works for the proposed development:
- Thickness of Blown Sands and presence, thickness, soil stiffness characterisation and acoustic parameters of any directly underlying soft layer which may be present.
 - Bedrock: top level, thickness, weathering profile (gravel/rock), soil stiffness characterisation and acoustic parameters.
- 1.3.3 The general scope of the intrusive GI is as follows:
- 4no. window samples, to approximately 6mbgl, located along the beach to confirm the stratigraphy. Standard penetration testing (SPTs) proposed in boreholes. Laboratory testing of selected soil samples for geotechnical purpose.
 - 8no. Cone penetration testing (CPT), to approximately 15mbgl, located along the beach to inform the deeper geology along the beach.
 - 8no. trial pits to approximately 42mbgl, located adjacent to the existing sheet piles to expose the sheet piles and confirm superficial geology. Laboratory testing of selected soil samples for geotechnical and geo-environmental purposes.
 - 2no. surface water samples taken from the culvert outfalls along the promenade front.

- 1.3.4 It is anticipated that work may take place on site between the hours of 8am and 6pm, Monday to Friday.
- 1.3.5 The works are located along the beach with timber groynes at frequent intervals of approximately 45m. The works are within the intertidal zone. The presence of the groynes may present restrictions on timescales available for rig tracking to and from locations, with potentially short time periods available for investigation within some locations, which will vary with the tide cycles.
- 1.3.6 Access will be from access points to the north and the south of the promenade. Beach material will be redistributed if necessary to reduce any drop from the end of the ramp onto the beach to ensure safety during access. Material for grading out the ramp would comprise gravels and cobbles reclaimed from the beach to the south of the promenade and placed at the end of the ramps.
- 1.3.7 The Proposed investigation boundary and indicative GI locations are provided within Appendix A of the Marine Licence Application. GI methods are further detailed under the relevant headings below.

Boreholes

- 1.3.8 Boreholes are proposed in four locations across the site boundary and includes window sampling and SPTs. This method will involve the driving of steel tubes into the ground to specific depths to retrieve samples. Works will involve the tracking of a drilling rig to each location. The rig is mounted on a small crawler unit with rubber tracks, making it relatively lightweight and easy to transport, minimising disturbance to its surroundings.
- 1.3.9 Dynamic Sampling holes shall be backfilled with soil arisings and sand from the beach.

Cone Penetration Testing (CPT)

- 1.3.10 CPT is proposed in eight locations across the site boundary. CPT will be undertaken by a Tracked crawler rig. The rig will be driven to the location, and a cone on the end of a series of rods is pushed into the ground at a defined depth at a constant rate. The CPT rig is an 18.5 tonne track mounted CPT rig (CPT005) which has low ground bearing pressure making it ideal for use in intertidal areas. The rigs have a maximum penetration of 20-30m (depending on ground conditions) and are capable of pushing up to 120m per day (depending on access). The measurement of the rigs are approximately 4.4m length, 2.5m width and 2.7m height.

Trial Pits

- 1.3.11 Trial pits are proposed at eight locations across the site boundary and will be excavated via machine. This is anticipated to require the use of a 13t excavator with a tractor and a trailer to transport trench boxes. It is possible that two tractors and trailers may be required depending on access arrangements.
- 1.3.12 The excavation depth of each trial hole will be 4metres below ground level (mbgl). Once each trial hole is excavated to the required depth the information required will be collated immediately and then the hole backfilled before continuing onto the next. As such, excavations will be carried out and backfilled within one tidal window. No excavations will be left over a tidal cycle.

- 1.3.13 All excavations will be left secured when left unattended with suitable fencing and signage, including during shift breaks.

1.4 Purpose of this Report

- 1.4.1 The purpose of this assessment is to identify potential effects of the Proposed investigation on the current status and future status objectives of waterbodies present at the site, with reference to the Water Framework Directive (WFD). The key objectives of the assessment are to:
- identify the relevant WFD water bodies that may be affected by the Proposed investigation and collate the available baseline information;
 - identify activities with the potential to affect the water bodies at the site;
 - undertake a preliminary scoping assessment to identify the baseline condition at the site and the likely impacts of the Proposed investigation on the current status and status objectives of the relevant waterbodies (including identification of any additional mitigation requirements);
 - identify any risks of non-compliance with water body objectives and associated requirements for further detailed impact assessment and/or mitigation design; and
 - identify potential enhancement opportunities to support the delivery of water body objectives.
- 1.4.2 The report summarises the assessment methodology and results. The assessment has been undertaken in accordance with relevant guidance (see Appendix A) and has involved a desk-based study using readily available baseline information and existing available site information.
- 1.4.3 The WER assessment comprises a 'living document' and will be reviewed and updated as necessary in liaison with NRW to support future business case stages and the final construction consents and approvals process.

1.5 Other supporting environmental reports

- 1.5.1 This report is supported by and should be read in conjunction with the following reports which are provided with the Marine Licence Application:
- BMTH-ARP-EBD-ZZ-RP-OE-000001 (Preliminary Ecological Appraisal RML with Arup summary);
 - BMTH-ARP-EBD-ZZ-RP-OE-000004 (Habitats Regulations Assessment Screening for GI); and
 - BMTH-ARP-VES-OFFSH-RP-OE-000001 (Barmouth North Promenade FAS Intertidal Biotope Survey Report).

1.6 Assumptions and limitations

- 1.6.1 The WFD water body classification data in this assessment has been taken from NRW's Water Watch Wales website for WFD Cycle 3 (2021). These classifications are considered to provide the current best estimate of status and are the formal baseline against which the NRW will assess compliance with the 'no deterioration' objective.

- 1.6.2 The assessment in this document is based on the design information available in the GI Specification¹ and contractor Risk Assessment Method Statement (RAMS)². Assumptions made based on this information include:
- No vegetation clearance will be required to allow the Proposed investigation to take place;
 - Any required removal of sections of the groynes will not impact areas where blue mussels have been identified³, and any removed sections will be reinstated (areas where blue mussels have been identified are highlighted in the Intertidal Biotope Survey Report);
 - All works forming part of the Proposed investigation will be undertaken at low tide;
 - The ordinary watercourse located within the northern extent of the Proposed investigation area will not be impacted;
 - Excavations will be carried out and backfilled within one tidal window. No excavations will be left over a tidal cycle; and
 - All excavations will be backfilled using soil arisings and beach sands.

¹ Arup (2024) Barmouth North Promenade FAS Phase 2 Ground Investigation Specification. Reference: BMTH-ARP-CGT-OFFSH-RP-G-000001

² Alun Griffiths (Contractors) Limited (2025) Barmouth North Promenade FAS Method Statement No. AGMS 001. Phase 2 Ground Investigation (GI) Works

³ Arup (2024) Barmouth North Promenade FAS Intertidal Biotope Survey Report. Reference: BMTH-ARP-VES-OFFSH-RP-OE-000001

2. Legislative context

- 2.1.1 The Water Environment (Water Framework Directive) (England and Wales) Regulations (WER) (amended 2017) is currently the largest and most influential piece of UK legislation for the water environment and transposes the European Commission Water Framework Directive (WFD) into English and Welsh law. Natural Resources Wales is the competent authority responsible for delivering the requirements of the WFD (as transposed) in Wales. Although the UK legislation is now referred to as the 'WER' the common usage term remains as WFD; this is the preferred term of reference for legislation and associated data in this report.
- 2.1.2 Under the WFD, water bodies are the basic management units. These water bodies form part of a larger River Basin District (RBD), for which River Basin Management Plans (RBMPs) are developed and environmental objectives are set. These RBMPs are produced every six years, in accordance with the river basin management planning cycle.
- 2.1.3 The WFD requires classification of the current condition of water bodies. This is referred to as their 'status' or, for artificial or Heavily Modified Water Bodies (HMWBs), their 'potential'. The WFD also requires the setting of a series of objectives for maintaining or improving conditions so that water bodies reach and/or maintain at least 'Good' overall status or potential in the future. These overall Environmental Objectives are to:
- prevent the deterioration in the status of aquatic ecosystems, protect them and improve the ecological condition of waters.
 - aim to achieve at least 'Good' status or potential for all water bodies by 2015. Where this has not been possible and is subject to the criteria set out in the Directive, aim to achieve Good by 2021 or 2027.
 - meet the requirements of WFD Protected Areas.
 - promote sustainable use of water as a natural resource.
 - conserve habitats and species that depend directly on water.
 - progressively reduce or phase out the release of individual pollutants or groups of pollutants that present a significant threat to the aquatic environment.
 - progressively reduce the pollution of groundwater and prevent or limit the entry of pollutants.
 - contribute to mitigating the effects of floods and droughts.
- 2.1.4 All new (and on-going) activities in the water environment need to be guided by the requirements of the WFD. This includes ensuring that no changes occur that cause a deterioration of current status of a water body or prevent the achievement of the future status objectives of a water body.
- 2.1.5 Further details regarding the water body status classification process, the requirements of WER Compliance Assessments, and relevant guidance is provided in Appendix A and B of this report.

3. Assessment methodology

3.1 Scope of assessment

- 3.1.1 WER Compliance Assessments typically comprise a stepped process undertaken in parallel with the design development for a project. This includes the following key steps:
- Screening assessment;
 - Scoping assessment;
 - Detailed impact assessment (where required); and
 - Application of Article 4.7 / Regulation 19 (where applicable).
- 3.1.2 Further guidance on the WFD assessment for estuarine and coastal waters is provided by the Environment Agency⁴.
- 3.1.3 This report comprises the screening and scoping assessment stages to support the Marine Licence application for the ground investigation stage of the project. The assessment is based on a desk-based study using readily available desk-based information.
- 3.1.4 The spatial scope of the assessment includes all water bodies potentially affected by the Proposed investigation. The assessment considers the potential impacts of the Proposed investigation on the relevant quality elements associated with the water bodies affected, at the water body scale.
- 3.1.5 The assessment focuses on the permanent impacts of the proposed works. Temporary impacts, typically resulting from construction activities, are not considered to result in a deterioration in WFD status if the water body:
- is only impacted for a short time period;
 - is likely to recover within a short time period;
 - is likely to recover without the need for any restoration measures.

3.2 Data sources

- 3.2.1 The following datasets and resources are readily available online and have been collated to support this assessment:
- Western Wales River Basin Management Plan⁵;
 - Welsh part of the Severn Cycle 3 RBMP 2021 water body status classification and status objectives data⁶;
 - WFD Protected Area data;

⁴ Environment Agency, 2023. Water Framework Directive assessment: estuarine and coastal waters. Available at: <https://www.gov.uk/guidance/water-framework-directive-assessment-estuarine-and-coastal-waters> [Accessed 6th February 2025]

⁵ Natural Resources Wales (2022) Western Wales River Basin Management Plan 2021 – 2027

⁶ Natural Resources Wales, 2023. 'Water Watch Wales'. Available at: <https://waterwatchwales.naturalresourceswales.gov.uk/en/> [Accessed 17th January 2024]

- The British Geological Society Interactive Map (see)⁷; and
- Designated Site and WFD Habitat Sensitivity information⁸.

