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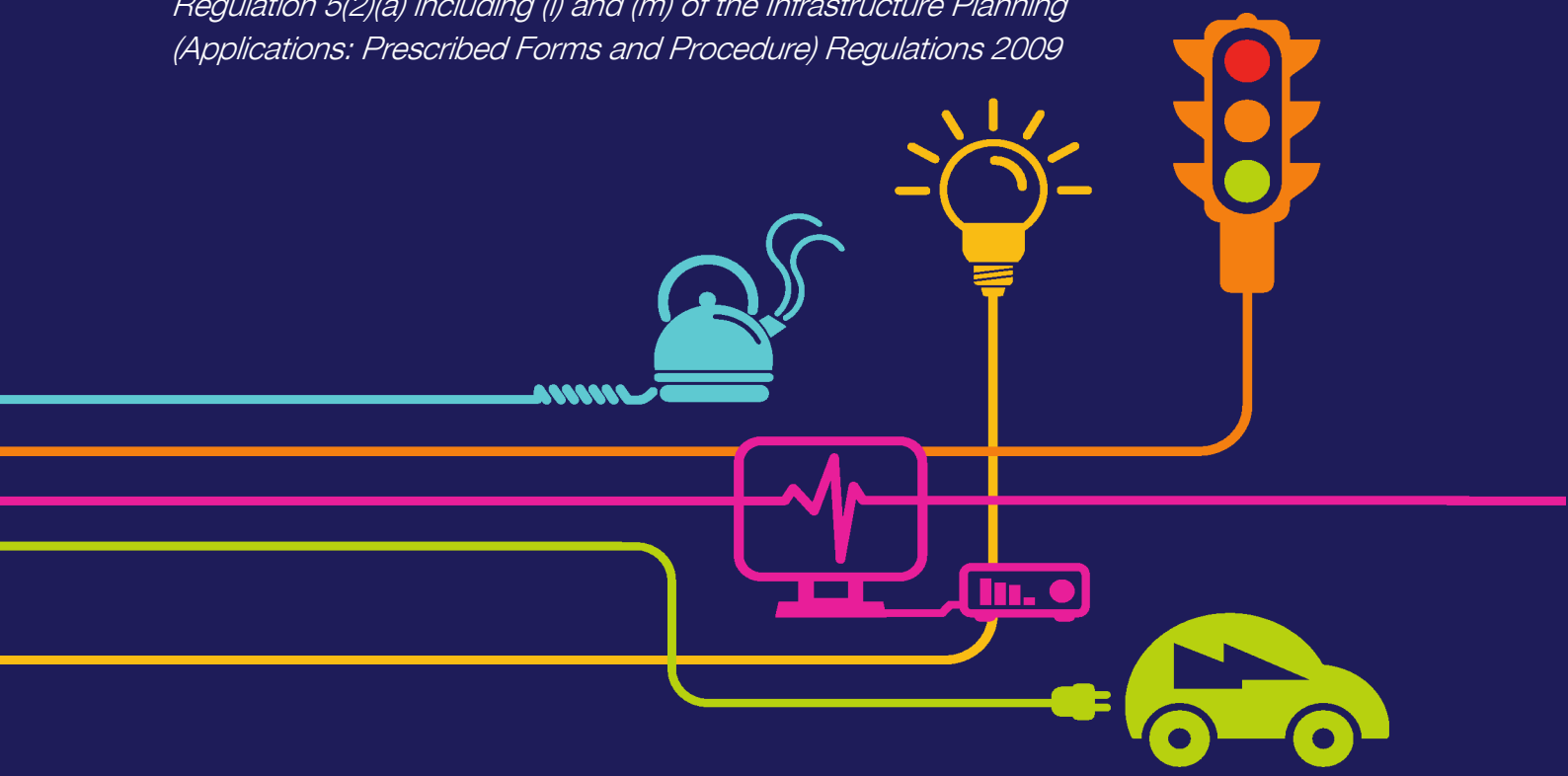
Water Framework Directive Assessment

Chapter 12 – Appendix 5

National Grid (North Wales Connection Project)

Regulation 5(2)(a) including (l) and (m) of the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009



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North Wales Connection Project

Volume 5

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Contents

1.1 Context 1

1 Introduction 1

1.2 The legislative context – Water Framework Directive 2
1.3 Structure of this report 6
1.4 Proposed Development design to facilitate WFD compliance 7
1.5 Introduction 8

2 Consultation 8

2.2 NRW response to proposed methodology 8
2.3 IACC response to proposed methodology 12
2.4 Gwynedd Council 14
2.5 NRW response to draft WFD assessment 15
2.6 responses to Revised draft WFD assessment 19

3 WFD Assessment Methodology 24

3.1 Structure of this assessment 24
3.2 Available guidance 25
3.3 Assessment process 26

4 WFD Baseline Environment 30

4.1 Introduction 30
4.2 River water bodies 30
4.3 Groundwater bodies 31
4.4 Lake water bodies 32
4.5 Transitional (estuarine) and coastal water bodies 32
4.6 Activities 34

5 Scoping Assessment 34

5.2 River water bodies 43
5.3 Lake water bodies 52
5.4 Groundwater bodies 52
5.5 Transitional (estuarine) and coastal water bodies 56
5.6 Protected areas 56

6 Detailed assessment results 59

6.1 Structure of the DETAILED assessment 59
6.2 The role of environmental mitigation measures associated with the Proposed Development 59
6.3 Surface water bodies 63
6.4 Groundwater bodies 92
6.5 Overview 103

7 Conclusion on WFD compliance 103

7.2 Will the Proposed Development lead to deterioration in WFD status of any WFD water body in the Study Area? 103

7.3 Will the Proposed Development compromise the achievement of Good status in any WFD water body in the Study Area? 103

7.4 Will the Proposed Development contribute towards a cumulative deterioration of WFD status (in combination with other Projects) or prevent the cumulative enhancement of status (up to 2027)? 103

7.5 Will the Proposed Development compromise the achievement of Protected Area objectives 104

7.6 Statement of WFD compliance 104

8 References 105

FIGURES	**TITLE**
Figure 5.12.1.2	Local and wider hydrological area of influence for sub-sections (**Document 5.12.1.2**)
Figure 5.12.1.3	Detailed hydrological features (**Document 5.12.1.3**)
Figure 5.12.1.14	Groundwater water framework directive (WFD) status (**Document 5.12.1.14**)

1 Introduction

1.1 CONTEXT

1.1.1 This document presents the Water Framework Directive (WFD; 2000/60/EC, Ref 12.1) Assessment for the North Wales Connection Project, hereafter referred to as 'the Proposed Development'. The purpose of this report is to identify whether the Proposed Development is compliant with the objectives of the WFD. A single document to cover all aspects of WFD compliance is presented, as it has the benefit of being able to draw conclusions on WFD compliance based on the outputs of several chapters of the Environmental Statement (**Volume 5.0**) including Chapter 9 Ecology and Nature Conservation (**Document 5.9**) and Chapter 11 Geology, Hydrogeology and Ground Conditions (**Document 5.11**). The findings of this assessment are then also reported in Chapter 12 Water Quality, Resources and Flood Risk (**Document 5.12**).

1.1.2 The Proposed Development is a Nationally Significant Infrastructure Project (NSIP), which will be authorised by a Development Consent Order (DCO). The decision will be made by the Secretary of State for Energy and Climate Change, as advised by the Planning Inspectorate (PINS). Further to this, Natural Resources Wales (NRW) is the relevant permitting authority in relation to its role in issuing Environmental Permits under the Environmental Permitting (England and Wales) Regulations 2016.

1.1.3 In Wales, whilst the responsibility for ensuring that the WFD is implemented lies with NRW, all public bodies have a duty to 'have regard' to the objectives of the WFD in exercising their functions. Public bodies in this instance include Isle of Anglesey County Council (IACC) and Gwynedd Council. These are the Lead Local Flood Authorities (LLFAs) who are

responsible for consenting works in and around Ordinary Watercourses[1] associated with the Proposed Development.

1.2 THE LEGISLATIVE CONTEXT – WATER FRAMEWORK DIRECTIVE

1.2.1 The WFD came into force in 2000 and was transposed into UK law in 2003. The principal aims of the WFD are to protect and improve the water environment and promote the sustainable use of water. Environmental Quality Standards (EQSs; 2008/105/EC; Ref 12.2) for priority substances were set by the daughter directive to the WFD (the EQS Directive and subsequent amendments (EQSD; 2013/39/EU; Ref 12.3 and 12.4)) and the Groundwater Directive (2006/118/EC; Ref 12.5). The environmental objectives of the WFD and its daughter directives are to:

- prevent deterioration of aquatic ecosystems;
- protect, enhance and restore water bodies to Good status; which is based on ecology (with its supporting hydromorphological and physico-chemical factors) and chemical factors for surface water, and water quantity and chemical status for groundwater;
- comply with water related standards and objectives for environmentally protected areas established under other European Union (EU) legislation;
- progressively reduce pollution from priority substances and cease or phase out discharges of priority hazardous substances; and
- prevent or limit the input of pollutants into groundwater and reverse any significant or sustained upward trends in the concentration of any groundwater pollutant.

1.2.2 The WFD sets a default objective for all rivers, lakes, estuaries, groundwater and coastal water bodies to achieve Good status by 2027 at the latest. Where it is not possible to achieve Good status by 2027, alternative water body objectives can be set. The current (baseline) status, and the

[1] An Ordinary Watercourse is a watercourse that is not part of a Main River and includes rivers, streams, ditches, drains, cuts and culverts.

measures required to achieve the 2027 status objective are set out, for each water body, in the relevant River Basin Management Plans (RBMPs), as prepared by NRW every six years (Ref 12.6). The first RBMPs were published in 2009, and the current Cycle 2 RBMPs were published in December 2015. The plans provide the baseline condition of the water environment at the time of publication, and indicate the measures needed and timescales required to attain their target status.

Surface waters

1.2.3 For surface water bodies (rivers, lakes, estuaries and coastal waters), overall water body status has an ecological and a chemical component. Ecological status is measured on the scale of high, good, moderate, poor and bad. Chemical status is measured as good or fail, based on the presence or absence of priority substances which present a risk to the environment. Good ecological status (GES) is defined as a slight variation from undisturbed natural conditions, with minimal distortion arising from human activity. The ecological status of water bodies is determined by examining biological elements (e.g. fish, invertebrates, plants) and a number of supporting elements and conditions, including physico-chemical (e.g. metals and organic compounds), and hydromorphological (e.g. depth, width, flow, and 'structure') factors. These elements are summarised in Table 1.1.

Table 1.1: WFD classification elements for rivers, lakes, transitional and coastal WFD water bodies

Waterbody type	Biological	Physio-chemical and chemical	Hydromorphological
Rivers	Macrophytes Phytobenthos Benthic invertebrates Fish	Thermal conditions Dissolved oxygen Acidification Nutrients Salinity Organic pollutants Pollution by substances being discharged e.g. chemicals, metals, pesticides.	Hydrological regime: - quantity and dynamics of water flow - connection to groundwater bodies. River continuity morphological conditions: - river depth and width variation - structure and substrate of the river bed - structure of the riparian zone.
Lakes	Macrophytes Phytoplankton	Transparency Thermal conditions	Hydrological regime: - quantity and dynamics of

Table 1.1: WFD classification elements for rivers, lakes, transitional and coastal WFD water bodies			
Waterbody type	Biological	Physio-chemical and chemical	Hydromorphological
	Benthic invertebrates	Dissolved oxygen Acidification Nutrients Salinity Pollution by substances being discharged e.g. chemicals, metals, pesticides.	inflows and outflows - residence time - connection to groundwater bodies Morphological conditions: - lake depth variation - quantity, structure and substrate of the lake bed - structure of the lake shore.
Transitional waters	Phytoplankton Other aquatic flora Benthic invertebrates Fish	Transparency Thermal conditions Dissolved oxygen Nutrients Salinity Pollution by substances being discharged e.g. chemicals, metals, pesticides.	Tidal regime: - freshwater flow - wave exposure Morphological conditions: - depth variation - quantity, structure and substrate of the bed - structure of the intertidal zone
Coastal waters	Phytoplankton Other aquatic flora Benthic invertebrates	Transparency Thermal conditions Dissolved oxygen Nutrients Salinity Pollution by substances being discharged e.g. chemicals, metals, pesticides.	Tidal regime: - freshwater flow - wave exposure Morphological conditions: - depth variation - quantity, structure and substrate of the bed - structure of the intertidal zone

1.2.4 Whilst GES is defined as a slight variation from undisturbed conditions in ‘natural’ water bodies, surface water bodies can also be designated as artificial or heavily modified water bodies (AWBs or HMWBs). These designations apply where there has been significant human influence on the nature of the water body such that they are considered to be unable to

achieve the standards required to attain GES. Instead, AWBs and HMWBs have a target to achieve good ecological potential (GEP), which recognises their essential human use/s (e.g. flood protection, navigation), whilst making sure ecology is protected and enhanced as far as possible. The ecological potential for AWBs and HMWBs is also measured on the scale high, good, moderate, poor and bad. For those ecological elements that are sensitive to the human use of the water body, status is measured based on the successful implementation of a list of mitigation measures. These measures are set in order for the sensitive ecological elements to achieve the best aquatic health that is possible without compromising the human use of the water body. Ecological elements that are not sensitive to the human use of the water body are measured in the same way and with the same standards as for natural water bodies. Similarly, the chemical status of AWBs and HMWBs is also measured and classified in the same way as for natural water bodies.

1.2.5 In order for a surface water body to attain good 'overall' status, it must meet the requirements of GES or GEP, and achieve good chemical status. The achievement of good overall status by 2027 or earlier is the default WFD objective for almost all water bodies in the UK.

Groundwater

1.2.6 For groundwater bodies, Good status has quantitative and chemical components that are assessed via a series of 'tests', as shown in Image 1 below. Together, these provide a single final classification: good or poor status. Quantitative status is evaluated on the basis of overall aquifer water balance, impacts of abstraction on dependent surface waters or wetlands and potential for saline intrusion. Chemical status is evaluated on the basis of evidence for impacts of poor water quality on dependent surface waters or wetlands or deterioration of the quality of groundwater used for potable supply.

1.2.7 There is also a trend objective set for groundwater bodies where environmentally significant and sustained rising trends in pollutant concentrations need to be identified and, where necessary, reversed.

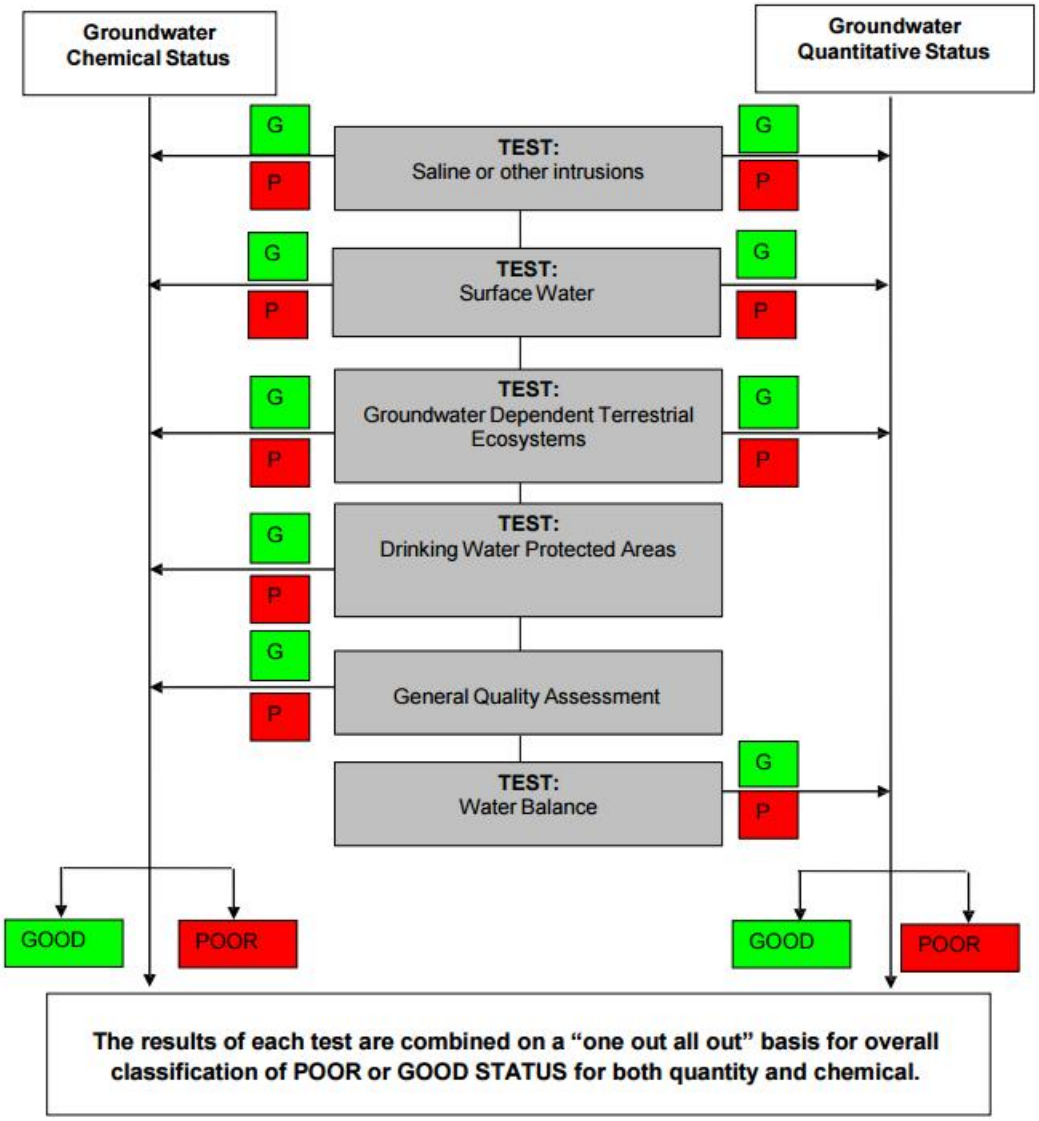

Image 1: Overview of the groundwater classification elements (Ref 12.7)

1.2.8 Both the WFD and the GWD also require the prevention of any input of priority substances and limiting (or control) of the input of all other substances to groundwater to prevent the deterioration of groundwater body status

1.3 STRUCTURE OF THIS REPORT

1.3.1 This WFD Assessment is an appendix to Chapter 12 of the Environmental Statement, 'Water Quality, Resources and Flood Risk' (**Document 5.12**), and is structured as follows:

- **Section 1 Introduction:** discussed the legislative requirements and context of the WFD in respect of the Proposed Development;

- **Section 2 Consultation:** provides an audit trail of written dialogue between National Grid and the regulatory bodies that have a responsibility of the WFD;

- **Section 3 WFD Assessment Methodology:** provides an overview of the methodology that has been adopted in order to undertake the WFD assessment;

- **Section 4 WFD Baseline Environment:** sets out the WFD baseline for all of the river, lake, groundwater, estuarine and coastal water bodies in the Study Area;

- **Section 5 Scoping Results:** sets out the process that has been followed to gain a better understanding of Proposed Development activities that are low risk and do not require further consideration ('scoped out') and those that require detailed assessment ('scoped in');

- **Section 6 Detailed Assessment Results:** sets out the process that has been followed and outcomes of a further, detailed assessment on those relatively high-risk activities that were scoped in as part of the work presented in Section 5; and

- **Section 7 Conclusions on WFD Compliance:** takes the outputs from Sections 5 and 6, and provides a statement of compliance with the objectives of the WFD.

1.4 PROPOSED DEVELOPMENT DESIGN TO FACILITATE WFD COMPLIANCE

1.4.1 As a general principle, the Proposed Development has been designed to minimise the impact to water bodies and WFD objectives; first by minimising direct contact between construction, operation and maintenance activities and surface water bodies, and second by incorporating appropriate mitigations where infrastructure has to pass over, under or through water bodies. In this way, the ultimate impact to WFD water bodies from the Proposed Development has been managed to an acceptably low level, and the Proposed Development would not therefore compromise WFD objectives. This document provides the evidence required to demonstrate how this conclusion has been reached.

2 Consultation

1.5 INTRODUCTION

2.1.1 This Section of the report sets out the consultation comments received in relation to the WFD Assessment. This includes comments on the proposed method statement (which is supplied by Annex D (**Document 5.12.2.5D**)), and comments on draft version of the WFD assessment.

2.1.2 Section 3 of this WFD Assessment sets out the scope of the WFD assessment following the consultation.

2.2 NRW RESPONSE TO PROPOSED METHODOLOGY

2.2.1 The issues raised by NRW during pre-application consultation, with regards to the assessment methodology, are set out in Table 2.1 with the corresponding responses. The methodology described in section 3 of this document has addressed, where necessary, the issues raised.

Table 2.1 Issues raised in the NRW response to the proposed WFD assessment methodology

Paragraph	Issue Raised	Response
3.2.1	Section 3.2 details the available guidance. NRW has not adopted the EA 'Clearing the Water for All' guidance (section 3.2.1) or the 2015 EA revision of 488_10 (section 3.2.3) but we are aware of these documents. NRW is in the process of producing WFD guidance for internal use which will include guidance for assessing activities and projects for compliance with the WFD for all water body types and on deterioration of water body status.	The methodology has been amended (section 3) to account for the procedure set out in the WFD guidance documents supplied by NRW (Refs 12.8 and 12.9) on 19th July 2017.
3.2.2	We would be grateful for further clarification with regards to paragraph 3.2.2. This paragraph starts by referring to within-class deterioration and talks about two exceptions,	This is clarified in paragraph 3.2.2 of this WFD Assessment Report.

Table 2.1 Issues raised in the NRW response to the proposed WFD assessment methodology		
Paragraph	Issue Raised	Response
	however the second exception discussed is between class rather than within class? Please note that a change in element status from high to good would not count as a deterioration. We can confirm that no deterioration applies to each individual element as well as the waterbody as a whole. However, a deterioration in any quality element (not just supporting) making up the WB status would constitute a deterioration, irrespective of whether the WB as a whole deteriorated	
3.3.13	With regards to section 3.3.13 we confirm that it is too early in the assessment process to pre-empt the outcome of the compliance assessment. We can comment further once we have reviewed the WFD assessment report.	A consultation meeting was held on 13th June 2017 to provide further details, and NRW were sent a draft version of a revised WFD assessment methodology for comment on 23rd July 2017.
	For us to be able to provide you with copies of the internal planning documentation that we have for each WFD water body in the study area, we would wish to receive a list of those waterbodies that you are proposing to include in your assessment.	A list of the water bodies within the WFD Study Area was supplied to NRW on 23 May 2017.
	With regards to the evidence that will be required in order to demonstrate WFD compliance for all parts of the Proposed Development, but specifically in relation with the effects associated with the dewatering for the onshore construction components of the tunnel we will require the following information;	This point was further discussed with NRW on 13 June 2017. Given that dewatering calculations indicate very low volumes/rates of water arising at either shaft location, a revised WFD scope was submitted to NRW on 23 July 2017. Subsequently, a

Table 2.1 Issues raised in the NRW response to the proposed WFD assessment methodology

Paragraph	Issue Raised	Response
	The degree to which the dewatering will affect surface water baseflow and water quality: We will base this on the dewatering volumes that will be calculated over the coming months and the proposals for water treatment and discharge. NRW's view on how quantitative this assessment needs to be would be welcomed. We will need to understand the effects of the dewatering on both the quantity and chemistry of the groundwater resource, any existing users, surface water and any GWDTEs. Unfortunately it is not possible to give any specific advice on how an assessment of this should be carried out. The scope of the assessment and level of detail required will depend on the proposed abstraction volume and duration. A robust hydrogeological model, which can be expanded and augmented as necessary will need to underpin any assessment. If risk to any of these receptors is identified, then I don't see how any further assessment can be anything other than quantitative. Please note that a permit may be required from NRW for dewatering activity under New Authorisations, depending on the date of implementation.	qualitative assessment was agreed in principle as the relatively low volumes of water can be managed in multiple ways, depending on its salinity (WE510 of the CEMP, (**Document 7.4)**). Effects of the onshore construction components of the tunnel on all elements of surface water and groundwater body status are considered in section 6 and Annex C (Document **5.12.2.5.C**).
	The degree to which the dewatering may affect any groundwater dependent terrestrial ecosystems (GWDTEs). This will clearly be driven by the dewatering quantities and	The effects of dewatering on GWDTEs have been considered within Chapter 11, Geology, Hydrogeology and Ground Conditions

Table 2.1 Issues raised in the NRW response to the proposed WFD assessment methodology		
Paragraph	Issue Raised	Response
	extent of effects, but we anticipate that the effects on the GWDTEs themselves will be qualitative and based on expert judgement between the hydrogeology and ecology disciplines. I'm not sure what the effects will be 'qualitative' means. Dewatering can directly draw down water beneath a GWDTE, or reduce recharge. Changes in flow direction can also result in changes to chemistry within these sites. If GWDTEs are identified to be at risk from the assessment above, then I would expect a detailed (quantitative) assessment of these effects to be undertaken to understand the significance of this in the context of the WFD (or Habitats Directive, if appropriate).	(**Document 5.11**) of the ES as well as within sections 5 and 6 of this document. The assessment considers the specific infrastructure and associated dewatering requirements located in the vicinity of the GWDTEs and the potential for effects based on the local hydrogeology and nature of the dewatering.
	The degree to which the dewatering could affect saline intrusion. As the dewatering is adjacent to the coast, we are anticipating including a qualitative assessment that will address the likelihood and extent of any groundwater saline intrusion. I would expect an assessment of the likelihood of saline intrusion to be quantitative, unless the conceptual model is sufficiently straightforward to allow for a simple qualitative assessment.	This point was further discussed with NRW on 13 June 2017 as described in Chapter 5 of the ES (**Document 5.5**). Given that dewatering calculations indicate very low volumes/rates of water arising at either shaft location, a revised groundwater WFD scope was submitted to NRW on 23rd July 2017. Subsequently, a qualitative assessment approach was agreed in principle.
	The degree to which the dewatering would affect the WFD groundwater water body water balance. Depending	This point was further discussed with NRW on 13 June 2017. Given that

Table 2.1 Issues raised in the NRW response to the proposed WFD assessment methodology		
Paragraph	Issue Raised	Response
	on how quantitative NRW require this test to be, we may require data on the current water balance value/s and how close these are to the good/fail threshold. This will probably only be required for the two ground water bodies adjacent to the tunnel shafts. We may no longer have access to these data, since splitting from the EA. However, we can re-generate the figures if given sufficient notice. The test can't be anything other than quantitative. I can't comment on the geographical extent of the tests without the conceptual model described above.	dewatering calculations indicate very low volumes/rates of water arising at either shaft location, a revised groundwater WFD scope was submitted to NRW on 23 July 2017. Subsequently, a qualitative assessment was agreed.

