

ST. MODWEN DEVELOPMENTS LTD



ECOLOGYSOLUTIONS

Part of the ES Group

NORTH SITE RESERVOIR
COED DARCY,
LLANDARCY, NEATH

**Information to Enable a
Habitat Regulations Assessment
of the Impacts on
Crymlyn Bog SAC and Ramsar
Pursuant to Regulation 63 of
The Conservation of
Habitats & Species
Regulations 2017 (as Amended)**

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1. INTRODUCTION

1.1. Background

- 1.1.1. Ecology Solutions was commissioned by St. Modwen Developments Ltd to assess the implications of the Development Proposals on nearby designated sites of European importance, namely the Crymlyn Bog Special Area of Conservation (SAC) and Ramsar.
- 1.1.2. The findings of this assessment are set out within this 'Information for Habitats Regulations Assessment' (iHRA) document, such that the competent authority (in this instance, Neath Port Talbot County Borough Council - NPTC) has all the necessary information before them in order to carry out their duties in considering the application in line with relevant legislation, including specifically The Conservation of Habitats and Species Regulations 2017 (as Amended), hereinafter referred to as the Habitats Regulations.
- 1.1.3. The Site comprises the North Site Reservoir (NSR), a large artificial waterbody constructed during the operation of the former Llandarcy Oil Refinery. Discontinuance of the reservoir is sought and effectively requires the NSR to be permanently modified, such that it is no longer capable of impounding a volume of water above 10,000m³. The intention to achieve discontinuation of the NSR is supported, in principle, by Natural Resources Wales (NRW).
- 1.1.4. It is relevant to note the construction of the NSR was permitted under a long-term lease agreement. Throughout this lease (which remains extant), the study site has remained under the ownership of Coombe Tennant Estate. The lease includes a legal obligation for the land within the study site to be restored to historic condition, following cessation of the NSRs operational use. Restoration of the land is therefore inherently linked to discontinuation of the NSR.
- 1.1.5. Development Proposals for the Site are for "*The Proposed Development comprises a series of engineering works which will modify and discontinue the NSR in such a manner that it is no longer capable of impounding a volume of water equal or above 10,000m³. The proposals therefore seek the removal of the reservoir dam embankment which forms the western bank of the NSR waterbody*".

1.2. Purpose of this Report

- 1.2.1. This report specifically assesses the potential effects of the Development Proposals on the nearby Crymlyn Bog SAC and Ramsar, in line with the staged assessment process under Regulation 63 of the Habitat Regulations. It has been produced considering recent case law. It is submitted to ensure the competent authority has all necessary information before it when discharging its legal obligations in granting a consent (should it be minded to do so).

- 1.2.2. Within this document specific regard is had to the test under Regulation 63(1) of the Habitats Regulations. Regulation 63(1) is described and considered further in Section 2 of this document.
- 1.2.3. The proximity of the Site to the SAC and Ramsar site (as well as the underpinning Crymlyn Bog SSSI [Site of Special Scientific Interest] and Pant-y-Sais SSSI) are described in detail at Section 3 of this report and also shown on Plan ECO1.
- 1.2.4. As part of this assessment professional judgement has been applied in some instances, in order to interpret information. Ecology Solutions is a member of the Chartered Institute of Ecology and Environmental Management (CIEEM) and the Institute of Environmental Management and Assessment, and its professional ecologists are qualified to make such judgements where appropriate.
- 1.2.5. This document assesses the likely significant effects of the Development Proposals associated with the Site as a whole, both alone and in combination with other plans/projects.

1.3. **Site Characteristics**

- 1.3.1. The Site is located to the north of Llandarcy, Neath. It is located approximately 6.1km north-east of Swansea and approximately 3.1km west of Neath (as shown on Plan ECO1). It comprises of a historic reservoir, as detailed above, for use in firefighting for the former BP oil refinery.
- 1.3.2. Water levels within the NSR are understood to have been artificially managed for many decades, both as part of the operational use of the former oil refinery and since the refineries decommissioning. This management, which has remained on-going, has been in the form of pumping and discharge of water from the NSR via the consented trade effluent which outfalls to the River Neath. As of December 2021, the rates of pumping have been increased to allow the partial drawdown of the reservoir, such that water volumes remain at approximately 10,000m³, the volume required for discontinuance. This reduced volume is to be retained through pumping hereon (i.e. up until discontinuance is achieved).
- 1.3.3. As a result of this drawdown, the Site supports an area of open water measuring approx. 1.33ha, with the wider basin comprising bare, unvegetated ground. Given its artificial nature, the NSR is effectively absent of marginal and aquatic vegetation. No true aquatic vegetation was recorded following the partial drawdown of the NSR.
- 1.3.4. Boundary vegetation present along the northern, southern and eastern banks includes for secondary, scrubby boundary woodland which is anticipated to be retained. A raised grass embankment forms the west boundary of the Site and forms the current dam.
- 1.3.5. The Site is bounded to the north, east and west by an area of secondary woodland, with a thin woodland strip also forming the majority of the southern boundary. The M4 motorway is present further to the east of the

site, whilst residential development is present further to the north. The South Wales Mainline Railway is present beyond the southern and western boundary, whilst the Crymlyn Bog designated sites complex (inclusive of the SSSI, SAC and Ramsar with Crymlyn Bog and Pant Y Sais NNR) is located approx. 0.6km to the south-west at its closest point.

2. LEGISLATIVE AND PLANNING POLICY BACKGROUND

Legislation and relevant case law

- 2.1. The proximity of the Site to nearby designated sites of European importance, namely the Crymlyn Bog SAC and Ramsar, means the EC Directive on the Conservation of Natural Habitats and of Wild Flora and Fauna (Habitats Directive) is relevant in this instance. This Directive (alongside the EC Directive on Wild Birds - the Birds Directive) is transposed in UK legislation through the Habitats Regulations 2017 (as Amended).

- 2.2. The relevant Directive and UK legislation are discussed below.

Habitats and Birds Directives

- 2.3. Under the EC Directive on the Conservation of Natural Habitats and of Wild Flora and Fauna, commonly referred to as the Habitats Directive (Council Directive 92/43/EEC), Member States are required to take special measures to maintain the distribution and abundance of certain priority habitats and species (listed in Annexes I and II of the Directive).

- 2.4. In particular, each Member State is required to designate the most suitable sites as SACs. All such SACs will form part of the Natura 2000 network under Article 3(1) of the Habitats Directive.

- 2.5. Article 2(3) sets out that Member States have a duty in exercising their obligations under the Habitats Directive to:

“... take account of economic, social and cultural requirements and local characteristics.”

- 2.6. Under the EC Directive on Wild Birds (the Birds Directive) (Council Directive 2009/147/EEC, previously 79/409/EEC), Member States are required to take special measures to conserve the habitats of certain rare species of birds (listed in Annex I of the Directive) and regularly occurring migratory birds.

- 2.7. In particular, each Member State is required to classify the most suitable areas of such habitats as Special Protection Areas (SPAs). This is designed to protect wild birds, to provide sufficient diversity of habitats for all species, and maintain populations at an ecologically sound level. All Bird Directive SPAs will also be part of the Natura 2000 network under Article 3(1) of the Habitats Directive.

- 2.8. Thus, there is an obligation under the Habitats Directive and the Birds Directive for Member States to designate sites before turning to measures for their protection.

- 2.9. The protection afforded to SACs and SPAs is delivered through Article 6 of the Habitats Directive. Article 6(2) requires Member States to take appropriate steps to avoid the deterioration of natural habitats and disturbance of species for which the sites have been designated, in so far as the disturbance could be significant in relation to the objectives of the Directive. Article 6(3) and Article 6(4) require a plan or project, not directly connected with the management of the site, but likely to have a significant

effect upon it, either individually or in combination with other plans or projects, must be subject to an Appropriate Assessment of its implications on the site, in view of the site's Conservation Objectives.

- 2.10. Having undertaken an Appropriate Assessment, the competent authority may agree to a plan or project where it can be concluded it will not adversely affect the integrity of the site. In light of a negative assessment on the implications for the integrity of the site, Article 6(4) provides that the plan or project may still proceed where it can be demonstrated there are no alternatives, and there are imperative reasons of over-riding public interest as to why it must proceed. In the event a plan or project is to proceed on the basis of imperative reasons of over-riding public interest, by direction of Article 6(4), compensatory measures must be put in place to ensure the overall coherence of the Natura 2000 network is protected.

The Conservation of Habitats and Species Regulations 2017 (as Amended)

- 2.11. The Conservation of Species and Habitats Regulations 2017 (as Amended), commonly referred to as the Habitats Regulations, transpose the requirements of the Habitats Directive and the Birds Directive into UK legislation. The Habitats Regulations aim to protect a network of sites in the UK that have rare or important habitats and species, in order to safeguard biodiversity. The Habitats Regulations 2017 consolidate all the previous amendments made to the Habitats Regulations 2010.
- 2.12. Following Brexit, the Habitats Regulations have been amended by the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 ('the 2019 Amendment Regulations') to ensure the Habitats Regulations are 'fit for purpose'. A number of the changes involve transferring functions from the European Commission to the appropriate authorities in England and Wales. The basic obligations of the competent authorities have not changed.
- 2.13. As a result of the 2019 Amendment Regulations the SACs and SPAs in the UK no longer form part of the European Union's Natura ecological network. The 2019 Amendment Regulations have created a national site network ('NSN') which includes existing SACs and SPAs, and any new SACs and SPAs designated under the Regulations.
- 2.14. The NSN is subject to network objectives which are set out at Regulation 16A of the Amendment Regulations.
- 2.15. Under the Habitats Regulations, competent authorities have a duty to ensure all the activities they regulate have no adverse effect on the integrity of any of the Natura 2000 sites (e.g. SPAs and SACs). Regulation 63 of the Habitats Regulations requires:

"63(1) A competent authority, before deciding to undertake, or give any consent, permission or other authorisation for a plan or project, which:-

(a) is likely to have a significant effect on a European site or a European offshore marine site (either alone or in combination with other plans or projects) and

(b) is not directly connected with or necessary for the management of the site,

must make an appropriate assessment of the implications of the plan or project for that site in view of that site's Conservation Objectives.

63(3) The competent authority must for the purposes of the assessment consult the appropriate nature conservation body and have regard to any representations made by that body within such reasonable time as the authority specifies.

63(5) In the light of the conclusions of the assessment, and subject to regulation 64, the authority may agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the European site or the European offshore marine site (as the case may be).

63(6) In considering whether a plan or project will adversely affect the integrity of the site, the authority must have regard to the manner in which it is proposed to be carried out or to any conditions or restrictions subject to which it proposes that the consent, permission or other authorisation should be given."

- 2.16. Some key concepts of the Habitats Directive and Habitats Regulations have been clarified through case law. The most pertinent cases in relation to the Development Proposals are the *Waddenzee* Judgment, the *Sweetman* Case, the *Dilly Lane* Case, the *Exminster* Judgment and the *People over Wind* Judgment. These are discussed below.

Waddenzee Judgment

- 2.17. In the *Waddenzee* case the European Court of Justice decided an Appropriate Assessment is required for a plan or project where there is a probability or a risk that it will have a significant effect on the European site. The Judgment states (at paragraph 3(a)):

"...any plan or project not directly connected with or necessary to the management of the site is to be subject to an appropriate assessment of its implications for the site in view of the site's Conservation Objectives if it cannot be excluded, on the basis of objective information, that it will have a significant effect on that site, either individually or in combination with other plans or projects."

- 2.18. Hence, the need for an Appropriate Assessment should be determined on a precautionary basis.
- 2.19. The Judgment gives clarity that the test of 'likely significant effect' should also be undertaken in view of the European site's Conservation Objectives. It is stated at paragraph 3(b):

"where a plan or project not directly connected with or necessary to the management of a site is likely to undermine the site's

Conservation Objectives, it must be considered likely to have a significant effect on that site.”

- 2.20. Paragraph 4 of the Judgment emphasises the requirement for the Appropriate Assessment to rely on objective scientific information:

“...an appropriate assessment...implies that, prior to its approval, all the aspects of the plan or project which can, by themselves or in combination with other plans or projects, affect the site's Conservation Objectives must be identified in the light of the best scientific knowledge in the field. The competent national authorities, taking account of the appropriate assessment of the implications...for the site concerned in the light of the site's Conservation Objectives, are to authorise such an activity only if they have made certain that it will not adversely affect the integrity of that site. That is the case where no reasonable scientific doubt remains as to the absence of such effects.”

Sweetman Case

- 2.21. Further guidance in relation to the consideration of impacts in light of the Habitats Regulations is provided in the Sweetman case. The case, as set out by the Advocate General, considered in detail the test for likely significant effect in paragraphs 50 and 51:

“50. The test which that expert assessment must determine is whether the plan or project in question has ‘an adverse effect on the integrity of the site’, since that is the basis on which the competent national authorities must reach their decision. The threshold at this (the second) stage is noticeably higher than that laid down at the first stage. That is because the question (to use more simple terminology) is not ‘should we bother to check’ (the question at the first stage) but rather ‘what will happen to the site if this plan or project goes ahead; and is that consistent with “maintaining or restoring the favourable conservation status” of the habitat or species concerned’...

51. It is plan, however, that the threshold laid down at this stage of Article 6(3) may not be set too high, since the assessment must be undertaken having rigorous regard to the precautionary principle. That principle applies where there is uncertainty as to the existence or extent of risks. The competent national authorities may grant authorisation to a plan or project only if they are convinced that it will not adversely affect the integrity of the site concerned. If doubt remains as to the absence of adverse effects, they must refuse authorisation.”

- 2.22. The Court of Justice of the European Union (CJEU) agreed with the Advocate General's conclusions, and held:

“40. Authorisation for a plan or project, as referred to in Article 6(3) of the Habitats Directive, may therefore be given only on condition that the competent authorities – once all aspects of the plan or project have been identified which can, by themselves or in combination with other plans or projects, affect the Conservation Objectives of the site

concerned, and in the light of the best scientific knowledge in the field – are certain that the plan or project will not have lasting adverse effects on the integrity of that site. That is so where no reasonable scientific doubt remains as to the absence of such effects.”

- 2.23. Hence, a plan or project may be authorised only if no reasonable scientific doubt remains as to the absence of effects. Reasonable scientific doubt will exist if the evidence is not sufficiently conclusive, or if there are gaps in the information.

Dilly Lane Case

- 2.24. The Secretary of State's decision to allow an appeal in relation to applications for a total of 170 new homes on a greenfield site off Dilly Lane, Hartley Wintney was challenged in the High Court by Hart District Council. The legal challenge was made on the grounds the Secretary of State had erred in departing from her Inspector's conclusions as to the effects on the Thames Basin Heaths SPA.
- 2.25. A key issue for the case was whether mitigation measures should be disregarded when assessing whether the project would have a significant effect on the SPA. Mr Justice Sullivan (subsequently Lord Justice Sullivan) ruled in favour of the Secretary of State after concluding there was no absolute legal rule that mitigation measures should be disregarded during the first stage – 'the likely significant test':

“55. The competent authority is not considering the likely effect of some hypothetical project in the abstract. The exercise is a practical one which requires the competent authority to consider the likely effect of the particular project for which permission is being sought. If certain features (to use a neutral term) have been incorporated into that project, there is no sensible reason why those features should be ignored at the initial, screening, stage merely because they have been incorporated into the project in order to avoid, or mitigate, any likely effect on the SPA.”

- 2.26. The position adopted in 'People over Wind' (see below) revokes the position summarised above, albeit other issues considered within the Judgment remain sound.

Exminster Judgment

- 2.27. Also of note is the Judgment handed down by Lord Justice Sales on 5 March 2015 in *Dianne Smyth v The Secretary of State for Communities and Local Government* [2015] EWCA Civ 174. This case concerned an appeal by Mrs Smyth against the decision of Mrs Justice Patterson, sitting in the High Court, [2013] EWHC 3844, who dismissed an application made by Mrs Smyth to quash the appeal decision to grant planning permission to Bellway for the development of 65 residential dwellings on land at Sentry's Farm, Exminster, Devon. In this case the development site was located close to the Exe Estuary SPA ("the SPA"), which is also notified as a SSSI. The SPA incorporates the Dawlish Warren SAC ("the SAC").

- 2.28. Amongst other matters, this case considered the weight that should be attributed to an expert's professional judgment.
- 2.29. Lord Justice Sales makes clear that an expert's experience can be classed as objective information, as set out in paragraphs 46 and 47 of the Judgment. These paragraphs state:

46. Mr Jones submitted that Mr Goodwin's evidence amounted merely to assertion, unsupported by any objective evidence. I do not agree. Three points should be made. First, I consider that on a fair reading of Mr Goodwin's proof of evidence it can be seen that he has drawn on specific information relevant to the SPA and the SAC, as well as the development site and proposed mitigation measures, in a manner which supports in an entirely conventional and acceptable way his expressions of opinion as an ecological expert. By way of example, at paras. 10.4 and 10.5 of his proof, he pointed out that, contrary to the suggestion made by GIE's representative at the inquiry, it was not appropriate to use the analogy of mitigation measures developed for heathland sites (a 400m exclusion zone), where ground nesting birds might be subject to predation by cats, since for the SPA "the designating bird features are wintering or passage species and access to large parts of the site is not possible in any event" (because it is marshland or cut off by water). He referred to the Interim Report and the Disturbance Study, as appropriate. Mr Goodwin demonstrated a good understanding of the particular ecological and mitigation features relevant to the SPA and the SAC. Contrary to Mr Jones's contention, Mr Goodwin's evidence was very far from being unsupported, free-standing assertion.

47. Secondly, in my view it is acceptable and to be expected that an expert will draw on his own background knowledge, experience and expertise in the field to inform the opinions which constitute his evidence to a relevant decision-maker (here, the Inspector). That is, indeed, in large part the point of looking to expert witnesses to provide assistance on technical matters. In this case, Mr Goodwin's own practical experience, the practical experience of ecologists generally and the knowledge shared between them all informed the expertise which he was able to bring to bear in giving his views regarding the effects of the development and the practical impact and viability of the mitigation options which he reviewed in his proof of evidence.

- 2.30. Paragraph 84 of the Judgment further clarifies that expert evidence can be considered as objective, stating:

...Mr Goodwin's evidence set out careful reasoning by him, with reference back as appropriate to underlying facts, to explain his opinion and expressions of view. It was expert evidence in conventional form and of good quality. Mr Goodwin was entitled to draw on his own experience and expertise as well, in forming his opinion: see paras. [46]-[48] above.

- 2.31. The *Exminster* case further considered the appropriate procedures for assessing in-combination impacts which may arise through combined development within the Zone of Influence (ZI) of a European Site.

Wealden v SSCLG [2017] ('the Wealden Judgment 2017')

- 2.32. The *Wealden* Judgment considers the appropriate approach to adopt when undertaking an in-combination assessment where several plans or projects, with no significant impacts alone, could together reach a threshold deemed to be significant. This Judgment specifically considers matters of air quality, although is relevant where any matters of threshold arise.
- 2.33. The Judgment was handed down by Mr Justice Jay in the case between Wealden District Council and the Secretary of State for Communities and Local Government, Lewis District Council, and the South Downs National Park Authority [*Wealden v SSCLG* (2017) EWHC 351 (Admin)], and was concerned with matters relating to air quality impacts on European Sites (in that case the Ashdown Forest SPA/SAC).
- 2.34. A critical issue explored within the Judgment was whether it is correct to test a plan or project against threshold values (in that case relating to the deposition of Nitrogen from increased road traffic) in isolation, with no recourse to undertake a true in combination test.
- 2.35. This matter was specifically considered by Mr Justice Jay at paragraph 108 of his Judgment. Here he concludes the only rational approach would be for plans or projects which would cumulatively exceed a threshold value (such as Nitrogen deposition) to be considered in-combination. The premise of this paragraph is Mr Justice Jay's view that it would be illogical not to consider the residual impacts of a plan or project alongside residual impacts of other relevant schemes (i.e. in combination).
- 2.36. As such it is clear; where matters of threshold arise (such as recreational pressure) impacts should be considered cumulatively.

People over Wind Case (Sweetman II) [C323/17]

- 2.37. The CJEU in *People over Wind v Coillte Teoranta* has revoked the position adopted under the *Dilly Lane* Decision that it was right and proper for mitigation or avoidance measures, which formed a feature of a plan/project, to be viewed as integral to the plan/project and not excluded when considering the likely significance test at Regulation 63(1).
- 2.38. The decision by the CJEU ruled:

"Article 6(3) of Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora must be interpreted as meaning that, in order to determine whether it is necessary to carry out, subsequently, an appropriate assessment of the implications, for a site concerned, of a plan or project, it is not appropriate, at the screening stage, to take account of the measures intended to avoid or reduce the harmful effects of the plan or project on that site."

- 2.39. In accordance with this ruling, avoidance or mitigation measures cannot be considered at the first stage of the test (the 'Likely Significant Effect' stage) and can only be considered at the Appropriate Assessment stage.
- 2.40. In considering the above, it is logical to distinguish between measures which are specifically "*intended to avoid or reduce the harmful effects*" (i.e. mitigation measures for the purposes of a HRA) and measures which would come forward in any event (i.e. intrinsic elements of scheme design). Notwithstanding these latter measures may, by default, avoid or reduce harmful effects on a European site(s), if they are integral elements of a development proposal, it remains appropriate to consider them at the first stage of the test.

ESB Wind Developments (Sweetman III) [Case C-164/17]

- 2.41. In this case a request for a preliminary ruling was made to the CJEU concerning the interpretation of Articles 6(3) and 6(4) of Council Directive 92/43/EEC (the Habitats Directive). The request was made in relation to proceedings brought by Mr Peter Sweetman and Edel Grace against the decision of An Bord Pleanála (National Planning Appeals Board, Ireland) concerning the latter's decision to grant ESB Wind Developments Limited and Coillte permission for a wind farm project within an SPA. The ruling was handed down on 25 July 2018.
- 2.42. This ruling distinguishes between, for the purpose of the application of Articles 6(3) and 6(4) of the Directive, 'mitigation' that consists of measures intended to avoid or reduce harm to the protected site, and measures intended to compensate for any harm (compensatory measures). It is stated:

"Article 6 of Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora must be interpreted as meaning that, where it is intended to carry out a project on a site designated for the protection and conservation of certain species, of which the area suitable for providing for the needs of a protected species fluctuates over time, and the temporary or permanent effect of that project will be that some parts of the site will no longer be able to provide a suitable habitat for the species in question, the fact that the project includes measures to ensure that, after an appropriate assessment of the implications of the project has been carried out and throughout the lifetime of the project, the part of the site that is in fact likely to provide a suitable habitat will not be reduced and indeed may be enhanced may not be taken into account for the purpose of the assessment that must be carried out in accordance with Article 6(3) of the directive to ensure that the project in question will not adversely affect the integrity of the site concerned; that fact falls to be considered, if need be, under Article 6(4) of the directive."

- 2.43. The ruling clarifies (in the context of the specifics of that project), what constitutes mitigation, and what should correctly be termed compensation. It confirms mitigation should be subject to Appropriate Assessment under Article 6(3), but that measures designed to compensate for any harm rather than prevent it, cannot be considered under Article 6(3) (Appropriate Assessment). In such instances, the proposal must be considered under

Article 6(4) and thus it cannot be permitted unless there are, “Imperative Reasons of Overriding Public Interest”.

Holohan Judgment

2.44. In the case of *Holohan v. An Bord Pleanála* the CJEU considered the Appropriate Assessment procedure to be adopted when considering potential impacts on a European site. In considering this case, the CJEU ruled, amongst other matters:

- a) *An Appropriate Assessment (AA) must catalogue the entirety of the habitat types and species for which a site is protected.*
- b) *It must also identify and examine the implications of the proposed project for the species present on that site and for which that site has not been listed. Additionally, it must examine the implications for habitat types and species outside the boundaries of the protected site, insofar as those implications are liable to affect the site’s Conservation Objectives.*
- c) *Where the competent authority rejects findings of an expert that additional information must be obtained, the Appropriate Assessment must include a detailed statement dispelling all reasonable scientific doubt concerning effects on the protected site.*

2.45. This assessment document is fully compliant with the relevant parts of the *Holohan* Judgment. The qualifying interest features are referred to wherever appropriate (described in detail at paragraphs 5.1 to 5.5 of this assessment report). The relevant information, as submitted to Europe relating to such matters, is included at Appendices 2 to 5, and referenced where appropriate. Consideration has been given to implications for habitats and species located outside the designated sites, with reference to the sites Conservation Objectives and the possibility that an adverse effect on the integrity of the site(s) could arise.

The Dutch Nitrogen Cases

2.46. On 7 November 2018 the Judgment of the CJEU was handed down pursuant to a reference for a Preliminary Ruling relating to the application of Article 6 of Directive 92/43/EEC (the Habitats Directive) in joined cases C-293/17 and C-294/17.

2.47. The cases concerned authorisation schemes for agricultural activities which cause Nitrogen deposition on Natura 2000 (European) sites in the Netherlands.

2.48. Key parts of the ruling (insofar as they are relevant to this assessment) are discussed below.

2.49. In line with preceding case law (*Waddenzee* and *Sweetman*, discussed above), the need for scientific rigour and firm conclusions as to the absence of effects are a pre-requisite for authorisation of a plan/project. Ruling 3 in the case states:

“Article 6(3) of Directive 92/43 must be interpreted as not precluding national programmatic legislation which allows the competent authorities to authorise projects on the basis of an ‘appropriate assessment’ within the meaning of that provision, carried out in advance and in which a specific overall amount of Nitrogen deposition has been deemed compatible with that legislation’s objectives of protection. That is so, however, only in so far as a thorough and in-depth examination of the scientific soundness of that assessment makes it possible to ensure that there is no reasonable scientific doubt as to the absence of adverse effects of each plan or project on the integrity of the site concerned, which it is for the national court to ascertain.”

[emphasis added]

2.50. Ruling 4 in the case states:

“Article 6(3) of Directive 92/43 must be interpreted as not precluding national programmatic legislation, such as that at issue in the main proceedings, exempting certain projects which do not exceed a certain threshold value or a certain limit value in terms of Nitrogen deposition from the requirement for individual approval, if the national court is satisfied that the ‘appropriate assessment’ within the meaning of that provision, carried out in advance, meets the criterion that there is no reasonable scientific doubt as to the lack of adverse effects of those plans or projects on the integrity of the sites concerned.”

[emphasis added]

2.51. Ruling 5 in the case states:

“Article 6(3) of Directive 92/43 must be interpreted as precluding national programmatic legislation, such as that at issue in the main proceedings, which allows a certain category of projects, in the present case the application of fertilisers on the surface of land or below its surface and the grazing of cattle, to be implemented without being subject to a permit requirement and, accordingly, to an individualised appropriate assessment of its implications for the sites concerned, unless the objective circumstances make it possible to rule out with certainty any possibility that those projects, individually or in combination with other projects, may significantly affect those sites, which it is for the referring court to ascertain.”

[emphasis added]

2.52. Ruling 6 in the case confirms any measures which are relied upon to mitigate or avoid adverse effects on the integrity of the European site in question must be certain at the time of assessment. It is stated:

“Article 6(3) of Directive 92/43 must be interpreted as meaning that an ‘appropriate assessment’ within the meaning of that provision

may not take into account the existence of 'conservation measures' within the meaning of paragraph 1 of that Article, 'preventive measures' within the meaning of paragraph 2 of that Article, measures specifically adopted for a programme such as that at issue in the main proceedings or 'autonomous' measures, in so far as those measures are not part of that programme, if the expected benefits of those measures are not certain at the time of that assessment."

[emphasis added]

Guidance and Other Relevant Documents

- 2.53. Guidance on the interpretation of key terms and concepts contained within the European and UK legislation of relevance to European designated sites is provided through several documents issued by the European Commission and national organisations such as the Joint Nature Conservation Committee (JNCC), Natural Resources Wales (NRW) and Natural England (NE). This guidance is discussed below.

Natura Standard Data Forms

- 2.54. A standard reporting format has been developed for Natura 2000 sites (SPAs and SACs) to ensure the relevant site selection information is reported and stored in a consistent manner which can easily be made available.
- 2.55. A standard reporting form for SPAs and SACs was developed by the European Commission and published in 1996. The form is used for all designated sites, or sites proposed to be designated as SPAs and SACs, under the relevant Directives, with the information to be stored on a central database.
- 2.56. Article 4 of the Habitats Directive provides the legal basis for providing the data. Article 4 states that information shall include a map of the site, its name, location, extent, and the data resulting from application of the criteria specified in Annex III, and that this shall be provided in a format established by the Commission. Under Article 4 (paragraph 3) of the Birds Directive Member States are required to provide the Commission with all relevant information to enable it to take any appropriate steps to protect relevant species in areas where the Directive applies.
- 2.57. Whilst it is the relevant country agency (i.e. NRW) that is responsible for designating a site, it is the JNCC who are responsible for collating the lists of European and international designated sites, together with relevant supporting information. The Natura 2000 Data Forms for SPAs and SACs are therefore made available by the JNCC.
- 2.58. Within the explanatory notes for Natura Standard Data Forms (European Commission 1996) the following "main objectives" of the Natura data form/database are given:
1. *"to provide the necessary information to enable the Commission, in partnership with the Member States, to co-ordinate measures to create a coherent NATURA 2000 network and to evaluate its*

effectiveness for the conservation of Annex I habitats and for the habitats of species listed in Annex II of Council Directive 92/43/EEC as well as the habitats of Annex I bird species and other migratory bird species covered by Council Directive 79/409/EEC.”

2. *“to provide information which will assist the Commission in other decision making capacities to ensure that the NATURA 2000 network is fully considered in other policy areas and sectors of the Commission's activities in particular regional, agricultural, energy, transport and tourism policies.”*
3. *“to assist the Commission and the relevant committees in choosing actions for funding under LIFE and other financial instruments where data relevant to the conservation of sites, such as ownership and management practice, are likely to facilitate the decision making process.”*
4. *“to provide a useful forum for the exchange and sharing of information on habitats and species of Community interest to the benefit of all Member States.”*

Managing Natura 2000 Sites (European Communities 2000)

2.59. The document entitled “Managing Natura 2000 Sites the Provisions of Article 6 of the Habitats Directive 92/43/CEE”, published by the European Commission in 2000, provides guidelines to the Member States on the interpretation of certain key concepts used in Article 6 of the Habitats Directive. It should be noted that the section relating to Article 6(4) has subsequently been replaced by the publication in 2007 of a further guidance document by the European Commission entitled “Guidance Document on Article 6(4) of the ‘Habitats Directive’ which is considered below under the relevant heading.

2.60. This guidance document states at section 2.3.3 that conservation measures must correspond to the ecological requirements of the habitats and species present for which the site is designated, and that these requirements “involve all the ecological needs necessary to ensure their favourable conservation status”.

2.61. At section 3.5 the guidance states, in relation to deterioration and disturbance of habitats or species:

“Deterioration or disturbance is assessed against the conservation status of species and habitats concerned. At a site level, the maintenance of the favourable conservation status has to be evaluated against the initial conditions provided in the Natura 2000 standard data forms when the site was proposed for selection or designation, according to the contribution of the site to the ecological coherence of the network. This notion should be interpreted in a dynamic way according to the evolution of the conservation status of the habitat or the species.”

- 2.62. Section 4.4.1 sets out that in determining what may constitute a likely 'significant' effect, one should take into account the Conservation Objectives for the site and other relevant baseline information. In the second paragraph of this section of the document it is stated:

"In this regard, the Conservation Objectives of a site as well as prior or baseline information about it can be very important in more precisely identifying conservation sensitivities."

