



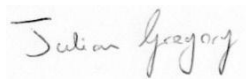
2025



**Afon Wen
Reactive Remedial Works
Water Framework Directive (WFD)**





DOCUMENT INFORMATION			
Project	Afon Wen - Water Framework Directive (WFD) Assessment		
Location	Address: Afon Wen, A497, Llanystumdwy, Chwillog, Gwynedd, Wales, LL53 6TX Grid Ref: SH 87023 78695 to SH 87638 78724		
Title	Water Framework Directive Assessment		
Document Ref	EV002539/WFD-1	Issue / Revision	1.0
File reference	EV002539/7/WFD-1		
Start Date	09/09/2025		
	Name	Signature	Date
Assessment Undertaken by	Owain Waters		09/2025
Document prepared by	Owain Waters		09/2025
Checked by	Julian Gregory		09/2025
Authorised by	Julian Gregory		09/2025

DOCUMENT CONTROL		
Rev.	Date	Description
0	09/2025	Draft
1	09/2025	Issued

Disclaimer

No part of this document may be copied or reproduced by any means without prior written permission from EcoVigour. If you have received this report in error, please destroy all copies in your possession or control.

This document has been prepared for the exclusive use of the commissioning party/parties and unless otherwise agreed in writing by EcoVigour, no other party may use, make use of, or rely on the contents of the report.

No liability is accepted by EcoVigour for any use of this document, other than for the purposes for which it was originally prepared and provided.

Opinions and information provided in the document are on the basis of EcoVigour using due skill, care and diligence in the preparation of the same and no explicit warranty is provided as to their accuracy.

Third party biological records are for project team use only and are not to be released to the public domain.



CONTENTS

1.	Introduction	4
1.2	Project Context	4
1.3	Project Design Overview	5
1.4	Methodology	6
2.	Introduction to the water framework directive	7
2.1	The Water Framework Directive	7
2.2	Scope of this assessment	7
2.3	Determination of Good Status	8
3.	Assessment Methodology	9
3.1	Methodology	9
4.	Baseline conditions	10
4.1	WDF Status of Waterbodies	10
5.	Water Framework Directive assessment: scoping for activities in estuarine and coastal waters ..	12
5.1	Section 1: Hydromorphology	12
5.2	Section 2: Biology, Habitat & Fish	13
6.	Designated Sites within Proximity to Site	15
6.2	Lleyn Peninsula and the Sarnau (PLAS) SAC	16
6.3	PLAS Annex Features Overview	16
6.4	Annex I Habitat within Project Area	17
6.5	Section 3: Water quality	19
6.6	Section 4: WFD protected areas	22
6.7	Section 5: Invasive non-native species (INNS)	23
6.8	Summary of WFD Pre-Assessment findings	24
7.	Proposed Project Mitigation	26
7.1	Construction Phase Mitigation	26
8.	WFD Conclusion	30
9.	Appendix A - Biosecurity Management Plan & Risk Assessment	31



FIGURES

Figure 1: Main works location (OS Map).	4
Figure 2: Drawing illustrating new rock armour extent (red) near northern rail crossing.	5
Figure 3: New rock armour extent along southern section.	5
Figure 6: Statutory Sites in relation to design.	15
Figure 7: Location of design in relation to wider SAC.	16
Figure 8: PLAS SAC Habitat Map.	17

TABLES

Table 1: Summary of the WFD status of the rivers / watercourses flowing into the Estuary and connected water bodies.	11
Table 2: Summary table to find out the hydromorphology status of the water body, if it is classed as heavily modified and for what use.	12
Table 3: Water body summary table and Magic maps, or other sources of information if available, to find the location and size of these habitats.	13
Table 4: Biology.	14
Table 1: Annex I & II features of the PLAS SAC.	16
Table 5: Potential fish species at risk from your activity, but only if your activity is in an estuary or could affect fish in or entering an estuary.	18
Table 6: Water body summary table to find information on phytoplankton status and harmful algae.	19
Table 7: Assessing whether water quality is at risk from your activity through the use, release or disturbance of chemicals.	21
Table 8: Assessing whether project falls within mixing zone.	22
Table 9: Location of protected areas in your water body (and adjacent water bodies) within 2km of your activity.	22
Table 10: Risk from INNS.	23
Table 11: Summary of Pre-Assessment Stage Findings.	24
Table 12: Water Framework Directive (WFD) Assessment for the Meirionnydd groundwater waterbody.	25
Table 13: Proposed Mitigation Matrix.	26



1. INTRODUCTION

- 1.1.1 EcoVigour was instructed by MGroup – Rail Division to undertake a Water Framework Directive Assessment (WFD) for proposed maintenance works to the Afon Wen Sea Defences (Approx Grid Ref: SH 87023 78695 to SH 87638 78724).
- 1.1.2 This assessment includes a summary of the current local conditions and, where appropriate, identifies mitigation measures for any likely significant effects (LSE) that may arise as part of the construction and operation of the Proposed Scheme. This WFD Assessment is required to demonstrate that the proposed works will not result in deterioration in the water body status and adjoining water bodies or prevent them from meeting their Water Framework Directive objective.
- 1.1.3 There are several watercourses flowing into the bay. The principal rivers are the Afon Wen from the NW, the Afon Dwyfor flowing into the NE. All of these enter the bay upstream of the structure. Tremadog Bay transitions into Cardigan Bay North, circa 12km due south.

1.2 PROJECT CONTEXT

- 1.2.1 The Afon Wen Rail Sea Defences are located along the west facing shore of the North Cardigan Bay, with the asset itself protecting and supporting the Dovey Junction to Pwllheli (DJP) line. The rail line represents the only remaining national rail link connecting this region of Northwest Wales to the wider UK network. The defence includes significant areas of rock armour, reinforced steel pile at the toe of masonry sloped defences and beach groins. Agricultural land and large waterbodies are situated behind the defence. The bodies of water form a component of the SSSI designation.
- 1.2.2 Recent significant damage has been sustained to the lower sheet pile revetment at Afon Wen. Resulting in scour pockets and internal voiding within the upper rail corridor. Urgent remedial measures have been requested by Network Rail asset teams. MGroup have been commissioned to undertake the repairs at the earliest opportunity. The failure currently affects roughly a 40m of the sea defence, but the working area may extend up to 60m to ensure a secure repair.