2.3 IACC RESPONSE TO PROPOSED METHODOLOGY

2.3.1 The issues raised by the IACC with regards to the proposed assessment methodology are set out in Table 2.2 with the corresponding responses.

Table 2.2 Issues raised in the IACC response to the proposed WFD assessment methodology		
Paragraph	Issue Raised	Response
3.2.2	The comment in the first sentence of this paragraph doesn't reflect the comment above regarding the Bund Ruling – the Bund Ruling stated that deterioration in individual elements would result in overall deterioration of the waterbody status – the methodology adopted by the EA appears to differ from this ruling. The methodology does not state which approach should be adopted and asks NRW to provide	The approach taken in this WFD assessment has subsequently been agreed in principle with NRW and is presented in 3.2.1 and 3.2.2.

Table 2.2 Issues raised in the IACC response to the proposed WFD assessment methodology		
Paragraph	Issue Raised	Response
	approval/input into this approach. It may be better to suggest which approach is recommended and ask for confirmation rather than leaving it so open.	
3.3.4	Should it state in this paragraph that within this screening exercise that individual activities will be assessed against the quality elements? Is this the planned approach?	WFD Screening (now referred to as scoping following the issue of NRW's Operational Guidance Note 72 (OGN72; Ref 12.8)) is undertaken against individual activities. The approach is summarised in section 3.3 and presented in section 5.
3.2.3/ 3.3.2/ 3.3.4	We do not have access to the EA position paper 488_10 referred to as it is not freely available and therefore we are unable to confirm whether the methodology stated follows this protocol. It would be useful for some detail regarding what the screening process will entail to be included within the document.	The approach is summarised in section 3.3 and presented in section 5.
3.3.5	The paragraph refers to a process for screening that is "provided in the WFD Directions" – What is the term "WFD Directions"? There is no reference to a report of this name - possibly the sentence needs to be re-written?	The WFD Directions can be found here: http://www.legislation.gov.uk/uksi/2015/1623/pdfs/uksiod_20151623_en_auto.pdf
3.3.7	"screening thresholds" what is meant by this? Where are these thresholds set out?	A combination of published physical modification thresholds (from NRW's Operational Guidance Note 72 (OGN72; Ref 12.8)) and expert opinion thresholds (as agreed

Table 2.2 Issues raised in the IACC response to the proposed WFD assessment methodology		
Paragraph	Issue Raised	Response
		in principle with NRW on 12 January 2017) can be found in section 5.
3.3.8	"the screening process employed in this WFD assessment provides a generic screening outcome based on WFD water body categories" – I do not agree with this approach as for example the impact of the crossing may differ depending on the size of the waterbody or its sensitivity to the activity and therefore the impact should not be generalised without good reason. There is also the consideration of cumulative effects of more than one crossing on a waterbody which may have a greater affect.	Due to the small amount of proposed in-channel works, and the similarity in activities/infrastructure throughout the OHL component of the Proposed Development a screening assessment for all activities per WFD water body would be disproportionately large and repetitive. The assessments consider the total number of activities (including watercourse crossings) within a water body catchment. The approach employed was discussed and agreed with NRW on January 12 and June 13 2017.
3.3.9 - 3.3.11	There is no reference in this section to developing an understanding of the baseline to assess impact against.	The baseline WFD data are presented in section 4.
3.3.14	The end of the first sentence could be written better – suggestion: 'which may become compliant if mitigation is implemented or incorporated into the design	This point is made in paragraph 3.3.11.

2.4 GWYNEDD COUNCIL

2.4.1 No detailed comments were provided for consideration by Gwynedd Council.

2.5 NRW RESPONSE TO DRAFT WFD ASSESSMENT

2.5.1 A draft of the WFD assessment was provided to NRW for review on 23 June 2017. Comments were provided in response to that review on 8 September 2017. Those comments are summarised in Table 2.3.

Table 2.3 Comments received from NRW in response to the draft WFD assessment, September 2017

Comment	Response
It would be useful to have a list of waterbodies in a table in the WFD Assessment Report at the beginning of section 4 or 5.2.	Lists of waterbodies have been added to section 4 (Table 4.1, 4.2 and 4.3)
We would recommend that previous correspondence including Tables 2.1 and 2.2 sit within an appendix/annex as the tables are quite lengthy and some of the issues have been superseded.	For consistency and transparency, the consultation section has been left within the main body of the report.
NRW is currently obtaining legal advice around the status of non-reportable water bodies. We can provide further clarification in due course, in the meantime please continue to refer to section 3.1 of NRW's Operational Guidance Note 72 (OGN72).	Text has been added to section 3.2.3 to confirm that non-reportable waterbodies are, based on the currently available guidance, assessed in the same way as reportable waterbodies.
Paragraph 3.1.1 identifies that the WFD Assessment has considered the following question; 'At the water body scale, on a non-temporary basis, will the Project result in deterioration of any of the WFD classification components from one status class to the next," We would suggest that the term "element" is used instead of "component" here.	The terminology has been updated to use "element" where appropriate.
3.2.2 Please note that change from high status to good status of an element does count as deterioration, as per previous correspondence… and previously shared guidance OGN73.	The reference to a change from high to good status has been removed from this section.
4.1.2 Paragraph 4.1.2 confirms that 'For operation and decommissioning phases,	The text has been amended

Table 2.3 Comments received from NRW in response to the draft WFD assessment, September 2017	
Comment	**Response**
the future baseline assumes that all WFD water bodies will have achieved their target of attaining Good Status'. Please note that some water bodies could have alternative objectives set and this would be the target rather than good status.	accordingly.
For lakes, the screening could be clearer – as currently screened it is left to the reader to assume that the activities/infrastructure screening is the same for the rivers where there is the potential to influence Llyn Alaw?	Confirmation has been added that the activities screened in are the same as for the river water body where there is the potential to influence Llyn Alaw.
5.5. Screening of coastal waterbodies – paragraphs 5.5.3 and 5.5.5 are contradictory statements	The text in paragraph 5.5.3 has been updated, and relevant text from 5.5.5 removed, in order to address this.
5.6.4. We recommend that this sentence is revised to read 'The Anglesey Fens, which consists of a number of wetlands that include the Cors Erddreiniog National Nature Reserve; and …'	The text has been updated accordingly
We recommend that paragraph 5.6.5 refers to the Anglesey Fens SAC which is a ground water dependent terrestrial ecosystem (GWDTE) and refer to relevant ground water body and where in the assessment this is covered to show the links.	Clarification has been added that the site is a GWDTE and is discussed in section 6.4.
The section could benefit from a bit more clarity around timescales including providing a definition for when works are identified as being "temporary" works. We refer you to OGN71.	This has been addressed in Table 5.1, where the typical construction duration of all temporary infrastructure is now outlined.
Table 6.1 does not include any ecological elements, just physico-chemical, chemical and hydromorphological. Does this mean the assessment has concluded that there is no potential for impact on	Text has been added to section 6.2.1 to clarify that effects on biological quality elements are almost exclusively associated with changes to the hydromorphology and/or water quality

Table 2.3 Comments received from NRW in response to the draft WFD assessment, September 2017	
Comment	**Response**
ecology? We wish clarification on this.	of a watercourse. Therefore, they are not separately considered in Table 6.1.
Terminology is slightly confusing in the "achievement of WFD target status" sections - various references e.g. "failing elements" (probably correct terminology?), but sometimes described as "supporting elements", "failing supporting elements".	All such references have been updated to 'failing elements'
In the absence of an assessment under the Conservation of Habitats and Species Regulations 2012 (as amended) we are not able to agree with the statement made in paragraphs 6.3.45 and 6.3.52 that the HRA concludes that the Project will not have any adverse effects on the conservation objectives of the protected sites.	A copy of The Applicants Report to Support the HRA is included as **Document 5.23**, which confirms that the Proposed Development will not have any adverse effects on the conservation objectives.
Braint & Nant Y Garth water bodies -while the salinity content of the groundwater is being monitored, there is no assessment of the receiving watercourses. Only one of these, the Braint, is routinely classified for WFD by NRW. Although NRW does not usually require monitoring of these watercourses at preapplication, it could benefit the operator to know what the actual background conditions are rather than NRW looking at classification midpoints during assessment of the permit application.	Baseline salinity levels will be determined after the DCO submission, during the process of environmental permitting.
Table 6.8 refers to 'In addition to the embedded measures, site specific measures have been recommended for the three culverted watercourse crossings (IDs 162 – 164) identified to be replaced by clear span bridges due to the proximity	The mitigation proposed in the draft paragraph is not part of the Proposed Development. As such, it has not been necessary to refer to Caeau Talwrn SSSI or other components of the SAC in this context in the final assessment.

Table 2.3 Comments received from NRW in response to the draft WFD assessment, September 2017	
Comment	**Response**
to Cors Erddreiniog, Cors Bodeilio (Anglesey Fens SAC)'. This paragraph should also refer to Caeau Talwrn (SSSI) which is a component of the SAC which is potentially impacted by works	
In the conclusion of section 7 on WFD compliance we would expect to see reference to inter-project effects e.g. list of foreseeable future projects that would overlap in time and space?	A conclusion regarding cumulative effects has been added to section 7.
7.2.1. It needs to be confirmed that there should be no deterioration in any element, not just status - elements can deteriorate without affecting status and this is considered deterioration.	The text has been updated accordingly
We note that C1 data for non-reportable water bodies needs revisiting if C1 data to be included – e.g. GB110102059160 was moderate and not HMWB, rather than good.	The details for GB110102059160 and GB110102058670 in Annex A **(Document5.12.2.5.A)**, have been checked and updated using the data currently available on Water Watch Wales.
The main areas of interest from a groundwater WFD point of view relate to non-temporary effects on groundwater resources on a regional scale and GWDTEs (specifically the Anglesey Fens). - Table 5.1 suggests that shafts would need to dewater 16 m^3/day during construction and 8 m^3/day during operation; these are small volumes and will not affect regional scale water resources. No other activities are listed that are likely to cause a GW Body scale problem. - The potential for change in groundwater quality that would deteriorate a GWDTE –	The text in Table 5.1, paragraph 6.4.8 and paragraph 6.4.27 has been updated to reflect these points.

Table 2.3 Comments received from NRW in response to the draft WFD assessment, September 2017	
Comment	**Response**
please refer to comments on section 6 above. - The potential for permanent saline intrusion – further comment on this aspect is provided below.	
In general, NRW agrees with the conclusions of Section 6.4… Most of the activity is confirmed to be shallow and temporary, and therefore low risk. However, paragraph 6.4.8 acknowledges that abstracted water could be saline (Ynys Mon Secondary GW Body). The critical question for WFD is whether or not this change in groundwater level will cause saline intrusion on a non-temporary basis... This needs to be considered further... Same comments apply for Section 6.4.15 (Ynys Mon Southern Carboniferous Limestone) and 6.4.27 (Llyn and Eryri).	Additional text has been added to paragraph 6.4.8, 6.4.15 and 6.4.21 for clarification.

2.6 RESPONSES TO REVISED DRAFT WFD ASSESSMENT

2.6.1 A revised draft of the WFD assessment was provided to NRW, IACC and Gwynedd Council for review in February 2018. The comments that were provided in response are summarised in Table 2.4 (NRW) and Table 2.5 (IACC). No comments were received from Gwynedd Council.

Table 2.4 Comments received from NRW in response to the revised draft WFD assessment, March 2018	
Comment	**Response**
27. Page 12-4 Table 1.1. Lakes do not have fish assessed as biological element as there is no standard method available for assessing this yet. The reference to fish under the biological column for lakes should be removed.	Reference to fish has been removed from Table 1.1.

Table 2.4 Comments received from NRW in response to the revised draft WFD assessment, March 2018	
Comment	**Response**
28. Page 12-17 Table 2.3. We advised in our comments on 8 Sept 2017 (review of the draft WFD assessment (Table 2.3 item 3) that we would provide further clarification on the status of small non-reportable water bodies in due course. The response is detailed below in paragraph 29-32. 29. NRW has recently revised an internal WFD guidance note regarding non-reportable water bodies, the relevant considerations with regard to this project is section 3.1 [Section 3.1 replicated] 31. It is likely that these stretches of water are not monitored by NRW and their status will not be reported. In the absence of any classification it should be assumed that they are at 'good' status and any deterioration from 'good status' be assessed as a result of an new activity." 32. NRW has also attached a copy of guidance OGN72 on WFD compliance assessment. This must not be distributed further without NRWs authorisation.	Changes had already been made in response to the June 2017 consultation, to recognise that non-reportable WFD water bodies are assessed in the same way as reportable water bodies. In addition to those earlier changes, paragraph 4.2.2 has been updated to indicate that non-reportable water bodies should be treated as being at good status.
33. Page 12-17/12-18 Table 2.3. National Grid response to NRW comment on Table 6.8 - "The Caeau Talwrn SSSI does not form part of the Anglesey Fens SAC site boundary and is, therefore, not a component of the SAC." For clarification, parts of the SSSI do form components of the site, others do not. This should be accurately reflected in the ES.	It is acknowledged that part of Caeau Talwrn SSSI is a component of the SAC. However as the Proposed Development does not require the mitigation that the original comment referred to, the response has been updated to reflect this.
35. Page 12-54, section 5.6.4. Amendment is required to current bathing water status as stated in this document:	The bathing water statuses have been updated in paragraph 5.6.4

Table 2.4 Comments received from NRW in response to the revised draft WFD assessment, March 2018	
Comment	**Response**
http://environment.data.gov.uk/wales/bathing-waters/profiles/profile.html?site=ukl1100-40050 - The Cemaes Bay bathing water is currently as assessed as “Poor” and not “sufficient” - Traeth Lligwy is currently assessed as excellent and not “good “	
38. Page 97, 7.4. Any conclusion on in-combination effects must be assessed upon completion of chapters 19, 20 and 21.	The conclusion regarding cumulative effects in paragraph 7.4.1 is consistent with the findings of the Environmental Statement (**Volume 5**).
40. NRW is satisfied with the WFD assessment with regard to fish providing the point detailed below can be appropriately addressed by the developer: 41. Ecology and Nature Conservation Document 5.9: Page 321, table 9.6.154. This table appears to refer to a field survey to identify only breeding habitats for fish species. This is not sufficient as some fish species like eels will not have breeding habitats in the river. While NRW acknowledges that some areas will present a lower risk, this initially needs to include surveys to identify all habitat requirements for all life stages of fish present. The National grid will then subsequently be detailing any site specific reasons not to undertake detailed survey/ categorise the area as a lower risk. This will ensure that these various habitats are not adversely affected by habitat fragmentation."	Pre-construction surveys will include for habitat requirements for all life stages of fish present. All main rivers will be crossed using clear span bridges, as will the majority of their tributaries. Surveys will in particular focus on those tributaries which could be crossed using a culvert and therefore could affect potential fish habitat if present.
When the national grid comes to forming	These requirements are part of the

Table 2.4 Comments received from NRW in response to the revised draft WFD assessment, March 2018	
Comment	**Response**
new / replacement crossings, it would better for structures to be clear span, or an oversized culvert, with invert sunk below bed level. Any these methods will have to be qualified by the national grid at the time for the specific site conditions.	measures set out in the CEMP (**Document 7.4**).

Table 2.5 Comments received from IACC in response to the revised draft WFD assessment, March 2018	
Comment	**Response**
IACC is concerned that National Grid has incorrectly identified the designation [of Cemaes Bay bathing waters], as the bathing water in Cemaes Bay was designated 'poor' during the 2017 bathing season and will also be the same during 2018. Indeed, IACC fundamentally disagrees with paragraph 3.6.7, as the Acclimatize study has demonstrated that the rivers and streams draining in to the bay have an adverse impact on bathing water and this is partly due to poor water dispersion within the bay. [further details then provided of the Acclimatize project]	The status of bathing waters has been corrected in paragraph 5.6.4. The discussion of cross-water body effects relating to Cemaes Bay in paragraph 6.3.7 and 6.3.12 has been updated to reflect that any residual effects at Cemaes Bay would be negligible, based on the conclusions for the upstream water bodies.
It is imperative that the work does not increase the sediment loading within the streams running in to Cemaes Bathing Water. This should be secured by National Grid committing to appropriate section 106 financial contributions towards the running of the Water Quality Prediction Model for Cemaes bathing water during the summer season e.g. staff costs to run model and the upkeep of the met station and river flow gauge during the period they are constructing the OHL in the Cemaes catchment.	As it has been concluded that there would not be a significant effect on Cemaes Bay associated with the Proposed Development, no such mitigation is proposed.

Table 2.5 Comments received from IACC in response to the revised draft WFD assessment, March 2018	
Comment	**Response**
It is advisable that work within this area is undertaken outside the bathing season and precautionary measures are taken to ensure that sediment does not enter streams/ rivers draining into the bay. Also, care must be taken to ensure that livestock fences are kept intact to prevent access to watercourses.	As it has been concluded that there would be no significant effect on Cemaes Bay associated with the Proposed Development, restrictions relating to the bathing season are not considered necessary. The CEMP (**Document 7.4**) incorporates a range of measures to manage sediment and reduce the risk of sediment loading to any stream or river. The CEMP (**Document 7.4**) also includes measures for livestock fencing around working areas. Paragraph 6.3.10 has been revised to present the proposed WFD measures for the water body: livestock fencing required for the construction of the Proposed Development will be inspected and repaired as necessary in accordance with measure GP84 in the CEMP (**Document 7.4**).

3 WFD Assessment Methodology

3.1 STRUCTURE OF THIS ASSESSMENT

3.1.1 All aspects of construction, operation, maintenance and decommissioning of the Proposed Development have been considered in the assessment in order to determine whether each would have an effect on WFD water bodies. Accordingly, the WFD assessment considers the following key questions:

- At the water body scale, on a non-temporary basis, will the Proposed Development result in deterioration of any of the WFD classification elements from one status class to the next, (e.g. from good to moderate) irrespective of whether or not it results in the lowering of overall status?
- Will the Proposed Development prevent any water bodies from achieving good overall status or, where relevant, an alternate objective?
- Will the Proposed Development contribute towards a cumulative deterioration of WFD status (in combination with other projects) or prevent the cumulative enhancement of status (up to 2027)?
- Will the Proposed Development compromise the achievement of the WFD objectives in multiple water bodies that are hydrologically linked?
- Can the Proposed Development assist in the delivery of any measures, as published in the RBMP, required to achieve water body objectives?

3.1.2 Assessment against WFD objectives may include consideration of additional or more stringent standards applied to protected areas if these are present, including standards set by other relevant EU legislation. The Anglesey Fens, for example, the second-largest area of calcareous fens in the UK, are a Special Area of Conservation (SAC), designated under the Habitats Directive (92/43/EEC). A project would not be considered to be compliant with the WFD if it would have an adverse effect on the conservation objectives of this Natura 2000 protected area (unless the tests for overriding public interest under Article 6.4 of the Habitats Directive are met).

3.2 AVAILABLE GUIDANCE

3.2.1 Operational Guidance Note OGN72, on WFD Compliance Assessment in Wales, has been provided by NRW (Ref. 12.8), accompanied by OGN73, Water Framework Directive – Deterioration in water body status (Ref. 12.9) which explains NRW's interpretation of WFD water body deterioration. In summary, the guidance states that the 'no deterioration criterion' applies to each supporting WFD element (Ref. 12.9). So, for example, a deterioration in the quality of macrophytes in a river water body from Good to Moderate status would be classed as deterioration, irrespective of whether this causes the overall water body status to be lowered (in this water body, for example, the status of fish may already be influencing the overall classification of Moderate, which would remain unchanged following the deterioration of macrophytes from Good to Moderate). This approach was reinforced by a recent European Court of Justice (ECJ) ruling on the WFD assessment of dredging activities in Germany. In this case (known as the 'Bund Case'), the court ruled that the deterioration of the hydromorphology element of a water body was in breach of the objectives of the WFD, despite the fact that this did not lead to a lowering of overall water body status (Ref 12.10).

3.2.2 Furthermore, the Cycle 2 RBMPs indicate that 'within class' deterioration of any constituent element (e.g. a lowering of the quality of macrophytes in a river water body that does not result in a lowering of the status of macrophytes i.e. they remain at Moderate status) is permissible, but should be limited as far as practicable. The only exception to this is where the water body is at the lowest possible class (bad ecological status/potential) where no 'within class' deterioration is allowed.

3.2.3 From an overall WFD compliance perspective, the principles set out in OGN72 form the basis for assessment of all surface water bodies (lakes, streams, canals and rivers), groundwater bodies, transitional (estuarine) and coastal waters (out to one nautical mile from the low-tide mark). Non-reportable waterbodies, those typically too small to be identified as formal WFD waterbodies, are assessed in the same way as reportable waterbodies. The foundation of the assessment is an ecosystem-based approach that requires measures to be taken to encourage the sustainable use of water and to protect and improve water bodies, with the aim of achieving Good status.

3.2.4 The Planning Inspectorates Advice note eighteen (Ref 12.17) explains 'the information that the Inspectorate considers an Applicant must provide with their NSIP application in order to clearly demonstrate that the WFD and the 2017 Regulations (Ref 12.18) have been appropriately considered'. The note introduces the legal context and obligations as well as the relationships

between the WFD assessment, the Environmental Impact Assessment (EIA) and Habitats Regulations Assessment (HRA). A WFD screening and assessment process similar to that set out in OGN72 is also provided. It is stated that Advice note eighteen has no statutory status; rather it forms part of a suite of advice provided by the Planning Inspectorate.

3.3 ASSESSMENT PROCESS

3.3.1 The WFD assessment comprises the following stages:

- Stage 1: Screening;
- Stage 2: Scoping;
- Stage 3: Detailed assessment; followed by, if required;
- Stage 4: Identification and evaluation of measures; and
- Stage 5: Article 4.7 considerations.

3.3.2 The approach adopted is intended to ensure there is no deterioration of a waterbody regardless of its WFD baseline classification. It provides flexibility for movements in the final spatial location of activities within the Limits of Deviation and temporal flexibility in terms of when construction commences and ceases.

Stage 1 – Screening

3.3.3 The Proposed Development has the potential to have effects on the water environment. As it requires consent under the Planning Act 2008 (as amended) and it is not a continuation of a previously permitted activity, the application for a DCO must be supported by necessary environmental information. Therefore, a WFD compliance assessment has been prepared in support of the DCO application.

Stage 2 – Scoping

3.3.4 The focus of the scoping stage was to identify component activities of the Proposed Development that have the potential to cause an impact to the WFD quality elements. Each water body potentially affected directly or indirectly (i.e. downstream) by the Proposed Development was considered. Water bodies were scoped out at this stage where it could be robustly demonstrated that there would be no impacts.

3.3.5 In terms of scoping new physical works, the OGN72 guidance states all stages of the activity, including construction, operation, maintenance and

decommissioning, should be considered. Some low risk activities were scoped out altogether, some were only scoped in if they exceeded a certain scale, and other activities were scoped in regardless of scale.

3.3.6 A similar process is set out for scoping against water quality elements, based on EQS values provided in the WFD Directions (Ref. 12.4).

3.3.7 The activities that could not be scoped out, on account of the potential risk posed to the water environment, were retained for detailed assessment (Stage 3). Those activities that were scoped out are considered to be compliant with the WFD, and no detailed assessment has been necessary.

3.3.8 Where scoping thresholds have not been defined under WFD or in supporting regulatory guidance, scoping involved expert judgement that was supplemented by available evidence and agreed with NRW as part of ongoing dialogue.

3.3.9 As many of the same Proposed Development activities/infrastructure types are proposed within the majority of WFD water bodies within the Study Area, the scoping process employed in this WFD assessment provides a generic scoping outcome based on WFD water body categories. For example, access track watercourse crossings were scoped once (once for culverted crossings and once for clear-span bridge crossings), rather than being scoped separately for each of the many water bodies where access track watercourse crossings are proposed. As all activities that directly impact the water environment were scoped in for detailed assessment, the ability to consider local variability in the baseline environment and sensitivities to specific infrastructure types is provided in the detailed assessment stage.

Stage 3 – Detailed assessment

3.3.10 For the activities that were ‘scoped in’ at Stage 2, a detailed assessment has been undertaken. This included the activities that were considered to pose enough of a potential risk to warrant further consideration so that the appropriate level of confidence has been reached to determine whether, on their own or with mitigation, they are WFD compliant. This involved understanding the sources of potential effect, pathways by which water bodies could be affected and consideration of effects on each WFD quality element (receptors) for each WFD water body type (river, coastal, estuarine, lake or groundwater). Although there is no formally published guidance on how to undertake a WFD detailed assessment, previous experience indicates that an evidence-based expert judgement approach to determining WFD compliance is generally supported by regulatory bodies.

3.3.11 A fundamental requirement of the detailed assessment was to evaluate the effectiveness of the control and management measures that have been identified, through the EIA process, in order to reduce/minimise the effects on the water environment. The full portfolio of measures to be incorporated into the construction phase of the Proposed Development are presented in the Construction Environment Management Plan (CEMP; **Document 7.4**). The generic scoping undertaken at Stage 2 was designed to be relatively quick, and to take into account the type and scale of activities / infrastructure being proposed. The detailed assessment undertaken at Stage 3 is the first time that the control and management measures are considered.

3.3.12 Conventionally, a detailed assessment would consider the range of different activities that may be proposed in different WFD water bodies, as part of the Proposed Development. However, as discussed in paragraph 3.3.9 the majority of activities/infrastructure types will not vary in design from water body to water body, and the mitigation measures that are proposed (see Stage 4) will be applicable across all water bodies. Therefore, a generic detailed assessment of each activity / infrastructure type has been provided. This is then cross-referenced to each relevant WFD water body in the study area so that permitting authorities will have a WFD assessment reference point for each individual water body that indicates the type and intensity of development and any factors which are relevant to specific water bodies.

Stage 4 – Identification and evaluation measures

3.3.13 Where the assessment has identified an activity which causes a risk of non-compliance with the WFD but which may become compliant with mitigation, the mitigation required is detailed. Where measures cannot be identified that will result in WFD compliance and no suitable alternatives can be identified, the provisions of Article 4.7 of the Directive would need to be invoked (Stage 5).

Stage 5 – Article 4.7

3.3.14 The provisions of Article 4.7 would only apply where there is a:

- failure to meet good groundwater status, GES or GEP or to prevent deterioration in status arises from new modifications to the physical characteristics of the water body or alteration of groundwater levels; or
- failure to prevent deterioration from high to good overall status of a surface water body is the result of new sustainable human development activities.

3.3.15 Where an assessment shows a scheme will not be compliant with WFD requirements, an Article 4.7 assessment would be needed to demonstrate that the following conditions are met:

- all practicable mitigation has been incorporated;
- there are no significantly better environmental options;
- the scheme is of overriding public interest and/or the benefits of the scheme outweigh the benefits of WFD compliance; and
- the reasons for the modifications to the water body are reported in the next RBMP.

3.3.16 If this route is invoked, the relevant appropriate authority in relation to each application for permission to proceed with the Proposed Development is responsible for deciding whether the Article 4.7 conditions have been met.