- 2.63. Section 4.5.3 of the document sets out the duty of Member States to provide certain specific information in support of the inclusion of a site within the Natura 2000 network. This information is to be provided in a format specified by the European Commission (the Natura 2000 Standard Data Form).

- 2.64. A link is drawn between the Standard Data Form and the formation of the site's Conservation Objectives within the text box at the end of section 4.5.3 of the guidance where it is stated:

"The information provided according to the standard data form established by the Commission forms the basis for a Member State's establishment of the site's Conservation Objectives."

- 2.65. With regard to an assessment of the effects of a plan/project on the integrity of a site, the 'integrity of the site' is defined at section 4.6.3 as:

"... the coherence of the site's ecological structure and function, across the whole area, or the habitats, complex of habitats and / or populations of species for which the site is or will be classified."

- 2.66. The guidance is clear, within the text box at the foot of page 39, that an assessment as to the implications of the plan/project on the integrity of the site should be limited to an assessment against the site's Conservation Objectives:

"The integrity of the site involves its ecological functions. The decision as to whether it is adversely affected should focus on and be limited to the site's Conservation Objectives."

Assessment of Plans and Projects Significantly Affecting Natura 2000 sites - Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC (European Commission 2001)

- 2.67. This document, published by the European Commission in 2001, gives guidance on carrying out and reviewing those assessments required under Articles 6(3) and (4) of the Habitats Directive. It is provided as supplementary guidance and does not over-ride or replace any of that set out within Managing Natura 2000 (European Commission 2000), which "is the starting point for the interpretation of the key terms and phrases contained in the Habitats Directive". The guidance provided is not mandatory and it is clearly set out that its use is "optional and flexible" and that it is for "Member States to determine the procedural requirements deriving from the Directive".

- 2.68. The guidance sets out the key stages in following the tests contained within the Habitats Directive. Pertinent to this Application, stages one and two are

relevant. Stage one is the screening stage, assessing the likelihood of a plan/project resulting in a significant effect upon the European site. The second comprises the Appropriate Assessment.

- 2.69. Section 3.2.4 is concerned with Appropriate Assessment and, specifically, the assessment against the Conservation Objectives of the European Site. Box 9 provides a list of five example Conservation Objectives for differing broad habitat types. One such example, for a coastal site, taken from Box 9 is provided below:

“to maintain the status of the European features of this coastal site in favourable condition, allowing for natural change. Features include coastal shingle vegetation and lagoons (within a candidate special area of conservation (SAC), which is also an SPA).”

Internal Guidance to decisions on ‘Site Integrity’: A framework for provision of advice to competent authorities (English Nature 2004)

- 2.70. NE (formerly English Nature [EN]) has produced an internal guidance document on the provision of advice to competent authorities regarding the concept of “site integrity” in undertaking an Appropriate Assessment. This guidance is considered to remain relevant in Wales. The concept of site integrity is further addressed within Technical Advice Note 5 (TAN 5), as discussed in subsequent Sections of this iHRA.

- 2.71. This guidance sets out a definition for integrity. It states that integrity is considered at the site level and gives the following definition, as taken from PPG9:

“The coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or levels of populations of the species for which it was classified”.

- 2.72. Integrity is further defined within Section 3.0 where it is stated:

“In a dynamic context ‘integrity’ can be considered as a site having a sense of resilience and ability to evolve in ways that are favourable to conservation.”

- 2.73. The need to maintain or restore the site to ‘Favourable’ conservation status is dealt with in the final paragraph of Section 3.0. NE quotes guidance issued jointly by the Environment Agency (EA), EN, and Countryside Council for Wales (CCW) (now NRW).

- 2.74. The guidance provides a checklist within Section 4.1, for assessing the likelihood of an adverse effect on integrity occurring as a result of the proposed plan/project. It is stated that if the answer to all the questions posed within the checklist is “yes” then it is reasonable to conclude there will be no adverse effect upon integrity. In the event one or more of the answers is “no”, then the guidance suggests a series of further site specific factors, listed at 4.2 to 4.7 of the guidance, must be considered.

Common Standards Monitoring (JNCC February 2004)

- 2.75. Common Standards Monitoring (CSM) is a means by which condition objectives for habitats, species, or other features of designated sites (e.g. SSSIs and SACs) are set, based on key attributes of the features.
- 2.76. The JNCC and the country conservation agencies (e.g. NRW) developed guidance on the setting and assessing of condition objectives, as required under the Birds and Habitats Directives, and set out a framework for this in 1999. This framework is provided in the form of CSM guidance which comprises a suite of documents including an "Introduction to the Guidance Manual on Common Standards Monitoring" and several species/habitat specific documents, including those for lowland heathland, birds, reptiles, and invertebrates. The introduction to the Guidance Manual covers various relevant concepts and terms. It also provides a background to the setting of Conservation Objectives, and sets out the desired approach to setting targets, monitoring, management, and reporting on conservation measures in designated sites.
- 2.77. The Introduction to CSM Guidance and CSM Guidance for individual site attributes (e.g. its bird interest) set out specific criteria regarding the identification of interest features, targets and methods of assessment. There is in-built flexibility and allowances for 'judgements to be made' when assessing, for example, 'Favourable' condition.
- 2.78. It is understood that NRW give due regard to the CSM approach to European designated sites when undertaking an assessment of the condition of that site (or the features within it). The assessment does not necessarily relate to the Conservation Objectives of the European site but provides a tool for tailoring future management that 'Favourable' condition of the interest features can be maintained or restored as appropriate.

Planning Policy Wales (Edition 11, February 2021) and Technical Advice Note 5 (TAN 5)

- 2.79. Paragraphs 6.4.10 to 6.4.19 of Planning Policy Wales are of direct relevance, identifying the level of protection that should be afforded designated sites, including sites of European Importance.
- 2.80. Paragraphs 6.4.11 to 6.4.13 are concerned with the hierarchy of international, national, and locally designated sites, with 6.4.13 stating that "*Differentiation should be given to the relative significance of the designation within the hierarchy, when considering the weight to be attached to nature conservation interests*". Paragraph 6.4.14 goes on to state that "*development should be refused where there are adverse impacts on the features for which a site has been designated*" and "*International and national responsibilities and obligations for conservation should be fully met, and, consistent with the objectives of the designation, statutorily designated sites protected from damage and deterioration, with their important features conserved and enhanced by appropriate management*". Paragraph 6.4.15 concerns the management of statutorily designated sites and the importance of appropriate management, with paragraph 6.4.16 emphasising that opportunities to restore habitats should be considered. Paragraph 6.4.18 relates specifically to sites of international importance (SPA, SAC, Ramsar)

and summarises the duties imposed by the Habitat Regulations. Paragraph 6.4.19 identifies that 'Proposed' SACs or SPAs should be granted the same levels of planning protection as that afforded formally designated sites.

2.81. Further guidance on European designates sites is provided through TAN5, namely within Section 5 and Annex 3 of that document. This includes for guidance on the determination of whether an effect on a European designated site is likely to be significant, together with the scope of Appropriate Assessments and ascertaining the effect on the integrity.

2.82. With respect to the significance test, TAN5 states at paragraph 5.3.2:

"The decision as to whether an appropriate assessment is necessary should be made on a precautionary basis".

2.83. The *Waddenzee* Judgment is specifically referred to at paragraph 5.3.2. With regards to the need to undertake an Appropriate Assessment; this is only required where it is not possible to conclude, on the basis of objective information, that the plan/project will not have a significant effect on the European site, either individually or in combination with other plans/projects.

2.84. Paragraph 7 at Annex 3 of TAN5 clarifies that in considering the likely significance of an effect, the decision taker should assess whether the effect would be significant in terms of the site's Conservation Objectives.

2.85. Paragraph 11 at Annex 3 clarifies the importance of assessing the likely significant effect on each of the interest features for which the site is designated.

2.86. Guidance on the scope of an Appropriate Assessment is provided at paragraph 17 of the Circular:

"If the decision-taker concludes that a proposed development not directly connected with site management is likely to significantly affect a European site or European offshore marine site, they must make an appropriate assessment of the implications of the proposal for the site in view of the site's Conservation Objectives. These relate to each of the interest features for which the site was classified ... The scope and content of an appropriate assessment will depend on the nature, location, duration and scale of the proposed project and the interest features of the relevant site. It is important that an appropriate assessment is made in respect of each interest feature for which the site is classified or listed; and for each designation where a site is classified or listed under more than one international obligation..."

2.87. At paragraph 19 of Annex 3, the definition of "integrity" for the purpose of interpreting the tests contained within the Habitats Regulations is given as:

"The integrity of a site is the coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified..."

- 2.88. Annex 3 also includes a flow diagram (see Appendix 1) setting out the series of steps competent authorities are required to take in considering proposals affecting internationally designated Nature Conservation Sites.
- 2.89. The information contained within this report follows the steps outlined in the flow diagram and takes account of the EC guidance, on the basis of information currently available on the nature of the development in relation to those Internationally Designated Nature Conservation Sites identified within this assessment. Professional judgement has been applied to interpret this information within the context of the site's Conservation Objectives and the criteria under which they are designated.

Guidance document on Article 6(4) of the 'Habitats Directive' (European Commission 2007)

- 2.90. This document, published by the European Commission in 2007, is intended to provide clarification on key terms/concepts as referred to within "Managing Natura 2000 Sites" and replaces the Section on Article 6(4) within that earlier document.
- 2.91. The Guidance document covers, in particular, the concepts of Alternative Solutions, Imperative Reasons of Overriding Public Interest, Compensation Measures, Overall Coherence and the Opinion of the Commission.
- 2.92. With regard to ensuring the quality of an Appropriate Assessment, and to define exactly what needs to be compensated, it is stated at Section 1.3:

"Assessment procedures of plans or projects likely to affect Natura 2000 sites should guarantee full consideration of all elements contributing to the site integrity and to the overall coherence of the network, both in the definition of the baseline conditions and in the stages leading to identification of potential impacts, mitigation measures and residual impacts. These determine what has to be compensated, both in quality and quantity."

- 2.93. The need to use information contained within the Natura Standard Data Form, in tandem with the site's Conservation Objectives when undertaking an Appropriate Assessment is specifically referred to (under the second hyphenated point at Section 1.3 on page 5).
- 2.94. Section 1.3.2 gives guidance on the application of Article 6(4) in respect of reasons of overriding public importance, and Section 1.4.1 gives guidance on the application of Article 6(4) in respect of compensatory measures.

Conservation Objectives

- 2.95. In Wales, Conservation Objectives are detailed within site specific Core Management Plans.
- 2.96. Within these Core Management Plans, NRW define Conservation Objectives as *"The expression of the desired state of a feature, expressed as a composite statement defining the condition that we wish the feature to be in. Each feature has one conservation objective."* It is further identified that the overall aim of Conservation Objectives is such that they must allow the

Favourable Conservation Status (FCS) of a site (and its qualifying habitat and species) to be met.

- 2.97. At a site level, a Conservation Objective describes the aspiration for the condition of the habitats/features present, and identifies performance indicators which must be met to achieve Favourable Condition.
- 2.98. The Conservation Objectives for designated sites are published by NRW. Those for the Crymlyn Bog SAC are included in Appendix 2, The citation and Information Sheet for Crymlyn Bog Ramsar is included in Appendix 3.

3. KEY TERMS AND CONCEPTS RELEVANT TO THE TESTS CONTAINED WITHIN THE HABITATS REGULATIONS

- 3.1. The application of the Habitats Regulations when deciding to grant a consent/permission for a plan or project has several individual steps but two main stages.
- 3.2. The first main stage of the process is, in accordance with Regulation 63(1), to ascertain whether, either alone or in combination, the plan/project is likely to give rise to any significant effects on the European site ("the likely significance test"). This is essentially a broad sieving stage, whereby if it can be shown that no significant effects are likely, then a consent can safely be granted without the need to move to the second main stage. If conversely the plan or project is likely to have a significant effect, or it cannot be determined with the required level of certainty whether an effect would arise, then the second main stage is triggered and an appropriate assessment should be undertaken. In line with the Waddenzee judgement, the test at the sieving stage should be undertaken in view of the Conservation Objectives of the European site, on the basis that a plan or project which is likely to undermine a site's Conservation Objectives, must be likely to have a significant effect upon it.
- 3.3. The second main stage, Regulation 63(5), where necessary, is to assess the implications of the plan/project on the integrity of the European site, again in view of a site's Conservation Objectives. This second main stage of the process (Appropriate Assessment or "the integrity test") is a more detailed and thorough examination of the proposals and the impacts on the European site.
- 3.4. In the event that in undertaking the Appropriate Assessment the competent authority cannot conclude that the plan/project will not have an adverse effect on the integrity of a European site, the plan/project may still be consented where the competent authority is satisfied that, there being no alternative solutions, the plan/project must be carried out for imperative reasons of overriding public interest. This is set out at Regulation 64 of the Habitats Regulations.
- 3.5. Regulation 68 provides that where a project is agreed to, notwithstanding a negative assessment, the appropriate authority must secure that any necessary compensatory measures are taken to ensure that the overall coherence of Natura 2000 is protected.

Defining "Integrity"

- 3.6. The "Managing Natura 2000 guidance document"¹ contains guidance as to the meaning of "integrity" for the purpose of addressing the provision of Article 6 of the Habitats Directive. It states at Section 4.6.4 that:

"The 'integrity of the site' can be usefully defined as the coherent sum of the site's ecological structure, function and ecological processes, across its whole area, which enables it to sustain the

¹ Managing Natura 2000 Sites – The provisions of Article 6 of the habitats Directive 92/43/EEC (2019)

habitats, complex of habitats and / or populations of the species for which the site is designated.”

- 3.7. The text box at the foot of page 47 of the Managing Natura 2000 guidance document goes on to state:

“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.”

- 3.8. Section 4.6.4 is also helpful in defining the types of effect which could constitute an adverse effect on integrity. It is stated:

“It is clear from the context and from the purpose of the Directive that the ‘integrity of a site’ relates to the site’s Conservation Objectives (see point 4.6.3 above). For example, it is possible that a plan or project will adversely affect the site only in a visual sense or only affect habitat types or species other than those listed in Annex I or Annex II for which the site has been designated. In such cases, the effects do not amount to an adverse effect for purposes of Article 6(3).

In other words if none of the habitat types or species for which the site has been designated is significantly affected then the site’s integrity cannot be considered to be adversely affected.

However, if just one of them is significantly affected, taking into account the site’s Conservation Objectives, then the site integrity is necessarily adversely affected.”

- 3.9. It is further stated:

“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.”

The term ‘Conservation Objectives’

- 3.10. Whilst Regulation 63 of the Habitats Regulations is explicit in setting out that any assessment of the implications of the plan/project on a European designated site should be undertaken in view of the site’s “Conservation Objectives”, the term ‘Conservation Objective’ is not defined within the Regulations. The term “Conservation Objectives” appears at Article 6(3) of the Habitats Directive which sets out the process of assessment for a plan or project which may be likely to have an effect on a designated site. However, the term itself is not defined.

- 3.11. It is useful to bear in mind that the Directive has two distinct objectives:

- a. To protect particular species of community interest which are under threat (Article 1(g) and Annex II, Part 3 of the Habitats Regulations). They are species which are endangered, vulnerable, rare, or otherwise require attention.
 - b. To protect habitats of community interest which are deteriorating (Article 1(c) and Annex I, Part 2 of the Habitats Regulations).
- 3.12. In order to do this the Directive requires the establishment of a coherent European ecological network of SACs' under the title Natura 2000 (Article 3(1)). The network is to comprise of sites hosting the natural habitat types listed in Annex I of the Directive, and habitats of the species listed in Annex II of the Directive. Article 3(1) provides that the network 'shall enable the natural habitat types and the species' habitats concerned to be maintained or, where appropriate, restored at a favorable conservation status in their natural range.'
- 3.13. As discussed above, as a result of the 2019 Amendment Regulations the SACs and SPAs in the UK no longer form part of the European Union's Natura ecological network although the basic obligations of the competent authorities have not changed.
- 3.14. Regulation 63 is clear that an Appropriate Assessment must still be carried out in light of a site's Conservation Objectives. As the term "Conservation Objective" is not defined, it is necessary to look at the Habitats Directive in light of relevant European and other guidance. That guidance is not always consistent or clear about the use of the term "Conservation Objectives". For the purposes of this iHRA it is the formal "Conservation Objectives" mentioned in Article 6(3) and Regulation 63 as "Conservation Objectives".
- 3.15. The term "conservation" is defined within the Habitats Directive at Article 1(a):

"conservation means a series of measures required to maintain or restore the natural habitats and the populations of species of wild fauna and flora at a favourable status as defined in (e) and (i)".
- 3.16. The term "conservation status of a natural habitat" is defined within the Habitats Directive at Article 1(e):

"conservation status of a natural habitat means the sum of the influences acting on a natural habitat and its typical species that may affect its long-term natural distribution, structure and functions as well as the long-term survival of its typical species within the territory referred to in Article 2."
- 3.17. The term "conservation status of a species" is defined within the Habitats Directive at Article 1(i):

"conservation status of a species means the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations within the territory referred to in Article 2:

The conservation status 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, and*
- *The natural range of the species is neither being reduced nor is it 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."*

3.18. Article 3 of the Habitats Directive sets out that Member States have a duty to designate (in accordance with Article 4 of the Directive) special areas of conservation and that, where necessary, Member States shall endeavour to improve the ecological coherence of Natura 2000.

3.19. Article 4(1) of the Habitats Directive states that Member States must provide a list of sites, indicating which Annex I habitats and species occurring on Annex II are present. This Article also clarifies the type of information which must be submitted for each listed site (map, name, location, extent, and the results of the application of qualification criteria listed at Annex III of the Directive). This information provides the basis of the Natura 2000 Data Form. Article 4(4) states:

"Once a site of Community importance has been adopted in accordance with the procedure laid down in paragraph 2, the Member State concerned shall designate that site as a special area of conservation as soon as possible within six years at most, establishing priorities in the light of the importance of the sites for the maintenance or restoration, at a favourable conservation status, of a natural habitat type in Annex I or a species in Annex II and for the coherence of Natura 2000, and in the light of the threats of degradation or destruction to which those sites are exposed."

3.20. There is a need for sufficient information to be provided to the European Commission, in a standardised format, at the designation stage (Article 4(1)), and also to the fact that "priorities" must be established for the "maintenance or restoration, at a favourable conservation status" of Annex I natural habitats or Annex II species. Article 4(4) is slightly ambiguous as to exactly when the establishment of the "priorities" should take place, but it is inferred this should be at the designation stage, within six years of the adoption of the site.

3.21. The European Commission guidance document titled "Managing Natura 2000 Sites – The Provisions of Article 6 of the Habitats Directive 92/43/EEC (2019)" provides guidelines to Member States on the interpretation of key concepts used in Article 6 of the Habitats Directive. In relation to "Conservation Objectives" Section 4.6.3 gives clarification as to what information should form the basis of establishing the site's Conservation Objectives. It is stated:

"As explained in section 2.3.1, 'Conservation Objectives' should be set at the level of each individual site and should concern, within that site, all the species and habitat types for which the site has been designated under the Habitats Directive or classified under the Birds Directive."

These Conservation Objectives should be based on the ecological requirements of the species and habitats present and should define the desired conservation condition of these species and habitat types on the site. This should be established in function of the conservation condition of each species and habitat type as recorded in the Standard Data Form. The Conservation Objectives should also reflect the importance of the site for the coherence of Natura 2000 so that each site contributes in the best possible way to achieving Favourable Conservation Status at the appropriate geographical level within the natural range of the respective species or habitat types.

Where such Conservation Objectives have been set for a site, the effects must be assessed against these objectives.”

- 3.22. Regulation 37(3) of the Habitats Regulations provides:

*“(3) As soon as possible after a site becomes a European marine site, the appropriate nature conservation bodies must advise other relevant authorities as to –
(a) The Conservation Objectives for that site.
(b)”*

- 3.23. It is therefore clear from the legislation and guidance that the Conservation Objectives are formally established for each European Site.

Assemblages

- 3.24. “Assemblage” is not a term or concept used in the Directive. Section 14 of the Introduction to the CSM Introduction describes what may constitute an assemblage, with specific reference to SSSIs, SPAs and Ramsar sites. Under the title, “What is an Assemblage?”, the following information is given:

“ASSIs/SSSIs, SPAs and Ramsar sites may each be notified because of the presence of important assemblages of species. This might seem straightforward, but in the context of species features two situations can be envisaged:

- 1. A colony of different species all occurring / living together, where the total number of individuals is the key aspect of the interest on the site (e.g. more than 20,000 seabirds on a SPA site).*
- 2. A number of characteristic species which together form the feature and usually share similar ecological or habitat requirements (e.g. the co-occurrence of woodland or upland bird species, or heathland invertebrates).*

The term 'assemblage' can also be used in a third, functional, way; when there are a number of features which co-exist, yet are individually notified (i.e. they are features in their own right). While it may be possible to assess them using the same or very similar attributes, these species must be assessed as individual features independently of any assemblage of which they may also form a part (e.g. under scenario 1).”

- 3.25. Thus, the quality of the 'assemblage' can be defined by the mix of species (assemblage) or the total number of characteristic species (aggregation).

Application of the "Precautionary Principle"

- 3.26. Relevant case law makes it clear that in applying the relevant tests of the Habitats Regulations, there is a need for certainty (or the absence of reasonable scientific doubt), both regarding the nature and extent of predicted effects on integrity, and in relation to the effectiveness of any preventative measures relied upon. Furthermore, enshrined within the Habitats Directive and Regulations (though not explicitly set out in either), based upon Article 191 of the Treaty on the Functioning of the European Union, is the need to apply the Precautionary Principle when assessing the risks posed to the integrity of the site(s). If a risk of significant effect to the integrity of a site cannot be excluded on the basis of objective information, then application of the precautionary principle requires no consent to be given for such a project. The Precautionary Principle is not, however, without limits. It cannot be based on a purely hypothetical approach founded simply on conjecture. A preventive measure, may be taken only if the risk appears nevertheless to be adequately backed up by scientific data available at the time the measure is taken.
- 3.27. Moreover, the document titled "Communication from the Commission on the Precautionary Principle" (2000) provides useful guidance in relation to the application of the Precautionary Principle in relation to European sites issues. Paragraph 6 sets out the six key matters for consideration when applying the Precautionary Principle. Paragraph 6 states:

"Where action is deemed necessary, measures based on the precautionary principle should be, inter alia:

- *proportional to the chosen level of protection,*
- *non-discriminatory in their application,*
- *consistent with similar measures already taken,*
- *based on an examination of the potential benefits and costs of action or lack of action (including, where appropriate and feasible, an economic cost/benefit analysis),*
- *subject to review, in the light of new scientific data, and*
- *capable of assigning responsibility for producing the scientific evidence necessary for a more comprehensive risk assessment."*

- 3.28. Under these bulleted points, the guidance gives specific definitions in relation to each of the above at pages 4 and 5, with further detail provided within Section 6.
- 3.29. In accordance with the Communication from the Commission it is clear that when deemed necessary, risk reduction measures should be proportionate and must not aim at zero risk. It is stated at Section 6.3.1 of the Communication from the Commission that:

"The measures envisaged must make it possible to achieve the appropriate level of protection. Measures based on the precautionary principle must not be disproportionate to the desired

level of protection and must not aim at zero risk, something which rarely exists. However, in certain cases, an incomplete assessment of the risk may considerably limit the number of options available to the risk managers."

- 3.30. With reference to not aiming "at zero risk" the judgement of the Appeal Court in the case of *Morge vs Hampshire County Council* [2010] EWCA Civ 608 is relevant. Lord Justice Ward considered what level of disturbance was required in addressing Article 12(1)(b) and at paragraph 35 he described the level or risk of threatened habitat and species stating that:

"... It must be certain, that is to say, identifiable. It must be real, not fanciful."

- 3.31. This is understood to mean that for the level of risk to be real and identifiable, it must be based upon objective evidence to substantiate the risk.

- 3.32. The judgment in the case of *Boggis v Natural England*² also assists in determining when it would be appropriate to invoke the precautionary principle and concludes that the objective information needed is simply not available.

- 3.33. At paragraph 37 of the Judgment, it is stated:

"...a claimant who alleges that there was a risk which should have been considered by the authorising authority so that it could decide whether that risk could be "excluded on the basis of objective information", must produce credible evidence that there was a real, rather than a hypothetical, risk which should have been considered."

- 3.34. Also of relevance is the case of *R (Champion) v. North Norfolk District Council*³, where at paragraph 41, Lord Carnwath makes it clear that Article 6(3) does not require absolute certainty of no adverse effect, and it is ultimately an issue of judgment for the decision maker. It is stated:

"As the court itself indicated in Waddenzee the context implies a high standard of investigation. However, as Advocate General Kokott said in Waddenzee [2005] All ER (EC) 353, para 107:

"The necessary certainty cannot be construed as meaning absolute certainty since that is almost impossible to attain. Instead, it is clear from the second sentence of article 6(3) of the Habitats Directive that the competent authorities must take a decision having assessed all the relevant information which is set out in particular in the appropriate assessment. The conclusion of this assessment is, of necessity, subjective in nature. Therefore, the competent authorities can, from their point of view, be certain that there will be no adverse effects even though, from an objective point of view, there is no absolute certainty"

² [2009] EWCA Civ 1061

³ [2015] UKSC 52, [2015] 1 WLR 3710,

In short, no special procedure is prescribed, and, while a high standard of investigation is demanded, the issue ultimately rests on the judgment of the authority.”

Summary Conclusions

- 3.35. Guidance issued by the European Commission states that information on which the formal (Article 6) Conservation Objectives are based should be reported on the standard Natura 2000 Data Form, this being the information held by the Commission regarding the site's quality and importance.
- 3.36. The formal Conservation Objectives are focused upon the reasons for which the site was designated. The formal Conservation Objectives are entirely different from condition objectives, which are used to assess whether interest features of a designated site are in 'Favourable' condition. In Wales, 'Favourable' condition objectives and associated attributes and targets, where produced, are found within Core Management Plans as prepared for each designated site.
- 3.37. European guidance, together with that issued by the JNCC, states that the 'Favourable' condition of qualifying interest features should be judged against the baseline condition at designation.
- 3.38. Having regard to the relevant legislation and supporting guidance it is clear the assessment at Regulation 63 of the Habitats Regulations is a two stage process, the first being the 'likely significance' test stage, the second being the 'integrity' test.
- 3.39. The competent authority should not grant a consent or other permission unless it can be ascertained the plan/project will not adversely affect the integrity of relevant European Sites. The decision taker must be certain of this, i.e. reach a judgment beyond reasonable scientific doubt in line with the Precautionary Principle. This test must be applied in light of the Conservation Objectives which have formally been adopted for each of the European Sites.
- 3.40. It is also necessary to note the Holohan Judgment. That Judgment emphasises that it may be necessary to look wider than the listed interest features when assessing against integrity. In that case the ECJ stated:

“Article 6(3) of Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora must be interpreted as meaning that an ‘appropriate assessment’ must, on the one hand, catalogue the entirety of habitat types and species for which a site is protected, and, on the other, identify and examine both the implications of the proposed project for the species present on that site, and for which that site has not been listed, and the implications for habitat types and species to be found outside the boundaries of that site, provided that those implications are liable to affect the Conservation Objectives of the site.”

- 3.41. This Judgment underlines the importance of the assessment and ultimate judgment being related to the Conservation Objectives of the site.

3.42. It is important to recognise that the species for which sites are protected (at any level) do not recognise arbitrary boundaries, and for many species/groups they will be reliant on different habitats or areas, in parts of their natural range, for different stages of their life cycle, or at different times of year (e.g. as a response to seasonal climatic changes). A protected site may serve a 'protective function' for only part, or all of a species life cycle.

3.43. Regarding European designated sites, Article 4.1 of the Habitats Directive is of direct relevance on this point. It states:

“For animal species ranging over wide areas these sites shall correspond to the places within the natural range of such species which present the physical or biological factors essential to their life and reproduction. For aquatic species which range over wide areas, such sites will be proposed only where there is a clearly identifiable area representing the physical and biological factors essential to their life and reproduction.”

3.44. The presence of a species within a site, and the population number at a point in time, is an important consideration in determining the quality and importance of the site to the species in question. However, in real terms, value judgments on site quality are made in relation to the contribution the site (e.g. SPA) makes to the favourable conservation status of the species generally. A reduction in numbers of a qualifying or other (e.g. typical) species within a designated site may not jeopardise the contribution the site makes to the sustainability of the species more generally and, in this respect, site integrity continues to be maintained.

3.45. Similarly, when considering bird assemblage features, the total loss of a species from an assemblage would be considered as harm in assessment terms. However, so long as the ongoing viability of that species (as a contributing facet of the assemblage), was maintained, then a level of loss would not have an adverse effect on integrity, since the coherence of the site's ecological structure, function, and ecological processes would still be maintained.

4. SITE LOCATIONS AND BACKGROUND

- 4.1. The Site is located approx. 0.6km to the east of the Crymlyn Bog SAC at its closest point. The closest component SSSI underpinning the above European site (also known as a Habitat Site) is the Crymlyn Bog SSSI, with a proportion of the SAC also underpinned by Pant-y-Sais SSSI. In addition to its designation as an SAC, much of the Crymlyn Bog is designated as Ramsar (1.0km at its closest point) and the Crymlyn Bog and Pant Y Sais National Nature Reserve (NNR), located approx. 1.5km from the Site at its closest point.
- 4.2. All other European/international designated sites (including potential sites) are located at considerably greater distances, with no other international designations within 10 km of the Site, and no potential effect pathways to more distant internationally designated sites.
- 4.3. In reaching this conclusion it is noted that no additional designated sites have been identified by Neath Port Talbot in their formal consultation response to a scoping opinion submitted in respect of the proposals. Noting the above, there is no requirement to consider any other sites in the HRA.

Crymlyn Bog SAC

- 4.4. Crymlyn Bog is a large lowland fen situated in a glacial depression on the eastern edge of Swansea. In addition to Crymlyn Bog itself, the SAC also includes Pant-y-Sais fen, a smaller (approximately 20ha) wetland located about 1 km east of the main Site.
- 4.5. Crymlyn Bog SAC is considered of international importance for its wetland communities, in particular for its mosaic of transition mires, quaking bogs, and calcareous fens, alongside its alluvial forest habitats. The SAC is additionally of importance on account of the notable plant and invertebrate species it supports.
- 4.6. Crymlyn Bog SAC covers an area of 299.42ha The Natura Standard Data Form for the site is included at Appendix 2.

Crymlyn Bog Ramsar

- 4.7. Crymlyn Bog Ramsar is designated for its extensive and diverse wetland habitats which cover an area of approximately 243.9ha. These habitats in turn support valuable floral and faunal assemblages. The Ramsar designation is broadly consistent (in geographic extent), aside from a section of the SAC that extends an additional (approximately) 35ha northwards.
- 4.8. The Ramsar Information Sheet for the site is included at Appendix 3.

Relationship between the Crymlyn Bog SAC/Ramsar and the Site

- 4.9. The relationship between the Site and the above Habitat Sites is shown graphically at Plan ECO1.

- 4.10. Both the SAC and Ramsar designations are underpinned by Crymlyn Bog SSSI (adjacent to the Site) and Pant-Y-Sais SSSI, located approximately 0.8km south of the Site.
- 4.11. Moreover, approximately a third of Crymlyn Bog, and all of Pant-y-Sais (excluding the adjoining Tennant Canal), is declared as a National Nature Reserve (NNR). Pant-y-Sais is also a Local Nature Reserve (LNR).

