Farchynys – Flood Bank Repair

Habitats Regulations Assessment (HRA)

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Appendices

List of Abbreviations

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

Executive Summary

This report comprises a Habitats Regulations Assessment (HRA) for the repair works required at Farchynys Flood Bank near Bontddu, Gwynedd. A HRA is an assessment of impacts on European protected sites of importance for nature conservation.

The project involves repairing a breach in the flood bank, where a sluice structure used to be, along with consolidating the height of the flood bank and repairing any sections along its length that have been eroded. Snowdonia National Park Authority own the central section of the flood bank where the breach has occurred. Owners of Tyddyn Du camp site, located on the northern side of the flood bank, have raised concerns regarding the condition of the flood bank, the frequency of flooding due to the breach and the consequence of such occurrences on their longstanding family business.

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

The assessment concluded that adverse effects on the integrity of the Pen Llyn a'r Sarnau SAC could not be avoided. The overriding reason for this conclusion is that the change in tidal inundation on the landward side of the bank, along with potential increased inundation and/or erosion on the seaward side of the bank, could potentially alter and lead to a loss of 'Atlantic Salt Meadow' habitat, which also forms part of the overriding 'Estuaries' habitat feature of the SAC. This potential impact is considered to be at a scale that would represent an adverse effect on the integrity of the site.

Through the application of mitigation measures, no adverse effect on the integrity of Afon Eden – Cors Goch Trawsfynydd SAC, and Meirionnydd Oakwoods and Bat Sites SAC would occur, and no residual effects would remain.

1.0 INTRODUCTION

YGC have been commissioned to undertake a Habitats Regulations Assessment (HRA) for proposed works to repair part of the flood bank at Farchynys which has breached at a point where a sluice structure used to be. Farchynys is a coastal area located to the south of the A496 road between Barmouth and Bont Ddu, on the north side of the Mawddach estuary (NGR: SH 66692 18055)

The area is broadly comprised of a flood bank, grazing land, woodland and a campsite. The vast majority of the area is located within the tidal floodplain, despite the presence of a flood embankment separating the foreshore (mud/sand flats and saltmarsh) and the tidally inundated grazed fields and reedbeds to the north, which are divided by a network of drainage ditches.

The area referred to as Farchynys is broadly divided into two in terms of ownership, with the Snowdonia National Park Authority (SNPA) owning the south-western half of the area, and Tyddyn Du Farm owning the north-eastern half of the area, including the camping site.

A breach has occurred within the flood bank at a point where a sluice structure used to be. It is believed that the breach occurred in 2018, although it is understood that the sluice structure has been defective for a number of years. The breach is on the central part of the flood bank, which falls within the section owned by SNPA. Owners of Tyddyn Du camp site have raised concerns regarding the condition of the flood bank, the frequency of flooding due to the breach and the consequence of such occurrences on their longstanding family business.

The proposed works under consideration for this HRA include repairing the sluice structure where the breach has occurred within the flood bank. This would involve the installation of a structure of similar function at this location. Also, the crest height of the bank varies significantly along its length, and as such, to lessen the scour and erosion effect of overtopping floodwater, the crest height would need to be made more uniform. The proposed work would involve consolidating the crest height, and repairing any eroded section of the bank where required along its entire length, as depicted on the location plan in figure 1 below.

Access to the site during construction is likely to be from Tyddyn Du, where a track leads down from the A496, through the campsite, down to the north eastern side of the flood bank. A small site compound would be located at Tydyn Du campsite (outside the SAC boundary). Should construction machinery need to access the flood bank from the south western side, there is a track that leads from the Snowdonia National Park Authority Car Park at Farchynys, and follows the edge of the woodland down towards the foreshore. A small section of temporary access track would be required from the edge of the woodland to the flood bank.

It is expected that the works would take approximately 8 – 12 weeks to complete.

The purpose of this Habitat Regulations Assessment (HRA) report is to assess the impact of the works described above on sites of international importance for biodiversity.

1.2 Authors

This HRA has been prepared by:

- Rhys Meilyr Thomas, PGDip, with 3 years of ecological consultancy experience, including HRA and Environmental Impact Assessment (EIA) of large projects.
- Nancy Wilkinson PGDip BSc (Hons) MCIEEM, with over 13 years of ecological consultancy experience, including HRA and Ecological Impact Assessment (EcIA) of large projects.

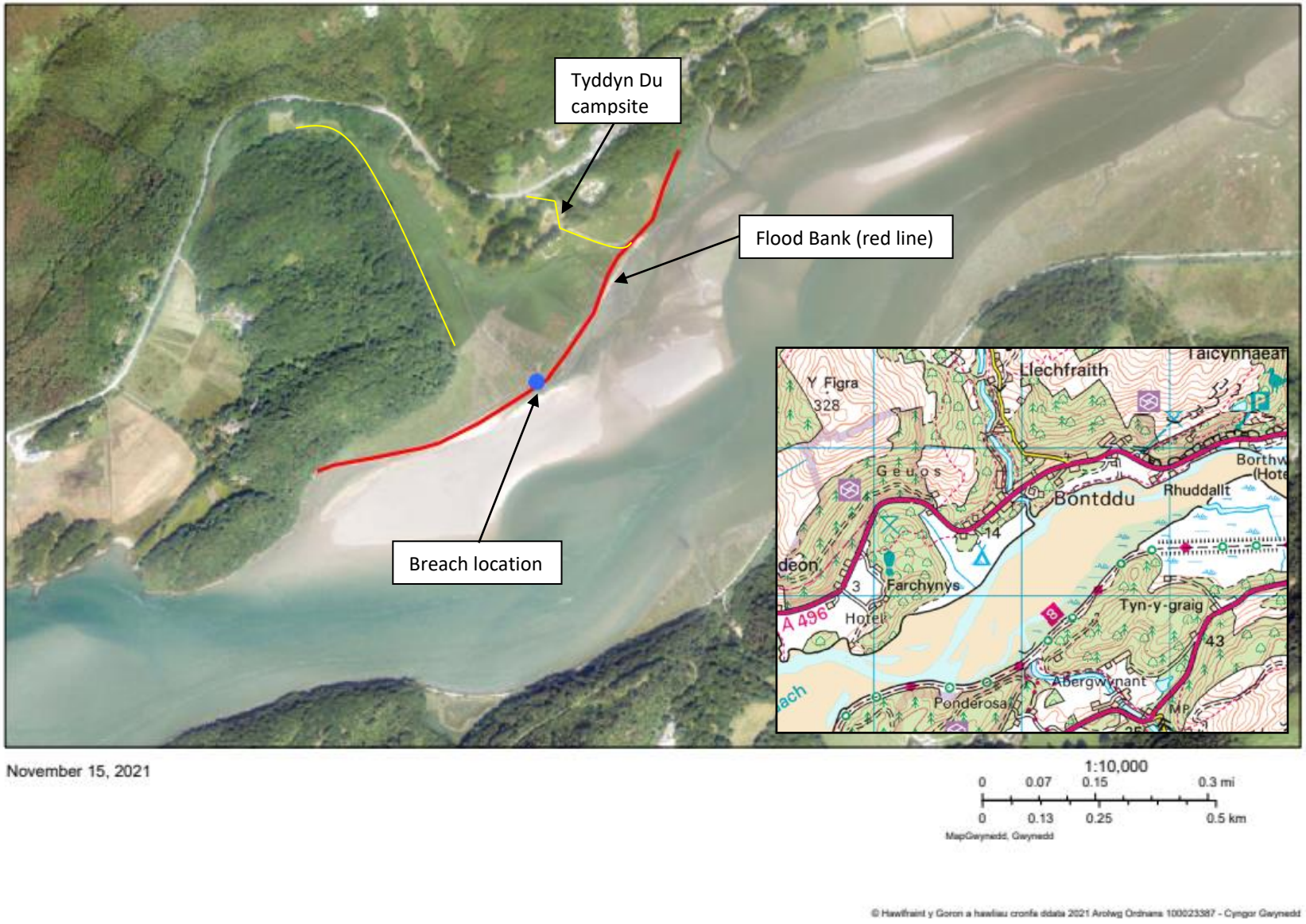

Figure 1: Location of proposed works at Farchynys. Extent of flood bank is outlined in red, with the breach location indicated with the blue dot. Access tracks are outlined in yellow.

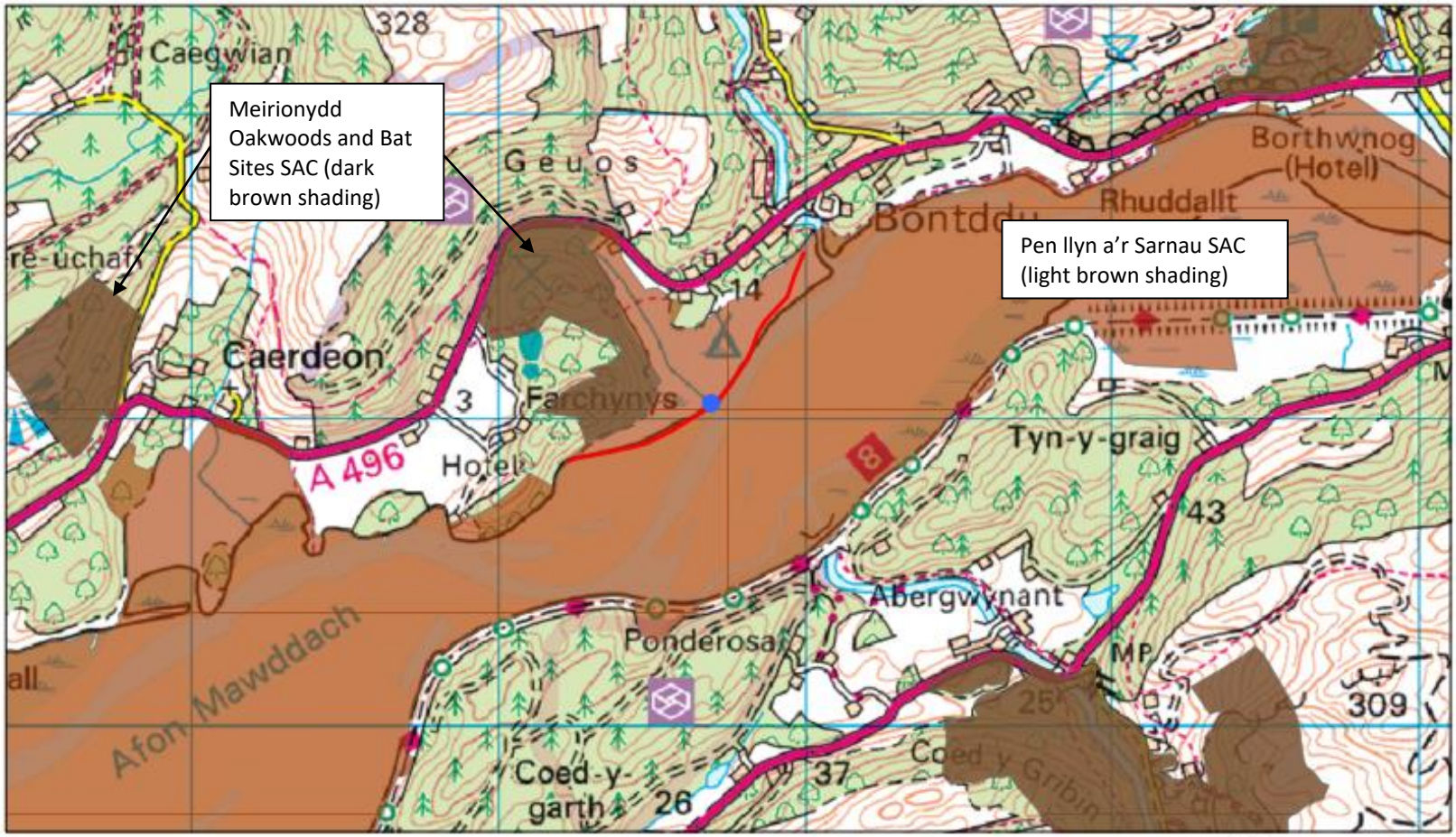

Figure 2: Location of proposals in relation to SACs.

1.3 European Sites and Ramsars

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

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

1.4 The HRA of Projects

HRA asks specific, mandatory questions of development projects. Firstly a pre-screening process establishes whether a project can be exempted, excluded or eliminated, either because it is directly connected with the conservation management of the protected site, or it doesn't qualify as a 'project' (within the meaning and scope of the Habitats Directive), or because it couldn't conceivably affect any protected sites. If it cannot be discounted for these reasons, it has to undergo a process involving the four stages outlined in Table 1 and Figure 3 below.

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

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

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

Table 1: Summary of the four-stage HRA process

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

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

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

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

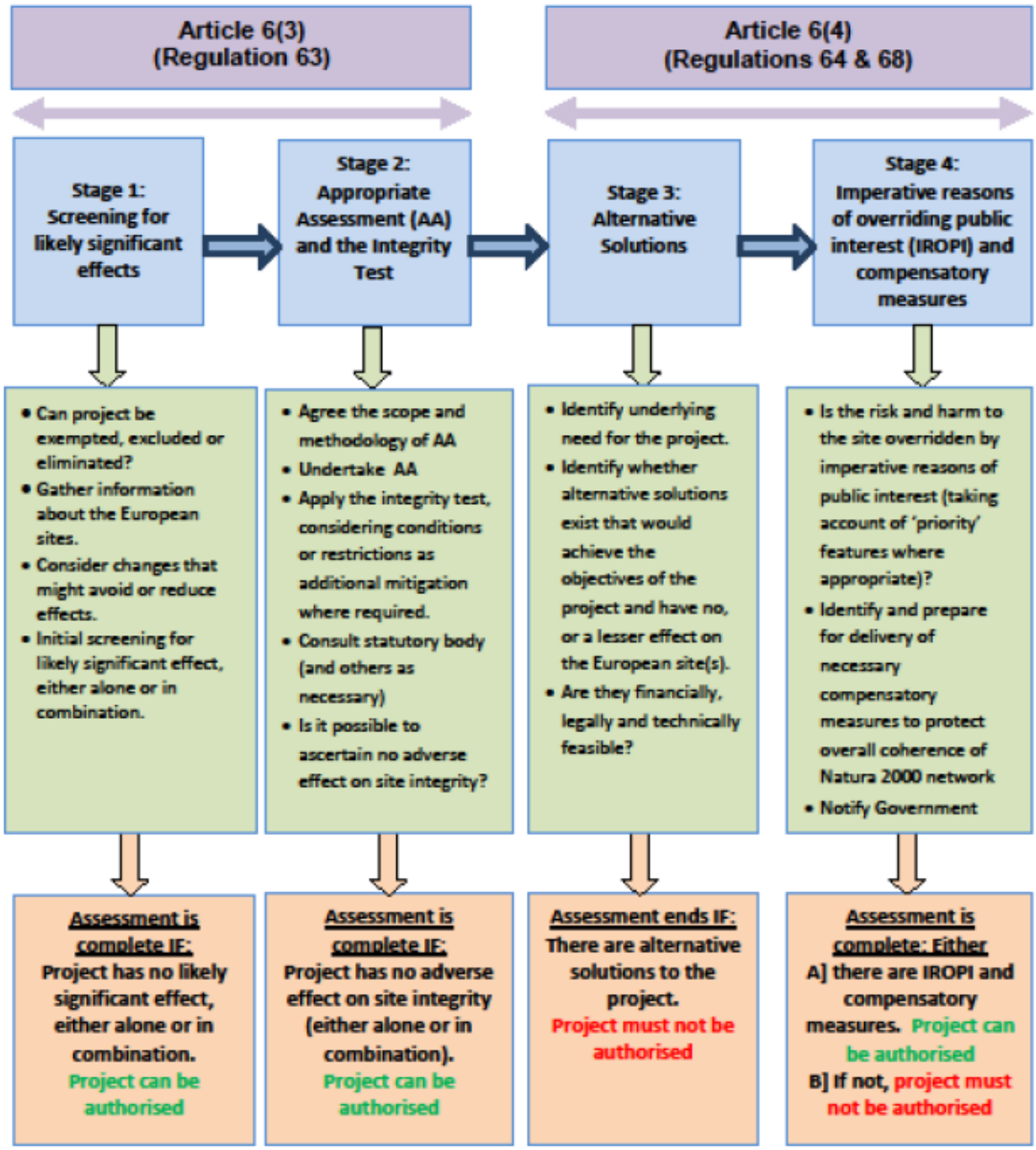

Figure 3: Outline of the four-stage approach to the Habitats Regulations Assessment of projects

1.5 Definitions, Evidence and Case Law

Stage One – Screening

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

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

Stage Two – Appropriate Assessment and the Integrity Test

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

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

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

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

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

Favourable Conservation Status

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

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

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

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

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

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

Priority features

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

Mitigation and case law

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

Role of the competent authority

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

2.0 THE NEED FOR ASSESSMENT AND IDENTIFYING EUROPEAN SITES AT RISK

2.1 Exclusion, Elimination and Exemption from the Need for Assessment

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

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

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

2.2 Identification of European sites at risk

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

In some instances, sites require a larger search radius of up to 30km if they support highly mobile qualifying species such as lesser horseshoe bats or otters that could be affected by the proposed works. In this instance there are no other sites with lesser horseshoe bats as a qualifying species feature within 30km of the proposals, other than Meirionnydd Oakwoods and Bat Sites SAC which is within the 10km radius. There are two European sites within 25km of the proposals which have otters as a qualifying species. Pen Llyn a'r Sarnau SAC, which is within the footprint of the works, and Afon Eden – Cors Goch Trawsfynydd SAC, located 4.9km east of the proposals.