⁷ British Geological Society, 2023. Geology of Britain Viewer. Available at: <https://mapapps.bgs.ac.uk/geologyofbritain/home.html> [Accessed 14th February 2025].

⁸ Defra, 2023. Multi-Agency Geographic Information for the Countryside (MAGIC) Maps. Available at: <https://magic.defra.gov.uk/MagicMap.aspx> [Accessed 14th February 2025].

4. Project study site

4.1 Project site location

- 4.1.1 The Proposed investigation area encompasses a 1.2km length of frontage of the North Promenade region in Barmouth (henceforth referred to as the Proposed investigation area), Gwynedd (approximate grid reference SH 60786 15941 to SH 60163 17448). The 1.2km Proposed investigation area comprises a mix of hard coastal defences (sheet piled wall, concrete revetment, and wave recurve wall, with masonry setback walls). The defences run parallel with the promenade and adjacent to Marine Parade.

4.2 Site description

Geology

- 4.2.1 The British Geological Survey (BGS) 1:50,000 scale mapping indicates that the bedrock geology directly beneath the Proposed investigation area comprises sandstones, mudstones and turbiditic siltstones, conglomerates and manganese ore beds of the Harlech Grits Group.
- 4.2.2 The superficial geology of the Proposed investigation area comprises coastal deposits of gravel, sand, silt and clay⁹.

Topography

- 4.2.3 Levels within the Proposed investigation area range from circa +3m Above Ordnance Datum (AOD) to circa 0m AOD¹⁰.

Land use

- 4.2.4 The land use of the Proposed investigation area is coastal and urban in nature, comprising a long sandy and fine-shingle beach in Cardigan Bay. The promenade provides access to the Barmouth Beach. The beach levels significantly decrease, and the defences deteriorate in condition, moving towards the northern extent of the Proposed investigation area.
- 4.2.5 Directly to the east of the Proposed investigation area is the settlement of Barmouth, occupying a linear strip of coastline between the beach and Barmouth Slab, a natural rock climbing area reaching a height of 253m AOD.

Ecology

- 4.2.6 A Preliminary Ecological Appraisal (PEA) was undertaken in September 2024 by Richards, Moorehead & Laing Ltd (RML) to inform the proposed improvement works to the flood defences at North Promenade, Barmouth¹¹. The site predominantly comprises hardstanding, bare ground and structures along

⁹ Defra, 2023. Geology Viewer. Available at: <https://geologyviewer.bgs.ac.uk/> [Accessed 15th January 2025]

¹⁰ Topographic-map.com, 2025. United Kingdom topographic map. Available at: <https://en-gb.topographic-map.com/map-cgt/United-Kingdom/?center=52.72674%2C-4.05823&zoom=16> [Accessed 15th January 2025]

¹¹ Ove Arup and Partners Ltd (2024) Barmouth North Promenade FAS Preliminary Ecological Appraisal (PEA) Reference: BMTH-ARP-EBD-ZZ-RP-OE-000001.

Marine Parade interspersed with small parcels of coastal and amenity grassland, tall ruderal vegetation and scrub, with adjacent coastal and intertidal habitat including mud/sand and cobble/shingle habitat. Invasive non-native species have been noted onsite including Japanese Knotweed (*Reynoutria japonica*), montbretia (*Crocasmia x crocosmiiflora*) and Japanese rose (*Rosa rugosa*). Habitats onsite, and within the potential footprint of works, have been assessed as suitable to support protected species including birds, bats, otter (*Lutra lutra*), other mammals including hedgehog (*Erinaceus europaeus*), reptiles and amphibians.

4.2.7 In addition to the PEA:

- A breeding bird habitat appraisal survey was undertaken during summer 2024;
- Passage and wintering bird surveys are being undertaken monthly between October-March 2024/2025;
- Further surveys are also proposed to assess the use of the site by riparian mammals, including a search for any other resting sites that could be affected by the proposed works on or adjacent to the two running watercourses onsite, or hydrologically connected to the site; and
- Further appraisal of the intertidal habitats have also been appointed, including a search for marine invasive non-native species and potential presence of piddocks.

WFD protected areas and statutory designated sites

4.2.8 The location of the Proposed investigation area in relation to WFD waterbodies is illustrated in Figure 1.

4.2.9 Interrogation of the 'Water Watch Wales'⁶ website identified the following WFD protected areas are located within 5km of the Proposed investigation area. The location of the Proposed investigation area in relation to WFD Protected Areas is illustrated in Figure 2.

Drinking Water Protected Areas

4.2.10 The eastern extent of the Proposed investigation area intersects the Meirionnydd groundwater Drinking Water Protected Area, classified as not at risk.

4.2.11 There are no river or lake Drinking Water Protected Areas within 5km of the Proposed investigation area.

Areas designated for the protection of economically significant aquatic species

4.2.12 The Mawddach shellfish waters protected area is located 787m south of the Proposed investigation area, and encompasses the lower reaches of the Mawddach Estuary.

4.2.13 No Urban Waste Water Treatment Regulations Sensitive Bathing Waters were identified within 5km of the Proposed investigation area.

Nitrate Vulnerable Zones (NVZs)

- 4.2.14 No NVZs were identified within 5km of the Proposed investigation area.

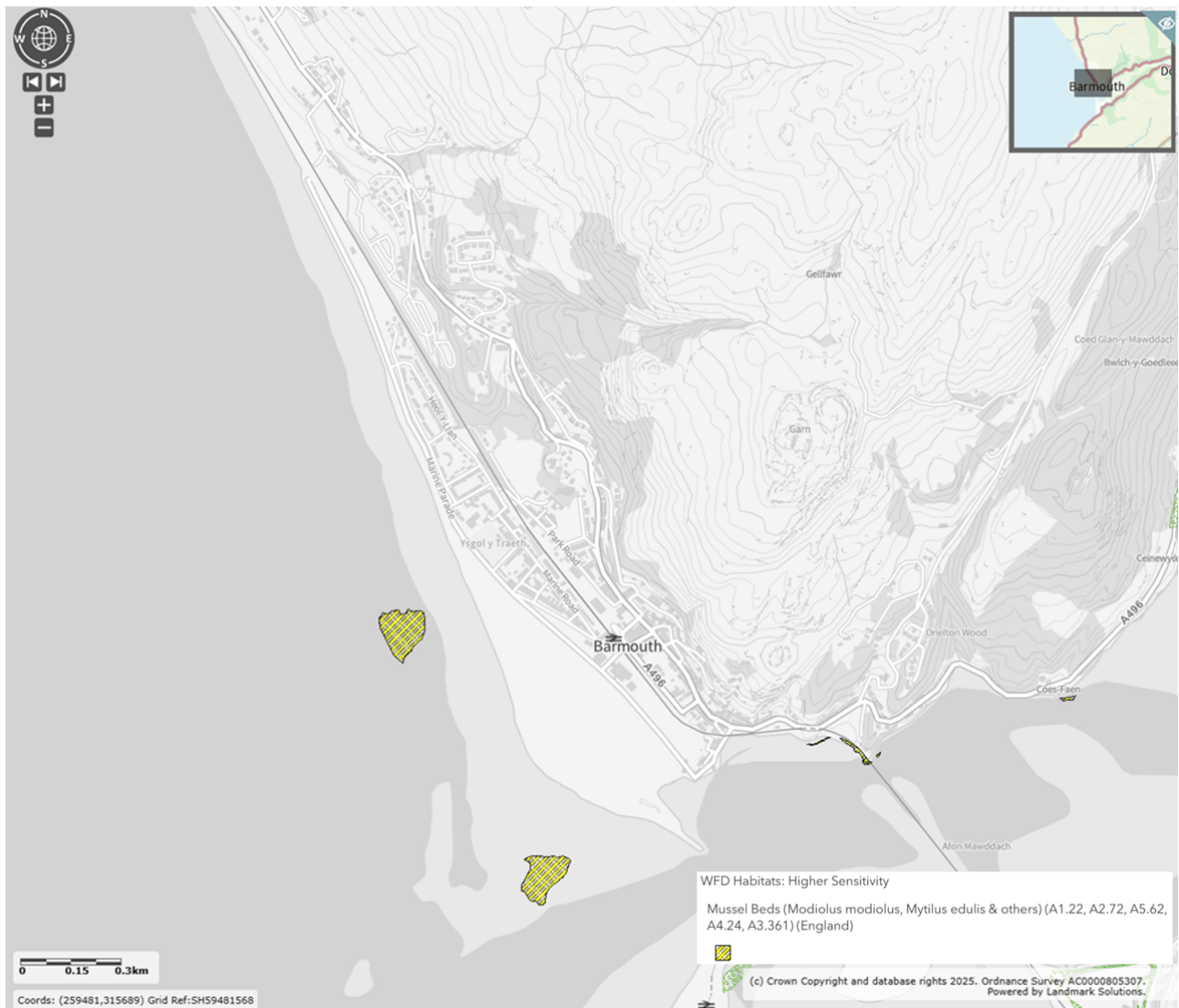
International statutory designated sites

- 4.2.15 There are three internationally designated sites for nature conservation within 5km of the Proposed investigation area, comprising:
- Lleyn Peninsula and the Sarnau Special Area of Conservation (SAC), located 100m west of the Proposed investigation area;
 - The Meirionnydd Oakwoods and Bat Sites SAC, located 340m east of the Proposed investigation area;
 - Northern Cardigan Bay Special Protection Area (SPA), located 2.22km west of the Proposed investigation area; and
 - Morfa Harlech a Morfa Dyffryn SAC, located 4.64km northwest of the Proposed investigation area.

4.3 WFD habitat classification

Higher sensitivity habitats

- 4.3.1 Blue mussel beds are located on lower sections of the groynes within the Proposed investigation area. For the purpose of this assessment, a precautionary approach is taken in assuming these mussel beds are WFD higher sensitivity habitats. Further blue mussel beds are located 110m to the south of the Proposed investigation area, as shown in Picture 1 below.