3.4 STUDY AREA

3.4.1 The selection criteria used and the types and numbers of surface water bodies under consideration in this assessment are detailed in ES Chapter 12 Water Quality, Resources and Flood Risk (**Document 5.12**), Figure 5.12.1.2 (**Document 5.12.1.2**) and Figure 5.12.1.3 (**Document 5.12.1.3**). In addition to the surface water bodies, the WFD groundwater bodies and protected water bodies scoped in are identified in Sections 3.3 and 4.6 of this report. The groundwater bodies are shown in Figure 5.12.1.14 (**Document 5.12.1.14**). The protected areas in connection to the Proposed Development include protected drinking water, bathing waters and Special Areas of Conservation (SACs) for the Natura 2000 network.

4 WFD Baseline Environment

4.1 INTRODUCTION

4.1.1 The current WFD baseline for all 22 water bodies in the Study Area is provided in Annex A **(Document 5.12.2.5.A)**, based on 2015 Cycle 2 data (most recent data available; Ref 12.13). This list is based on the Study Areas that have been identified as part of ES Chapter 12 Water Quality, Resources and Flood Risk (**Document 5.12**), Chapter 11 Geology, Hydrogeology and Ground Conditions (**Document 5.11**) and Chapter 9 Ecology and Nature Conservation (**Document 5.9**). Figures showing the location of all water bodies included in the assessment are provided in **Document 5.12.1.2**, **Document 5.12.1.3** and **Document 5.12.1.14**.

4.1.2 Given the timescales for construction (2020-2026), the current (2015 2nd cycle RBMP) baseline has been used for the WFD assessment of the construction phase. For operation and decommissioning phases, the future baseline assumes that all WFD water bodies will have achieved their target status. This was agreed with NRW at the consultation meeting held on 12 January 2017.

4.1.3 A summary of the Proposed Development activities / infrastructure types located within each individual water body is located within Annex B **(Document 5.12.2.5.B)**.

4.2 RIVER WATER BODIES

4.2.1 There are 14 WFD river water bodies that have the potential to be affected by Proposed Development activities/infrastructure types (see Table 4.1; more detailed WFD information is provided in Annex A **(Document 5.12.2.5.A)**, Table 1), two of which are non-reportable WFD water bodies draining to the sea. This leaves a total of 12 reportable water bodies that have a formal classification in the 2nd cycle RBMP. Of these, six water bodies are currently achieving Good status. The remaining six were assessed as being of Moderate overall status due to supporting ecological elements being of a lower quality than is needed to achieve Good status. The objective is for all of these water bodies to achieve Good status by 2021 or, in some cases, 2027.

Table 4.1: WFD river water bodies potentially affected by the Proposed Development		
Waterbody ID	Waterbody name	Section of the Proposed Development
GB110102059160	Non reportable WFD Waterbody adjacent to the Irish Sea	A
GB110102059170	Wygyr (River)	A and B
GB110102058982	Alaw (upstream Llyn Alaw)	B
GB110102059000	Goch Dulas	B and C
GB110102058790	Cefni (Cefni reservoir west)	C
GB110102059070	Lligwy	C
GB110102058780	Cefni (Cefni reservoir east)	C
GB110102058770	Cefni (Ceint to Cefni reservoir)	C and D
GB110102058940	Ceint	D and E
GB110102058670	Non reportable WFD Waterbody east of Malltraeth Sands	E
GB110102058660	Braint (lower)	E and F
GB110102058690	Braint (upper)	E and F
GB110065058490	Nant-y-Garth	F
GB110065058540	Cegin	F

4.2.2 As the Proposed Development includes several components that are situated in small catchments that are adjacent to the coast, two of NRW's 'non-reportable' water bodies are included in Annex A **(Document 5.12.2.5.A)**, Table 1. Although these water bodies do not have a RBMP baseline (i.e. there is no indication of their water body status in the 2nd cycle RBMP), they still receive protection under the WFD in so far as there is a requirement for no deterioration in the status of these water bodies. NRW has recommended (see Table 2.4) that these non-reportable water bodies should be treated as being at good status. The non-reportable water bodies have therefore been considered in the assessment in the same way as all other water bodies.

4.3 GROUNDWATER BODIES

4.3.1 There are four groundwater bodies within the Study Area. The 2nd cycle RBMP 2015 baseline for groundwater bodies indicates that one of the four water bodies, Ynys Mon Southern Carboniferous Limestone, is currently achieving Good status (more detailed WFD information provided in Annex A

(Document 5.12.2.5.A), Table 2). The reasons for the remaining three not achieving Good status are due to the failing elements 'Chemical dependent surface water status' and the 'Groundwater dependent terrestrial ecosystems test'. The objective for one of these groundwater bodies, Ynys Mon Central Carboniferous Limestone, is to achieve Good status by 2021. For two of the groundwater bodies there is no known technical solution available for achieving Good status.

Table 4.2: WFD groundwater bodies potentially affected by the Proposed Development

Waterbody ID	Waterbody name	Section
GB41002G204400	Ynys Mon Secondary	A, B, C, D, E and F
GB41001G204200	Ynys Mon Central Carboniferous Limestone	C, D and E
GB41002G206100	Ynys Mon Southern Carboniferous Limestone	F
GB41002G204600	Llyn and Eryri	F

4.4 LAKE WATER BODIES

4.4.1 There are two WFD lake water bodies within the Study Area. Both currently achieve Moderate status (more detailed WFD information provided in Annex A **(Document 5.12.2.5.A)**, Table 3). Both water bodies are designated as heavily modified and store water for drinking water supply. The reasons for not achieving Good status are diffuse pollution sources associated with agriculture/rural land management and the absence of necessary mitigation measures.

Table 4.3: WFD Lake water bodies potentially affected by the Proposed Development

Waterbody ID	Waterbody name	Section
GB31032538	Llyn Alaw	B
GB31032926	Cefni Reservoir	C

4.5 TRANSITIONAL (ESTUARINE) AND COASTAL WATER BODIES

4.5.1 Of the two coastal WFD water bodies in the Study Area, one, Menai Strait, currently attains Good status (more detailed WFD information provided in Annex A **(Document 5.12.2.5.A)** Table 4). The Anglesey North water body has a Moderate overall status as it fails on water chemistry due to Mercury levels. The objective is for Good status to also be achieved in this water

body by 2021. There are two protected bathing waters within the Anglesey North water body, one at Cemaes Bay the other at Traeth Lligwy.

Table 4.4: WFD Coastal water bodies potentially affected by the Proposed Development

Waterbody ID	Waterbody name	Section
GB641010620000	Anglesey North	A, B, C, D and E
GB681010120000	Menai Strait	F

4.5.2 A single Transitional water body, Cefni, is hydrologically connected to and downstream of the Order Limits. However, it was not scoped in due to the distance (approximately 4 km) from the Order Limits and the associated potential for dilution, which mean that it is highly unlikely that any effects as a result of the Proposed Development would transmit as far downstream as this water body.

5 Scoping Assessment

4.6 ACTIVITIES

5.1.1 This section provides a brief overview of the Proposed Development. Further details are provided in Chapter 3: Description of The Proposed Development (**Document 5.3**) and Figure 3.1 (**Document 5.3.1.1**) shows the Order Limits.

5.1.2 The Proposed Development would provide a new 400 kilovolt (kV) connection between the existing substations at Wylfa and Pentir and includes the following principal components:

- Modifications to the existing substation at Wylfa;
- Sections of new 400 kV overhead line (OHL) between Wylfa substation and Braint Tunnel Head House (THH) and Cable Sealing End Compound (CSEC) on Anglesey including modifications to parts of the existing 400 kV OHL between Wylfa and Pentir;
- Braint THH and CSEC on Anglesey;
- Tunnel between Braint and Tŷ Fodol THHs;
- Tŷ Fodol THH and CESC in Gwynedd;
- New section of 400 kV OHL between Tŷ Fodol THH and CSEC and Pentir Substation;
- Extension to the existing substation at Pentir; and
- Temporary construction compounds, access tracks, construction working areas and third party works that are required to construct the infrastructure listed above.

5.1.3 Temporary construction works are described in Chapter 4, Construction, Operation, Maintenance and Decommissioning of the Proposed Development (**Document 5.4**) and would include the following elements:

- Construction compounds at Penmynydd Road, to the east of Llangefni and immediately south of Pentir substation;
- Construction compounds for tunnelling works at Braint and Tŷ Fodol including drainage areas that would include localised water

treatment (surface water runoff and tunnel dewatering arisings) and attenuation facilities;

- Bellmouths and visibility splays where temporary access tracks connect to the public highway;
- Temporary access tracks and associated culvert and clear-span bridge watercourse crossings, including bridge working areas;
- Working areas for temporary pylons;
- Construction and installation of pylons and temporary pylons and dismantling of existing pylons (where required);
- Installation of Scaffolding Protection Prior to Stringing of Conductors Scaffold; and
- Establishment of conductor pulling positions.

5.1.4 The construction is scheduled to commence in 2020 and would take six years to complete. Site preparation works are expected to commence in 2020 and for the overhead lines in 2022. The proposed Development is expected to be operational by 2026.

5.1.5 Typically, pylons steelwork and foundations have a life expectancy of approximately 80 years, conductors approximately 60 years and the insulators and fittings have approximately 25 to 40 years. The lifespan of the equipment within a THH/CSEC and substation is approximately 40 years (Ref 12.12).

5.1.6 A detailed description of the construction and maintenance activities and what they would entail is provided in Chapter 4 Construction, Operation, Maintenance and Decommissioning of the Proposed Development (**Document 5.4**). In this assessment the Operational phase is taken to include any maintenance activities for all permanent infrastructure. Decommissioning would likely involve similar works to the construction phase, but at a lesser scale. A summary of the Proposed Development activities/infrastructure and the elements of their construction and maintenance that are of interest to the WFD assessment is provided in Table 5.1. These elements include structural changes to water bodies through the construction of infrastructure within or adjacent to watercourse crossings. There is also the potential for changes to water quality and quantity through excavation of soil, changing surface infiltration and the creation of preferential flow paths both adjacent to water bodies and within their wider catchments. At all phases of the Proposed Development there is a requirement for mobile lifting and heavy plant for the installation and maintenance of infrastructure.

There is a risk of hydrocarbon leakages from heavy plant, however, the risk of leakages would be minimised through regular maintenance and appropriate pollution prevention measures, including interceptors and oil separators.

5.1.7 All temporary works that facilitate the construction of the OHL including access tracks, culverted and bridged watercourse crossings and bellmouths would be installed from 2022 and remain in place for the length of the OHL construction period. The temporary activities/land use would be reinstated to the previous land use following completion of construction. The construction of Pylons would be phased over a three year period, starting at Section A, working across the sections, ending at Section F. More detailed information regarding the phasing and duration of activities is provided in section 2 of Chapter 4 Construction, Operation, Maintenance and Decommissioning of the Proposed Development (**Document 5.4**).

Table 5.1: Proposed Development activities and the WFD

Activity/ Infrastructure	Element of construction/maintenance of interest to the WFD
Access tracks	The access tracks would typically be 4.5 m wide, and up to 9 m wide at passing places, which, coupled with the area between the track and the fence line, gives a maximum swathe of 12 m. They would either be stone laid on a geotextile, or formed of interlocking panels, depending on ground conditions and the duration and type of use. The installation of the access tracks would be undertaken at a rate of approximately 50 m per day per construction gang, although the number of construction gangs has not yet been determined). Access tracks for the tunnel have a higher maximum width of 25 m as shown on Design Plan DCO_DE/PS/11 Sheet 2 of 6 (**Document 4.13**) The THH/CSEC have new permanent access roads. All other access tracks are temporary and would be fully removed following construction of the OHL.
Access track culverted watercourse	Culvert installations are required for temporary access tracks to cross ditches and watercourses. The size of the culvert would vary per crossing

Table 5.1: Proposed Development activities and the WFD	
Activity/ Infrastructure	Element of construction/maintenance of interest to the WFD
crossing	depending on the dimensions of the crossing, sensitivity and importance of the watercourse. Illustrative culvert construction details are shown on Design Plan DCO_DE/PS/11 Sheet 4 of 6 (**Document 4.13**). Consent for the detailed culvert design would be sought from Natural Resources Wales (NRW). To install a culvert, typically the banks are first strimmed at the proposed location of the culvert. Bunds would then be installed upstream and downstream to prevent water from entering the work site, water contained between the two bunds would be pumped downstream to clear the work area. To maintain the flow of the watercourse whilst the culvert is installed, a pump is used to pump water from upstream to downstream, bypassing the work site. The upstream damming would be likely to locally increase water quantity and reduce flow/velocity variability due to the impounding of flow. The total length of watercourse impacted would not be expected to extend beyond 50 m. The bottom of the ditch would be excavated to the size of the proposed foundation and lined with a geotextile separation membrane overlain by bedding material. A geotextile separation membrane would be placed on top of the ditch banks allowing backfilling to commence. The culvert would then be installed. The backfill would be laid to provide minimum cover over the culvert based on maximum loadings. A concrete bag headwall and temporary fencing is subsequently installed after which the bunds upstream and downstream are removed and the over-pumping ceased to allow water to flow through the culvert.

Table 5.1: Proposed Development activities and the WFD	
Activity/ Infrastructure	Element of construction/maintenance of interest to the WFD
	The installation of culverts would take approximately two days per culvert.
Access track bridge watercourse crossing	Where culverts are not suitable for a particular crossing due to either the sensitivity of the watercourse or engineering requirements a temporary bridge would be installed. Illustrative bridge details for tunnel construction are shown on Design Plan DCO_DE/PS/11 Sheet 6 of 6 (**Document 4.13**) and the locations of the bridge crossings are shown on the Figure 4.1 Construction Plans (**Document 5.4.1.1**). All bridges would be clear span and the foundations would be offset back from the banks of the watercourse. The bridge abutments would first be marked out and the ground excavated to the desired level. Where practical, excavated material would be laid and compacted to form the approach ramps to the bridge. A layer of stone would be laid and compacted on top of a geotextile membrane to provide a solid base for the concrete abutments. Shuttering would be delivered and installed inside the excavation, providing the formwork for the concrete abutments. A steel reinforcing cage would then be positioned after which the concrete would be poured. The final foundation design would be dependent on the ground conditions. Once the abutments are cured the temporary bridge can be fitted. Although the installation method is dependent on the type of bridge being installed, a typical bridge would be delivered in sections. Each bridge component would be assembled on site and lifted into position by crane. For the heavy loads involved, additional measures may be required to provide a suitable foundation for the crane and crane

Table 5.1: Proposed Development activities and the WFD	
Activity/ Infrastructure	Element of construction/maintenance of interest to the WFD
	outriggers. Once the bridge is in position, decking panels would be lifted and fixed into position. The installation of each bridge would take up to 15 days.
Pylons (inc cable sealing end platform)	The foundations of the proposed pylons would either be pad and column, mini pile or tube pile; the solution being dependent upon the ground conditions. Typical drawings for the three types of foundation are illustrated on Design Plan DCO_DE/PS/08 Sheet 3 of 3 – Illustrative Lattice Pylon Foundations (**Document 4.13**). The installation of foundations would take up to four weeks for each pylon.
Temporary Working Areas	Temporary working areas would be required to construct individual pylons and string the conductors. Access would also be required to each of these. The topsoil would be removed from working areas and replaced by temporary stone. Temporary working areas would include the following, with the estimated length of time for establishing each site provided in brackets: New Pylon working area: Typically 50 m by 50 m (one week per construction gang). Temporary Pylon Work Area: Typically 40 m by 50 m (one week per construction gang). Existing Pylon Work Area: Typically 40 m by 40 m (one week per construction gang). Existing Pylon Dismantling Area: Typically 50 m by 50 m (one week per construction gang). Conductor Pulling Position: Approximately 23000 m^2 (NB the pulling positions would not be stripped of soil)

Table 5.1: Proposed Development activities and the WFD	
Activity/ Infrastructure	Element of construction/maintenance of interest to the WFD
	Scaffolding: Typically 2000 m^2 (8 m of scaffolding would be installed per day). (NB the scaffolding areas would not be stripped of soil). Bridge working area: Typically in excess of 2000 m^2 (four days).
Construction Compounds (OHL)	The construction compounds would be constructed in the same way, albeit on a much larger scale, as the temporary working areas (above). Topsoil would be excavated and replaced temporarily with a base layer of crushed stone (MOT1 or similar). The OHL Construction Compounds are scheduled for construction over a six month period. They would take approximately three weeks to prepare and install and would remain in place for the duration of the construction phase.
Third Party Assets	In order to construct the Proposed Development it is proposed to modify a number of existing third party services. This would be done by either placing an existing above ground asset underground or re-routeing an existing underground asset. A section of Existing 132 kV OHL is also to be completely removed. Distribution Network Operator (DNO) OHL of Voltages up to and Including 33 kV and British Telecom (BT) Overhead Lines are to be placed underground. This will require a cable trench approximately 300 millimetres (mm) wide and 600 mm deep to be excavated, by use of a mini digger within a working area of up to 1.5 m either side of the trench. Removal of a section of existing 132 kV OHL entails the existing wood poles to be removed generally by excavating down one side of the structure, to allow room for movement, and then part pulling the

Table 5.1: Proposed Development activities and the WFD	
Activity/ Infrastructure	Element of construction/maintenance of interest to the WFD
	structure over and then lifting it out To replace of existing DNO underground 132 kV cables, a trench likely to be 1 m wide and 1 m deep, for the single circuit diversion and 1.5 to 2 m wide for the double circuit diversion would be excavated. The working area would be likely to be up to 10 m wide to include cable trench, top soil storage and access. Where a cable trench needs to cross a watercourse, the depth of the trench would increase to an appropriate depth below the river bed. To maintain the flow of the watercourse whilst the cable trench is installed, a pump is used to pump water from upstream to downstream, bypassing the work site. The upstream damming would be likely to locally increase water quantity and reduce flow/velocity variability due to the impounding of flow. The total length of watercourse impacted would not be expected to extend beyond 50 m. Over pumping for the installation of a crossing is expected for a maximum duration of 2 days. On completion, the original bed and bank material would be reinstated without any additional bank/bed reinforcement. These works would be likely to take between 8 to 12 months.
Tunnel and Shafts	Construction of a tunnel would require the sinking of vertical shafts at each end of the tunnel, to enable access for the subsurface excavation. The tunnel shaft at Braint would be approximately 75 m deep and Tŷ Fodol approximately 95 m deep. Both shafts would have an internal diameter of 15 m. An illustrative shaft cross section is shown on Design Plan DCO_DE/PS/07 Sheet 2 of 2 (**Document 4.13**). The tunnel would have a diameter of 4 m. When passing under the Menai Strait, the tunnel would be

Table 5.1: Proposed Development activities and the WFD	
Activity/ Infrastructure	Element of construction/maintenance of interest to the WFD
	at least 10 m below the bed. Dewatering of the shafts and tunnel would be required during both the construction and operational phase due to ingress of groundwater. The anticipated rates of dewatering are presented and explained in **Document 5.11.2.8** An allowance has been made for 30 m^3/d from each shaft. For the tunnel, the rate of dewatering would depend on the construction method and is summarised below: - TBM total 5 m^3/d - Drill and Blast up to 650 m^3/d from Braint and 250 m^3/d from Ty Fodol prior to break-through, followed by up to 900 m^3/d at Braint after break-through During operation there would be water ingress in to the tunnel requiring dewatering at an estimated rate of 5 m^3/d. Water acquired from all dewatering would be collected and require suitable disposal.
THH/CSEC	The CSECs at Braint and Tŷ Fodol have a proposed plan area of 8,600 m^2. After the access and compound are installed, construction of the foundations for the terminal pylon or gantry and some of the electrical equipment, including the installation of troughs for the underground cables, would be undertaken. The foundations would either be standard concrete foundations or piled foundations. Both CSECs would take approximately 125 days to construct.
Substation upgrades and extensions	At Pentir two small construction compounds would be established at the north-western and south-eastern extents of the proposed extensions these are shown on Design Plan DCO_DE/PS/01 Sheet 4 of 9

Table 5.1: Proposed Development activities and the WFD	
Activity/ Infrastructure	Element of construction/maintenance of interest to the WFD
	(**Document 4.13**) and on the Construction Plans included as Figure 4.1 (**Document 5.4.1.1**). The initial preparatory works would comprise the temporary removal and storage of topsoil and the installation of a temporary stone capping in the substation construction area to provide a clean and stable working platform. An earth grid would be installed below the ground to create an 'earth mat' to make the compound electrically safe. An earth mat consists of a series of copper earth tapes installed below the ground. The substation support structures and electrical equipment would then be erected. The construction works at Pentir Substation would extend over a three year period. Wylfa Substation is located adjacent to the existing Wylfa Nuclear Power Station. No extension is required to the building however items of existing equipment would need to be removed and new equipment installed. A small construction compound would be established within the existing site boundary to the north-east of the existing substation. This is shown on Design Plan DCO_DE/PS/01 Sheet 1 of 9 (**Document 4.13**) and on the Construction Plans included as Figure 4.1 (**Document 5.4.1.1**). The construction works at Wylfa Substation would take approximately 13 months to complete.

5.2 RIVER WATER BODIES

5.2.1 A total of 14 river water bodies have been identified for consideration in this assessment, based on the Study Area presented in Chapter 12 Water Quality, Resources and Flood Risk (**Document 5.12**). These include both reportable and non-reportable water bodies. They are presented individually in Table 1, Annex B **(Document5.12.2.5.B)**, along with a summary of the

type and scale of the associated Proposed Development activities/infrastructure types.

5.2.2 A summary of the scoping conclusions for each of the identified activities / infrastructure types is provided in Table 5.2.

5.2.3 Based on the assessment, 2 of the 14 river water bodies have been completely scoped out from any further assessment. These are the non-reportable water body to the east of Malltraeth Sands and the Afon Cegin, which have been omitted from detailed assessment as the scoping has identified that there is only a limited section of the Order Limits that cross the headwaters of these water bodies. The infrastructure and activities within these water bodies do not carry a significant WFD risk that would warrant an assessment of effects on receptors.

5.2.4 The remaining 12 river water bodies are all considered in more detail within the detailed assessment (section 6) on account of the location of and activities associated with the Proposed Development infrastructure, as summarised in Table 5.2.

Table 5.2 River water body: activity / infrastructure type scoping summary			
Activity / infrastructure type	Scoping criteria	Scoping Result	Explanation
Access tracks	Within Flood Zone C2 or <25 m of any watercourse/drainage channel	In In	Construction/Decommissioning: Potential for pollutants and sediments to reach watercourses via runoff, particularly during flood conditions. Operation/Maintenance: Fuel spills and other track pollutants could reach watercourses particularly in flood conditions, particularly from construction of temporary access tracks, if required for periodic maintenance works during the operational phase.
	Wider WFD Water body Catchment	Out	No direct pathway for construction or operational effects to reach watercourse.
Access track watercourse crossings (culvert and bridge)	All	In	Construction/Decommissioning: Potential for pollutants and sediments to reach watercourses (both the wider river network and mapped WFD principal watercourses[2]) directly from in channel and

[2] The most significant watercourses within the catchment, from which the monitoring and assessment of the status a water body are usually derived.

Table 5.2 River water body: activity / infrastructure type scoping summary			
Activity / infrastructure type	Scoping criteria	Scoping Result	Explanation
		In	river bank changes for watercourse crossings. Alteration to watercourse morphology (culverted access track watercourse crossings). Operation/Maintenance: Fuel spills and other track pollutants could reach watercourses particularly in flood conditions. However, these effects would be very limited due to low frequency of vehicle use. The only access tracks that would remain in situ following the end of construction are the permanent accesses to Braint and Tŷ Fodol THH/CSEC, neither cross any watercourses.
Working areas, including Pylon working areas, scaffolding, conductor pulling positions and bellmouths.	Within Flood Zone C2 or <25 m of any watercourse/drainage channel	In Out	Construction/Decommissioning: Potential for pollutants and sediments to reach watercourses via runoff. Operation/Maintenance: No permanent effects identified as working areas removed after construction complete. Any reinstatement of working areas (e.g. for replacement of conductors) would be removed once maintenance works are complete.
	Wider WFD Water body Catchment	Out	No direct pathway for construction effects to reach watercourse.
Pylons (New, existing, temporary and to be	Within Flood Zone C2 or <25 m of any watercourse/drainage	In	Construction/Decommissioning: Potential for pollutant release and ground disturbance during construction of pylon foundations, including discharge of dewatered groundwater pumped from

Table 5.2 River water body: activity / infrastructure type scoping summary			
Activity / infrastructure type	Scoping criteria	Scoping Result	Explanation
dismantled)	channel	Out	foundation excavations. Operation/Maintenance: No effects on WFD water bodies during operation from pylons.
	Wider WFD Water body Catchment	Out	No direct pathway for construction effects to reach watercourse. No effects on WFD water bodies during operation from pylons.
Conductors	Within Flood Zone C2 or <25 m of any watercourse/drainage channel	Out	No effects during construction or operation as the conductors would be suspended between pylons and any construction/operational activities (e.g. conductor stringing) have been considered under working areas. Operations phase maintenance could require additional access tracks to be laid (considered as part of Access Track category).
	Wider WFD Water body Catchment	Out	No effects during construction or operation as OHL would be suspended above the ground between pylons (maintenance would require access tracks only, which are considered as part of Access Track category).
Third Party services	Within Flood Zone C2 or <25 m of any watercourse/drainage channel	In Out	Construction/Decommissioning: Ground disturbance from excavations would result in the potential for sediment-laden runoff and pollutants to reach watercourses, and possible disruption of existing drainage pathways/the need for altered outfall locations to watercourses.