Table 2. European sites within 10km (or more for mobile species) of the proposed works

European site	Distance
Pen Llyn a'r Sarnau SAC	Within the footprint of the proposed works.
Meirionnydd Oakwoods and Bat Sites SAC	42m north at its nearest point.
Cadair Idris SAC	3.8km south of proposals.
Afon Eden – Cors Goch Trawsfynydd SAC	4.9km east of the proposals.
Rhinog SAC	6.6km north of proposals.
North Cardigan Bay SPA	8.7km west of the proposals.

Morfa Dyffryn SAC	9.5km north west of proposals.

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

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

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

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

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

Types of project (or potential effects)	Sites to scan for and check (and additional context)	List of European sites potentially at risk
(1) All projects (terrestrial, coastal and marine)	Sites within which the project is wholly or partly located. The project would result in a direct impact to the Pen Llyn a'r Sarnau SAC as the proposed works are located wholly within this site. According to the proposals, works would need to take place to repair the sluice structure where there is currently a breach, along with repairing other sections of the flood bank to ensure a consolidated crest height. The total area along the flood bank likely to be affected (i.e. the footprint of the work) is approx. 0.80 ha. The SAC habitat features likely to be affected by the proposals include 'Atlantic Salt Meadow' and the broader 'Estuaries' feature which are both qualifying features of the SAC and present in the area directly affected by the proposals. (Other habitat features nearby which are not within the work footprint but could be indirectly affected are included under criterion 2.) The proposed works could lead to temporary changes in habitat within the working corridor during construction and for a period afterwards until the vegetation re-establishes, due to physical damage caused by works to repair sections of the bank, and from vehicle movements to gain access to the working areas. This is likely to mostly effect the 'Atlantic Salt Meadow' feature of the SAC. The nature of the proposals would also result in less frequent tidal inundation of habitats on the landward side of the flood bank, than what is currently occurring. This change in pattern and extent of flooding could lead to habitat / community alteration due to a change in vegetation community. Such impacts could undermine the conservation objectives for Atlantic Salt Meadow habitat. The Invasive non-native species Japanese Knotweed is also present on the eastern end of the flood bank, and the works could cause this species to be inadvertently spread onto other areas within the working corridor. The proposals are only located within Pen Llyn a'r Sarnau SAC therefore all other sites are ruled out under criterion 1.	Pen Llyn a'r Sarnau SAC.

Types of project (or potential effects)	Sites to scan for and check (and additional context)	List of European sites potentially at risk
	Therefore, at this stage the potential for harmful effects on the Pen Llyn a'r Sarnau SAC and its features cannot be ruled out and further consideration is required.	
(2) Projects that could affect wetland features	**Effects considered are those associated with the physical presence of built development and the localised effects on surface/groundwater resources and quality, resulting from changes in run-off, sedimentation, erosion, etc.** The repair works to the flood bank could directly impact the inter-tidal estuary habitat of the Pen-Llyn a'r Sarnau SAC. There is also potential for the works to create adverse pollution impacts to the qualifying habitat and species features of the Pen Llyn a'r Sarnau SAC during construction. Afon Eden – Cors Goch Trawsfynydd SAC is located approximately 4.9km to the east of proposals, upstream along the Afon Mawddach. The tidal reach of the estuary reaches as far as 500m upstream of the Mawddach / Wnion confluence, therefore does not reach as far as the Afon Eden – Cors Goch Trawsfynydd SAC. For this reason, it is not likely that any pollution impacts from the works will affect wetland features of the Afon Eden – Cors Goch Trawfynydd SAC. There is the possibility of contamination of otter foraging habitat outside of the protected site, and a reduction in abundance and availability of prey for otters (fish), which is covered in other criterion below. Effects can be ruled out for wetland features of the Meirionydd Oakwoods and Bat Sites SAC under this criterion as no wetland features associated with the site are likely to be affected. However, the abundance and availability of prey for lesser horseshoe bats (ie invertebrates) could be reduced and further scrutiny will be required. Effects can also be ruled out for the Cadair Idris SAC, Rhinog SAC and Morfa Dyffryn SAC given the distance of the sites from the proposed works, the size and nature of the proposed works and the lack of fluvial connectivity, meaning that the risk of their qualifying habitats and species being affected is remote. **Therefore, at this stage the potential for harmful effects on the features of Pen Llyn a'r Sarnau SAC, and the lesser horseshoe bats of the Meirionnydd Oakwoods and Bat sites cannot be ruled out and further**	Pen Llyn a'r Sarnau SAC Meirionnydd Oakwoods and Bats Sites SAC

Types of project (or potential effects)	Sites to scan for and check (and additional context)	List of European sites potentially at risk
	consideration is required. *Note: There is a link between criterion 2 and criterion 3 and 5 below.*	
(3) Projects that could affect the marine environment	Criterion 3 involves sites that could be affected by changes in water quality, currents or flows; or effects on the inter-tidal or sub-tidal areas or the sea bed, or marine species. The repair works to the flood bank could directly impact the inter-tidal estuary habitat of the Pen-Llyn a'r Sarnau SAC. There is likely to be temporary impacts on areas of estuary habitat due to construction activities and associated vehicle movements. There could also be more permanent impacts on the estuary habitats due to the repair in the breach resulting in less tidal inundation of habitats on the landward side of the bank. There is also potential for the works to create adverse pollution impacts to the qualifying habitat and species features of the Pen Llyn a'r Sarnau SAC during construction. Effects can be ruled out for the North Cardigan Bay SPA given the distance of the site from the proposed works (8.7km) and the size and nature of the proposed works. Therefore, at this stage the potential for harmful effects on the Pen Llyn a'r Sarnau SAC and its features cannot be ruled out and further consideration is required. *Note: There is a link between criterion 3 and criterion 2 and 5*	Pen Llyn a'r Sarnau SAC
(5) Projects that could affect mobile species	Criterion 5 includes sites whose qualifying features include mobile species which may be affected by the project irrespective of the location of the project or whether the species would be in or out of the site when they might be affected. Mobile species are those considered to spend part of their life-cycle on land, in water or air beyond the designated site boundary. Typically, it focuses on potential impacts on functionally-linked land and water utilised by the birds, mammals and migratory fish associated with the European sites listed.	Pen Llyn a'r Sarnau SAC Meirionnydd Oakwoods and Bats Sites SAC Afon Eden – Cors Goch Trawsfynydd SAC

Types of project (or potential effects)	Sites to scan for and check (and additional context)	List of European sites potentially at risk
	Note that 'indirect' effects on mobile species on functionally – linked land or water beyond the development site, are considered under other criteria 14 and 15 below. Otter is a mobile species feature of both the Pen Llyn a'r Sarnau SAC and Afon Eden – Cors Goch Trawsfynydd SAC. Both sites are located within the Mawddach catchment and it is feasible that otter populations of both sites could utilise land within or adjacent to the area of proposed works for foraging, commuting or as resting sites, given the proximity of the Afon Eden – Cors Goch Trawsfynydd SAC to the proposals. Lesser horseshoe bat is a mobile species feature of the Meirionnydd Oakwoods and Bat Sites SAC. Given its proximity (42m at its closest point), the potential for harmful effects on the lesser horseshoe bat population of the Meirionnydd Oakwoods and Bat Sites SAC cannot be excluded and will require further consideration Atlantic Salmon is a qualifying mobile Salmon Species of the Afon Eden – Cors Goch Trawsfynydd SAC. This species is likely to utilise the river habitat of the Mawddach adjacent to the proposed works, which is fluvially connected to the Afon Eden – Cors Goch Trawsfynydd SAC. Any pollution impacts to the Afon Mawddach could potentially affect the Atlantic Salmon population connected to the Afon Eden – Cors Goch Trawsfynydd SAC and therefore will require further consideration. While the North Cardigan Bay SPA has mobile species features (red-throated diver), given the distance of the site from the proposed works, and the small size and nature of the proposed works, the likelihood of significant harmful effects can be ruled out. **Therefore, at this stage the potential for harmful effects on the otters of Pen Llyn a'r Sarnau SAC, the otters and Atlantic Salmon of Afon Eden – Cors Goch Trawsfynydd SAC, and the lesser horseshoe bats of Meirionnydd Oakwoods and Bat Sites SAC and their features cannot be ruled out and further consideration is required.** *Note: There is a close link between criterion 5 and criteria 14 and 15 below.*	

Types of project (or potential effects)	Sites to scan for and check (and additional context)	List of European sites potentially at risk
(14) Projects which could introduce or increase, or alter the timing, nature or location of disturbance to species	**Criterion 14 refers to sites whose qualifying features are considered to be potentially sensitive to disturbance, for example as a result of noise, activity or movement or the presence of disturbing features that could be brought about by the project.** There is a risk of disturbance to otters, a qualifying feature of the Pen Llyn a'r Sarnau SAC and the Afon Eden – Cors Goch Trawsfynydd SAC, during construction. Otters are known to be present in the area and the area adjacent to the flood bank provides foraging habitat and potential resting sites for Otters. These impacts could be through disturbance or noise pollution caused by the plant machinery and site personnel that would be needed on site for the proposed works. The risk is also reduced as the works would be undertaken during daylight hours when otters are much less active. Historical Cofnod records indicate the presence of lesser horseshoe bat roosts within mine adits located in Farchynys Woods. These are located approximately 200m west of the flood bank at its nearest point. Lesser horseshoe bats are a species feature of the Meirionnydd Oakwwods and Bat Sites SAC. There are no structures for roosting bats within the vicinity of the propsed works itself, and as works would be carried out during daylight hours the risk of disturbance is greately reduced. However, there remains a residual risk of temporary disturbance to this species during construction phase due to the proximity of the SAC to the proposed works. There is no works proposed within the channel of the Afon Mawddach itself, therefore it is highly unlikely that there will be any interruption of migratory movement of fish or disturbance of any spawning redds. Potential effects on this species through pollution during construction are covered in criterion 5 above. Potential disturbance to Atlantic Salmon, a species feature of the Afon Eden – Cors Goch Trawsfynydd SAC, is therefore ruled out at this stage under this criterion. Impacts on other mobile species that represent qualifying features of other European sites further afield, such as the mobile species of the North Ceredigion Bay SPA can be ruled out given the distances involved (8.7km). **Therefore, effects that include potential disturbance of otters cannot be ruled out for the Afon Eden –**	Afon Eden – Cors Goch Trawsfynydd SAC Pen Llyn a'r Sarnau SAC Meirionnydd Oakwoods and Bat Sites SAC

Types of project (or potential effects)	Sites to scan for and check (and additional context)	List of European sites potentially at risk
	Cors Goch Trawsfynydd SAC and Pen Llyn a'r Sarnau SAC and further consideration is required. Similarly, potential disturbance of lesser horseshoe bats cannot be ruled out for the Meirionnydd Oakwoods and Bat Sites SAC and further consideration is required. *Note: There is a close link between criterion 14 and criteria 5 and 15.*	
(15) Projects which could introduce or increase or change the timing, nature of location of light or noise pollution	**Criterion 15 includes sites whose qualifying features are considered to be potentially sensitive to the effects of changes in light or noise that could be brought about by the project.** There would be some localised temporary noise pollution during the construction period, which could potentially cause a level of disturbance to otters. Otters are a mobile species feature of the Pen Llyn a'r Sarnau SAC and Afon Eden Cors Goch Trawsfynydd SAC. The proposed works are likely to create a temporary increase in noise levels during the course of the works, potentially impacting lesser horseshoe bats. Historical Cofnod records indicate the presence of lesser horshoe bat roosts within mine adits at Farchynys Woods, approximately 200m west of the flood bank. Effects on foraging bats would be minimal as works would be undertaken during daylight hours and there would be no artificial lighting of the site. However, impact on potential roosting bats through noise pollution during construction cannot be ruled out. Noise pollution effects can be ruled out for the North Ceredigion Bay SPA given the considerable distance of the site from the scheme. **Therefore, effects on otters and lesser horshoe bats from noise pollution on the Afon Eden – Cors Goch Trawsfynydd SAC, Pen Llyn a'r Sarnau SAC and Meirionnydd Oakwoods and Bat Sites SAC cannot be ruled out.** *Note: There is a close link between criterion 15 and criteria 5 and 14 above.*	Afon Eden – Cors Goch Trawsfynydd SAC Pen Llyn a'r Sarnau SAC Meirionnydd Oakwoods and Bat Sites SAC.

2.3 Initial outcome of site identification exercise

Following the initial high-level preliminary screening exercise provided by Table 3 above and Appendix A (full version including criteria screened out as well as those screened in), the number of potential threats and sites affected is reduced. Despite this, the nature of the criteria results in considerable overlap in some instances, such as in criteria 5, 14, and 15 which can all effectively be represented by 'disturbance of mobile species' and 'pollution of foraging habitat'. Criteria 1, 2 and 3 effectively represent the threats caused by 'loss or alteration of habitat' and 'pollution'. These terms will therefore be used in any subsequent assessment, in place of the criteria in Table 3 above.