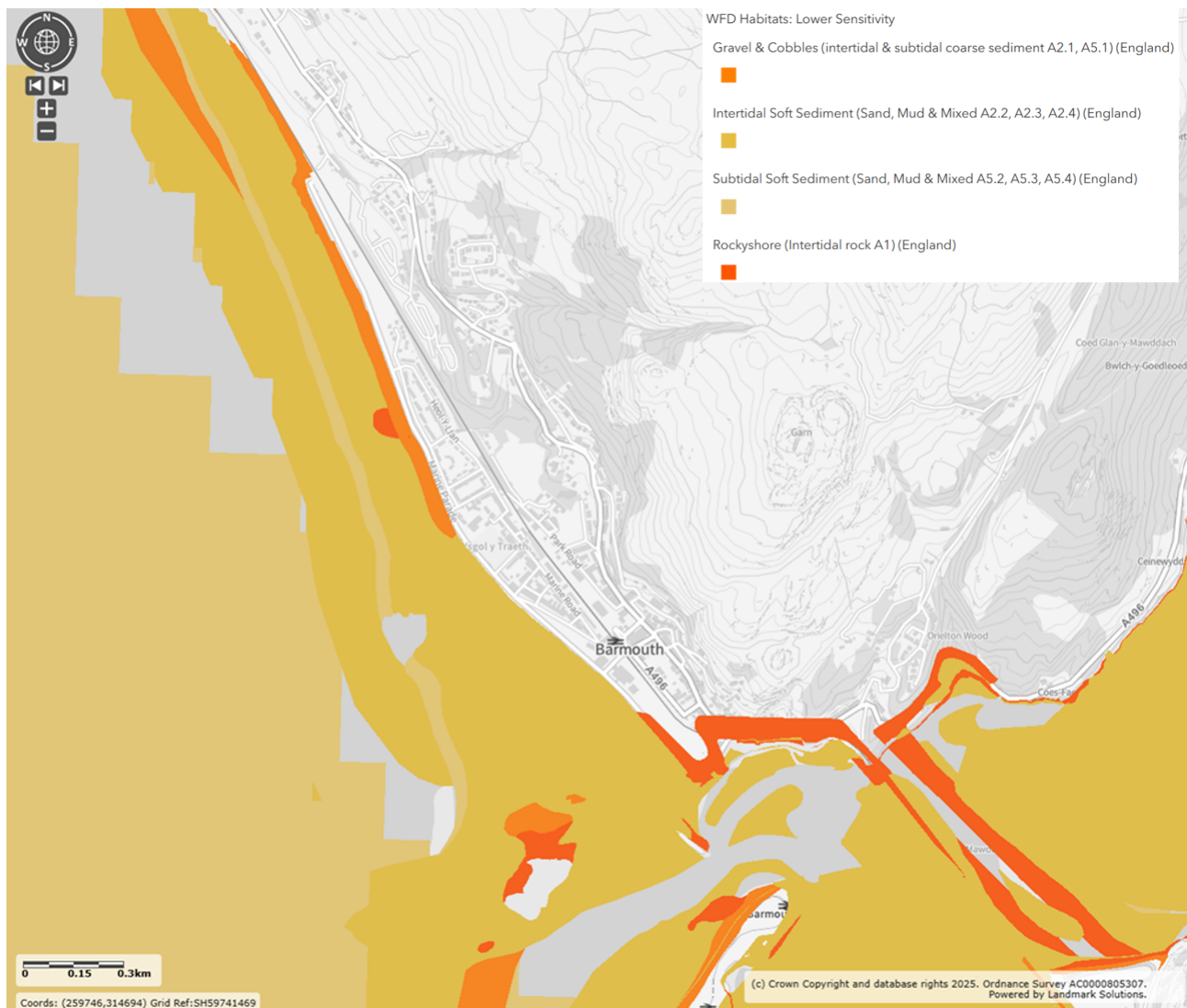


Picture 1 WFD higher sensitivity habitats

Lower sensitivity habitats

4.3.2 Four WFD lower sensitivity habitats are located either within and/or adjacent to the Proposed investigation area, comprising:

- Gravel and Cobbles are present within the northern extent of the Proposed investigation area;
- Intertidal Soft Sediment is present throughout the Proposed investigation area;
- Subtidal Soft Sediment is adjacent to the west of the Proposed investigation area; and
- Rocky shore is present within the centre of the Proposed investigation area.



Picture 2 WFD lower sensitivity habitats

4.4 Waterbodies

- 4.4.1 The western extent of the Proposed investigation area falls below Mean High Water Springs (MHWS) and therefore intersects a small part of Cardigan Bay. In addition, analysis of aerial imagery suggests there may also be a culverted ordinary water course running through the site and potentially surfacing within the Proposed investigation area.
- 4.4.2 The mouth of the Mawddach Estuary is located 120m south of the Proposed investigation area.

5. Proposed investigation

5.1 Scope of Ground Investigation (GI)

5.1.1 The scope of the proposed intrusive GI will comprise the following:

- 4no. boreholes (window samples or cable percussive), to approximately 6mbgl, located along the beach to confirm the stratigraphy. SPTs proposed in boreholes. Laboratory testing of selected soil samples for geotechnical purposes. Due to potential presence of cobbles the GI Contractor shall propose preferred method (window sample/ Cable percussive) to achieve the scheduled depth.
- 8no. Cone penetration testing (CPT), to approximately 15mbgl, located along the beach to inform the deeper geology along the beach.
- 8no. trial pits to approximately 4mbgl, located adjacent to the existing sheet piles to expose the sheet piles and confirm superficial geology. Laboratory testing of selected soil samples for geotechnical and geo-environmental purposes.
- 2no. surface water samples taken from the culvert outfalls along the promenade front.

5.1.2 The location of these samples is illustrated in **Error! Reference source not found.**

5.1.3 Further detail on the methodology for the Proposed investigation is available in the Contractor's RAMS submitted with the Marine Licence Application (Appendix H of the marine licence application).

5.2 Embedded mitigation

5.2.1 During Investigation works, general principles of construction best practice and risk mitigation will be followed.

5.2.2 A Risk Assessment Method Statement (RAMS) has been prepared in advance of construction. This outlines the environmental risks and constraints identified within the Proposed investigation area and defines best practice and mitigation measures required for inclusion within the construction method statements, to ensure compliance with relevant environmental legislation, consents, and approvals. These mitigation measures are outlined below.

Pollution control

5.2.3 The RAMS will contain the following best practice methods to mitigate the risk of pollution:

- Measures to avoid and minimise impacts to the water environment during construction, in alignment with good practice guidance. For the basis of this assessment, it is assumed that environmental good practice advice set out in the Pollution Prevention Guidance (PPG¹²) and replacement Guidance for

¹² GOV.UK. Pollution prevention guidance (withdrawn). Available at: <https://www.gov.uk/government/collections/pollution-prevention-guidance-ppg> [Accessed 14th February 2025].

Pollution Prevention (GPP¹³) series will be implemented on site during the investigation. Whilst PPGs and GPPs do not provide regulatory guidance, they form environmental good practice guidance for the whole UK;

- All construction activities will be carried out in accordance with guidance outlined within CIRIA best practice guidance¹⁴;
- A pollution risk assessment will be carried out for the Proposed investigation area ahead of the investigation, considering both the storage and transportation of materials used. This will identify potentially hazardous materials or activities and assess the probability and magnitude of potentially harmful effects. From this, a pollution incident response plan (see GPP 21¹⁵) will be compiled to identify the specific measures needed to reduce the likelihood of a spillage happening, and to minimise the impact of any spills that may occur;
- All plant operating on the beach will use biodegradable oils and carry spill kits;
- Both the beach and adjacent drains/watercourses will be protected from run-off pollution;
- Ensuring that all site activities in proximity to watercourses and intertidal areas are controlled and are in accordance with relevant legislation and undertaken in compliance with the relevant Guidance for Pollution Prevention (e.g. GPP5¹⁶) and industry best practice (CIRIA, CIRIA C741¹⁷). Additional measures such as silt fencing, silt busters or bales may be necessary to prevent silt or contaminants from being released into watercourses connected to the site via drainage measures or as surface run off;
- Emergency spill kits are to be maintained at every work location or be easily accessible at all times from a centralised location;
- Spill kits will be deployed in the event of a spillage. In the event of a pollution incident, work should cease in the vicinity of the incident and contaminants must be cleaned up immediately;
- Drip trays and “nappies” to be used under plant when not in use and when re-fuelling;
- The storage and use of hazardous chemicals would be in accordance COSHH Regulations (1998);
- A clean and tidy site will be maintained at all times;
- Bio-oils will be used in plant;

¹³ NetRegs. Guidance for Pollution Prevention (GPP) documents. Available at: <https://www.netregs.org.uk/environmental-topics/guidance-for-pollution-prevention-gpp-documents/> [Accessed 14th February 2025]

¹⁴ CIRIA (2025) CIRIA <http://www.ciria.org>.

¹⁵ NetRegs, 2021. GPP 21: Pollution incident response planning. Available at: <https://www.netregs.org.uk/environmental-topics/guidance-for-pollution-prevention-gpp-documents/gpp-21-pollution-incident-response-planning/> [Accessed 14th February 2025]

¹⁶ Guidance for Pollution Prevention: Works and maintenance in or near water (GPP5), NetRegs <https://www.netregs.org.uk/media/1418/gpp-5-works-and-maintenance-in-or-near-water.pdf>

¹⁷ CIRIA C741 'Environmental Good Practice on Site'; Fifth Edition (2023).

- Daily checks to be carried out before any plant is used on site;
- Equipment to be stored on designated drip trays/bunded areas;
- All fuel will be stored within the site compound. The main fuel storage area will be at the main site compound on Promenade, which will house the stationary tank, which will be double skinned, bunded, secure and lockable. This will be sited in a safe position, out of public view, away from heavy movement areas.
- All refuelling operations are to be undertaken at the site compound, at least 10m from any watercourse or intertidal area;
- All refuelling will be carried out with a spillage control kit in place, at the refuelling location (Carried by the tractor/item of plant). Care will be taken not to spill any fuel, the operative must remain in attendance at all times and the filling nozzle must not be fixed open unless automatic shut-off nozzle is fitted on the hose;
- A designated, trained and experienced operative will fill the mobile fuel bowser unit from the stationary tank at the main compound using the delivery nozzle;
- Hoses and valves to be checked regularly for signs of wear and renew as and when required;
- If a spill should occur, the following should be used: stop, contain and notify. All spillages, no matter how small, will be cleaned up immediately and reported to the Site and Agent; and
- All highways affected by the works will be cleansed as and when necessary, following continuous monitoring by the site team to prevent unnecessary build-up of dirt on carriageway surfaces and within associated run off drains.