Table 5.2 River water body: activity / infrastructure type scoping summary			
Activity / infrastructure type	Scoping criteria	Scoping Result	Explanation
			Operation: Maintenance anticipated to be minimal therefore limited opportunity for effects to reach watercourses.
	Wider WFD Water body Catchment	Out	No direct pathway for construction/operation/decommissioning effects to reach watercourses.
Third Party services.	All	In Out	Construction/Decommissioning: Ground disturbance from excavations result in the potential for sediment-laden runoff and pollutants to reach both wider river network and WFD watercourses. Alteration to watercourse morphology associated with trenched underground cable watercourse crossings. Operation: Maintenance anticipated to be minimal for both trenched and HDD crossings therefore limited opportunity for source of effects on watercourses.
Construction Compounds	Within Flood Zone C2 or <25 m of any watercourse/drainage channel	In Out	Construction/Decommissioning: Potential for pollutants and sediments to reach watercourses. Operation: No effects identified as compounds would be removed after construction.
	Wider WFD Water body Catchment	Out	No direct pathway for construction effects to reach watercourse. No effects identified during operation as result of Proposed Development

Table 5.2 River water body: activity / infrastructure type scoping summary			
Activity / infrastructure type	Scoping criteria	Scoping Result	Explanation
			element as areas removed after construction complete.
CSECs	Within Flood Zone C2 or <25 m of any watercourse/drainage channel	In Out	Construction/Decommissioning: Dewatering and ground disturbance from excavations have potential for pollutants and sediment-laden runoff to enter watercourses. Operation/Maintenance: No effects anticipated on water bodies as any new hard standing surface drainage at each site would be discharged to a receiving watercourse at the agreed flow rate and water quality.
	Wider WFD Water body Catchment	In Out	Construction/Decommissioning: Dewatering and ground disturbance from excavations have potential for pollutants and sediment-laden runoff to enter watercourses. Operation/Maintenance: No effects anticipated on water bodies as any new hard standing surface drainage at each site would be discharged to a receiving watercourse at the agreed flow rate and water quality.
Tunnelling, Tunnel, THHs, and shafts	All	In	Construction/Decommissioning: Dewatering and ground disturbance from shaft and tunnelling activities has the potential for pollutants, including saline water, and sediment-laden runoff to enter watercourses. Also a potential for alterations to flow regime in

Table 5.2 River water body: activity / infrastructure type scoping summary			
Activity / infrastructure type	Scoping criteria	Scoping Result	Explanation
		Out	receiving watercourse/s if dewatered groundwater is discharged to the watercourse network. Operation/Maintenance: No effects anticipated on water bodies as any hardstanding surface drainage effects are not likely to result in any measurable change to receiving watercourse flow regime and water quality.
	Wider WFD Water body Catchment	In Out	Construction/Decommissioning: Dewatering and ground disturbance from shaft and tunnelling activities has potential for pollutants and sediment-laden runoff to enter watercourses. Operation/Maintenance: No effects anticipated on water bodies as any hardstanding surface drainage effects are not likely to result in any measurable change to receiving watercourse flow regime and water quality.
Substation (Extensions)	Within Flood Zone C2 or <25 m of any watercourse/drainage channel	In Out	Construction/Decommissioning: Dewatering and ground disturbance from excavations have potential for pollutants and sediment-laden runoff to enter watercourses. Operation/Maintenance: No effects anticipated on water bodies as any hardstanding surface drainage effects or pollutants are not likely to result in any measurable change to receiving watercourse flow regime and water quality.

Table 5.2 River water body: activity / infrastructure type scoping summary			
Activity / infrastructure type	Scoping criteria	Scoping Result	Explanation
	Wider WFD Water body Catchment	Out	No effects anticipated on water bodies as any hardstanding surface drainage effects are not likely to result in any measurable change to receiving watercourse flow regime and water quality.

5.3 LAKE WATER BODIES

5.3.1 Two WFD lake water bodies have been identified for consideration in this assessment based on the Study Area presented in ES Chapter 12 Water Quality, Resources and Flood Risk (**Document 5.12**).

5.3.2 Consideration of the lake water bodies for the scoping assessment is provided in Table 5.3. Cefni Reservoir is considered to be of sufficient distance from the Order Limits to have limited potential for hydrological connectivity with activities associated with the Proposed Development infrastructure types. However, Llyn Alaw is within sufficient proximity to the Order Limits to be taken forward for detailed assessment in Section 6. The activities scoped in are the same as for the river water body assessment where there is a potential to influence Llyn Alaw. There are no Proposed Development activities within 0.7 km of the lake waterbody.

Table 5.3: Lake water bodies considered for scoping

Lake water body	Distance from the Order Limits	Explanation
Llyn Alaw	<0.7 km	Scoped in due to proximity to Order Limits and the potential for effects to propagate to the water body.
Cefni Reservoir	>2.4 km	Scoped out due to distance from the Order Limits and the effects of dilution within upstream catchment, resulting in no potential for effects on the Cefni Reservoir water body.

5.4 GROUNDWATER BODIES

5.4.1 Four WFD groundwater bodies have been identified for consideration in this assessment as they are intersected by the Order Limits.

5.4.2 The Proposed Development activities/infrastructure types located within each groundwater water body are presented in Annex B **(Document 5.12.2.5.B)**.

Activity scoping assumptions for groundwater bodies

5.4.3 The assumptions made in developing the scoping methodology/process for groundwater bodies, in terms of which activities are scoped, include:

- Only significant activities / infrastructure that potentially have a direct connection to the groundwater bodies are included. This includes the construction, operation, maintenance and decommissioning of the shafts and tunnel, culverted and trenched watercourse crossings;
- Any activities/infrastructure that require shallow foundations and shallow/limited potential for dewatering are scoped out. This includes but is not limited to, temporary working areas, pylons, bridges, and construction compounds. It is assumed any dewatered arisings would be disposed of locally via soakaways or to an adjacent watercourse, therefore having a neutral effect on water body water balance, as set out in the UKTAG guidance (Ref 11); and
- The mitigation measures associated with construction activities that are scoped out in the assessment of groundwater bodies are, however, discussed within the assessment of the surface water bodies. These measures are assumed to protect the groundwater bodies from any potential water quality impacts.

5.4.4 A summary of activities scoped in for detailed assessment of groundwater WFD water bodies is provided below in Table 5.4.

5.4.5 All four groundwater bodies intersected by the Proposed Development are scoped in for detailed assessment and are all considered within the detailed assessment (section 6).

Table 5.4 Groundwater water body: activity / infrastructure type scoping summary		
Activity / infrastructure type	Scoping Result	Explanation
Culverted access track watercourse crossings	In Out	Construction/Decommissioning: Potential for a pollution pathway to be created through the construction of culverts and through interactions between groundwater and surface waters during construction in river stretches losing flow to the ground. Operation/Maintenance: There would be no groundwater effect between the infrastructure and groundwater bodies during the operational phase (including maintenance activities) due to the lack of intrusive works.
Third Party services.	In Out	Construction/Decommissioning: Potential for a pollution pathway to be created through the construction of culverts and through interactions between groundwater and surface waters during construction in river stretches losing flow to the ground. Operation/Maintenance: There would be no groundwater effect between the infrastructure and groundwater bodies during the operational phase due to the lack of intrusive works.
Tunnelling, tunnel, THHs and shafts	In	Construction/Decommissioning: Dewatering and ground disturbance for excavation of the shafts and construction of the foundations has the potential to reduce groundwater levels and cause inter-related effects between discharged groundwater during dewatering and the quantity (flooding) and quality of receiving surface waters.

Table 5.4 Groundwater water body: activity / infrastructure type scoping summary		
Activity / infrastructure type	Scoping Result	Explanation
	In	Operation/Maintenance: Possible changes to water connectivity between surface water and ground waters due to dewatering of tunnels and shafts. Depending on the salinity of the water there are two options, dilution and discharge to surface water, or should the arisings be too saline, removal of saline water from site via tanker for appropriate disposal.

5.5 TRANSITIONAL (ESTUARINE) AND COASTAL WATER BODIES

5.5.1 No Transitional water bodies have been identified as having any potential to be impacted by the Proposed Development.

5.5.2 Two WFD Coastal water bodies, Anglesey North and Menai Strait, have been identified for consideration in this assessment (Annex A **(Document 5.12.2.5.A**)). The identified Coastal water bodies either:

- Have inflowing river water bodies that could be impacted by the Proposed Development; or
- Have proposed activities/infrastructure types located within/beneath them;

5.5.3 There would be no direct works within the marine environment (i.e. infrastructure that is constructed below Mean High Water Spring (MHWS) tides). The tunnel would be constructed at least 10 m below the Menai Strait water body but would not directly impact the physical environment of the Strait. There is a very low probability of blow out of drilling fluid during tunnelling activities during construction, which could impact the Marine environment in the Menai Strait. This is discussed within the detailed assessment of the Menai Strait coastal water body.

5.5.4 Effects associated with activities that would be situated in upstream hydrologically connected river water bodies are considered in the river water body section. Such activities are presented in Table 5.2. The limited number of effects from a river water body that may transmit to any downstream coastal water body are considered in the detailed assessment of each river water body.

5.5.5 The Anglesey North coastal water body would not be directly impacted by the Proposed Development, i.e. no infrastructure is proposed to be constructed within it. Therefore, it is referred to within the detailed assessment of its upstream river water bodies (Wygyr, Goch Dulas and Lligwy) that do include Proposed Development infrastructure.

5.5.6 Both coastal water bodies potentially impacted by the Proposed Development are scoped in and so are considered in more detail within the detailed assessment presented in section 6.

5.6 PROTECTED AREAS

5.6.1 Consideration must also be given to protected areas that are designated under European legislation. These areas are protected because of their

importance for purposes such as, drinking water supply, bathing or wildlife conservation. The scoping assessment has identified seven protected areas as potentially being impacted by the Proposed Development including drinking waters (Protected under the WFD - 2000/60/EC; Ref 12.1), bathing waters (Bathing Water Directive - 2006/7/EC; Ref 12.14) and Natura 2000 protected areas (Habitats Directive - 92/43/EEC; Ref 12.15).

5.6.2 There are three drinking water protected areas that would potentially be affected by the Proposed Development. These include:

- Llyn Alaw;
- Cefni Reservoir; and
- Ceint to Cefni Reservoir catchment area.

5.6.3 The Cefni Reservoir WFD water body was scoped out of the detailed assessment on account of the distance from the Order Limits to the receptor and the effects of dilution within upstream catchment (section 5.3). Therefore, the Cefni Reservoir Drinking Water Protected Area is also scoped out of the detailed assessment. The other two Drinking Water Protected Areas are scoped in.

5.6.4 The EU Designated bathing waters that have a potential connection to the Proposed Development are:

- Cemaes Bay at the north of Anglesey into which the Afon Wygyr discharges is currently assessed as Poor; and
- Traeth Lligwy to the north-east of Anglesey into which the Lligwy discharges is currently assessed as Excellent.

5.6.5 The Natura 2000 areas include three SACs, which are:

- Corsydd Môn/ Anglesey Fens SAC, which consists of a number of wetlands that include the Cors Erddreiniog National Nature Reserve;
- Y Fenai a Bae Conwy/ Menai Strait and Conwy Bay SAC; and
- Glannau Môn: Cors heli / Anglesey Coast: Saltmarsh SAC.

5.6.6 The effects that originate in a river water body and may transmit to a downstream SAC are considered in the detailed assessment stage within the associated river water body:

- The Anglesey Fens SAC is discussed in section 6.3 in relation to Ceint to Cefni reservoir water body (GB110102058770).
- The Menai Strait and Conwy Bay SAC is discussed in section 6.3 in relation to the Braint upper water body (GB110102058690) and the Nant-y-garth water body (GB110065058490).

5.6.7 The Glannau Môn: Cors heli/Anglesey Coast: Saltmarsh SAC is not considered within the detailed assessment due to distance from the Proposed Development (approximately 10 km); it was also screened out of the HRA as no effect pathway was identified.

5.6.8 All of the EU designated protected sites are considered within the detailed assessment process as a component of the WFD water body that they fall within.

6 Detailed assessment results

6.1 STRUCTURE OF THE DETAILED ASSESSMENT

6.1.1 As the design of the Proposed Development, in many cases, would not vary significantly from water body to water body, the approach adopted here provides one assessment for each activity/infrastructure type per water body category (i.e. river, coastal, transitional, groundwater). These generic assessments are provided in Annex C **(Document 5.12.2.5.C)**. Based on the scoping assessment presented in Section 5, those water bodies that have been identified as not requiring detailed assessment are not considered here. Pertinent CEMP measures and their relevance to effects associated with WFD elements for river water bodies are provided in Table 6.1.

6.1.2 In addition, and in order to fully address the nuances associated with each individual water body, Table 6.2 to Table 6.18 provide an overview of any site-specific considerations that need to be taken into account. This includes consideration of both the WFD requirement for no deterioration in WFD class and the need to ensure the Proposed Development does not prevent achievement of future target status through effects on water body specific improvement actions.

6.2 THE ROLE OF ENVIRONMENTAL MITIGATION MEASURES ASSOCIATED WITH THE PROPOSED DEVELOPMENT

6.2.1 The scoping of activities/infrastructure types that was undertaken and explained in section 5 did not include consideration of any mitigation measures that would be implemented as part of the Proposed Development. However, in practice, a range of measures would be incorporated in order to manage any potential effects on the water environment to an acceptable level. A full description of these measures is provided in section 9 of Chapter 12 Water Quality, Resources and Flood Risk (**Document 5.12**). Furthermore, the mitigation measures to be incorporated into the construction phase of the Proposed Development are presented in the Construction Environment Management Plan (CEMP; **Document 7.4**). The degree to which the measures would manage effects associated with WFD elements are summarised in Table 6.1 but, in combination, they are considered sufficient to manage all potential effects to an acceptable level such that the Proposed Development would comply with the objectives of

the WFD. Effects on biological quality elements are almost exclusively associated with changes to the hydromorphology and/or water quality of a watercourse, therefore, they are not separately considered in Table 6.1.

Table 6.1 CEMP Measures and their relevance to effects associated with WFD elements for river water bodies.		
WFD Element	Potential effect on WFD element	Incorporated measure to manage potential effect – For full description see the CEMP (**Document 7.4**).
Hydromorphology	Alteration of flow regime – direct – via input to watercourses	WE31: Standoff distances from watercourses WE41-43: Groundwater and dewatering discharges WE51-56: Drainage management WE57-58 Cors Erddreiniog drainage management WE59-WE511: Tunnel construction FM12: Flood Risk Activities Permit or Ordinary Watercourse Consent FM13: Structures in the floodplain FM14: Design and installation of watercourse crossings
Hydromorphology	Alteration of flow regime – indirect via changes within the catchment	FM13: Structures in the floodplain WE41-43: Groundwater and dewatering discharges WE51-56: Drainage management WE59-WE511: Tunnel construction
Hydromorphology	Alteration of channel morphology	FM12: Flood Risk Activities Permit or Ordinary Watercourse Consent FM14: Design and installation of watercourse crossings

Table 6.1 CEMP Measures and their relevance to effects associated with WFD elements for river water bodies.		
WFD Element	Potential effect on WFD element	Incorporated measure to manage potential effect – For full description see the CEMP (**Document 7.4**).
		WE56: Field drain management
Chemical and Physico-chemical	Mobilisation of sediment or contaminated sediment / material in the catchment that has the potential to enter the watercourse network. Introduction and/or mobilisation of sediment or contaminated sediment / material within the channel that has the potential to be transported downstream	FM13: Structures in the floodplain FM14: Design of watercourse crossings WE21-23: Pollution control WE31: Stand-off distances from watercourses WE41-42: Groundwater and dewatering discharges WE43: Environmental Permit for water discharge activity WE51-54: Drainage strategies WE55: Soil stockpile management WE56: Field drain management WE59-511: Tunnel management

6.3 SURFACE WATER BODIES

Introduction

6.3.1 This section provides a summary of the detailed assessment based on Proposed Development activities for all surface water bodies (including non-reportable water bodies adjacent to the coast) that were scoped in during Stage 4.

6.3.2 WFD water body baseline conditions are presented in Annex A **(Document 5.12.2.5.A)**. The activities/infrastructure types proposed to be located within each water body (i.e. those that include activities/infrastructure types scoped in for further assessment) are presented in Annex B **(Document 5.12.2.5.B)** (Table 1). The scoping of these activities/infrastructure types is presented in Table 6.2 to 6.14.

6.3.3 The detailed assessment of the activities/infrastructure types that have been scoped in has taken into consideration the measures identified in Table 6.1.

Non reportable WFD Water body adjacent to the Irish Sea

6.3.4 Based on the results of the scoping assessment (section 5), proposed activities associated with the activity types within Table 6.2 may pose a risk to the WFD status and objectives in this water body. A summary of the detailed assessment for the water body, taking account of the measures in Table 6.1, is provided in Table 6.2 below and the full results for each of the Proposed Development activity/infrastructure types are presented in Annex C **(Document 5.12.2.5.C)**.

Table 6.2 Summary of the results of the detailed assessment for the river water body adjacent to the Irish Sea.

Infrastructure element scoped in	Total number/length, scoped in for further assessment	Summary of the detailed assessment (based on the assessment presented in Annex C **(Document 5.12.2.5.C**)
Access Tracks* Access track watercourse	0.1 km 1 x bridge 1 x culvert	The assumptions for the construction of infrastructure activities are provided in Table 5.1. Annex C **(Document 5.12.2.5.C)** provides a comprehensive summary of the

Table 6.2 Summary of the results of the detailed assessment for the river water body adjacent to the Irish Sea.		
Infrastructure element scoped in	Total number/length, scoped in for further assessment	Summary of the detailed assessment (based on the assessment presented in Annex C **(Document 5.12.2.5.C**)
crossings		effects of these activities/infrastructure on each WFD classification element. The mitigation measures presented in Table 6.1 would be sufficient to ensure that any effects would not lead to deterioration in WFD status for any stage of the Proposed Development.
working areas	1 x Conductor pulling positions 2 x Pylon (New) 2 x Pylon (Existing)	
Pylons	2 (New)	

*Length of access track within Flood Zone C2 or within 25 m of water body

Achievement of WFD target status

6.3.5 This water body is a non-reportable water body, therefore there is no baseline assessment for this water body on which to improve. Nor is there an RBMP objective for this water body to achieve.

WFD deterioration

6.3.6 The measures identified in Table 6.1 are considered to be sufficient to avoid any effects on the delivery of the no deterioration WFD objective.

Cross water body effects

6.3.7 This non-reportable water body discharges to the Anglesey North coastal water body at Cemaes Bay, a designated protected bathing water (ID 40050). Incorporation of the measures presented in Table 6.1 has been deemed sufficient for removing the sources of any adverse effects (during all phases of the Proposed Development) to the upstream water body, therefore, the potential to exacerbate the Cemaes Bay bathing water quality issues have been mitigated. All residual effects are considered to be negligible in relation to the scale of both the source of effect and the receiving Cemaes Bay water body. The Proposed Development would not

impact the WFD measures for reducing bacterial inputs and improving the bathing water status of Cemaes Bay.

Conclusions

6.3.8 Incorporation of the mitigation measures presented in Table 6.1 would largely remove the sources of any adverse effects (during all phases of the Proposed Development) that may have the potential to cause deterioration in WFD status. All residual effects are considered to be negligible in relation to the scale of both the source of effect and the receiving WFD water body as a whole. Therefore, in the case of the non-reportable WFD Water body adjacent to the Irish Sea, the Proposed Development is considered to be compliant with the objectives of the WFD.

Afon Wygyr (GB110102059170)

6.3.9 Based on the results of the scoping assessment (section 5), proposed activities associated with the infrastructure types within Table 6.3 may pose a risk to the WFD status and objectives in this water body. A summary of the detailed assessment for the Wygyr water body, taking account of the measures identified in Table 6.1, is provided in Table 6.3 below and the full results for each of the Proposed Development activity/infrastructure types are presented in Annex C **(Document 5.12.2.5.C**. The Order Limits within this water body catchment cover a total area of 0.89 km^2 or 3.3% of the total catchment area. However, the footprint of construction would be much smaller than this; the Order Limits provide the overall boundary for the Proposed Development, but only a small amount of the area within the Order Limits would actually be affected by new infrastructure.

Table 6.3 Summary of the results of the detailed assessment for the Afon Wygyr water body.

Infrastructure element scoped in	Total number / length scoped in for further assessment	Summary of the detailed assessment (based on the assessment presented in Annex C **(Document 5.12.2.5.C**)
Access Tracks* Access track watercourse crossings	1 km 3 x bridge 11 x culvert	The assumptions for the construction of infrastructure activities are provided in Table 5.1. Annex C **(Document 5.12.2.5.C** provides a

Table 6.3 Summary of the results of the detailed assessment for the Afon Wygyr water body.		
Infrastructure element scoped in	Total number / length scoped in for further assessment	Summary of the detailed assessment (based on the assessment presented in Annex C **(Document 5.12.2.5.C**)
working areas	2 x Conductor pulling positions 3 x Pylon (New) 4 x Pylon (Existing) 2 x Scaffolding	comprehensive summary of the effects of these activities/infrastructure on each WFD classification element. The measures presented in Table 6.1 would be sufficient to ensure that any effects would not lead to deterioration in WFD status for any stage of the Proposed Development.
Pylons	2 x Existing 2 x New	
Undergrounded Third Party infrastructure -	140 m 1 x trenched watercourse crossing	

*Length of access track within Flood Zone C2 or within 25 m of water body

Achievement of WFD target status

6.3.10 This water body is currently attaining Moderate WFD status, with a target of achieving Good by 2021 (Table 1, Annex A **(Document 5.12.2.5.A**). The physico-chemical status was assessed as being less than Good as a result of Phosphate levels. It is considered that the Proposed Development would have no effects on the measures to address phosphate failure and work to reduce bacterial inputs to improve the downstream bathing water status at Cemaes Bay, to which the Wygyr discharges. The proposed WFD measures include river walkovers, riparian fencing, reducing livestock access, farm visits to provide advice and guidance to homeowners on septic tank awareness/maintenance. The Proposed Development would not introduce any new activities that would preclude these measures being carried out.

WFD deterioration

6.3.11 The measures identified in Table 6.1 are considered to be sufficient to avoid any effects on the delivery of the no deterioration WFD objective.

Cross-water body effects

6.3.12 The Wygyr river catchment water body discharges to the Anglesey North coastal water body at Cemaes Bay (ID 40050), which is also a designated protected bathing water. Incorporation of the measures presented in Table 6.1 has been deemed sufficient for removing the sources of any adverse effects (during all phases of the Proposed Development) to the upstream WFD Afon Wygyr water body. Therefore, the potential to exacerbate the Cemaes Bay bathing water quality issues, approximately 1.9 km downstream, has been fully mitigated. All residual effects are considered to be negligible in relation to the scale of both the source of effect and the receiving Cemaes Bay water body. The Proposed Development would not impact the WFD measures for reducing bacterial inputs and improving the bathing water status of Cemaes Bay.

Conclusions

6.3.13 Incorporation of the measures presented in Table 6.1 would largely remove any sources of adverse effects (during all phases of the Proposed Development) that may have had the potential to cause deterioration in WFD status. All residual effects are considered to be negligible in relation to the scale of both the source of effect and the receiving WFD Wygyr water body as a whole. Furthermore, the Proposed Development would not preclude or conflict with any planned actions to improve the water body to Good status. Therefore, in the case of the Wygyr water body, the Proposed Development is considered to be compliant with the objectives of the WFD.

Alaw - upstream Llyn Alaw (GB110102058982)

6.3.14 Based on the results of the scoping assessment (section 5), proposed activities associated with the infrastructure types within Table 6.4 may pose a risk to the WFD status and objectives in this water body. A summary of the detailed assessment for the Alaw (upstream Llyn Alaw) water body, taking account of the measures identified in Table 6.1, is provided in Table 6.4 and the full results for each of the Proposed Development activity/infrastructure types are presented in Annex C **(Document 5.12.2.5.C**. The Order Limits within this water body catchment covers a total area of 0.67 km^2 or 2% of the total catchment area. During the construction phase, the surface area of all access tracks, working areas, culverts and

trenches for third party infrastructure within the Order Limits is estimated to be 0.45 km^2, or 1.4% of the total catchment area.

Table 6.4 Summary of the results of the detailed assessment for Alaw river water body.

Infrastructure element scoped in	Total number / length scoped in for further assessment	Summary of the detailed assessment (based on the assessment presented in Annex C **(Document 5.12.2.5.C**)
Access Tracks* Access track watercourse crossings	0.73km 1 x bridge 5 x culvert	The assumptions for the construction of infrastructure activities are provided in Table 5.1. Annex C **(Document 5.12.2.5.C)** provides a comprehensive summary of the effects of these activities/infrastructure on each WFD classification element. The mitigation measures presented in Table 6.1 would be sufficient to ensure that any effects would not lead to deterioration in WFD status for any stage of the Proposed Development.
Working areas	6 x Conductor pulling positions 7 x Pylon (New) 3 x Pylon (Dismantling) 1 x Pylon (Temporary) 8 x Scaffolding	
Pylons	3 x New 1 x Temporary 3 x Dismantling	
Undergrounded Third Party infrastructure -	0.2km 4 x trenched watercourse crossings	

*Length of access track within Flood Zone C2 or within 25 m of water body

Achievement of WFD target status

6.3.15 This water body is currently achieving Good status (Table 1, Annex A **(Document 5.12.2.5.A**). Therefore there is no requirement (or associated actions) for this water body to achieve an improvement in WFD status. The focus for this detailed assessment has been to understand any potential for deterioration in current WFD class.

WFD deterioration

6.3.16 The activities listed in Table 6.4 show that there are a large number of activities in close proximity to the watercourses (<25 m of watercourse or FZ 3). However, the only in-channel works with the potential to impact river morphology are the culverted access track watercourse crossings and trenched third party infrastructure watercourse crossings. All other activities have been scoped in, not because of potential direct effects, but because they have the potential to deliver sediment to the watercourse if flow pathways are not managed. Of the approximately 0.73 km of access track within proximity of the watercourses, approximately 0.3 km is parallel and within 10 m of a ditch to the west of the Garreg Wen Estate at the south of Rhosybol. A distance of 10 m is, however, considered sufficient to implement the measures in Table 6.1 such that there would be no effects on WFD water body status in this water body.

Cross-water body effects

6.3.17 Downstream of the Order Limits in this catchment is the Llyn Alaw WFD lake water body (GB31032538), a protected drinking water reservoir. The Llyn Alaw water body and its associated drinking water protection are considered in more detail in the following section. However, it follows that as the mitigation measures in Table 6.1 would be sufficient to avoid deterioration in the upstream water body, that there would be no effects on WFD objectives in the downstream water body.

Conclusions

6.3.18 Incorporation of the measures presented in Table 6.1 would largely remove the sources of any adverse effects (during all phases of the Proposed Development) that may have the potential to cause deterioration in WFD status. All residual effects are considered to be negligible in relation to the scale of both the source of effect and the receiving WFD Alaw (upstream Llyn Alaw) water body as a whole. Therefore, in the case of the Alaw (upstream Llyn Alaw) water body, the Proposed Development is considered to be compliant with the objectives of the WFD.

Llyn Alaw (GB31032538)

6.3.19 The Llyn Alaw reservoir drains a single WFD water body catchment, Alaw (upstream Llyn Alaw). There are no Proposed Development activities within 25m of the lake water body. The Order Limits are approximately 0.6 km upstream of the lake at their closest point. However, approximately 3.25 km^2, or 10 %, of the Alaw river catchment (33.22km^2) lies upstream of the Order Limits and the Order Limits within this upstream water body catchment cover a total area of 0.67 km^2 or 2% of the total catchment area. However, the footprint of construction would be smaller than this; the Order Limits provide the overall boundary for the Proposed Development, not the area that would actually be directly affected.

Achievement of WFD target status

6.3.20 This water body is currently designated as having Moderate overall WFD status (Table 3, Annex A **(Document 5.12.2.5.A**), with an objective to achieve Good status by 2021. The Ecological status was assessed as being less than good with expert judgment, a lack of mitigation measures and total phosphorus listed as failing elements.