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

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

Potential threat	Relevant Criteria from Table 3	European sites
Loss or alteration of habitat and/or species feature	(1) (2) (3)	Pen Llyn a'r Sarnau SAC
Pollution - of wetland features and foraging habitat for mobile species features (during construction)	(2) (3) and (5)	Pen Llyn a'r Sarnau SAC Meirionnydd Oakwoods and Bats Sites SAC Afon Eden – Cors Goch Trawsfynydd SAC
Disturbance of mobile species feature - otter, lesser horseshoe bat (during construction)	(5), (14) and (15)	Pen Llyn a'r Sarnau SAC Afon Eden – Cors Goch Trawsfynydd SAC Meirionnydd Oakwoods and Bats Sites SAC

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

3.0 SCREENING

3.1 Purpose

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

3.2 Approach

In order to complete the screening stage and identify any likely significant effects on site features, additional information is needed for each site at risk. The screening tables (Table 5, 6 and 7) below therefore collate additional information for each site, including a site description and list of qualifying features, and use this to identify any likely significant effects from the proposed works (based on the threats listed in Table 4 above) and the site features potentially affected. The site-specific information provided in these tables has been collated from the Natural Resources Wales and JNCC websites. If necessary more detailed descriptions of the sites will be provided at the Appropriate Assessment stage, including the conservation objectives, but the information in Tables 5 and 6 below is sufficient for the screening stage.

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

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

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

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

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

Potential Threats / Vulnerabilities

1) Loss of area and alteration of habitat feature:

As the proposed development would be undertaken within the SAC itself, the nature of the works would result in a direct impact on the 'Atlantic salt meadow' and 'Estuaries' features of the SAC.

The proposed works could lead to temporary changes in habitat within the working corridor during construction and for a period afterwards until the vegetation re-establishes, due to physical damage caused by works to repair sections of the bank, and from vehicle movements to gain access to the working areas. This is likely to mostly effect the 'Atlantic Salt Meadow' feature of the SAC.

The nature of the proposals involve the repair of a sluice structure within the flood bank, that has breached since 2018, but is believed to have been defective for a while before this. The repairing of the sluice structure would result in less frequent tidal inundation of habitats on the landward side of the flood bank, than what is currently occurring. This change in pattern and extent of water flow and tidal inundation could lead to a change in vegetation community of the saltmarsh habitats on the landward side of the bank. Such impacts could undermine the conservation objectives for the SAC's Atlantic Salt Meadow habitat.

Japanese Knotweed (*Fallopia japonica*), a Schedule 9 Invasive non-native plant species, is present on the north east end of the flood bank, on an area where materials have been deposited along the flood bank. No works are due to take place within this area as part of the proposals, however the works could cause this species to be inadvertently spread onto other areas within the working corridor through movement of plant and personnel on site. Japanese Knotweed is known to be fast-growing and particularly invasive, and can prevent other native species from growing if it colonises an area. If this invasive species was to spread onto adjacent SAC habitats it could undermine their conservation objectives.

Cord Grass (*Spartina Anglica*) has been recorded on site, and is considered to be an invasive non-native species of saltmarsh habitat. It is often considered to be an indicator of negative condition within saltmarsh vegetation swards and is considered to alter the dynamics of the vegetation communities to an 'un-natural' state. The presence of this species is acknowledged in the Aber Mawddach SSSI Site Management Statement (SMS), specifying a vision for cord grass to be decreasing within the site. Cord grass will spread vegetatively via rhizomes, therefore the potential for the proposed works to cause this species to spread within the site cannot be ruled out at this stage. Such a scenario could undermine the conservation objectives of the SAC.

Outcome: It is considered that the threat of loss and/or alteration of habitat features during construction and during operational phase of proposals could potentially undermine the conservation objectives of the site for 'Atlantic Salt Meadow' and 'Estuaries' habitat features, and is therefore included as a likely significant effect.

2) Pollution of wetland features and foraging habitat for mobile species:

It is possible that the machinery used for works on site could be a source of pollution, which could directly affect the intertidal estuary habitat features of the SAC. The works are located within and directly adjacent to the 'Atlantic Salt meadow', 'Salicornia and other annuals colonising mud and sand', and 'Mudflats and sandflats not covered by sea water at low tide' features of the SAC.

Therefore, there is a direct pollution risk to these features. This whole area is also part of the 'estuaries' feature of the SAC.

Otters are known to be widely distributed in the Mawddach catchment, and it is highly likely that the species are present in the vicinity of the proposed works at Farchynys. There is potential for the works to lead to temporary deterioration in water quality through increase in suspended solids from works next to the water environment, or from pollution through accidental spill from construction machinery. There is therefore, the possibility of contamination of otter foraging habitat within the protected site, and a reduction in abundance and availability of prey for otters (fish).

Outcome: It is considered that this threat could potentially undermine the conservation objectives of the site for the four habitat features and one species feature discussed above and is therefore a likely significant effect.

3) Disturbance of mobile species feature - otter:

Otters are known to be widely present in the Mawddach catchment. The Pen Llyn a'r Sarnau SAC supports a population of otters which will range within and beyond the boundaries of the SAC to feed and commute using the waterways and riparian land to feed, rest and breed. An otter resting site and otter spraints have been observed in the vicinity of the Farchynys flood bank during surveys. It is therefore likely that the area is used by otters for resting / laying-up and for foraging and commuting.

There would be some localised temporary noise pollution during the construction period. There would also be some physical disturbance of potential otter resting sites and foraging habitat through the presence of construction machinery and personnel. There is therefore a risk that foraging and resting places will be subject to disturbance during construction, potentially undermining conservation objectives for the otter feature of the Pen Llyn a'r Sarnau SAC.

Outcome: It is considered that the threat from disturbance during construction could potentially undermine the conservation objectives of the site for the otter feature and is therefore a likely significant effect.

Summary of Likely Significant Effects and Features requiring Appropriate Assessment

- Loss and/or alteration of SAC habitat features
- Pollution / degredation of SAC habitat features
- Disturbance of mobile species feature; Otter.

Table 6. Screening Assessment for the Meirionnydd Oakwoods and Bat Sites SAC.

Meirionnydd Oakwoods and Bat Sites SAC (2812.79 ha)	**UK0014789**
Qualifying features	
91A0 Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	
91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) *Priority Feature	
3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation	
4010 Northern Atlantic wet heaths with *Erica tetralix*	
4030 European dry heaths	
9180 *Tilio-Acerion* forests of slopes, screes and ravines *Priority Feature	

91D0 Bog woodland ***Priority Feature**
1303 Lesser horseshoe bat *Rhinolophus hipposideros*

Description

The Meirionnydd Oakwoods and Bat Sites SAC is made up of a series of woodlands, stretching from Dolgellau in the south to Eryri in the north. The majority of the SAC is classified as the woodland type known as "Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles", which covers approximately 84% of the SAC and is the dominant woodland type at most of the sites. A key feature of European importance is the rich Atlantic bryophyte communities that are often well developed within this Annex I type. These include numerous rare species, such as *Campylopus setifolius*, *Sematophyllum demissum*, *Adelanthus decipiens*, *Leptocyphus cuneifolius* and *Plagiochila atlantica*. Another key feature of the Meirionnydd Oakwoods and Bat Sites SAC is the lichen flora which is exceptionally rich and includes numerous rare species such as, *Micarea xanthonica*, *Parmelinopsis horrescens*, *Phyllopsora rosei*, *Micarea stipitata* and *Tyothallia biformigera*.

Frequently the oak woodland occurs as part of a mosaic of woodland types including other Annex I Habitats, "Bog woodland", "Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*" and "*Tilio-Acerion* forests of slopes, screes and ravines" which occur in small areas and are only significant at a few of the component SSSI/units. The transitions between these different woodland types are important in terms of maintaining the structure and function of the habitat type and vary across the U.K.

The heath is characterised by abundant *Calluna vulgaris*, *Ulex gallii* and *Erica cinerea* growing on thin, poor acidic soils. There are many small areas of dry heath interspersed amongst the woodland, which have not been measured, but the three largest areas of dry heath, together comprise 1% of the area of the SAC.

The feature "Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation" occurs within the Afon Glaslyn, within the Glaslyn SSSI and currently outside the SAC but within a proposed extension to the SAC.

Lesser horseshoe bats have over 20 known roosts within the SAC and forage widely within the SAC's woodlands, associated habitats and the surrounding countryside. The SAC includes maternity roost sites in various types of buildings and structures, and winter hibernation sites, especially in mines. There are other types of roost such as night, transitional, leks and swarming sites, about which very little is known.

Potential Threats / Vulnerabilities

- *Pollution of foraging habitat for lesser horseshoe bat:*

The Meirionnydd Oakwoods and Bat Sites SAC comprises a number of discrete woodlands. Together, these support an important population of lesser horseshoe bats which are known to range within and beyond the boundaries of the SAC to forage, commute and breed across the landscape. At its closest point, at Coed Farchnynys, the proposed works lies within 40m of the SAC.

The woodland habitat will provide commuting and foraging habitat for lesser horseshoe bats, however in terms of pollution to foraging habitat, it is not expected that the woodland will be affected during the works. The proposed works are small scale, but do pose a pollution threat the adjacent water environment of the estuary during the construction period. Lesser Horseshoe Bats forage in woodlands, hedgerows and trees along river banks and are rarely found over pasture or open water. Any pollution to the estuary habitat adjacent to the works is therefore unlikely to have an effect on lesser horseshoe bats, as it not considered to be optimal foraging habitat for this species.

Due to the short-term nature of the construction works posing the threat, the abundance of foraging habitat elsewhere in the area and large range of the lesser horseshoe bat, it is considered very unlikely that this impact would have a significant effect on any of the conservation objectives of this SAC feature. This is therefore scoped out and is not considered a likely significant effect.

Outcome: No likely significant effect

- *Disturbance of mobile species feature (lesser horseshoe bat):*

The closest woodland component of the SAC, at Coed Farchynys, lies approx. 40m north of the flood bank where works are proposed. Lesser horseshoe bats are known to use the mine adits at Farchynys. It is therefore considered that the woodland, along with the mine adits within it, provide important roosting, foraging and commuting habitat which could be vulnerable to disturbance due to the proximity of the proposals.

The proposed works are likely to create a temporary increase in noise levels during the course of the construction. As the works will be taking place during daylight hours there is not likely to be any effect on foraging bats, however potential impacts from noise pollution on nearby roosts cannot be ruled out and is included as a likely significant effect.

Outcome: It is considered that the threat from disturbance during construction could potentially undermine the conservation objectives of the lesser horseshoe bat species feature and is therefore a likely significant effect for this feature.

Summary of Likely Significant Effects and Features requiring Appropriate Assessment

- Disturbance of lesser horseshoe bat species feature during construction.

Table 7. Screening Assessment for the Afon Eden – Cors Goch Trawsfynydd SAC

Afon Eden – Cors Goch Trawsfynydd SAC (284.29 ha)	**UK0030075**
Qualifying features 7110 Active raised bogs ***Priority Feature** 1029 Freshwater pearl mussel *Margaritifera margaritifera* 1831 Floating water-plantain *Luronium natans* 1106 Atlantic Salmon *Salmo salar* 1355 Otter *Lutra lutra* Description The Afon Eden/River Eden is a relatively unmodified river, mainly upland in character, of approximately 10km length. The watershed begins just south of Llyn Trawsfynydd, within an area of gently sloping and poorly drained land. The upper section of the catchment is slow-flowing with a number of deep pools along its length. In the lower two-thirds of the catchment the river flows more steeply into a narrow rocky gorge, with an adjacent area of forestry plantation, known as Coed y Brenin. The Afon Eden joins with the Afon Mawddach, just above the village of Ganllwyd, but the SAC boundary continues downstream to the tidal limit of the Mawddach at Llanelltyd. The Afon Eden is fed by a number of base-poor upland streams, which flow from the eastern flanks of the Rhinog mountains. The Ardudwy leat takes the most acidic waters from the eastern tributaries to Llyn Trawsfynydd. This water is used to maximise the water available for HEP generation by the Maentwrog Power Station.	

The area receives high average rainfall, which has contributed to the development of raised bogs, blanket bog, and transition mires and quaking bogs. Two areas of raised bog occur at the top end of the catchment, close to the watershed, where they were once part of a much larger extent of bog, much of which is now flooded by Llyn Trawsfynydd. Transition mires and quaking bogs occur in waterlogged situations where they receive nutrients from the surrounding catchment as well as from rainfall. They are located within the wetlands surrounding the areas of raised bog.

The ecological structure and functions of the site are dependent on hydrological and geomorphological processes (often referred to as hydromorphological processes), the quality of riparian habitats and connectivity of habitats. Animals that are highly mobile such as migratory fish and otters, are also affected by factors operating outside the site.

The river contains the last known population of freshwater pearl mussels surviving in Wales, they are almost entirely confined to one section of the river. Historically the mussels were more widespread in the catchment. The mussels rely on salmonid parr hosting, for a short period of time, the glochidial larvae of the mussels on their gills, so the success of migratory and spawning fish in the catchment is crucial to their long-term survival. Atlantic salmon is also an important fish species that breeds in the Mawddach catchment.

In the slow-moving waters just upstream from Pont y Grible is a population of floating water plantain.

Potential Threats / Vulnerabilities

1) Pollution of supporting habitat outside SAC, impacting Atlantic salmon and otter:

The Afon Eden – Cors Goch Trawsfynydd SAC is located approximately 4.9km to the east of proposals. The SAC is connected fluvially to the proposed works via the Afon Mawddach, however the SAC is located upstream of proposals. The tidal reach of the estuary reaches as far as 500m upstream of the Mawddach / Wnion confluence, therefore does not reach as far as the Afon Eden – Cors Goch Trawsfynydd SAC. For this reason, it is not likely that any pollution impacts from the proposed works would directly effect habitat within the SAC.

Otters are known to be widely distributed in the Mawddach catchment, and given that the species can have a range of between 20 – 30km it is highly likely that otters using habitat within the SAC would also be present in the vicinity of the proposed works at Farchynys. There is potential for the works to lead to temporary deterioration in water quality through increase in suspended solids from works next to the water environment, or from pollution through accidental spill from construction machinery. There is therefore the possibility of contamination of otter foraging habitat outside of the protected site, and a reduction in abundance and availability of prey for otters (fish).

Similarly, Atlantic Salmon is a feature of the Afon Eden – Cors Goch Trawsfynydd SAC and would be vulnerable to deterioration in water quality in the Afon Mawddach caused by any potential pollution event during the course of construction. Any pollution to the Afon Mawddach caused by the works, could lead to mortality of Atlantic Salmon within the affected area, but could also act as a barrier to migrating Salmon moving up the catchment during spawning season. This could lead to a reduction in Atlantic Salmon population numbers, undermining the conservation objectives of the SAC.

Outcome: It is considered that the threat from pollution during construction could potentially undermine the conservation objectives of the site for otter and Atlantic salmon features and is therefore a **likely significant effect** for these features.

2) Disturbance of mobile species features – Otter:

The Afon Eden – Cors Goch Trawsfynydd SAC supports a population of otters which will range within and beyond the boundaries of the SAC to feed and commute using the waterways and riparian land to feed, rest and breed. Otters are known to be widely present in the Mawddach catchment. An otter resting site and otter spraints have been observed in the vicinity of the Farchynys flood bank during surveys. It is therefore likely that the area is used by otters for resting / laying up and for foraging and commuting.

There would be some localised temporary noise pollution during the construction period. There would also be some physical disturbance of potential otter resting sites and foraging habitat through the presence of construction machinery and personnel.
Foraging and resting places will be subject to disturbance during construction.

Outcome: It is considered that the threat from disturbance during construction could potentially undermine the conservation objectives of the site for the otter feature and is therefore a **likely significant effect**.

Summary of Likely Significant Effects and Features requiring Appropriate Assessment

- **Pollution of supporting habitat outside SAC: Atlantic Salmon, Otter.**
- **Disturbance of mobile species feature: Otter**

Evidence provided in Tables 5 – 7 above allows the likely significant effects to European sites to be broken down into threats to specific features of the sites identified, with some features being screened out of any further assessment. Therefore, Table 8 below summarises the results of this screening exercise, listing the European sites identified as being at risk from the proposed works, the likely significant effects and the features of each of the sites that could be affected.