5. CONSERVATION STATUS OF RELEVANT DESIGNATED SITES

5.1. Crymlyn Bog SAC Qualifying Features

5.1.1. Crymlyn Bog SAC is designated primarily for the Annex 1 habitats it supports, including:

- **7140 transition mire and quaking bogs** which supports Bottle Sedge *Carex rostrata* and Bogbean *Menyanthes trifoliata*, with Common Cottongrass *Eriophorum angustifolium*, Water Horsetail *Equisetum fluviatile*, Star Sedge *Carex echinate*, and locally rare Mud Sedge *Carex limosa*.
- **7210 Calcareous fens with *Cladium mariscus* and species of *Caricion davallianae***, with the SAC supporting the largest area of *Cladium*-dominated vegetation in south Wales.

5.1.2. Additionally, the Site supports the following Annex 1 habitat as a qualifying feature.

- **91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae)**

5.1.3. Habitats listed in the Natura 2000 Form for the SAC include inland water bodies [standing water, running water] (1.6%), bogs, marshes, water fringed vegetation, fens (86%), heath, scrub, maquis and garrigue, phygrana (0.6%), humid grassland, mesophile grassland (3.5%) and broad-leaved deciduous woodland (8.3%).

5.2. Crymlyn Bog Ramsar Qualifying Features

5.2.1. Crymlyn Bog Ramsar is designated under Ramsar Criterion 1, 2A and 2B (identified as Criterion 1, 2 and 3 on the Ramsar Information Sheet issued by JNCC), on account of its diverse wetland habitats, with these identified to be of international importance. The site qualifies under Ramsar Criterion 1 on account of it supporting an extensive inter-estuarine complex, forming the largest valley floodplain mires in Wales. The site includes the adjacent Pant-y-Sais Fen and consists of a complex mosaic of vegetation communities, characteristic of both nutrient-rich and nutrient-poor conditions. This criterion recognises the diverse swamp, tall-herb fen, fen meadow, and carr communities present.

5.2.2. The Crymlyn Bog qualifies under Ramsar Criterion 2A on account of it supporting a substantial population of the nationally rare Slender Cottongrass *Eriophorum gracile* community, as well as for its rich invertebrate fauna, including nationally rare or highly localised species associated with mires.

5.2.3. The Crymlyn Bog qualifies under Ramsar Criterion 2B on account of the range of vascular plants it supports, including 199 species of which 17 are regionally uncommon. Within the site citation, reference is also made to notable summer populations of Reed Warblers *Acrocephalus scirpaceus* and Sedge Warblers *Acrocephalus schoenobaenus*.

- 5.2.4. The site citation and Ramsar Information Sheet for the site is included at Appendix 3.

5.3. **Crymlyn Bog SAC Conservation Objectives**

- 5.3.1. The Conservation Objectives for Crymlyn Bog SAC are provided at Appendix 2, and further set out below. Within that document, objectives have been identified for each of the three designated criteria, and can be broken down into the following four groups:

- The extent should be stable in the long term or, where appropriate, increasing.
- Quality (including in terms of ecological structure and function) should be being maintained, or where appropriate improving.
- Populations of the habitat's typical species must be being maintained or, where appropriate, increasing, and,
- Factors affecting the extent and quality of the habitat and its typical species (and thus affecting the habitat's future prospects) should be under appropriate control.

- 5.3.2. The Conservation Objectives for each qualifying feature can be found below.

Conservation objective for Feature 1: Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* (EU habitat code 7210)

The extent should be stable in the long term or, where appropriate, increasing.

- 5.3.3. *The extent and distribution of calcareous fen should be as mapped in 2005 and 2009 (Bosanquet et al., 2005; Bosanquet et al., 2009).*

Quality (including in terms of ecological structure and function) should be being maintained or, where appropriate, improving.

- 5.3.4. *The calcareous fen should be of high quality throughout. At Crymlyn Bog the calcareous fen occurs in two forms: tall vegetation dominated by Great Fen-sedge *Cladium mariscus* and more open calcareous fen. The *Cladium* dominated areas should continue to be present as a minimum extent but should not increase at the expense of the open calcareous fen; ideally they should be opened up to allow increased plant diversity within them. The open calcareous fen should be species-rich, with little or no rank vegetation. Non-native species and indicators of eutrophication and/or changing water levels should be largely absent.*

- 5.3.5. *Providing these broad quality standards are met across the whole feature area, some heterogeneity in condition is both natural and acceptable, but the bulk (at least 70%) of the open calcareous fen should be referable to good quality calcareous fen habitat, where:*

- *Tufted-sedge *Carex elata* is present, with associates such as Yellow Loosestrife *Lysimachia vulgaris*, Greater Spearwort*

Ranunculus lingua, Blunt-flowered Rush *Juncus subnodulosus*,
Cyperus Sedge *Carex pseudocyperus*, Lesser Bulrush *Typha*
angustifolia, Water Dock *Rumex hydrolapathum*, Purple-
loosestrife *Lythrum salicaria*, Hemp-agrimony *Eupatorium*
cannabinum, Marsh Cinquefoil *Potentilla palustris* and Royal
Fern *Osmunda regalis*.

- Common Reed *Phragmites australis* or Great Fensedge *Cladium mariscus* are not dominant.
- Scrub is absent.
- Non-native species including Himalayan Balsam *Impatiens glandulifera* are absent.

Populations of the habitat's typical species must be being maintained or, where appropriate, increasing.

- 5.3.6. *In addition to the above typical plant species, the calcareous fen areas will also contribute to the wider fen environment of Crymlyn Bog in supporting a range of typical fenland bird and invertebrate species.*

Factors affecting the extent and quality of the habitat and its typical species (and thus affecting the habitat's future prospects) should be under appropriate control.

- 5.3.7. *Factors affecting the extent and quality of the calcareous fen habitat (including water quality, atmospheric pollution, water levels, successional change, scrub encroachment and non-native species) should be under appropriate control.*

Conservation objective for Feature 2: Transition mires and quaking bogs (EU habitat code 7140)

The extent should be stable in the long term or, where appropriate, increasing.

- 5.3.8. *The extent and distribution of transition mire should be as mapped in 2005 and 2009 (Bosanquet et al., 2005; Bosanquet et al., 2009). Plus, an additional 3 ha of transition mire should also be restored.*

Quality (including in terms of ecological structure and function) should be being maintained or, where appropriate, improving.

- 5.3.9. *The transition mire should be of high quality throughout and composed of typical native species. The stands should be species-rich, with little or no rank vegetation or scrub encroachment. Non-native species and indicators of eutrophication and/or changing water levels should be largely absent.*

- 5.3.10. *Providing these broad quality standards are met across the whole feature area, some heterogeneity in condition is both natural and acceptable, but the bulk (at least 60%) of the habitat should be referable to good quality transition mire, where:*

- Bottle Sedge *Carex rostrata* is present at high cover; or, where the vegetation is composed of mixtures of: Bogbean

Menyanthes trifoliata, Marsh Cinquefoil *Potentilla palustris*, Water Horsetail *Equisetum fluviatile*, Common Cottongrass *Eriophorum angustifolium*, Slender Cottongrass *E. gracile*, Bottle Sedge *Carex rostrata*, Bog Sedge *C. limosa*, Star Sedge *C. echinata*, Lesser Water-parsnip *Berula erecta*, Branched Bur-reed *Sparganium erectum* and the bog mosses *Sphagnum squarrosum* and *S. subnitens*.

- Common Reed *Phragmites australis* is not dominant.
- Purple Moor-grass *Molinia caerulea*, Greater tussocksedge *Carex paniculata*, Tufted-sedge *C. elata* and Great Fen-sedge *Cladium mariscus* are not abundant.
- Scrub is absent.
- Non-native species including Himalayan Balsam *Impatiens glandulifera* are absent.

Populations of the habitat's typical species must be being maintained or, where appropriate, increasing.

- 5.3.11. *In addition to the above typical plant species, the transition mire areas will also contribute to the wider fen environment of Crymlyn Bog in supporting a range of typical fenland bird and invertebrate species.*

Factors affecting the extent and quality of the habitat and its typical species (and thus affecting the habitat's future prospects) should be under appropriate control.

- 5.3.12. *Factors affecting the extent and quality of the transition mire habitat (including water quality, atmospheric pollution, water levels, successional change, scrub encroachment and nonnative species) should be under appropriate control.*

Conservation objective for Feature 3: Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, *Alnion incanae*, *Salicion albae*) (EU habitat code 91E0)

The extent should be stable in the long term, or where appropriate increasing.

- 5.3.13. *The extent of alluvial forest should be as mapped in 2009 by the last SAC monitoring exercise (Wilkinson & Bevan, 2009). An increase in alluvial forest at the expense of important open fen vegetation is not desirable.*

Quality (including in terms of ecological structure and function) should be being maintained or, where appropriate, improving.

- 5.3.14. *The alluvial forest should be of high quality throughout and composed of typical native species. Non-native species and indicators of eutrophication and/or drying out should be largely absent.*
- 5.3.15. *Providing these broad quality standards are met across the whole woodland area, some heterogeneity in condition is both natural and acceptable, but the bulk (at least 75%) of the habitat should be referable to good quality alluvial forest, where:*

- *The canopy is composed of Alder *Alnus glutinosa*, Grey Willow *Salix cinerea* and/or Downy Birch *Betula pubescens*.*
- *Over-mature canopy trees are frequent throughout.*
- *The field layer is dominated by Greater Tussock sedge *Carex paniculata*, with associates such as Yellow Loosestrife *Lysimachia vulgaris*, Royal Fern *Osmunda regalis*, Purple-loosestrife *Lythrum salicaria*, Bittersweet *Solanum dulcamara*, Yellow Iris *Iris pseudacorus*, Skullcap *Scutellaria galericulata* and Branched Bur-reed *Sparganium erectum*.*
- *Viable regeneration of *A. glutinosa*, *S. cinerea* and/or *B. pubescens* is frequent throughout, either as saplings or as regrowth from the base of trees or fallen stems.*
- *Species indicative of drying out (e.g. Bracken *Pteridium aquilinum*) or eutrophication (e.g. Common Nettle *Urtica dioica*) are absent.*
- *Non-native species such as Himalayan Balsam *Impatiens glandulifera* are absent.*

Populations of the habitat's typical species must be being maintained or, where appropriate, increasing.

- 5.3.16. *The alluvial forest should also support species that are naturally associated with a high quality alluvial forest ecosystem, including all its components from the soil, through ground flora and shrub layer to the canopy, and the micro-habitats and structural variations that occur within them. This includes soil flora and fauna, epiphytic lower plants, breeding birds and higher plants as listed above. Characteristic plants of the habitat in this locality such as Royal Fern *Osmunda regalis* and Marsh Fern *Thelypteris palustris* should also be stable or increasing.*

Factors affecting the extent and quality of the habitat and its typical species (and thus affecting the habitat's future prospects) should be under appropriate control.

- 5.3.17. *Factors affecting the extent and quality of alluvial forest (including water quality, atmospheric pollution, water levels and grazing) should be under appropriate control.*

5.4. Underpinning SSSI qualifying features

- 5.4.1. The Crymlyn Bog SAC/Ramsar is underpinned by Crymlyn Bog SSSI and Pant-y-Sais SSSI.
- 5.4.2. Crymlyn Bog SSSI is designated for its fen communities, wet woodland, associated invertebrate assemblages, a substantial population of nationally rare Slender Cottongrass, and a population of the nationally scarce Hornet Robberfly *Asilus crabroniformis*. The site is also part of the large inter-estuarine complex including Pant-y-Sais SSSI and the Neath floodplain. The site supports a complex mosaic of vegetation types, including communities of both rich and poor fen, swamp, Alder carr, and acidic grassland, in addition to plant species and communities usually characteristic of East Anglian fens.

5.4.3. Pant-y-Sais SSSI is located approximately 1.9km south-west of the Site at its closest point. It is designated as an area of predominantly lowland fen that supports a range of fenland communities including Sphagnum, *Molinia caerulea* communities, swamp areas with abundant *Typha latifolia*, and fen carr. The Tennant Canal section functions as a refuge for aquatic plants such as county rare Flowering Rush *Butomus umbellatus*.

5.4.4. The citations for Crymlyn Bog SSSI and Pant-y-Sais SSSI are included at Appendix 4.

5.5. Condition Status of SAC/Ramsar/SSSI Features

5.5.1. The Core Management Plan prepared in respect of Crymlyn Bog SAC/Ramsar details the condition of SAC features within Section 5 of the document. A summary of management requirements is also identified such that restoration of relevant features can be achieved.

5.5.2. Feature 1 (calcareous fen) is identified to be in “Unfavourable: Declining” condition due to the prevalence of *Phragmites australis* and/or *Cladium Mariscus*, likely as a result of insufficient management. Feature 2 (transition mire) is also identified to be in “Unfavourable: Declining” condition, in part on account of the prevalence of *Phragmites australis*. Feature 3 (alluvial forest) is considered to be in “Unfavourable: Recovering” condition. The continued natural maturation of the woodland is currently assessed as likely to allow ‘Favourable’ condition to be attained without specific management intervention being required.

5.5.3. As detailed above, the Crmlyn Bog SAC/Ramsar is underpinned by

- Crymlyn Bog SSSI; and
- Pant-y-Sais SSSI.

5.5.4. Crymlyn Bog SSSI comprises 14 management units. Of these, management units 2, 3, 5, 7, 8, 10 to 13 are identified to require action to attain ‘Favourable’ condition.

5.5.5. Pant-Y-Sais SSSI comprises 2 management units, of which unit 15 requires action. Further detail is provided within the Core Management Plan at Appendix 2.

5.5.6. Management/remedial issues which are identified as requiring attention to restore or attain ‘Favourable’ status are identified to include the following:

- Reinstatement of management for open water habitats (units 2 and 3),
- Management to control ecological succession such as grazing, cutting, and removal of arisings (units 5, 7, 8, 10 to 13, 15)
- Nutrient enrichment (units 5, 7, 10 to 12)
- Water levels, namely over-wetting (units 5, 7, 10 to 12)

- 5.5.7. Further consideration is given to management issues within the SSSI Management Statements for the Crymlyn Bog and Pant-y-Sais sites, with this provided at Appendix 5.

6. ASSESSMENT OF THE IMPLICATIONS OF THE DEVELOPMENT PROPOSALS ON THE DESIGNATED SITES

- 6.1. Section 2 of this document sets out the legislation, guidance, and case law of relevance to an assessment of the implications of a plan/project on a European site. Section 3 discusses key terms and themes associated with Habitats Regulations assessments. Having regard to this legislation and supporting guidance, it is clear the assessment is a two-stage process, the first being the 'likely significant effect', and the second being the 'integrity test'.
- 6.2. It is clear the Conservation Objectives of a European site are the most important consideration in determining whether the plan/project will have an adverse effect on the site, including any effects on its integrity.
- 6.3. It is evident there is a clear hierarchical approach to assessing effects on European sites in line with the Habitats Directive/Regulations. The primary test is that against the Conservation Objectives, with other considerations following these. Such other considerations would include:
 - Other features of interest associated with the site; and
 - Other relevant baseline information for the site.
- 6.4. In line with the above, whilst the qualifying interest features of the Site, and other baseline information, have informed this assessment, the greatest weight has been placed upon the formal Conservation Objectives for the European sites, as set out by NRW. As noted above, consideration has also been afforded to the Supplementary Advice produced by NE, where relevant.
- 6.5. With reference to the relevant designated sites/features, this Section includes a description of the potentially significant effects arising from the plan/project. The potential effects are assessed within this Section in order to address the test under Regulation 63 (1) in the first instance (the 'likely significant effect' stage).
- 6.6. In undertaking this assessment, consideration has been had to the best available scientific knowledge. Further consideration under the Habitats Regulations can therefore be undertaken consistent with the *Waddenzee* Judgement (C-127/02), which requires the use of the best scientific knowledge to inform a decision where no reasonable scientific doubt remains as to the presence and/or absence of effects that would adversely affect the integrity of the designated site (see Section 2 above).
- 6.7. Furthermore, consideration is given to the *People over Wind* Judgement (C-323/17), which confirmed the view of the CJEU that avoidance or mitigation measures can only be taken into consideration at the Appropriate Assessment stage. This overrules the domestic *Dilly Lane* Judgement in the High Court (see Section 2 above).
- 6.8. As set out in Section 2 of this iHRA, it is logical to distinguish between measures which are specifically "*intended to avoid or reduce the harmful effects*" (i.e. mitigation measures for the purposes of a HRA), and measures which would come forward in any event (i.e. intrinsic elements of scheme design). Notwithstanding these latter measures may, by default, avoid or

reduce harmful effects on a European site(s), if they are integral elements of a development proposal it remains appropriate to consider them at the first stage of the test.

Potential significant effects in the absence of mitigation

- 6.9. The Development Proposals and relevant contextual information have been described in Section 1 of this assessment report. The qualifying interest features and Conservation Objectives for all relevant designated sites are described in detail within Section 4 of this assessment.
- 6.10. As detailed in Section 3, given the nature of the Development Proposals and the Site's separation from any other European/Internationally designated sites, it has been concluded that no source/receptor pathway exists which could give rise to a likely significant effect for any European Sites, with the exception of Crymlyn Bog SAC/Ramsar.
- 6.11. In view of the reasons for the qualification of the Crymlyn Bog SAC/Ramsar, the distance of the Site from these designated sites, and the nature of the Development Proposals, the following pathways for potential significant effects have been screened out of requiring further consideration:
- Matters relating to direct 'land take' or accidental damage at the SAC/Ramsar;
 - Matters relating to noise, artificial lighting and air quality;
 - Dust impacts;
 - Spread of invasive species;
 - Potential recreational impacts; and
 - Matters relating to supporting habitat for the SAC/Ramsar.
- 6.12. In reaching this conclusion, it is noted that the proposals are physically well separated from the Crymlyn Bog (>0.6km), with extensive areas of vegetation in-between. Given this separation, there is no potential for impacts through land take or accidental damage. Similarly, the separation would prevent any risk of impacts through light spill during construction.
- 6.13. Noting the nature of the Proposals (discontinuance of a reservoir, and reversion of land to a naturalistic grassed valley), with no built form proposed, there is no potential for operational impacts as a result of recreational use, spread of invasive species, operational lighting or noise.
- 6.14. Regarding construction noise, none of the SAC qualifying features are considered to be sensitive to noise related impacts, noting these comprise habitat features only. Equally, and with reference to the Ramsar Information Sheet for Crymlyn Bog, none of the qualifying criteria (all of which comprise habitats, flora, or invertebrate interests) are deemed potentially sensitive to noise/vibration. In any event, again the significant separation between the Site and the Crymlyn Bog complex would prevent any construction related noise impacts arising. In reaching this conclusion, it is noted that construction works would be limited to excavation and plant movement. There are no requirements for piling, or construction related activities that may otherwise give rise to sudden or 'percussive' noise, as may otherwise be disturbing to bird populations. Noting the presence of existing road and rail infrastructure at considerably closer distances to the Crymlyn Bog, temporary vehicle

movements associated with the proposals would not have the potential to give rise to any significant adverse impact upon any faunal assemblages supported within the SAC/Ramsar/SSSI.

- 6.15. In regards dust impacts, it is noted dust arising during construction work only has a significant impact within 20m due to heavy soiling of vegetation; further than that it is dispersed and of negligible significance.
- 6.16. Noting this, and given the separation in this instance, it is not considered dust deposition would have the potential to result in direct impacts on the SAC. Notwithstanding the above conclusion, the implementation of standard engineering protocols will be adopted as an integral element of the scheme, in order to ensure dust deposition impacts on off-site habitats are fully avoided.
- 6.17. Regarding potential air quality impacts, the Proposals will not result in any built form, and therefore there will be no net increase in emissions arising either from traffic generation or on-site uses. Plant movements in the construction phase will be temporary in nature, and in any event on-site vehicle movements will be in excess of 0.6km from the Crymlyn Bog. Given that deposition rates for vehicle emissions are assessed to be insignificant (*nugatory*) beyond 200m, construction related air quality impacts can be scoped out.
- 6.18. Turning to potential supporting habitats, the habitats present within the Site are distinct from those within the Crymlyn Bog SAC/Ramsar. Indeed, (as set out in the accompanying Ecological Assessment), the vast majority of on Site habitats comprise of recently exposed bare ground, alongside an areas of unvegetated open water of poor quality. On the basis of the habitats present, and with reference to the breeding and wintering bird surveys of the wider Coed Darcy site, as well as detailed invertebrate surveys, there is nothing to indicate that the study site would be of potential breeding value for any of the qualifying species / assemblages within the Crymlyn Bog designated sites complex.
- 6.19. In light of the nature of the plan/project, the qualifying interest features site potential pathways for significant effects can be broadly distilled as follows:
- Hydrological impacts/water levels
 - Water quality impacts including:
 - toxic pollutants
 - sedimentation
 - nitrification
- 6.20. Each of these potential pathways for significant effects are considered in detail below. Where appropriate, consideration is given to avoidance/mitigation strategies which allow for potential effects through the above pathways to be avoided and/or mitigated.

Consideration of the implications of the proposals on the integrity of Crymlyn Bog SAC/Ramsar

Hydrological Impacts/Water Level

Vulnerability

- 6.21. Maintenance of appropriate water levels are essential for wetland sites, and Crymlyn Bog is no exception. If the water table is too low wetland habitats risk drying out, leaving them prone to erosion, the effects of drought, and at heightened risk of fire damage. Conversely, if the water table is too high 'over-wetting' can occur, with this having the potential to alter habitat communities, potentially leading to the transition of fen and transition mire to non-target habitat types. Within their scoping response to the Proposed Development, NRW have specifically identified the risk of over-wetting at Crymlyn Bog, a matter also identified within the Core Management Plan for the SAC/Ramsar. It is relevant to note that funding has since been secured by NRW, in the form of the LIFEquake project, which will permit vegetation clearance works to improve drainage flows through the Crymlyn Bog and therefore reduce water levels overall.

Consideration of Likely Significant Effects

- 6.22. The Crymlyn Bog has an extensive catchment area, receiving water from hundreds of inputs across its circa 7 miles circumference. The Site has historically contributed to this overall input, both prior to the construction of the NSR, as well as for much of its operational lifespan, where water levels have been permitted to over-top the NSR, via an overflow channel, and discharge towards the Crymlyn Bog via a watercourse traversing the site to the Tal-y-wedu outfall. The Site forms only a small component of this overall catchment.
- 6.23. Notwithstanding the long-term input contribution the Site has made to the Crymlyn Bog, the current pumping regime has temporarily 'broken' the historic hydrological link between the NSR and this designated site complex (with waters instead diverted to the strategic sewer network). Under the current baseline scenario, and as a result of artificial pumping, there is no hydrological link between the Site and the Crymlyn Bog designated site complex.
- 6.24. The proposals seek the discontinuation of the NSR and the restoration of the Site to its historic condition, including the reinstatement of the watercourse. In practical terms, this equates to the removal (breaching) of the retaining dam, and the creation of a grassed valley system with a central watercourse that discharges towards the Crymlyn Bog via the Tal-y-wedu outfall. Resultantly, the Site will no longer hold a volume of standing water in excess of 10,000m³ and artificial pumping will cease.
- 6.25. Whilst the proposals will revert the Site to a historic (natural) hydrological baseline, it is acknowledged that the change in regime would give rise to increased water flows, relative to the current baseline scenario. This impact would be comparable, in quantitative terms, to the cessation of artificial pumping (which would ultimately result in the NSR overtopping and flows reaching the Crymlyn Bog).
- 6.26. A net increase in flows towards the Crymlyn Bog would arise when the Proposals are considered in isolation. This increase is relative to the recent (pumped) baseline scenario rather than the historic scenario in which all flows were received by the Bog. A wider Water Balance Surface Water Catchment

assessment, has considered the quantitative changes in inflows identified from all potential inputs (including that predicted as a result of the Coed Darcy Masterplan). Whilst extreme rainfall events will cause temporary raising of levels in the Crymlyn Bog (currently modelled at 10mm for the 1:100 year +CC year) the input into the bog from the wider catchment would be significantly greater than the sole NSR catchment contribution. In normal flow conditions water level rises within the bog are likely to be negligible.

- 6.27. Given the anticipated negligible increases in water levels predicted within the Crymlyn Bog as a result of the proposals, they are not predicted to give rise to likely vegetative changes of significance within the SAC, nor influence the distribution of the Annex I habitats.
- 6.28. Nonetheless, and on a precautionary basis, the Proposals will adopt a two-phase drainage strategy in this instance. This two-phase approach would adopt a Grampian style mechanism, preventing any reversion of 'historic flows' (i.e. flows from the Site towards the Crymlyn Bog), until such a time that agreement is reached with NRW and NPTC. This will permit, for example opportunities to discuss the sequencing of drainage improvement or channel clearance works within the Crymlyn Bog (e.g. Glan y Wern canal). Given this phased strategy is specifically proposed to avoid impacts on European sites, it constitutes a mitigation measure under the Habitat Regulations. As such, the correct procedural approach, as made clear in the *People Over Wind* Judgment, is for this mitigation to be considered at the Appropriate Assessment stage (see Section 7 below).
- 6.29. Noting the lack of current hydrological connectivity between the Site and the Crymlyn Bog, there is not considered any potential for hydrological impacts during construction to arise. Indeed, the proposed phasing of construction (which will include the retention attenuation capacity within the Application Site until the completion of all remedial works) will ensure there is no potential for construction stage surface water to discharge towards the Crymlyn Bog. In any event, a Construction Environmental Management Plan (CEMP) will be secured for the Site which will ensure appropriate, best practice safeguards are adopted throughout construction. This will ensure that potential adverse impacts as a result of the hydrological regime can be avoided, both when considered alone and in combination with other plans and projects. The CEMP is to be secured by a suitably worded planning condition. Noting this document forms an integral component of the proposals, as opposed to mitigation in relation to the Crymlyn Bog specifically, it is considered appropriate to account for at this stage of the assessment process.

Water Quality

Vulnerability

- 6.30. Changes to water quality have the potential to directly impact the communities and assemblages supported within the Crymlyn Bog SAC/Ramsar site. Excessive levels of nitrates and phosphates can lead to nutrient enrichment, in turn encouraging rapid or undesirable vegetation growth, and potentially ecological succession. The release of petrochemicals or heavy metals can result in toxic contamination which has the potential to directly harm interest features, not least invertebrates and plant species. Via

the uptake of toxins by these groups, knock on effects on organisms further up the food chain (e.g. birds or mammals), are also possible.

Consideration of Likely Significant Effects

- 6.31. Whilst the current pumping regime has broken the long-standing hydrological connectivity between the Site and the Crymlyn Bog SAC/Ramsar, the Proposals seek to restore this hydrological connectivity via removal of the NSR dam and the recreation of a watercourse historically present within the valley basin. Therefore, without mitigation/avoidance measures, it is considered the Development Proposals would have the potential to lead to changes in the quality of surface water runoff discharged from the Site. Such effects could arise in both the construction and operational phase of the Proposed Development (noting that the proposed watercourse will receive surface waters from the M4 motorway, upstream of the Application Site).
- 6.32. Potential pollutants of particular relevance in this instance include Nitrogen (N), phosphorous (P), suspended solids (SS), hydrocarbons, road salts, oil and grease (Hydrocarbons), pH, and suspended solids.
- 6.33. The remediation of the Site, as well as its restoration to a naturalistic landscape is an integral component of the proposals, being a legal requirement stipulated under the long-term tenancy agreement made with Coombe Tennant Estate. As such, these measures can be viewed as inherent scheme design, rather than targeted avoidance measures through the lens of the Habitat Regulations 2017. It is therefore appropriate to consider them at this stage of the assessment process.
- 6.34. The completion of Site remediation under the Proposals will include for the following measures:
- Targeted remediation works within the NSR in order to ensure that any restored landform achieves appropriate environmental standards, both in regards water quality and chemical quality of soils; and
 - A landscape restoration scheme, including consideration of extant semi-natural habitats in the immediate area.
- 6.35. Regarding the environmental standards to be adopted in this instance, it is proposed that these be agreed with NRW and secured for the Proposals in the form of a suitably worded planning condition. Confirmation of water quality will be afforded via monitoring during and post-remediation of the NSR to ensure the quality of waters discharged from the Site has achieved environmentally appropriate standards. Again, this monitoring regime is proposed to be secured through a suitability worded planning condition, including for written approval of NRW.
- 6.36. As detailed in respect of water quantity above, until such a time that agreed water quality standards have been achieved (in agreement with NRW), it is proposed for flows from the Site to continue to be pumped to the diverted to the strategic sewer network, therefore preventing any potential for adverse water quality impacts to arise on the Crymlyn Bog SAC. As a further safeguard (to prevent any risk of uncontrolled flows in flood events), it will be ensured that the Application Site will retain capacity to temporarily store

waters in flood events (and therefore exclude a risk of any water flows exiting the Site towards the Crymlyn Bog). Accordingly, the Proposals will require either retention of the existing dam, or otherwise the implementation and retention of alternative, temporary attenuation features (as could be installed for the construction phase) until the final stage of development, when appropriate water quality has been achieved and approved by NRW. At this stage it is anticipated that dam removal will take place during an early construction phase, and therefore that temporary attenuation basins will be utilised for much of the construction phase.

- 6.37. Notwithstanding that the restoration and remediation of the Site can be viewed as an integral component of scheme design, the two-stage drainage approach does represent a targeted avoidance measure through the lens of the Habitat Regulations 2017 (as amended).
- 6.38. Regarding potential impacts during construction, and as detailed in respect of water quantity above, there is no current hydrological link between the Site and the SAC. Nonetheless, it is intended for the Proposals to be supported by a comprehensive CEMP for the Proposals, ensuring compliance with industry standards and best practice measures. This is proposed to be secured by way of a suitably worded planning condition.
- 6.39. This will ensure that potential adverse impacts arising from water quality can be avoided, both when considered alone and in combination with other plans and projects. Noting this CEMP document forms an integral component of the proposals, as opposed to mitigation in relation to the Crymlyn Bog specifically, it is considered appropriate to account for at this stage of the assessment process.
- 6.40. Importantly, it should be noted the Proposed Development is intrinsically linked to the long-term and on-going remediation of the wider Coed Darcy site following its prior use as an oil refinery. The extensive historic decommissioning of the previous structures/operations, large scale remediation, and the implementation of previous management and monitoring plans have already contributed significantly to the safeguarding of the Crymlyn Bog SAC/Ramsar.

Summary

- 6.41. It is considered mitigation on a precautionary basis is required in respect of the following potential adverse impacts on the SAC/Ramsar/SSSI:
- Hydrological impacts (water quality / quantity)
- 6.42. Appropriate avoidance and mitigation measures can be secured for the Development Proposals such that potential harm through the above pathways can be avoided. Appropriate measures in this regard are detailed in Section 7 of this iHRA. The securing of these measures would ensure potential impacts on the integrity of the Crymlyn Bog SAC/Ramsar complex would be avoided.
- 6.43. However, given these measures are specifically proposed to avoid impacts on European sites, they constitute a mitigation measure under the Habitat Regulations. As such, the correct procedural approach, as made clear in the

People Over Wind Judgment, is for this mitigation to be considered at the Appropriate Assessment stage (see Section 7 below).

- 6.44. In the absence of appropriate avoidance and mitigation measures it is considered, on a precautionary basis, that potential adverse impacts on the SAC/Ramsar site/SSSIs could arise through hydrological impacts.