Minimising disturbance

5.2.4 Appropriate measures will be included within the RAMS to reduce potential environmental impacts of any activities within the intertidal zone. This includes measures to:

- Minimise the footprint of any intertidal works as far as reasonable possible to reduce the degree of physical disturbance of the existing marine and coastal environment;
- Noise levels shall be minimised where possible;
- Mitigation measures to suppress dust generation will be implemented throughout the duration of the Proposed investigation, as and when the requirement is deemed necessary;
- Reinstate any impacted benthic or marginal habitats where necessary;
- Reduce associated noise and vibration impacts where possible;
- Control the timing of works so they are programmed to take place outside of sensitive times of year for protected species, such as wintering birds;
- Constant monitoring of dust levels and effective methods of work should be adopted to prevent dust becoming airborne at the source for example; using

wet sweeping methods to prevent accumulation of dust and mud and using effective exhaust ventilation and filtering to minimise potential dust pollution;

- Plant will be regularly serviced and maintained;
- Any excavations and excavated material will be kept damp, where possible, to control dust generation;
- Construction noise and vibration will be minimised as far as possible in line with best practice; and
- Use of noise control equipment such as jackets, hoods and shrouds on equipment such as generators.

Biosecurity

- 5.2.5 Good biosecurity practices are vital for preventing the spread of invasive non-native species (INNS) and pathogens such as waterborne fish diseases. Measures will be adopted to minimise the risk of activities leading to the spread of invasive non-native species or pathogens.
- 5.2.6 Measures will be adopted to minimise the risk of construction activities leading to the spread of these invasive non-native species.
- 5.2.7 To avoid the spread of these invasive species the following measures will be adhered to, and detailed within the RAMS, during the Proposed investigation:
- Contractor's Ecologist to undertake toolbox talks for any INNS prior to works starting. Toolbox talks are to be signed by contractor on site;
 - Fencing will be erected around the working areas;
 - Ensure all site teams are briefed on INNS prevention procedures and made aware of areas on site where INNS are known to be present; and
 - Avoid working in areas where INNS are present. Where this is not possible, appropriate biosecurity measures are to be adopted.

6. Baseline (screening) assessment

6.1 Overview

- 6.1.1 A baseline assessment has been undertaken to identify the relevant water bodies affected by the Proposed investigation and to collate latest available baseline data, in order to inform a scoping assessment of the likely effects of the Proposed investigation on WFD status and objectives. The location of the Proposed investigation area in relation to WFD waterbodies is illustrated in Figure 1.

6.2 Relevant WFD waterbodies

- 6.2.1 The Proposed investigation is located within the 'Meirionnydd' management catchment.
- 6.2.2 The WFD status, status objectives and programme of measures derived by NRW for water bodies located within this River Basin District (RBD) are outlined within the current Cycle 3 Western Wales RBMP¹⁸.

Table 6-1 Relevant waterbodies for the Proposed investigation

Operational catchment	WFD water body	ID	Hydro-morphological designation	Screen in for further assessment?
Meirionnydd	Meirionnydd (groundwater body)	GB41002G203200	Natural	Screened out
Cardigan Bay North	Cardigan Bay North (coastal waterbody)	GB621009600000	Natural	Screened in
Mawddach Estuary	Mawddach (transitional waterbody)	GB511006407100	Natural	Screened out

6.3 Cardigan Bay North

Waterbody description

- 6.3.1 The Cardigan Bay North coastal waterbody (GB621009600000) intersects the western extent of the Proposed investigation area and is designated as 'natural' (not heavily modified or artificial).

WFD status

- 6.3.2 In WFD Cycle 3 2021, Cardigan Bay North had an overall status of 'Moderate', with an ecological status of 'Good' and a chemical status of 'Moderate'. A breakdown of the current status of the waterbody is provided in Table 6-2.

¹⁸ Natural Resources Wales (2022) Western Wales River Basin Management Plan 2021 – 2027

Table 6-2 Summary of 2021 WFD status for ‘Cardigan Bay North’ coastal waterbody

Waterbody	Description, notes or more information
WFD waterbody name	Cardigan Bay North
Waterbody ID	GB621009600000
Waterbody total area (ha)	193,522 ha
Overall status	Moderate
Ecological status	Good
Invertebrates	Good
Infaunal quality index (IQI)	Good
Phytoplankton	Good
Macroalgae	High
Rocky shore macroalgae	High
Dissolved inorganic nitrogen	High
Dissolved oxygen	High
Chemical status	Moderate
Specific pollutants	High
Arsenic	High
Copper	High
Iron	High
Manganese	High
Zinc	High
Priority hazardous substances	Moderate
Cadmium	High
Dioxins	High
Endosulfan	High
Hexabromocyclododecane	High
Hexachlorobutadiene	High
Hexachlorocyclohexane	High
Hexachlorocyclohexane	High
Mercury	Moderate
Nonyphenol	High
Perfluorooctane sulphonate (PFOS)	High
Pentachlorobenzene	High
Polycyclic aromatic hydrocarbons (PAH)	High
Priority substances	High
Benzene	High
Cypermethrin	High
1,2-dichloroethane	High
Dichloromethane	High
Fluorothene	High
Lead	High
Napthalene	High
Nickel	High
Octylphenol	High
Trichloromethane	High
Other pollutants	High

Waterbody	Description, notes or more information
Target water body status and deadline	Good by 2033
Morphology	Not High
Higher sensitivity habitats present	Mussel beds Subtidal Kelp Beds Polychaete Reef
Lower sensitivity habitats present	Gravel & Cobbles Intertidal Soft Sediment Subtidal Soft Sediment Rockyshore Subtidal Rocky Reef
WFD protected areas within 5km	Mawddach Shellfish Waters Protected Area Dyfi Shellfish Waters Protected Area Fathew Drinking Water Protected Area (River Catchment) Un-named tributary near Afon Dysynni Drinking Water Protected Area (River Catchment) Gwriil Drinking Water Protected Area (River Catchment) Llyn and Eryri Drinking Water Protected Area (Groundwater) Meirionnydd Drinking Water Protected Area (Groundwater) North Ceredigion Rheidol Area Drinking Water Protected Area (Groundwater) Teifi and Coastal Ceredigion Drinking Water Protected Area (Groundwater) Aberdaron Coast and Bardsey Island SPA Mynydd Cilan, Trwyn y Wylfa ac Ynysoedd Sant Tudwal SPA Northern Cardigan Bay SPA Dyfi Estuary SPA West Wales Marine SAC Lleyn Peninsula and the Sarnau SAC Morfa Harlech a Morfa Dyffryn SAC Meirionnydd Oakwoods and Bat Sites SAC Cadair Idris SAC Cors Fochno SAC Seacliffs of Lleyn SAC Cors Fochno and Dyfi Ramsar Site

6.4 Mawddach Estuary

Waterbody description

- 6.4.1 The Mawddach Estuary transitional waterbody (GB511006407100) is located 130m south of the Proposed investigation area and is designated 'natural' (not heavily modified or artificial).

WFD status

- 6.3.2 In WFD Cycle 3 2021, Mawddach Estuary had an overall status of 'Moderate', with an ecological status of 'Good' and a chemical status of 'Moderate'.

6.5 Meirionnydd

Waterbody description

- 6.5.1 The Meirionnydd groundwater body (GB41002G203200) intersects the eastern extent Proposed investigation area and is designated 'natural' (not heavily modified or artificial).

WFD status

- 6.3.2 In WFD Cycle 3 2021, Meirionnydd had an overall status of 'Poor'.

6.6 Screening conclusions

- 6.6.1 The Cardigan Bay North coastal waterbody has been screened into the next stage of the assessment on the basis of that the proposed works will directly intersect the waterbody and therefore there is risk of potential impact of the structural coring and trial pitting to the Cardigan Bay North waterbody.
- 6.6.2 The vertical and lateral extent of the Proposed investigation is limited and is unlikely to affect the underlying groundwater. Consequently, the Meirionnydd groundwater body has been screened out of the assessment.
- 6.6.3 The Mawddach Estuary transitional waterbody is considered to be outside of the influence of the Proposed investigation, due to the separation distance of 120m, and has also been screened out of further assessment.

7. Scoping assessment

- 7.1.1 A baseline assessment has been undertaken to identify the relevant WFD waterbodies which may be affected by the Proposed investigation and to collate the latest available WFD baseline data, in order to inform a scoping assessment of the likely effects of the options on WFD status and objectives.

7.2 Hydromorphology

Table 7-1 Hydromorphology scoping assessment

Consider if your activity:	Yes	No	Hydromorphology risk issue(s)
Could impact on the hydromorphology (for example morphology or tidal patterns) of a water body at high status		Impact assessment not required	Not a WFD waterbody of high status.
Could significantly impact the hydromorphology of any water body		Impact assessment not required	Any alteration of flow will be temporary and restricted to the location of the trial pits and sample locations. Works will take place at low tide. Therefore, it is not considered that the Proposed investigation will significantly impact on the hydromorphology of the Cardigan Bay North coastal waterbody.
Is in a water body that is heavily modified for the same use as your activity		Impact assessment not required	The Cardigan Bay North coastal waterbody is designated 'natural' (not heavily modified or artificial).

7.3 Biology

Habitats

Table 7-2 Higher sensitivity and lower sensitivity habitats – for information only

Higher sensitivity habitats ¹⁹	Lower sensitivity habitats ²⁰
Mussel beds	Gravel & Cobbles
Subtidal Kelp Beds	Intertidal Soft Sediment
Polychaete Reef	Subtidal Soft Sediment
	Rockyshore
	Subtidal Rocky Reef

¹⁹ Higher sensitivity habitats have a low resistance to, and recovery rate, from human pressures.

²⁰ Lower sensitivity habitats have a medium to high resistance to, and recovery rate from, human pressures.

Table 7-3 Habitats scoping assessment

Consider if the footprint of your activity is:	Yes	No	Biology habitats risk issue(s)
0.5km ² or larger	Yes, to one or more requires impact assessment		The Proposed investigation area is 0.25km ² and therefore does not exceed 0.5km ² .
1% or more of the water body's area			The Proposed investigation area is less than 1% of the waterbody's area.
Within 500m of any higher sensitivity habitat			Higher sensitivity habitats comprising blue mussel beds are located on lower sections of the groynes within the Proposed investigation area. Further blue mussel beds are located 110m to the south of the proposed investigation area.
1% or more of any lower sensitivity habitat			The Proposed investigation area contains three lower sensitivity habitats comprising 'Gravel and Cobbles', 'Intertidal Soft Sediment' and 'Rockyshore'. The proposed investigation area that interacts with these habitats is less than 1% of the total area of these habitats within the waterbody.

Fish**Table 7-4 Fish scoping assessment**

Consider your activity:	Yes	No	Biology fish risk issue(s)
Is in an estuary and could affect fish in the estuary, outside the estuary but could delay or prevent fish entering it or could affect fish migrating through the estuary		No	The Proposed investigation area is not located within an estuary and the Proposed investigation will not present any barrier to the migration of fish.