Table 8. Summary of Screening Exercise

European Site	Likely Significant Effects and Features at Risk		
	Loss / alteration of habitat features	*Pollution of wetland features and foraging habitat for mobile species (during construction)*	*Disturbance of mobile species feature (during construction).*
Pen Llyn a'r Sarnau SAC	• Atlantic Salt Meadow. • Estuaries	• Atlantic Salt Meadow. • Salicornia and other annuals colonizing mud and	• Otter

		sand. • Mudflats and sandflats not covered by seawater at low tide • Estuaries • Otter	
Meirionnydd Oakwoods and Bat sites SAC			• Lesser Horseshoe Bat
Afon Eden – Cors Goch Trawsfynydd SAC		• Otter • Atlantic Salmon	• Otter

4.0 FORMAL SCREENING OPINION

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

The screening exercise concluded that likely significant effects (LSE) could not be ruled out for the Pen Llyn a'r Sarnau SAC, Meirionnydd Oakwoods and Bat Sites SAC, and Afon Eden - Cors Goch Trawsfynydd SAC due to the reasons outlined in Tables 5, 6 and 7 above and summarised in Table 8 above. Therefore, an appropriate assessment is required for these likely significant effects.

5.0 APPROPRIATE ASSESSMENT

5.1 Purpose

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

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

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

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

5.2 Approach

The screening assessment found that likely significant effects could not be ruled out for four habitat features and the otter feature of Pen Llyn a'r Sarnau SAC, the otter and Atlantic Salmon feature of the Afon Eden – Cors Goch Trawsfynydd SAC, and the lesser horseshoe bat feature of the Meirionnydd Oakwoods and Bat Sites SAC.

These issues are individually subject to further scrutiny through an appropriate assessment (Tables 9, 10, and 11 below), which considers the site's conservation objectives for the features that have been screened into the assessment (see Table 8 above). Individual effects are assessed with and without mitigation, concluding with an individual Integrity Test including an assessment of whether any residual effects remain with mitigation in place. A list of the mitigation measures proposed is included in Table 12. If no adverse effect on integrity is recorded but residual effects do remain, an in-combination assessment is likely to be required. If an adverse effect on the integrity of the site remains, the assessment would have to proceed to the derogations, or stages 3 and 4 of HRA (see Table 1 and Figure 1 in Section 1 above).

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

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

Table 9. Appropriate Assessment for Loss / Alteration of Habitat

Pen Llyn a'r Sarnau SAC (146,010.52 ha)	Features at risk Atlantic Salt Meadow Estuaries *Salicornia* and other annuals colonising mud and sand

Assessment without mitigation

As discussed in section 3 of this report, the proposed work has potential to cause damage to the Atlantic salt meadow habitat in the vicinity of the flood bank due to repair works to eroded sections of the bank and associated vehicle / plant movement. The repair of the sluice structure will also alter the current water flow regime and tidal inundation pattern which could cause long-term alteration to habitat on the landward side of the flood bank. The proposed repair works could also lead to increased inundation and erosion on the seaward side of the bank, potentially causing degradation or alteration of Atlantic salt meadow (and Estuary) habitat in this area. It is possible that this potential loss or alteration in habitat will have an adverse impact on the integrity of the site, if deemed to be significant. To assess this, the following will need to be determined;

- The characteristics of the qualifying features;
- how the ecological structure and function of the site might be affected;
- what ecological function the affected area is performing;
- and the location of the affected area both in terms of its geographic position in the designated site and in terms of its position relative to the project.

The Pen Llyn a'r Sarnau SAC supports a number of estuarine and marine habitats and species across 14,600ha, that extends from Nefyn on the north of the Llyn Peninsula, down to Clarach in Ceredigion. The working corridor along the flood bank where repairs to the bank wall and sluice structure will take place amounts to approx. 0.80ha and is comprised of saltmarsh habitat that constitutes the 'Atlantic Salt Meadow' feature of the Pen Llyn a'r Sarnau SAC and also represents a sub-feature of the broader 'estuary' feature of the SAC. (The habitat along the top of the flood bank is an upper salt-marsh community that is not included in the Atlantic Salt meadow feature definition of the SAC, therefore the saltmarsh habitat within the working corridor that falls within the Atlantic Salt Meadow feature of the SAC will be slightly less than 0.80ha. See Appendix B)

The 'estuary' feature of the Pen Llyn a'r Sarnau SAC comprises the three main bar-built estuaries situated along the Meirionnydd and Ceredigion coasts; the Glaslyn/Dwyryd estuary, the Mawddach estuary and the Dyfi estuary. Collectively they comprise about 2% of the UK's estuary resource. The estuaries of the SAC are good examples of bar-built estuaries and exhibit an unusual and specific suite of physical and chemical conditions. Estuaries are widespread throughout the Atlantic coasts of Europe, but approximately one quarter of the area of estuaries in north-western Europe occur in the UK (CCW, 2009).

The 'Atlantic salt meadow' within the SAC is located within the estuaries of the Meirionnydd and Ceredigion coasts: the Glaslyn/Dwyryd, Artro, Mawddach and Dyfi estuaries. The most extensive areas occur in the Dyfi estuary with over 380ha, whilst the greatest variety of vegetation types occurs in the Mawddach Estuary. Salt marsh within the Mawddach estuary is extensive and diverse and includes natural transitions to brackish marsh, swamp, bog and woodland. The estuary however, is defined in most areas by flood banks, which provide an unnatural boundary to the salt marsh. Pioneer and lower marsh communities dominate near the mouth of the estuary, with extensive stands of common cord grass and annual glasswort. Further upstream are common salt marsh grass and red fescue salt marsh

with sea rush dominating the upper marsh.

Of all the features within the SAC, the estuaries have probably received the greatest degree of impact and physical modification from what might be considered their natural state in the absence of human interventions. This has affected the other SAC features that are component of the estuaries (mudflats and sandflats, Atlantic Salt Meadow and *Salicornia* communities). Past and recent modifications have resulted in loss of estuary habitats, constraining the estuaries functioning and ability to evolve. (NRW, 2018).

Atlantic salt meadows develop when plants able to tolerate salty soil conditions colonise soft intertidal sediments of mud and sand in areas protected from strong wave action. The current breach in the Farchynys flood bank, along with the network of ditches on the landward side of the bank, act as typical saltmarsh creeks, which is an important element when considering the ecological structure and function of the habitat. The two prime functions of the networks of saltmarsh creeks are to transport new sediment into the saltmarsh and to drain tidal water from the marsh surface on the ebb tide. Seawater enters the tidal creeks on the flood tide, gradually filling them as the tide rises until the water spills over and floods the adjacent intertidal mudflats and saltmarsh. Following high tide slack water, the water drains back off the saltmarsh and mudflats, initially over the leading edge of the saltmarsh and then through the creeks until the entire intertidal area is exposed once more. The tide is the central feature around which intertidal mudflats and saltmarshes function, through erosion/accretion and the development and maintenance of tidal creek networks. The proposals to repair the sluice structure will prevent tidal water from entering the saltmarsh habitat on the landward side of the bank, as is currently the case. The presence of the flood bank also means that tidal inundation will only occur at the most extreme flood/tidal events when the bank is overtopped.

Saltmarshes are extremely important coastal habitats. They support specialist plant communities with very high primary productivity and provide a habitat for a wide variety of animals including birds (breeding and feeding), fish (feeding and nursery areas), small mammals, terrestrial and marine invertebrates. On the whole, saltmarsh soils are waterlogged, creating anoxic saline conditions and containing substances normally toxic to plant growth. Consequently, saltmarsh plants are characterised by adaptations to anoxia, such as air-filled spaces in the roots and rhizomes, and are tolerant of salt and phytotoxins (e.g. ferric ions and sulphides) to a varying degree. Within the saltmarsh plant community there is a halophyte element (species more or less confined to this particular kind of saline environment) and a glycophyte element (species which are widespread in inland, non-saline habitats). Their habitat tolerances largely determine which zone or zones they occur in. In tolerating saline conditions, saltmarsh plants can out-compete other terrestrial vegetation. The plant diversity typically increases higher up the marsh as more generalist species are able to colonise. Natural transitions to terrestrial and freshwater habitats are often the most diverse communities but are absent from many marshes due to flood defences. Remaining areas of such saltmarsh succession are regarded as particularly important for biodiversity conservation (NRW, 2018)

A feature of saltmarsh vegetation is the zonation of different communities with increasing elevation. The causes of zonation are connected with the gradient of changing conditions related to decreasing tidal submergence as marsh elevation increases, as well as differences in the efficacy of the tolerance mechanisms of the different species. There is therefore a correlation between the plant communities and frequency / duration of tidal inundation. In terms of the habitats present on the landward side of the flood bank at Farchynys, these comprise; mid to upper saltmarsh communities (SM18a - *Juncus maritimus* salt-marsh, *Plantago maritima* sub-community & SM16ci *Agrostis stolonifera* variant of SM16c), Reedbed (*Phragmites australis*), and semi-improved mesotrophic grassland. (See Appendix B -NVC survey plan.) Of these habitats, it is the mid to upper saltmarsh communities SM18a (*Juncus maritimus* salt-marsh, *Plantago maritima* sub-community) and SM16ci that represent the Atlantic Salt Meadow feature of the SAC. As mentioned above, there is a likelihood of the communities on the

landward side being affected by the change in tidal inundation regime. In terms of the mid-to upper saltmarsh communities that represent the Atlantic Salt marsh feature of the SAC, the area on the landward side of the flood bank, potentially affected by this change in tidal inundation regime equates to approximately 5.55ha (Based on NVC survey plan).

In terms of the seaward side of the floodbank at Farchynys, the habitat is comprised of mid to upper saltmarsh communities (SM18a - *Juncus maritimus* salt-marsh, *Plantago maritima* sub-community & SM16c *Festuca rubra* salt-marsh community *Juncetum gerardi*, *Festuca rubra-Glaux maritima* sub-community (with patches of SM6 – *Spartina anglica* salt-marsh community, *Spartinetum townsendii*)) and lower salt marsh communities (SM13a - *Puccinellia maritima* salt-marsh community *Puccinellietum maritimae*, sub-community with *Puccinellia maritima* dominant, SM13b - *Puccinellia maritima* salt-marsh community *Puccinellietum maritimae*, *Glaux maritima* sub-community
SM13d – *Plantago maritima Armeria maritima* sub-community, & SM8 – *Annual Salicornia* salt-marsh community) See Appendix B – NVC survey plan for details. These communities represent the 'Atlantic Salt Meadow' and '*Salicornia* and other annuals colonising mud and sand' (SM8) features of the SAC. In terms of potential impact on these habitats on the seaward side of the flood bank, the proposed repair works could lead to increased inundation and erosion, resulting in an alteration and potential loss of habitat. The scale of such change is difficult to predict and quantify due to the dynamic nature of the estuary environment. The NVC Survey Plan in Appendix B provides an indication of the extent of these communities on the seaward side of the bank.

Construction works can have an impact on the habitat due to a requirement for access across the marsh or works to the flood bank. Certain species that may be rarely distributed or sensitive to damage could be particularly at risk. This would be as a result of requirement for machinery access on to and along the flood bank, and undertaking necessary repairs to areas of the flood bank that are eroded and where bank height needs consolidating. This area is largely comprised of a mid to upper saltmarsh community (SM18a - *Juncus maritimus* salt-marsh*, Plantago maritima* sub-community) which is one of the communities representing the Atlantic Salt Meadow' feature of the SAC. The area where this community is present includes the strip of habitat along the sides and base of flood bank. The narrow strip of habitat along the top of the flood bank has been classed as upper marsh (SM28: *Elymus repens* salt-marsh community, *Elymetum repentis maritimum),* and is not one of the communities representing SAC Atlantic Salt Meadow habitat, although it still represents the broader Estuary feature of the SAC. (See Appendix B -NVC survey plan). The area of proposed working corridor along the flood bank is estimated to be approx. 0.80ha, therefore the saltmarsh habitat along this corridor is considered to be at risk from construction-related damage, as mentioned above.

The presence of saltmarshes is related to the supply of sediment for the accretion of the marsh surface, and saltmarsh buffers are naturally self-repairing and maintenance-free. Rates of recovery and recolonisation depend on the level of damage or disturbance and will likely be protracted where the sediment has been disturbed (Beeftink 1979). The proposed works would involve temporary changes in habitat within the working corridor during construction and for a period afterwards until vegetation re-establishes.

The invasive non-native species Japanese Knotweed (*Fallopia japonica*) and Cord Grass (*Spartina anglica*) are both present in the vicinity of the proposals. Construction related activities, such as the movement of machinery and materials, could cause these plant species to spread. Without mitigation, such activity could result in either or both of these invasive plant species colonising habitat within and adjacent to the proposals. This could result in native plant species being out-competed, changing the vegetative nature of the habitat, and having a knock on effect on the ecosystem function, such as the availability of feeding habitat, etc.

The purpose of this assessment is to consider the impact on the integrity of the SAC, with respect to the site's structure and function and its conservation objectives. In relation to the conservation

objectives for the Atlantic salt meadow habitat feature, and the broader estuary feature, the proposed works can be deemed to compromise objective (i), (ii), and (iii) as listed below. This is due to potential impacts in relation to overall distribution and extent of the habitat features, the potential impact on morphology, hydrography and sedimentology of saltmarsh creeks and pans, and the potential effects on presence, abundance, condition and diversity of species leading to degradation of habitat quality, particularly in relation to population structure and dynamics. The site's conservation objectives also refer to potential restoration and recovery of the estuary feature, particularly in relation to restoring land which should form an integral part of the estuarine ecosystem, and restoring the features and functions that have been damaged/degraded by the constraints of artificial structures such as flood banks.

Because of the existing flood bank in the location of the proposed works, the natural structure and function of this section of the estuary is already compromised. However, the defective sluice structure, followed by its breach in 2018, has allowed tidal waters to flow into the landward side of the bank. The proposed repair works would alter this tidal inundation regime and potentially lead to longterm degradation of the saltmarsh habitat on the landward and possibly seaward side of the bank. Due to the area of land involved, this would compromise the SAC's conservation objectives and can be deemed as an adverse affect on the integrity of the site.

Conclusion

The proposed works could affect the 'Atlantic Salt Meadow' feature and the broader 'Estuary' feature of the SAC, as well as possibly affecting a small area of the '*Salicornia* and other annuals colonising mud and sand' feature, due to changes in tidal inundation regime, disturbance of substrate surface, and introduction of invasive non-native species. Damage / degradation of habitat due to surface disturbance as a result of the construction activities may be temporary in nature as the vegetation might recover over time, however residual effects are likely to remain. The change in tidal inundation regime is likely to result in a long-term impact that could result in loss or alteration of the Atlantic Salt Meadow habitat and result in an adverse effect on the integrity of the SAC. Without mitigation there is a risk of invasive non-native species being introduced into SAC habitats, in contravention of the conservation objectives of the site.

Assessment with Mitigation

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

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

A range of measures will be introduced to ensure working practices minimise the risk of damage and degradation of habitats through construction-related activities and spread of invasive non-native species as a result of the proposals. These are detailed in Table 12 below, and can be summarised as follows:

- All areas of Invasive non-native species in the vicinity of the proposals to be mapped prior to construction, with infestations clearly marked and avoided by personnel and machinery

during construction.