7. APPROPRIATE ASSESSMENT, MITIGATION/AVOIDANCE MEASURES AND IN COMBINATION CONSIDERATIONS

- 7.1. As outlined in Section 6 above, a range of measures are to be adopted to avoid potential impacts on off-site receptors (Crymlyn Bog SAC/Ramsar). These measures include for the implementation of an extensive remediation exercise, landscaping and the adoption of a wide range of construction safeguards, as would be secured within documents including a CEMP, and would form an integral element of scheme design. It is considered appropriate for these to be considered at the 'screening stage' of Regulation 63, as opposed to needing to be considered as part of an Appropriate Assessment.
- 7.2. Notwithstanding this position, and on a precautionary basis to nullify any potential for adverse impacts to arise in the short term, it is proposed for a two phase drainage strategy to be secured in this instance. As above, this two stage approach is specifically identified as an avoidance/mitigation measure to avoid potential adverse impacts on the Crymlyn Bog SAC. Resultantly, it is appropriate for this mitigation to be considered at this (Appropriate Assessment) stage.
- 7.3. Regarding other potential impact pathways, following conclusions reached in the above Assessment Section, mitigation and avoidance measures which are to be brought forward for each relevant effect pathway are described below.

Water Quantity

- 7.4. As detailed above, the Proposals will result in anticipated minor increases in inflows towards the Crymlyn Bog and generally negligible rises in water level relative to the current hydraulic baseline position. These flows will enter via the Tal-y-wedu outfall, leading into the Crymlyn Brook. These increases, which are considered minor in nature, will achieve reversion to the historical (pre NSR and pre pumping) hydraulic baseline position. This notwithstanding, anecdotal evidence (as reported within the Crymlyn Bog SAC Conservation Objectives) suggests that the site has become wetter in recent times, with this in turn impacting some of the long-term management practices for the SAC, namely grazing. As detailed within the Conservation Objectives for the site, the *"wetter nature of the site in recent decades is likely to be genuine, resulting from high water levels in the Glan y Wern and Tennant Canals. Regular over-topping of these canals is believed to influence the distribution of the Annex I habitats"*.
- 7.5. The current (higher) water levels within the Crymlyn Bog are therefore assessed as being undesirable and are a contributing factor to the 'Unfavourable – Declining' condition of the Calcareous Fen and Transitional Mire habitats for which the SAC is designated. Noting this, and notwithstanding the exceedingly limited changes in water level predicted to arise due to the Proposals, these would have the potential to exacerbate the existing issue and contribute towards adverse condition.
- 7.6. Importantly however, NRW have now secured funding for their LIFEQuake initiative which, amongst other matters, will allow for the implementation of on-site interventions within the Crymlyn Bog. The measures being

implemented by NRW are understood to include for works to facilitate access management to the Crymlyn Bog, investigations to ascertain the desirable hydraulic conditions across the Bog and subsequent measures to implement management interventions within the designated site. In particular, these management measures are expected to include works to clear waterways within the SAC (including the Crymlyn Brook, Glan y Wern and Tennant Canals). These clearance works are predicted to improve water flows throughout the SAC, preventing over-topping at key locations (particularly within units 5, 7, 11 and 15), therefore permitting an overall reduction in water levels in these areas. The scope of works above are predicted to address the underlying factors contributing to Unfavourable Condition as a result of hydrology, thereby ensuring that water levels are not giving rise to harm at the SAC in future years. It is expected that improvement in water levels within the SAC, as a result of LIFEQuake works, will off-set (to acceptable levels) any increase in flows arising as a result of the Proposals. Indeed, this position has been reaffirmed by NRW in their PAC consultation response, where they have stated that *“The additional flow transferred from the North Site Res [sic] catchment can be accommodated within the Bog without adverse impact if the drainage channels, i.e. Glan y Wern canal, Crymlyn Brook, semi-circular ditch are clear and would enable through flow of water down the lowest point of the Bog and out to the Tennant Canal and its spill structures, not leading to an increase in wetting/raised water levels”*

- 7.7. Notwithstanding that water levels are predicted to improve in future years, detailed hydraulic modelling to quantify this improvement is not available at this time. As such, the net quantitative changes in flows, as well as the net change in water levels across the Crymlyn Bog are not currently known.
- 7.8. Noting the above, and notwithstanding the minor contribution to flows that would arise from the Proposals, it is therefore proposed for a two-stage drainage solution to be secured for the Proposals on a precautionary basis. This two-stage approach would include a mechanism to prevent any net increase in flows from the Site to the Crymlyn Bog, until such a time that written authorisation is provided by NRW. This will permit for further discussions between the applicant and NRW, as is consistent with their PAC response in which the following statement is made: *“Clearance of vegetation from the Glan y Wern canal, which would act as a conduit for the additional water, is therefore a pre-requisite action prior to any reconnection of the NSR watercourse”*.
- 7.9. This two-stage approach is set out below.
- 7.10. The intention under ‘Phase 1’ is to maintain pumping of waters within the Site, such that there is no initial hydrological link in the initial post-development scenario. In retaining this ‘status-quo’, the proposals will ensure that there is no hydrological connection between the Site and the nearby Crymlyn Bog designated sites complex under Phase 1 of the proposals. All waters will continue to be discharged via the consented trade effluent which outfalls to the River Neath. This pumping regime will be retained whilst wider restoration works (including investigation of contaminants, remediation, land forming and landscaping) are completed and until sufficient hydrological monitoring data has been gathered to demonstrate, beyond reasonable scientific doubt, that the waters held within the Site meet appropriate environmental standards and can be discharged at appropriate

standards/rates to avoid any potential adverse impacts (either alone or in combination) upon the Crymlyn Bog complex.

- 7.11. For clarity, the monitoring regime will consider both water quality and water quantity, ensuring both achieve appropriate environmental levels.
- 7.12. Whilst sufficient pumping rates can readily be achieved in normal (non-flood) conditions (i.e. to avoid potential overtopping towards the Crymlyn Bog), it is recognised that pumping may not be sufficient to prevent flows entering the Crymlyn Bog in flood events, if the NSR dam was removed upfront and no alternative (temporary) storage solution was made available.
- 7.13. For this reason, the Proposed Development seeks to retain sufficient flood attenuation capacity with the Application Site until the final stage of the development process. For clarity, the development proposals will either bring new (temporary) attenuation features online or otherwise retain the existing dam until all necessary site remediation works have been completed and once a sufficient post-remediation water monitoring dataset has been collated (sufficiently representative to account for potential seasonal trends) which demonstrates no significant risk to the Crymlyn Bog. This approach to NSR decommissioning will ensure that, even in the most significant flood events, no construction phase hydrological link would exist between the Application Site and the Crymlyn Bog.
- 7.14. Following the completion of requisite remediation and restoration works, and the provision of monitoring data to the satisfaction of NRW and NPTC, it is then the intention to cease pumping and restore the natural (historical) hydrological link towards the Crymlyn Bog (i.e. Phase 2). For clarity, the long-term intention is for surface waters to discharge towards the Crymlyn Bog via the Tal-y-wedu outfall. Importantly, and as an additional safeguard, it is proposed for the timing of any hydrological 're-connection' to be informed by the LIFEQuake restoration works (including clearance works to the Glan y Wern canal) being implemented by NRW and which, amongst other matters, seek to improve drainage flows through the Crymlyn Bog.
- 7.15. The inclusion of this trigger mechanism, which may be secured by way of a Grampian Condition (or otherwise a permitting regime or legal agreement), would provide a safeguard sufficient to avoid any adverse changes in the hydraulic regime, as a result of the Proposals. It would avoid any potential route through which changes in water levels within the Crymlyn Bog may arise, until such a time that proposed flows can be confirmed as non-harmful (in agreement with NRW). As above, it is considered that any re-connection works would be informed by timeframes for drainage improvement or channel clearance works within the Crymlyn Bog (e.g. Glan y Wern canal), and therefore is consistent with the PAC response from NRW.
- 7.16. As above, the Phase 2 element of the Proposals (i.e. the restoration of the hydrological link between the Site and the Crymlyn Bog) will only take place following completion of all on-site remediation (including relevant landscaping) and once detailed hydrological modelling is available to confirm discharge flow rates. The considerable landscape creation works within the Site, inclusive of meadow grassland and provision of a naturalistic water channel would both ensure habitat provision and help attenuate water flows

and discharge rates through the Site. The landscape proposals for the Site are included at Appendix 6.

- 7.17. The land reformation, landscaping regime and drainage strategy for the Site will be specifically designed in a way that regulates the rate of discharge of water from the Site.
- 7.18. The detailed design of the proposed channel will be such that its performance allows moderation of discharges for both frequent, low volume run-off events, as well as more extreme (storm) rainfall events (including future climate change scenarios). It will permit flows to be released at slower rates but over a longer period. This will allow for a level of control of flood waters passing through the Site and permit a more predictable hydrological regime within the nearby SAC.
- 7.19. For completeness, a table summary of the mitigation approach in regards water quality and quantity impacts, is set out below. Further details on each of these steps are also included within the Flood Consequences Assessment (FCA) submitted alongside this HRA.

	Sequential Works Within Phase	Detail of Works
Phase 1 (Works to ensure no hydrological connectivity between the Site and Crymlyn Bog)	A. Enabling works and water management	Install necessary pumps, sumps, drainage channels and temporary attenuation features to enable final dewatering and control water levels during wider Phase 1 works.
	B. Silt investigation to inform detailed remediation strategy	Completion of silt sampling once sediments are sufficiently dry to permit access. Data will be used to confirm Remediation Strategy
	C. Soil remediation works	Completion of remedial earthworks, envisaged to be a combination of in situ treatment and removal of heavily contaminated sediments.
	D. Land form earthworks and landscaping	Completion of Phase 1 landscaping (i.e. all elements that don't require dam / temporary attenuation removal). Dam removal to proceed at this stage if an appropriate quantum of alternative (temporary), on-site attenuation is provided upfront.
	E. Continued surface water monitoring	Continuance of surface water quality monitoring until collation of sufficiently representative dataset to account for potential seasonal trends. Once water quality is considered to demonstrate no unacceptable risks to Crymlyn Bog, discussions will be held with NRW. These discussions to include consideration of LIFEquake works and

		the sequential approach to re-connection. N.B water will continue to be pumped to the 36" Trade effluent discharge point for the duration of Stages 1 to 5 inclusive.
Phase 2 (Hydrological reconnection to Crymlyn Bog)	F. Dam removal	Following approval from NRW in respect of necessary water quality / quantity mitigation having been achieved. Remove dam and/or temporary flood water attenuation features and complete any associated earthworks and landscaping. Re-establish stream to restore hydrological connectivity to Crymlyn Bog via the Tal-y- Fedw stream.
	G. Final de-commissioning works	Removal of any remaining temporary attenuation features, sumps and pumps and return of land to landowner.

Table 1. Summary of phased works proposed to ensure the Proposed Development avoids adverse impacts on the Crymlyn Bog designated sites complex.

- 7.20. Thus, insofar as changes to the hydrological regime are concerned, potential significant adverse effects on the integrity of the Crymlyn Bog SAC/Ramsar site (and SSSI) will be mitigated by appropriately designed landscaping within the Site, alongside the adoption of an appropriate two-phase mitigation approach to prevent any harmful increase in flows towards the Crymlyn Bog.
- 7.21. Subject to the adoption of the above measures, and with regard to other plans and projects which are due to come forward and which are also predicted to influence the hydrological regime of the Crymlyn Bog, it is considered the Proposed Development would not give rise to potential harm as a result of water quantity impacts. At worst, potential impacts would be nugatory.

Water Quality

- 7.22. As detailed in Section 6 of this assessment, the Proposals seek to implement a remediation regime within the Site, inclusive of land reformation and an extensive landscaping regime. These measures collectively seek to ensure soils within the Site achieve appropriate chemical quality, and additionally allow for the improved treatment of waters which will flow through the Site, not least surface water flows arising from the nearby M4 motorway.
- 7.23. The Proposals will therefore provide a mechanism to ensure that, when the Site becomes hydrologically reconnected to the Crymlyn Bog (i.e. when pumping ceases and reinstated flows exit the Site towards the Crymlyn Bog via the Tal-y-wedu outfall), any discharged waters will be achieving suitable chemical quality. As for water quantity above, it is proposed for these standards / thresholds to be agreed in writing with NRW.
- 7.24. However, it is understood that precise water quality levels will only be identifiable once the final channel has been installed, and monitoring can undertaken at this feature directly. Accordingly, it is proposed that waters are discharged towards the strategic sewer network (as is the baseline position)

until such a time that written consent has been obtained from NRW that appropriate quality has been met, and therefore the historical flow regime (pre-NSR) can be restored.

- 7.25. As detailed for water quantity above, the Development proposals will ensure the Application Site retains capacity to temporarily store waters during flood events up until appropriate water quality is achieved (to the satisfaction of NRW). This safeguard will avoid any potential hydrological connection between the Application Site and the Crymlyn Bog during construction. This approach will either require either retention of the existing dam, or (as is anticipated at this stage), the provision of alternative, temporary attenuation features (to be installed prior to dam removal) until the final stage of development.
- 7.26. Once appropriate water quality has been achieved, the existing NSR dam (and/or temporary attenuation) will be removed and pumping ceased (allowing hydrological reconnection of the Site and the Crymlyn Bog). This two-phase approach, which would be secured by a suitably worded planning condition, would provide a robust backstop, removing any potential for adverse water quality impacts to arise on the Crymlyn Bog as a result of the Proposals, either alone or in combination with other plans or projects.
- 7.27. In light of the above, and subject to the adoption of an appropriately designed scheme, any potential water quality impacts on the Crymlyn Bog SAC/Ramsar during the operational phases would be fully avoided or mitigated. The identified mitigation measures and safeguards may be appropriately secured by Condition or legal obligation.
- 7.28. Subject to the adoption of the above measures, it is considered the Proposed Development would not give rise to potential harm as a result of water quality impacts. At worst, potential impacts would be nugatory.

Summary Conclusions in Relation to Mitigation

- 7.29. In summary, no potential impacts have been identified to arise as a result of land take or accidental damage, noise pollution, air quality, dust, artificial lighting, spread of invasive species, recreational impacts or impacts to supporting habitat. Resultantly, no mitigation is required in respect of these pathways.
- 7.30. In regards hydrological impacts (quantity and quality), a series of intrinsic mitigation measures, including the adoption of a suitably designed drainage strategy, will be secured, ensuring potential adverse impacts are avoided. As a further safeguard, which forms a targeted mitigation and avoidance measure for the SAC/Ramsar, it is proposed for a two phase drainage strategy to be secured, in the form of a Grampian Style planning condition. This will provide a further safety net, avoiding any hydrological connectivity between the Site and the Crymlyn Bog until such a time that the Proposals have demonstrably achieved acceptable quality and quantity of water discharge.
- 7.31. In all instances, the mitigation and avoidance measures proposed can be secured by planning Condition or through a Section 106 planning obligation, in order to give further comfort to the competent authority.

Consideration of In-combination effects

- 7.32. Ecology Solutions considers the potential effects identified in relation to the Development Proposals will be avoided or mitigated through the implementation of the measures set out in this iHRA, such that there would be no significant residual adverse effects on the Crymlyn Bog SAC/Ramsar, their underpinning SSSIs, or indeed any other European designated sites when the plan/project is considered alone. For clarity, the Development Proposals, when considered alone, would not adversely impact the integrity of any European sites.
- 7.33. Importantly, the two-phase drainage approach set out in this instance has been specifically designed to consider the cumulative impacts of other plans or projects assessed as likely to come forward in the wider Crymlyn Bog catchment. In particular, the timing of the Proposed hydrological 're-connection' of the Site and the Crymlyn Bog is to be directly linked to the completion of relevant works under the LIFEQuake project which is being implemented by NRW. As above, NRW have confirmed through the PAC process that channel clearance works within the Crymlyn Bog (e.g. Glan y Wern canal) would be sufficient to offset any water flows from the NSR.
- 7.34. The inclusion of this trigger mechanism, which may be secured by way of a Grampian Condition, provides a sufficient safeguard to ensure no adverse changes in the hydraulic regime, as a result of the Proposals, when considered in combination with other plans or projects. It would avoid any potential route through which changes in water levels within the Crymlyn Bog may arise, until such a time that proposed flows can be confirmed as non-harmful (in agreement with NRW).

Summary Conclusion of Appropriate Assessment

- 7.35. Having undertaken an Appropriate Assessment considering all of the potential significant effects which could arise from the Proposals, in light of the package of avoidance and mitigation measures proposed, Ecology Solutions conclude the proposals would not be likely to give rise to a significant effect on the integrity of the Crymlyn Bog SAC/Ramsar (nor any other European site), when the proposed scheme is considered either alone or in combination with other plans or projects. No additional adverse impacts have been identified in relation to the underpinning SSSIs and no additional mitigation would be required.

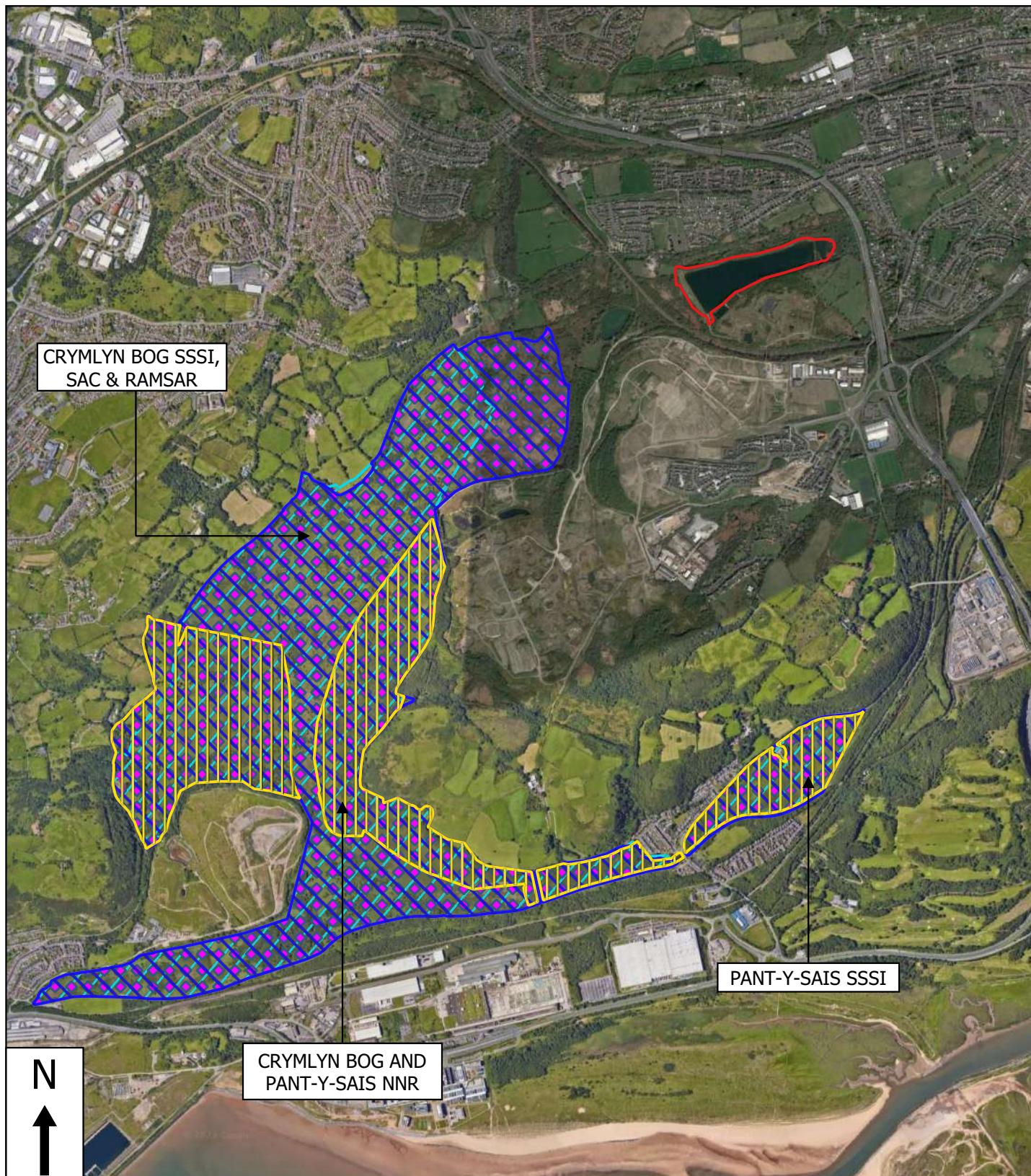
8. CONCLUSIONS

- 8.1. Ecology Solutions has undertaken a detailed assessment of the implications of the Proposals on the Crymlyn Bog SAC/Ramsar in view of the European sites' Conservation Objectives.
- 8.2. The findings of this work are set out within this information to enable a Habitats Regulations Assessment document, such that the competent authority, in exercising its duties under the Habitats Regulations, has all the necessary information before it to consider the Development Proposals against the strict tests set out in the legislation.
- 8.3. Assessment under Regulation 63 of the Habitats Regulations is required in this instance, since the Site lies in close proximity to the Crymlyn Bog SAC/Ramsar. Consideration has also been given to any additional impacts which could arise in relation to the SSSIs which underpin these European sites, wherever relevant.
- 8.4. All relevant potential pathways for significant effects to arise on the European designated site as a result of the Development Proposals have been fully examined, initially in the absence of avoidance/mitigation measures (at the 'likely significant effect' stage) and subsequently taking into account the avoidance measures proposed (at the 'Appropriate Assessment' stage). This assessment has been undertaken with due regard to relevant legislation, case law and planning decisions, guidance, and information, such as that provided by JNCC and NRW.
- 8.5. Appropriate avoidance and mitigation measures have been identified where necessary as part of the Proposals. These measures give due regard to other plans and projects of relevance in the catchment, allowing for an in-combination assessment to be undertaken.
- 8.6. Having considered all the potential significant effects that could arise from the Development Proposals, in light of the avoidance and mitigation measures proposed, Ecology Solutions conclude the proposals would not result in any adverse effects on the integrity of the Crymlyn Bog SAC/Ramsar (in view of the site's Conservation Objectives), when the Development Proposal is considered alone or in combination with other plans or projects.
- 8.7. As such, the Development Proposals would, by definition, be acceptable subject to securing the avoidance measure proposed. In those terms the competent authority could legally and safely grant an approval under the Habitats Regulations 2017 for the proposed plan/project.
- 8.8. As the project alone or in combination would not give rise to adverse impacts on the integrity of the SAC/Ramsar site (in view of the Conservation Objectives), or adverse impacts on the constituent SSSIs, the Development Proposals would by definition be acceptable, subject to securing the avoidance measure proposed. In those terms the competent authority could legally and safely grant consent for the proposed plan/project.

PLANS

PLAN ECO1

Site Location in Relation to Relevant Designated
Sites



KEY:

- SITE BOUNDARY
- NATIONAL NATURE RESERVE (NNR)
- RAMSAR SITE
- SPECIAL AREA OF CONSERVATION (SAC)
- SITE OF SPECIAL SCIENTIFIC INTEREST (SSSI)



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PLAN ECO1: SITE LOCATION IN
RELATION TO RELEVANT DESIGNATED
SITES

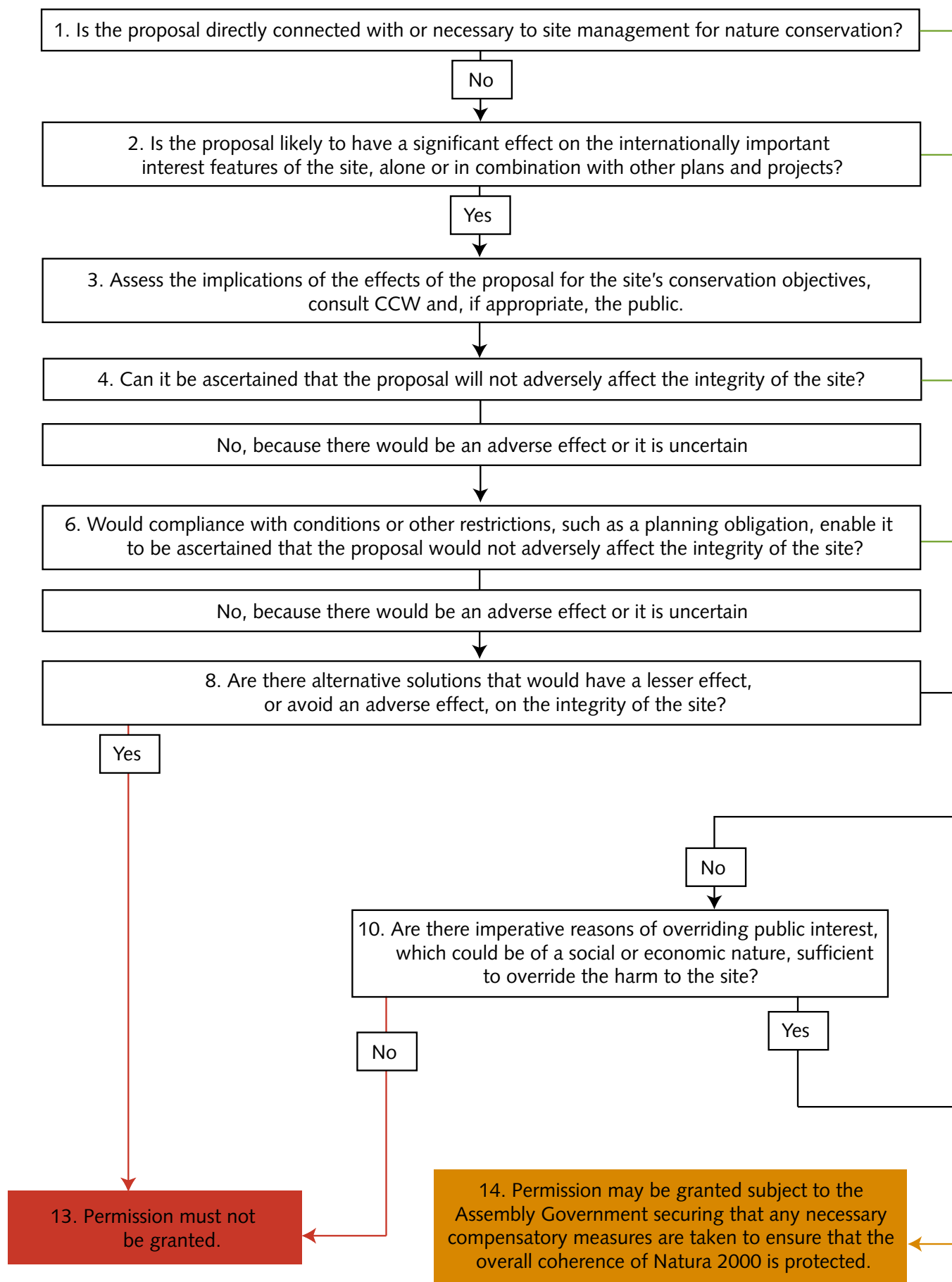
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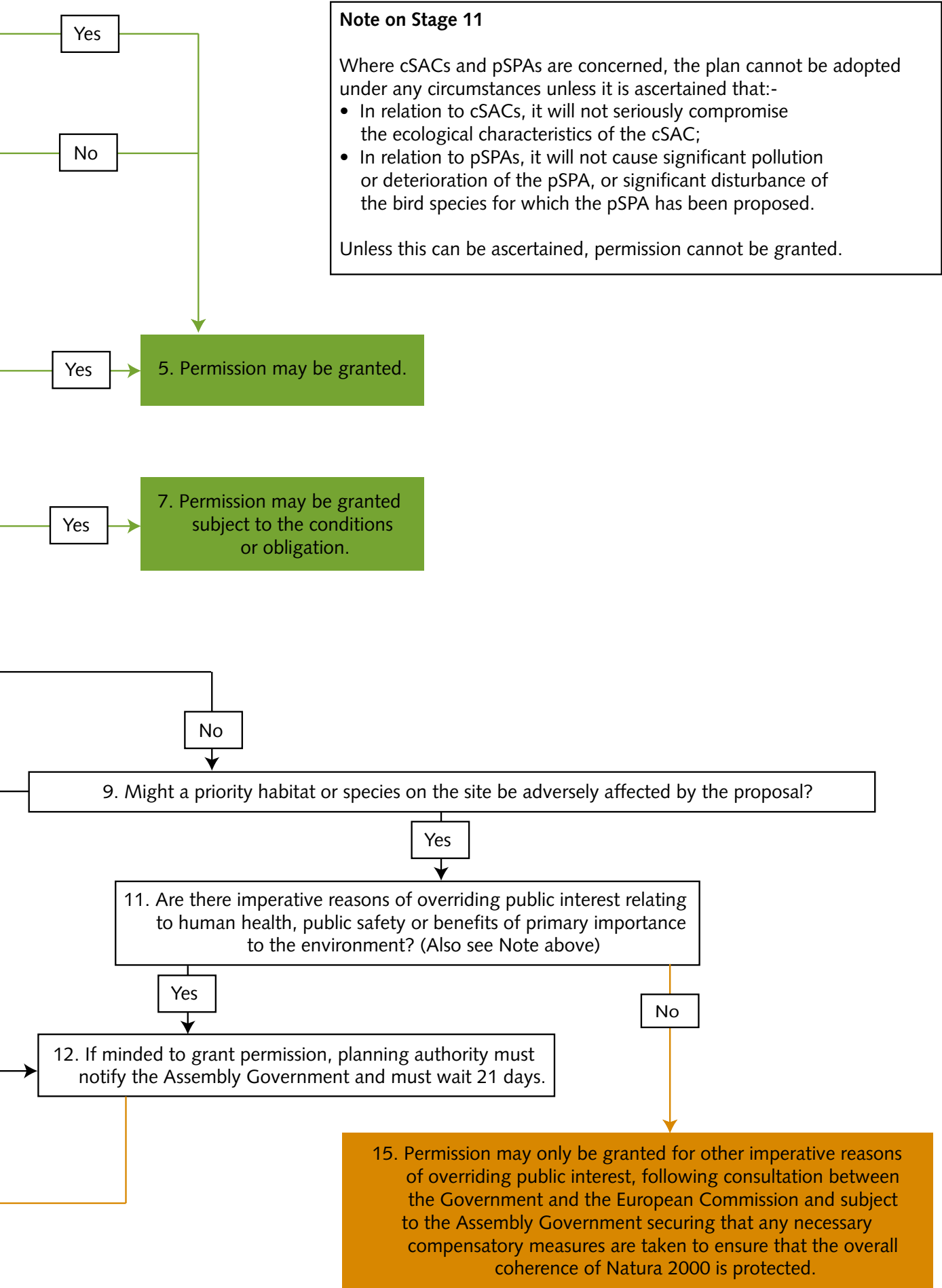
APPENDICES

APPENDIX 1

Flow Diagram from TAN 5

CONSIDERATION OF DEVELOPMENT PROPOSALS AFFECTING INTERNATIONALLY





APPENDIX 2

Core Management Plan (Conservation Objectives)
and Natura 2000 Data Form for Crymlyn Bog SAC

CORE MANAGEMENT PLAN INCLUDING CONSERVATION OBJECTIVES

FOR

CRYMLYN BOG / CORS CRYMLYN SPECIAL AREA OF CONSERVATION (SAC)/CRYMLYN BOG RAMSAR SITE

Version	Date	Summary of changes made	Approved by
Version 6	25 April 2014	Updated to the new format. Conservation Objectives rewritten and monitoring results updated.	Mary Youell
Version 5	29 September 2010		Charlotte Gjerlov
Version 4	9 April 2008		Tracey Lovering

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PREFACE

This document provides the main elements of Natural Resources Wales' management plan for the site(s) named. It sets out what needs to be achieved on the site(s), and advice on the action required. This document is made available through Natural Resources Wales' web site and may be revised in response to changing circumstances or new information. This is a technical document that supplements summary information on the Natural Resources Wales' web site.