WFD deterioration

6.3.21 The WFD objectives in the upstream water body, Alaw (GB110102058982), have been assessed as being uncompromised by the Proposed Development. Therefore, coupled with the fact there is no infrastructure located within the boundary of this water body, it can be concluded that there would be no effect on WFD status.

Cross-water body effects

6.3.22 The Llyn Alaw water body is downstream of the Order Limits, and a maximum of 12% of the Llyn Alaw upstream catchment drains through the Order Limits. It was concluded that the measures as summarised in Table 6.1 would be sufficient to ensure no deterioration to the Alaw (upstream Llyn Alaw) water body status. The interaction with the downstream Llyn Alaw water body would naturally be even less significant given the increased distance and dilution.

6.3.23 Furthermore, the construction work is not continuous throughout the programme, but is undertaken in shorter ‘bursts’ as each element of works takes place, meaning the aggregate time works are being undertaken is considerably shorter than the overall construction programme. There would, therefore, be no significant residual impact from construction activities.

Conclusions

6.3.24 Incorporation of the measures presented in Table 6.1 would largely remove the sources of any adverse effects (during all phases of the Proposed Development) in the upstream catchment that may have the potential to cause deterioration in WFD status of Llyn Alaw. There are no direct impacts to the water body, with the Order Limits being at least 0.6km upstream of the water body boundary. All residual effects are considered to be negligible in relation to the scale of both the source of effect and the receiving, WFD, Llyn Alaw water body as a whole. Therefore, in the case of the Llyn Alaw, the Proposed Development is considered to be compliant with the objectives of the WFD and would not impair the achievement of Good status by 2021.

Goch Dulas (GB110102059000)

6.3.25 Based on the results of the scoping assessment (section 5), proposed activities associated with the infrastructure types within Table 6.5 may pose a risk to the WFD status and objectives in this water body. A summary of the detailed assessment for the Goch Dulas water body, taking account of mitigation measures identified in Table 6.1, is provided in Table 6.5 and the full results for each of the Proposed Development activity/infrastructure types are presented in Annex C **(Document 5.12.2.5.C)**. The Order Limits within this water body catchment covers a total area of 0.78 km^2 or 2.7% of the total catchment area. However, the footprint of construction would be smaller than this; the Order Limits provide the overall boundary for the Proposed Development, not the area that would actually be directly affected.

Table 6.5 Summary of the results of the detailed assessment for the Goch Dulas water body.

Infrastructure element scoped in	Total number / length, scoped in for further assessment	Summary of the detailed assessment (based on the assessment presented in Annex C **(Document 5.12.2.5.C**)
Access Tracks* Access track watercourse crossings	1.76km 2 x bridge 3 x culvert	The assumptions for the construction of infrastructure activities are provided in Table 5.1. Annex C **(Document 5.12.2.5.C** provides a comprehensive summary of the effects of these
Working Areas	4 x Conductor pulling	

Table 6.5 Summary of the results of the detailed assessment for the Goch Dulas water body.		
Infrastructure element scoped in	Total number / length, scoped in for further assessment	Summary of the detailed assessment (based on the assessment presented in Annex C **(Document 5.12.2.5.C**)
	positions 4 x Pylon (New) 3 x Pylon (Existing)	activities/infrastructure on each WFD classification element. The mitigation measures presented in Table 6.1 would be sufficient to ensure that any effects would not lead to deterioration in WFD status for any stage of the Proposed Development.
Pylons	4 x New 2 x Existing	
Undergrounded Third Party infrastructure -	0.52 km 2 x trenched watercourse crossings	

Achievement of WFD target status

6.3.26 This water body is currently designated as having Moderate overall WFD status (Table 1, Annex A **(Document 5.12.2.5.A**), with an objective to achieve Good status by 2021. The ecological status was assessed as being less than good with zinc and phosphorus highlighted as the failing elements.

WFD deterioration

6.3.27 The measures provided in Table 6.1 are considered to be sufficient to avoid any deterioration in WFD status.

Cross-water body effects

6.3.28 The Goch Dulas WFD river catchment drains north to the Anglesey North coastal water body. Given the significant size and volume of this coastal water body, the impact of any Proposed Development activities transmitting to this downstream water body are highly unlikely given the effects of distance (approximately 7 km) and dilution.

Conclusions

6.3.29 Incorporation of the measures presented in Table 6.1 would largely remove the sources of any adverse effects (during all phases of the Proposed Development) that may have the potential to cause deterioration in WFD status. All residual effects are considered to be negligible in relation to the scale of both the source of effect and the receiving, WFD, Goch Dulas water body as a whole. Therefore, in the case of the Goch Dulas water body, the Proposed Development is considered to be compliant with the objectives of the WFD.

Cefni reservoir west (GB110102058790)

6.3.30 Based on the results of the scoping assessment (section 5), proposed activities associated with the infrastructure types within Table 6.6 may pose a risk to the WFD status and objectives in this water body. A summary of the detailed assessment for the Cefni reservoir west water body, taking account of the mitigation measures identified in Table 6.1, is provided in Table 6.6 below and the full results for each of the Proposed Development activity/infrastructure types are presented in Annex C **(Document 5.12.2.5.C)**. The Order Limits within this water body catchment covers a total area of 0.14 km^2 or 0.5% of the total catchment area. However, the footprint of construction would be smaller than this; the Order Limits provide the overall boundary for the Proposed Development, not the area that would actually be directly affected.

Table 6.6 Summary of the results of the detailed assessment for the Cefni reservoir west water body.

Infrastructure element scoped in	Total number / scoped in for further assessment	Summary of the detailed assessment (based on the assessment presented in Annex C **(Document 5.12.2.5.C**)
Access Tracks*	0.05 km	The assumptions for the construction of infrastructure activities are provided in Table 5.1. Annex C **(Document 5.12.2.5.C)** provides a comprehensive summary of the effects of these activities/infrastructure on each WFD classification element.
Working areas	1 x Pylon (New)	
Undergrounded	0.04 km	

Table 6.6 Summary of the results of the detailed assessment for the Cefni reservoir west water body.		
Infrastructure element scoped in	Total number / scoped in for further assessment	Summary of the detailed assessment (based on the assessment presented in Annex C **(Document 5.12.2.5.C**)
Third Party infrastructure -		The mitigation measures presented in Table 6.1 would be sufficient to ensure that any effects would not lead to deterioration in WFD status for any stage of the Proposed Development.

*Length of access track within Flood Zone C2 or within 25 m of water body

Achievement of WFD target status

6.3.31 This water body is currently achieving Good status (Table 1, Annex A **(Document 5.12.2.5.A**)). Therefore, there is no requirement (or associated actions) for this water body to achieve an improvement in WFD status. The focus for this detailed assessment has been to understand any potential for deterioration in current WFD class.

WFD deterioration

6.3.32 The measures provided in Table 6.1 are considered to be sufficient to avoid any deterioration in WFD status of the water body.

Cross-water body effects

6.3.33 This water body drains to the Cefni reservoir, a WFD lake water body. The Cefni lake water body was scoped out due to the distance from the Order Limits.

Conclusions

6.3.34 Incorporation of the measures presented in Table 6.1 would largely remove the sources of any adverse effects (during all phases of the Proposed Development) that may have the potential to cause deterioration in WFD status (Table 6.6). All residual effects are considered to be negligible in

relation to the scale of both the source of effect and the receiving, WFD, Cefni reservoir west water body as a whole. Therefore, in the case of the Cefni reservoir west water body, the Proposed Development is considered to be compliant with the objectives of the WFD.

Lligwy (GB110102059070)

6.3.35 Based on the results of the scoping assessment (section 5), proposed activities associated with the infrastructure types within Table 6.7 may pose a risk to the WFD status and objectives in this water body. A summary of the detailed assessment for the Lligwy water body, taking account of measures identified in Table 6.1, is provided in Table 6.7 below and the full results for each of the Proposed Development activity/infrastructure types are presented in Annex C **(Document 5.12.2.5.C)**. The Order Limits within this water body catchment covers a total area of 0.12 km^2 or 1.2% of the total catchment area. However, the footprint of construction would be smaller than this; the Order Limits provide the overall boundary of the Proposed Development, not the area that would be directly affected.

Table 6.7 Summary of the results of the detailed assessment for the Lligwy river water body.

Infrastructure element scoped in	Total number scoped in for further assessment	Summary of the detailed assessment (based on the assessment presented in Annex C **(Document 5.12.2.5.C**)
Working areas	1 x Conductor pulling position 1 x Pylon (New)	The assumptions for the construction of infrastructure activities are provided in Table 5.1. Annex C **(Document 5.12.2.5.C)** provides a comprehensive summary of the effects of these activities/infrastructure on each WFD classification element. The mitigation measures presented in Table 6.1 would be sufficient to ensure that any effects would not lead to deterioration in WFD status for any stage of the Proposed

Table 6.7 Summary of the results of the detailed assessment for the Lligwy river water body.		
Infrastructure element scoped in	Total number scoped in for further assessment	Summary of the detailed assessment (based on the assessment presented in Annex C **(Document 5.12.2.5.C**)
		Development.

Achievement of WFD target status

6.3.36 This water body is currently achieving Good status (Table 1, Annex A **(Document 5.12.2.5.A**)). Therefore there is no requirement (or associated actions) for this water body to achieve an improvement in WFD status. The focus for this detailed assessment has been to understand any potential for deterioration in current WFD class.

WFD deterioration

6.3.37 The measures provided in Table 6.1 are considered to be sufficient to avoid any effects on the delivery of the no deterioration WFD objective.

Cross-water body effects

6.3.38 The Lligwy river catchment drains north to the Anglesey North WFD coastal water body (GB641010620000), coinciding with the Traeth Lligwy protected bathing waters (ID 40085). The Traeth Lligwy bathing water are overall classified as Excellent. Given the limited number of scoped activities (Table 6.7) in the headwaters of the Lligwy catchment and the mitigation measures there would be no deteriorating impact on the receiving waters.

Conclusions

6.3.39 Incorporation of the measures presented in Table 6.1 would largely remove the sources of any adverse effects (during all phases of the Proposed Development) that may have the potential to cause deterioration in WFD status (Table 6.7). All residual effects are considered to be negligible in relation to the scale of both the source of effect and the receiving, WFD, Lligwy water body as a whole. Therefore, in the case of the Lligwy water body, the Proposed Development is considered to be compliant with the objectives of the WFD.

Cefni reservoir east (GB110102058780)

6.3.40 Based on the results of the scoping assessment (section 5), proposed activities associated with the infrastructure types within Table 6.8 may pose a risk to the WFD status and objectives in this water body. A summary of the detailed assessment for the Cefni reservoir east water body, taking account of measures identified in Table 6.1, is provided in Table 6.8 below and the full results for each of the Proposed Development activity/infrastructure types are presented in Annex C **(Document 5.12.2.5.C)**. The Order Limits within this water body catchment covers a total area of 0.45 km^2 or 2.7% of the total catchment area. However, the footprint of construction would be smaller than this; the Order Limits provide the overall boundary of the Proposed Development, not the area that would be directly affected.

Table 6.8 Summary of the results of the detailed assessment for Cefni reservoir east water body.

Infrastructure element scoped in	Total number / length, scoped in for further assessment	Summary of the detailed assessment (based on the assessment presented in Annex C **(Document 5.12.2.5.C**)
Access Tracks* Access track watercourse crossings	0.45 km 1 x bridge 2 x culvert	The assumptions for the construction of infrastructure activities are provided in Table 5.1. Annex C **(Document 5.12.2.5.C)** provides a comprehensive summary of the effects of these activities/infrastructure on each WFD classification element. The mitigation measures presented in Table 6.1 would be sufficient to ensure that any effects would not lead to deterioration in WFD status for any stage of the Proposed Development.
Working areas	1 x Conductor pulling positions 2 x Pylon (New)	
Pylons	2 x New	
Undergrounded Third Party infrastructure -	0.07 km 2 x trenched watercourse crossings	

*Length of access track within Flood Zone C2 or within 25 m of water body

Achievement of WFD target status

6.3.41 This water body is currently achieving Good status (Table 1, Annex A **(Document 5.12.2.5.A**). Therefore there is no requirement (or associated actions) for this water body to achieve an improvement in WFD status. The focus for this detailed assessment has been to understand any potential for deterioration in current WFD class.

WFD deterioration

6.3.42 The measures provided in Table 6.1 are considered to be sufficient to avoid any effects on the delivery of the no deterioration WFD objective.

Cross-water body effects

6.3.43 This river catchment water body drains to the Cefni reservoir, a WFD lake water body (GB31032926). The Cefni lake water body was scoped out due to the distance from the OL.

6.3.44 The Order Limits border the western and southern extents of the Cors Erddreiniog component of the Anglesey Fens SAC. The Order Limits overlap with the ditch that borders the site in a small number of locations. There are two watercourse crossings of ditches to the west that drain to the ditch at the perimeter of the SAC. However, implementation of the mitigation measures presented in Table 6.1 would sufficiently mitigate any potential impact to the SAC, which is 40 m downstream of the watercourse crossings.

Conclusions

6.3.45 Incorporation of the measures presented in Table 6.1 would largely remove the sources of any adverse effects (during all phases of the Proposed Development) that may have the potential to cause deterioration in WFD status (Table 6.8). All residual effects are considered to be negligible in relation to the scale of both the source of effect and the receiving, WFD, Cefni reservoir east water body as a whole. Therefore, in the case of the Cefni reservoir east water body, the Proposed Development is considered to be compliant with the objectives of the WFD.

6.3.46 Potential effects of the Proposed Development on the Anglesey Fens SAC are assessed as part of The Applicants Report to Support the Habitat Regulations Assessment (**Document 5.23**) and in Chapter 9: Ecology and Nature Conservation (**Document 5.9**). In respect of the Anglesey Fens SAC, the HRA concludes that the Proposed Development would not result in

a likely significant effect on the conservation objectives of the protected area.

Ceint to Cefni reservoir (GB110102058770)

6.3.47 Based on the results of the scoping assessment (section 5), proposed activities associated with the infrastructure types within Table 6.9 may pose a risk to the WFD status and objectives in this water body. A summary of the detailed assessment for the Ceint to Cefni reservoir water body, taking account of measures identified in Table 6.1, is provided in Table 6.9 below and the full results for each of the Proposed Development activity/infrastructure types are presented in Annex C **(Document 5.12.2.5.C)**. The Order Limits within this water body catchment covers a total area of 0.33 km^2 or 2% of the total catchment area. However, the footprint of construction would be smaller than this; the Order Limits provide the overall boundary for the Proposed Development, not the area that would actually be directly affected.

Table 6.9 Summary of the results of the detailed assessment for the Ceint to Cefni water body.

Infrastructure element scoped in	Total number / length, scoped in for further assessment	Summary of the detailed assessment (based on the assessment presented in Annex C **(Document 5.12.2.5.C**)
Access Tracks* Access track watercourse crossings	0.46 km 1 x bridge 4 x culvert	The assumptions for the construction of infrastructure activities are provided in Table 5.1. Annex C **(Document 5.12.2.5.C** provides a comprehensive summary of the effects of these activities/infrastructure on each WFD classification element. The mitigation measures presented in Table 6.1 would be sufficient to ensure that any effects would not lead to deterioration in WFD status for any stage of the Proposed Development.
Working areas	2 x Scaffolding	
Pylons	2 x New	
Undergrounded Third Party infrastructure -	0.1 km	

*Length of access track within Flood Zone C2 or within 25 m of water body

Achievement of WFD target status

6.3.48 This water body is currently designated as having Moderate overall WFD status (Table 1, Annex A **(Document 5.12.2.5.A**), with an objective to achieve Good status by 2027. The Ecological status was assessed as being less than good with Macrophytes and Phytobenthos combined, highlighted as the failing element.

WFD deterioration

6.3.49 The measures provided in Table 6.1 are considered to be sufficient to avoid any effects on the delivery of the no deterioration WFD objective.

Cross-water body effects

6.3.50 The catchment is a designated protected drinking water catchment and contains and contains three distinct areas of the Anglesey Fens. The Order Limits traverse the northern extent of the catchment, which drains south to Llangefni where it meets the Afon Cefni draining from the Cefni reservoir.

6.3.51 The Anglesey Fens border the water course in three locations in close proximity to the Order Limits. At one location (360m south-west of pylon 4AP062), the site boundary is approximately 0.27 km downstream of a proposed culverted watercourse crossing. Constructing the crossing is estimated to take a maximum of two days. The measures presented in Table 6.1 should ensure no negative impact to this designated area.

Conclusions

6.3.52 Incorporation of the measures presented in Table 6.1 would largely remove the sources of any adverse effects (during all phases of the Proposed Development) that may have the potential to cause deterioration in WFD status (Table 6.9). All residual effects are considered to be negligible in relation to the scale of both the source of effect and the receiving, WFD, Ceint to Cefni reservoir water body as a whole. Therefore, in the case of the Ceint to Cefni reservoir water body, the Proposed Development is considered to be compliant with the objectives of the WFD.

6.3.53 Potential effects of the Proposed Development on the Anglesey Fens SAC are assessed as part of as part of The Applicants Report to Support the Habitat Regulations Assessment (**Document 5.23**). In respect of the Anglesey Fens SAC, the HRA concludes that the Proposed Development would not result in an adverse effect on the site integrity.

Ceint (GB110102058940)

6.3.54 Based on the results of the scoping assessment (section 5), proposed activities associated with five infrastructure types within Table 6.10 may pose a risk to the WFD status and objectives in this water body. A summary of the detailed assessment for the Ceint water body, taking account of mitigation measures, is provided in Table 6.10 below and the full results for each of the Proposed Development activity/infrastructure types are presented in Annex C **(Document 5.12.2.5.C**. The Order Limits within this water body catchment covers a total area of 0.66 km^2 or 3.5% of the total catchment area. However, the footprint of construction would be smaller than this; the Order Limits provide the overall boundary of the Proposed Development, not the area that would be directly affected.

Table 6.10 Summary of the results of the detailed assessment for the Ceint water body.

Infrastructure element scoped in	Total number / length scoped in for further assessment	Summary of the detailed assessment (based on the assessment presented in Annex C **(Document 5.12.2.5.C**)
Access Tracks* Access track watercourse crossings	0.98 km 4 x bridge 8 x culvert	The assumptions for the construction of infrastructure activities are provided in Table 5.1. Annex C **(Document 5.12.2.5.C** provides a comprehensive summary of the effects of these activities / infrastructure on each WFD classification element. The mitigation measures presented in Table 6.1 would be sufficient to ensure that any effects would not lead to deterioration in WFD status for any stage of the Proposed Development.
Working areas	2 x Conductor pulling positions 3 x Pylon (New) Penmynydd Road construction compound, Approximately 50,000 m^2.	
Pylons	2 x New	
Undergrounded Third Party	0.05 km	

Table 6.10 Summary of the results of the detailed assessment for the Ceint water body.		
Infrastructure element scoped in	Total number / length scoped in for further assessment	Summary of the detailed assessment (based on the assessment presented in Annex C **(Document 5.12.2.5.C**)
infrastructure -	1 x trenched watercourse crossing	

*Length of access track within Flood Zone C2 or within 25 m of water body

Achievement of WFD target status

6.3.55 This water body is currently designated as having Moderate overall WFD status (Table 1, Annex A **(Document 5.12.2.5.A**)), with an objective to achieve Good status by 2021. The Ecological status was assessed as being less than good with the mitigation measures assessment highlighted as the failing element.

WFD deterioration

6.3.56 The measures provided in Table 6.1 are considered to be sufficient to avoid any effects on the delivery of the no deterioration WFD objective.

Cross-water body effects

6.3.57 The Ceint WFD river catchment water body drains south to the Cefni transitional WFD water body. The Cefni transitional water body was not scoped in due to the distance (approximately 4 km) from the Order Limits and the large potential for dilution of any residual effects.

Conclusions

6.3.58 Incorporation of the measures presented in Table 6.1 would largely remove the sources of any adverse effects (during all phases of the Proposed Development) that may have the potential to cause deterioration in WFD status (Table 6.10). All residual effects are considered to be negligible in relation to the scale of both the source of effect and the receiving, WFD, Ceint water body as a whole. Therefore, in the case of the Ceint water body, the Proposed Development is considered to be compliant with the objectives of the WFD.

Braint lower (GB110102058660)

6.3.59 Based on the results of the scoping assessment (section 5), proposed activities associated with five infrastructure types within Table 6.11 may pose a risk to the WFD status and objectives in this water body. A summary of the detailed assessment for the Braint (lower) water body, taking account of the measures presented in Table 6.1, is provided in Table 6.11 below and the full results for each of the Proposed Development activity/infrastructure types are presented in Annex C **(Document 5.12.2.5.C)**. The Order Limits within this water body catchment covers a total area of 0.25 km^2 or 0.9% of the total catchment area. However, the footprint of construction would be smaller than this; the Order Limits provide the overall boundary of the Proposed Development, not the area that would be directly affected.

Table 6.11 Summary of the results of the detailed assessment for the Braint lower water body.

Infrastructure element scoped in	Total number / length scoped in for further assessment	Summary of the detailed assessment (based on the assessment presented in Annex C **(Document 5.12.2.5.C**)
Access Tracks* Access track watercourse crossings	0.53 km 2 x bridge 3 x culvert	The assumptions for the construction of infrastructure activities are provided in Table 5.1. Annex C **(Document 5.12.2.5.C** provides a comprehensive summary of the effects of these activities/infrastructure on each WFD classification element. The measures presented in Table 6.1 would be sufficient to ensure that any effects would not lead to deterioration in WFD status for any stage of the Proposed Development.
Working areas	2 x Pylon (New)	
Pylons	2 x New	
Undergrounded Third Party infrastructure -	0.22 km 1 x trenched watercourse crossing	

*Length of access track within Flood Zone C2 or within 25 m of water body

Achievement of WFD target status

6.3.60 This water body is currently designated as having Moderate, overall WFD status (Table 1, Annex A **(Document 5.12.2.5.A**), with an objective to achieve Good status by 2021. The Ecological status was assessed as being less than good with the mitigation measures assessment highlighted as the failing element.

WFD deterioration

6.3.61 The measures provided in Table 6.1 are considered to be sufficient to avoid any effects on the delivery of the no deterioration WFD objective.

Cross-water body effects

6.3.62 There is a bifurcation in the Braint upper which contributes flows to the Braint lower. The mitigation measures presented in Table 6.1, within the upper Braint, would ensure there are no cumulative effects transferred to the Braint lower.

Conclusions

6.3.63 Incorporation of the measures presented in Table 6.1 would largely remove the sources of any adverse effects (during all phases of the Proposed Development) that may have the potential to cause deterioration in WFD status (Table 6.11). All residual effects are considered to be negligible in relation to the scale of both the source of effect and the receiving, WFD, Braint (lower) water body as a whole. Therefore, in the case of the Braint (lower) water body, the Proposed Development is considered to be compliant with the objectives of the WFD.

Braint upper (GB110102058690)

6.3.64 Based on the results of the scoping assessment (section 5), proposed activities associated with five infrastructure types within Table 6.12 may pose a risk to the WFD status and objectives in this water body. A summary of the detailed assessment for the Braint (upper) water body, taking account of the measures presented in Table 6.1, is provided in Table 6.12 below and the full results for each of the Proposed Development activity/infrastructure types are presented in Annex C **(Document 5.12.2.5.C)**. The Order Limits within this water body catchment covers a total area of 0.62 km^2 or 2.1% of the total catchment area. However, the footprint of construction would be smaller than this; the Order Limits provide the overall boundary of the Proposed Development, not the area that would actually be directly affected.

Table 6.12 Summary of the results of the detailed assessment for the Braint upper water body.		
Infrastructure element scoped in	Total number / length, scoped in for further assessment	Summary of the detailed assessment (based on the assessment presented in Annex C **(Document 5.12.2.5.C**)
Access Tracks* Access track watercourse crossings	1.2 km 1 x bridge 1 x culvert	The assumptions for the construction of infrastructure activities are provided in Table 5.1. Annex C **(Document 5.12.2.5.C)** provides a comprehensive summary of the effects of these activities/infrastructure on each WFD classification element. The mitigation measures presented in Table 6.1 would be sufficient to ensure that any effects would not lead to deterioration in WFD status for any stage of the Proposed Development.
Working areas	1 x Pylon (New) 1 x Conductor pulling positions 2 x Scaffolding	
Undergrounded 3rd Party infrastructure	0.42 km 1 x trenched watercourse crossings	
Tunnel construction compounds, tunnel head houses and shafts	Braint Construction Compound, THH/CSEC and associated infrastructure	

*Length of access track within Flood Zone C2 or within 25 m of water body

Achievement of WFD target status

6.3.65 This water body is currently achieving Good status (Table 1, Annex A **(Document 5.12.2.5.A**). Therefore there is no requirement (or associated actions) for this water body to achieve an improvement in WFD status. The focus for this detailed assessment has been to understand any potential for deterioration in current WFD class.

WFD deterioration

6.3.66 The measures provided in Table 6.1 are considered to be sufficient to avoid any effects on the delivery of the no deterioration WFD objective.

Cross-water body effects

6.3.67 The Braint construction compound is located within the Braint (upper) catchment which overlies the Ynys Mon Secondary WFD groundwater body. The tunnel itself would then pass through the Ynys Mon Southern Carboniferous Limestone WFD groundwater body beneath the Menai Strait. During both the construction and operation of the shafts and tunnel there would be dewatering requirements associated with the intrusion of groundwater, possibly saline, in the vicinity of the Menai Strait. The shaft dewatering volume is currently anticipated to be very modest (30m^3/day) and relate to groundwater inflow into the shaft base through drainage of the residual water pressure behind the secondary lining. No external dewatering would be required. This volume would also reflect operation as the shaft would be constructed with a drained lining. If the tunnel is constructed by Tunnel Boring Machine (TBM) the permanent tunnel lining would be installed as the TBM progresses and the allowable groundwater leakage rate through the tunnel lining would be 0.1 litres/m^2/day (British Tunnelling Society Specification for 'Capillary Dampness'). For the 4 km tunnel with internal diameter of 4 m, the groundwater inflow rate would be approximately 5 m^3/day. If the tunnel is constructed by drill and blast, open-face excavation for the entire length of the tunnel would be undertaken prior to the installation of the secondary tunnel lining. The estimated groundwater inflow rate is estimated to be a maximum of 900 m^3/day to the Braint THH, during the short time window following breakthrough to the tunnel originating at Tŷ Fodol. During operation, using either construction method, the groundwater inflow rate would be estimated to be approximately 5 m^3/day. The Braint THH will be used for extracting all groundwater seepages during the operational phase with a worst case, maximum, volume of 65 m^3day to be discharged (30 m^3/day from both shafts and 5 m^3/day from the tunnel). In addition, surface water runoff generated in the vicinity of the THH and CSEC would also need to be treated to remove excess suspended solids and any hydrocarbon contamination and attenuated to pre-development rates prior to discharge from the site. There are a range of options proposed for these discharge activities (control and management measure WE59). However, on a reasonable worst-case basis, should it be discharged in full to an adjacent watercourse, then this would be consented via an Environmental Permit that would stipulate restrictions in terms of water quality and quantity (control and management measures WE41, WE42 and WE43).