Consider your activity:	Yes	No	Biology fish risk issue(s)
Could impact on normal fish behaviour like movement, migration or spawning (for example creating a physical barrier, noise, chemical change or a change in depth or flow)		No	The Proposed investigation does not present any barrier to the movement or migration of fish. The Proposed investigation area is predominantly located between MHWS and MLWS and will not always be accessible to fish. All works will be undertaken on the beach at low tide, limiting underwater noise, and any noise disturbance would impact only a fractional area of the waterbody. Best practice measures outlined in a Risk Assessment Method Statement (RAMS) will ensure noise impacts are minimised and there is no chemical change to the local marine environment.
Could cause entrainment or impingement of fish		No	There is no potential for the Proposed investigation to result in fish entrainment or impingement. Excavations will be immediately backfilled. No excavations will be left exposed over a tidal cycle.

7.4 Water quality

Table 7-5 Water quality scoping assessment

Consider your activity:	Yes	No	Water quality risk issue(s)
Could affect water clarity, temperature, salinity, oxygen levels, nutrients, or microbial patterns continuously for longer than a spring neap tidal cycle (about 14 days)		No – Impact assessment not required	All works will be undertaken at low tide. In addition, the Proposed investigation will take place under standard good practice procedures (such as adherence to current Guidance for Pollution Prevention and CIRIA best practice

Consider your activity:	Yes	No	Water quality risk issue(s)
			construction guidance to control any sediment run-off or pollutant, see Section 5.2).
Is in a water body with a phytoplankton status of moderate, poor or bad		No – Impact assessment not required	Phytoplankton status is 'Good' for this waterbody
Is in a water body with a history of harmful algae	Yes – Impact assessment required		Macroalgae and Rocky shore macroalgae levels within the waterbody are 'high'.
If your activity uses or releases chemicals (for example through sediment disturbance or building works) consider if:	Yes	No	Water quality risk issue(s)
The chemicals are on the Environmental Quality Standards Directive (EQSD) list		No – Impact assessment not required	No proposal to discharge chemicals into the marine environment. Any spills from construction will be addressed through the Contractors Method Statement(s).
It disturbs sediment with contaminants above Cefas Action Level 1 ²¹	Yes – Impact assessment required.		A geotechnical desk study ²² of the Proposed investigation area, undertaken in 2018 as part of the Outline Business Case for the Scheme, identified the presence of a sewerage pipe running underneath the Proposed investigation area. An unidentified pollution incident from 2014 was also recorded within 100m, in addition to a license discharge consent operational from 2005 to present. However, the sewer pipe is present on the 1887 historic OS maps.
The chemicals are on the Environmental Quality		No – impact assessment not required	No proposal to discharge chemicals

²¹ Cefas Action Level 1 compounds: <https://www.gov.uk/guidance/marine-licensing-sediment-analysis-and-sample-plans#sample-plans-and-sediment-analysis>

²² Ove Arup and Partners Ltd (2018). Barmouth North Promenade Outline Business Case Geotechnical desk study.

Consider your activity:	Yes	No	Water quality risk issue(s)
Standards Directive (EQSD) list			into the marine environment.

7.5 WFD protected areas

Table 7-6 WFD protected areas scoping assessment

Consider your activity is:	Yes	No	Protected areas risk issue(s)
Within 2km of any WFD protected area	Yes - Impact assessment required		• Meirionnydd groundwater Drinking Water Protected Area, located partially within the Proposed investigation area; • Llyn Peninsula and the Sarnau SAC, located 100m west of the Proposed investigation area; • The Meirionnydd Oakwoods and Bat Sites SAC, located 340m east of the Proposed investigation area; and • The Mawddach shellfish waters protected area, located 787m south of the Proposed investigation area.

7.6 Invasive Non-native species (INNS)

Table 7-7 INNS scoping assessment

Consider your activity could:	Yes	No	INNS risk issue(s)
Introduce or spread INNS	Impact assessment required		There is a potential risk of introduction of invasive species via machinery. RAMS to include biosecurity risk assessment ²³ . The intertidal biotope survey

²³ Cook, E.J., Macleod, A. Payne, R.D., and Brown, S. (2014) edited by Natural England and Natural Resources Wales, 2015. *Marine Biosecurity Planning – Guidance for producing site and operation-based plans for preventing the introduction and spread of non-native species in England and Wales*.

Consider your activity could:	Yes	No	INNS risk issue(s)
			undertaken on 30 September and 1 October 2024 ³ identified an invasive barnacle (<i>Austrominius modestus</i>) as being widespread across the surveyed area, including on a number of the groynes. Although it is worth noting that this species is considered lower risk for Wales according to the Marine Invasive Non-native Species Priority Monitoring and Surveillance List for Wales ²⁴ .

7.7 Scoping summary

Table 7-8 Scoping assessment summary

Receptor	Potential risk to receptor	Risk issues for impact assessment
Hydromorphology	No	Not applicable, see Table 7-1
Biology – habitats	Yes	Blue mussel beds are located on lower sections of the groynes within the Proposed investigation area. Further blue mussel beds are located 110m to the south of the Proposed investigation area.
Biology – fish	No	Not applicable, see Table 7-4
Water quality	Yes	Macroalgae and Rocky shore macroalgae levels are 'high'.
Protected areas	Yes	– Meirionnydd groundwater Drinking Water Protected Area; – Llyn Peninsula and the Sarnau SAC; – The Meirionnydd Oakwoods and Bat Sites SAC; and – The Mawddach shellfish waters protected area.
INNS	Yes	Potential risk of introduction and spread of invasive species

²⁴ <https://www.gov.wales/sites/default/files/publications/2018-02/invasive-aquatic-species-priority-marine-species.pdf> [Accessed October 2024]

Receptor	Potential risk to receptor	Risk issues for impact assessment
		via machinery to be covered within RAMS biosecurity risk assessment.

8. Further assessment

- 8.1.1 The WER Scoping Assessment identified potential risks to the following receptors: biology (habitats), water quality, protected areas, and INNS.

8.2 Potential risks

Biology: higher sensitivity habitats

- 8.2.1 Higher sensitivity habitats comprising blue mussel beds are located on lower sections of the groynes within the Proposed investigation area. Further blue mussel beds are located 110m to the south of the Proposed investigation area.
- 8.2.2 In the absence of good practice, these habitats may be at risk of direct effects or pollution incidents, e.g., sedimentation (from vehicle tracking) or accidental spillages (leaks from machinery/plant).
- 8.2.3 The Proposed investigation will be a temporary activity implementing specialist plant to access the intertidal zone.
- 8.2.4 Where partial removal of sections of the groynes is required, it will be ensured that only the upper most sections where blue mussels are not present will be impacted. The sections of the groynes will then be reinstated.
- 8.2.5 Works within the intertidal zone will be undertaken at low tide to minimise sediment suspension. Production of waste is likely to be minimal and best practice procedures will be integrated to avoid potential pollution incidents.
- 8.2.6 Best practice pollution prevention measures will be employed for marine working, as follows; in addition to biosecurity measures as discussed in Section 5.2.
- Site-specific methods will ensure that all site activities are controlled and are in accordance with standard operating procedures, e.g., PPG13 and CIRIA best practice.
 - Limiting the physical works footprint and the dimensions of the access corridor as far as reasonably practicable.
 - All plant will be sourced from a trusted reputable company and will come with spill kits which site personnel will be trained to use.
 - Vehicles will be loaded with all plant and materials necessary to undertake the works to minimise plant movements below MHWS.
 - Minimal quantities of fuels, materials, etc. will be taken on to the foreshore with biodegradable fuel oils implemented where practicable.
 - All storage containers will remain within the site compound and be appropriately bunded to prevent any spillages or leaks. No storage of materials or refuelling operations will be permitted outside the site compound.
- 8.2.7 As such, it is reasonable to conclude that no adverse impacts are predicted on higher sensitivity habitats.

Water quality

- 8.2.8 A geotechnical desk study of the Proposed investigation area, undertaken in 2018 as part of the Outline Business Case for the Scheme, identified the presence of a sewerage pipe running underneath the Proposed investigation area. An unidentified pollution incident from 2014 was also recorded within 100m, in addition to a license discharge consent operational from 2005 to present. However, the sewer pipe is present on 1887 historic OS maps.
- 8.2.9 The Proposed investigation will displace sediment below MHWS. This provides a potential pathway for effect through sub-surface sediment being exposed to surface waters.
- 8.2.10 With no visual or olfactory evidence of contamination at the site, it is likely the site is made up of natural material. The risk of incidental disturbance resulting in contamination is therefore considered to be negligible, with no measurable change to status at the water body scale for the Cardigan Bay North coastal waterbody in terms of current WFD status and in the achievement of 'Good' status of WFD elements.
- 8.2.11 The RAMS will be reviewed when available to ensure standard best practice pollution control measures as detailed in Section 5.2 above are included.
- 8.2.12 Levels of macroalgae and rocky shore macroalgae are recorded as high for this waterbody. The Proposed investigation does not present a risk of additional eutrophication of the waterbody. Runoff will be strictly controlled using the best practice measures outlined in Section 5.2.

Protected areas

- 8.2.13 The Proposed investigation is within 2km of the following WFD protected areas:
- Meirionnydd groundwater Drinking Water Protected Area, located partially within the Proposed investigation area;
 - Llyn Peninsula and the Sarnau SAC, located 100m west of the Proposed investigation area;
 - The Meirionnydd Oakwoods and Bat Sites SAC, located 340m east of the Proposed investigation area; and
 - The Mawddach shellfish waters protected area, located 787m south of the Proposed investigation area.
- 8.2.14 Potential pathways for effect include pollution incidents or disturbance during the Proposed investigation.
- 8.2.15 Best practice pollution prevention measures will be employed for marine working, as detailed in Section 5.2 above; in addition to biosecurity measures also discussed in Section 5.2.
- 8.2.16 As such, it is reasonable to conclude that no adverse impacts are predicted on the protected habitats as a result of pollution incidents.

INNS

- 8.2.17 Introducing plant to the marine environment incurs the risk of transporting INNS from one site to the next. In addition, the intertidal biotope survey undertaken on

30 September and 1 October 2024²⁵ identified an invasive barnacle (*Austrominius modestus*) as being widespread across the surveyed area, including on a number of the groynes. Although it is worth noting that this species is considered lower risk for Wales according to the Marine Invasive Non-native Species Priority Monitoring and Surveillance List for Wales²⁶.

- 8.2.18 To address this risk, a specialist INNS Management Plan will be developed as part of the RAMS for the treatment and/ or avoidance of these species. All machinery, equipment and footwear will be cleaned thoroughly before entering the site with a suitable disinfectant. In addition, all equipment and footwear will be thoroughly cleaned and disinfected when leaving site, particularly in areas where INNS have been located in accordance with Check, Clean, Dry guidance. The biosecurity measures proposed will accord with the latest NRW guidance. It is thus assumed that there will be negligible effect with no measurable change to status at the water body scale for the Cardigan Bay North coastal waterbody in terms of current WFD status and in the achievement of 'Good' status of WFD elements.