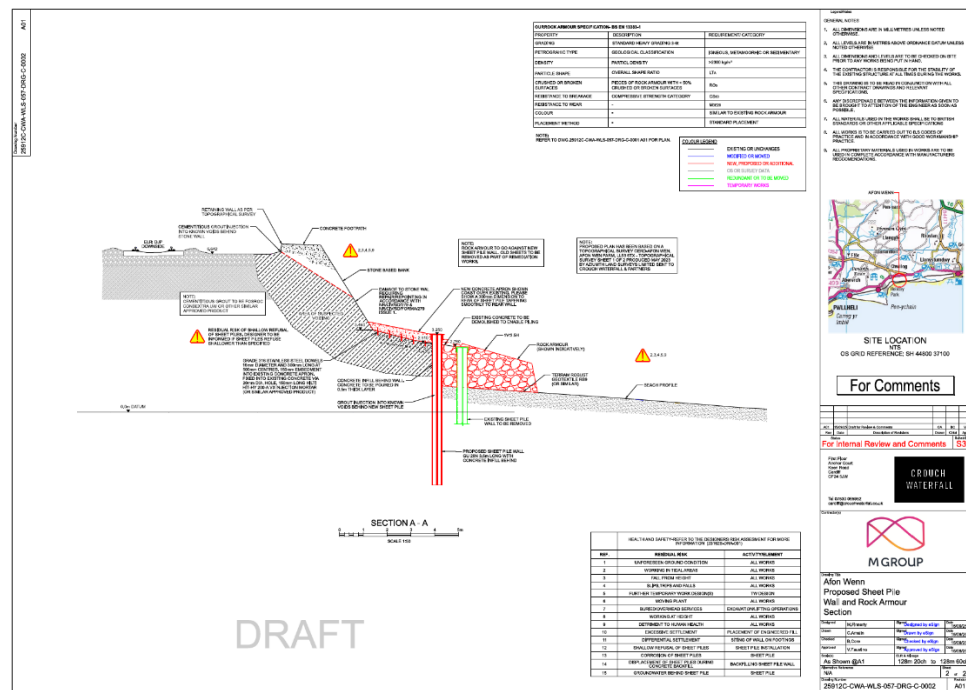
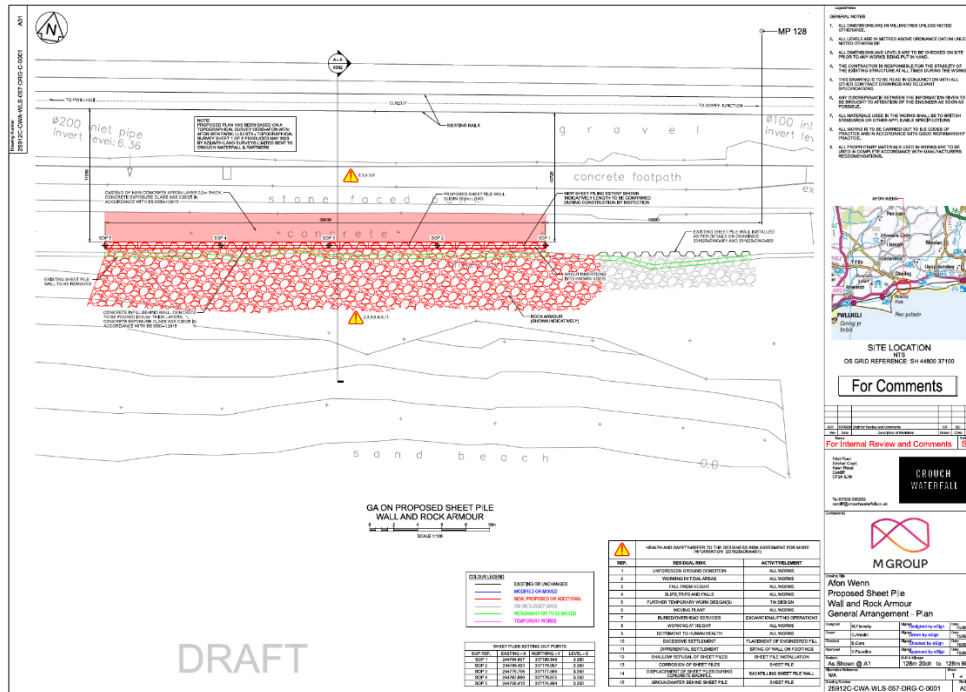


Figure 1: Main works location (OS Map).



1.3 PROJECT DESIGN OVERVIEW

- 1.3.1 The proposed design includes masonry repairs, replacement rock armour components and sheet pile replacement. The figures below illustrate the design footprint and new proposed alignment. Full size design drawings are available in the attached appendices.





1.4 METHODOLOGY

- 1.4.1 Access to the works area will be via adjacent access road from the local landowner, with compounds and material storage set up within Network rail sidings. Access to the beach area will be possible along existing tracks down to the beach, connected by the existing rail crossing within the adjacent caravan park. All refuelling points will be set up within the compound a minimum of 10m away from any watercourse / coastline with extinguishers and spill kits locally stored, all COSHH regulations adhered to with bunded containers and warning signage.
- 1.4.2 Plant access and designated walking routes will be set up using marker posts and site access plans distributed and briefed to all operatives on induction, all works are programmed for low tide working and towable lighting towers will be placed providing access egress lighting across the shoreline, these will be removed at the end of each shift. Signage will also be placed at the start of each shift giving information to other beach users of works and minimise disruption to their enjoyment. All plant access routes will be marshalled by banks men with two-way radio contact to the operators maintained throughout, should other beach walkers need to cross the access route dumper/excavator operator will be instructed to stop to allow safe crossing.
- 1.4.3 Where required, lighting of the work site will be via lighting towers placed track side and shining down to prevent unnecessary light spill. 13-25t excavator with wide low-pressure tracks fitted to reduce ground pressure and reduce rutting will be used for concrete excavation and sheet pile installation, then the stacking of rock armour in front of the replaced sheet piles all these works carried out working from the beach side.
- 1.4.4 A 6-8 tonne dumper with wide floatation tyres will be used for transporting spoil from the beach side to the compound tip and bringing the rock armour onto the beach for sheet pile protection. All plant machines will be modern and fit for purpose with a provable maintenance schedule and all current industry noise reduction fitted.
- 1.4.5 All plant will run on bio diesel and use bio oil grease to lower the risk of pollution, spill kits will be supplied on all machines along with spill kits placed around the work site for emergency use should a spill occur, both plant vehicles will also be fitted with plant nappies in case of pipe failure, during all works carried out beach side an industry competent plant fitter will be on site in case of breakdown.
- 1.4.6 All existing sheet piles and concrete spoil will be removed from site. Sheet piles to match existing will be installed using the excavator on the beach, then the rear of the sheet piles will be back filled and compacted to design specification.
- 1.4.7 A concrete pump will be used for concreting the capping this will be parked track side with no access to the beach and allow controlled flow of concrete to the back of the sheet piles, the installation of the concrete will be programmed to commence as the tide retreats to allow maximum curing time of the concrete before contact with the sea.
- 1.4.8 Concrete capping will be replaced using a rapid set or greater mix of concrete, with stainless steel dowels resin fixed in situ to join the slabs together with a fibre additive added to the mix to replace steel reinforcement and prevent future delamination of the concrete, concrete will be trowel finished to all edges and brush finish to surface. The stacking of rock armour will be carried out as final works using local sourced rocks and placed in a random style to match existing rock armour along the beach.
- 1.4.9 Once completed, all temporary works elements will be demobilised and removed from the site, with the Marine License handed back to NRW.



2. INTRODUCTION TO THE WATER FRAMEWORK DIRECTIVE

2.1 THE WATER FRAMEWORK DIRECTIVE

- 2.1.1 The Water Framework Directive (WFD) (Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000) is a European Union Directive which committed member states to achieve good qualitative and quantitative status of all water bodies by 2015. Under the Directive water bodies are defined as all ground and surface waters, including rivers, lakes, transitional waters and coastal waters (up to one nautical mile from shore).
- 2.1.2 It was not possible to achieve good status of all water bodies by 2015; therefore, outstanding water bodies have objectives set for 2021 or 2027. Interim assessments were undertaken in 2018.
- 2.1.3 The WFD is transposed into law in England and Wales by The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (the 2017 Regulations). These revoke and replace The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003 (subject to transitional provisions in article 38 of the 2017 Regulations).