6.3.68 The Braint upper discharges to the Menai Strait WFD coastal water body, which is also a designated SAC. The distance from the Order Limits and the mitigation measures presented in Table 6.1 would ensure no deterioration to these receiving water bodies.

Conclusions

6.3.69 Incorporation of the measures presented in Table 6.1 would manage the sources of any adverse effects (during all phases of the Proposed Development), which may otherwise have had the potential to cause deterioration in WFD status (Table 6.12), to a negligible level. All residual effects are considered to be negligible in relation to the scale of both the source of effect and the receiving, WFD, Braint upper water body as a whole. Therefore, in the case of the Braint upper water body, the Proposed Development is considered to be compliant with the objectives of the WFD.

6.3.70 Proposed Development-related effects on the Menai Strait SAC are assessed as part of as part of The Applicants Report to Support the Habitat Regulations Assessment (**Document 5.23**). The closest activity within the Braint upper WFD catchment with a pathway to the Menai SAC is a bridge crossing of the main river, approximately 1.6 km from the SAC. In respect of the Menai SAC, the HRA concludes that the Proposed Development would not result in an adverse effect on the site integrity.

Nant-y-garth (GB110065058490)

6.3.71 Based on the results of the scoping assessment (Section 5), proposed activities associated with five infrastructure types within Table 6.13 may pose a risk to the WFD status and objectives in this water body. A summary of the detailed assessment for the Nant-y-garth water body, taking account of measures identified in Table 6.1, is provided in Table 6.13 below and the full results for each of the Proposed Development activity/infrastructure types are presented in Annex C **(Document 5.12.2.5.C)**. The Order Limits within this water body catchment covers a total area of 1.03 km^2 or 7.2% of the total catchment area. However, the footprint of construction would be smaller than this; the Order Limits provide the overall boundary of the Proposed Development, not the area that would actually be directly affected.

Table 6.13 Summary of the results of the detailed assessment for the Nant-y-garth water body.

Infrastructure element scoped in	Total number / length, scoped in for further assessment	Summary of the detailed assessment (based on the assessment presented in Annex C **(Document 5.12.2.5.C**)
Access Tracks* Access track watercourse crossings	0.6 km 1 x bridges 7 x culverts	The assumptions for the construction of infrastructure activities are provided in Table 5.1. Annex C **(Document 5.12.2.5.C** provides a comprehensive summary of the effects of these activities / infrastructure on each WFD classification element. The mitigation measures presented in Table 6.1 would be sufficient to ensure that any effects would not lead to deterioration in WFD status for any stage of the Proposed Development.
Working areas	Pentir Substation and OHL Construction Compounds	
Undergrounded Third Party infrastructure -	0.22 km 4 x trenched watercourse crossings	
Tunnel construction compounds, tunnel head houses and shafts	Tŷ Fodol Construction Compound, THH/CSEC and associated infrastructure	

*Length of access track within Flood Zone C2 or within 25 m of water body

Achievement of WFD target status

6.3.72 This water body is currently achieving Good status (Table 1, Annex A **(Document 5.12.2.5.A**). Therefore there is no requirement (or associated actions) for this water body to achieve an improvement in WFD status. The focus for this detailed assessment has been to understand any potential for deterioration in current WFD class.

WFD deterioration

6.3.73 The measures provided in Table 6.1 are considered to be sufficient to avoid any effects on the delivery of the no deterioration WFD objective

Cross-water body effects

6.3.74 The Tŷ Fodol construction compound and THH/CSEC are located in the Nant-y-garth WFD catchment which overlies the Llyn and Eryri WFD groundwater body. During construction of the tunnel there would be a necessity to dispose of the dewatering arising as outlined in Table 6.1. There would be dewatering activities during the construction of the shaft and the construction phase of the tunnel. The shaft dewatering volume is currently anticipated to be very modest ($30m^3$/day) and relates to groundwater inflow into the shaft base through drainage of the residual water pressure behind the secondary lining. No external dewatering would be required. This volume would also reflect operation as the shaft would be constructed with a drained lining. The construction and operation of the tunnel also has the potential to have an impact on groundwater through groundwater inflow into the tunnel. If the tunnel is constructed by Tunnel Boring Machine (TBM) the permanent tunnel lining would be installed as the TBM progresses and the allowable groundwater leakage rate through the tunnel lining would be 0.1 litres/m^2/day (British Tunnelling Society Specification for 'Capillary Dampness'). For the 4 km tunnel with internal diameter of 4 m, the groundwater inflow rate would be approximately 5 m^3/day. If the tunnel is constructed by drill and blast, open-face excavation for the entire length of the tunnel would be undertaken prior to the installation of the secondary tunnel lining. The estimated maximum groundwater inflow rate is estimated to be a maximum of 250 m^3/day to the Tŷ Fodol THH. There are a range of options proposed for these discharge activities (control and management measure WE59). However, on a reasonable worst-case basis, should it be discharged in full to an adjacent watercourse, then this would be consented via an Environmental Permit that would stipulate restrictions in terms of water quality and quantity (control and management measures WE41, WE42 and WE43).

6.3.75 The Nant-y-garth discharges to the Menai Strait WFD, coastal water body which is also a designated SAC. Given the significant size and volume of this coastal water body, the impact of any Proposed Development activities transmitting to this downstream water body are highly unlikely given the effects of distance (approximately 2 km to a bridge crossing) and dilution.

Conclusions

6.3.76 Incorporation of the measures presented in Table 6.1 would largely remove the sources of any adverse effects (during all phases of the Proposed Development) that may have the potential to cause deterioration in WFD status (Table 6.13). All residual effects are considered to be negligible in relation to the scale of both the source of effect and the receiving, WFD,

Nant-y-garth water body as a whole. Therefore, in the case of the Nant-y-garth water body, the Proposed Development is considered to be compliant with the objectives of the WFD.

6.3.77 Proposed Development-related effects on the Menai Strait SAC are assessed as part of as part of The Applicants Report to Support the Habitat Regulations Assessment (**Document 5.23**). In respect of the Menai Strait SAC, the HRA concludes that the Proposed Development would not result in an adverse effect on the sites integrity.

Menai Strait (GB681010120000)

6.3.78 Based on the results of the scoping assessment (Section 5), proposed activities associated with the infrastructure types within Table 6.14 may pose a risk to the WFD status and objectives in this water body as well as its SAC status. A summary of the detailed assessment for the Menai Strait water body, taking account of measures presented in Table 6.1, is provided in Table 6.14 below and the full results for each of the Proposed Development activity/infrastructure types are presented in Annex C **(Document 5.12.2.5.C)**.

Table 6.14 Summary of the results of the detailed assessment for the Menai Strait water body.

Infrastructure element scoped in	Total number / length, scoped in for further assessment	Summary of the detailed assessment (based on the assessment presented in Annex C **(Document 5.12.2.5.C**)
Tunnel	Approximately 0.6 km of tunnel, 10 m below the surface.	The assumptions for the construction of infrastructure activities are provided in Table 5.1. Annex C **(Document 5.12.2.5.C)** provides a comprehensive summary of the effects of these activities/ infrastructure on each WFD classification element. The mitigation measures presented in Table 6.1 would be sufficient to ensure that any effects would not lead to deterioration in WFD status for any stage of

Table 6.14 Summary of the results of the detailed assessment for the Menai Strait water body.		
Infrastructure element scoped in	Total number / length, scoped in for further assessment	Summary of the detailed assessment (based on the assessment presented in Annex C **(Document 5.12.2.5.C**)
		the Proposed Development.

Achievement of WFD target status

6.3.79 This water body is currently achieving Good status (Table 4, Annex A (**Document 5.12.2.5.A**)). Therefore there is no requirement (or associated actions) for this water body to achieve an improvement in WFD status. The focus for this detailed assessment has been to understand any potential for deterioration in current WFD class.

WFD deterioration

6.3.80 The measures provided in Table 6.1 are considered to be sufficient to avoid any effects on the delivery of the no deterioration WFD objective

Cross-water body effects

6.3.81 There is a very small possibility a Tunnel Boring Machine (TBM) blow out during the construction of the tunnel, which at its closest is around 10 m beneath the bed of the Menai Strait. Such an occurrence could potentially result in drilling fluids reaching the water body via a groundwater/fault line pathway. The mitigation measures proposed in Table 6.1 (Specifically Control of blowout: WE511) would minimise the potential for a blow out occurring through constant monitoring of the drilling conditions. If these were to fail the volume of drilling fluid released is likely to be very small in comparison to the volume of the receiving water and the dilution effect is very likely to minimise any potential for harm.

6.3.82 The Menai Strait receives river inflows from four WFD river catchments (Braint upper, Braint lower, Nant-y-garth and Cegin). All four WFD river

water bodies have been assessed as being compliant with the WFD objectives therefore there is likely limited impact to the Menai Strait from these water bodies. Given the significant size and volume of this coastal water body, the impact of any Proposed Development activities transmitting to this downstream water body are highly unlikely given the effects of distance and dilution.

Conclusions

6.3.83 Incorporation of the measures presented in Table 6.1 would largely remove the sources of any adverse effects (during all phases of the Proposed Development) that may have the potential to cause deterioration in WFD status (Table 6.14). All residual effects are considered to be negligible in relation to the scale of both the source of effect and the receiving, WFD, Menai Strait water body as a whole. The probability of a TBM blow out is low, however, should one occur there would be a rapid shut down of the tunnel boring machine. The volume of any drilling fluid released is likely to be very small in comparison to the volume of the receiving water and the dilution effect is very likely to minimise any potential for harm, the effects would diminish rapidly and it is not permanent. Therefore, in the case of the Menai Strait water body, the Proposed Development is considered to be compliant with the objectives of the WFD.

6.3.84 Proposed Development-related effects on the Menai Strait SAC are assessed as part of The Applicants Report to Support the Habitat Regulations Assessment (**Document 5.23**). In respect of the Menai SAC, the HRA concludes that the Proposed Development would not result in an adverse effect on the sites integrity.

6.4 GROUNDWATER BODIES

Introduction

6.4.1 This section provides a summary of the detailed assessment based on Proposed Development activities for all groundwater bodies that were scoped in during stage 4.

6.4.2 WFD water body baseline conditions are presented in Annex A **(Document 5.12.2.5.A)**. The activities/infrastructure types proposed to be located within each water body (i.e. those that include activities/infrastructure types scoped in for further assessment) are presented in Annex B (**Document 5.12.2.5.B)**. The scoping of these activities/infrastructure types was presented in Table 6.15 to 6.18.

6.4.3 The detailed assessment of the activities/infrastructure types that have been scoped in has taken into consideration the measures provided in Table 6.1.

Ynys Mon Secondary (GB41002G204400)

6.4.4 Based on the results of the scoping assessment (section 5), proposed activities associated with the infrastructure types within Table 6.15 may pose a risk to the WFD status and objectives in this water body. A summary of the detailed assessment for the Ynys Mon Secondary groundwater body, taking account of mitigation measures, is provided in Table 6.15 below and the full results for each of the Proposed Development activity/infrastructure types are presented in Annex C **(Document 5.12.2.5.C)**.

Table 6.15 Summary of the results of the detailed assessment for the Ynys Mon Secondary groundwater body.

Infrastructure element scoped in	Total number / length, scoped in for further assessment	Summary of the detailed assessment (based on the assessment presented in Annex C **(Document 5.12.2.5.C**)
Access track water course crossings	30 x culverts	The assumptions for the construction of infrastructure activities are provided in Table 5.1. Annex C **(Document 5.12.2.5.C)** provides a comprehensive summary of the effects of these activities/ infrastructure on each WFD classification element. The mitigation measures presented in Table 6.1 would be sufficient to ensure that any effects would not lead to deterioration in WFD status for any stage of the Proposed Development.
Undergrounded Third Party infrastructure - Trenched watercourse crossing	11	
Shafts	1	
Tunnel length (m)	415	

Achievement of WFD target status

6.4.5 This water body is currently assessed as Poor overall status (Table 2, Annex A **(Document 5.12.2.5.A**) due to the chemical status. The classification elements achieving less than Good status are the chemical groundwater surface water (GWSW) test and the chemical groundwater dependent terrestrial ecosystems (GWDTEs) test and there is deemed to be no known technical solution available for remedying this status within the WFD time frame.

WFD deterioration

6.4.6 The measures provided in Table 6.1 are considered to be sufficient to avoid any deterioration of WFD elements from Propose Development activities. There is a very small possibility a tunnel blow out during the construction of the tunnel which could potentially result in drilling fluids reaching the water body via a groundwater pathway. The measures identified should minimise the potential for a blowout occurring through constant monitoring of the drilling conditions. If these were to fail the volume of drilling fluid released is likely to be very small in comparison to the volume of the receiving water and the dilution effect is very likely to minimise any potential for harm

Cross-water body effects

6.4.7 This water body is a large water body lying beneath most of Anglesey and therefore a large number of the surface water bodies. However, given the comparatively shallow nature of the foundations associated with many of the Proposed Development activities and the mitigation measures it is significantly unlikely for any impact to the surface water bodies.

6.4.8 The Braint construction compound would be located at the eastern extent of this water body. There would be dewatering activities during the construction of the shaft and the construction phase of the tunnel. The shaft dewatering volume is currently anticipated to be very modest ($30m^3$/day) and relate to groundwater inflow into the shaft base through drainage of the residual water pressure behind the secondary lining. No external dewatering would be required. This volume would also reflect operation as the shaft would be constructed with a drained lining. The construction and operation of the tunnel also has the potential to have an impact on groundwater through groundwater inflow into the tunnel. If the tunnel is constructed by Tunnel Boring Machine (TBM) the permanent tunnel lining would be installed as the TBM progresses and the allowable groundwater leakage rate through the tunnel lining would be 0.1 litres/m^2/day (British Tunnelling Society Specification for 'Capillary Dampness'). For the 4km tunnel with internal diameter of 4m, the groundwater inflow rate would be approximately

5m^3/day. If the tunnel is constructed by drill and blast, open-face excavation for the entire length of the tunnel would be undertaken prior to the installation of the secondary tunnel lining. The estimated groundwater inflow rate is estimated to be a maximum of 900 m^3/day to the Braint THH. During operation, using either construction method, the groundwater inflow rate would be estimated to be approximately 5 m^3/day. Therefore, the small change to groundwater availability associated with dewatering would be expected to have a negligible effect on groundwater resource availability (as concluded in **Document 5.11**). There are a range of options proposed for these discharge activities. However, on a reasonable worst-case basis, should it be discharged in full to an adjacent watercourse, then this would be consented via an Environmental Permit that would stipulate restrictions in terms of water quality and quantity.

6.4.9 There is the potential that these arisings could be saline. The salinity is as yet undetermined. Depending on the salinity of the water there are two options: dilution of the water arising and subsequent discharge to a surface watercourse or, should the arising be of too high salinity, removal of the water from site via tanker for appropriate disposal. There are, therefore, no anticipated non-temporary effects on groundwater resources on a regional scale. The identified GWDTEs (as identified in **Document 5.11**) are not within the same groundwater bodies as the shafts, tunnel, tunnel head houses or any associated activities. Therefore, there is no potential for effect on GWDTEs associated with these activities.

Conclusions

6.4.10 Incorporation of the measures presented in Table 6.1 would largely remove, or otherwise render as negligible, the sources of any adverse effects (during all phases of the Proposed Development) that may have otherwise had the potential to cause deterioration in WFD status (Table 6.15). All residual effects are considered to be negligible in relation to the scale of both the source of effect and the receiving WFD/Ynys Mon Secondary groundwater body as a whole. Therefore, in the case of the Ynys Mon Secondary groundwater body, the Proposed Development is considered to be compliant with the objectives of the WFD.

Ynys Mon Central Carboniferous Limestone (GB41001G204200)

6.4.11 Based on the results of the scoping assessment (section 5), proposed activities associated with the infrastructure types within Table 6.16 may pose a risk to the WFD status and objectives in this water body. A summary of the detailed assessment for the Ynys Mon Central Carboniferous Limestone groundwater body, taking account of mitigation measures, is provided in

Table 6.16 below and the full results for each of the Proposed Development activity/infrastructure types are presented in Annex C **(Document 5.12.2.5.C)**.

Table 6.16 Summary of the results of the detailed assessment for the Ynys Mon Central Carboniferous Limestone groundwater body.

Infrastructure element scoped in	Total number / scoped in for further assessment	Summary of the detailed assessment (based on the assessment presented in Annex C **(Document 5.12.2.5.C**)
Access track water course crossings	8 x culverts	The assumptions for the construction of infrastructure activities are provided in Table 5.1. Annex C **(Document 5.12.2.5.C)** provides a comprehensive summary of the effects of these activities / infrastructure on each WFD classification element. The mitigation measures presented in Table 6.1 would be sufficient to ensure that any effects would not lead to deterioration in WFD status for any stage of the Proposed Development.
Undergrounded Third Party infrastructure - Trenched watercourse crossing	1	

Achievement of WFD target status

6.4.12 This water body is currently assessed as Poor overall status (Table 2, Annex A (**Document 5.12.2.5.A)**) due to the chemical status. The classification element achieving less than Good status is the chemical GWDTEs test. The objective for this groundwater body is to achieve Good status by 2021. The Proposed Development activities would not preclude delivery of the proposed measures for reducing diffuse pollution at source.

WFD deterioration

6.4.13 The measures provided in Table 6.1 are considered to be sufficient to avoid any effects on the delivery of the no deterioration WFD objective.

Cross-water body effects

6.4.14 Given the comparatively shallow nature of excavations associated with many of the Proposed Development activities and the mitigation measures identified in Table 6.1 it is significantly unlikely for any impact to the surface water bodies overlying.

Conclusions

6.4.15 Incorporation of the measures presented in Table 6.1 would largely remove the sources of any adverse effects (during all phases of the Proposed Development) that may have the potential to cause deterioration in WFD status (Table 6.16). All residual effects are considered to be negligible in relation to the scale of both the source of effect and the receiving, WFD, Ynys Mon Central Carboniferous Limestone groundwater body as a whole. Therefore, in the case of the Ynys Mon Central Carboniferous Limestone groundwater body, the Proposed Development is considered to be compliant with the objectives of the WFD.

Ynys Mon Southern Carboniferous Limestone (GB41002G206100)

6.4.16 Based on the results of the scoping assessment (section 5), proposed activities associated with five infrastructure types within Table 6.17 may pose a risk to the WFD status and objectives in this water body. A summary of the detailed assessment for the Ynys Mon Southern Carboniferous groundwater body, taking account of mitigation measures, is provided in Table 6.17 below and the full results for each of the Proposed Development activity/infrastructure types are presented in Annex C **(Document 5.12.2.5.C)**.

Table 6.17 Summary of the results of the detailed assessment for the Ynys Mon Southern Carboniferous Limestone groundwater body.

Infrastructure element scoped in	Total number / length, scoped in for further assessment	Summary of the detailed assessment (based on the assessment presented in Annex C **(Document 5.12.2.5.C**)
Tunnel length (m)	625	The assumptions for the construction of infrastructure activities are provided in Table 5.1. Annex C **(Document 5.12.2.5.C)** provides a

Table 6.17 Summary of the results of the detailed assessment for the Ynys Mon Southern Carboniferous Limestone groundwater body.		
Infrastructure element scoped in	Total number / length, scoped in for further assessment	Summary of the detailed assessment (based on the assessment presented in Annex C **(Document 5.12.2.5.C**)
		comprehensive summary of the effects of these activities / infrastructure on each WFD classification element. The mitigation measures presented in Table 6.1 would be sufficient to ensure that any effects would not lead to deterioration in WFD status for any stage of the Proposed Development.

Achievement of WFD target status

6.4.17 This water body is currently achieving Good status (Table 2, Annex A **(Document 5.12.2.5.A)**). Therefore there is no requirement (or associated actions) for this water body to achieve an improvement in WFD status. The focus for this detailed assessment has been to understand any potential for deterioration in current WFD class.

WFD deterioration

6.4.18 The measures provided in Table 6.1 are considered to be sufficient to avoid any effects on the delivery of the no deterioration WFD objective.

6.4.19 There is a very small possibility a tunnel blow out during the construction of the tunnel using the TBM method, which could potentially result in drilling fluids affecting the water body. The mitigation measures should minimise the potential for a blowout occurring through constant monitoring of the drilling conditions. If these were to fail the volume of drilling fluid released is likely to be very small in comparison to the volume of the receiving water body and the dilution effect is very likely to minimise any potential for harm.

Cross-water body effects

6.4.20 This groundwater body underlies a small section of the eastern extents of both the Braint upper and lower surface water bodies. This groundwater body only coincides with approximately 260 m of access track within the Braint upper catchment water body. Due to the comparatively shallow nature of the foundations/excavations associated with access tracks and the mitigation measures it is significantly unlikely for any impact to the surface water bodies.

6.4.21 Approximately 650 m of tunnel pass through this groundwater body. There would be dewatering activities from the construction and operation phases of the tunnel to a tributary of the Braint upper WFD river water body. There is the potential that these arisings would be saline. The precise salinity is as yet undetermined but satisfactory mitigation would be capable of being implemented. Depending on the salinity of the water there are two options, dilution and discharge to surface water, or should the arisings be too saline, removal of saline water from site via tanker for appropriate disposal.

Conclusions

6.4.22 Incorporation of the measures presented in Table 6.1 would largely remove the sources of any adverse effects (during all phases of the Proposed Development) that may have the potential to cause deterioration in WFD status (Table 6.17). All residual effects are considered to be negligible in relation to the scale of both the source of effect and the receiving, WFD, Ynys Mon Southern Carboniferous groundwater body as a whole. Therefore, in the case of the Ynys Mon Southern Carboniferous groundwater body, the Proposed Development is considered to be compliant with the objectives of the WFD.

Llyn and Eryri (GB41002G204600)

6.4.23 Based on the results of the scoping assessment (section 5), proposed activities associated with the infrastructure types within Table 6.18 may pose a risk to the WFD status and objectives in this water body. A summary of the detailed assessment for the Llyn and Eryri groundwater body, taking account of mitigation measures, is provided in Table 6.18 below and the full results for each of the Proposed Development activity/infrastructure types are presented in Annex C **(Document 5.12.2.5.C).**

Table 6.18 Summary of the results of the detailed assessment for the Llyn and Eryri groundwater body.

Infrastructure element scoped in	Total number / length, scoped in for further assessment	Summary of the detailed assessment (based on the assessment presented in Annex C **(Document 5.12.2.5.C**)
Access track water course crossing	7 x culvert	The assumptions for the construction of infrastructure activities are provided in Table 5.1. Annex C **(Document 5.12.2.5.C)** provides a comprehensive summary of the effects of these activities / infrastructure on each WFD classification element. The mitigation measures presented in Table 6.1 would be sufficient to ensure that any effects would not lead to deterioration in WFD status for any stage of the Proposed Development.
Trenched Undergrounded Third Party infrastructure - watercourse crossing	4	
Shafts	1	
Tunnel length (m)	2390	

Achievement of WFD target status

6.4.24 This water body is currently assessed as Poor overall status (Table 2, Annex A **(Document 5.12.2.5.A)**) due to the chemical status. The classification elements achieving less than Good status are the GWSW test and the chemical GWDTEs test and there is deemed to be no known technical solution available for remedying this status within the WFD time frame.

WFD deterioration

6.4.25 The measures provided in Table 6.1 are considered to be sufficient to avoid any effects on the delivery of the no deterioration WFD objective.

6.4.26 There is a very small possibility a tunnel blow out during the construction of the tunnel with the TBM method, which could potentially result in drilling fluids reaching the waterbody. The mitigation measures should minimise the potential for a blowout occurring through constant monitoring of the drilling conditions. If these were to fail the volume of drilling fluid released is

likely to be very small in comparison to the volume of the receiving water and the dilution effect is very likely to minimise any potential for harm.

Cross-water body effects

6.4.27 This groundwater body is the only one encountered on the Welsh mainland and entirely underlies both the Nant-y-garth and Cegin surface water bodies. Due to the comparatively shallow nature of the foundations/excavations associated with many of the Proposed Development activities and the mitigation measures it is significantly unlikely for any impact to the surface water bodies.

6.4.28 The Tŷ Fodol construction compound and THH/CSEC would be located at the western extent of this groundwater body. There would be dewatering activities during the construction of the shaft and the construction phase of the tunnel. The shaft dewatering volume is currently anticipated to be very modest (30m^3/day) and relate to groundwater inflow into the shaft base through drainage of the residual water pressure behind the secondary lining. No external dewatering would be required. This volume would also reflect operation as the shaft would be constructed with a drained lining. The construction and operation of the tunnel also has the potential to have an impact on groundwater through groundwater inflow into the tunnel. If the tunnel is constructed by Tunnel Boring Machine (TBM) the permanent tunnel lining would be installed as the TBM progresses and the allowable groundwater leakage rate through the tunnel lining would be 0.1 litres/m^2/day (British Tunnelling Society Specification for 'Capillary Dampness'). For the 4 km tunnel with internal diameter of 4m, the groundwater inflow rate would be approximately 5 m^3/day. If the tunnel is constructed by drill and blast, open-face excavation for the entire length of the tunnel would be undertaken prior to the installation of the secondary tunnel lining. The estimated groundwater inflow rate is estimated to be a maximum of 250 m^3/day to the Tŷ Fodol THH. Therefore, the small change to groundwater availability associated with dewatering would be expected to have a negligible effect on groundwater resource availability (as concluded in **Document 5.11**). There are a range of options proposed for these discharge activities. However, on a reasonable worst-case basis, should it be discharged in full to an adjacent watercourse, then this would be consented via an Environmental Permit that would stipulate restrictions in terms of water quality and quantity.

6.4.29 There is the potential that these arisings could be saline. The salinity is as yet undetermined. Depending on the salinity of the water there are two options: dilution of the water arising and subsequent discharge to a surface watercourse or, should the arising be of too high salinity, removal of the

water from site via tanker for appropriate disposal. There are, therefore, no anticipated non-temporary effects on groundwater resources on a regional scale. The identified GWDTEs (as identified in **Document 5.11**) are not within the same groundwater bodies as the shafts, tunnel, tunnel head houses or any associated activities. Therefore, there is no potential for effect on GWDTEs associated with these activities.

Conclusions

6.4.30 Incorporation of the measures presented in Table 6.1 would largely remove the sources of any adverse effects (during all phases of the Proposed Development) that may have the potential to cause deterioration in WFD status (Table 6.18). All residual effects are considered to be negligible in relation to the scale of both the source of effect and the receiving, WFD, Llyn and Eryri groundwater body as a whole. Therefore, in the case of the Llyn and Eryri groundwater body, the Proposed Development is considered to be compliant with the objectives of the WFD.