²⁵ Arup (2024) Barmouth North Promenade FAS Intertidal Biotope Survey Report. Reference: BMTH-ARP-VES-OFFSH-RP-OE-000001

²⁶ <https://www.gov.wales/sites/default/files/publications/2018-02/invasive-aquatic-species-priority-marine-species.pdf> [Accessed October 2024]

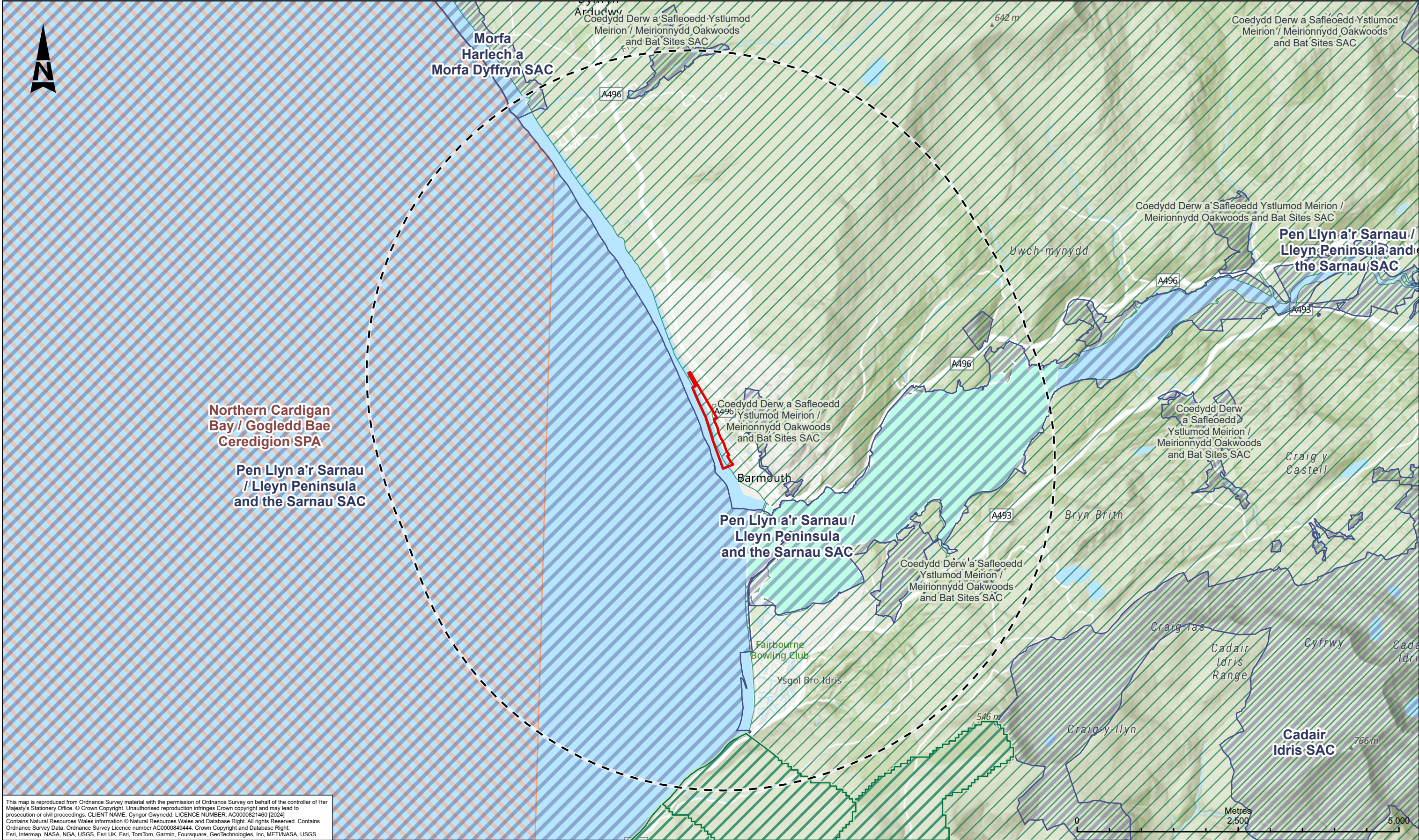
9. Conclusion

- 9.1.1 The screening stage identified three waterbodies that the Proposed investigation could potentially impact the WFD status of, Meirionnydd groundwater body, Cardigan Bay North coastal waterbody and Mawddach transitional waterbody. Only the Cardigan Bay North waterbody was screened into the preliminary scoping assessment, due to it having the potential to be directly or indirectly impacted by various components of the proposed scheme.
- 9.1.2 Based on the information available, the WER Scoping Assessment identified potential risks to the following receptors: biology (habitats), water quality, protected areas, and INNS. Further assessment for each of the risks was conducted.
- 9.1.3 For higher sensitivity habitats it is reasonable to conclude that no adverse impacts are predicted, due to the active avoidance of sensitive habitats on-site and the implementation of good practice techniques to minimise the risk of disturbance and pollution incidents.
- 9.1.4 With regards to water quality, following embedded mitigation to minimise the risk of disturbance and pollution incidents, there would be negligible effect with no measurable change to status at the water body scale for the Cardigan Bay North water body.
- 9.1.5 For protected sites, assuming good practice pollution prevention measures are employed as set out in the RAMS, it is reasonable to conclude that no adverse impacts are predicted on the protected habitats as a result of pollution incidents or disturbance during the investigation works. A Habitats Regulations Assessment (HRA) has been undertaken to fully assess potential impacts on internationally designated sites for nature conservation²⁷. The HRA concluded that there will be no adverse effects on the integrity of any international designated sites as a result of the Proposed investigation.
- 9.1.6 With regards to INNS, following embedded mitigation to minimise the risk introducing or spreading non-native species, there would be negligible effect with no measurable change to status at the water body scale for the Cardigan Bay North water body.
- 9.1.7 In conclusion, the ground investigation works proposed as part of the project are considered to be compliant with the objectives of the Water Framework Directive. This assessment comprises a 'live document'. The assessment is based up the current proposed methodology for the Proposed investigation. The assessment should be reviewed if significant changes are made to the methodology.

²⁷ Arup (2025) Barmouth North Promenade FAS Habitats Regulations Assessment Screening for GI. Reference: BMTH-ARP-EBD-ZZ-RP-OE-000004

Figure 1 WFD Waterbodies

Figure 2 WFD Protected Areas



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LEGEND

- Proposed Investigation Boundary
- Proposed Investigation Boundary - 5km Buffer
- Shellfish Protected Areas
- Special Areas of Conservation (SAC)
- Special Protection Areas (SPA)
- Drinking Water Protection Area - River Catchments
- Drinking Water Protection Area - Groundwater

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING SIGNIFICANT RESIDUAL RISKS (REFERENCE SHALL ALSO BE MADE IN THE DESIGN HAZARD LOG)

CONSTRUCTION			
NONE			
MAINTENANCE / CLEANING			
NONE			
USE			
NONE			
DECOMMISSIONING / DEMOLITION			
NONE			
P01	24/02/2025	FOR REVIEW AND ACCEPTANCE	AF PS TE --
Rev.	Date	Description	By Chk'd App'd Auth'd

Suitability S5 Drawing Status Suitable for Review and Acceptance

GRIFFITHS ARUP

Client: CYNGOR GWYNEDD YGC Llywodraeth Cymru Welsh Government

Project Title BARMOUTH NORTH PROMENADE FAS

Drawing Title FIGURE 2 WFD PROTECTED AREAS

Scale 1:55,000 By AF Checked PS Approved TE Authorised --

Original Size A3 Date 24/02/2025 Date 06/03/2025 Date 06/03/2025 Date --

Drawing Number Project BMTH - ZZ Location Originator ARP -DR - G - 000002 Type Role Number Volume EWE Number P01

Appendix A Determination of WER Status

A.1 Introduction

- A.1.1.1 Surface water bodies and groundwater bodies are defined within WER legislation. There are three types of surface water body, as follows:
- Natural water bodies;
 - Heavily modified water bodies (HMWBs); and,
 - Artificial water bodies (AWBs).
- A.1.1.2 The Overall Status of natural surface water bodies is determined on the basis of their Ecological Status and Chemical Status. The overall status of heavily modified and artificial water bodies is classified based on their ecological potential and chemical status. The overall status of groundwater bodies is determined on the basis of their Quantitative Status and Chemical Status.
- A.1.1.3 Groundwater bodies are defined within WER legislation as Groundwater Management Units (GWMU) and Water Resource Management Units (WRMU) and their status is determined on the basis of quantitative and chemical sub-elements.
- A.1.1.4 The means by which these determinations are made for both surface water and ground water bodies is described in this section.