- A bio-security risk assessment shall be implemented and adhered to during construction.
- All site personnel to be briefed with a toolbox talk on the ecological issues relevant to site, including the presence of invasive non-native species, to ensure they comply with environmental protocols.
- Access to the site to be along designated access routes only.
- A method statement shall be prepared if any areas of cord grass are likely to be encountered within the footprint of the works, with appropriate methods put in place to manage the species in line with best practice.

These measures above can be adopted to reduce the risk of adverse effect on the site during construction. However, the potential longer term effects caused by the proposals, such as the alteration of tidal inundation patterns in some areas, cannot be mitigated.

Conclusion

Mitigation measures can be implemented, during construction, to reduce the risk of habitat loss and degradation from construction-related activities and spread of invasive non-native species. However, the longer term impacts of the proposed works cannot be mitigated. The proposed works could affect the 'Atlantic Salt Meadow' feature, and the broader 'Estuary' feature of the SAC, as well as possibly affecting a small area of the '*Salicornia* and other annuals colonising mud and sand' feature, due to changes in tidal inundation regime, resulting in less frequent inundation of saltmarsh habitat on the landward side of the flood bank, and potentially increased inundation and erosion of saltmarsh habitat on the seaward side of the bank. Potential adverse effect on the integrity of the Pen Llyn a'r Sarnau SAC therefore cannot be ruled out.

Impact on Conservation Objectives – Pen Llyn a'r Sarnau SAC	
Conservation Objectives for 'Atlantic Salt Meadow', '*Salicornia* and other annuals colonising mud and sand' and 'Estuaries' To achieve favourable conservation status, all the following, subject to natural processes, need to be fulfilled and maintained in the long-term:	**Outcome**
(i) The overall distribution and extent of the habitat features within the site, and each of their main component parts is stable or increasing. For the Salicornia feature this includes – communities characterised by the species *Sarcocornia perennis.* For estuaries this includes the stability of sandy sediments in proportion to the muddy sediments. Restoration and recovery As part of this objective it should be noted that; for the estuaries feature additional land which should form an integral part of the estuarine ecosystem should be restored	Adverse effect on site integrity.
(ii) The physical, biological and chemical structure and functions necessary for the long-term maintenance and quality of the habitat are not degraded. Important elements include; - Geology - Sedimentology	Adverse effect on site integrity

- Geomorphology - Hydrography and meteorology - Water and sediment chemistry - Biological interactions. This includes a need for nutrient levels in the water column and sediments to be: - at or below existing statutory guideline concentrations - within ranges that are not potentially detrimental to the long-term maintenance of the features species populations, their abundance and range. Contaminant levels in the water column and sediments derived from human activity to be: - at or below existing statutory guideline concentrations - below levels that would potentially result in increase in contaminant concentrations within sediments or biota - below levels potentially detrimental to the long-term maintenance of the feature species populations, their abundance or range taking into account bioaccumulation and biomagnification. For Atlantic salt meadows this includes the morphology of the saltmarsh creeks and pans. <u>Restoration and recovery</u> As part of this objective it should be noted that; for the estuaries feature the structure and functions of the estuaries that have been damaged/degraded by the constraints of artificial structures such as flood banks, are restored.	
(iii) The presence, abundance, condition and diversity of typical species is such that habitat quality is not degraded. Important elements include: - species richness - population structure and dynamics - physiological heath, - reproductive capacity - recruitment, - mobility - range As part of this objective it should be noted that: - populations of typical species subject to existing commercial fisheries need to be at an abundance equal to or greater than that required to achieve maximum sustainable yield and secure in the long term - the management and control of activities or operations likely to adversely affect the habitat feature is appropriate for maintaining it in favourable condition and is secure in the longterm.	Adverse effect on site integrity

Integrity test:	Loss / Alteration of habitat: Potential loss / alteration of approx. 5.6ha of habitat from the 'Atlantic Salt Meadow' and 'Estuary' features of the SAC, with potential for further impact on these features on the seaward side of the flood bank, does contravene the conservation objectives of the site and is considered to represent an adverse effect on the integrity of the site. No mitigation is possible therefore residual effects remain.
Residual effects / In combination:	Residual effects remain due the potential loss from two features of the Pen Llyn a'r Sarnau SAC, which cannot be mitigated. However, as the proposed works would lead to an adverse effect on the integrity of the site alone, there is no need for this to be assessed in combination with other relevant projects.

Table 10. Appropriate Assessment for Pollution Impacts

Pen Llyn a'r Sarnau SAC (146,010.52 ha)	Features at risk: Atlantic Salt Meadow Salicornia and other annuals colonizing mud and sand Mudflats and sandflats not covered by seawater at low tide Estuaries Otter
Afon Eden – Cors Goch Trawsfynydd SAC (284.29 ha)	Features at risk: Otter Atlantic Salmon
Assessment without mitigation	
The Pen Llyn a'r Sarnau SAC supports a number of estuarine and marine habitats and species, and the proposed works will take place within the SAC boundary. Much of the SAC is marine but extensive intertidal areas are also included. Of the nine habitats for which the site is designated, those in closest proximity to the proposals include 'Atlantic Salt Meadow' which is present within the footprint of the works, 'Salicornia and other annuals colonizing mud and sand' and 'mudflats and sandflats not covered by seawater at low tide' which are both present adjacent to the proposals on the seaward side of the flood bank, and the broader 'estuaries' habitat which covers the whole of the Mawddach estuary area. The Pen Llyn a'r Sarnau SAC is also designated for a number of qualifying species, including its population of otters, which are known to range far and wide within and beyond the boundaries of the SAC to forage, breed, rest and commute. Whilst predominantly aquatic, they will use riparian land and rush pasture for foraging and resting and are susceptible to disturbance or changes in prey availability. Consequently, the presence and availability of resting places, food and freshwater, are key factors in the maintenance of the overall population.	

The Afon Eden – Cors Goch Trawsfynydd SAC is designated for its raised bog and blanket bog habitats along with the Afon Eden which is a relatively unmodified river, mainly upland in character. The Afon Eden, approximately 10km, flows from just south of Llyn Trawsfynydd, down toward the village of Ganllwyd where it joins with the Afon Mawddach. The SAC boundary continues downstream to the tidal limit of the Mawddach at Llanelltyd, where the Mawddach flows into the Pen Llyn a'r Sarnau SAC boundary, approx. 4.9km upstream of the proposals. The ecological structure and functions of the site are dependent on hydrological and geomorphological processes, the quality of riparian habitats and connectivity of habitats. Species that are highly mobile, such as migratory fish and otters, are also affected by factors operating outside the site.

Like the Pen Llyn a'r Sarnau SAC, Otter is also a qualifying species for the Afon Eden - Cors Goch Trawsfynydd SAC. It can be presumed, given the distances involved and the wide-ranging behaviour of the species, and the fact that the site is within the same catchment as the proposals, that otters in the vicinity of the proposals will form part of the Afon Eden – Cors Goch Trawsfynydd SAC population.
Atlantic Salmon is a qualifying species of the Afon Eden – Cors Goch Trawsfynydd SAC population, that migrate into the Mawddach catchment to spawn.

As reported in the screening stage (section 3) of this HRA, it is possible that the machinery used for the proposed works, and associated ground disturbance could be a source of pollution during construction, which could directly affect the habitat and species features discussed above. Such pollution incidents would cause localised pollution of the immediate habitat and water environment, and depending on the scale, flows and tides at the time, could spread both upstream and downstream. There is a risk therefore of pollution causing degradation of habitat features within and adjacent to the works. Likewise, it is possible that any contamination of the intertidal or riparian habitat could lead to a reduction in prey availability and prevent use of resting places for the local otter population. Similarly, there are fluvial links between the proposed works and the main channel of the Afon Mawddach, where pollution could lead to mortality of Atlantic Salmon, or act as a barrier to migrating Salmon moving up the catchment during spawning season.

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

<u>Conclusion</u>
Without mitigation, there is some risk to the Atlantic salt meadow, Salicornia, mudflats, and the broader estuaries features of the Pen Llyn a'r Sarnau SAC, and their conservation objectives could be compromised. Similarly there is a risk to the otter feature of Pen Llyn a'r Sarnau SAC and Afon Eden-Cors Goch Trawsfynydd SAC, and the Atlantic Salmon feature of the Afon Eden-Cors Goch Trawsfynydd SAC. Therefore, in the absence of any mitigation measures, adverse effects on the integrity of the Pen Llyn a'r Sarnau SAC and the Afon Eden-Cors Goch Trawsfynydd SAC cannot be ruled out.

Assessment with Mitigation

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

Each of the mitigation measures is considered to cover the criteria identified in the DTA HRA Handbook, namely effectiveness, reliability, timeliness, deliverability, enforcibility and likelihood they will be maintained and persist for however long is necessary.

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

This HRA does not make any distinction between embedded elements of the design that may provide ecological benefits that are secondary to their primary purpose and the bespoke measures specifically designed to avoid, cancel or reduce the impact of the development on site features.

Application of mitigation measures:
Mitigation measures are included in full in Table 12 below, but those involved with reducing or avoiding the potential impact from pollution can be summarised as follows:

- A range of measures will be introduced to ensure working practices and good environmental site management are secured, minimising the risk of pollution or other incidents. These would include the adoption of best practice guidelines including GPP and CIRIA guidance, particularly GPP 5: Works and maintenance in or near water for construction or maintenance works near, in or over water. The mechanism for ensuring the delivery of these would be via a Construction Environmental Management Plan (CEMP) and associated Method Statements for the works, to be agreed in advance with the Authority and NRW where necessary, beforehand. Typical examples would comprise ensuring the use of spill kits andrefuelling in designated areas away from the intertidal area and ensuring an Emergency Pollution Response Plan is put in place;
- Access to the site would be via two designated tracks only, through Tyddyn Du campsite and along the eastern side of Farchynys woods, to minimise disruption to the intertidal area.
- All works would be supervised by an Environmental Manager or Environmental Clerk of Works, as appropriate;
- Site personnel would follow good practice guidelines and be briefed with a toolbox talk on the ecological issues relevant to the site to ensure they comply with environmental protocols;
- No works to be completed at high tide when the adjacent intertidal mudflats and sandflats are inundated with sea water, with no working within or adjacent to (within 10m of) the intertidal area 1.5 hours either side of high tide.

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

Impact on Conservation Objectives – Pen Llyn a'r Sarnau SAC	
Conservation Objectives for 'Atlantic Salt Meadow', 'Salicornia and other annuals colonizing mud and sand', 'Mudflats and sandflats not covered by seawater at low tide', and 'Estuaries'	**Outcome**

To achieve favourable conservation status, all the following, subject to natural processes, need to be fulfilled and maintained in the long-term:	
(i) The overall distribution and extent of the habitat features within the site, and each of their main component parts is stable or increasing. For the intertidal mudflat and sandflat feature these include: - Mya arenaria and polychaetes in muddy gravel - Eel grass Zostera marina beds - Muddy gullies in the Mawddach estuary. For the Salicornia feature this includes: - Communities characterised by the species *Sarcocornia perennis* For the intertidal mudflats and sandflats and sandbanks features this requires an overall stability or increase in the amount of the feature, taking into account the areas of long-term stability and localised losses and additions arising from environmental processes. For estuaries this includes the stability of sandy sediments in proportion to the muddy sediments. <u>Restoration and recovery</u> As part of this objective it should be noted that; for the estuaries feature additional land which should form an integral part of the estuarine ecosystem should be restored	No adverse effect on integrity; No residual effects
(ii) The physical, biological and chemical structure and functions necessary for the long-term maintenance and quality of the habitat are not degraded. Important elements include; - Geology - Sedimentology - Geomorphology - Hydrography and meteorology - Water and sediment chemistry - Biological interactions. This includes a need for nutrient levels in the water column and sediments to be: - at or below existing statutory guideline concentrations - within ranges that are not potentially detrimental to the longterm maintenance of the feature's species populations, their abundance and range. Contaminant levels in the water column and sediments derived from human activity to be: - at or below existing statutory guideline concentrations - below levels that would potentially result in increase in contaminant concentrations within sediments or biota - below levels potentially detrimental to the long-term maintenance of the feature's species populations, their abundance or range taking into account bioaccumulation and biomagnification.	No adverse effect on integrity; No residual effects

For Atlantic salt meadows this includes the morphology of the saltmarsh creeks and pans. <u>Restoration and recovery</u> As part of this objective it should be noted that; for the estuaries feature the structure and functions of the estuaries that have been damaged/degraded by the constraints of artificial structures such as flood banks, are restored.	
(iii) The presence, abundance, condition and diversity of typical species is such that habitat quality is not degraded. Important elements include: - species richness - population structure and dynamics - physiological heath, - reproductive capacity - recruitment, - mobility - range As part of this objective it should be noted that: - populations of typical species subject to existing commercial fisheries need to be at an abundance equal to or greater than that required to achieve maximum sustainable yield and secure in the long term - the management and control of activities or operations likely to adversely affect the habitat feature is appropriate for maintaining it in favourable condition and is secure in the long term.	No adverse effect on integrity; No residual effects
Conservation Objectives for 'Otter' To achieve favourable conservation status, all the following, subject to natural processes, need to be fulfilled and maintained in the long-term:	**Outcome**
(i) The population is maintaining itself on a long-term basis as a viable component of its natural habitat. Important elements include: • population size • structure, production • condition of the species within the site.	No adverse effect on integrity; No residual effects
(ii) The species population within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future.	No adverse effect on integrity; No residual effects
(iii) The presence, abundance, condition and diversity of habitats and	No adverse effect on

species required to support this species is such that the distribution, abundance and populations dynamics of the species within the site and population beyond the site is stable or increasing. Important considerations include; • distribution • extent • structure • function and quality of habitat • prey availability and quality. As part of this objective it should be noted that; • The abundance of prey species subject to existing commercial fisheries needs to be equal to or greater than that required to achieve maximum sustainable yield and secure in the long term. • The management and control of activities or operations likely to adversely affect the species feature is appropriate for maintaining it in favourable condition and is secure in the long term. • Contamination of potential prey species should be below concentrations potentially harmful to their physiological health. • Disturbance by human activity is below levels that suppress reproductive success, physiological health or long-term behaviour • There are sufficient sources within the SAC and beyond of high-quality freshwater for drinking and bathing.	integrity; No residual effects
(iv) Populations should be increasing.	No adverse effect on integrity; No residual effects

Impact on Conservation Objectives – Afon Eden - Cors Goch Trawsfynydd SAC	
Conservation Objectives for '*Atlantic Salmon*' The vision for this feature is for it to be in favourable conservation status, where all the following conditions are satisfied:	**Outcome**
(i) The Atlantic salmon population must be viable throughout its distribution in the river and maintaining itself on a long-term basis.	No adverse effect on integrity; No residual effects
(ii) There will be no contraction of the number or age range of the salmon population.	No adverse effect on integrity; No residual effects
(iii) There will be sufficient habitat to support a viable population.	No adverse effect on integrity; No residual effects

(iv)	All factors affecting the achievement of these conditions are under control.	No adverse effect on integrity; No residual effects
Conservation Objectives for '*Otter*'		Outcome
(i)	The population of otters in the SAC is stable or increasing over the long term and reflects the natural carrying capacity of the habitat within the SAC, as determined by natural levels of prey abundance and associated territorial behaviour.	No adverse effect on integrity; No residual effects
(ii)	The natural range of otters in the SAC is neither being reduced nor is likely to be reduced for the foreseeable future. The natural range is taken to mean those reaches that are potentially suitable to form part of a breeding territory and/or provide routes between breeding territories. A number of potential and breeding sites have been identified (Lyles, 2006) in the upper reaches of the Afon Eden. The size of breeding territories may vary depending on prey abundance.	No adverse effect on integrity; No residual effects
(iii)	The population size should not be limited by the availability of suitable undisturbed breeding sites. Where these are insufficient they should be created through habitat enhancement and where necessary the provision of artificial holts. No otter breeding site is subject to a level of disturbance that could have an adverse effect on breeding success. Where necessary, potentially harmful levels of disturbance are managed. Survey information shows that otters are widely distributed in the Mawddach catchment.	No adverse effect on integrity; No residual effects
(iv)	The safe movement and dispersal of individuals around the SAC is facilitated by the provision, where necessary, of suitable riparian habitat, and underpasses, ledges, fencing etc at road bridges and other artificial barriers.	No adverse effect on integrity; No residual effects
(v)	All factors affecting the achievement of these conditions are under control.	No adverse effect on integrity; No residual effects

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

Table 11. Appropriate Assessment for Disturbance Impacts

Pen Llyn a'r Sarnau SAC (146,010.52 ha)	Features at risk Otter
Afon Eden – Cors Goch Trawsfynydd SAC (284.29 ha)	Features at risk Otter
Meirionnydd Oakwoods and Bat Sites SAC (2812.79 ha)	Features at risk Lesser Horseshoe Bats (*Rhinolophus hipposideros*)

Assessment without mitigation

This part of the appropriate assessment considers the effect of disturbance on some of the species qualifying features of the Pen Llyn a'r Sarnau SAC, Afon Eden - Cors Goch Trawsfynydd SAC, and Meirionnydd Oakwoods and Bat sites SAC.