2.2 SCOPE OF THIS ASSESSMENT

- 2.2.1 All new activities in the water environment need to take account of the requirements of the WFD. For a project or activity to be compliant with the WFD, it should demonstrate that:
- ◆ There is no risk of it causing a deterioration of the status of any element, in addition, for groundwater, it will limit or prevent the input of pollutants;
 - ◆ There is no risk of it preventing WFD protected areas from achieving their objectives;
 - ◆ It will not jeopardise any waterbody from achieving good status/potential; and
 - ◆ It will contribute to the protection, enhancement and restoration of waterbodies.
- 2.2.2 This WFD Assessment considers all activities that will take place as part of the proposed scheme, during both construction and operation, and identifies the potential risks associated with these activities and the WFD receptors that are at risk.
- 2.2.3 The NRW guidance includes detailed screening criteria that can be used to determine whether a proposed activity is not likely to cause a deterioration in the status of a waterbody. This includes a list of activities that in general will not cause a deterioration, such as 'temporary' works that do not normally last more than six months and are not likely to have a residual impact on a waterbody. The guidance also lists other physical works and defines screening thresholds for each; these thresholds help to determine whether any activity presents a risk to a waterbody and any requirements for further assessment. However, these thresholds are for guidance only and expert judgement is required to determine if a proposed activity may have an impact on a waterbody.
- 2.2.4 Published guidance also states that the assessment must consider the potential for impacts on the following:
- ◆ Protected Areas – these are defined under Article 6 of the Directive.
 - ◆ Priority Habitats – these are 'habitats of principal importance for conservation and biodiversity', which are defined under Section 41 of a Natural Environmental and Rural Communities (NERC) Act 2006 in England and Section 7 of the Environment (Wales) Act 2016 in Wales.
 - ◆ Invasive non-native species (INNS) – assessment of INNS is required if a development could cause the introduction or spread of INNS to a waterbody.



- 2.2.5 A detailed Compliance Assessment would be required if it cannot be concluded that the scheme would not cause deterioration or inhibit the objective status of a waterbody. Further to this and in line with WFD requirements, there would be a need to apply the Article 4.7 test to seek approval for progression of the scheme if after the full WFD

2.3 DETERMINATION OF GOOD STATUS

- 2.3.1 Good status is determined from the ecological and chemical status of surface waters. These statuses are assessed according to the following criteria:
- ◆ Biological quality (fish, benthic invertebrates, aquatic flora);
 - ◆ Hydromorphological quality (e.g. riverbank structure, river continuity and substrate of the riverbed); and
 - ◆ Physical-chemical quality (e.g. temperature, oxygenation and nutrient conditions).
- 2.3.2 The chemical quality refers to environmental quality standards for river basin specific pollutants. These standards specify maximum concentrations for specific water pollutants. The WFD works on a 'one out, all out' basis, so if one such concentration is exceeded, then the water body will not be classed as having a good status. The chemical status of surface waters is therefore classified as good or fail.
- 2.3.3 The ecological status of surface waters is classified as being high, good, moderate, poor or bad, whilst water bodies that have been modified (e.g. canals or contain significant flood defences) are classed as 'Heavily Modified Water bodies' (HMWB) and have to reach at least good potential by their objective year.



3. ASSESSMENT METHODOLOGY

3.1 METHODOLOGY

3.1.1 This WFD Assessment was completed using the following methodology:

- ◆ The collection of baseline data to identify the current status, as well as future baseline and ability of the water bodies within and in close proximity to the proposed works to meet the WFD objectives;
- ◆ A Consultation with relevant authorities;
- ◆ The review of the proposed works and the potential impacts to the identified surface and groundwater bodies; this involves identifying the impacts that could reduce the WFD status and affect the ability of the water bodies to meet the objectives of the WFD;
- ◆ The consideration of mitigation that can be included in the design, and
- ◆ The provision of an assessment of residual risks.

3.1.2 This assessment has been prepared using the following WFD screening/scoping assessment guidance:

- ◆ Guidance for assessing activities and projects for compliance with the Water Framework Directive, OGN72, Version 1.1, May 2017, Natural Resources Wales.
- ◆ Advice Note 18: The Water Framework Directive, Version 1, June 2017, The Planning Inspectorate. Available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/2017/06/advice_note_18.pdf
- ◆ Local Authority services and the water environment: Advice note on the Water Framework Directive, Natural Resources Wales. Available at: <https://naturalresources.wales/media/2627/wfd-docs-eng.pdf>
- ◆ Water Framework Directive assessment: estuarine and coastal waters – How to assess the impact of your activity in estuarine (transitional) and coastal waters for the Water Framework Directive (WFD), 9 November 2017, Environment Agency.
- ◆ Available at: <https://www.gov.uk/guidance/water-framework-directive-assessment-estuarine-and-coastal-waters>.



4. BASELINE CONDITIONS

4.1 WDF STATUS OF WATERBODIES

- 4.1.1 Data on the location and status of WFD waterbodies and WFD Protected Areas has been obtained from the Water Watch Wales website (Waterwatchwales.naturalresourceswales.gov.uk) and the Multi-Agency Geographic Information for the Countryside (MAGIC) website (magic.defra.gov.uk/MagicMap.aspx)
- 4.1.2 The following WFD surface waterbodies are in proximity of the proposed scheme: Tremadog Bay (GB651009350000), Dwyfor (GB511006511000), Wen (Lleyn Peninsula) (GB110065053680).
- 4.1.3 Only one groundwater waterbody, the Llyn and Eryri (GB41002G204600).
- 4.1.4 Given the localised nature of the works, Tremadog Bay and Wen (Lleyn Peninsula) will be directly assessed within this document.
- 4.1.5 Table 3 (below) presents summary information on the current WFD status of each of the constituent quality elements of the waterbodies downstream of the works. This information has been obtained from the Water Watch Wales website. Each of the quality elements will be assessed to determine whether the proposed scheme has the potential to adversely affect their status.



Table 1: Summary of the WFD status of the rivers / watercourses flowing into the Estuary and connected water bodies.

Waterbody name, ID, Type, Management Catchment, River Basin District.	Hydro-morphological designation	Current overall status & objectives	Biological elements	Physico-chemical elements	Water body Protected Area Links
Tremadog Bay (GB651009350000) Type: Coastal Man Catchment: Llyn and Eryri TraC RBD: Western Wales Area Name: Marine;North West Wales	Designated as heavily modified Morphology = High	Current overall status = Good; Current ecological status = Good; Current chemical status = High;	Fish = Not assessed Macroalgae = Good Phytoplankton = Not assessed Opportunistic Macroalgae = Not assessed Invertebrates = Good Infaunal Quality Index = Good	Dissolved oxygen = Not assessed Dissolved Inorganic Nitrogen = Not assessed Annex 8 Chemicals = Not assessed Copper = Not assessed Zinc = Not assessed Cadmium = Not assessed Brominated diphenylether (BDPE) Calc = Not assessed Benzopyrene = Not assessed Hexachlorobutadiene = Not assessed Hexachlorobenzene = Not assessed Mercury = Not assessed Fluoranthene = Not assessed Lead = Not assessed Nickel = Not assessed	Protected Area = Yes Bathing Waters = No Special Protection Area = No Drinking Water Protected Area = No Special Area of Conservation = Yes Nitrate Vulnerable Zone = No Shellfish Water = No
Wen (Lleyn Peninsula) (GB110065053680) Type: River Man Catchment: Llyn and Eryri RBD: Western Wales Area Name: WA North	Designated as Natural	Current overall status = Moderate; Current ecological status = Moderate; Current chemical status = High;	Fish = Good Macroalgae = High Phytoplankton = High Macroalgae= Good Opportunistic Macroalgae = High Invertebrates = High Infaunal Quality Index = Good Imposex = Good	Ammonia = High Dissolved oxygen = High Dissolved Inorganic Nitrogen – Good PH: High	Protected Area = No Bathing Waters = No Special Protection Area = No Drinking Water Protected Area = No Special Area of Conservation = No Nitrate Vulnerable Zone = No Shellfish Water = No