One of the key functions of this document is to provide Natural Resources Wales' statement of the Conservation Objectives for the relevant Natura 2000 site(s). This is required to implement the Conservation of Habitats and Species Regulations 2010, as amended. As a matter of Welsh Government Policy, the provisions of those regulations are also to be applied to Ramsar sites in Wales.

1. VISION FOR THE SITE

This is a descriptive overview of what needs to be achieved for conservation on the site. It brings together and summarises the Conservation Objectives (part 4) into a single, integrated statement about the site.

Lowland fen will be the predominant habitat at Crymlyn Bog SAC, covering approximately 80% of Crymlyn Bog itself and about 75% of Pant y Sais fen.

A range of fen communities will be represented, including the SAC Annex I habitat types 'calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*' and 'transition mires and quaking bogs'; at least 56 ha of the former habitat and 21 ha of the latter type will be present across the SAC.

Effective habitat management will be carried out to maintain the lowland fen vegetation (including its component SAC habitats) in favourable condition. This conservation management will be based on techniques such as grazing and vegetation cutting, as requirements dictate. Targeted scrub control will also be undertaken to prevent scrub development in important habitat areas. Wider protection measures will safeguard water levels, water quality and atmospheric pollution impacts at the site; this will include measures to minimise impacts from known surrounding sources including Tir John landfill site, the former Llandarcy oil refinery site (now being redeveloped as Coed Darcy urban village) and watercourses such as Crymlyn Brook.

Wet woodland will occupy approximately 10% of Crymlyn Bog, including the SAC Annex I habitat 'alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*'. This woodland will continue to develop a natural wet woodland species composition and structure, through natural dynamic processes. A strong population of marsh fern *Thelypteris palustris* will also be present.

The fen vegetation at Crymlyn Bog SAC will support a suite of uncommon plant species, including a large and sustainable population of slender cotton-grass *Eriophorum gracile*.

The range of fen and associated open water habitats will also support a suite of uncommon invertebrates. In particular a viable population of the rare fen raft spider *Dolomedes plantarius* will occupy the various canal and open water habitats at the site. A viable population of the hornet robberfly *Asilus crabroniformis* will also occur in the drier pastures on the western periphery of Crymlyn Bog.

The purpose of the designation of Natura 2000 sites is to help secure the maintenance or restoration of habitats and species to favourable conservation status *for the foreseeable future*. Given that we foresee a changing climate, despite the uncertainty of the nature, degree and timing of those changes, we must address the need to ensure the resilience of each

site to that changing environment. This will be achieved in the first instance by ensuring favourable condition of the important features, since a healthy feature is likely to be more resilient to the effects of climate change than one which is already stressed. Secondly, consideration must be given to those structures, functions and processes which maintain or boost the resilience of ecosystems to climate stress, including the avoidance, reduction or mitigation of other stress factors such as invasive species, nutrient enrichment, habitat and population fragmentation.

This site forms part of a wider network, and is ecologically connected with its surroundings and with other designated sites in the region. Although the focus of this document is on the individual site, the conservation objectives and management requirements need to be considered in the wider context. A connected network of sites is more robust than sites in isolation, and more resilient to pressures such as climate change.

2. SITE DESCRIPTION

2.1 Area and Designations Covered by this Plan

Grid reference: SS694947

Unitary authorities:

- Abertawe / Swansea
- Castell-Nedd a Porth Talbot / Neath and Port Talbot

Area (hectares): 299.45Ha

Designations covered: Crymlyn Bog / Cors Crymlyn Special Area of Conservation (SAC) comprises two component Sites of Special Scientific Interest (SSSI):

Cors Crymlyn / Crymlyn Bog SSSI;
Pant-y-Sais SSSI.

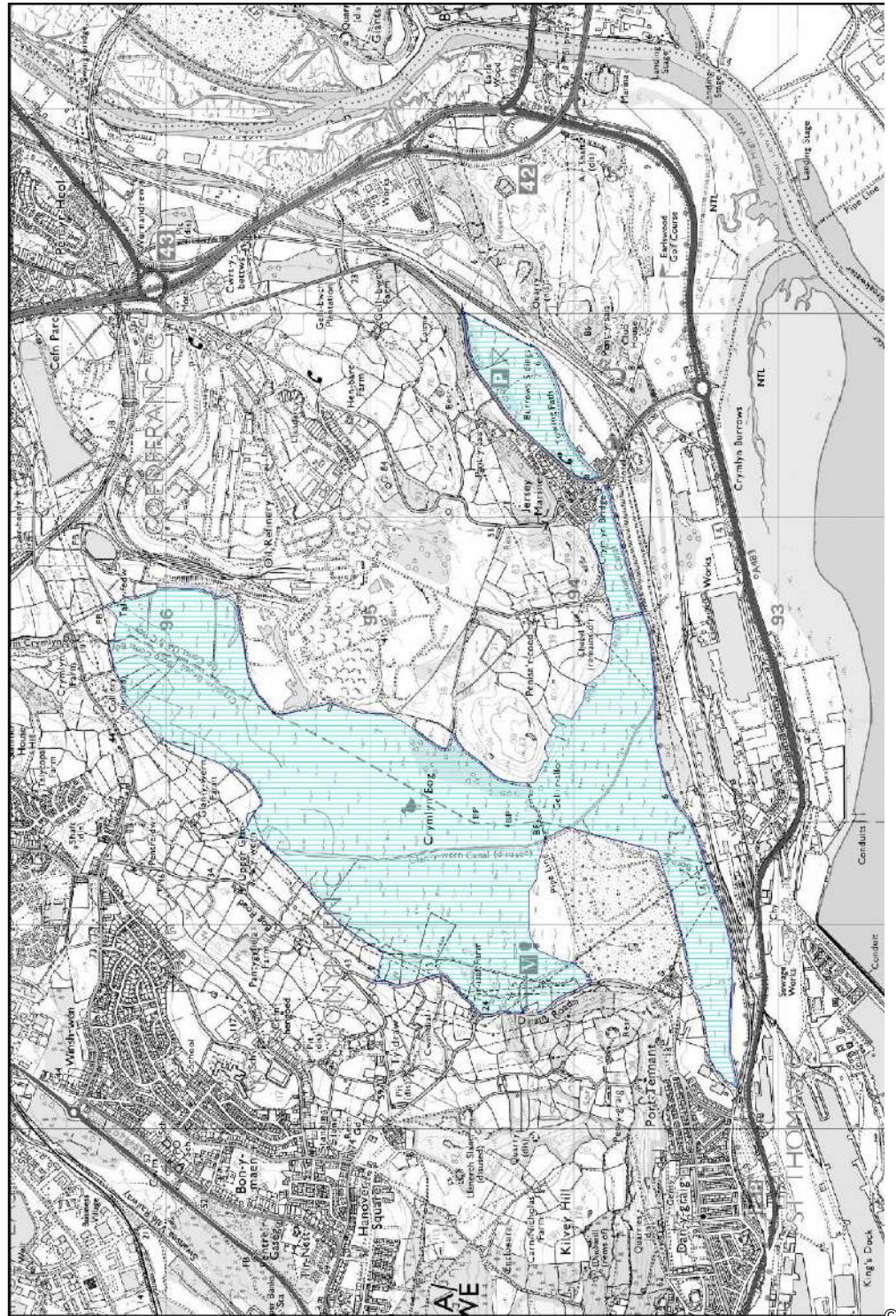
Apart from approximately 35 hectares of land at the northern end of Crymlyn Bog, the majority of the SAC (including Pant-y-Sais SSSI) is also designated a Ramsar site.

Approximately one-third of Crymlyn Bog, and all of Pant-y-Sais (excluding the adjoining Tennant Canal), is declared as a National Nature Reserve (NNR). Pant-y-Sais is also a Local Nature Reserve (LNR).

Detailed maps of the designated sites are available on the Natural Resources Wales web site.

A summary map showing the coverage of this document is shown below:

Crymlyn Bog/Cors Crymlyn SAC



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2.2 Outline Description

Crymlyn Bog is a large lowland fen situated in a glacial depression on the eastern edge of Swansea. In addition to Crymlyn Bog itself, the SAC also includes Pant-y-Sais fen, a smaller (approximately 20 ha) wetland located about 1 km east of the main site.

The predominant habitat at Crymlyn Bog and Pant-y-Sais is lowland topogenous fen, which comprises a diverse range of mire, tall-herb fen and swamp communities. Of particular interest are the stands of the SAC Annex I habitat types 'Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*' and 'Transition mires and quaking bogs'.

Also of interest are the stands of wet woodland at Crymlyn Bog, including the Annex I habitat 'Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*' (*Alno-Padion*, *Alnion incanae*, *Salicion albae*).

In addition the SAC supports a suite of uncommon plant species, including a large population of the nationally rare slender cotton-grass *Eriophorum gracile*; marsh fern *Thelypteris palustris* also occurs within the alluvial woodland.

The site is also of importance for its invertebrate fauna. Of particular note is the population of the fen raft spider *Dolomedes plantarius*, which is known from just two other sites in the UK. The hornet robberfly *Asilus crabroniformis* also occurs in some of the drier pastures on the western flank of Crymlyn Bog.

2.3 Outline of Past and Current Management

The main current management practices at Crymlyn Bog SAC are grazing and scrub control.

At Crymlyn Bog, a fairly extensive area of grazing has been established within the western, NRW-managed NNR block, using Welsh Mountain ponies. Other peripheral parts of the bog are also grazed by neighbouring farmers' livestock, including some of the eastern section next to Penisa'r-coed Farm (cattle grazed). Much of the rest of the bog is very wet and inaccessible, making grazing of these areas difficult, both for NRW and adjoining landowners.

No grazing takes place at Pant-y-Sais. There are no stock-proof boundaries here and the site does not lend itself to livestock management at present.

An annual programme of scrub control has been carried out since at least 1995, covering both Crymlyn Bog and Pant-y-Sais.

Open water restoration work has also been carried out in recent years, to benefit fen raft spider and other open water-dependent species.

The Tennant Canal, which forms the southern boundary of Crymlyn Bog and the south-eastern boundary of Pant-y-Sais, has been maintained as an open water channel by the canal owners. The Glan y Wern Canal, an arm of the Tennant Canal that runs through the centre of Crymlyn Bog, has received little management in recent times but still persists as an open water conduit along much of its length.

In terms of past management, it is presumed that grazing is a long-established practice at Crymlyn Bog, especially around the periphery of the bog. A local farmer has reported that grazing was formerly more extensive on the western side of the bog, using a mix of cattle and horses. However, anecdotal evidence suggests that the site has become wetter in recent times, making extensive grazing of the site less straightforward than before. Historical maps show a network of drainage ditches across the bog, which would have enabled at least parts of the site to be grazed more effectively than now.

The wetter nature of the site in recent decades is likely to be genuine, resulting from high water levels in the Glan y Wern and Tennant Canals. Regular over-topping of these canals is believed to influence the distribution of the Annex I habitats.

Scrub control may also have been carried out in the past. However, local people claim that the site was previously burned on a regular basis, as a means of controlling scrub development, preventing build up of litter and reducing rank vegetation.

2.4 Management Units

The area covered by this plan has been divided into management units to enable practical communication about features, objectives, and management. This will also allow us to differentiate between the different designations where necessary. In this plan the management units have been based mainly on tenure, but also with reference to features and land management requirements.

Maps showing the management units referred to in this plan are on this site's web page.

The following table confirms the relationships between the management units and the designations covered:

Unit reference	Unique unit number	SAC	Ramsar	SSSI	NNR	Natural Resources Wales owned/managed
Crymlyn Bog SSSI						
1	000901	✓	✓	✓		
2	000904	✓	✓	✓		
3	000906	✓	✓	✓		
4	000907	✓	✓	✓	✓	✓
5	000908	✓	✓	✓	✓	✓
6a	000909	✓		✓	✓	✓
6b	002511	✓	✓	✓	✓	✓
7	000911	✓		✓		
8	000914	✓	✓	✓	✓	✓
9	000915	✓	✓	✓	✓	✓
10	000916	✓	✓	✓		
11	000920	✓	✓	✓		
12	000922	✓		✓		
13	000923	✓	✓	✓		
Pant-y-Sais SSSI						

14	000927	✓	✓	✓		
15	000928	✓	✓	✓	✓	✓

2.5 Position within an ecological network

Crymlyn Bog is the most extensive area of lowland fen in south Wales. In terms of its important SAC habitats, calcareous fen is highly restricted in the UK, with its two main centres of distribution being the Broadlands of East Anglia and the fen systems of Anglesey. Apart from Crymlyn Bog, there are no other known examples in south Wales, although it should be noted the Crymlyn stands are a rather poorly characterised form of calcareous fen and lack any strongly calcicolous species of the *Caricion davallianae*. Transition mires and quaking bogs are more widespread in the UK, but this habitat is still scarce in a south Wales context. Wet woodlands are relatively common, although true alluvial forests in a flood plain setting are more fragmentary.

3. THE FEATURES

3.1 Confirmation of Features

Designated feature		Relationships, nomenclature etc	Conservation Objective in part 4
SAC features			
Annex I habitats that are a primary reason for selection of this site			
1. Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i> (EU habitat code 7210)	Part of topogenous fen Ramsar feature and SSSI feature	1	
2. <i>Transition mires and quaking bogs</i> (EU habitat code 7140)	Part of topogenous fen Ramsar feature and SSSI feature	2	
Annex I habitats present as a qualifying feature, but not a primary reason for site selection			
3. <i>Alluvial forests with Alnus glutinosa and Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) (EU habitat code 91E0)	Part of wet woodland SSSI feature	3	
SPA features			
Not applicable			
Ramsar features (provisional)			
<i>Note: The Ramsar features for Crymlyn Bog SAC are open to interpretation at present. They will be subject to a 'quality control' exercise in the future, to confirm the qualifying features. Hence the following list of Ramsar features is only provisional at present. Conservation objectives for the Ramsar features will be developed once the confirmed list of features has been agreed.</i>			
4. Topogenous fen	Equates to topogenous fen SSSI feature. Includes above two SAC fen features (Features 1 and 2)	To be developed, with reference to 1 and 2 above	
5. Slender cotton-grass	Equates to slender cotton-grass SSSI feature	To be developed	
6. Peatland invertebrate assemblage	Equates to invertebrate assemblage SSSI feature	To be developed	
7. Plant species		To be developed	

assemblage		
SSSI features		
8. Topogenous fen	Equates to topogenous fen Ramsar feature. Includes above two SAC fen features (Features 1 and 2)	To be developed, with reference to 1 and 2 above
9. Wet woodland	Includes above alluvial woodland SAC feature (Feature 3)	To be developed, with reference to 3 above
10. Slender cotton-grass	Equates to slender cotton-grass Ramsar feature	To be developed
11. Marsh fern		To be developed
12. Fen raft spider		Has been developed
13. Hornet robberfly		Has been developed
14. The weevil <i>Tapeinotus sellatus</i>		Has been developed
15. Peatland invertebrate assemblage	Equates to invertebrate assemblage Ramsar feature	To be developed

3.2 Features and Management Units

This section sets out the relationship between the designated features and each management unit. This is intended to provide a clear statement about what each unit should be managed for, taking into account the varied needs of the different special features. All features are allocated to one of seven classes in each management unit. These classes are:

Key Features

KH - a 'Key Habitat' in the management unit, i.e. the habitat that is the main driver of management and focus of monitoring effort, perhaps because of the dependence of a key species (see KS below). There will usually only be one Key Habitat in a unit but there can be more, especially with large units.

KS – a 'Key Species' in the management unit, often driving both the selection and management of a Key Habitat.

Geo – an earth science feature that is the main driver of management and focus of monitoring effort in a unit.

Other Features

Sym - habitats, species and earth science features that are of importance in a unit but are not the main drivers of management or focus of monitoring. These features will benefit from management for the key feature(s) identified in the unit. These may be classed as 'Sym' (sympathetic) features because:

(a) They are present in the unit but may be of less conservation importance than the key feature; and/or

- (b) they are present in the unit but in small areas/numbers, with the bulk of the feature in other units of the site; and/or
- (c) their requirements are broader than and compatible with the management needs of the key feature(s), e.g. a mobile species that uses large parts of the site and surrounding areas: and/or
- (d) key features (KH, KS) are closely associated with these features, and the conservation of key features depends on them being managed appropriately.

Nm - an infrequently used category where features are at risk of decline within a unit as a result of meeting the management needs of the key feature(s), i.e. under Negative Management. These cases will usually be compensated for by management elsewhere in the plan, and can be used where minor occurrences of a feature would otherwise lead to apparent conflict with another key feature in a unit.

Mn - Management units that are essential for the management of features elsewhere on a site e.g. livestock over-wintering area included within designation boundaries, buffer zones around water bodies, etc.

x – Features not known to be present in the management unit.

The table below sets out the relationship between the features and management units identified in this plan:

Crymlyn Bog SSSI		Management units												
Unique unit number	901	904	906	907	908	909	2511	911	914	915	916	920	922	923
Unit reference	1	2	3	4	5	6a	6b	7	8	9	10	11	12	13
Unit name	Tennant Canal – managed section	Tennant Canal – unmanaged section	Glan y Wern Canal	CCW wet woodland	CCW fen	CCW grassland A (non-Ramsar)	CCW grassland B	BP A (Non-Ramsar)	BP B	BP C	Tennant Canal Company	Crymlyn Farm A	Crymlyn Farm B (non-Ramsar)	Glan y Wern Farm
SAC	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Ramsar	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓		✓
SSSI	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
NNR/Natural Resources Wales managed				✓	✓	✓	✓		✓	✓				
SAC features														
1. Calcareous fen	x	x	x	x	KH	x	x	KH	KH	KH	KH	KH	x	x
2. Transition mire	x	x	x	x	KH	x	x	KH	KH	x	KH	KH	KH	KH
3. Alluvial forest	x	x	x	KH	Sym	x	x	x	KH	KH	x	x	x	x
Ramsar features (provisional)														
4. Topogenous fen	x	x	x	x	KH	x	Sym	KH	KH	KH	KH	KH	KH	KH
5. Slender cotton-grass	x	x	x	x	x	x	x	Sym	x	x	Sym	Sym	x	Sym
6. Invertebrate assemblage	Sym	Sym	Sym	x	Sym	x	x	Sym	Sym	Sym	Sym	Sym	Sym	Sym
7. Plant species assemblage	x	x	x	x	Sym	x	x	Sym	Sym	Sym	Sym	Sym	Sym	Sym
SSSI features (provisional)														
8. Topogenous fen	x	x	x	x	KH	x	Sym	KH	KH	KH	KH	KH	KH	KH
9. Wet woodland	x	x	x	KH	Sym	x	x	x	KH	KH	Sym	x	Sym	x
10. Slender cotton-grass	x	x	x	x	x	x	x	Sym	x	x	Sym	Sym	x	Sym
11. Marsh fern	x	x	x	KS	x	x	x	x	x	x	x	x	x	x
12. Fen raft spider	KS	KS	KS	x	Sym	x	x	x	x	x	Sym	Sym	x	Sym
13. Hornet robberfly	x	x	x	x	x	KS	KS	x	x	x	x	x	x	x
14. The weevil <i>Tapeinotus sellatus</i>	x	x	x	x	x	x	x	x	x	x	x	x	x	x
15. Invertebrate assemblage	Sym	Sym	Sym	x	Sym	x	x	Sym	Sym	Sym	Sym	Sym	Sym	Sym

Crymlyn Bog has an additional two units to those listed above (7042 and 7044). These aren't included in the table as they have no Annex 1 habitats or Annex 2 species features.

Pant-y-Sais SSSI		Management units	
Unique unit number	927	928	
Unit reference	14	15	
Unit name	Tennant Canal	Fen	
SAC	✓	✓	
Ramsar	✓	✓	
SSSI	✓	✓	
NNR/Natural Resources Wales managed		✓	
SAC features			
1. Calcareous fen	x	KH	
2. Transition mire	x		
3. Alluvial woodland	x	x	
Ramsar features (provisional)			
4. Topogenous fen	x	KH	
5. Slender cotton-grass	x	Sym	
6. Invertebrate assemblage	Sym	Sym	
7. Plant species assemblage	x	Sym	
SSSI features (provisional)			
8. Topogenous fen	x	KH	
9. Wet woodland	x	x	
10. Slender cotton-grass	x	Sym	
11. Marsh fern	x	x	
12. Fen raft spider	KS	x	
13. Hornet robberfly	x	x	
14. The weevil <i>Tapeinotus sellatus</i>	KS	x	
15. Invertebrate assemblage	Sym	Sym	

4. CONSERVATION OBJECTIVES

Background to Conservation Objectives:

a. Outline of the legal context and purpose of conservation objectives.

Conservation objectives for individual SACs and SPAs are required by the 1992 'Habitats' Directive (92/43/EEC). The aim of the Habitats Directive is the maintenance or where appropriate the restoration, of the 'favourable conservation status' (FCS) of habitats and species listed in the Annexes to the Directive (see Box). Therefore FCS provides the overarching framework for defining the conservation objectives for individual SACs.

Although neither the Birds Directive nor the Ramsar Convention refer to FCS, Natural Resources Wales considers that the overall aim of both those legal instruments is sufficiently similar to FCS to make it practical and proportionate to use the same guiding principle when establishing the conservation objectives for SPAs and Ramsar sites, as well as SACs. Therefore the Habitats Directive definition of FCS is considered to provide the overarching framework for conservation objectives for all SACs, SPAs and Ramsar sites in Wales.

Favourable conservation as defined in Articles 1(e) and 1(i) of the Habitats Directive

"The conservation status of a natural habitat is the sum of the influences acting on it and its typical species that may affect its long-term natural distribution, structure and functions as well as the long term survival of its typical species. 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, and
- 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.

The conservation status of a species is the sum of the influences acting on the species that may affect the long-term distribution and abundance of its populations. The conservation status will be taken as 'favourable' when:

- population dynamics data on the species indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- 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."

The achievement of FCS is not an objective that applies at the level of the individual sites. Rather it is a wider objective to which each individual site contributes. Therefore the conservation objectives for an individual site are intended to express what is considered to be that site's appropriate contribution to achieving FCS. Since SACs are the most important mechanism in the Habitats Directive for achieving FCS, and the sites represent the most important areas for conservation of the Annex I habitat types and Annex II species, the objectives for each individual SAC should seek to ensure that the site makes a substantial contribution which properly reflects its importance in a local, national and European context and the particular reasons why the site was selected for inclusion in the network. A similar approach is taken to setting conservation objectives for SPAs and Ramsar sites.

Achieving the conservation objectives of individual sites requires appropriate management and the control of factors which are influencing, or may influence the features.

The conservation objectives have a number of specific roles:

- **Communication**
The conservation objectives should help convey to stakeholders what are the reasons for the designation and what it is intended to achieve.
- **Site planning and management**
The conservation objectives guide management of sites, to maintain or restore the designated habitats and species. They provide the basis for identifying what management is required both within the site boundary, and outside it, where achieving the objectives requires action to be taken outside the site.
- **River Basin Management Planning**
Conservation Objectives for aquatic and water dependent Natura 2000 features are also used as the "standards and objectives" referred to in Article 4 (1c) of the Water Framework Directive (WFD) (2000/60/EC). In 2009, Welsh Ministers decided that where Natura 2000 conservation objectives are more stringent than 'Good Ecological Status' (GES) as defined in the WFD, they (and the standards they contain) are the objectives referred to in Article 4(1c) of the WFD.
- **Assessing plans and projects**
Article 6(3) of the 'Habitats' Directive requires the assessment of proposed plans and projects in view of a site's conservation objectives. Subject to certain exceptions, plans or projects may not proceed unless it is established that they will not adversely affect the integrity of sites. There are similar requirements for the review of existing decisions and consents.
- **Monitoring and reporting**
In addition to foregoing purposes, conservation objectives provide the basis for defining the evidence that will be used for assessing the condition of a feature and the status of factors that affect it. That evidence is contained in a separate but closely related set of 'performance indicators' which provide the basis for monitoring and reporting. To avoid confusion between the conservation objectives and the measures specified in performance indicators, the performance indicators are set out in an Appendix to this document.

The conservation objectives in this document reflect Natural Resources Wales' current information and understanding of the site and its features and their importance in an international context. The conservation objectives are subject to review by Natural Resources Wales in the light of new knowledge.

b. Format of the conservation objectives

Each conservation objective is a composite statement defining a site-specific aspiration for each designated feature. This composite statement contains clauses that correspond to all the elements of FCS, namely:

For habitat features:

- Extent should be stable in the long term, or where appropriate increasing;
- Quality (including in terms of ecological structure and function) should be being maintained, or where appropriate improving;
- Populations of the habitat's typical species must be being maintained or where appropriate increasing;
- Factors affecting the extent and quality of the habitat and its typical species (and thus affecting the habitat's future prospects) should be under appropriate control.

For species features:

- The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term;
- The distribution of the population should be being maintained;
- There should be sufficient habitat, of sufficient quality, to support the population in the long term;
- Factors affecting the population or its habitat should be under appropriate control.

The elements above constitute a generic checklist or guide to the elements that should normally be included in the conservation objectives, in order to ensure that the site makes an effective and appropriate contribution to achieving favourable conservation status for the habitats and species for which it is designated.

There is one conservation objective for each designated feature listed in part 3. In some cases, where there are distinct areas or forms of a designated habitat or separate populations of a designated species within a site, the conservation objective is sub-divided into different sections to enable different aspirations to be expressed for different occurrences of the features within the site.

As well as describing the aspirations for the condition of the feature, each conservation objective contains a statement that the factors which significantly affect the feature are under appropriate control.

**4.1 Conservation objective for Feature 1:
Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* (EU habitat code 7210)**

The extent should be stable in the long term, or where appropriate increasing.	The extent and distribution of calcareous fen should be as mapped in 2005 and 2009 (Bosanquet <i>et al.</i> , 2005; Bosanquet <i>et al.</i> , 2009).
Quality (including in terms of ecological structure and function) should be being maintained, or where appropriate improving.	The calcareous fen should be of high quality throughout. At Crymlyn Bog the calcareous fen occurs in two forms: tall vegetation dominated by Great Fen-sedge <i>Cladium mariscus</i> and more open calcareous fen. The <i>Cladium</i> dominated areas should continue to be present as a minimum extent but should not increase at the expense of the open calcareous fen; ideally they should be opened up to allow increased plant diversity within them. The open calcareous fen should be species-rich, with little or no rank vegetation. Non-native species and indicators of eutrophication and/or changing water levels should be largely absent. Providing these broad quality standards are met across the whole feature area, some heterogeneity in condition is both natural and acceptable, but the bulk (at least 70%) of the open calcareous fen should be referable to good quality calcareous fen habitat, where: • Tufted-sedge <i>Carex elata</i> is present, with associates such as Yellow Loosestrife <i>Lysimachia vulgaris</i>, Greater Spearwort <i>Ranunculus lingua</i>, Blunt-flowered Rush <i>Juncus subnodulosus</i>, Cyperus Sedge <i>Carex pseudocyperus</i>, Lesser Bulrush <i>Typha angustifolia</i>, Water Dock <i>Rumex hydrolapathum</i>, Purple-loosestrife <i>Lythrum salicaria</i>, Hemp-agrimony <i>Eupatorium cannabinum</i>, Marsh Cinquefoil <i>Potentilla palustris</i> and Royal Fern <i>Osmunda regalis</i>. • Common Reed <i>Phragmites australis</i> or Great Fen-sedge <i>Cladium mariscus</i> are not dominant. • Scrub is absent. • Non-native species including Himalayan Balsam <i>Impatiens glandulifera</i> are absent.
Populations of the habitat's typical species must be being maintained or where appropriate increasing.	In addition to the above typical plant species, the calcareous fen areas will also contribute to the wider fen environment of Crymlyn Bog in supporting a range of typical fenland bird and invertebrate species.
Factors affecting the extent and	Factors affecting the extent and quality of the calcareous fen habitat (including water quality, atmospheric pollution, water

quality of the habitat and its typical species (and thus affecting the habitat's future prospects) should be under appropriate control.	levels, successional change, scrub encroachment and non-native species) should be under appropriate control.
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4.2 Conservation objective for Feature 2: Transition mires and quaking bogs (EU habitat code 7140)

The extent should be stable in the long term, or where appropriate increasing.	The extent and distribution of transition mire should be as mapped in 2005 and 2009 (Bosanquet <i>et al.</i> , 2005; Bosanquet <i>et al.</i> , 2009). Plus an additional 3 ha of transition mire should also be restored.
Quality (including in terms of ecological structure and function) should be being maintained, or where appropriate improving.	The transition mire should be of high quality throughout and composed of typical native species. The stands should be species-rich, with little or no rank vegetation or scrub encroachment. Non-native species and indicators of eutrophication and/or changing water levels should be largely absent. Providing these broad quality standards are met across the whole feature area, some heterogeneity in condition is both natural and acceptable, but the bulk (at least 60%) of the habitat should be referable to good quality transition mire, where: • Bottle Sedge <i>Carex rostrata</i> is present at high cover; or, where the vegetation is composed of mixtures of: Bogbean <i>Menyanthes trifoliata</i>, Marsh Cinquefoil <i>Potentilla palustris</i>, Water Horsetail <i>Equisetum fluviatile</i>, Common Cottongrass <i>Eriophorum angustifolium</i>, Slender Cottongrass <i>E. gracile</i>, Bottle Sedge <i>Carex rostrata</i>, Bog Sedge <i>C. limosa</i>, Star Sedge <i>C. echinata</i>, Lesser Water-parsnip <i>Berula erecta</i>, Branched Bur-reed <i>Sparganium erectum</i> and the bog mosses <i>Sphagnum squarrosum</i> and <i>S. subnitens</i>. • Common Reed <i>Phragmites australis</i> is not dominant. • Purple Moor-grass <i>Molinia caerulea</i>, Greater tussock-sedge <i>Carex paniculata</i>, Tufted-sedge <i>C. elata</i> and Great Fen-sedge <i>Cladium mariscus</i> are not abundant. • Scrub is absent. • Non-native species including Himalayan Balsam <i>Impatiens glandulifera</i> are absent.
Populations of the habitat's typical species	In addition to the above typical plant species, the transition mire areas will also contribute to the wider fen environment of Crymlyn Bog in supporting a range of typical fenland bird and

must be being maintained or where appropriate increasing.	invertebrate species.
Factors affecting the extent and quality of the habitat and its typical species (and thus affecting the habitat's future prospects) should be under appropriate control.	Factors affecting the extent and quality of the transition mire habitat (including water quality, atmospheric pollution, water levels, successional change, scrub encroachment and non-native species) should be under appropriate control.