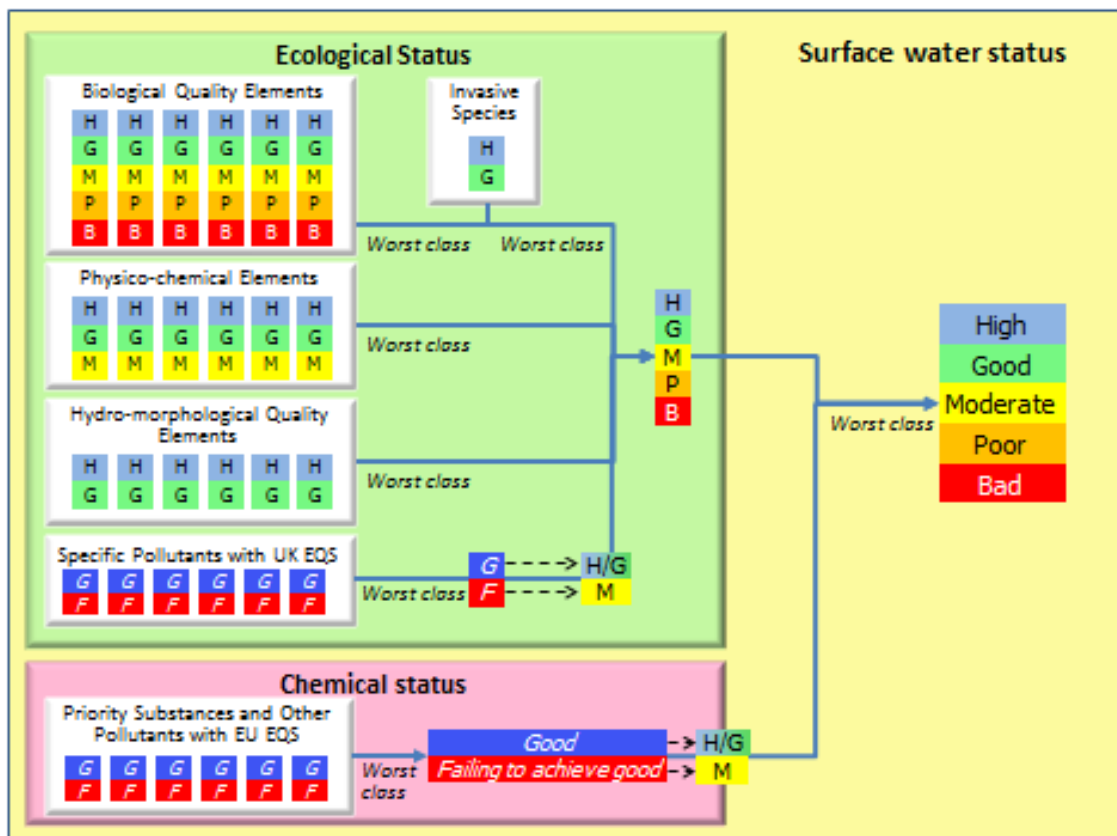
A.2 Surface water bodies

A.2.1 Ecological status

- A.2.1.1 Ecological Status is defined by the overall quality of the structure and functioning of aquatic ecosystems associated with surface waters, i.e. the condition of the watercourse. This is assigned on a scale of high, good, moderate, poor or bad, and on the basis of four classification elements or 'tests', as follows:
- Biological - this test is designed to assess the status indicated by biological quality elements such as fish, invertebrates, macrophytes or phytobenthos (diatoms). The biological quality elements can influence an overall water body status from bad through to high. It is also important to note that the presence of invasive species prevents a water body from achieving high status when all other elements attain high;
 - Physicochemical - this test is designed to assess the status indicated by physicochemical quality elements such as dissolved oxygen, phosphorus and ammonia, against environmental standards. The physicochemical quality elements can only influence an overall water body status from moderate through to high;
 - Specific pollutants - this test is designed to assess compliance with environmental standards for concentrations of specific pollutants, such as zinc, cypermethrin or arsenic. As with the physicochemical test, the specific pollutant assessment can only influence an overall water body status from moderate through to high; and

- Hydromorphology - for natural surface water bodies this test is undertaken by the NRW during classification when the biological and physicochemical tests indicate that a water body may be of high Overall Status. It specifically assesses hydromorphological quality elements such as water flow, sediment composition and movement, continuity, and structure of the habitat against reference or 'largely undisturbed' conditions. If the hydromorphological quality elements do not support high Ecological Status, then the status of the water body is limited to good Overall Status. Hydromorphological assessments are used to determine 'high' Overall Status only and are not used to drive a water body status class below good. The 'does not support good' classification should be reported for the purposes of identifying water bodies which fail the flow test.

A.2.1.2 The worst-case classification is assigned as the overall surface water body status, in a 'one-out all-out' system. This system is summarised in Picture 3.



Picture 3 Ecological status classification process (Source: Environment Agency, 2015)

A.2.2 Chemical status

A.2.2.1 Chemical Status is defined by compliance with environmental standards for chemicals that are priority substances and/or priority hazardous substances, in

accordance with the Environmental Quality Standards Directive (2008/105/EC)²⁸. This is assigned on a scale of good or fail.

- A.2.2.2 Surface water bodies are only monitored for priority substances where there are known discharges of these pollutants; otherwise surface water bodies are reported as being of good Chemical Status.

A.2.3 Ecological potential for heavily modified (and artificial) water bodies

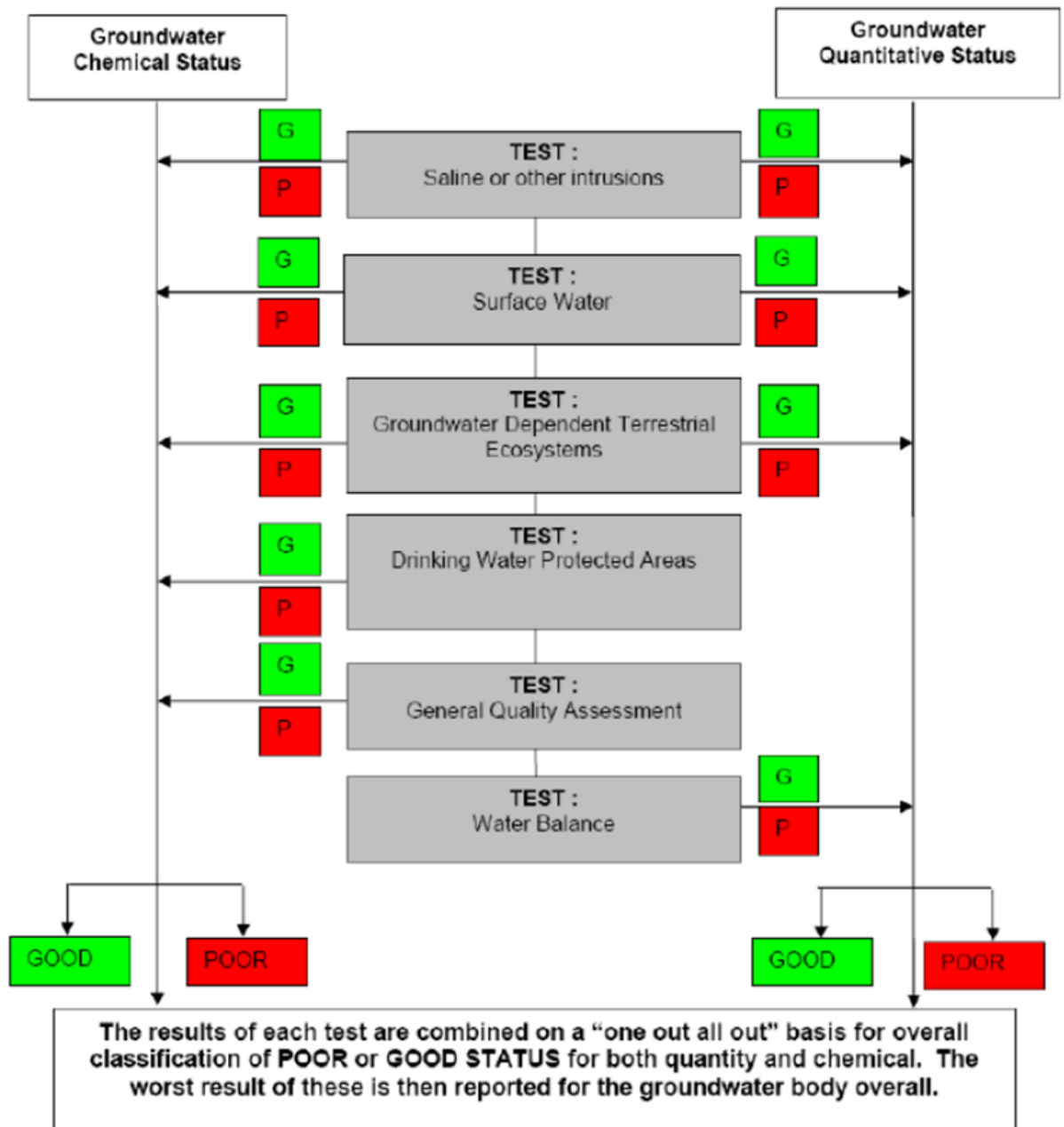
- A.2.3.1 Ecological Potential is assigned to AWB (such as reservoirs and canals), or natural water bodies which, as a result of physical alterations by human activity, are substantially changed in character. The latter are termed HMWB. The term 'ecological potential' is used to classify AWBs and HMWBs as it may be impossible for these water bodies to achieve good Ecological Status (GES) because of their creation or modification for a specific use, such as navigation, water supply or flood protection. The Ecological Potential of an AWB or HMWB represents the degree to which the quality of the water body approaches the optimum condition it could achieve given its artificial or heavily modified state.
- A.2.3.2 AWB and HMWB are subject to an additional set of rules that need to be implemented prior to running the one-out-all-out process. These rules determine which biological quality elements should be used in the water body Ecological Potential classification. Under normal circumstances, AWB and HMWB are classified according to an assessment of mitigation measures, which defines good Ecological Potential (GEP) in water bodies where all applicable mitigation is in place, and moderate ecological potential in water bodies where some or all relevant mitigation is missing. However, to prevent AWB and HMWB being incorrectly classified as good potential in situations where all mitigation is in place, but other pressures are causing an impact (e.g. nutrient enrichment or pollution from toxic substances), the methodology adopted in the UK additionally considers biological indicators providing they are not sensitive to the heavily modified nature of the water body.
- A.2.3.3 AWB and HMWB hydromorphological elements are assessed using a three-stage process, firstly looking at flow, then mitigation measures and biological quality elements.
- A.2.3.4 Flow conditions are assessed initially on a fail or pass basis to determine which of the biological and physicochemical quality elements should be used in the classification of Ecological Potential.
- A.2.3.5 Where the flow conditions are unaffected by the physical modification (flow conditions pass), the water body Ecological Potential is determined by the worst of either the mitigation measures assessment, or any element that is not sensitive to the modified nature of the water body.

²⁸ Directive 2008/105/EC of the European Parliament and of the Council of 16 December 2008; on environmental quality standards in the field of water policy, amending and subsequently repealing Council Directives 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC and amending Directive 2000/60/EC of the European Parliament and of the Council. Strasbourg, European Parliament and European Council

- A.2.3.6 Where the flow conditions are significantly impacted by the physical modification (flow conditions fail), the water body Ecological Potential is determined by the worst of any of the mitigation measures assessments or the assessment of biological quality elements, physicochemical quality elements or specific pollutants.
- A.2.3.7 Where a water body is designated as artificial or heavily modified for water resources usage, either solely or jointly with other uses, the flow condition is assumed to be good (pass).

A.2.4 Groundwater bodies

- A.2.4.1 Under the WER, groundwater body Overall Status is classified on the basis of Quantitative Status and Chemical Status. The groundwater bodies are separated into GWMU and WRMU. GWMU are sub-divisions of the groundwater to aid the resource assessment process. WRMU are sub-divisions according to the water resource availability and the management of water.
- A.2.4.2 The worst-case classification dictates the Overall Status, via a 'one-out all-out' system. This system is summarised below in Picture 4.