5. WATER FRAMEWORK DIRECTIVE ASSESSMENT: SCOPING FOR ACTIVITIES IN ESTUARINE AND COASTAL WATERS

Consider the potential risks of your activity to each of these receptors: hydromorphology, biology (habitats and fish), water quality and protected areas. Also consider invasive non-native species (INNS).

5.1 SECTION 1: HYDROMORPHOLOGY

5.1.1 The first stage is to consider if there is hydromorphology at risk from your activity.

Table 2: Summary table to find out the hydromorphology status of the water body, if it is classed as heavily modified and for what use.

Consider if your activity:	Hydromorphology risk issue(s)
Could impact on the hydromorphology (for example morphology or tidal patterns) of a water body at high status	There will be no changes to the below MHWS sections of the structures. During construction and temporary works at MHWS will be removed at the end of each shift. The works will therefore not impact the hydromorphology of the bay or the watercourse.
Could significantly impact the hydromorphology of any water body	Please see above - No impacts on any other water bodies.
Is in a water body that is heavily modified for the same use as your activity	The bay is considered to be heavily modified.



5.2 SECTION 2: BIOLOGY, HABITAT & FISH

5.2.1 The second stage is to consider if habitats, Biology and Fish Species are at risk from your activity. The figures and tables below illustrate and discuss the features present within the relevant units.

Table 3: Water body summary table and Magic maps, or other sources of information if available, to find the location and size of these habitats.

Area Name & ID		Tremadog Bay (GB651009350000)	
Higher sensitivity habitats		Lower sensitivity habitats	
Habitat Type	Potential Impacts	Habitat Type	Potential Impacts
Polychaete Reef (A5.61, A2.71, HOCl 8, HOCl 16)	Potential for indirect impacts due to chemical and hydrocarbon emissions from the works, if sufficient controls are not put in place.	Gravel & Cobbles (intertidal & subtidal coarse sediment A2.1, A5.1)	Potential for indirect impacts due to chemical and hydrocarbon emissions from the works, if sufficient controls are not put in place.
		Intertidal Soft Sediment (Sand, Mud & Mixed A2.2, A2.3, A2.4)	Direct impact in the form of vehicle movement over this harder substrate to access the structure Potential for indirect impacts due to chemical and hydrocarbon emissions from the works, if sufficient controls are not put in place.
		Subtidal Soft Sediment (Sand, Mud & Mixed A5.2, A5.3, A5.4)	Potential for indirect impacts due to chemical and hydrocarbon emissions from the works, if sufficient controls are not put in place.
		Rockyshore (Intertidal rock A1)	Potential direct impact (where exposed) in the form of vehicle movement over this harder substrate to access the structure Potential for indirect impacts due to chemical and hydrocarbon emissions from the works, if sufficient controls are not put in place.



² Higher sensitivity habitats have a low resistance to, and recovery rate, from human pressures.

³ Lower sensitivity habitats have a medium to high resistance to, and recovery rate from, human pressures.

Table 4: Biology.

Consider if the footprint ⁴ of your activity is:	Biology habitats risk issue(s)
0.5km ² or larger	The total licensed area of the at and to access the structure is approximately 24613m ² and hence the worksite will be below 0.5km ² (500000m ²).
1% or more of the water body's area	The bay covers an area of approximately 239418590m ² . The footprint of the works is therefore less than 1% of the bays area.
Within 500m of any higher sensitivity habitat	Works will be undertaken within the following designated sites: ◆ Glanllynau a Glannau Pen-Y-Chain I Gricieth – Site of Special Scientific Interest (SSSI) ◆ Lleyl Peninsula and the Sarnau – Special Area of Conservation (SAC) ◆ West Wales Marine – Special Area of Conservation (SAC) ◆ Northern Cardigan Bay (SPA) The impact of the works on the SSSI and SAC are considered in the sections below.
1% or more of any lower sensitivity habitat	

⁴ Note that a footprint may also be a temperature or sediment plume. For dredging activity, a footprint is 1.5 times the dredge area.



6. DESIGNATED SITES WITHIN PROXIMITY TO SITE

- 6.1.1 There are several statutory designated sites within proximity to the defence line.
- 6.1.2 Site of Special Scientific Interest:
- ◆ Glanllynau a Glannau Pen-Y-Chain I Gricieth – Site of Special Scientific Interest (SSSI)
- 6.1.3 Special Area of Conservation:
- ◆ Llyn Peninsula and the Sarnau – Special Area of Conservation (SAC)
 - ◆ West Wales Marine – Special Area of Conservation (SAC)
- 6.1.4 Special Protection Area:
- ◆ Northern Cardigan Bay (SPA)
- 6.1.5 They will not be considered further in this assessment in terms of design, however as indicated within the first section of this document, they must be reassessed against a project methodology, once this has been further developed.
- 6.1.6 In terms of direct interaction with designated site boundaries, no portion of the defence alignment is in direct contact with the defined statutory designated site boundaries. The PLAS SAC is 100m offshore at it's closest point to the defence line. The SPA is 1.5km offshore, while the West Wales Marine is 15km offshore.
- 6.1.7 The West Wales Marine (SAC) site boundary is located a significant distance away from the structure, however due to the highly mobile Annex II feature (1351: Harbour Porpoise – Phocoena Phocoena), it will be discussed further in the sections below.
- 6.1.8 Consequently, the Llyn Peninsula and the Sarnau (SAC), West Wales Marine (SAC) and Northern Cardigan Bay (SPA) sites will be discussed further in their own sections below.