4.3 Conservation objective for Feature 3:

Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, *Alnion incanae*, *Salicion albae*) (EU habitat code 91E0)

The extent should be stable in the long term, or where appropriate increasing.	The extent of alluvial forest should be as mapped in 2009 by the last SAC monitoring exercise (Wilkinson & Bevan, 2009). An increase in alluvial forest at the expense of important open fen vegetation is not desirable.
Quality (including in terms of ecological structure and function) should be being maintained, or where appropriate improving.	The alluvial forest should be of high quality throughout and composed of typical native species. Non-native species and indicators of eutrophication and/or drying out should be largely absent. Providing these broad quality standards are met across the whole woodland area, some heterogeneity in condition is both natural and acceptable, but the bulk (at least 75%) of the habitat should be referable to good quality alluvial forest, where: • The canopy is composed of Alder <i>Alnus glutinosa</i>, Grey Willow <i>Salix cinerea</i> and/or Downy Birch <i>Betula pubescens</i>. • Over-mature canopy trees are frequent throughout. • The field layer is dominated by Greater Tussock-sedge <i>Carex paniculata</i>, with associates such as Yellow Loosestrife <i>Lysimachia vulgaris</i>, Royal Fern <i>Osmunda regalis</i>, Purple-loosestrife <i>Lythrum salicaria</i>, Bittersweet <i>Solanum dulcamara</i>, Yellow Iris <i>Iris pseudacorus</i>, Skullcap <i>Scutellaria galericulata</i> and Branched Bur-reed <i>Sparganium erectum</i>. • Viable regeneration of <i>A. glutinosa</i>, <i>S. cinerea</i> and/or <i>B. pubescens</i> is frequent throughout, either as saplings or as regrowth from the base of trees or fallen stems. • Species indicative of drying out (e.g. Bracken <i>Pteridium aquilinum</i>) or eutrophication (e.g. Common Nettle <i>Urtica dioica</i>) are absent. • Non-native species such as Himalayan Balsam <i>Impatiens glandulifera</i> are absent.
Populations of the habitat's typical species must be being maintained or where appropriate increasing.	The alluvial forest should also support species that are naturally associated with a high quality alluvial forest ecosystem, including all its components from the soil, through ground flora and shrub layer to the canopy, and the micro-habitats and structural variations that occur within them. This includes soil flora and fauna, epiphytic lower plants, breeding birds and higher plants as listed above. Characteristic plants of the habitat in this locality such as Royal Fern <i>Osmunda regalis</i> and Marsh Fern <i>Thelypteris palustris</i> should also be stable or increasing.
Factors affecting the extent and quality of the	Factors affecting the extent and quality of alluvial forest (including water quality, atmospheric pollution, water levels and grazing) should be under appropriate control.

habitat and its typical species (and thus affecting the habitat's future prospects) should be under appropriate control.	
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5. ASSESSMENT OF STATUS AND MANAGEMENT REQUIREMENTS

This section provides:

- A summary of the assessment of the status of each feature.
- A summary of the management issues that need to be addressed to maintain or restore each feature.

5.1 Status and Management Requirements of Feature 1: Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* (EU habitat code 7210)

Status of Feature 1

The calcareous fen feature was last monitored in 2012 (Wilkinson, 2013a). The feature was judged to be in **unfavourable: declining** condition. The main reason for this assessment was a high cover of *Phragmites australis* and/or *Cladium mariscus*, with a corresponding shortage of positive indicator species in places.

It is presumed that the calcareous fen vegetation has become more rank and overgrown since previous monitoring visits, with a reduction in species-richness, through natural vegetation succession. Although some of the calcareous fen areas are grazed by cattle, insufficient management is presumably the main cause of this vegetation succession.

Management Requirements of Feature 1

Grazing is the principal management requirement for restoring the calcareous fen feature to favourable condition. The calcareous fen vegetation in units 8, 9 and 10 is currently (2014) grazed by cattle belonging to the neighbouring farmer, and grazing levels have indeed increased in recent years. Despite this the calcareous fen in these units is still deemed to be unfavourable, although the quality of the vegetation may improve after grazing has been in place longer term.

The calcareous fen in units 7, 11 and 15, and parts of unit 5, is currently ungrazed. Restoring grazing to these units is highly problematic at present, given the very wet ground and inaccessibility. Nonetheless opportunities to expand grazing at the site should continue to be explored where feasible. Other techniques such as vegetation cutting and biomass removal should also be considered.

Scrub control is already carried out at the site on an annual basis. Scrub encroachment is therefore less of a problem for most of the calcareous fen areas, although targeted scrub control should continue in future to maintain this position.

5.2 Status and Management Requirements of Feature 2: Transition mires and quaking bogs (EU habitat code 7140)

Status of Feature 2

The transition mire feature was last monitored in 2011 (Wilkinson, 2013b). The feature was judged to be in **unfavourable: declining** condition. The reasons for this vary between stands, but a high cover of *Phragmites australis* and/or scrub in places, sometimes with a corresponding shortage of positive indicator species, are the main issues.

It is thought that most of the transition mire vegetation is becoming more rank and overgrown due to natural vegetation succession, probably encouraged by enrichment. Insufficient management is presumably the main cause of this vegetation succession, coupled with lack of control over the nutrient status of some key hydrological inputs. The main areas of transition mire are located in units 5, 7, 10, 11, 13 and 15.

Management Requirements of Feature 2

Grazing is one of the principal management practices required for restoring the transition mire feature to favourable condition. The transition mire in parts of units 5 and 10 is currently (2014) grazed by ponies and/or horses, but the bulk of these units are ungrazed, as are units 7, 11, 13 and 15. Restoring grazing to these units is highly problematic at present, given the very wet ground and inaccessibility. Nonetheless opportunities to expand grazing at the site should continue to be explored where feasible. Other techniques such as vegetation cutting and biomass removal should also be considered.

Scrub control is already carried out at the site on an annual basis. Targeted scrub control should continue in future, to ensure any scrub encroachment within transition mire areas is tackled.

Hydrological control is the other major management type required for restoration of the feature. It is thought that over-topping of Crymlyn Brook is leading to a replacement of transition mire habitat by more swampy vegetation in the north of Crymlyn Bog, through over-wetting and perhaps nutrient enrichment. The clearing out of Crymlyn Brook to address this issue, together with nutrient reduction measures, is currently being explored and needs to be carried forward. It is envisaged that clearing out Crymlyn Brook could lead to an overall expansion of transition mire habitat in the north of the site in future. In addition, it is believed that over-topping of the Glan y Wern Canal is limiting the extent of the influence of nutrient-poor inflows from the sides of the wetland, thus favouring swampy vegetation rather than transition mire. Coupled with re-opening the Glan y Wern Canal, the possibility of slightly lowering the water level in the Glan y Wern and Tennant Canals to reduce the extent of over-topping is being investigated.

5.3 Status and Management Requirements of Feature 3: Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, *Alnion incanae*, *Salicion albae*) (EU habitat code 91E0)

Status of Feature 3

The alluvial forest feature was last monitored in 2009 (Wilkinson & Bevan, 2009). The feature was judged to be in **unfavourable: recovering** condition. The main reason for the unfavourable assessment is the lack of over-mature trees in certain areas, a reflection of the relatively young age of some of the woodland. However, it is felt that the woodland is developing a more mature age structure under its own devices, with no management intervention required; hence the 'recovering' status.

Management Requirements of Feature 3

Key management requirements for the alluvial forest feature are to maintain the high water table and prevent any increase in nutrient levels. There are no concerns over either of these factors at the current time. Similarly there is no threat from excessive grazing at present, as the wet ground conditions provide a natural deterrent to livestock.

A key conservation aim for the alluvial forest feature is for it to develop a natural wet woodland species composition and structure through natural dynamic processes. It is envisaged that this condition will be achieved simply through the current non-intervention management.

6. ACTION PLAN: SUMMARY

This section takes the management requirements outlined in Section 5 a stage further, assessing the specific management interventions required on each management unit. This information is presented in two parts:

- A summary of the information held in Natural Resources Wales' Actions Database for sites
- A summary of ongoing management which is not recorded in Natural Resources Wales' actions database

6.1 Actions in Natural Resources Wales' actions database

Unit reference	Unique unit number	Unit name	Summary of Conservation Management Issues	Action needed?
1	000901	Tennant Canal - managed section	Tennant Canal requires regular sympathetic management to maintain open water habitat and marginal tussocky vegetation for fen raft spider. Current management, carried out by Tennant Canal Company, is ideal.	No
2	000904	Tennant Canal - unmanaged section	This section of Tennant Canal has not been managed for many years and has become choked with encroaching vegetation. Reinstatement of management is required to provide open water habitat for fen raft spider.	Yes
3	000906	Glan y Wern Canal	The Glan y Wern Canal has not been managed for many years and has become choked with encroaching vegetation. Reinstatement of management is required to provide open water habitat for fen raft spider.	Yes
4	000907	CCW wet woodland	Current non-intervention management is ideal for alluvial forest/wet woodland feature.	No
5	000908	CCW fen	Key management issue is vegetation succession of fen vegetation to tall rank vegetation and woody scrub. Parts of unit are grazed by ponies (CCW stock); other parts are currently ungrazed. Need to consider introduction of grazing to currently ungrazed areas. Cutting of vegetation (and removal of arisings) using specialised machinery should also be considered. Burning is another possible management option. Scrub control is carried out to reduce scrub encroachment. Eutrophication linked to elevated nutrient levels in Crymlyn Brook has also been highlighted as a potential threat to the fen vegetation in this unit, as well as over-topping of Glan y Wern Canal.	Yes
6a	000909	CCW grassland A (non-Ramsar)	Grassland is grazed by horses, and scrub control is carried out to prevent scrub encroachment. Current	No

			management regime is ideal for hornet robberfly feature.	
7	000911	BP A (non-Ramsar)	Key management issue is vegetation succession of fen vegetation to tall rank vegetation and woody scrub. Unit is currently ungrazed. Need to consider introduction of grazing; cutting of vegetation (and removal of arisings) using specialised machinery should also be considered. Scrub control is carried out to reduce scrub encroachment. Overtopping of Crymlyn Brook could be leading to a replacement of transition mire habitat here, through over-wetening and perhaps nutrient enrichment. Clearing out Crymlyn Brook to address this issue, together with nutrient reduction measures, is being explored and should be carried forward.	Yes
8	000914	BP B	Key management issue is vegetation succession of fen vegetation to tall rank vegetation and woody scrub. Part of unit (including calcareous fen vegetation) is grazed by cattle belonging to neighbouring tenant farmer. Need to consider increased grazing. Cutting of vegetation (and removal of arisings) using specialised machinery should also be considered. Burning is another possible management option. Scrub control is carried out to reduce scrub encroachment.	Yes
9	000915	BP C	Current non-intervention management is ideal for alluvial forest/wet woodland feature.	No
10	000916	Tennant Company Canal	Key management issue is vegetation succession of fen vegetation to tall rank vegetation and woody scrub. Part of unit (including calcareous fen vegetation) is grazed by cattle belonging to neighbouring tenant farmer. Need to consider increased grazing; however, much of unit is extremely wet and unsuitable for grazing. Cutting of vegetation (and removal of arisings) using specialised machinery should also be considered. Burning is another possible management option. Scrub control is carried out to reduce scrub encroachment. Eutrophication linked to elevated nutrient levels in Crymlyn Brook has also been highlighted as a potential threat to the fen vegetation in this unit, as well as overtopping of Glan y Wern Canal.	Yes
11	000920	Crymlyn Farm A	Key management issue is vegetation succession of fen vegetation to tall rank vegetation and woody scrub. Unit is currently ungrazed. Need to	Yes

			consider introduction of grazing; cutting of vegetation (and removal of arisings) using specialised machinery should also be considered. Scrub control is carried out to reduce scrub encroachment. Overtopping of Crymlyn Brook could be leading to a replacement of transition mire habitat here, through over-wetening and perhaps nutrient enrichment. Clearing out Crymlyn Brook to address this issue, together with nutrient reduction measures, is being explored and should be carried forward.	
12	000922	Crymlyn Farm B (non-Ramsar)	Key management issue is vegetation succession of fen vegetation to tall rank vegetation and woody scrub. Unit is currently ungrazed. Need to consider introduction of grazing; cutting of vegetation (and removal of arisings) using specialised machinery should also be considered. Scrub control is carried out to reduce scrub encroachment. Overtopping of Crymlyn Brook could be leading to a replacement of transition mire habitat here, through over-wetening and perhaps nutrient enrichment. Clearing out Crymlyn Brook to address this issue, together with nutrient reduction measures, is being explored and should be carried forward.	Yes
13	000923	Glan y Wern Farm	Key management issue is vegetation succession of fen vegetation (and associated uncommon species) to tall rank vegetation and woody scrub. Unit is currently ungrazed. Need to consider introduction of grazing; however, unit is very wet and unsuitable for grazing. Cutting of vegetation (and removal of arisings) using specialised machinery should also be considered. Burning is another possible management option. Scrub control is carried out to reduce scrub encroachment.	Yes
14	000927	Tennant Canal	Tennant Canal requires regular sympathetic management to maintain open water habitat and marginal tussocky vegetation for fen raft spider. The current management, carried out by the Tennant Canal Company, is ideal.	No
15	000928	Fen	Key management issue is vegetation succession of fen vegetation (and associated uncommon species) to tall rank vegetation and woody scrub. Unit is ungrazed and there is no history of grazing at the site (no stockproof boundaries). Cutting of vegetation (and removal of arisings)	Yes

			using specialised machinery could be considered. Burning is not a viable management option due to the close proximity of housing and also the recreational use of the site. Scrub control is carried out to reduce scrub encroachment.	
6b	002511	CCW grassland B	Grassland is grazed by horses, and scrub control is carried out to prevent scrub encroachment. Current management regime is ideal for hornet robberfly feature.	No
18	007044	Ramsar boundary error B		No

6.2 Ongoing management

Grazing should continue where it is currently taking place at Crymlyn Bog. Opportunities to expand grazing should continue to be explored, although restoring grazing to much of the site is highly problematic due to the very wet ground and inaccessibility.

Scrub control is already carried out on an annual basis and this should continue, often targeted towards stands of SAC calcareous fen and transition mire vegetation.

Open water restoration work has been carried out in recent years, to benefit fen raft spider and other open water-dependent species. Extending this work to the currently disused sections of the Tennant Canal (unit 2) and Glan-y-wern Canal (unit 3) should continue to be explored.

Measures to tackle the over-topping of Crymlyn Brook with nutrient-enriched water need to be decided and implemented, as do measures to tackle over-topping of the Glan y Wern Canal. Any other problems with point-source inputs of nutrients also need to be tackled as required, as well groundwater migration of leachate from the Tir John landfill site; the latter issue is currently being addressed through a variation to the existing permit for the Tir John site.

7. GLOSSARY

This glossary defines some of the terms used in this **Core Management Plan**. Some of the definitions are based on definitions contained in other documents, including legislation and other publications of Natural Resources Wales and the UK nature conservation agencies.

Action	A recognisable and individually described act, undertaking or project of any kind, specified in section 5 or 6 of a Core Management Plan or Management Plan, as being required for protecting, managing or enhancing one or more of the features for which a site is designated.
Attribute	A quantifiable and monitorable characteristic of a feature that, in combination with other such attributes, describes its condition.
Common standards	See JNCC common standards.
Condition	A description of the state of a feature in terms of qualities or attributes that are relevant in a nature conservation context. For example, the condition of a habitat usually includes its extent and species composition and might also include aspects of its ecological functioning, spatial distribution and so on. The condition of a species population usually includes its total size and might also include its age structure, productivity, relationship to other populations and spatial distribution. Aspects of the habitat(s) on which a species population depends may also be considered as attributes of its condition. Condition is considered favourable when all the conservation objectives are being met.
Conservation management	Acts or undertaking of all kinds, including but not necessarily limited to actions, taken with the aim of achieving the conservation objectives of a site. Conservation management includes the taking of statutory and non-statutory measures, it can include the acts of any party and it may take place outside site boundaries as well as within sites. Conservation management may also be embedded within other frameworks for land/sea management carried out for purposes other than achieving the conservation objectives.
Conservation objective	The expression of the desired state of a feature, expressed as a composite statement defining the

	condition that we wish the feature to be in. Each feature has one conservation objective.
Core Management Plan	A Natural Resources Wales document containing the conservation objectives for a site and a summary of other information contained in a full site Management Plan.
Factor	Anything that has influenced, is influencing, or may influence the condition of a feature. Factors can be natural processes, human activities or effects arising from natural process or human activities. They can be positive or negative in terms of their influence on features, and they can arise within a site or from outside the site. Physical, socio-economic or legal constraints on management of the site can also be considered as factors.
Favourable condition	See condition.
Favourable conservation Status	The Habitats Directive definition of Favourable Conservation Status (FCS) is given in full in section 4.
Feature	The species population, habitat type or other entity for which a site is designated. The ecological or geological interest which justifies the designation of a site and which is the focus of conservation management.
Integrity	See Site integrity.
JNCC common standards	A set of principles developed jointly by the UK nature conservation agencies to help ensure a consistent approach to monitoring and reporting on the features of sites designated for nature conservation, supported by guidance on identification of attributes and monitoring methodologies.
Key Feature	The habitat or species population within a management unit that is the primary focus of management and monitoring in that unit.
Management Plan	The full expression of a designated site's legal status, vision, features, conservation objectives, performance indicators and management requirements. A complete management plan may not reside in a single document, but may be contained in a number of documents (including in

particular the Core Management Plan) and sets of electronically stored information.

Management Unit

An area within a site, defined according to one or more of a range of criteria, such as topography, location of features, tenure, patterns of land/sea use. The key characteristic of management units is to reflect the spatial scale at which site management and monitoring can be most effectively organised. They are used as the primary basis for differentiating priorities for conservation management and monitoring in different parts of a site, and for facilitating communication with those responsible for management of different parts of a site.

Monitoring

An intermittent (regular or irregular) series of observations in time, carried out to show the extent of compliance with a formulated standard or degree of deviation from an expected norm. In monitoring of sites designated for habitat and species conservation, the formulated standard is the quantified expression of favourable condition based on attributes.

Operational limits

The levels or values within which a factor is considered to be acceptable in terms of its influence on a feature. A factor may have both upper and lower operational limits, or only an upper limit or lower limit. For some factors an upper limit may be zero.

Performance indicators

The attributes and factors together with their associated target values (or ranges of values) which provide the standard against which information from monitoring and other sources is used to determine the degree to which the conservation objectives for a feature are being met.

Plan or project

Project: Any form of construction work, installation, development or other intervention in the environment, the carrying out or continuance of which is subject to a decision by any public body or statutory undertaker.

Plan: a document prepared or adopted by a public body or statutory undertaker, intended to influence decisions on the carrying out of **projects**.

Decisions on plans and projects which affect Natura 2000 and Ramsar sites are subject to specific legal and policy procedures.

Site integrity

This is defined in Welsh Government policy as the coherence of a site's ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it is designated.

Site Management Statement (SMS) The document containing Natural Resources Wales' views about the management of a site issued as part of the legal notification of an SSSI under section 28(4) of the Wildlife and Countryside Act 1981, as substituted.

Special Feature

See feature.

Specified limits

The levels or values for an attribute which define the degree to which the attribute can fluctuate without creating cause for concern about the condition of the feature. The range within the limits corresponds to favourable, the range outside the limits corresponds to unfavourable. Attributes may have lower specified limits, upper specified limits, or both.

Unit

See management unit.

Vision Statement

The statement conveying an impression of the whole site in the state that is intended to be the product of its conservation management. A 'pen portrait' outlining the conditions that should prevail when all the conservation objectives are met. A description of the site as it would be when all the features are in favourable condition.

8. REFERENCES

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9. APPENDICES

These performance indicators describe the evidence, including in particular evidence to be obtained from monitoring of sites and features, that will be used to inform judgements about whether or not the conservation objectives (in section 4 of the Core management plans) are being met.

These performance indicators should NOT be used as a substitute for the conservation objectives, including in particular for the purposes of assessing plans and projects. The assessment of plans and projects should be made in view of the conservation objectives set out in section 4.

9.1 Appendix 1.1 - Performance indicators for Feature 1: Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* (EU habitat code 7210)

Performance indicators		The calcareous fen with <i>Cladium mariscus</i> and species of the <i>Carex davallianae</i> at Crymlyn Bog SAC will be in favourable condition when:
Extent	Lower limit	The extent and distribution of calcareous fen habitat should be at least that mapped as shown on Map 1 (Crymlyn Bog) & 2 (Pant-y-sais fen) (Bosanquet 2009 & Bosanquet 2005, revised in 2011). And Within the mapped areas of calcareous fen there are no stands of dense scrub > 10 x 10 m.
Quality	Lower limit	All of the following criteria should be met: - At least two areas of '<i>Cladium</i> dominated vegetation' should be retained on Crymlyn Bog. - There should be no areas of '<i>Cladium</i> dominated vegetation' within stands mapped as open, calcareous fen shown on Maps 3 & 4 (NVC communities S24 and '<i>Carex elata</i> – <i>Molinia</i> vegetation') (Bosanquet 2009 & Bosanquet 2005, revised 2011). - Vegetation meeting the definition of good condition calcareous fen should make up at least: 50% of each of plots B, D and E; 60% of plot A; and 70% of both plots C and F. Sample plot locations are shown on Map 5.

Site specific habitat definitions		
Calcareous fen	There are a number of communities that make up this Annex I habitat and they are variable in their composition. They include species-poor stands dominated by <i>Cladium mariscus</i> , sometimes with <i>Molinia caerulea</i> (S2 and <i>Cladio-Molinietum</i> vegetation), vegetation dominated by <i>Carex elata</i> and <i>Molinia</i> in association with other calcareous species (' <i>Carex elata</i> – <i>Molinia</i> vegetation') and more species-rich stands where <i>Lysimachia vulgaris</i> , <i>Juncus subnodulosus</i> , <i>Ranunculus lingua</i> , <i>Rumex hydrolapathum</i> or <i>Typha angustifolia</i> are frequent (NVC community S24)	
Good quality calcareous fen	Within a 2 m radius of each sampling point: 1. <i>Carex elata</i> is present along with at least three of the following positive indicators: <i>Lythrum salicaria</i> , <i>Osmunda regalis</i> , <i>Lysimachia vulgaris</i> , <i>Potentilla palustris</i> , <i>Rumex hydrolapathum</i> , <i>Ranunculus lingua</i> , <i>Carex pseudocyperus</i> , <i>Eupatorium cannabinum</i> , <i>Typha angustifolia</i> or <i>Juncus subnodulosus</i> 2. The cover of <i>Phragmites australis</i> is <30% 3. The cover of <i>Cladium mariscus</i> is <20% 4. Scrub > 1m tall is absent 5. Non-natives are absent	
<i>Cladium</i> dominated vegetation	Stands of vegetation > 20 x 20 m where <i>Cladium mariscus</i> forms > 50% cover.	
Scrub	<i>Salix</i> sp., <i>Betula</i> sp., <i>Alnus glutinosa</i> , <i>Frangula alnus</i> or <i>Rhododendron</i> sp.	
Stand of scrub	An area of continuous cover dominated by scrub species that is > 10 x 10 m.	
Non-native	Any species that is not native to south Wales.	

9.2 Appendix 1.2 - Performance indicators for Feature 2: Transition mires and quaking bogs (EU habitat code 7140)

Performance indicators		To maintain the transition mire and quaking bogs habitat at Crymlyn Bog/Cors Crymlyn SAC in favourable condition where:
Extent	Upper limit	Not set
	Lower limit	The extent and distribution should be at least that mapped by the Phase II team (Bosanquet 2009 & Bosanquet 2005, revised in 2011) Plus at least an additional 3 ha of transition mire and quaking

		bog habitat should be restored.
Quality	Lower limit	At least 60% of the vegetation within each of Plots 1 to 6 at Crymlyn Bog and Plots 1 and 2 at Pant-y-sais Fen (shown on Map 3) is referable to good condition transition mire and quaking bogs habitat.
Definitions		
Transition mire and quaking bogs		In the main bulk of the habitat some or all of the following species <i>Carex rostrata</i> , <i>Potentilla palustris</i> , <i>Equisetum fluviatile</i> or <i>Menyanthes trifoliata</i> are present, sharing dominance in varying combinations (NVC community S27). However, in some stands <i>Sphagna</i> species (particularly <i>squarrosus</i> and <i>subnitens</i> in stands referable to M5 and M21), <i>Narthecium ossifragum</i> (in M21) or <i>Erica tetralix</i> (in M15 'swampy variant') are more prevalent along side these four more typical poor fen species.
Good condition transition mire and quaking bogs		Within any 1m radius the following criteria are met: • Either <i>Carex rostrata</i> forms >30% cover or at least 4 of the following positives are present: <i>Berula erecta</i>, <i>Carex echinata</i>, <i>C. limosa</i>, <i>C. rostrata</i>, <i>Equisetum fluviatile</i>, <i>Eriophorum angustifolium</i>, <i>E. gracile</i>, <i>Menyanthes trifoliata</i>, <i>Potentilla palustris</i>, <i>Sparganium erectum</i>, <i>Sphagnum squarrosus</i> or <i>S. subnitens</i> with at least one of the four positives being a key transition mire and quaking bogs indicator species. • There are 50 or less green aerial shoots of <i>Phragmites australis</i> • The individual covers of each of <i>Molinia caerulea</i>, <i>Carex paniculata</i> and <i>Carex elata</i> are <20% • There are <10 green aerial shoots of <i>Cladium mariscus</i> • Scrub >1m tall is absent
Key transition mire and quaking bogs indicator species		<i>Carex limosa</i> , <i>C. rostrata</i> , <i>Equisetum fluviatile</i> , <i>Eriophorum gracile</i> , <i>Menyanthes trifoliata</i> and <i>Potentilla palustris</i>

Scrub	<i>Alnus glutinosa</i> , <i>Salix</i> sp., <i>Betula</i> sp., <i>Frangula</i> sp. or <i>Rhododendron</i> .
-------	--

9.3 Appendix 1.3 - Performance indicators for Feature 3: Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) (EU habitat code 91E0)

Performance indicators		To maintain the <i>alluvial forest</i> feature of Crymlyn Bog in favourable condition the following criteria should be met:
Extent	Upper limit	No further expansion of the alluvial forest is desired. Additional spread will not affect the condition of the woodland feature but would impact on the condition of the fen habitats.
	Lower limit	Desired extent as shown in Map 1.
Quality	Upper limit	None set
	Lower limit	At least 75% of the alluvial forest will be in good condition.
Definitions		
Alluvial forest		Woodland with a canopy and shrub layer dominated by <i>Salix</i> sp., <i>Betula pubescens</i> or <i>Alnus glutinosa</i> , in any combination. <i>Frangula alnus</i> should be frequent in the shrub layer. The groundflora is typically dominated by <i>Carex paniculata</i> , although in slightly drier areas <i>Molinia caerulea</i> may be present. Other species that occur in the ground flora include <i>Lysimachia vulgaris</i> , <i>Osmunda regalis</i> , <i>Lythrum salicaria</i> , <i>Solanum dolcamara</i> , <i>Iris pseudacorus</i> , <i>Scutellaria galericulata</i> and <i>Sparganium erectum</i> .
Good condition alluvial forest		Woodland where, in a 15m radius: - At least 95% of the canopy is made up of <i>Salix</i> sp., <i>Alnus glutinosa</i> or <i>Betula pubescens</i>, in any combination - Viable regeneration of a typical alluvial forest species is at least present - At least one over mature tree is present And where, in a 5m radius: <i>Carex paniculata</i> is present along with at least 2 of the following: <i>Lysimachia vulgaris</i>, <i>Osmunda regalis</i>, <i>Lythrum salicaria</i>, <i>Solanum dolcamara</i>, <i>Iris pseudacorus</i>, <i>Scutellaria galericulata</i> or <i>Sparganium erectum</i> - and <i>Urtica dioica</i> and <i>Pteridium aquilinum</i> are absent
Viable regeneration of a typical alluvial forest		Re-growth from a fallen stem, base of a tree or a sapling that is >1m in height yet does not reach the canopy of either <i>Salix</i> sp., <i>Betula pubescens</i> or <i>Alnus glutinosa</i>
Over mature tree		A tree with a trunk that is >20cm in diameter at chest height which either has at least one dead limb over 10cm in diameter or a dead crown or has fallen or is slumping.

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STANDARD DATA FORM for sites within the 'UK national site network of European sites'

Special Protection Areas (SPAs) are classified and Special Areas of Conservation (SACs) are designated under:

- the Conservation of Habitats and Species Regulations 2017 (as amended) in England and Wales (including the adjacent territorial sea) and to a limited extent in Scotland (reserved matters) and Northern Ireland (excepted matters);
- the Conservation (Natural Habitats &c.) Regulations 1994 (as amended) in Scotland;
- the Conservation (Natural Habitats, &c) Regulations (Northern Ireland) 1995 (as amended) in Northern Ireland; and
- the Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended) in the UK offshore area.

Each SAC or SPA (forming part of the UK national site network of European sites) has its own Standard Data Form containing site-specific information. The information provided here generally follows the same documenting format for SACs and SPAs, as set out in the [Official Journal of the European Union recording the Commission Implementing Decision of 11 July 2011 \(2011/484/EU\)](#).

Please note that these forms contain a number of codes, all of which are explained either within the data forms themselves or in the end notes.

More general information on SPAs and SACs in the UK is available from the [SPA homepage](#) and [SAC homepage](#) on the JNCC website. These webpages also provide links to Standard Data Forms for all SAC and SPA sites in the UK.

<https://jncc.gov.uk/>



NATURA 2000 - STANDARD DATA FORM

For Special Protection Areas (SPA),
Proposed Sites for Community Importance (pSCI),
Sites of Community Importance (SCI) and
for Special Areas of Conservation (SAC)

SITE UK0012885
SITENAME Crymlyn Bog/ Cors Crymlyn

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- [1. SITE IDENTIFICATION](#)
- [2. SITE LOCATION](#)
- [3. ECOLOGICAL INFORMATION](#)
- [4. SITE DESCRIPTION](#)
- [5. SITE PROTECTION STATUS AND RELATION WITH CORINE BIOTOPES](#)
- [6. SITE MANAGEMENT](#)

1. SITE IDENTIFICATION

1.1 Type B	1.2 Site code UK0012885	Back to top
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1.3 Site name

Crymlyn Bog/ Cors Crymlyn

1.4 First Compilation date 1995-06	1.5 Update date 2015-12
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1.6 Respondent:

Name/Organisation: Joint Nature Conservation Committee
Address: Joint Nature Conservation Committee Monkstone House City Road Peterborough PE1 1JY
Email:

Date site proposed as SCI:	1995-06
Date site confirmed as SCI:	2004-12
Date site designated as SAC:	2004-12
National legal reference of SAC designation:	Regulations 11 and 13-15 of the Conservation of Habitats and Species Regulations 2010 (http://www.legislation.gov.uk/uksi/2010/490/contents/made).

2. SITE LOCATION

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2.1 Site-centre location [decimal degrees]:

Longitude

-3.888333333

Latitude

51.63638889

2.2 Area [ha]:

299.42

2.3 Marine area [%]

0.0

2.4 Sitelength [km]:

3.0

2.5 Administrative region code and name

NUTS level 2 code

Region Name

UKL2

East Wales

2.6 Biogeographical Region(s)

Atlantic (100.0
%)

3. ECOLOGICAL INFORMATION

3.1 Habitat types present on the site and assessment for them

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Annex I Habitat types						Site assessment			
Code	PF	NP	Cover [ha]	Cave [number]	Data quality	A B C D	A B C		
						Representativity	Relative Surface	Conservation	Global
7140 			8.08	0	G	B	C	B	B
7210 	X		59.88	0	M	A	B	B	B
91E0 	X		7.46	0	G	C	C	B	C

- **PF:** for the habitat types that can have a non-priority as well as a priority form (6210, 7130, 9430) enter "X" in the column PF to indicate the priority form.
- **NP:** in case that a habitat type no longer exists in the site enter: x (optional)
- **Cover:** decimal values can be entered
- **Caves:** for habitat types 8310, 8330 (caves) enter the number of caves if estimated surface is not available.
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation)

4. SITE DESCRIPTION

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4.1 General site character

Habitat class	% Cover
N16	8.3
N08	0.6
N06	1.6
N07	86.0
N10	3.5
Total Habitat Cover	99.99999999999999

Other Site Characteristics

1 Terrestrial: Soil & Geology: sandstone,clay,peat 2 Terrestrial: Geomorphology and landscape: lowland, valley

4.2 Quality and importance

Transition mires and quaking bogs for which this is considered to be one of the best areas in the United Kingdom. Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* for which this is considered to be one of the best areas in the United Kingdom. which is considered to be rare as its total extent in the United Kingdom is estimated to be less than 1000 hectares. Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) for which the area is considered to support a significant presence.