Picture 4 Groundwater body status classification (Source: UKTAG, 2012)

A.2.5 Quantitative status

A.2.5.1 Quantitative Status is defined by the quantity of groundwater available as base flow to watercourses and water-dependent ecosystems and as 'resource' available for use as drinking water and other consumptive purposes. It is assigned on a scale of good or poor, and on the basis of four classification elements or 'tests' as follows:

- Saline or other intrusions - this test is designed to identify groundwater bodies where the intrusion of poor quality water, such as saline water or water of different chemical composition, as a result of groundwater abstraction is leading to sustained upward trends in pollutant concentrations or significant impact on one or more groundwater abstractions;

- Surface water - this test is designed to identify groundwater bodies where groundwater abstraction is leading to a significant diminution of the Ecological Status of associated surface water bodies;
- Groundwater Dependent Terrestrial Ecosystems (GWDTE) - this test is designed to identify groundwater bodies where groundwater abstraction is leading to significant damage to associated GWDTE; and,
- Water balance - this test is designed to identify groundwater bodies where groundwater abstraction exceeds the 'available groundwater resource', defined as the rate of overall recharge to the groundwater body itself less the rate of flow required to meet the ecological needs of associated surface water bodies and GWDTE.

A.2.6 Chemical status

A.2.6.1 Chemical Status is defined by the concentrations of a range of key pollutants, by the quality of groundwater feeding into watercourses and water-dependent ecosystems and by the quality of groundwater available for drinking water purposes. This is assigned on a scale of good or poor, and on the basis of five classifications elements or 'tests', as follows:

- Saline or other intrusions - this test is designed to identify groundwater bodies where the intrusion of poor quality water, such as saline water or water of different chemical composition, as a result of groundwater abstraction is leading to sustained upward trends in pollutant concentrations or significant impact on one or more groundwater abstractions;
- Surface water - this test is designed to identify groundwater bodies where groundwater is leading to a significant diminution of the Chemical Status of associated surface water bodies;
- GWDTE - this test is designed to identify groundwater bodies where groundwater is leading to significant damage to associated GWDTE;
- Drinking Water Protected Areas (DrWPA) - this test is designed to identify groundwater bodies failing to meet the DrWPA objectives defined in Article 7 of the WER or at risk of failing in the future. The aim is no deterioration in quality of waters for human consumption; and,
- General quality assessment - this test is designed to identify groundwater bodies where widespread deterioration in quality has, or will, compromise the strategic use of groundwater. The aim is no significant impairment of human use of groundwater and no significant environmental risk from pollutants across a groundwater body. Status is assessed primarily using data collected from NRW monitoring network; therefore, the scale of assessment means that groundwater status is mainly influenced by larger scale effects such as significant abstraction or widespread diffuse pollution.

A.2.7 Environmental standards

A.2.7.1 Under the WER, a range of environmental standards and condition limits are applied in order to help the classification of water body status and the setting of status objectives via the RBMP process. These environmental standards define the range of environmental conditions that support "healthy" aquatic life. For instance, standards are set for the composition of biological communities, the

physicochemical water quality parameters, the concentration of pollutants, and the level of flows in rivers (as described above).

- A.2.7.2 These standards inform the EA on the implementation of the RBMP process, including the identification of measures required to support the achievement of the GES / GEP objectives, as well as underpinning efforts to protect the water environment by helping to regulate activities that could cause adverse impacts.

A.3 WER Assessment requirements for new developments

- A.3.1.1 To ensure compliance with the WER, decision makers must consider whether proposals for new developments have the potential to:
- Cause a deterioration of a water body from its current status or potential;
 - Prevent future attainment of good status or potential where not already achieved;
 - Impact on protected or priority species and habitats; and/or,
 - Provide opportunities to improve the water environment.
- A.3.1.2 A ruling by the European Union Court of Justice on 1 July 2015²⁹ has significant implications for projects that may impact water bodies, namely:
- Consent for development must not be granted by an authorising authority – unless a derogation is granted - where the project may cause a deterioration in the status of a body of surface water or where it jeopardises the attainment of good Ecological Status or of good Ecological Potential and good Chemical Status by the date laid down in the Directive;
 - That deterioration of the status of the relevant body of surface water includes a fall by one class of any element of the quality elements within the meaning of Annex V of the WER even if the fall does not result in a fall of the classification of the body of surface water as a whole; and,
 - If the quality element is already in the lowest class, any deterioration of that element represents deterioration of status within the meaning of Article 4(1)(a)(i).

A.4 Guidance

- A.4.1.1 Whilst there is no established methodology for assessing compliance with WER legislation, the WER Compliance Assessment will be based upon expert judgement, established best practice and consultation with NRW and will be undertaken in accordance with relevant NRW guidance and the recent advisory guidance provided by The Planning Inspectorate³⁰.

²⁹ Case 461/13 Bund für – Umwelt Und Naturschutz Deutschland v Bundesrepublik Deutschland ('the Bund case') concerning the interpretation of Article 4(1)(a)(i) to (iii) of the Water Framework Directive 2000/60/EC (WFD)

³⁰ The Planning Inspectorate (2017), Advice note eighteen: The Water Framework Directive.

Appendix B WER Assessment Process

B.1 Overview

- B.1.1.1 WER Compliance Assessment is undertaken as an iterative, stepped process, which typically includes the following:
- Step 1: Baseline assessment (screening);
 - Step 2: Preliminary assessment (scoping);
 - Step 3: Detailed impact assessment (where required); and,
 - Step 4: Application of Article 4.7 (where applicable).
- B.1.1.2 These key process steps are described in further detail in the following sections. Consultation with regulatory authority should be undertaken to share the findings of each step, where necessary/applicable.

B.2 Baseline assessment (screening)

- B.2.1.1 The key objective of the baseline (screening) assessment is to identify the relevant WER surface water and groundwater bodies (including any undesignated tributary watercourses) potentially affected by the proposed development and to establish their baseline condition.
- B.2.1.2 The water body baseline condition of relevant water bodies has been identified via desk-top assessment, utilising readily available information and environmental, asset and operations data obtained from relevant stakeholders, including the EA, Natural England, and Yorkshire Water.
- B.2.1.3 WER baseline datasets have been obtained from Water Watch Wales. This includes:
- RBMP Cycle 2 current status and status objectives data;
 - WER Protected Areas data;
 - Reasons for to achieving good status (RNAG) data; and,
 - Measures data.
- B.2.1.4 The 2019 and 2022 NRW WER water body status data has been used to inform the assessment. These data are considered to provide the current best estimate of status and the formal baseline against which NRW will assess compliance with the 'no deterioration' objective. Where baseline data is limited, professional judgement has been used in the assessment and a precautionary approach taken with regard to screening.
- B.2.1.5 The relevant WER water bodies present within the potential zone of influence of the proposed development are taken through to the subsequent preliminary assessment (scoping) stage.

B.3 Preliminary assessment (scoping)

- B.3.1.1 The objective of the preliminary (scoping) assessment is to establish the relevant likely effects of the proposed development on the WER status elements of the relevant WER surface water and groundwater bodies. This includes identification of potential impact types and any relevant mitigation measures embedded within the design of proposed development at this stage.
- B.3.1.2 The preliminary assessment considers both the beneficial and adverse effects of the relevant elements of the proposed development and applies a risk-based method in line with existing NRW guidance.
- B.3.1.3 Effects are considered with regard to the risk of the proposed development causing a deterioration in current status and/or a failure to achieve status objectives. The assessment identifies those scheme components / impacts that pose a risk current status or status objectives and thus may require more detailed impact assessment.
- B.3.1.4 The preliminary assessment therefore comprises two parts, as follows:
- Likely effects on current status or potential, involving:
 - identification of relevant scheme components with potential to impact upon water body status;
 - identification of likely potential impact and magnitude of effects of the relevant scheme components on the current status of the water body (taking account of any 'embedded' mitigation; and,
 - identification of potential risks of deterioration in current status and associated requirements for additional mitigation and/or further detailed assessment.
 - Likely effects on status objectives, involving:
 - scoping of the relevant scheme components to identify where the proposed development may pose a risk of worsening existing pressures responsible for current status failures (RNAGs) and/or prevent the implementation of measures identified by NRW to address existing status failures; and,
 - scoping of relevant scheme components against any available NRW HMWB/ AWB 'mitigation measure assessment' outputs, in order to identify where the proposed development may pose a potential risk of inhibiting the implementation of measures derived to mitigate the impacts of existing physical modifications and operational regimes to support the achievement of good Ecological Potential objectives.

B.4 Detailed impact assessment

- B.4.1.1 Where deemed required, the objective of the detailed impact assessment is to establish the nature and anticipated magnitude of the effects of relevant elements of the proposed development on the WER quality elements of the surface water and groundwater bodies affected. These effects are considered in terms of the potential for deterioration of current status and/or the prevention of

status objectives. This detailed assessment may be based on targeted baseline surveys, monitoring or modelling assessments completed at the impact sites.

- B.4.1.2 As with the preliminary assessment stage, the detailed impact assessment is therefore comprised of two key parts, as follows:
- Assessment of effects on current status of quality element; and,
 - Assessment of effects on status objectives, with regards to any water body RNAG or measures/actions identified as potentially being at risk from the proposed development under the preceding preliminary (scoping) assessment. This is done via expert judgement and consultation with the EA, based on the currently available information.
- B.4.1.3 Where significant effects are identified with regard to the risk of status deterioration and/or the prevention of status objectives, the assessment should identify 'further mitigation' required in order to avoid and/or minimise risks and the residual effects on quality elements at the water body scale.
- B.4.1.4 The detailed impact assessment will also identify if Article 4.7 tests need to be prepared for affected water bodies, where a residual risk to status deterioration and/or prevention of future status objectives has been identified.
- B.4.1.5 A detailed impact assessment has not been deemed required for the proposed development, based on the information available at this stage.

B.5 Article 4.7 tests

- B.5.1.1 Article 4.7 of the WER states that Member States will not be in breach of the Directive when failure to meet its environmental objectives is the result of either new modifications to the physical characteristics of a water body or as a result of new human sustainable development, on the proviso that the modifications or new development proposed are compliant with the four key conditions listed below. In doing so, Article 4.7 provides a means whereby a derogation for a proposed modification or sustainable development may be granted where it meets these four conditions.
- All practicable steps have been taken to mitigate the adverse impact on the status of the water body;
 - The reasons for the modifications or alterations are of overriding public interest and/or the benefits to the environment and to society of achieving the objectives are outweighed by the benefits of the new modifications or alterations to human health, to the maintenance of human safety or to sustainable development; and
 - The beneficial objectives served by the modifications or alterations of the water body cannot for reasons of technical feasibility or disproportionate cost be achieved by other means, which are a significantly better environmental option.
 - The reasons for the modifications or alterations are clearly identified to NRW, so that they can be specifically set out and explained in the relevant RBMP (as required under Article 13).

B.5.1.2 Article 4.7 tests are not deemed required for the proposed development, based on the information available at this stage.