As reported in Table 10 above, otters are a mobile species feature of the Pen Llyn a'r Sarnau SAC and the Afon Eden – Cors Goch Trawsfynydd SAC. Both sites are within the Mawddach river catchment, and given the wide-ranging behaviour of the species, it is presumed that otters within the vicinity of the proposals will form part of the populations of both sites.

Otters are listed on Annex II of the Habitats Directive and so merit the designation of SACs in their own right. In addition, they are listed on Annex IV which requires their 'strict protection'. Perhaps partly as a consequence of this but more probably because of a marked improvement in water quality and reduction in persecution in many catchments, otters are now increasing in range and numbers across Great Britain after decades of decline especially in the latter half of the 20th Century. This pattern is repeated in Wales and they are widely distributed throughout Gwynedd; reflecting this expansion in numbers and range, the conservation status of otters in the UK is considered to be 'Favourable'.

The area within and adjacent to the footprint of the proposed works provides suitable foraging and resting habitat for otters. An otter resting site along with otter spraints were identified along the flood bank during a site survey in 2020, and historic records also indicate that otters are active in the area.

The works could potentially result in a loss of one resting place due to repair works required to the flood bank. The loss of resting places can have considerable effects on otters potentially removing places for feeding, grooming and other activities. The loss of this resting place could therefore conflict with the conservation objectives for both SAC's, although the lack of any food remains suggest it is at best infrequently used, and otters will utilise a number of such sites throughout their territories.

Otters are vulnerable to disturbance, especially the movement of people, and both light and noise. They are typically nocturnal and although they will commute through urbanised areas (even occasionally in daytime), they will rarely engage in foraging and other typical behaviours when people are present. The proposed works will involve disturbance in the form of workforce presence, machinery and noise during the construction period only.

There is therefore a risk that otters could be subject to disturbance during the construction period, in the absence of mitigation measures. This could undermine the conservation objectives for both the Pen Llyn a'r Sarnau SAC and the Afon Eden – Cors Goch Trawsfynydd SAC and have adverse effects on the integrity of the sites.

The Meirionnydd Oakwoods and Bat Sites SAC comprises a number of discrete woodlands. Together, these support an important population of lesser horseshoe bats which are known to range within and beyond the boundaries of the SAC to forage, commute and breed across the landscape.

The closest woodland component of the SAC, at Coed Farchynys, lies approx. 40m north of the flood bank where works are proposed. Lesser horseshoe bats are known to use the mine adits at Farchynys. It is therefore considered that the woodland, along with the mine adits within it, provide important roosting, foraging and commuting habitat which could be vulnerable to disturbance due to the proximity of the proposals.

Lesser horseshoe bats are listed on Annex II of the Habitats Directive and so merit the designation of SACs in their own right. In addition, they are listed on Annex IV which requires their 'strict protection'. Yet, across Europe, this species has suffered prolonged declines, especially in the north of its range, and the UK now supports one of its largest national populations. (JNCC, 2013). Wales remains a stronghold for the species (they are relatively widespread in Gwynedd, for example) with Snowdonia considered by some to support 25% of the UK population. Despite this, they are nationally rare in the UK, making the population of the Meirionnydd Oakwoods and Bat Sites SAC one of considerable importance. The conservation status of the population of the SAC is also considered to be 'Favourable'.

Originally, the species roosted in caves but it now frequently makes use of buildings, and individuals will use a variety of roosts throughout the year and rely on a series of satellite, transitional and night roosts along with winter hibernation sites; night roosts are often situated near favoured feeding areas to minimise flight times. The lesser horseshoe bat is not regarded as a strong flier, typically found within 2.5km of its summer roosts and rarely flies above 5m from the ground, tending to follow established commuting routes to foraging grounds; lesser horseshoes will rarely cross open ground (Schofield, 2008).

The proposed works are likely to create an increase in noise levels during the course of the construction. This noise associated with the construction works will be temporary in nature. Lesser horseshoe bats are sensitive to noise and light which can disturb their echolocation, flight and other behaviour and so compromise their ability to commute, catch prey and interact with each other. Consequently, the typical range of construction activities such as lighting, noise, vibration and more, could result in a range of environmental barriers throughout the construction period. As the works will be taking place during daylight hours there is not likely to be any effect on foraging bats, however potential impacts from noise pollution on nearby roosts cannot be ruled out.

The timing of the proposed works is currently unknown. Disturbance could occur at all times of year and would not be limited to the warmer spring to autumn period when bats are more active. Hibernating bats could be disturbed by excessive noise and vibration nearby, and the disturbance of maternity roosts during the breeding season could have severe effects on mothers and their young. Noise disturbance of lesser horseshoe bat roosts through noise pollution during construction could potentially undermine Conservation Objective (ii) (listed below) of the lesser horseshoe bat feature of the SAC.

The potential roosts at Farchynys adits are likely to be occupied by hibernating bats over the winter months. According to Cofnod records, the nearest roost record within Farchynys woods lies approx. 200m west of the flood bank. Due to the distance between the roost and proposed works, and the amount of vegetation providing screening between the two locations, significant effects due to noise disturbance are not expected. There is therefore only a limited potential for impact through noise pollution on the conservation status of the SAC's lesser horseshoe bat population. Any impact would be minor as it would only affect a small proportion of the population supported by the SAC, and would be temporary in nature.

Conclusion

Therefore, in the absence of any mitigation measures, adverse effects on the integrity of the Pen Llyn a'r Sarnau SAC and the Afon Eden – Cors Goch Trawsfynydd site cannot be ruled out due to the risk of disturbance of otter. Without mitigation, the risk of disturbance of the lesser horseshoe bat population of the Meirionnydd Oakwoods and Bat sites SAC during the construction period is not considered to represent a significant adverse effect on the integrity of the SAC, although residual effects remain.

Assessment with Mitigation

Each of the mitigation measures is considered to cover the criteria identified in the DTA HRA Handbook, namely effectiveness, reliability, timeliness, deliverability, enforcibility and likelihood they will be maintained and persist for however long is necessary.

Application of mitigation measures:

Mitigation measures are included in full in Table 12 below, but those involved with reducing or avoiding the potential impact from disturbance can be summarised as follows:

- Works to take place during daylight hours only. No artificial lighting to be used.
- Pre-construction check for otters to be undertaken by a suitably qualified ecologist.
- Relevant works to be completed under the terms of an otter licence from NRW.
- Any open excavations to be covered at night, or an egress provided to prevent animals becoming trapped.
- No equipment or materials to be stored in the watercourse overnight or during any time when works are not taking place, including removal of any physical barriers along water's edge between dusk and dawn during construction.
- Provision of artificial otter holt (should identified resting site require removal).
- Works should not take place between June – August inclusive, to avoid the period when female lesser horseshoe bats have dependant young and are therefore more vulnerable to disturbance.
- Measures to control noise should be implemented throughout construction in accordance with 'BS5228:2009 *Noise and Vibration Control on Construction and Open Sites'.*

Conclusion

With the benefits of these mitigation measures in place, conflicts with the conservation objectives of the Pen Llyn a'r Sarnau SAC and Afon Eden – Cors Goch Trawsfynydd SAC and adverse effects on the integrity of the sites due to disturbance, can be ruled out.

Accordingly, with these mitigation measures in place it is considered that the risk is reduced to the extent that there would be no adverse effect on the integrity of the Meirionnydd Oakwoods and Bat Sites SAC, with no residual effects on any of the Conservation Objectives of the features of the site.

Impact on Conservation Objectives – Pen Llyn a'r Sarnau SAC	
Conservation Objectives for 'Otter' To achieve favourable conservation status, all the following, subject to natural processes, need to be fulfilled and maintained in the long-term:	**Outcome**

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

Impact on Conservation Objectives – Afon Eden - Cors Goch Trawsfynydd SAC	
Conservation Objectives for '*Otter*'	Outcome

(vi)	The population of otters in the SAC is stable or increasing over the long term and reflects the natural carrying capacity of the habitat within the SAC, as determined by natural levels of prey abundance and associated territorial behaviour.	No adverse effect on integrity; No residual effects
(vii)	The natural range of otters in the SAC is neither being reduced nor is likely to be reduced for the foreseeable future. The natural range is taken to mean those reaches that are potentially suitable to form part of a breeding territory and/or provide routes between breeding territories. A number of potential and breeding sites have been identified (Lyles, 2006) in the upper reaches of the Afon Eden. The size of breeding territories may vary depending on prey abundance.	No adverse effect on integrity; No residual effects
(viii)	The population size should not be limited by the availability of suitable undisturbed breeding sites. Where these are insufficient they should be created through habitat enhancement and where necessary the provision of artificial holts. No otter breeding site is subject to a level of disturbance that could have an adverse effect on breeding success. Where necessary, potentially harmful levels of disturbance are managed. Survey information shows that otters are widely distributed in the Mawddach catchment.	No adverse effect on integrity; No residual effects
(ix)	The safe movement and dispersal of individuals around the SAC is facilitated by the provision, where necessary, of suitable riparian habitat, and underpasses, ledges, fencing etc at road bridges and other artificial barriers.	No adverse effect on integrity; No residual effects
(x)	All factors affecting the achievement of these conditions are under control.	No adverse effect on integrity; No residual effects

Impact on Conservation Objectives – Meirionnydd Oakwoods and Bat Sites SAC		
Conservation Objectives for 'Lesser Horseshoe bats (*Rhinolophus hipposideros)*' The vision for this feature is for it to be in favourable conservation status, where all the following conditions are satisfied:		**Outcome**
(i)	The population of lesser horseshoe bats should be maintained at its current size and encouraged where possible to increase.	No adverse effect on integrity; No residual effects
(ii)	There are sufficient breeding roosts (buildings, structures and trees) and hibernation roosts (mines and buildings) of appropriate quality. The other types of roost such as night, transitional, leks and swarming sites, should also be maintained as our knowledge of these often significant roosts improves.	No adverse effect on integrity; No residual effects
(iii)	Foraging or feeding habitat in the SAC and surrounding countryside, including grasslands and some gardens, is of appropriate quality, extent and connectivity across the range.	No adverse effect on integrity; No residual effects
(iv)	The range of the population within the SAC/Gwynedd is stable or increasing.	No adverse effect on integrity; No residual

		effects
(v)	All factors affecting the achievement of these conditions are under control.	No adverse effect on integrity; No residual effects

Integrity test:	Disturbance Impacts: In terms of the effect of disturbance on the otter feature of the Pen Llyn a'r Sarnau and Afon Eden – Cors Goch Trawsfynydd SAC, the mitigation proposed would rule out any adverse impact on these species, with no residual effect. In terms of the effect of disturbance on the lesser horseshoe bat population of the Meirionnydd Oakwoods and Bat sites SAC, it is considered that the mitigation proposed rules out any adverse impacts, with no residual effect.
Residual effects / In combination:	As it is considered that the mitigation measures proposed would reduce the risk to such an extent that there would be no residual effects, there is no need to consider this impact in combination with other plans or projects.

Table 12. Mitigation Measures Proposed to Reduce or Avoid Impacts on European Sites

Mitigation Proposed	Impact Reduced/Avoided	European Site Affected	Site Features Affected
• All areas of Invasive non-native species in the vicinity of the proposals to be mapped prior to construction, with infestations clearly marked and avoided by personnel and machinery during construction. • A bio-security risk assessment shall be implemented and adhered to during construction. • All site personnel to be briefed with a toolbox talk on the ecological issues relevant to site, including the presence of invasive non-native species, to ensure they comply with environmental protocols. • Access to the site to be along designated access routes only. • A method statement shall be prepared if any areas of cord grass are likely to be encountered within the footprint of the works, with appropriate methods put in place to manage the species in line with best practice.	Loss / alteration of habitat	Pen Llyn a'r Sarnau SAC	Atlantic Salt Meadow Estuaries Otter
• Contractor to adhere to best practice guidelines, in line with GPP5 'Works and maintenance in or near water'. • No storage of materials or equipment within intertidal area or within riparian habitat. Materials stored on site shall be located more than 10m away from watercourses at all times. • Pollution spill kits to be readily available on site at all times, with staff suitably trained in how to deploy. • Contractor to have emergency incident response procedure in place in the case of a spillage. • All works required within water channel to take place from bank where possible, to keep in-river works to absolute minimum. • Should watercourse become discoloured works will cease until the water becomes clear again. • Works will cease should river/water levels rise.	Pollution of wetland environment and foraging habitat.	Pen Llyn a'r Sarnau SAC Afon Eden – Cors Goch Trawsfynydd	Atlantic Salt Meadow Salicornia and other annuals colonizing mud and sand Mudflats and sandflats not covered by seawater at low tide Estuaries Otter Otter Atlantic Salmon

• No works to be completed at high tide when the adjacent intertidal mudflats and sandflats are inundated with sea water, with no working within or adjacent to (within 10m of) the intertidal area 1.5 hours either side of high tide. • No in-river works will take place within the main channel of the Afon Mawddach through the estuary. • Access to site will be via the access road through the campsite, or along the track through the woodland, and will be limited to designated access routes along the flood bank, to minimise disruption to the intertidal area. • All works would be supervised by an Environmental Manager or Environmental Clerk of Works, as appropriate. • Site personnel would follow good practice guidelines and be briefed with a toolbox talk on the ecological issues relevant to the site to ensure they comply with environmental protocols; • Works to take place during daylight hours only. No artificial lighting to be used.		SAC	
• Pre-construction check for otters to take place by a suitably qualified / experienced ecologist. • Relevant works to be completed under the terms of an otter licence from NRW. • Provision of artificial otter holt (should identified resting site require removal) • Works to take place during daylight hours only. No artificial lighting to be used. • Any open excavations to be covered at night, or an egress provided to allow mammals to escape. • No equipment or materials to be stored in the watercourse overnight or during any time when works are not taking place. • Removal of any physical barriers along water's edge / watercourses between dusk and dawn during construction. • Works should not take place between June – August inclusive, to avoid period when female lesser horseshoe bats have dependant young and are therefore more vulnerable to disturbance. • Measures to control noise should be implemented throughout construction in accordance with	Disturbance of mobile species:	Pen Llyn a'r Sarnau SAC Afon Eden – Cors Goch Trawsfynydd SAC Meirionnydd oakwoods and bat sites SAC	Otter Otter Lesser horseshoe bat

'BS5228:2009 *Noise and Vibration Control on Construction and Open Sites'*			

6.0 IN-COMBINATION ASSESSMENT

6.1 Purpose

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

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

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

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

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

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

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

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

As this HRA concluded that the level of risk associated with each of the identified likely significant effects merited appropriate assessment *alone*, there were *no residual effects* and no need for an in-combination assessment. Furthermore, it found that the outcome of the Appropriate Assessment stage was no adverse effect on site integrity with 'no residual effects' for most of the impacts identified but concluded 'Adverse effect' for the loss or degradation of habitat features of the Pen Llyn a'r Sarnau SAC. As this latter conclusion implies that the project would have an adverse effect 'alone' in this respect, there is no need to assess this impact in-combination with other plans or projects. Therefore, there is no need to carry out an in-combination assessment of these potential impacts. The individual Integrity Tests for each issue evaluated in the appropriate assessment therefore stand with no need for further scrutiny and can be carried forward into the Formal Integrity Test in Section 7.