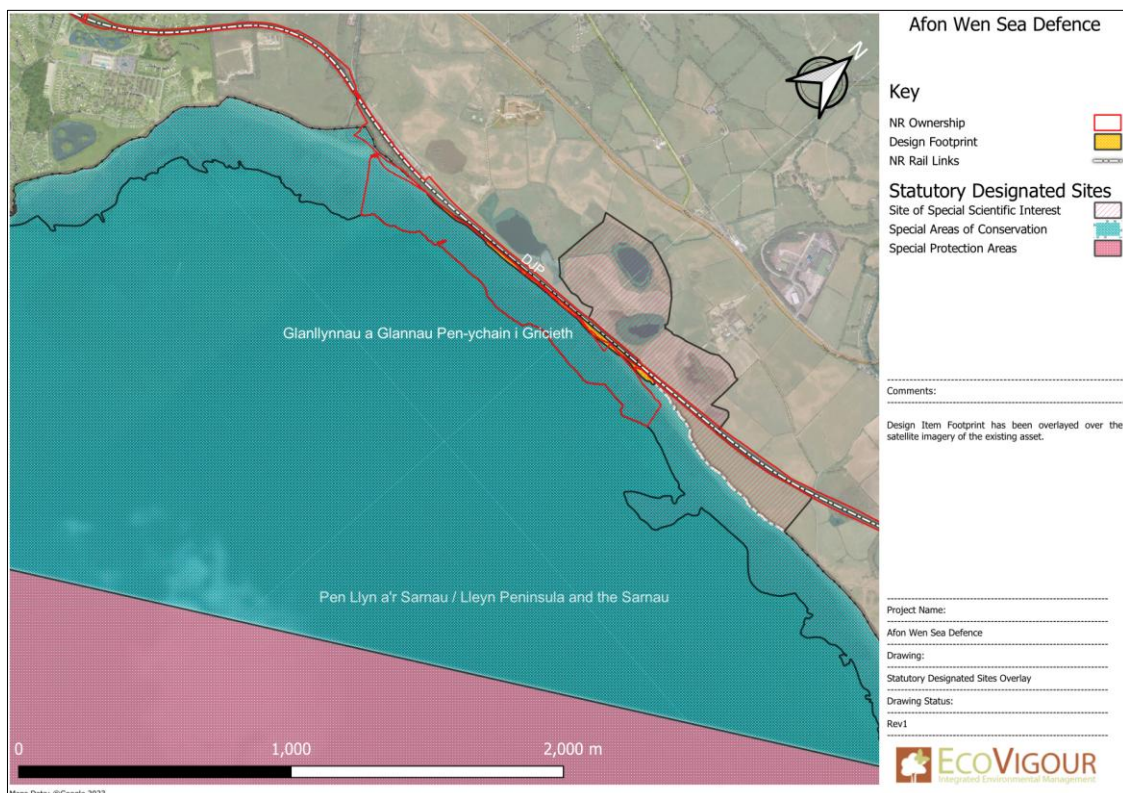


Figure 4: Statutory Sites in relation to design.



6.2 LLEYN PENINSULA AND THE SARNAU (PLAS) SAC

6.2.1 The Llyn Peninsula and the Sarnau SAC is comprised of sea, coast and estuary that supports a wide range of marine habitats and dependant wildlife. The nature of the seabed and coast including the range of environmental conditions present vary throughout the SAC - See figure below for project location in relation to the SAC boundary. For the qualifying habitats and species listed in the table below (table 1), the Llyn Peninsula and the Sarnau SAC is one of the best areas in the United Kingdom.

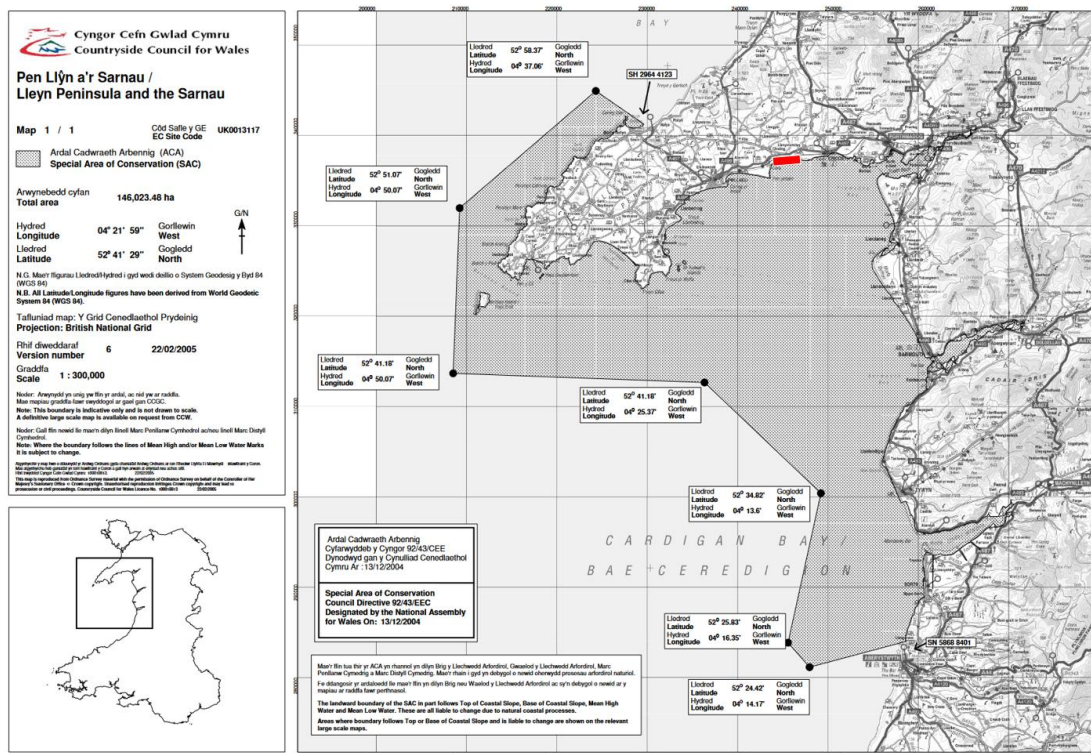


Figure 5: Location of design in relation to wider SAC.

6.3 PLAS ANNEX FEATURES OVERVIEW

Table 5: Annex I & II features of the PLAS SAC.

EU Code	Feature
Annex I habitats that are a primary reason for selection of this site	
1110	Sandbanks which are slightly covered by sea water all the time
1130	Estuaries
1150	Coastal lagoons (* Priority feature)
1160	Large shallow inlets and bays
1170	Reefs
Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site	
1140	Mudflats and sandflats not covered by seawater at low tide
1310	Salicornia and other annuals colonizing mud and sand
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritima)
8330	Submerged or partially submerged sea caves
Annex II species present as a qualifying feature, but not a primary reason for site selection	
1349	Bottlenose dolphin (Tursiops truncatus)
1355	Otter (Lutra lutra)
1364	Grey seal (Halichoerus grypus)



- 6.3.1 As the projected refurbishment works occur directly within the SAC, it is necessary to identify the Annex I & II features that will be found directly within the project footprint.
- 6.3.2 Annex II species will be assumed as these species are highly mobile. The Annex I habitat however are discussed in the following subsections.