7 Conclusion on WFD compliance

6.5 OVERVIEW

7.1.1 Of the 22 water bodies in the Study Area, a total of 21 were considered to have activities/infrastructure types resulting from the Proposed Development within them or in close enough proximity that could cause some degree of risk to the delivery of WFD objectives. Upon detailed assessment of these activities/infrastructure types, and taking into account the effectiveness of the committed mitigation measures in managing any effects, it is concluded that the Proposed Development is compliant with the WFD.

7.2 WILL THE PROPOSED DEVELOPMENT LEAD TO DETERIORATION IN WFD STATUS OF ANY WFD WATER BODY IN THE STUDY AREA?

7.2.1 Based on the assessment provided in this document, no components or phases of the Proposed Development would lead to a deterioration of any WFD elements or the WFD status of any water body in the study area.

7.3 WILL THE PROPOSED DEVELOPMENT COMPROMISE THE ACHIEVEMENT OF GOOD STATUS IN ANY WFD WATER BODY IN THE STUDY AREA?

7.3.1 Based on the assessment provided in this document, no components or phases of the Proposed Development would compromise the ability of any WFD water body to attain WFD target status.

7.4 WILL THE PROPOSED DEVELOPMENT CONTRIBUTE TOWARDS A CUMULATIVE DETERIORATION OF WFD STATUS (IN COMBINATION WITH OTHER PROJECTS) OR PREVENT THE CUMULATIVE ENHANCEMENT OF STATUS (UP TO 2027)?

7.4.1 The potential cumulative effects of the Proposed Development with other reasonably foreseeable developments are discussed in section 10 of Chapter 12 Water Quality, Resources and Flood Risk (**Document 5.12**), and in Chapter 20 Inter-Project Cumulative Effects (**Document 5.20**). Within the cumulative effects assessment 24 major projects are identified as potentially relevant, 11 of which are within the same WFD water bodies as the Proposed Development. The standard

mitigation measures committed to as part of the Proposed Development would ensure that there is no potential for the Proposed Development to contribute to any cumulative effects, and, as such, cumulative effects would not preclude the delivery of WFD objectives.

7.5 WILL THE PROPOSED DEVELOPMENT COMPROMISE THE ACHIEVEMENT OF PROTECTED AREA OBJECTIVES

7.5.1 Based on the assessment provided in The Applicants Report to Support the Habitat Regulations Assessment (**Document 5.23**), and within this document, no components or phases of the Proposed Development would compromise the conservation objectives of any protected areas.

7.6 STATEMENT OF WFD COMPLIANCE

7.6.1 The assessment provided in this document demonstrates that the Proposed Development is compliant with the objectives of the WFD. Therefore, there is no requirement for an Article 4.7 assessment.

8 References

8.1.1 Ref 12.1 *Council Directive 2000/60/EC of the European Parliament and of the Council of* 23 October 2000 *on establishing a framework for Community action in the field of water policy (the Water Framework Directive).*

8.1.2 Ref 12.2 *Council Directive 2008/105/EC of the European Parliament and of the Council of* 16 December 2008 *on environmental quality standards in the field of water policy, amending and subsequently repealing Council Directives 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC and amending Directive 2000/60/EC of the European Parliament and of the Council (the Priority Substances Directive).*

8.1.3 Ref 12.3 *Council Directive 2013/39/EU of the European Parliament and of the Council of* 12 August 2013 *amending Directives 2000/60/EC and 2008/105/EC as regards priority substances in the field of water policy.*

8.1.4 Ref 12.4 The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015.

8.1.5 Ref 12.5 *Council Directive 2006/118/EC of the European Parliament and of the Council of* 12 December 2006 *on the protection of groundwater against pollution and deterioration (the Groundwater Directive) including Commission Directive 2014/80/EU which amends Annex II of the original Directive 2006/118/EC.*

8.1.6 Ref 12.6 Natural Resources Wales (2015); River Basin Management Plans Published 2015 – 2021, available from https://naturalresources.wales/evidence-and-data/research-and-reports/water-reports/river-basin-management-plans-published/?lang=en (Accessed 18/05/2017)

8.1.7 Ref 12.7 UK Technical Advisory Group on the Water Framework Directive (2012) Paper 11b(i) Groundwater Chemical Classification for the purposes of the Water Framework Directive and the Groundwater Directive.

8.1.8 Ref 12.8 Natural Resources Wales (2017). Operation Guidance Note (OGN) - Guidance for Assessing Activities and Projects for Compliance with the Water Framework Directive (OGN72).

8.1.9 Ref 12.9 Natural Resources Wales (2017). Operation Guidance Note (OGN) - Water Framework Directive – Deterioration in water body status (OGN73).

8.1.10 Ref 12.10 Court of Justice of the European Union (2015) Judgment in Case C-461/13 The obligations laid down by the Water Framework Directive concerning enhancement and prevention of deterioration apply to individual Projects such as the deepening of a navigable river. Available at http://curia.europa.eu/jcms/upload/docs/application/pdf/2015-07/cp150074en.pdf (Accessed 18/05/2017).

8.1.11 Ref 12.11 UK Technical Advisory Group on the Water Framework Directive (2003) Guidance on abstraction and flow regulation pressures on surface waters (Final) https://www.wfduk.org/sites/default/files/Media/Characterisation%20of%20the%20water%20environment/Abstraction%20and%20flow%20regulation%20pressures_Final_011203.pdf (Accessed 25/05/2017)

8.1.12 Ref 12.12 National Grid North Wales Connection Project (2016). Preliminary Environmental Information Report (PEIR). Accessed at http://northwalesconnection.com/current-documents-and-maps.aspx

8.1.13 Ref 12.13 Natural Resources Wales (2017) Cycle 2 Rivers and waterbodies web maps. https://nrw.maps.arcgis.com/apps/webappviewer/index.html?id=2176397a06d64731af8b21fd69a143f6 (Accessed 01/06/2017)

8.1.14 Ref 12.14 *Council Directive 2006/7/EC of the European Parliament and of the Council of* 15 February 2006 *concerning the management of bathing water quality and repealing Directive 76/160/EEC (The Bathing Waters Directive).*

8.1.15 Ref 12.15 *Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (The Habitats Directive).*

8.1.16 Ref 12.16 Mott Macdonald (2017) Wylfa - Pentir 400kV Double Circuit Cable Route - Outline Drainage Strategy Report.

8.1.17 Ref 12.17 The Planning Inspectorate (2017) Advice note eighteen: The Water Framework Directive. https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/2017/06/advice_note_18.pdf (Accessed 11/06/2018)

8.1.18 Ref 12.18 The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. http://www.legislation.gov.uk/uksi/2017/407/contents/made (Accessed 11/06/2018)

Annex A

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Document 5.12.2.5A Water Framework Directive 2015 water body baseline

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Table 1 2015 RBMP baseline data for all river water bodies in the Study Area

Water body name	Water body ID	Approximate length of principal watercourse (km)	Approximate catchment area (km^2)	Hydro-morphological designation	Chemical Status	Eco-logical Status/ Potential	Overall Water-body Status	Classification element not achieving Good	Reasons for not achieving Good status	Objective
Non reportable WFD Waterbody adjacent to the Irish Sea[1]	GB110102059160	-	-	Not designated as being artificial or Heavily Modified	Did not require assessment	Moderate	Moderate	Expert Judgement	-	Good by 2027
Wygyr (River)	GB110102059170	5.9	27.03	Not designated as being artificial or Heavily Modified	Good	Moderate	Moderate	Phosphorous		Good by 2021
Alaw (upstream Llyn Alaw)	GB110102058982	8.96	33.22	Not designated as being artificial or Heavily Modified	Good	Good	Good	-	-	Already Good
Goch Dulas	GB110102059000	3.77	29.05	Not designated as being artificial or Heavily Modified	Good	Moderate	Moderate	Zinc and Phosphorus		Good by 2021
Cefni (Cefni reservoir west)	GB110102058790	7.70	28.38	Not designated as being artificial or Heavily Modified	Good	Good	Good	-	-	Already Good
Lligwy	GB110102059070	5.92	10.22	Not designated as being artificial or Heavily Modified.	Good	Good	Good	-	-	Already Good
Cefni (Cefni reservoir east)	GB110102058780	5.28	16.10	Not designated as being artificial or Heavily Modified	Good	Good	Good	-	-	Already Good
Cefni (Ceint to Cefni reservoir)	GB110102058770	6.35	16.53	Not designated as being artificial or Heavily Modified	Good	Moderate	Moderate	Macrophytes and Phytobenthos combined		Good by 2027

[1] The data presented is from the Cycle 1, 2009 baseline. This water water body formerly fell within the Wygyr catchment. These non reportable water bodies were not assessed in Cycle 2, 2015.

Table 1 2015 RBMP baseline data for all river water bodies in the Study Area

Water body name	Water body ID	Approximate length of principal watercourse (km)	Approximate catchment area (km^2)	Hydro-morphological designation	Chemical Status	Eco-logical Status/ Potential	Overall Water-body Status	Classification element not achieving Good	Reasons for not achieving Good status	Objective
Ceint	GB110102058940	7.03	18.63	The water body is designated as being Heavily Modified	Good	Moderate	Moderate	Mitigation Measures Assessment		Good by 2021
Non reportable WFD Waterbody east of Malltraeth Sands[2]	GB110102058670	-	-	The water body was designated as being Heavily Modified	Good	Moderate	Moderate	Mitigation Measures Assessment	-	Good by 2027
Braint (lower)	GB110102058660	10.19	27.52	The water body is designated as being artificial or Heavily Modified	Good	Moderate	Moderate	Mitigation Measures Assessment		Good by 2021
Braint (upper)	GB110102058690	11.43	29.50	Not designated as being artificial or Heavily Modified	Good	Good	Good	-	-	Already Good
Nant-y-Garth	GB110065058490	7.01	14.23	Not designated as being artificial or Heavily Modified	Good	Good	Good	-	-	Already Good
Cegin	GB110065058540	9.27	25.48	Not designated as being artificial or Heavily Modified.	Good	Moderate	Moderate	Phosphorus, Macrophytes and Phytobenthos		Good by 2027

[2] The data presented is from the Cycle 1, 2009 baseline. This water water body formerly fell within the ‘Cefni - tidal limit to Ceint’ catchment. These non reportable water bodies were not assessed in Cycle 2, 2015.

Table 2 2015 RBMP baseline data for all groundwater bodies in the Study Area

Water body name	Water body ID	Approximate catchment area (km^2)	Chemical Status	Quantitative Status	Overall Status	Classification element not achieving Good	Reason for not achieving Good	Objective
Ynys Mon Secondary	GB41002G204400	623.22	Poor	Good	Poor	Chemical GWSW test Chemical GWDTEs test	No known technical solution is available	Poor by 2015
Ynys Mon Central Carboniferous Limestone	GB41001G204200	57.77	Poor	Good	Poor	Chemical GWDTEs test	-	Good by 2021
Ynys Mon Southern Carboniferous Limestone	GB41002G206100	25.19	Good	Good	Good	-	-	Good by 2015
Llyn and Eryri	GB41002G204600	1,317.20	Poor	Good	Poor	Chemical GWSW test Chemical GWDTEs test	No known technical solution is available	Poor by 2015

Table 3 2015 RBMP baseline data for all Lake water bodies in the Study Area

Water body name	Water body ID	Approximate catchment area (km^2)	Hydromorphological designation	Chemical Status	Ecological Status/ Potential	Overall Waterbody Status	Classification element not achieving Good	Reasons for not achieving Good status	Objective
Llyn Alaw	GB31032538	3.09[3] 33.2[4]	Designated as Heavily Modified Water Body	Good	Moderate	Moderate	Expert Judgement Mitigation Measures Assessment Total Phosphorus	-	Good by 2021
Cefni Reservoir	GB31032926	0.68[3] 44.8[5]	Designated as Heavily Modified Water Body	Good	Moderate	Moderate	Expert Judgement Mitigation Measures Assessment Total Phosphorus	-	Good by 2021

[3] NRW reported surface area

[4] Catchment area of the Alaw upstream catchment draining to the lake.

[5] Total area of catchments, Cefni reservoir east and Cefni reservoir west, draining to Cefni reservoir.

Table 4 2015 RBMP baseline data for all transitional and coastal water bodies in the Study Area									
Water body name	Water body ID	Approximate catchment area (km^2)	Hydro-morphological designation	Chemical Status	Ecological Status/ Potential	Overall Waterbody Status	Classification element not achieving Good	Reasons for not achieving Good status	Objective
Anglesey North	GB641010620000	126.00	Not designated as being artificial or Heavily Modified	Fail	Good	Moderate	Mercury	-	Good by 2021
Menai Strait	GB681010120000	72.10	Not designated as being artificial or Heavily Modified	Good	Good	Good	-	-	Good by 2015

Annex B

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North Wales Connection Project

Volume 5

Document 5.12.2.5B Water Framework Directive Assessment: Infrastructure Locations

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Table 1 Infrastructure located within each WFD surface water body in the Study Area

Water body name	Water body ID	Water body Area (km^2)	Length of mapped principal watercourse (km)	Access track (km)	Access track water-course crossings	Pylons	Bel-mouths	Scaffold working area	Bridge working area	Conductor pulling positions	Under-grounding 3rd party services (m)	Under-ground water-course crossings	Construction compounds (m^2)	THH/ CSECs & Shafts	Sub-station upgrades and extensions (m^2)
	River waterbody														
Non reportable WFD Waterbody adjacent to the Irish Sea	GB11010 2059160		-	4.21 (NG) 1.24 (SPEN)	1 Bridge 1 Culvert	7 (New) 7 (Existing)	7	10	1	5	1269	0	0	0	1 (Upgrade, no change in footprint or activities)
Wygyr (River)	GB11010 259170	27.03	5.9	8.04 (NG) 4.46 (SPEN)	3 Bridge 11 Culvert	15 (New) 15 (Existing)	3	8	3	5	1722	1	0	0	0
Alaw (upstream Llyn Alaw)	GB11010 2058982	33.22	8.96	5.01 (NG) 2.26 (SPEN)	1 Bridge 5 Culvert	16 (New) 9 (Existing, 7 being dismantled) 2 (Temporary)	8	25	1	10	1951	4	0	0	0
Goch Dulas	GB11010 2059000	29.05	3.77	6.69 (NG) 7.07 (SPEN)	2 Bridge 3 Culvert	15 (New) 12 (Existing, 3 being dismantled)	6	10	2	10	3057	2	0	0	0
Cefni (Cefni reservoir west)	GB11010 2058790	28.38	7.70	1.00 (NG) 1.65 (SPEN)	0	3 (New) 3 (Existing)	2	2	0	1	1080	0	0	0	0
Lligwy	GB11010 2059070	10.22	5.92	0.73 (NG)	0	2 (New) 2 (Existing)	0	0	0	1	924	0	0	0	0

Table 1 Infrastructure located within each WFD surface water body in the Study Area

Water body name	Water body ID	Water body Area (km^2)	Length of mapped principal watercourse (km)	Access track (km)	Access track water-course crossings	Pylons	Bel-mouths	Scaffold working area	Bridge working area	Conductor pulling positions	Under-grounding 3rd party services (m)	Under-ground water-course crossings	Construction compounds (m^2)	THH/ CSECs & Shafts	Sub-station upgrades and extensions (m^2)
				1.83 (SPEN)											
Cefni (Cefni reservoir east)	GB11010 2058780	16.10	5.28	4.47 (NG) 2.52 (SPEN)	1 Bridge 2 Culvert	9 (New) 7 (Existing)	3	2	1	2	1211	2	0	0	0
Cefni (Ceint to Cefni reservoir)	GB11010 2058770	16.53	6.35	3.47 (NG) 1.68 (SPEN)	1 Bridge 4 Culvert	8 (New) 7 (Existing)	8	8	1	0	525	0	0	0	0
Ceint	GB11010 2058940	18.63	7.03	6.55 (NG) 1.59 (SPEN)	4 Bridge 8 Culvert	11 (New) 12 (Existing)	6	10	4	2	747	1	4,900	0	0
Non reportable WFD Waterbody east of Malltraeth Sands	GB11010 2058670	0.038	-	0.18 (NG) 0.05 (SPEN)	0	1 (New)	0	0	0	1	32	0	0		0
Braint (lower)	GB11010 2058660	27.52	10.19	2.94 (NG) 1.16 (SPEN)	2 Bridge 3 Culvert	6 (New) 3 (Existing)	0	2	2	2	1001	1	0		0
Braint (upper)	GB11010 2058690	29.50	11.43	3.58 (NG) 3.32	1 Bridge 1 Culvert	6 (New) 10 (Existing)	6	6	1	2	2280 725 of tunnel	1	0	1	0

Table 1 Infrastructure located within each WFD surface water body in the Study Area

Water body name	Water body ID	Water body Area (km^2)	Length of mapped principal watercourse (km)	Access track (km)	Access track water-course crossings	Pylons	Bel-mouths	Scaffold working area	Bridge working area	Conductor pulling positions	Under-grounding 3rd party services (m)	Under-ground water-course crossings	Construction compounds (m^2)	THH/ CSECs & Shafts	Sub-station upgrades and extensions (m^2)
				(SPEN)											
Nant-y-Garth (Menai Strait)	GB11006 5058490	14.23	7.01	3.34 (NG) 1.47 (SPEN)	1 Bridge 7 Culvert	6 (New) 9 (Existing)	11	2	3	2	1619 1400 of tunnel	4	22,600	1	1 (extension area approx 3.4 ha)
Cegin	GB11006 5058540	25.48	9.27	0	0	0	0	0	0	0	0	0	20,000	0	0
	Groundwater bodies (Sum of all infrastructure on top and within Order Limits)														
Ynys Mon Secondary	GB41002 G204400	623.22	-	38.87 (NG) 25.56 (SPEN)	14 Bridge 30 Culverts	49 (New) 25 (Existing) 10 (Dismantled) 2 (Temporary)	36	61	12	39	14406	11	0	1	1 (Upgrade, no change in footprint or activities)
Ynys Mon Central Carboniferous Limestone	GB41001 G204200	57.77	-	7.75 (NG) 3.27 (SPEN)	2 Bridge 8 Culverts	15 (New)	9	15	4	1	1166	1	4,900	0	0
Ynys Mon Southern Carboniferous Limestone	GB41002 G206100	25.19	-	0.26	0	0	1	0	0	0	227	0	0	0	0
Llyn and Eryri	GB41002 G204600	1,317.20	-	3.34 1.47 (SPEN)	1 Bridge 7 Culvert	6 (New) 2 (Existing)	12	2	3	2	1619	4	44,600	1	1 (extension area approx 3.4

Table 1 Infrastructure located within each WFD surface water body in the Study Area

Water body name	Water body ID	Water body Area (km^2)	Length of mapped principal watercourse (km)	Access track (km)	Access track water-course crossings	Pylons	Bel-mouths	Scaffold working area	Bridge working area	Conductor pulling positions	Under-grounding 3rd party services (m)	Under-ground water-course crossings	Construction compounds (m^2)	THH/ CSECs & Shafts	Sub-station upgrades and extensions (m^2)
															ha)
	Lake waterbodies (Sum of all infrastructure associated with inflowing catchments. The Order Limits do not extend to within 0.5km of the lake water bodies)														
Llyn Alaw	GB31032 538	3.091 33.222	-	5.01 (NG) 2.26 (SPEN)	1 Bridge 5 Culvert	16 (New) 9 (Existing, 7 being dismantled) 2 (Temporary)	8	25	1	10	1951	4	0	0	0
Cefni Reservoir	GB31032 926	0.68**Error! Bookmark not defined.** 44.483	-	5.47 (NG) 4.17 (SPEN)	1 Bridges 2 Culvert	12 (New) 10 (Existing)	5	4	2	3	2211	2	0	0	0
	Transitional and coastal waterbody (Sum of all infrastructure associated with inflowing catchments. The Order Limits are outwith these water bodies, with the exception of tunneling)														
Anglesey North	GB64101 0620000	126.00	-	19.67 (NG) 14.6 (SPEN)	15 Bridge 37 Culvert	39 (New) 26 (Existing)	16	28	6	21	6972	4	0	0	1 (Upgrade, no change in footprint or activities)
Menai	GB68101	72.10	-	9.86	2 Bridge	18 (New)	17	10	6	6	4900m of	5	22600	2	62,000

[1] WFD catchment area for waterbody.

[2] Area of inflowing Alaw catchment

[3] Combined area of inflowing Cefni reservoir east and Cefni reservoir west

Table 1 Infrastructure located within each WFD surface water body in the Study Area															
Water body name	Water body ID	Water body Area (km^2)	Length of mapped principal watercourse (km)	Access track (km)	Access track water-course crossings	Pylons	Bel-mouths	Scaffold working area	Bridge working area	Conductor pulling positions	Under-grounding 3rd party services (m)	Under-ground water-course crossings	Construction compounds (m^2)	THH/ CSECs & Shafts	Sub-station upgrades and extensions (m^2)
Strait	0120000			(NG) 5.95 (SPEN)	8 Culvert	22 (Existing)					3rd party infrastructure, 420 m of the tunnel, at least 10 m below sea bed				

Annex C

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nationalgrid

North Wales Connection Project

Volume 5

Document 5.12.2.5C Water Framework Directive Compliance Assessment

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Table 1 Access tracks including watercourse crossings (culverts and clear span)			
WFD Element	WFD Sub element	Control and management measures of particular relevance (described further in the CEMP Document 7.4)	Assessment of effects on WFD Element
RIVER WATER BODIES			
Hydromorphological Supporting Elements	Quantity and dynamics of flow	Drainage management: WE51-WE55, Stand-off distances from watercourses: WE31, Structures in the floodplain: FM13 Watercourse crossing design: FM14 Watercourse crossing design: FM14, Flood Risk Activities Permit or Ordinary Watercourse Consent: FM12	**Access tracks** There would be no effects on quantity and dynamics of flow as there would be no in channel works or alterations to the flow regime following the implementation of control and management measures. **Bridge watercourse crossings** There would be no effects on quantity and dynamics of flow as there would be no in channel works or alterations to the flow regime associated with the construction of access track bridge watercourse crossings following the implementation of control and management measures. Illustrative bridge details for overhead line construction are shown on Design Plan DCO_DE/PS/11_05 Sheet 5 of 6 (**Document 4.13**). **Culverted watercourse crossings** The construction of culverted access track watercourse crossings would generally be achieved by localised damming of the flow upstream of the proposed crossing location, with overpumping of water to leave a dry area in which to install the culvert. This would naturally lead to a period of localised flow regime alteration. During this period, which is likely to be less than two days in duration, there would be a temporary change in both the quantity and dynamics of flow. The upstream damming is likely to locally increase water quantity and reduce flow/velocity variability due to the impounding of flow. The extent to which these effects will propagate upstream of the dam would depend on the amount of flow within and gradient of the watercourse, but it is not expected to extend beyond 50 m upstream. The discharge location of the overpumped water, downstream of the crossing, is likely to be a point discharge rather than being spread across the full width of the channel. However, it is anticipated that the full channel width would be occupied with normal flow quantity and variability within a short distance of the discharge point. The length of channel that falls between the damming and discharge points would have all recognisable flow removed from it until the culvert is installed and overpumping of water is no longer necessary. This is likely to be less than one day in duration. Whilst these local alterations to the quantity and dynamics of flow are not insignificant, the effects would be fully reversible once the flow is re-connected following culvert installation. Once the culvert is installed, the baseline quantity of water within the channel would be re-established. Given the introduction of a straight and homogeneous culvert lining, it is likely that there may be some localised changes to more uniform flow types as water passes under the culvert. However, as the conveyance capacity of the channel would not be reduced as a result of any watercourse crossing, it is unlikely that any local change in flow dynamics would propagate any further than 10 m up or

Table 1 Access tracks including watercourse crossings (culverts and clear span)			
WFD Element	WFD Sub element	Control and management measures of particular relevance (described further in the CEMP Document 7.4)	Assessment of effects on WFD Element
			downstream of the culvert itself. Considering the scale and duration of these activities in the context of the WFD water body size and the RBMP reporting timescales, there is a high degree of confidence that the effects of these localised changes in the quantity and dynamics of flow would not have any effect on WFD water body status following the implementation of control and management measures. Furthermore, only the THH/CSECs have permanent access tracks, therefore, the majority of access track watercourse crossings would be temporary, any effects are likely to be fully reversible once they are removed following the construction phase. Effects on hydromorphology quality element: Based on the criteria set out in Table 12.6 of **Document 5.12** there would be a Low magnitude of change on quantity and dynamics of flow. However, this would be for a very short duration and would be reversible. There would be no need to provide additional mitigation to facilitate compliance with WFD for all phases of the Proposed Development.
	River continuity (lateral and longitudinal)	**Stand-off distances from watercourses: WE31** **Watercourse crossing design: FM14** **Watercourse crossing design: FM14**, **Flood Risk Activities Permit or Ordinary Watercourse Consent: FM12**	**Access tracks** As access tracks would not involve any in channel works, and therefore would not affect the ability of water to connect either upstream/downstream or laterally with the adjacent floodplain, there would be no effects associated with river continuity. **Bridge watercourse crossings** There would be no effects on river continuity as there would be no in channel works (e.g. piers or bank reinforcement) or alterations to the flow regime associated with the construction of access track bridge watercourse crossings following the implementation of control and management measures. **Culverted watercourse crossings** The culverted access track watercourse crossings would be enclosed structures that would result in a very minor/localised reduction of the lateral connectivity of river flow with the adjacent floodplain. Furthermore, as the culverts would be solid structures, they would locally restrict the ability of the watercourse to alter its planform via changes to bed and bank morphology through changing erosion/deposition patterns. Whilst culvert beds are likely to reduce the flow resistance relative to the background conditions (i.e. the existing river channel boundary), the conveyance capacity of the channel would not be reduced as a result of any watercourse crossing, in line with the control and management measures. This would be accommodated through appropriate hydraulic design, as part of **FM14**, and via the permitting process for in-channel works, as part of **FM12**. Therefore, it would be unlikely for there to be any discernible change in water and/or sediment transfer relative to baseline conditions. Based on a reasonable worst-case assumption of 45 culverted watercourse crossings each with a worst case width of 10 m, there would be a total of 450 m of culverted watercourse. These would be installed

Table 1 Access tracks including watercourse crossings (culverts and clear span)			
WFD Element	WFD Sub element	Control and management measures of particular relevance (described further in the CEMP Document 7.4)	Assessment of effects on WFD Element
			across the Order Limits for a maximum period of six years, during construction, after which they would be removed. This total culvert length would represent only ~ 0.5 % of the total length of mapped WFD principal watercourse in the Study Area, which itself is a gross underestimation of the total watercourse length within the Study Area. Even based on these reasonable worst case assumptions, the scale of culverting is considered to be minimal. Considering the scale and duration of these activities in the context of the WFD water body size, there is a high degree of confidence that the effects of any localised changes in the river continuity would not have any effect on WFD water body status. Furthermore, as the majority of access track watercourse crossings would be temporary, any effects are likely to be fully reversible once they are removed following the construction phase. **Effects on hydromorphology quality element**: Based on the criteria set out in Table 12.6 of **Document 5.12**, and considering the implementation of the control and management measures, there would be a Very Low magnitude of change on river continuity. There would be no need to provide additional mitigation to facilitate compliance with WFD for all phases of the Proposed Development.
	River width and depth variation	**Stand-off distances from watercourses: WE31** **Watercourse crossing design: FM14, Flood Risk Activities Permit or Ordinary Watercourse Consent: FM12** **Watercourse crossing design: FM14, Flood Risk Activities Permit or Ordinary Watercourse Consent: FM12**	**<u>Access tracks</u>** There would be no effects on river width and depth variation as there would be no in channel works. **<u>Bridge watercourse crossings</u>** There would be no effects on river width and depth variation as there would be no in channel works (e.g. piers or bank reinforcement) or alterations to the flow regime associated with the construction of access track bridge watercourse crossings, provided bridge abutments are set back sufficiently from the banktop. This would be secured via the implementation of control and management measures. **<u>Culverted watercourse crossings</u>** The culverted access track watercourse crossings would have a localised effect on both the planform and cross-sectional form of all relevant watercourses. The culverts would introduce a straight planform and a uniform cross-section. The degree of change that this may introduce would be dependent on the type of watercourse in question. For example, a culverted crossing of a man-made drainage ditch (making up approximately 45 of the 62 watercourse crossings, based on a visual assessment of crossings) is unlikely to introduce much of a change relative to the baseline planform and cross-section of the channel. Culverted crossings of relatively natural watercourses are likely to experience a greater magnitude of change as their baseline width and depth variability is likely to be greater. However, as the maximum culvert crossing would not extend beyond 10 m of river length, it is reasonable to conclude that these effects would be very localised. Furthermore, the avoidance of locating culverts in obviously mobile reaches of watercourse would further limit any change in width and depth variation relative to the baseline conditions.