4.3 Threats, pressures and activities with impacts on the site

The most important impacts and activities with high effect on the site

Negative Impacts			
Rank	Threats and pressures [code]	Pollution (optional) [code]	inside/outside [i o b]
H	H01		B
H	J02		I
H	K02		I
H	A04		I
H	H04		B
L	H05		I

Rank: H = high, M = medium, L = low

Pollution: N = Nitrogen input, P = Phosphor/Phosphate input, A = Acid input/acidification, T = toxic inorganic chemicals, O = toxic organic chemicals, X = Mixed pollutions

i = inside, o = outside, b = both

Positive Impacts			
Rank	Activities, management [code]	Pollution (optional) [code]	inside/outside [i o b]
M	J02		I
M	A10		I
M	A04		I
M	G03		I
M	D05		I

4.5 Documentation

The Natural Resources Wales weblink below provides access to information on its designated sites. Detailed information about this Natura 2000 site can be accessed via the Management Plan link provided in Section 6.2. See also the 'UK Approach' document for more information (link via the JNCC website).

Link(s): <https://naturalresources.wales/guidance-and-advice/environmental-topics/wildlife-and-biodiversity/protected-areas-of-lan>

http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

5. SITE PROTECTION STATUS (optional)

5.1 Designation types at national and regional level:

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Code	Cover [%]
UK00	8.4

Code	Cover [%]
UK01	44.0

Code	Cover [%]
UK04	91.6

6. SITE MANAGEMENT

6.1 Body(ies) responsible for the site management:

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Organisation:	Natural Resources Wales
Address:	
Email:	

6.2 Management Plan(s):

An actual management plan does exist:

☒ Yes	Name: CRYMLYN BOG / CORS CRYMLYN Link: https://naturalresources.wales/media/675011/crymlyn-bog-sac-english.pdf
☐ No, but in preparation	
☐ No	

EXPLANATION OF CODES USED IN THE SPECIAL AREA OF CONSERVATION (SAC) AND SPECIAL PROTECTION AREA (SPA) STANDARD DATA FORMS

The codes in the table below generally follow those explained in the [official European Union guidelines for the Standard Data Form](#) (also referencing the relevant page number).

1.1 Site type

CODE	DESCRIPTION	PAGE NO
A	SPA (classified Special Protection Area)	53
B	cSAC, SCI or SAC (candidate Special Area of Conservation, Site of Community Importance, designated Special Area of Conservation)	53
C	SPA area/boundary is the same as the cSAC/SCI/SAC i.e. a co-classified/designated site (Note: this situation only occurs in Gibraltar)	53

3.1 Habitat code

CODE	DESCRIPTION	PAGE NO
1110	Sandbanks which are slightly covered by sea water all the time	57
1130	Estuaries	57
1140	Mudflats and sandflats not covered by seawater at low tide	57
1150	Coastal lagoons	57
1160	Large shallow inlets and bays	57
1170	Reefs	57
1180	Submarine structures made by leaking gases	57
1210	Annual vegetation of drift lines	57
1220	Perennial vegetation of stony banks	57
1230	Vegetated sea cliffs of the Atlantic and Baltic Coasts	57
1310	Salicornia and other annuals colonizing mud and sand	57
1320	Spartina swards (Spartinion maritimae)	57
1330	Atlantic salt meadows (Glaucio-Puccinellietalia maritimae)	57
1340	Inland salt meadows	57
1420	Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi)	57
2110	Embryonic shifting dunes	57
2120	Shifting dunes along the shoreline with Ammophila arenaria ("white dunes")	57
2130	Fixed coastal dunes with herbaceous vegetation ("grey dunes")	57
2140	Decalcified fixed dunes with Empetrum nigrum	57
2150	Atlantic decalcified fixed dunes (Calluno-Ulicetea)	57
2160	Dunes with Hippophya• rhamnoides	57
2170	Dunes with Salix repens ssp. argentea (Salicion arenariae)	57
2190	Humid dune slacks	57
21A0	Machairs (* in Ireland)	57
2250	Coastal dunes with Juniperus spp.	57
2330	Inland dunes with open Corynephorus and Agrostis grasslands	57
3110	Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)	57
3130	Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea	57
3140	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.	57
3150	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation	57

CODE	DESCRIPTION	PAGE NO
3160	Natural dystrophic lakes and ponds	57
3170	Mediterranean temporary ponds	57
3180	Turloughs	57
3260	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitriche-Batrachion vegetation	57
4010	Northern Atlantic wet heaths with Erica tetralix	57
4020	Temperate Atlantic wet heaths with Erica ciliaris and Erica tetralix	57
4030	European dry heaths	57
4040	Dry Atlantic coastal heaths with Erica vagans	57
4060	Alpine and Boreal heaths	57
4080	Sub-Arctic Salix spp. scrub	57
5110	Stable xerothermophilous formations with Buxus sempervirens on rock slopes (Berberidion p.p.)	57
5130	Juniperus communis formations on heaths or calcareous grasslands	57
6130	Calaminarian grasslands of the Violetalia calaminariae	57
6150	Siliceous alpine and boreal grasslands	57
6170	Alpine and subalpine calcareous grasslands	57
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	57
6230	Species-rich Nardus grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe)	57
6410	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)	57
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	57
6510	Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)	57
6520	Mountain hay meadows	57
7110	Active raised bogs	57
7120	Degraded raised bogs still capable of natural regeneration	57
7130	Blanket bogs (* if active bog)	57
7140	Transition mires and quaking bogs	57
7150	Depressions on peat substrates of the Rhynchosporion	57
7210	Calcareous fens with Cladium mariscus and species of the Caricion davallianae	57
7220	Petrifying springs with tufa formation (Cratoneurion)	57
7230	Alkaline fens	57
7240	Alpine pioneer formations of the Caricion bicoloris-atrofuscae	57
8110	Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)	57
8120	Calcareous and calcshist scree of the montane to alpine levels (Thlaspietalia rotundifoliae)	57
8210	Calcareous rocky slopes with chasmophytic vegetation	57
8220	Siliceous rocky slopes with chasmophytic vegetation	57
8240	Limestone pavements	57
8310	Caves not open to the public	57
8330	Submerged or partially submerged sea caves	57
9120	Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion robur-petraeae or Ilici-Fagenion)	57
9130	Asperulo-Fagetum beech forests	57
9160	Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli	57
9180	Tilio-Acerion forests of slopes, scree and ravines	57
9190	Old acidophilous oak woods with Quercus robur on sandy plains	57
91A0	Old sessile oak woods with Ilex and Blechnum in the British Isles	57
91C0	Caledonian forest	57
91D0	Bog woodland	57
91E0	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	57
91J0	Taxus baccata woods of the British Isles	57

3.1 Habitat representativity (abbreviated to 'Representativity' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent representativity	57
B	Good representativity	57
C	Significant representativity	57
D	Non-significant presence representativity	57

3.1 Relative surface

CODE	DESCRIPTION	PAGE NO
A	> 15%-100%	58
B	> 2%-15%	58
C	≤ 2%	58

3.1 Degree of conservation (abbreviated to 'Conservation' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	59
B	Good conservation	59
C	Average or reduced conservation	59

3.1 Global assessment (abbreviated to 'Global' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent value	59
B	Good value	59
C	Significant value	59

3.2 Population (abbreviated to 'Pop.' in data form)

CODE	DESCRIPTION	PAGE NO
A	> 15%-100%	62
B	> 2%-15%	62
C	≤ 2%	62
D	Non-significant population	62

3.2 Degree of conservation (abbreviated to 'Con.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	63
B	Good conservation	63
C	Average or reduced conservation	63

3.2 Isolation (abbreviated to 'Iso.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Population (almost) Isolated	63
B	Population not-isolated, but on margins of area of distribution	63
C	Population not-isolated within extended distribution range	63

3.2 Global Grade (abbreviated to 'Glo.' or 'G.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent value	63
B	Good value	63
C	Significant value	63

3.3 Other species – essentially covers bird assemblage types

CODE	DESCRIPTION	PAGE NO
WATR	Non-breeding waterbird assemblage	UK specific code
SBA	Breeding seabird assemblage	UK specific code

BBA	Breeding bird assemblage (applies only to sites classified pre 2000)	UK specific code
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4.1 Habitat class code

CODE	DESCRIPTION	PAGE NO
N01	Marine areas, Sea inlets	65
N02	Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins)	65
N03	Salt marshes, Salt pastures, Salt steppes	65
N04	Coastal sand dunes, Sand beaches, Machair	65
N05	Shingle, Sea cliffs, Islets	65
N06	Inland water bodies (Standing water, Running water)	65
N07	Bogs, Marshes, Water fringed vegetation, Fens	65
N08	Heath, Scrub, Maquis and Garrigue, Phygrana	65
N09	Dry grassland, Steppes	65
N10	Humid grassland, Mesophile grassland	65
N11	Alpine and sub-Alpine grassland	65
N14	Improved grassland	65
N15	Other arable land	65
N16	Broad-leaved deciduous woodland	65
N17	Coniferous woodland	65
N19	Mixed woodland	65
N21	Non-forest areas cultivated with woody plants (including Orchards, groves, Vineyards, Dehesas)	65
N22	Inland rocks, Screes, Sands, Permanent Snow and ice	65
N23	Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites)	65
N25	Grassland and scrub habitats (general)	65
N26	Woodland habitats (general)	65

4.3 Threats code

CODE	DESCRIPTION	PAGE NO
A01	Cultivation	65
A02	Modification of cultivation practices	65
A03	Mowing / cutting of grassland	65
A04	Grazing	65
A05	Livestock farming and animal breeding (without grazing)	65
A06	Annual and perennial non-timber crops	65
A07	Use of biocides, hormones and chemicals	65
A08	Fertilisation	65
A10	Restructuring agricultural land holding	65
A11	Agriculture activities not referred to above	65
B01	Forest planting on open ground	65
B02	Forest and Plantation management & use	65
B03	Forest exploitation without replanting or natural regrowth	65
B04	Use of biocides, hormones and chemicals (forestry)	65
B06	Grazing in forests/ woodland	65
B07	Forestry activities not referred to above	65
C01	Mining and quarrying	65
C02	Exploration and extraction of oil or gas	65
C03	Renewable abiotic energy use	65
D01	Roads, paths and railroads	65
D02	Utility and service lines	65
D03	Shipping lanes, ports, marine constructions	65
D04	Airports, flightpaths	65
D05	Improved access to site	65
E01	Urbanised areas, human habitation	65
E02	Industrial or commercial areas	65

CODE	DESCRIPTION	PAGE NO
E03	Discharges	65
E04	Structures, buildings in the landscape	65
E06	Other urbanisation, industrial and similar activities	65
F01	Marine and Freshwater Aquaculture	65
F02	Fishing and harvesting aquatic resources	65
F03	Hunting and collection of wild animals (terrestrial), including damage caused by game (excessive density), and taking/removal of terrestrial animals (including collection of insects, reptiles, amphibians, birds of prey, etc., trapping, poisoning, poaching, predator control, accidental capture (e.g. due to fishing gear), etc.)	65
F04	Taking / Removal of terrestrial plants, general	65
F05	Illegal taking/ removal of marine fauna	65
F06	Hunting, fishing or collecting activities not referred to above	65
G01	Outdoor sports and leisure activities, recreational activities	65
G02	Sport and leisure structures	65
G03	Interpretative centres	65
G04	Military use and civil unrest	65
G05	Other human intrusions and disturbances	65
H01	Pollution to surface waters (limnic & terrestrial, marine & brackish)	65
H02	Pollution to groundwater (point sources and diffuse sources)	65
H03	Marine water pollution	65
H04	Air pollution, air-borne pollutants	65
H05	Soil pollution and solid waste (excluding discharges)	65
H06	Excess energy	65
H07	Other forms of pollution	65
I01	Invasive non-native species	65
I02	Problematic native species	65
I03	Introduced genetic material, GMO	65
J01	Fire and fire suppression	65
J02	Human induced changes in hydraulic conditions	65
J03	Other ecosystem modifications	65
K01	Abiotic (slow) natural processes	65
K02	Biocenotic evolution, succession	65
K03	Interspecific faunal relations	65
K04	Interspecific floral relations	65
K05	Reduced fecundity/ genetic depression	65
L05	Collapse of terrain, landslide	65
L07	Storm, cyclone	65
L08	Inundation (natural processes)	65
L10	Other natural catastrophes	65
M01	Changes in abiotic conditions	65
M02	Changes in biotic conditions	65
U	Unknown threat or pressure	65
XO	Threats and pressures from outside the Member State	65

5.1 Designation type codes

CODE	DESCRIPTION	PAGE NO
UK00	No Protection Status	67
UK01	National Nature Reserve	67
UK04	Site of Special Scientific Interest (GB)	67
UK05	Marine Conservation Zone	67
UK06	Nature Conservation Marine Protected Area	67
UK86	Special Area (Channel Islands)	67
UK98	Area of Special Scientific Interest (NI)	67
IN00	Ramsar Convention site	67
IN08	Special Protection Area	67
IN09	Special Area of Conservation	67

APPENDIX 3

Information Sheet and Site Citation for Crymlyn Bog
Ramsar

Information Sheet on Ramsar Wetlands (RIS)

Categories approved by Recommendation 4.7 (1990), as amended by Resolution VIII.13 of the 8th Conference of the Contracting Parties (2002) and Resolutions IX.1 Annex B, IX.6, IX.21 and IX.22 of the 9th Conference of the Contracting Parties (2005).

Notes for compilers:

1. The RIS should be completed in accordance with the attached *Explanatory Notes and Guidelines for completing the Information Sheet on Ramsar Wetlands*. Compilers are strongly advised to read this guidance before filling in the RIS.
2. Further information and guidance in support of Ramsar site designations are provided in the *Strategic Framework for the future development of the List of Wetlands of International Importance* (Ramsar Wise Use Handbook 7, 2nd edition, as amended by COP9 Resolution IX.1 Annex B). A 3rd edition of the Handbook, incorporating these amendments, is in preparation and will be available in 2006.
3. Once completed, the RIS (and accompanying map(s)) should be submitted to the Ramsar Secretariat. Compilers should provide an electronic (MS Word) copy of the RIS and, where possible, digital copies of all maps.

1. Name and address of the compiler of this form:

Joint Nature Conservation Committee

Monkstone House

City Road

Peterborough

Cambridgeshire PE1 1JY

UK

Telephone/Fax: +44 (0)1733 – 562 626 / +44 (0)1733 – 555 948

Email: RIS@JNCC.gov.uk

FOR OFFICE USE ONLY.

DD MM YY

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Designation date

--	--	--	--	--	--

Site Reference Number

2. Date this sheet was completed/updated:

Designated: 08 June 1993

3. Country:

UK (Wales)

4. Name of the Ramsar site:

Crymlyn Bog

5. Designation of new Ramsar site or update of existing site:

This RIS is for: Updated information on an existing Ramsar site

6. For RIS updates only, changes to the site since its designation or earlier update:

a) Site boundary and area:

**** Important note:** If the boundary and/or area of the designated site is being restricted/reduced, the Contracting Party should have followed the procedures established by the Conference of the Parties in the Annex to COP9 Resolution IX.6 and provided a report in line with paragraph 28 of that Annex, prior to the submission of an updated RIS.

b) Describe briefly any major changes to the ecological character of the Ramsar site, including in the application of the Criteria, since the previous RIS for the site:

7. Map of site included:

Refer to Annex III of the *Explanatory Notes and Guidelines*, for detailed guidance on provision of suitable maps, including digital maps.

a) A map of the site, with clearly delineated boundaries, is included as:

- i) **hard copy** (required for inclusion of site in the Ramsar List): yes ✓ -or- no ☐;
- ii) **an electronic format** (e.g. a JPEG or ArcView image) Yes
- iii) **a GIS file providing geo-referenced site boundary vectors and attribute tables** yes ✓ -or- no ☐;

b) Describe briefly the type of boundary delineation applied:

e.g. the boundary is the same as an existing protected area (nature reserve, national park etc.), or follows a catchment boundary, or follows a geopolitical boundary such as a local government jurisdiction, follows physical boundaries such as roads, follows the shoreline of a waterbody, etc.

The site boundary is the same as, or falls within, an existing protected area.

For precise boundary details, please refer to paper map provided at designation

8. Geographical coordinates (latitude/longitude):

51 38 08 N 03 53 16 W

9. General location:

Include in which part of the country and which large administrative region(s), and the location of the nearest large town.

Nearest town/city: Swansea

Crymlyn Bog lies within a south Wales industrial and urban landscape between Swansea and Neath, 1 km inland of the coast.

Administrative region: Abertawe/ Swansea; Castell-Nedd a Porth Talbot/ Neath and Port Talbot

10. Elevation (average and/or max. & min.) (metres): 11. Area (hectares): 264.18

Min. 7
Max. 9
Mean 8

12. General overview of the site:

Provide a short paragraph giving a summary description of the principal ecological characteristics and importance of the wetland.

Crymlyn Bog comprises a floodplain-valley mire located within a lowland coastal context and is the most extensive wetland of its type in Wales. The mire features a complex mosaic of vegetation types, supporting examples of swamp, tall herb fen, fen meadow and carr communities. The site supports an exceptionally wide range of rich and poor fen communities, some of which bear a close floristic affinity to certain floodplain mires in East Anglia. The presence of significant areas of saw sedge *Cladium mariscus* swamp is notable in extensive stands of this uncommon vegetation type, occurring at only three other sites in Wales. Crymlyn Bog is part of a larger inter-estuarine complex which includes the adjacent Pant y Sais fen.

13. Ramsar Criteria:

Circle or underline each Criterion applied to the designation of the Ramsar site. See Annex II of the *Explanatory Notes and Guidelines* for the Criteria and guidelines for their application (adopted by Resolution VII.11).

1, 2, 3

14. Justification for the application of each Criterion listed in 13 above:

Provide justification for each Criterion in turn, clearly identifying to which Criterion the justification applies (see Annex II for guidance on acceptable forms of justification).

Ramsar criterion 1

Largest example of valley floodplain topogenous mire in South Wales, and one of the largest surviving fens in the west of Britain. Very few other sites are known to support a comparable complexity and diversity of vegetation. Habitats Directive Annex I features present on the SAC include:

- H7140 Transition mires and quaking bogs
- H7210 Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*
- H91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*

Ramsar criterion 2

Supports a substantial population of the nationally-rare slender cotton-grass *Eriophorum gracile*, and a rich invertebrate fauna including many rare and highly localised species.

Ramsar criterion 3

The site supports 199 vascular plant species including 17 regionally-uncommon and one nationally-rare.

See Sections 21/22 for details of noteworthy species

15. Biogeography (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation):

Name the relevant biogeographic region that includes the Ramsar site, and identify the biogeographic regionalisation system that has been applied.

a) biogeographic region:

Atlantic

b) biogeographic regionalisation scheme (include reference citation):

Council Directive 92/43/EEC

16. Physical features of the site:

Describe, as appropriate, the geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth, water permanence; fluctuations in water level; tidal variations; downstream area; general climate, etc.

Soil & geology	mud, clay, peat, nutrient-poor
Geomorphology and landscape	lowland, floodplain, pools
Nutrient status	eutrophic, highly eutrophic, mesotrophic, oligotrophic
pH	acidic, alkaline, strongly acidic
Salinity	fresh
Soil	mainly organic
Water permanence	usually permanent
Summary of main climatic features	Annual averages (Cardiff, 1971–2000) (www.metoffice.com/climate/uk/averages/19712000/sites/cardiff.html) Max. daily temperature: 14.3° C Min. daily temperature: 6.8° C Days of air frost: 33.0 Rainfall: 1111.7 mm Hrs. of sunshine: 1518.0

General description of the Physical Features:

No information available

17. Physical features of the catchment area:

Describe the surface area, general geology and geomorphological features, general soil types, general land use, and climate (including climate type).

Crymlyn Bog has been described as a natural oasis in a densely industrial landscape. The bog at Crymlyn is surrounded by a major oil refinery, a waste disposal tip and large housing estates. Earlier, industries used its water to establish a transport system, and the remains of a 19th century canal network are still evident today.

The bog is the most extensive area of lowland fen in Wales, and it lies in the flood plain of the Neath river estuary. The plants here are more typical of East Anglia. The habitats include swamps, meadows, tall reed beds, and waterlogged scrub, mainly of willow, where the wetter areas merge with woodland.

18. Hydrological values:

Describe the functions and values of the wetland in groundwater recharge, flood control, sediment trapping, shoreline stabilization, etc.

No special values known, Water supply

19. Wetland types:

Human-made wetland, Inland wetland

Code	Name	% Area
U	Peatlands (including peat bogs swamps, fens)	79.9
W	Shrub-dominated wetlands	9.8
Other	Other	9.2
9	Canals and drainage channels	0.7
Tp	Freshwater marshes / pools: permanent	0.4

20. General ecological features:

Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Ramsar site, and the ecosystem services of the site and the benefits derived from them.

This site embraces the more acid range of variation of the Calcareous fens with *Cladium mariscus* habitat type and is relatively species-poor. It is one of the largest sites for *Cladium* spp in south Wales. There are large stands of *Cladium* spp, with transitions to a highly distinctive suite of tall-herb fen communities, often dominated to varying degrees by *Phragmites australis*. The area is also important for the occurrence of a substantial population of the nationally-rare cotton-grass *Eriophorum gracile*.

Plant communities grade from *Sphagnum* dominated poor fen with *Narthecium ossifragum* and *Utricularia vulgaris* to more eutrophic associations with *Typha angustifolia*, *Typha latifolia*, *Cladium mariscus* and *Carex elata*. *Molinia caerulea* is dominant in drier areas, with stands of pure *Phragmites australis* reedswamp where conditions are wettest. Willow-birch and alder carr woodland with *Carex paniculata* occur on the eastern margins.

The site supports an exceptionally wide range of rich- and poor-fen communities, some of which bear a close floristic resemblance to certain floodplain mires in East Anglia, including S2 *Cladium mariscus* swamp and sedge-beds, and *Cladio-molinietum* communities which are in the central part of the bog.

A key feature concerns the presence of tall herb fen communities transitional between swamp and fen, with sedge beds dominated by *Cladium mariscus* being of particular importance.

Also of international significance is the Transition Mire and Quaking Bog community, characterised by the presence of *Carex rostrata*, *Menyanthes trifoliata*, *Carex limosa* and supporting good stands of the nationally important *Eriophorum gracile*.

Ecosystem services

21. Noteworthy flora:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 12. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc., including count data. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Nationally important species occurring on the site.

Higher Plants.

Eriophorum gracile.

22. Noteworthy fauna:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 12. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc., including count data. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Birds

Species Information

Nationally important species occurring on the site.

Invertebrates.

The more significant wetland rarities at Crymlyn Bog include:

Dolomedes plantarius

Crossocerus vagabundus (Panzer) Hymenoptera, Sphecidae

Pteromicra leucopeza (Meigen) Diptera, Sciomyzidae

Cephalops perspicuus (de Meijere) Diptera, Pipunculidae

Gyrinus suffriani (Scriba 1855) Coleoptera, Gyrinidae

The nationally scarce hornet robberfly Asilus crabroniformis occurs on the drier grassland slopes bordering the fen

23. Social and cultural values:

Describe if the site has any general social and/or cultural values e.g. fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values.

Aesthetic

Archaeological/historical site

Environmental education/ interpretation

Livestock grazing

Non-consumptive recreation

Scientific research

Sport fishing

b) Is the site considered of international importance for holding, in addition to relevant ecological values, examples of significant cultural values, whether material or non-material, linked to its origin, conservation and/or ecological functioning?
No

If Yes, describe this importance under one or more of the following categories:

- i) sites which provide a model of wetland wise use, demonstrating the application of traditional knowledge and methods of management and use that maintain the ecological character of the wetland:
- ii) sites which have exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland:
- iii) sites where the ecological character of the wetland depends on the interaction with local communities or indigenous peoples:
- iv) sites where relevant non-material values such as sacred sites are present and their existence is strongly linked with the maintenance of the ecological character of the wetland:

24. Land tenure/ownership:

Ownership category	On-site	Off-site
Local authority, municipality etc.	+	+
Private	+	
Public/communal	+	

25. Current land (including water) use:

Activity	On-site	Off-site
Nature conservation	+	+
Tourism	+	+
Recreation	+	+
Current scientific research	+	+
Fishing: recreational/sport	+	+
Fishing: subsistence	+	+
Livestock watering hole/pond	+	+
Grazing (unspecified)	+	+
Rough or shifting grazing	+	+
Industrial water supply	+	+
Industry		+
Flood control	+	+
Oil/gas production		+
Transport route		+
Urban development		+

26. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land (including water) use and development projects:

Explanation of reporting category:

1. Those factors that are still operating, but it is unclear if they are under control, as there is a lag in showing the management or regulatory regime to be successful.
2. Those factors that are not currently being managed, or where the regulatory regime appears to have been ineffective so far.

NA = Not Applicable because no factors have been reported.

Adverse Factor Category	Reporting Category	Description of the problem (Newly reported Factors only)	On-Site	Off-Site	Major Impact?
Eutrophication	1		+		

For category 2 factors only.

What measures have been taken / are planned / regulatory processes invoked, to mitigate the effect of these factors?

Is the site subject to adverse ecological change? NO

27. Conservation measures taken:

List national category and legal status of protected areas, including boundary relationships with the Ramsar site; management practices; whether an officially approved management plan exists and whether it is being implemented.

Conservation measure	On-site	Off-site
Site/ Area of Special Scientific Interest (SSSI/ASSI)	+	+
National Nature Reserve (NNR)	+	
Site management statement/plan implemented	+	
Other	+	
Special Area of Conservation (SAC)	+	+
Management plan in preparation	+	

b) Describe any other current management practices:

The management of Ramsar sites in the UK is determined by either a formal management plan or through other management planning processes, and is overseen by the relevant statutory conservation agency. Details of the precise management practises are given in these documents.

28. Conservation measures proposed but not yet implemented:

e.g. management plan in preparation; official proposal as a legally protected area, etc.

No information available

29. Current scientific research and facilities:

e.g. details of current research projects, including biodiversity monitoring; existence of a field research station, etc.

Environment.

A review of the hydrological processes at Crymlyn Bog NNR was completed by the Environmental Consultancy at the University of Sheffield, on contract to CCW in March 1998. Following the announcement by BP/Mobil Llandarcy in November 1997 of the closure of the oil refinery over the next two years, CCW and the Environment Agency continue to work closely with BP and their consultants regarding the implementation of a comprehensive risk-based strategy to the long-term amelioration of the refinery site and its redevelopment for housing. This includes associated pollutant influences on the adjacent Crymlyn Bog. During 2004 CCW and the Environment Agency worked jointly on a detailed hydrological and nutrient assessment of the site to ascertain the overall nutrient loading on sensitive mire communities (Headley 2004). These studies will also inform CCW's long term aspirations for the restoration of historical water channels. It is proposed to continue with a water quality monitoring programme and further studies will be undertaken in 2005 to inform restoration work on a relict canal and the Crymlyn Brook. A presentation of this recent research was given to the British Hydrological Society in 2004.

Flora.

Annual census of slender cotton-grass Eriophorum gracile.

(no longer current)

Preliminary survey for lichens and bryophytes of the wet woodlands

Fauna.

Monitoring of hornet robberfly, survey for additional populations of the fen raft spider, and moth-trapping.

Bird ringing.

30. Current communications, education and public awareness (CEPA) activities related to or benefiting the site:

e.g. visitor centre, observation hides and nature trails, information booklets, facilities for school visits, etc.

Used by visiting university groups for studies on entomology, peat stratigraphy and fenland communities, used by local school groups for studies relevant to the National Curriculum. Crymlyn Visitors Centre is used for school groups and talks. It houses a permanent exhibition and is a focal point for field study groups. Meetings and guided walks, focused on the visitors centre. Annual open days. Long-term partnership with Swansea Environment Centre as educational providers and recent Community Liaison work undertaken through the British Trust for Conservation Volunteers (BTCV) (no longer current). Pant y Sais fen is a Local Nature Reserve and is also used by school groups via boardwalk access.

31. Current recreation and tourism:

State if the wetland is used for recreation/tourism; indicate type(s) and their frequency/intensity.

Activities.

All low-key: walking, dog walking, birdwatching, sport/recreational fishing in relict canal.

Facilities provided.

Car parking, nature trails and interpretative leaflets. There are themed open days, guided walks, on-site interpretative information, and disabled access at Pany-y-Sais.

Seasonality.

Year-round access and use. There is summer wardening April-September.

32. Jurisdiction:

Include territorial, e.g. state/region, and functional/sectoral, e.g. Dept. of Agriculture/Dept. of Environment, etc.

Head, Countryside Division, Welsh Assembly Government, Cathays Park, Cardiff, CF1 3NQ

33. Management authority:

Provide the name and address of the local office(s) of the agency(ies) or organisation(s) directly responsible for managing the wetland. Wherever possible provide also the title and/or name of the person or persons in this office with responsibility for the wetland.

Site Safeguard Officer, International Designations, Countryside Council for Wales, Maes-y-Ffynnon, Penrhosgarnedd, Bangor, Gwynedd, LL57 2DW

34. Bibliographical references:

Scientific/technical references only. If biogeographic regionalisation scheme applied (see 15 above), list full reference citation for the scheme.

Site-relevant references

- Barber, KE & Hughes, PDH (1995) *Palaeoecology and radiocarbon dating of peat deposits at Crymlyn Bog National Nature Reserve, south Wales*. Report for the Countryside Council for Wales. (Contractor: University of Southampton)
- Dumayne-Peaty, L (1998) *Holocene palaeoecology and development of Crymlyn Bog NNR, south Wales. Final report to British Petroleum and Countryside Council for Wales*
- Fowles, A (1994) *Invertebrates of Wales: a review of important sites and species*. Joint Nature Conservation Committee, Peterborough
- Headley, AD (2004) Substratum enrichment at Crymlyn Bog cSAC, south Wales: an analysis of current and future impacts with particular reference to SAC feature fen communities. *CCW Contract Science Report*, No. 652
- Headley, AD (2005) Investigations of canal sediment and peat chemistry at Crymlyn Bog NNR, south Wales. *CCW Contract Science Report*, No. 721
- Headley, AD, Wheeler, BD & Baker, AJM (1992) The impact of man on the vegetation of Crymlyn Bog. In: *Peatland ecosystems and Man: an impact assessment*, ed. by OM Bragg, PD Hulme, HAP Ingram & RA Robertson, 257-261. University of Dundee, Department of Biological Sciences
- Hughes, PDM & Dumayne-Peaty, L (2002) Testing theories of mire development using multiple successions at Crymlyn Bog, West Glamorgan, south Wales, UK. *Journal of Ecology*, 90(3), 456-471
- Jones, PS, Stevens, DP, Blackstock, TH, Burrows, CR & Howe, EA (eds.) (2003) *Priority habitats of Wales: a technical guide*. Countryside Council for Wales, Bangor
- McLeod, CR, Yeo, M, Brown, AE, Burn, AJ, Hopkins, JJ & Way, SF (eds.) (2004) *The Habitats Directive: selection of Special Areas of Conservation in the UK*. 2nd edn. Joint Nature Conservation Committee, Peterborough. www.jncc.gov.uk/SACselection
- Robertson, J (2000) Reserve focus – Crymlyn Bog NNR, Glamorgan. *British Wildlife*, 12(1), 22-27
- Rosen, D & Dumayne-Peaty, L (2001) Human impact on the vegetation of south Wales during late historical times: palynological and palaeoenvironmental results from Crymlyn Bog NNR, West Glamorgan, Wales, UK. *The Holocene* 11(1), 11-23

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RAMSAR CONVENTION ON WETLANDS OF INTERNATIONAL IMPORTANCE.