6.4 ANNEX I HABITAT WITHIN PROJECT AREA

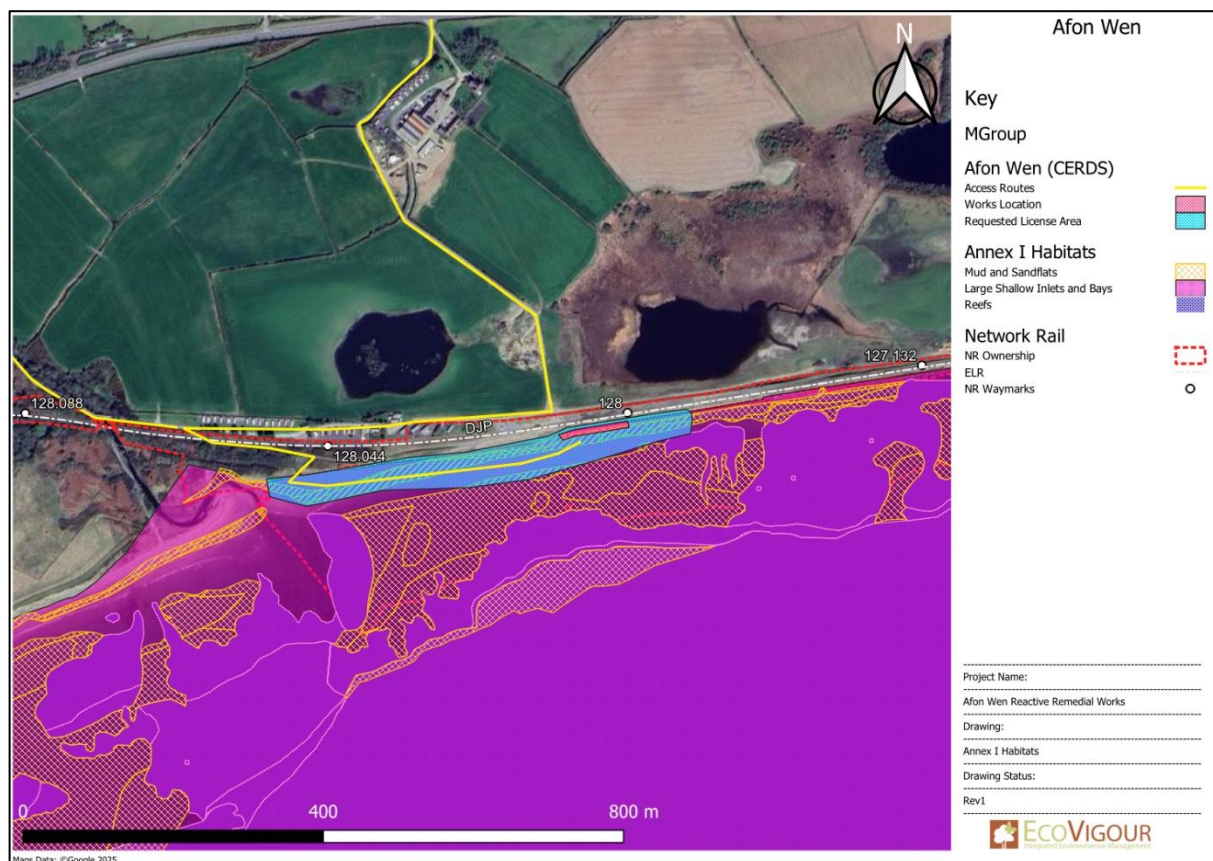


Figure 6: PLAS SAC Habitat Map.

- 6.4.1 Using the available data from the CCW (now NRW) Designated Habitat Map (Figure above), the relevant Annex I Habitats in relative proximity to the project footprint are:
- ◆ 1160 Large shallow inlets and bays.
 - ◆ 1170 Reefs.
 - ◆ 1140 Mudflats and sandflats not covered by seawater at low tide.
- 6.4.2 Adjacent to, but not within the footprint of the design, habitat 1140 is present along the foreshore of the site, at lower tidal reaches. This band of habitat although not technically within the mapped SAC boundary area, is present nonetheless.



Table 6: Potential fish species at risk from your activity, but only if your activity is in an estuary or could affect fish in or entering an estuary.

Consider if your activity:	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	Works will be restricted to the defence structures during lower tide conditions, with no physical impediment to fish passage along the estuary.
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)	Please refer to information above. Works will not cause a barrier to migrating fish species.
Could cause entrainment or impingement of fish	No identified impacts.



6.5 SECTION 3: WATER QUALITY

6.5.1 Stage 3 - Consider if water quality is at risk from your activity.

Table 7: Water body summary table to find information on phytoplankton status and harmful algae.

Consider if your activity:	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)	Sediment Release: There is potential for a small amount of sediment release from the rising tide and from scour due to water being discharged from the headwall between repairs or sediment mobilised during personnel access to the soft substrate below the structure. This would not add any materials to the marine environment but may re-mobilise deposited materials. Use of Hydrocarbons: No refuelling of equipment will occur within the bay. All items of static equipment will be placed within a plant nappy when not in use. Fuelled equipment will be checked for defects and leaks prior to the start of each shift. Within the compound, a refuelling procedure will be implemented, whereby plant nappies will be placed beneath fuelling apertures during fuelling and refuelling will only be undertaken by designated, trained individuals using equipment specifically designed for that purpose. Network Rail have a spillage plan and specialised contractor in place to respond to and clean up spills. Impact Assessment – To assess the potential impacts of these activities, the following should be considered: Fuel powered equipment will be used on the asset within the estuary/bay and hence there is a heightened risk of hydrocarbon release due to leaks of fuels and oils. The contractor will refer to guidance from: ◆ GPP 2 - Above ground oil storage tanks, ◆ GPP 5 - Works and maintenance in or near water, ◆ GPP 7 - Safe storage – The safe operation of refuelling facilities, ◆ GPP 21 - Pollution incident response planning, ◆ GPP 22 - Dealing with spills, ◆ GPP26 - Safe storage – drums and intermediate bulk containers.



Consider if your activity:	Water quality risk issue(s)
	This includes controls for the operation of equipment using biodegradable hydraulic oil (where this is within the manufacturers permitted specification), the re-fuelling of equipment, inspection and maintenance routines to identify defects which could result in the release of liquids, biosecurity protocols, silt mitigation procedures, waste management procedures. The ESMP also includes details on incident response and reporting, including hydrocarbon spills, remediation and reporting to NRW. Conclusion: Provided detailed mitigation plans are developed as part of the Task Specific Method Statements, in line with the broad guidance above, risks to water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns have therefore been assessed as low.
Is in a water body with a phytoplankton status of moderate, poor or bad	N/A (No Data)
Is in a water body with a history of harmful algae	N/A



Table 8: Assessing whether water quality is at risk from your activity through the use, release or disturbance of chemicals.

If your activity uses or releases chemicals (for example through sediment disturbance or building works) consider if:	Water quality risk issue(s)
The chemicals are on the Environmental Quality Standards Directive (EQSD) list	Impact Assessment: Chemicals which will be taken into the estuary as part of the works will be: Hydrocarbons within machinery. Conclusion: Provided the project complies with the measures set out within the ESMP, which in turn contains guidance from the relevant GPPs, the risk of release of hydrocarbons and cementitious materials is low.
It disturbs sediment with contaminants above Cefas Action Level 1	Impact Assessment: There is a low risk of sediment release during disturbance to ground around the exposed section of sheet piles being replaced. Conclusion: Risks from sediment release are negligible.



Table 9: Assessing whether project falls within mixing zone.

If your activity has a mixing zone (like a discharge pipeline or outfall) consider if:	Water quality risk issue(s) / Assessment of Risk / Mitigation Proposals.
The chemicals released are on the Environmental Quality Standards Directive (EQSD) list	The works are maintaining an existing asset.

⁵ Carry out your impact assessment using the Environment Agency's surface water pollution risk assessment guidance, part of Environmental Permitting Regulations guidance.