7.0 FORMAL INTEGRITY TEST / CONCLUSION

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

In terms of potential loss / alteration of habitat features of the Pen Llyn a'r Sarnau SAC, it was considered that there could be an adverse effect on the integrity of the site due to the proposed works.

In terms of potential pollution of the immediate habitat and adjacent watercourse / wetland features during construction, leading to degradation of habitat and species features of Pen Llyn a'r Sarnau SAC and species features of the Afon Eden - Cors Goch Trawsfynydd SAC, it was considered that with mitigation in place, there would be no adverse effect on the integrity of these two sites, with no residual effect.

In terms of potential disturbance of otter, a mobile species feature of Pen Llyn a'r Sarnau SAC and Afon Eden - Cors Goch Trawsfynydd SAC, along with potential disturbance of the lesser horseshoe bat feature of the Meirionnydd Oakwoods and Bat Sites SAC, it was considered that with mitigation in place, there would be no adverse effect on the integrity of these sites, with no residual effect.

To conclude, following Appropriate Assessment this HRA found that adverse effects on the integrity of the Pen Llyn a'r Sarnau SAC could not be avoided. In line with HRA process, as outlined in section 1 of this report, as adverse effects cannot be ruled out, the assessment should progress to stages three and four and specific derogations may be sought. These determine whether alternative solutions exist and if not, whether imperative reasons of overriding public interest apply and if so, whether compensation is feasible.

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

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APPENDICES

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

Types of project (or potential effect)	Sites to scan for and check	Initial list of potentially affected sites	Additional context	Final list of European sites potentially at risk
(1)All projects (terrestrial, marine, coastal)	Sites within which the project is wholly or partially located	Pen Llyn a'r Sarnau SAC.	This criterion identifies all the European sites within the footprint of the scheme. The project would take place within the Pen Llyn a'r Sarnau SAC and thus would result in a direct impact to this site. Potential loss and/or damage to habitat features could occur during construction activity. Installation of repaired sluice gate is likely to alter water flow and frequency of tidal inundation of habitat on landward side of bank, which could alter these habitats over time. The Invasive non-native species Japanese Knotweed is also present on the eastern end of the flood bank, and the works could cause this species to be inadvertently spread onto other areas within the working corridor.	Pen Llyn a'r Sarnau SAC.
(2) Projects that could affect wetland features	(a) Sites upstream or downstream of the project location in the case of river or estuary sites (b) Open water, peatland, fen, marsh and other wetland sites with relevant hydrological links to the project, irrespective of distance from the project location	Pen Llyn a'r Sarnau SAC	Effects considered are those associated with the physical presence of built development and the localised effects on surface/groundwater resources and quality, resulting from changes in run-off, sedimentation, erosion, etc. The repair works to the flood bank could directly impact the inter-tidal estuary habitat of the Pen-Llyn a'r Sarnau SAC. There is also potential for the works to create adverse pollution impacts to the qualifying habitat and	Pen Llyn a'r Sarnau SAC

Types of project (or potential effect)	Sites to scan for and check	Initial list of potentially affected sites	Additional context	Final list of European sites potentially at risk
			species features of the Pen Llyn a'r Sarnau SAC during construction. Afon Eden – Cors Goch Trawsfynydd SAC is located approximately 4.9km to the east of proposals, upstream along the Afon Mawddach. The tidal reach of the estuary reaches as far as 500m upstream of the Mawddach / Wnion confluence, therefore does not reach as far as the Afon Eden – Cors Goch Trawsfynydd SAC. For this reason, it is not likely that any pollution impacts from the works will effect wetland features of the Afon Eden – Cors Goch Trawfynydd SAC. Effects can be ruled out for wetland features of the Meirionydd Oakwoods and Bat Sites SAC under this criterion as no wetland features associated with the site are likely to be affected. However, the abundance and availability of prey for lesser horseshoe bats (ie invertebrates) could be reduced and further scrutiny will be required. Effects can also be ruled out for the Cadair Idris SAC, Rhinog SAC and Morfa Dyffryn SAC given the distance of the sites from the proposed works, the size and nature of the proposed works and the lack of fluvial connectivity, meaning that the risk of their qualifying habitats and species being affected is remote.	
(3) Projects that	Sites that could be affected by	Pen Llyn a'r Sarnau SAC	Effects considered are those of a wider, more strategic	Pen Llyn a'r Sarnau

Types of project (or potential effect)	Sites to scan for and check	Initial list of potentially affected sites	Additional context	Final list of European sites potentially at risk
could affect the marine environment	changes in water quality, currents or flows; or effects on the intertidal or sub-tidal areas, or the seabed, or marine species		scale than (2) above. The repair works to the flood bank could directly impact the inter-tidal estuary habitat of the Pen-Llyn a'r Sarnau SAC, both temporarily through construction activity, and more permanently through altering the current rate of tidal inundation of areas on the landward side of the bank. There is also the potential for the proposed works to cause adverse pollution impacts on the estuary habitats of the Pen Llyn a'r Sarnau SAC. Effects can be ruled out for the North Cardigan Bay SPA given the distance of the site from the proposed works (8.7km) and the size and nature of the proposed works.	SAC
(4)Projects that could affect the coast	Sites in the same coastal 'cell', or part of the same coastal ecosystem, or where there are interrelationships with or between difference physical coastal processes	See 3 above	Effects considered are those of a wider, more strategic scale than (2) above.	See 3 above
(5) Projects that could affect mobile species	Sites whose qualifying features include mobile species which may be affected by the project irrespective of the location of the location of the project or whether the species would be	Pen Llyn a'r Sarnau SAC Meirionnydd Oakwoods and Bat Sites SAC Afon Eden – Cors Goch	This considers direct impacts of the scheme on mobile species within or outside the designated sites. Mobile species are those considered to spend part of their life-cycle on land, in water or air beyond the designated site boundary. Typically, it focuses on potential impacts on functionally-linked land and water utilised by bird,	Pen Llyn a'r Sarnau SAC Meirionnydd Oakwoods and Bat Sites SAC

Types of project (or potential effect)	Sites to scan for and check	Initial list of potentially affected sites	Additional context	Final list of European sites potentially at risk
	in or out of the site when they might be affected	Trawsfynydd SAC	mammals or fish associated with European sites. Note that 'indirect' effects on mobile species on functionally – linked land or water beyond the development site, is considered under other criteria below, such as '6. Recreational pressure', and '14. Disturbance'. Otter is a mobile species feature of both the Pen Llyn a'r Sarnau SAC and Meirionnydd Oakwoods and Bat Sites SAC. Lesser horseshoe bat is a mobile species feature of the Meirionnydd Oakwoods and Bat Sites SAC. Both of these species could utilise land within or adjacent to the area of proposed works for foraging. Atlantic Salmon is a mobile species feature of the Afon Eden – Cors Goch Trawsfynydd SAC and could be affected by any deterioration of water quality in the Afon Mawddach adjacent to the works.	Afon Eden – Cors Goch Trawsfynydd SAC
(6) Projects that could increase recreational pressure on European sites where qualifying features are sensitive to such pressures	(a)European sites within which the project would be wholly or partly located (b)Such European sites within an agreed zone of influence or other reasonable and evidence-based travel distance of the project location that may be affected by local recreational or other visitor	None	The project is not considered to increase recreational pressure on European sites. Therefore, direct effects on European sites from increased recreational pressure can be ruled out of any further consideration.	None

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

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

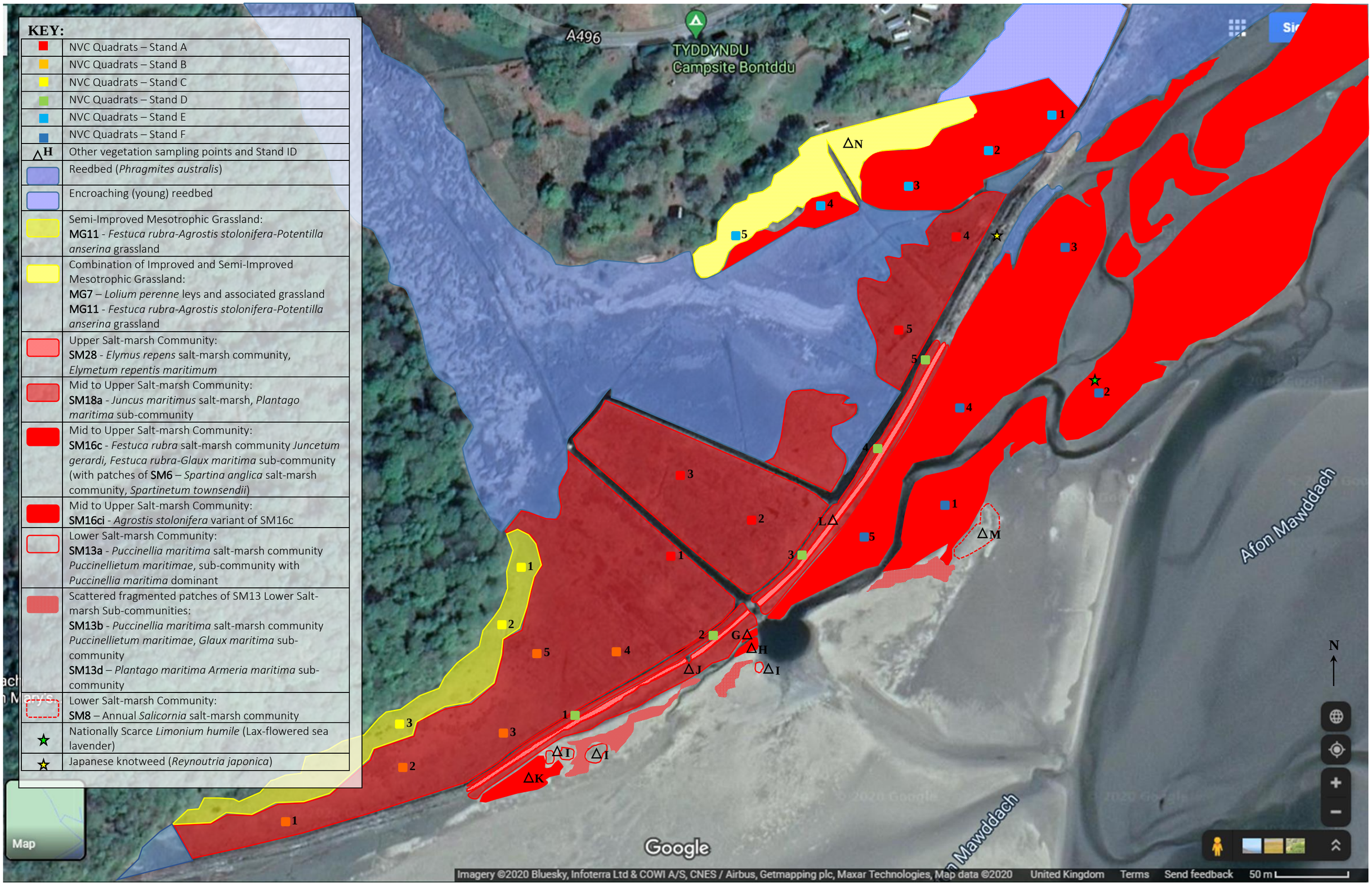
Types of project (or potential effect)	Sites to scan for and check	Initial list of potentially affected sites	Additional context	Final list of European sites potentially at risk
that could change the nature, area, extent, intensity, density, timing or scale of existing activities or uses	qualifying features potentially vulnerable or sensitive to the effects of the changes to existing activities proposed by the project		extent, intensity, density, timing or scale of existing activites or uses in a way that would pose a threat to any habitat or species features of the rotected sites.	
(11) Projects that could change the quantity, quality, timing, treatment or mitigation of emissions or discharges to air, water or soil harvested, extracted or consumed	Sites considered to have qualifying features potentially vulnerable or sensitive to the changes in emissions or discharges that could arise as a result of the project, over and above those already identified project may affect, for example as prey species or supporting habitat or which may be disturbed by the harvesting, extraction or consumption	None	The project is not considered to change the the quantity, quality, timing, treatment or mitigation of any emissions or discharges to air, water or soil harvested, extracted or consumed.	None
(12) Projects that could change the quantity, volume, timing, rate or other characteristics	Sites whose qualifying features include the biological resources which the project may affect, or whose qualifying features depend on the biological resources which the project may affect, for	None	No such activities are proposed and changes to biological resources that might affect qualifying features on all European sites listed can be ruled out of any further consideration.	None

Types of project (or potential effect)	Sites to scan for and check	Initial list of potentially affected sites	Additional context	Final list of European sites potentially at risk
of biological resources harvested, extracted or consumed	example prey species or supporting habitat which may be disturbed by the harvesting, extraction or consumption			
(13) Projects that could change the quantity, volume, timing, rate, or other characteristics of physical resources extracted or consumed	Sites whose qualifying features rely on the physical resources which the project may affect, for example, as habitat or a physical environment on which habitat may develop or which may be disturbed by the extraction or consumption	None	The proposed works would not cause changes to any physical resources extracted or consumed.	None
(14) Projects which could introduce or increase, or alter the timing, nature or location of disturbance to species	Sites whose qualifying features are considered to be potentially sensitive to disturbance, for example as a result of noise, activity or movement or the presence of disturbing features that could be brought about by the project	Afon Eden – Cors Goch Trawsfynydd SAC Pen Llyn a'r Sarnau SAC Meirionnydd Oakwoods and Bat Sites SAC.	There is a risk of disturbance to otters, a qualifying feature of the, during construction. There is also a risk of disturbance to Lesser Horseshoe Bats, a species feature of the Meirionnydd Oakwoods and Bat Sites SAC.	Afon Eden – Cors Goch Trawsfynydd SAC Pen Llyn a'r Sarnau SAC Meirionnydd Oakwoods and Bat Sites SAC.
(15) Projects which could introduce or increase or change the	Sites whose qualifying features are considered to be potentially sensitive to the effects of changes in light or noise that could be brought	Afon Eden – Cors Goch Trawsfynydd SAC Pen Llyn a'r Sarnau SAC	There would be some localised temporary noise pollution during the construction period, which could potentially cause disturbance to otters, a qualifying feature of Pen Llyn a'r Sarnau SAC and the Afon Eden – Cors Goch Trawsfynydd SAC.	Afon Eden – Cors Goch Trawsfynydd SAC Pen Llyn a'r Sarnau SAC