CRYMLYN BOG SSSI, SOUTH WALES

CRITERION 1

Crymlyn Bog SSSI, South Wales qualifies under criterion 1 as the largest example of valley-flood plain mire in Wales. There is no other known example of this type with a comparable complexity and diversity of vegetation in Britain. The site occupies a total area of 243.9 ha of which 60 ha. are managed as National Nature Reserve.

Crymlyn Bog is part of a large inter-estuarine complex which includes the adjacent Pant-y-Sais Fen SSSI. It is classified as a mire type intermediate between that of valley and floodplain and shares hydrological and vegetation characteristics of both. .

The mire features a complex mosaic of vegetation types. Vegetation communities characteristic of both rich-fen and poor fen are represented at the site. The occurrence of rich-fen in Wales (with the important exception of the limestone areas of the Lleyn peninsula and the Isle of Anglesey) is limited owing to the predominance of hard, acid rock types. Therefore, the presence and extent of these communities at Crymlyn is regarded as nationally and internationally significant.

The diversity and spatial distribution of the various communities and sub-communities are related to a number of complicated environmental gradients; chemical nutrient status, toxicity, hydrosere succession, hydrology and management. Industrial impacts upon the site have given rise to a number of the environmental gradients and hence the development of certain communities and the floristic character of other vegetation communities. Despite these impacts the nature conservation interest of the site remains nationally and internationally important.

The mire supports examples of swamp, tall-herb fen, fen meadow and carr communities which form a complex mosaic of continuous fen.

Swamp communities are particularly well represented. Of special note is the occurrence of Cladium mariscus swamp. Sedge swamp is uncommon in Britain, and within Wales only three other fens contain stands of similar extent. These fens are located in North Wales.

Areas of semi-floating fen are characterised by a mosaic of the communities; Carex rostrata-Potentilla palustris and Carex rostrata-Calliargon cuspidatum. This latter community is recognized as nationally rare both in Wales and Great Britain as a whole.

A substantial proportion of the site is characterised by the tall-herb fen community Phragmites australis-Eupatorium cannabinum. This community has a widespread but scattered distribution throughout the lowlands of England and Wales.

However, in Wales the distribution of the community is mainly concentrated within the rich-calcareous mires of North Wales with only a few other sites found elsewhere in Wales.

CRITERION 2A

The mire contains a substantial population (10,000-100,000 shoots) of the nationally rare slender cotton-grass (Eriophorum gracile) (Schedule 8 species of the Wildlife and Countryside Act 1981). This species, listed as declining throughout Europe (IUCN category C), is found only on 4 other sites in Britain.

Crymlyn Bog is of national importance for its rich invertebrate fauna including many rare and other highly localised species associated with mires. This is a reflection of the mosaic of high quality vegetation communities.

Dragonflies, flies and beetles include regionally species-rich faunas, including species of particular note. The staphylinid beetle Hadronathus longipalpis is only known from one other site in Britain. The water beetle Limnoxenus niger is only known from scattered sites in the south of Britain and the nationally scarce beetles include Cerapheles terminatus and Elaphrus uliginosus. The crane fly fauna is rich in scarce species and the hoverflies include

Parhelophilus consimilis, a very scarce species, as well as Platycheirus perpallidus, a northern species at the southern extremity of its range. The snail-killing flies, a further good indicator group for mire quality, include Tetanocera freyi, which is rare in Britain and the scarce species Dictya umbrarum and Antichaeta anilis. Dragonflies include Ischnura pumilio, Coenagrion pulchellum and Brachytron pratense which are nationally scarce and their occurrence at Crymlyn is of regional importance.

CRITERION 2B

199 species of vascular plant have been recorded at Crymlyn Bog and of this total one is nationally rare and 17 are recognized as regionally uncommon.

A number of the regionally uncommon species found at Crymlyn Bog are forming part of the western extreme of their geographical range in Britain; Carex elata, C. pseudocyperus and C. mariscus. These species are more typical and frequent in the fenland habitat of East Anglia.

In addition, to the eastern floristic element, the mire also contains species of a more northern distribution; Carex limosa, C. lasiocarpa and Sparganium minimum. The two former species are occurring at the southern end of their Welsh geographical range. The regionally uncommon Osmunda regalis is a species associated with western Britain. Other regionally uncommon species are; Schoenus nigricans, Ranunculus lingua, Baldellia ranunculoides and Juncus subnodulosus.

The site is notable for supporting summer populations in excess of 400 pairs of reed warblers Acrocephalus scirpaceus and 200 pairs of sedge warblers A. schoenobaenus. These populations are of regional importance in Wales.

Dr Wanda Fojt and Mr Alan Stubbs
CSD
10/05/90

APPENDIX 4

Crymlyn Bog and Pant-y-Sais SSSI Citations

**CYNGOR CEFN GWLAD CYMRU
COUNTRYSIDE COUNCIL FOR WALES**

SITE OF SPECIAL SCIENTIFIC INTEREST: CITATION

SWANSEA AND NEATH PORT TALBOT CORS CRYMLYN/CRYMLYN BOG

Date of Notification: 1975, 1983, 1985, 1997, 2003

National Grid Reference: SS695945

OS Maps: 1:50,000 Sheet number: 159 and 170
1:10,000 Sheet number: SS 69 SE, SS 69 NE
SS 79 SW, SS 79 NW

Site Area: 279.9 ha

Description:

Crymlyn Bog is of special interest for its fen (topogenous mire) communities, wet woodland, associated invertebrate assemblages, a substantial population of the nationally rare slender cotton grass *Eriophorum gracile* and a population of the nationally scarce hornet robberfly *Asilus crabroniformis*. It is the most extensive area of lowland fen in South Wales and is situated 3.5 km east of central Swansea within a landscape heavily influenced by past and present industrial activities.

The site is part of a larger inter-estuarine complex including Pant-y-Sais SSSI and the Neath flood plain. Crymlyn Bog owes its form to glacial erosion, followed by a series of Boreal marine incursions, giving rise to sequences of clay and peat. The main fen area which developed on these deposits lies between 5 - 7 m above sea level.

Recent studies of preserved plant remains in the peat have revealed a complex and unusual pattern of vegetation change extending back over 7,000 years. Some parts of the site at least demonstrate that a classic succession took place from open reedswamp through fen and fen carr to rain-fed bog, with the latter persisting for over 1,000 years before reverting to fen. This reversion from bog back to fen is highly unusual and took place at about 1,000 AD, possibly as a result of increased runoff from the site catchment.

The site comprises of a complex mosaic of vegetation types, including communities of both rich and poor fen, swamp, alder carr and acidic grassland. Unusually some of the plant species and communities are more characteristic of East Anglian fens.

Several sources of water and differing patterns of flow have created complex environmental gradients resulting in a wide range of fenland communities. These range from *Sphagnum*-dominated poor-fen, with bog asphodel *Narthecium ossifragum* and greater bladderwort *Utricularia vulgaris*, through others with bottle sedge *Carex rostrata*, marsh cinquefoil *Potentilla palustris* and bog bean *Menyanthes trifoliata*, to more eutrophic and taller associations with lesser bulrush *Typha angustifolia*, bulrush *Typha latifolia*, great fen-sedge *Cladium mariscus*, tufted-sedge *Carex elata* and common reed *Phragmites australis*. Purple moor-grass *Molinia*

caerulea becomes dominant in drier areas, with pure *Phragmites* reedswamp where conditions are wettest. The eastern margin bears greater tussock-sedge *Carex paniculata*, and alder carr woodland.

Plant species of particular interest include the nationally rare slender cottongrass *Eriophorum gracile*, whilst tufted sedge, bog-sedge *Carex limosa*, dioecious sedge *Carex dioica*, cyperus sedge *Carex pseudocyperus*, saw sedge, greater spearwort *Ranunculus lingua*, least bur-reed *Sparganium natans*, lesser water-plantain *Baldellia ranunculoides*, slender spike-rush *Eleocharis uniglumis* and black bog rush *Schoenus nigricans* are close to the limit of their British geographical range and/or of limited distribution locally. The royal fern *Osmunda regalis* occurs in several communities and is particularly well represented on this site.

Carr woodland is a rare habitat and this site contains one of the largest areas of alder carr in Wales, characterised by species such as alder *Alnus glutinosa*, alder buckthorn *Frangula alnus*, grey willow *Salix cineria* and downy birch *Betula pubescens*.

Crymlyn Bog is also of national importance for invertebrates, supporting several rare and nationally scarce species. These include the water beetle *Limnoxenus niger*, the crane fly *Pilaria nigropunctata* and the jumping spider *Marpissa radiata*. Open waterways and marginal flushes support the scarce blue-tailed damselfly *Ischnura pumilio* and the variable damselfly *Coenagrion pulchellum*.

Also of note is the hornet robber fly *Asilus crabroniformis*, a declining species nationally, occurring in the traditionally grazed pastures bordering the fen.

There are sizeable breeding populations of reed warbler *Acrocephalus scirpaceus* and sedge warbler *Acrocephalus schoenobaenus* associated with the denser areas of *Phragmites*.

Remarks:

Slender cottongrass *Eriophorum gracile* is listed on Schedule 8 of the Wildlife and Countryside Act.

Cors Crymlyn/Crymlyn bog SSSI is part of Cors Crymlyn/Crymlyn Bog candidate Special Area of Conservation, being host to the following habitats listed in Annex I of the EC Habitats Directive: (Directive 92/43/EEC on the Conservation of Natural habitats and of Wild Fauna and Flora).

‘Calcareous fen with *Cladium mariscus* and species of the *Caricion davallianae*’,
‘Transition mires and quaking bogs’,
‘Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-padion*, *Alnion incanae* and *salicion alvae*)’.

The majority of the SSSI area is also designated as a Wetland of International Importance under Ramsar Convention

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**CYNGOR CEFN GWLAD CYMRU
COUNTRYSIDE COUNCIL FOR WALES**

SITE OF SPECIAL SCIENTIFIC INTEREST CITATION

NEATH PORT TALBOT

PANT-Y-SAIS

Date of Notification: 1979, 1983

Natonal Grid Reference: SS 716942

O.S. Maps: 1:50,000 Sheet number: 170
1:25,000 Sheet number: SS 79

Site Area: 19.5 ha

Description:

Predominantly an area of lowland fen located in a narrow valley which was a former course of the River Neath. The site supports a range of fenland communities including *Sphagnum* and bryophyte dominated areas of poorer fen vegetation, *Molinia caerulea* communities, swamp areas with abundant *Typha latifolia* and *Typha angustifolia*, and developing fen carr. Formerly part of the same hydrological system as Crymlyn Bog.

The Tennant Canal section acts as a refuge for aquatic plants, including *Butomus umbellatus* which is rare in the county.

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APPENDIX 5

Crymlyn Bog and Pant-y-Sais SSSI Management Statements

**CYNGOR CEFN GWLAD CYMRU
COUNTRYSIDE COUNCIL FOR WALES**

SITE OF SPECIAL SCIENTIFIC INTEREST: MANAGEMENT STATEMENT

**CITY AND COUNTY OF SWANSEA CORS CRYMLYN/CRYMLYN BOG
NEATH PORT TALBOT**

Date of Notification:

Site Area: 279.9 Ha

1. Introduction

This management statement contains CCW's opinion of the way in which the SSSI should be managed in order to maintain its special interest. It also provides a basis for future discussions and decisions on the conservation management of the SSSI. It is important that any works described in this statement are fully discussed with and formally consented by CCW, before any of these management activities are started.

The document sets out a vision for the features of interest; it describes the key issues affecting those features and outlines any management considered necessary to safeguard the features.

It is very important to recognise that management may need to change with time. Problems that we are aware of today may be resolved or completely removed and new unforeseen problems may arise. New improved management techniques may also become available. Consequently the management outlined in this document is considered appropriate for the short term but may need to change in the long term.

2. Features of Special Scientific Interest

- Fen
- Wet woodland
- Slender cottongrass
- Rare and scarce invertebrate assemblage
- Hornet robberfly

As well as the features listed above, Cors Crymlyn/Crymlyn Bog SSSI has other habitats that contribute to the special wildlife interest. These include scrub, neutral grassland, marshy grassland, dry heath, open water and flushes and streams. This diversity of habitats is important for a wide range of species. Except where specified below, management of this site should aim to look after these habitats as well as the listed features of interest.

3. Long Term Vision for the Site

3.1 Fen

The range of fen communities should be maintained on site and fen should cover approximately 80% of the SSSI area. A wide range of typical species such as common reed, sedges (e.g. bottle sedge and tufted sedge), club-rushes, bur-reeds and bog mosses should be present along with submerged aquatic plants and flowering plants of wetland margins.

Saw sedge Cladium mariscus will be predominant in approximately 14 ha of the fen and transitional/open water fringe fen types will be stable or increasing in area. Stands of vegetation dominated by common reed or scrub should not be expanding at the expense of more species-rich and nutrient poor fen.

The management of the site such as grazing/cutting and maintenance of water levels and water quality should be suitable to maintain the feature in favourable condition in the long term.

3.2 Wet Woodland

Wet woodland will occupy approximately 5% of the SSSI area and should be present in all phases of development from regenerating to over-mature. The following species should be common; grey willow, downy birch and alder with scattered alder buckthorn. The field layer will include greater tussock-sedge, common reed and royal fern. The water table in the woodland should be sufficiently high to maintain the wet woodland character in the long term without causing adverse effect on the adjacent fen habitat.

3.3 Slender Cottongrass

The site should support populations of the slender cottongrass which should not reduce in range within its habitat and which are sustainable in the long term.

3.4 Rare and Scarce Invertebrate Assemblage

The site should support populations of the hornet robberfly Asilus crabroniformis which should not reduce in range within their habitat, nor lose the ability to reproduce and sustain themselves in the long term. In addition the site should sustain a diverse assemblage of other nationally, regionally and locally scarce invertebrates associated with the range of wetland habitats present, such as water beetles, flies and damselflies.

4. Key Management Issues

4.1 Fen

4.1.1 Scrub encroachment

An ongoing scrub control programme was initiated in the mid 1990's to reverse the natural successional changes on the fen. In the long term the need for scrub control will be kept under regular review. Scrub colonisation can shade out valuable plant communities and large-scale spread of tree and scrub cover will exacerbate drying out of the fen. The spread of scrub in priority areas of fen will be prevented by manual clearance and stump treatment. Some areas of scattered scrub/woodland will be

retained as it provides habitat of value to birds and invertebrates. Areas classed as wet woodland feature will be retained. Total area of woodland or scrub should not exceed 15% of the site.

4.1.2 Non - native invasive plants

Rhododendron occurs on the western boundary of the SSSI and some plants have encroached onto drier parts of the fen. Control measures are in place as for scrub. Japanese knotweed is present on adjacent land, this may need control in future.

4.1.3 Reed encroachment

As well as changes in water level at the site, increases in the nutrient status of water and peat will lead to an increase in dominance of reed at the expense of other valuable plant communities. Future management will look at ways of identifying and isolating sources of plant nutrients and preventing the expansion of existing areas of reed-dominated swamp. It is also intended that management should reduce existing reed cover in priority areas of fen. Grazing is the favoured management although cutting may be considered in future. Fires can promote regeneration of reed.

4.1.4 Nutrient enrichment (Eutrophication)

The site has long been associated with industrial activities, including adjacent former mine workings, power stations, oil refinery and landfill site. Pollutants such as iron-rich mine discharge, oil and pulverised fuel ash have all, over time, affected the site and continue to influence water chemistry and nutrient status (particularly nitrogen levels). Many of the historical sources of pollution from old tips are now isolated and future management will continue to focus on ways of reducing the dispersal of pollutants through effective flow management and containment. Unlike some other lowland fen sites, agricultural run-off is not a major concern at present.

4.1.5 Water levels and quality

Fen vegetation requires water levels to be at, or just below the surface level, all year round. The ideal water balance for the site needs to be identified and inputs, channel flows and outputs may require future management to maintain conditions within acceptable limits and natural fluctuations. Key features of the site's hydrology include the Tennant and Glan y Wern canals and the Crymlyn Brook. The wider catchment area for water draining to the site requires consideration in land use decisions.

4.1.6 Grazing

Traditional summer grazing on the fen has largely ceased in recent times. The reintroduction of light grazing regimes with cattle or ponies adapted to the wet conditions is needed to control reed expansion and maintain an open and species-rich fen community. It will be necessary to keep the grazing regime under review as excessive dunging and poaching would be detrimental.

4.1.7 Burning

The site has a history of periodic burning, possibly as a management tool, but is now discouraged. Whilst burning may have helped to reduce scrub invasion in the past, in uncontrolled situations it is likely to promote drying out of the fen and increasing purple moor grass cover. Invertebrate populations can be adversely affected and damage to upper peat layers and moss vegetation can occur.

4.2 Wet Woodland

4.2.1 Water levels and quality

This “carr” woodland relies on a high water table and this will relate to water levels within the adjacent canal. Appropriate water levels will prevent drying out and subsequent changes in woodland species composition. The community may exhibit trends towards drying out in the very long term as a natural result of the accumulation of leaf litter and increased uptake of water as trees mature. The woodland may become more open in time as trees mature and collapse and some areas could revert to open fen. It may be necessary to initiate some woodland management (e.g. coppicing) in the long term. Whilst the expansion of scrub woodland across the fen will be limited through management, specific areas of wet woodland will be retained. The wet woodland is an integral part of the wetland system and any potential pollutant or nutrient sources will need to be contained as for fen.

4.3 Slender Cottongrass

4.3.1 Nutrient enrichment

Slender cottongrass is a species restricted to low productivity fen systems. It is therefore important that nutrient levels in the peat and surface waters remain low in areas where it occurs.

4.3.2 Grazing

In recent years insufficient summer grazing on the margins of the fen is considered to have contributed to an increasing dominance of reed, which poses a risk to areas supporting slender cotton grass.

4.4 Rare and Scarce Invertebrate Assemblage

4.4.1 Scrub and reed encroachment

Botanical richness and a variety of three-dimensional vegetation structure are important for invertebrates, and this can be maintained by the implementation of suitable grazing or cutting and scrub control regimes.

4.4.2 Water levels and quality

Many of the rare and scarce invertebrates are aquatic species or require a range of open water, flushes, streams and ditch habitats to complete their lifecycles. These

habitats and their water quality should be appropriately maintained to support breeding activity in favourable years.

4.5 Hornet Robberfly

4.5.1 Grazing

The pastures in which the hornet robberfly occurs should be open and prevented from becoming rank. This will be achieved by sustaining a suitable grazing regime with cattle and ponies. Dung beetles are the host species for the hornet robberfly's larvae and fresh dung is therefore needed especially during the critical flight period (July to September).

4.5.2 Scrub control

It will also be necessary to keep the areas of scrub, particularly gorse, under control in the pastures to maintain open grassland.

4.5.3 Livestock parasite treatments

Use of persistent parasite treatments in livestock sterilises dung beetles, which are the host species for the hornet robberfly's larvae. The effects of veterinary chemicals on non-target species and their environment therefore need to be taken into account when implementing grazing regimes.

Confirmed 19.09.06

PANT Y SAIS SITE OF SPECIAL SCIENTIFIC INTEREST



Source: D Painter, CCW

YOUR SPECIAL SITE AND ITS FUTURE

‘Your Special Site and its Future’ is part of our commitment to improve the way we work with Site of Special Scientific Interest (SSSI) owners and occupiers. In this site management statement we explain what is special about the wildlife on your site, and what care is needed to look after its wildlife into the future.

All SSSIs are considered to be of national importance and we recognise the crucial role that owners and occupiers play in their management and protection. We need you to share your views and knowledge of this site with us, to help safeguard it.

We hope that you will find ‘Your Special Site and its Future’ interesting and helpful. Please contact us if there is anything about the site and its management that you would like to discuss.

What is 'special' about the wildlife at Pant y Sais?

Pant y Sais has 4 special features.

Species-rich Fen is a rare habitat. In the past most sites like this would have been drained and converted to farmland. A wide range of typical species such as common reed, Royal fern, sedges (e.g. bottle sedge and tufted sedge), club-rushes, bur-reeds and bog mosses are present. Pant y Sais SSSI is one of the best remaining fragments of species-rich fen in South Wales.



Slender cottongrass is a grass with a white cotton-like flower smaller than its common relative Common cottongrass. It is found in the wettest parts of bogs, transitional mires, poor fens and on the edge of Alder carr woodland, typically over liquid peats. Its sites are calcareous or moderately acidic, and have some water movement. Since 1930, Slender cottongrass has become extinct in Norfolk and Dorset and declined to one site in Surrey and two in Hampshire. However, it

appears to be stable in Wales and Ireland; there are large populations at nearby Crymlyn Bog NNR. Losses have been due to drainage, afforestation and infilling. This is an endangered species found in only a few sites and has Red Data-book status.

Rare and scarce invertebrate assemblage

Because of the range of wetland habitats present, there is diverse insect life such as dragonflies, water beetles, flies, spiders and moths. By comparison, modern agricultural grassland may have as few as one or two species of plant and supports few insects and birds. Pant y Sais SSSI is one of the best areas for invertebrates in the Swansea and Neath Port Talbot area.

Fen Raft Spider is a wetland spider dependent on permanent, standing or slow moving water. It lives on the surface of pools and ditches, and amongst emergent vegetation; typically it hunts from 'perches' on stems emerging from the water, taking a wide range of invertebrate prey on or below the surface. Emergent, stiff-leaved vegetation in open, sunny conditions is also required for the construction of nursery webs in which the young are reared. This species is only known from two other UK sites and is an endangered species.



As well as the features listed above, Pant y Sais has other habitats that contribute to the special wildlife interest. These include marshy grassland, wet woodland, running water and fen carr. This diversity of habitats is important for a wide range of species. Except where specified below, management of this site should aim to look after these habitats as well as the listed features of interest.

What do we want Pant y Sais to look like?

The following is a description of how we would like to see the features at Pant y Sais:

The range of fen communities is maintained on site and fen covers approximately three quarters of the SSSI area. A wide range of typical species such as common reed, sedges (e.g. bottle sedge and tufted sedge), club-rushes, bur-reeds and bog mosses are present along with submerged aquatic plants and flowering plants of wetland margins. Stands of vegetation dominated by common reed or scrub do not expanding at the expense of more species-rich and nutrient poor fen.

The site supports populations of the slender cottongrass, which is viable in the long term. The range of this species within the site is not contracting, and enough habitat exists to support the population in the long term. Those factors, which affect this species or its habitat, are under control.



Pant y Sais supports populations of insects, which should not reduce in range within their habitat, nor lose the ability to reproduce and sustain themselves, through factors within human control. In addition the site supports a diverse assemblage of nationally, regionally and locally scarce invertebrates associated with the range of wetland habitats present, such as water beetles, flies and damselflies.

The site supports populations of the Fen Raft Spider, which must be viable in the long term. The range of this species within the site is not contracting, and enough habitat exists to support the population in the long term. Those factors, which affect this species or its habitat, are under control.

What management is needed on Pant y Sais SSSI and why?

Although Pant y Sais is an excellent place for wildlife it will only remain so if the necessary management continues. CCW's priority is to work with you to ensure that this management is carried out.

What does this mean in practice?

There are a number of different factors that could damage the special features at Pant y Sais if they are not properly managed. These are the ones we regard as most important:

Scrub encroachment can shade out valuable plant communities and large-scale spread of tree and scrub cover will exacerbate drying out of the fen. The spread of scrub in priority areas of fen will be prevented by manual clearance and stump treatment. Botanical richness and a variety of three-dimensional vegetation structure are important for invertebrates, and this can be maintained by the implementation of suitable grazing or cutting and scrub control regimes. In the long term the need for scrub control will be kept under regular review.

Invasive non-native plants can be a problem because they compete with native species. Rhododendron occurs in the drier parts of the fen and control measures are in place as for scrub. Japanese knotweed is present on a section of roadside verge and in the car park. The Local Authority, as site owners, regularly treat the car park, and CCW will control the roadside verge populations to prevent encroachment into the fen.

Reed encroachment - As well as changes in water level at the site, increases in the nutrient status of water and peat will lead to an increase in dominance of reed at the expense of other valuable plant communities. Future management will look at ways of identifying and isolating sources of plant nutrients and preventing the expansion of existing areas of reed-dominated swamp.

Light summer grazing by ponies targeting reed will be considered as the future management, providing fencing and suitable graziers can be arranged.

Nutrient enrichment (Eutrophication) - There are two main water sources: The Tennant Canal and a stream that enters the reserve alongside the car park. Both sources have the potential for eutrophication. Slender cottongrass is a species restricted to low productivity fen systems; therefore it is important that nutrient levels of peat and surface waters remain low in areas where it occurs.

Water levels and quality - Fen vegetation requires water levels to be at surface level or just below all year round. The ideal water balance for the site needs to be identified and inputs, channel flows and outputs may require future management to maintain conditions within acceptable limits and natural fluctuations. A key feature

of the site's hydrology is the Tennant Canal. The wider catchment area for water draining to the site requires consideration in land use decisions, including links to the adjacent Red Jacket Fen. Many of the rare and scarce invertebrates are wholly aquatic species or require a range of open water, flushes, streams and ditch habitats to complete their lifecycles. These habitats and their water quality should be appropriately maintained to support breeding activity in favourable years. Sampling by CCW and EA will provide data, which will determine future management.

Grazing does not appear to have taken place in the past. The absence of grazing of the fen is considered to have contributed to an increasing dominance of reed, which poses a risk to areas supporting slender cotton grass. The introduction of light summer grazing regimes with cattle or ponies adapted to the wet conditions may be needed to control reed expansion and maintain an open and species-rich fen community. It would be necessary to keep the grazing regime under review, as excessive dunging and poaching would be detrimental. Any livestock would have to be excluded from the well-used boardwalk, and fences should not interfere with visitor access.

Burning of reed has occurred in the past. There have been several uncontrolled fires all starting from the boardwalk. Whilst burning may have helped to reduce scrub invasion, in uncontrolled situations it is likely to promote drying out of the fen and increasing purple moor grass cover. Furthermore, invertebrate populations can be adversely affected and damage to upper peat layers can occur. Uncontrolled fires are a potential problem not only to wildlife but also to the nearby village.

Finally

Our knowledge and understanding of wildlife is continually improving. It is possible that new issues may arise in the future, whilst other issues may disappear. This site management statement is written with the best information we have now, but may have to change in the future as our understanding improves. Any information you can provide on the wildlife of your site, its management and its conservation would be much appreciated.

If you would like to discuss any aspect of your SSSI, or have any concerns about your SSSI, please contact your local CCW office.

Your local office is;
CCW
Llys Tawe
Kings road
Swansea
SA1 8PG

Telephone: 01972 634960
Fax: 01792 464245

APPENDIX 6

Landscape Regime prepared by PJA

Suggested Species List

Seed Mixes:

EM8 - Emorsgate Wetland Meadow species rich grassland mix (or similar and approved) installed as per suppliers recommendations

EP1 - Emorsgate Pond Edge species mix (or similar and approved) installed as per suppliers recommendations

Localised humps and depressions left in ground profile within meadow areas

Bare ground left to naturally colonise

EXISTING BROADLEAVED WOODLAND RETAINED

EXISTING BROADLEAVED WOODLAND RETAINED

Lower sections seeded with pond edge mix to stabilise ground

Excavated fill from embankment placed on slopes leaving undulating profiles not steeper than 1:3m'

Reprofiled slopes seeded with wetland meadow mix to stabilise ground

KEY

- RED LINE BOUNDARY
- EXISTING BROAD LEAVED WOODLAND TO BE RETAINED
- EM8 WETLAND MEADOW MIX (BY EMORSGATE OR SIMILAR AND APPROVED)
- EM8 POND EDGE MIX (BY EMORSGATE OR SIMILAR AND APPROVED)
- BARE GROUND
- WATERCOURSE
- HUMPS AND DEPRESSIONS CREATED DURING GROUND RE-PROFILING
- EXCAVATED FILL FROM EMBANKMENT NOTCH

LANDSCAPE STRATEGY

The strategy for the landscape proposals the North South Reservoir is to deliver areas of meadow grassland and early successional, open sward habitats in order to secure significant net gains in semi-natural habitat relative to the current, predominantly bare baseline scenario.

Seeding will also help to ensure stabilisation of the newly profiled slopes and ground following remediation.

The following landscape types are proposed;

Seeding mixes

Prior to any sowing commencing, necessary soil remediation works will be completed, after which soils will be suitably tilled and prepared to receive seed. In preparing soils for seeding, care will be taken to create a diverse surface microtopography to enhance structural and botanical diversity in future years. This will include for localised humps and small depressions within meadow areas.

The seeded areas will require little maintenance once established. Each year, a rotational mowing regime with only 30% of the meadow cut at any time would allow more tussocky sward to develop over winter. This would provide a habitat for overwintering birds.

In order to allow for a component of natural re-colonisation, a proportion of proposed grassland (25%) habitats are proposed to be left un-seeded as bare ground. This approach will both improve overall habitat diversity, and promote local genetic stock within the site.

Watercourse / Waterbody (including aquatic and marginal vegetation)

The proposals seek to deliver a sinuous, naturalistic watercourse within the basin of the restored grassland valley. The final design will be refined as the flood modelling is completed which will included channel depth and bank gradients.

This proposal will mitigate for the net loss of unvegetated, standing water habitat providing enhancement to that which is currently present.

NOTES

GENERAL NOTES:

- This drawing is to be read in conjunction with all other relevant Engineering and Architect's details.
- The design shown is for preliminary discussion and will be subject to further design and iteration when further details of flood modelling have been carried out.
- The watercourse design shown is indicative and is subject to assessment via hydrological modelling, and further design.
- The design details presented must be reviewed in conjunction with the wider site information and site constraints which may not be evident on drawing and must be requested if not already provided. This includes, but not limited to, ground conditions (geotechnical and geo-environmental), groundwater levels, buried services, remnant obstructions, ecology, tree protection and topography.
- The Engineer shall be notified immediately, in writing, should any errors or discrepancies be found prior to the commencement or continuation of any works.
- All work is to be carried out in accordance with current British Standards, Building Regulations and NHBC Standards.
- It is the responsibility of the Contractor to execute the works at all times in strict accordance with the requirements of the Health and Safety at Work Act 1974, and the C.D.M. Regulations 2015. The Contractor will be deemed to have allowed for full compliance, including full liaison with the CDM Co-ordinator, within his rates.
- Any existing details which are shown on this drawing are for guidance only and are not suitable for construction. Any variations are to be recorded and reported to the engineer immediately.
- Before work commences contractor should consult the engineer and the SI report regarding any contamination issues. All necessary Health and safety measures to be taken
- This drawing should be read in conjunction with all relevant documents, drawings and standard details
- PJA accept no liability for the accuracy of third party data.
- PJA accept no responsibility for changes made to these drawings by third party without consent

INFORMATION

P01	17.05.23	Text and colour amendments	PO
REV	DATE	REVISION NOTE	BY

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CLIENT

St Modwen Developments Ltd

PROJECT

Coed Darcy

DRAWING TITLE
NSR Landscape Strategy
For PAC submission

DRAWING ISSUE STATUS

PJA JOB No.	SUB-CODE	DRAWING NO.	REVISION
04020	- L -	SK919 - PO1	
Revision Letter: P = Prelim / A = Approval / T = Tender / C = Construction			
BIM DRAWING REFERENCE			

SCALE	DRAWN	REVIEWED	DATE
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