6.6 SECTION 4: WFD PROTECTED AREAS

6.6.1 Stage 4 is to consider if WFD protected areas are at risk from your activity. These include:

- ◆ Special Areas Of Conservation (SAC)
- ◆ Special Protection Areas (SPA)
- ◆ Shellfish Waters
- ◆ Bathing Waters
- ◆ Nutrient Sensitive Areas

Table 10: Location of protected areas in your water body (and adjacent water bodies) within 2km of your activity.

Consider if your activity is: Within 2km of any WFD protected area ⁶	Protected areas risk issue(s)
Lleyn Peninsula and the Sarnau (SAC).	The works will be undertaken within the Lleyn Peninsula and the Sarnau (SAC). It is not anticipated that there will be any direct impacts on the SAC but without sufficient controls in place, there is potential for the release of deleterious materials from the works. This is considered within the following sections and also in the Habitat Regulations Assessment for the scheme.
Designated Bathing Waters	There is potential for impacts from the works due to the following: - Impacts are unlikely due to the scale and relatively low impact of the proposed works. Mitigation will be implemented as described above. - Reference has been made to GPP 2: Above ground oil storage tanks, GPP 5: Works and maintenance in or near water and PPG 6: Working at construction and demolition sites, GPP 7: Safe storage – The safe operation of refuelling facilities, GPP



Consider if your activity is: Within 2km of any WFD protected area ⁶	Protected areas risk issue(s)
	21: Pollution incident response planning, GPP 22: Dealing with spills, GPP26: Safe storage – drums and intermediate bulk containers in the preparation of the ESMP.
Shellfish Waters	Impacts and proposed mitigation will be the same as for the Designated Bathing Waters area, above.

⁶ Note that a regulator can extend the 2km boundary if your activity has an especially high environmental risk.

6.7 SECTION 5: INVASIVE NON-NATIVE SPECIES (INNS)

6.7.1 Stage 5 is to consider if there is a risk your activity could introduce or spread INNS.

6.7.2 Risks of introducing or spreading INNS include:

- ◆ Materials or equipment that have come from, had use in or travelled through other water bodies.
- ◆ Activities that help spread existing INNS, either within the immediate water body or other water bodies.

Table 11: Risk from INNS.

Consider if your activity could:	INNS risk issue(s)
Introduce or spread INNS	No INNS have been identified within the worksite. The risk of introducing INNS into the estuary environment will be controlled through Biosecurity Best Practice - Equipment to be used within and adjacent to the estuary will be subject to the Check, Clean, Dry process and will be treated with an aquatic safe disinfectant such as Virkon S. A Biosecurity Management Plan has been prepared for the project, which assesses the risk from INNS and proposes mitigation for this. Please refer to Appendix A.



6.8 SUMMARY OF WFD PRE-ASSESSMENT FINDINGS

Table 12: Summary of Pre-Assessment Stage Findings.

Receptor	Potential risk to receptor?	Note the risk issue(s) for impact assessment
Hydromorphology	The repairs will connect to previous structure repairs along the lower defence alignment. There will be no new independent structures placed into the bay and no temporary structures such as scaffolding used.	Mitigation to be out in place to minimise impacts – Please refer to Table 15 for proposed mitigation.
Biology: habitats	No identified impacts on habitats, provided adequate pollution control measures are put in place i.e. sealed crash deck beneath the structure, controls on the storage and use of hydrocarbons and chemicals, controls on the use of cements, grouts and concrete.	Mitigation to be specified within the Social and Environmental Management Plan (ESMP)
Biology: fish	No identified impact. There will be no physical blocks to fish migrating through the estuary/river. Key impacts on fish will therefore be noise and vibration from works and the use of a equipment near channel. As the works will occur during low tide, noise and vibration will not be transmitted directly into the water column.	As above
Water quality	Potential impacts to water quality has been assessed.	Mitigation for these potential impacts is described within Table 15.
Protected areas	Works will be undertaken within the Llyn Peninsula and the Sarnau (SAC)	Working procedures and mitigation to be put in place to minimise potential for sediment release and hydrocarbon release. Mitigation described in Table 15.
Invasive non-native species	A Biosecurity Management Plan has been developed for the project, which includes INNS. Please refer to Appendix A.	Please refer to Biosecurity Risk Assessment

6.8.1 The WFD guidance stipulates if a pre-assessment has not identified any receptors at risk during scoping, you don't need to continue to the impact assessment stage and your WFD assessment is complete.

6.8.2 However, if the pre-assessment identifies one or more receptors at risk during scoping, you should continue to the impact assessment stage.



Table 13: Water Framework Directive (WFD) Assessment for the Meirionnydd groundwater waterbody.

WFD elements	Assessment
Chemical status	<u>Temporary impacts during construction</u> No identified impacts <u>Permanent effects during operation</u> No predicted impacts from the operation of the rail structure as it is not proposed to amend the finished level of the railway and hence no excavation will be required and hence no new conduits between the rail track and ground water will be formed. <u>Assessment outcome</u> No adverse effects on the chemical status of the groundwater body have been identified and therefore this is scoped out of further assessment.
Quantitative status	<u>Temporary impacts during construction</u> No interaction with groundwater during construction. <u>Permanent effects during operation</u> No predicted impacts from the operation of the rail structure. <u>Assessment outcome</u> Effects to the quantitative status of the groundwater body have been scoped out of further assessment.



7. PROPOSED PROJECT MITIGATION

7.1 CONSTRUCTION PHASE MITIGATION

7.1.1 In Table 15 below, measures have been set out detailing mitigation to be implemented to minimise the potential project impacts.

Table 14: Proposed Mitigation Matrix.

Potential Hazard	Mitigating Circumstances / Mitigation Measures	Likelihood of Impact with Mitigation
Estuarine habitat - Loss of habitat from project activities.	During the project, all welfare, storage, parking and general works will occur within third party agricultural fields and the immediate area below the structure during low tide only. No Annex I habitat removal is required. The only physical interaction with the bay bed will be during the low tide periods where vehicle access along the beach areas of sand / silt below the structure (not rocky areas, see below) to undertake the remedial works. Plant/machinery will not deviate from the designated routes at any time. Personnel will walk along the available public footpath or access route. No walking over the saltmarsh is permitted.	Negligible likelihood of significant impacts.
Salt marshes (also part of estuarine habitat) - Loss of habitat from project activities.	No loss of habitat is projected to occur as all site access takes place landward of the proposed works. No vehicle or pedestrian access into the saltmarsh habitats.	Negligible likelihood of impacts, with suitable mitigation in place.
Reefs - Loss of habitat from project activities.	No works are proposed above the mapped Reefs as per the HRA.	Negligible likelihood of impacts.
Mudflats and sandflats not covered by seawater at low tide – muddy gullies in the Estuary - Loss of habitat from project activities.	Access will primarily be limited to the predominantly sandflat dominated area below the sea defence. Vehicle access closer to mudflats will only occur where existing groynes present normal vehicles movements.	Negligible likelihood of impacts.
Release of contaminative chemicals from sediments within the estuary	Limited removal of sediment is proposed, with excavation to reach the base of sheet piles not being envisaged. Shallow pulling away of sand built up in front of some piles may be required, to ensure a secure point, in which to pull out damaged piles.	Negligible likelihood of impacts with mitigation in place.