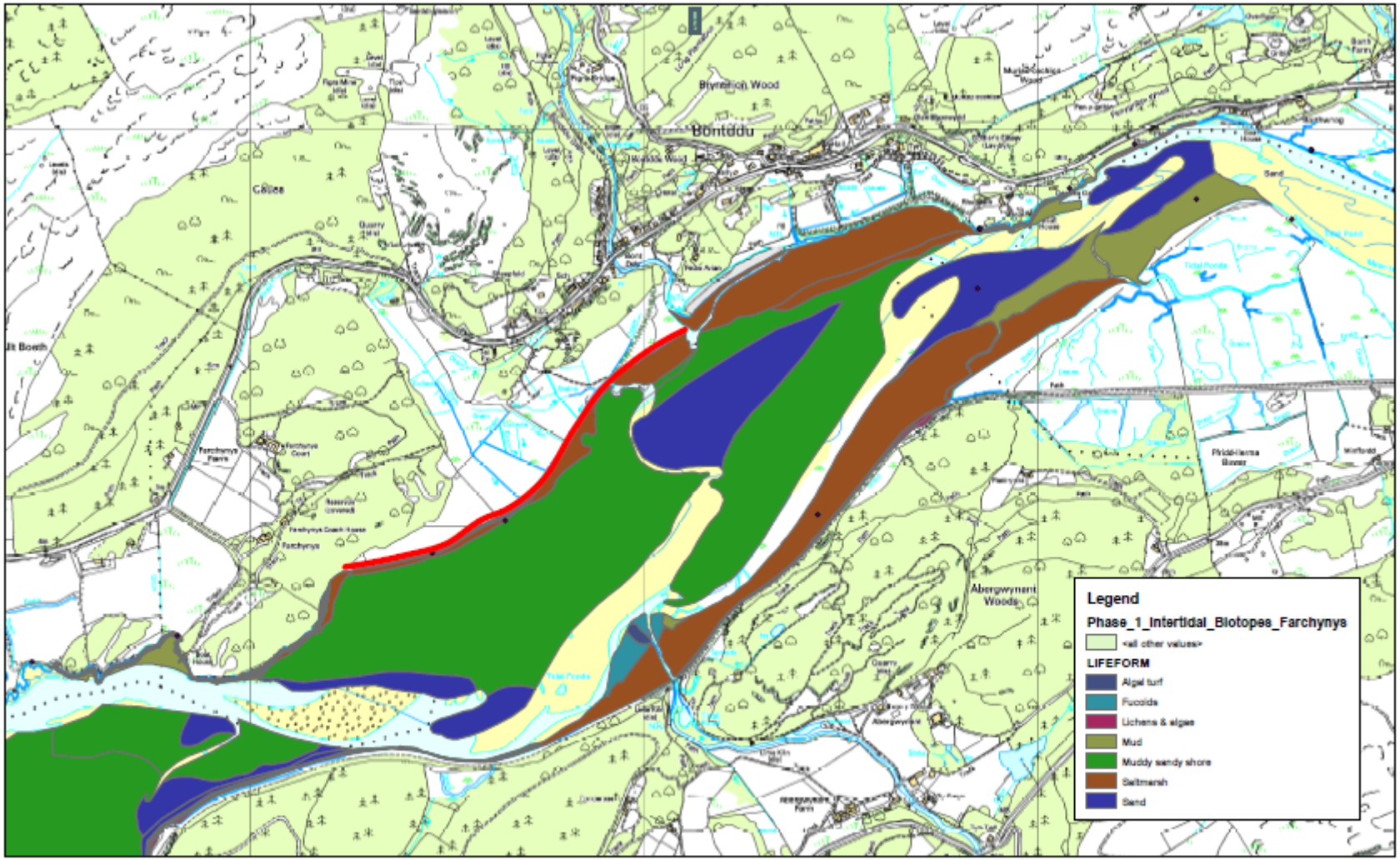
Types of project (or potential effect)	Sites to scan for and check	Initial list of potentially affected sites	Additional context	Final list of European sites potentially at risk
timing, nature or location of light or noise pollution	about by the project		There is also a risk of disturbance to Lesser Horseshoe Bats, a species feature of the Meirionnydd Oakwoods and Bat Sites SAC, that are likelty to be roosting in the area.	Meirionnydd Oakwoods and Bat Sites SAC
(16) Projects which could introduce or increase a potential cause of mortality of species	Sites whose qualifying features are considered to be potentially sensitive to the source of new or increased mortality that could be brought about by the project	None	The project would not introduce or increase a potential cause of mortality of species.	None

Appendix B: NVC Survey Results

NVC Survey Results from September 2020 for land within and outside the flood embankment at Farchynys, adjacent to Tyddyn Du campsite, Bont Ddu (Aerial photograph taken from Google Maps as referenced above, date unknown but no earlier than 2017):

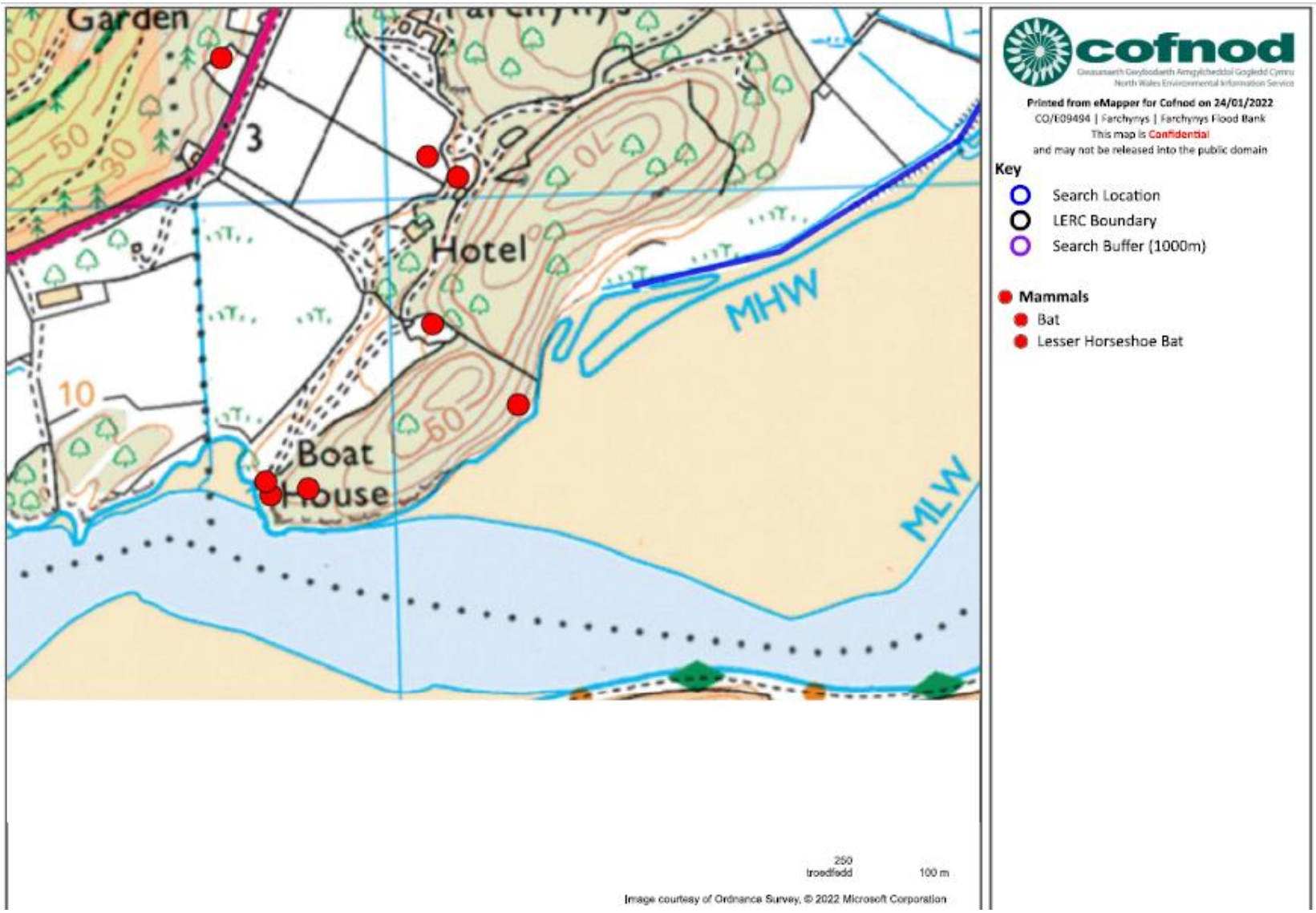

KEY:
NVC Quadrats – Stand A
NVC Quadrats – Stand B
NVC Quadrats – Stand C
NVC Quadrats – Stand D
NVC Quadrats – Stand E
NVC Quadrats – Stand F
ΔH Other vegetation sampling points and Stand ID
Reedbed (Phragmites australis)
Encroaching (young) reedbed
Semi-Improved Mesotrophic Grassland:
MG11 - Festuca rubra-Agrostis stolonifera-Potentilla anserina grassland
Combination of Improved and Semi-Improved Mesotrophic Grassland:
MG7 – Lolium perenne leys and associated grassland
MG11 - Festuca rubra-Agrostis stolonifera-Potentilla anserina grassland
Upper Salt-marsh Community:
SM28 - Elymus repens salt-marsh community, Elymetum repentis maritimum
Mid to Upper Salt-marsh Community:
SM18a - Juncus maritimus salt-marsh, Plantago maritima sub-community
Mid to Upper Salt-marsh Community:
SM16c - Festuca rubra salt-marsh community Juncetum gerardi, Festuca rubra-Glaux maritima sub-community (with patches of SM6 – Spartina anglica salt-marsh community, Spartinetum townsendii)
Mid to Upper Salt-marsh Community:
SM16ci - Agrostis stolonifera variant of SM16c
Lower Salt-marsh Community:
SM13a - Puccinellia maritima salt-marsh community Puccinellietum maritimae, sub-community with Puccinellia maritima dominant
Scattered fragmented patches of SM13 Lower Salt-marsh Sub-communities:
SM13b - Puccinellia maritima salt-marsh community Puccinellietum maritimae, Glaux maritima sub-community
SM13d – Plantago maritima Armeria maritima sub-community
Lower Salt-marsh Community:
SM8 – Annual Salicornia salt-marsh community
Nationally Scarce Limonium humile (Lax-flowered sea lavender)
Japanese knotweed (Reynoutria japonica)
A496
TYDDYNDU
Campsite Bontddu
Afon Mawddach
N
Map
Google
Imagery ©2020 Bluesky, Infoterra Ltd & COWI A/S, CNES / Airbus, Getmapping plc, Maxar Technologies, Map data ©2020
United Kingdom
Terms
Send feedback
50 m

Appendix C: Intertidal phase 1 data from NRW Lle with study area shown as red line

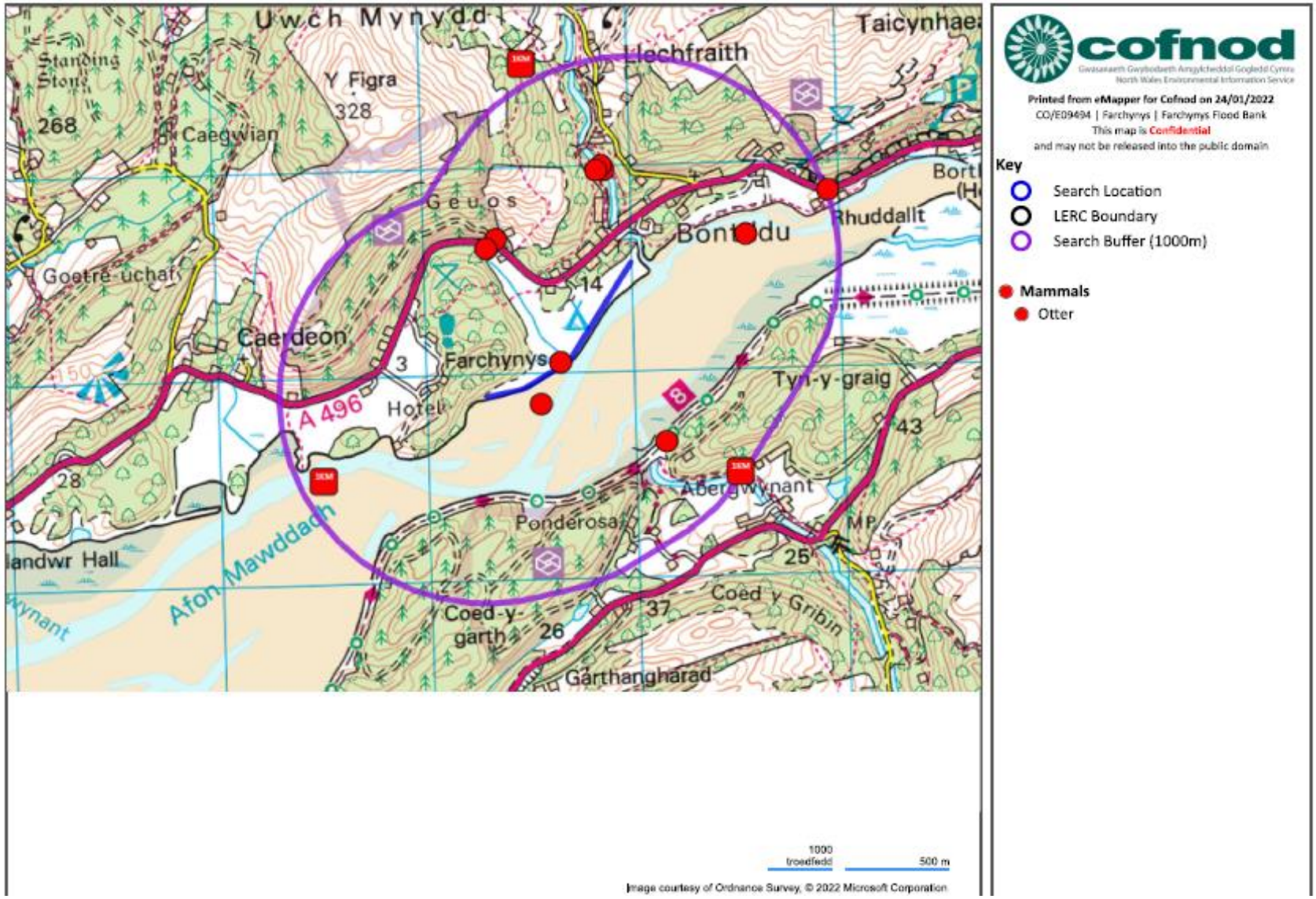


7174: Farchynys Flood Bank		Darlunwyd Gan: Drawn By: EGD	Dyddiad Darlunwyd: Date Drawn: 30/06/2020
		Gwirwyd Gan: Checked By:	Dyddiad Gwirwyd: Date Checked:
NRW Phase 1 Interdidal Biotopes		Tafien: 1 o 1 Sheet: 1 of 1	Graddfeydd: Scales: Not to scale
		Rhif Lluniad: Drawing No:	Cywi Rev

Appendix D: Cofnod Records of Lesser Horseshoe Bats and Otter



Cofnod records of Lesser Horseshoe Bats (red dots) in Farchynys woods in relation to the proposals (blue line)



Cofnod records of otter (red dots) in relation to the proposals (blue line).

Appendix E: Site Photographs (Taken May 2020)

Existing flood bank breach showing extent of vertical scour

View east towards campsite

Existing breach in the flood bank with saltmarsh and woodland in background.

Looking north - extent of saltmarsh adjacent to the breach

View north along access track with Farchynys woodland to the west