Potential Hazard	Mitigating Circumstances / Mitigation Measures	Likelihood of Impact with Mitigation
Contamination of the estuary from spillage of hydrocarbons during refuelling of plant and equipment or due to equipment failure.	Plant/Machinery will only operate in low tide conditions and will be removed from the estuary ahead of the rising tide. Provision will be made to remove broken down plant / vehicles or plant and vehicles which become bogged down. No refuelling of plant machinery or equipment will occur within the estuary habitat. All items of static plant will be placed within a plant nappy when in use or being stored. Plant will be checked for defects and leaks prior to the start of each shift. Bulk fuels will be stored in a bowser with secondary containment. This will be located in the site compound. Within the compound, a refuelling procedure will be implemented, whereby plant nappies will be placed beneath fuelling apertures during fuelling and refuelling will only be undertaken by designated, trained individuals using equipment specifically designed for that purpose. Network Rail have a spillage plan and specialised contractor in place to respond to and clean up spills. The Contractor will develop and implement an Emergency Awareness and Response Plan. This will describe how spills will be contained and cleaned up. The emergency plan will appoint an Incident Coordinator, define roles and responsibilities during an incident, detail response procedures and contain an inventory of response equipment to be maintained on site. Plant will also be available to remove contaminated ballast from site if required. All machinery entering the estuary will undergo regular checks and only use approved biodegradable oils. If oil leaks or damage to hydraulic hoses is noted, plant and machinery will be removed from the site and isolated within the site compound with containment measures beneath the leak, until it has been repaired and signed off by a competent fitter. The contractor will develop and emergency response plan in the event a machine becomes stranded in the estuary from mechanical failure. Equipment will be available to syphon the fuel from the disabled machine in order to reduce the potential release of hydrocarbons into the estuary/bay.	Negligible likelihood of impacts with mitigation in place.
Contamination of the estuary from release of concrete.	Works will only occur during low tide conditions. Concrete used will be a rapid drying marine standard which will have cured by the time the tide returns to the working area. No concrete / cementitious materials will be stored in areas within the tidal range of the estuary or in areas liable to flooding.	Negligible likelihood of impacts with mitigation in place.
Aggregations of non-breeding birds Noise disturbance / Visual Disturbance / Habitat Destruction.	Project activities will create a source of light and noise over 8-12 hours during the day. Times will vary depending on specific tasks. Working hours will be generally between 07:00-19:00 As working hours are not continuous there will be periods where birds are not disturbed by site activities during the early mornings and night. It is likely that local bird populations are habituated to a level of human activities.	Negligible likelihood of impacts with mitigation in place.



Potential Hazard	Mitigating Circumstances / Mitigation Measures	Likelihood of Impact with Mitigation
Individual wintering birds - Noise disturbance / Visual Disturbance / Habitat Destruction.	The works are scheduled to occur within circa October-November 2025, outside of the important peak wintering period.	Impact Not Likely to be Significant
Otter - Noise disturbance / Visual Disturbance / Habitat Destruction.	Toolbox Talks will inform site personnel on identifying the Annex II Species. No otter holts have been noted to date within proximity to the structure, access route or Morfa Compound area. The project does not represent a hard boundary preventing access to the wider estuary by this species. Habitat impact is limited, however there may be a temporary impact to prey species disturbed by ongoing works. It is not anticipated that these works will have an impact on the population. Additionally, no equipment or excavation will be left in such a manner that during high tide an animal could become snared and trapped within the working area. Should an Otter be encountered during works, personnel will temporarily stand down until the animal has vacated the immediate area under its own volition. The contractor will abide by the Gwynedd Marine Code of Conduct. Salmon, which are a prey of Otter will not be prevented from travelling up the estuary during the project. Although there will be an elevated human presence around the structure, it is unlikely that this will present an impassable barrier to salmon migrating to spawn. Directional lighting measures as with those proposed for bat species will be implemented for Otter population to limit disturbance.	Impact Not Likely to be Significant, with appropriate mitigation
Bottle Nose Dolphin - Noise disturbance / Visual Disturbance / Habitat Destruction.	The structure is a significant distance away from the deeper portions of the estuary that continued to flow during low tides. In addition, the project is scheduled to occur during a lower tidal variation period, constitutently it is unlikely this species will be encountered during the project period. Identification of this species will be provided in toolbox talks.	Impact Not Likely to be Significant, with appropriate mitigation
Grey Seal - Noise disturbance / Visual Disturbance / Habitat Destruction.	See above.	Impact Not Likely to be Significant, with appropriate mitigation
Fish Assemblage – Pollution and water quality impacts.	Pollution control and Biosecurity measures implemented as described above will minimise water quality impacts on fish species.	Impact Not Likely to be Significant, with appropriate mitigation
Fish Assemblage - Noise disturbance / Visual Disturbance / Habitat Destruction.	The works will be undertaken towards the start of the fish spawning season for migratory fish such as salmon, trout and eel (mid Oct – Mid April). However, no working at the structure will occur during high tide conditions. Works within the estuary during low tide at bed level will be localised and low impact and will not involve deep excavation or dredging.	Works have potential to cause a Minor Significant impact.



Potential Hazard	Mitigating Circumstances / Mitigation Measures	Likelihood of Impact with Mitigation
	Task lighting will be designed to illuminate the works area but limit light spill into the estuary.	
Fish Assemblage - Contamination of the estuary from spillage	See comments under estuarine habitat	Impact Not Likely to be Significant
Biosecurity	A detailed Biosecurity Plan has been prepared for the project. This includes the following: - All site personnel and site visitors will be informed if any INNS are known to be present on site and that they are jointly responsible for preventing their spread/impacts. They will be made aware of what these species look like so they can avoid it where possible and take appropriate actions. - All site personnel and visitors will be inducted in good biosecurity practices. This will include adoption of the CHECK-CLEAN-DRY campaign (NNSS, 2015). - The CHECK-CLEAN-DRY poster will be displayed in the site office as a reminder of good biosecurity practices: - http://www.nonnativespecies.org/checkcleandry/ - All equipment, tools, vehicles and personal protective equipment (PPE) used on site will be checked for seeds originating from any identified INNS before leaving the area. If seeds from identified invasive species are identified, the items will be cleaned and removed seeds will be destroyed. - The spread of waterborne diseases will be limited through the adoption of the CHECK-CLEAN-DRY campaign. This would entail the use of a suitable disinfectant e.g. Virkon® S Aquatic to decontaminate all machinery and PPE prior to it entering site and upon leaving site. Following application of a suitable disinfectant, machinery and PPE will be allowed to fully dry for at least 72 hours before being used on another aquatic site. The Biodiversity Management Plan can be found in Appendix A.	Impact Not Likely to be Significant
Blue Mussels - Contamination of the estuary from spillage and increased sediment loading.	Works will be undertaken at low tide and hence these will not be immediately released into the estuary but there is some potential for incoming tides to wash out small volumes of mobilised sediment.	Impact Not Likely to be Significant
Vascular plant assemblage associated with salt marsh (part of estuarine habitat) - No impact	See comments under estuarine habitat	No impact



8. WFD CONCLUSION

- 8.1.1 Due to the nature and scale of the works to be undertaken during the DJP Afon Wen Defence Repairs, providing the mitigation outlined within this document and within this document and the supporting Habitat Regulations Assessment (HRA) is implemented, this project will not prevent any of the water bodies associated with the project from meeting their Water Framework Directive objectives.



9. APPENDIX A - BIOSECURITY MANAGEMENT PLAN & RISK ASSESSMENT