Table 1 Access tracks including watercourse crossings (culverts and clear span)			
WFD Element	WFD Sub element	Control and management measures of particular relevance (described further in the CEMP Document 7.4)	Assessment of effects on WFD Element
			Considering the scale of any effects in the context of the WFD water body size (as presented above, the entire culverted length across the Study Area is only ~0.5% of the length of the mapped length of principal WFD watercourse), there is a high degree of confidence that the effects of these localised changes on river width and depth variation would not have any effect on WFD water body status. Furthermore, as the majority of access track watercourse crossings would be temporary, any effects are likely to be fully reversible once they are removed following the construction phase. **Effects on hydromorphology quality element**: Based on the criteria set out in Table 12.6 of **Document 5.12**, and considering the implementation of the control and management measures, there would be a Very Low magnitude of change on river width and depth variation. There would be no need to provide additional mitigation to facilitate compliance with WFD for all phases of the Proposed Development.
	Structure and substrate of the river bed	**Stand-off distances from watercourses: WE31** **Watercourse crossing design: FM14** **Watercourse crossing design: FM14**, **Flood Risk Activities Permit or Ordinary Watercourse Consent: FM12**	**<u>Access tracks</u>** There would be no effects on structure and substrate of the river bed as there would be no in channel works. **<u>Bridge watercourse crossings</u>** There would be no effects on structure and substrate of the river bed as there would be no in channel works (e.g. piers or bank reinforcement) or alterations to the flow regime associated with the construction of bridge access track watercourse crossings. **<u>Culverted watercourse crossings</u>** The culverted access track watercourse crossings would present a localised alteration to the structure and substrate of the river bed. This is as a result of the culvert introducing a short section of new physical modification that would be composed of hard/resistant material. In most circumstances this will replace the existing bed material, which may range from gravels/cobbles for more natural watercourses to fine grained / silty beds on man-made drainage ditches. Considering the scale of any effects in the context of WFD water body size (as presented above, the entire culverted length across the Study Area is only ~0.5% of the length of the mapped length of principal WFD watercourse), there is a high degree of confidence that the effects of these localised changes on the structure and substrate of the river bed would not have any effect on WFD water body status. Furthermore, as the majority of access track watercourse crossings would be temporary, any effects are likely to be fully reversible once they are removed following the construction phase. **Effects on hydromorphology quality element**: Based on the criteria set out in Table 12.6 of **Document 5.12**, and considering the implementation of the control and management measures, there would be a Very Low magnitude of change on the structure and substrate of the river bed. There would be no need to provide additional mitigation to facilitate compliance with WFD for all phases of the

Table 1 Access tracks including watercourse crossings (culverts and clear span)			
WFD Element	WFD Sub element	Control and management measures of particular relevance (described further in the CEMP Document 7.4)	Assessment of effects on WFD Element
			Proposed Development.
	Connectivity with groundwater	**Stand-off distances from watercourses: WE31** **Watercourse crossing design: FM14** **Watercourse crossing design: FM14**	**<u>Access tracks</u>** There would be no effects on the connectivity between the river and groundwater as there would be no in channel works. **<u>Bridge watercourse crossings</u>** There would be no effects on the connectivity between the river and groundwater as there would be no in channel works or changes to the river bed or banks associated with the bridge watercourse crossings. **<u>Culverted watercourse crossings</u>** Given the scale of the culverts under consideration (reasonable worst case of 10 m in the downstream direction) and the fact that they would not extend significantly beyond the depth of the current bed level, there is a high degree of confidence that any localised disturbance of the connectivity between watercourses and the underlying groundwater would be negligible. Considering the scale of any effects in the context of the WFD water body size (both river and groundwater), there is a high degree of confidence that the effects of these localised changes on the connectivity with groundwater would not have any effect on the WFD water body status. Furthermore, as the majority of access track watercourse crossings would be temporary, any effects are likely to be fully reversible once they are removed following the construction phase. **Effects on hydromorphology quality element**: Based on the criteria set out in Table 12.6 of **Document 5.12** and considering the implementation of the control and management measures, there would be a Very Low magnitude of change on connectivity with groundwater. There would be no need to provide additional mitigation to facilitate compliance with WFD for all phases of the Proposed Development.
	Structure of the riparian zone	**Structures in the floodplain FM13, Watercourse crossing design: FM14**	**<u>Access tracks, bridge and culverted watercourse crossings</u>** The access track watercourse crossings may result in local alterations to the type of riparian vegetation present on the channel margins to allow the track or crossing to be built with sufficient space to accommodate the vehicles that would be used to transport materials to works locations. However, considering the size of the proposed tracks and crossings, it is likely that any localised removal of riparian vegetation would be negligible in relation to the length of the existing riparian corridor.

Table 1 Access tracks including watercourse crossings (culverts and clear span)			
WFD Element	WFD Sub element	Control and management measures of particular relevance (described further in the CEMP Document 7.4)	Assessment of effects on WFD Element
			Considering the scale and duration of any effects in the context of the WFD water body size, there is a high degree of confidence that the effects of these localised changes on the structure of the riparian zone would not have any effect on WFD water body status. Furthermore, as the majority of the access tracks and watercourse crossings would be temporary, any effects are likely to be fully reversible once they are removed following the construction phase. **Effects on hydromorphology quality element:** Based on the criteria set out in Table 12.6 of **Document 5.12**, and considering the implementation of the control and management measures, there would be a Very Low magnitude of change on the structure of the riparian zone. There would be no need to provide additional mitigation to facilitate compliance with WFD for all phases of the Proposed Development.
Physico-chemical quality elements Chemical quality elements	Ammonia (Phys-Chem), Phosphate, Dissolved oxygen, Temperature Specific Pollutants, Priority substances and Priority Hazardous substances	**Pollution control: WE21-WE23, Watercourse crossing design: FM14, Flood Risk Activities Permit or Ordinary Watercourse Consent: FM12, Drainage management: WE51-WE56, WE57-58**	**<u>Access tracks, bridge and culverted watercourse crossings</u>** Small indirect effects on the existing baseline water quality could occur via the disturbance of fine grain and/or contaminated sediments, should they be present, within the channel and/or on the river banks at the location of culvert or bridge installation or the disturbance of any contaminated surface sediments where access tracks are constructed on the floodplain and/or close to watercourses. This risk is greatest in respect of culvert watercourse crossings where a short term 'pulse' of fine grained and/or contaminated sediment could propagate downstream once the flow is reconnected following culvert completion. This could also occur as a result of soil stockpiling for access track construction adjacent to watercourses. However, considering the control and management measures, and the scale of any effects in the context of WFD water body size (as presented above, the entire culverted length across the Study Area is only ~0.5% of the length of the mapped length of principal WFD watercourse), there is a high degree of confidence that the effects of these localised and short duration changes on water quality would not have any effect on the WFD water body status. Direct effects, specifically on WFD chemical status, could be with accidental spillage or leakage of hydrocarbons associated with vehicle/machinery fuels and oils, or metals (from machinery itself) at or adjacent to the location of culvert or bridge installation. Whilst the control and management measures are expected to manage the occurrence of such effects as far as practicable, small residual effects (e.g. slow/gradual leaks directly into or adjacent to the watercourse) cannot be discounted. However, considering the control and management measures, and the scale of any effects in the context of WFD water body size (as presented above, the entire culverted length across the Study Area is only ~0.5% of the length of the mapped length of principal WFD watercourse), there is a high degree of confidence that the effects of these localised and short duration changes on water quality would not have any effect on WFD water body status. **Effects on identified Physico-chemical and Chemical quality elements**: Based on the criteria set out in Table 12.6 of **Document 5.12**, and considering the implementation of the control and

Table 1 Access tracks including watercourse crossings (culverts and clear span)			
WFD Element	WFD Sub element	Control and management measures of particular relevance (described further in the CEMP Document 7.4)	Assessment of effects on WFD Element
			management measures, there would be a Very Low magnitude of change associated with access tracks and their watercourse crossings. There would be no need to provide additional mitigation to facilitate compliance with the WFD for all phases of the Proposed Development.
Biological quality elements	Fish, Macrophytes, phytobenthos, and invertebrates	None required in addition to those identified for hydromorphological, physico-chemical and chemical quality elements.	Effects on biological quality elements are almost exclusively associated with changes to the hydromorphology and/or water quality of a watercourse that collectively make up the habitat upon which fish, macrophytes/phytobenthos and invertebrates are dependent. Given that no effects on hydromorphology or water quality (physico-chemical and chemical) WFD element status have been identified as a result of access tracks, bridge watercourse crossings and/or culverted watercourse crossings, it is logical to conclude that there would also be no effects on the WFD status of any biological quality elements.
GROUNDWATER BODIES			
Groundwater quantity elements	All	**Drainage management: WE51-WE55.** **Groundwater and Dewatering Discharges: WE41 and WE43**	**<u>Access tracks, bridge and culverted watercourse crossings</u>** As identified above, effects on surface water – groundwater connectivity in relation to access tracks, bridges and culverts are expected to be negligible at the groundwater body scale. As a result, there is a high degree of confidence that the same conclusion can be applied to the groundwater quantity elements of groundwater body status. **Effects on quantity elements**: Based on the criteria set out in Table 11.4 of **Document 5.11**, and considering the implementation of the control and management measures, there would be a Low magnitude of change associated with access tracks and their watercourse crossings. There would be no need to provide mitigation to facilitate compliance with WFD for all phases of the Proposed Development.
Groundwater chemical elements	All	**Pollution control: WE21-WE23, Watercourse crossing design: FM14, Drainage management: WE51-WE56, WE57-58, Soil stockpile management: FM13 and WE31,** **Contaminated Land: CL11, CL21, CL23 and CL26.**	**<u>Access tracks, bridge and culverted watercourse crossings</u>** Small indirect effects on the existing baseline water quality could in theory occur via the disturbance or introduction of contaminated sediments during access track or watercourse crossing construction, where a pathway to groundwater exists or may be created. Direct effects, specifically on WFD chemical status, could in theory occur with accidental spillage or leakage of PAHs associated with vehicle/machinery fuels and oils, or metals (from machinery itself) at or adjacent to construction locations for the access tracks or watercourse crossings, where a pathway to groundwater exists. Whilst the control and management measures are expected to manage the occurrence of such effects as far as practicable, small residual effects (e.g. slow/gradual leaks directly to ground) cannot be discounted. However, considering the control and management measures, and the scale of any effects in the context of WFD groundwater body size, there is a high degree of confidence that the effects of these localised and short duration changes on water quality would not have any effect on WFD water

Table 1 Access tracks including watercourse crossings (culverts and clear span)			
WFD Element	WFD Sub element	Control and management measures of particular relevance (described further in the CEMP Document 7.4)	Assessment of effects on WFD Element
			body status. **Effects on chemical elements**: Based on the criteria set out in Table 11.4 of **Document 5.11**, and considering the implementation of the control and management measures, there would be a Low magnitude of change associated with access tracks and their watercourse crossings. There would be no need to provide mitigation to facilitate compliance with WFD for all phases of the Proposed Development.
TRANSITIONAL/COASTAL WATER BODIES			
The impacts of the access tracks and associated watercourse crossings are considered within the assessment of the WFD river catchment water bodies. It is considered that the control and management measures associated with these activities provide a sufficient level of protection. Any residual effects would be very minimal given the distance from the Order Limits to the coastal and transitional water bodies as well as the considerable dilution associated with the pathway of the effects to these receptors. There would be no effects on the WFD status of any of the Transitional and Coastal water bodies in the Study Area as a result of the access tracks or associated watercourse crossings.			

Table 2 Temporary Working Areas (Including, pylons, scaffolding, bellmouths, conductor pulling, temporary construction compounds and CSE compounds)			
WFD Element	WFD Sub element	Control and management measures of particular relevance (described further in Table 12.20 in **Document 5.12**)	Assessment of effects on WFD Element
RIVER WATER BODIES			
Hydromorphological Supporting Elements	All sub-elements, and specifically structure and substrate of the river bed	**Pollution control: WE21-WE23, Groundwater and dewatering discharges: WE41-43, Drainage management: WE51-WE56, Stand-off distances from watercourses: WE31**	There would be no direct effects on hydromorphology as there would be no in channel works or alterations to the flow regime. However, the initial ground works associated with temporary working areas would result in the short-term exposure and disturbance of sediment. This will be managed by control and management measures such that the levels of fine-grained sediment delivered to adjacent watercourses would be minimised as far as practicable. However, there may be a very minor, short-duration and localised change in the structure and substrate of the river bed associated with delivery of fine-grained sediment that is elevated relative to baseline levels. Furthermore, any indirect effects on river flow regime will be managed via measures to ensure infiltration of any locally displaced runoff. **Effects on hydromorphology quality elements**: Based on the criteria set out in Table 12.6 of **Document 5.12**, and considering the implementation of the control and management measures, there would be a Very Low magnitude of change on the structure and substrate of the river bed. There would be no need to provide additional mitigation to facilitate compliance with WFD for all phases of the Proposed Development.
Physico-chemical quality elements Chemical quality elements	Ammonia (Phys-Chem), Phosphate, Dissolved oxygen, Temperature Specific Pollutants, Priority substances and Priority Hazardous substances	**Pollution control: WE21-WE23, Groundwater and dewatering discharges: WE41-43, Drainage management: WE51-WE56, WE57-58**	Pylon working areas, construction compounds and substations areas that are scoped in for detailed assessment are those located within Flood Zone C2 or within 25 m from any watercourse. The objective of these scoping thresholds is to ensure that effects on water quality associated with the activities at these areas are fully accounted for. Effects during construction would principally be associated with activities that would involve the disturbance of sediments that have a pathway to the adjacent watercourse via runoff. This would particularly be associated with high rainfall periods or during a flood, but is will be fully managed by the incorporation of **WE21-WE23** and **WE51-WE56**. Effects could also be associated with short duration discharges associated with dewatering activities during pylon foundation construction, although this is expected to be very minimal and fully managed by the incorporation of **WE41-WE43**. Furthermore, effects, specifically on WFD chemical status, could be associated with accidental spillage or leakage of hydrocarbons associated with vehicle/machinery fuels and oils, or metals (from machinery itself) that could have a pathway to an adjacent watercourse. The same effects could be associated with the disturbance and mobilisation of contaminated sediments that forms part of the baseline conditions. Whilst the control and management measures (principally **WE21-WE23** and **WE51-WE56**) will manage the occurrence of such effects as far as practicable, small residual effects (e.g. slow/gradual leaks) cannot be discounted. However, considering the control and management measures, and the scale and duration of any effects in the context of WFD water body size, there is a high degree of confidence that the effects of these localised and short duration changes on water

Table 2 Temporary Working Areas (Including, pylons, scaffolding, bellmouths, conductor pulling, temporary construction compounds and CSE compounds)			
WFD Element	WFD Sub element	Control and management measures of particular relevance (described further in Table 12.20 in **Document 5.12**)	Assessment of effects on WFD Element
			quality would not have any effect on WFD water body status. **Effects on identified Physico-chemical and Chemical quality elements**: Based on the criteria set out in Table 12.6 of **Document 5.12**, and considering the implementation of the control and management measures, there would be a Very Low magnitude of change on the structure of the riparian zone. There would be no need to provide additional mitigation to facilitate compliance with WFD for all phases of the Proposed Development.
Biological quality elements	Fish, Macrophytes and phytobenthos, and invertebrates	None required in addition to those identified for hydromorphological, physico-chemical and chemical quality elements.	Effects on biological quality elements are almost exclusively associated with changes to the hydromorphology and/or water quality of a watercourse that collectively make up the habitat upon which fish, macrophytes/phytobenthos and invertebrates are dependent. Given that no effects on hydromorphology or water quality (physico-chemical and chemical) WFD element status have been identified as a result of pylon working areas, construction compounds, substations and CSE compounds, it is logical to conclude that there would also be no effects on the WFD status of any biological quality elements.
GROUNDWATER BODIES			
Groundwater quantity elements	All	**Drainage management: WE51-WE55.** **Groundwater and Dewatering Discharges: WE41 and WE43.**	Works in relation to temporary working areas access are generally not expected to encounter groundwater. However, dewatering may be required at pylon locations to form foundations. The maximum depth of foundations for the majority of pylons shallow pad foundations would be 3.5 m and any pumping to allow the construction of the pylon footings would typically continue for a short period of approximately 3 to 6 days. Therefore, the effect is expected to be negligible at the groundwater body scale. **Effects on quantity elements**: Based on the criteria set out in Table 11.4 of **Document 5.11**, and considering the implementation of the control and management measures, there would be a Low magnitude of change on the groundwater conditions associated with laydown and working areas. There would be no need to provide additional mitigation to facilitate compliance with WFD for all phases of the Proposed Development.
Groundwater chemical elements	All	**Pollution control: WE21-WE23.** **Drainage management: WE51-WE56, WE57-58.** **Soil stockpile management: FM13 and WE31.** **Contaminated Land: CL11, CL21, CL23 and CL26.**	Small indirect effects on the existing baseline water quality could in theory occur via the disturbance or introduction of contaminated sediments or groundwater during construction of temporary working areas, where a pathway to groundwater exists or may be created. Direct effects, specifically on WFD chemical status, could in theory occur with accidental spillage or leakage of hydrocarbons associated with vehicle/machinery fuels and oils, or metals (from machinery itself) at or adjacent to construction locations, where a pathway to groundwater exists. Whilst the control and management measures are expected to manage the occurrence of such effects as far as practicable, small residual effects (e.g. slow/gradual leaks directly to ground) cannot be discounted. However, considering the control and

Table 2 Temporary Working Areas (Including, pylons, scaffolding, bellmouths, conductor pulling, temporary construction compounds and CSE compounds)			
WFD Element	WFD Sub element	Control and management measures of particular relevance (described further in Table 12.20 in **Document 5.12**)	Assessment of effects on WFD Element
			management measures, and the scale of any effects in the context of the WFD groundwater body size, there is a high degree of confidence that the effects of these localised and short duration changes on groundwater quality would not have any effect on the WFD water body status. **Effects on chemical elements**: Based on the criteria set out in Table 11.4 of **Document 5.11**, and considering the implementation of the control and management measures, there would be a Low magnitude of change associated with temporary areas. There would be no need to provide additional mitigation to facilitate compliance with WFD for all phases of the Proposed Development.
TRANSITIONAL/COASTAL WATER BODIES			
The impacts of the working areas are considered within the assessment of the WFD catchment water bodies. It is considered that the control and management measures associated with these activities provide a sufficient level of protection. Any residual effects would be very minimal given the distance from the Order Limits to the coastal and transitional water bodies as well as the considerable dilution associated with the pathway of the effects to these receptors. There would be no effects on the WFD status of any of the Transitional and Coastal water bodies in the Study Area as a result of working areas.			

Table 3 Underground Third Party Assets (including cable watercourse crossings)			
WFD Element	WFD Sub element	Control and management measures of particular relevance (described further in Table 12.20 in **Document 5.12**)	Assessment of effects on WFD Element
RIVER WATER BODIES			
Hydromorphological Supporting Elements	Quantity and dynamics of flow	Drainage management: WE51-WE56, Groundwater and dewatering discharges WE41-WE42 Environmental Permit for water discharge activity: WE43, Design of watercourse crossings: FM14, Flood Risk Activities Permit or Land Drainage Consent: FM12, Structures in the floodplain: FM13	**Trenched third party assets laying:** Any dewatering requirements to facilitate the necessary conditions for cable installation for third party works would be of shallow depth and low volume (both depending on ground conditions, but a maximum depth of 1m is assumed as a reasonable worst case) and short duration (typically dewatering would not take place at one individual location for more than two days) such that there would be no effects on adjacent watercourse baseflow. Should the low quantities of dewatered groundwater be discharged to an adjacent watercourse any effects on the baseline flow volume would be Very Low. Any alteration of existing subsurface (field) drains would be accommodated using control and management measures, specifically **WE56**, such that any new outfalls / re-routeing of the drains would not alter the baseline flow regime. **Underground trenched third party assets watercourse crossing**: The installation of trenched underground cable watercourse crossings would generally be achieved by localised damming of the flow upstream of the proposed crossing location, with overpumping of water to leave a dry area in which to install the cables. This would naturally lead to a period of localised flow regime alteration. During this period, which is likely to be less than two days in duration, there would be a temporary change in both the quantity and dynamics of flow. The upstream damming is likely to locally increase water quantity and reduce flow/velocity variability due to the impounding of flow. The extent to which these effects will propagate upstream of the dam would depend on the amount of flow within and gradient of the watercourse, but it is not expected to extend beyond 50 m upstream. The discharge location of the overpumped water, downstream of the crossing, is likely to be a point discharge rather than being spread across the full width of the channel. However, it is anticipated that the full channel width would be occupied with normal flow quantity and variability within a short distance of the discharge point. The channel that falls between the damming and discharge points would have all recognisable flow removed from it until the cables are installed and the bed and bank material have been reinstated, when the overpumping of water is no longer necessary. This process is likely to last less than two days in duration. Whilst these local alterations to the quantity and dynamics of flow are not insignificant, the effects would be fully reversible once the flow is re-connected following cable trench installation. Where a cable trench needs to cross a watercourse, the depth of the trench would increase to an appropriate depth below the river bed. Once the cables are installed, the baseline quantity of water within the channel and morphological conditions of the channel cross-section would be re-established. Therefore, the baseline quantity and dynamics of flow would be restored within approximately less than

Table 3 Underground Third Party Assets (including cable watercourse crossings)			
WFD Element	WFD Sub element	Control and management measures of particular relevance (described further in Table 12.20 in **Document 5.12**)	Assessment of effects on WFD Element
			two days. Considering the scale and duration of these activities in the context of the WFD water body size and the RBMP reporting timescales, there is a high degree of confidence that the localised and short duration changes in the quantity and dynamics of flow would not have any effect on the WFD water body status. Effects on hydromorphology quality element: Based on the criteria set out in Table 12.6 of **Document 5.12**, and considering the implementation of the control and management measures, there would be a Low magnitude of change on quantity and dynamics of flow. However, this would be for a very short duration and would be fully reversible. There would be no need to provide additional mitigation to facilitate compliance with the WFD for all phases of the Proposed Development.
	River continuity (lateral and longitudinal)	None required **Design of watercourse crossings: FM14, Flood Risk Activities Permit or Land Drainage Consent: FM12**	**<u>Trenched third party assets installation:</u>** There would no effects on river continuity as there would be no in-channel works. **<u>Underground trenched third party assets watercourse crossing:</u>** The construction works to facilitate underground asset watercourse crossings would not result in any permanent reduction in the lateral connectivity of river flow and the adjacent floodplain, as the topsoil and sediment that is removed in the trenching process would be reinstated on completion of the trench installation. Similarly, the interruption of longitudinal river continuity as a result of the temporary damming and overpumping of water (for a period of less than two days) would be fully reversed on completion of trench installation. Considering the scale and duration of these activities in the context of WFD water body size and the RBMP reporting timescales, there is a high degree of confidence that the effects of these localised changes in the river continuity would not have any effect on WFD water body status. Based on a reasonable worst case assumption of 16 trenched cable watercourse crossings each with a worst case width of 15 m, there would be a total of 150 m of river trenching across the Study Area during construction. This total trenched length would represent less than 0.5% of the total length of mapped WFD principal watercourse in the Study Area, which itself is a gross underestimation of the total watercourse length within the Study Area. Even based on these reasonable worst case assumptions, the scale of trenching is considered to be minimal. Furthermore, any effects would be short-lived and the structure of the river bed would become re-established following the first significant flow event after completion of the trench. **Effects on hydromorphology quality element:** Based on the criteria set out in Table 12.6 of **Document 5.12**, and considering the implementation of the control and management measures, there would be a Very Low magnitude of change on river continuity. There would be no need to provide additional mitigation to facilitate compliance with the WFD for all phases of the Proposed Development.

Table 3 Underground Third Party Assets (including cable watercourse crossings)			
WFD Element	WFD Sub element	Control and management measures of particular relevance (described further in Table 12.20 in **Document 5.12**)	Assessment of effects on WFD Element
	River width and depth variation	None required **Flood Risk Activities Permit or Land Drainage Consent: FM12, Design of watercourse crossings: FM14, Pollution control: WE21-WE23**	**Trenched third party assets:** There would no effects on river width and depth variation as there would be no in-channel works. **Underground trenched third party assets watercourse crossing:** The construction works to facilitate underground cable watercourse crossings would result in no perceptible alteration of the baseline river width and depth variation as the sediment and cross-sectional form that is removed in the trenching process would be reinstated on completion of the cable installation (a period of less than two days duration). This would be secured by implementation of **FM14**. Furthermore, as no new hard bank/bed reinforcement would be added to the channel, the works would not alter the baseline ability of the river to alter its form either laterally or vertically. Considering the scale and duration of these activities in the context of the WFD water body size and the RBMP reporting timescales, there is a high degree of confidence that the effects of these localised changes in the river continuity would not have any effect on the WFD water body status. **Effects on hydromorphology quality element**: Based on the criteria set out in Table 12.6 of **Document 5.12**, and considering the implementation of the control and management measures, there would be a Very Low magnitude of change on river width and depth variation. There would be no need to provide mitigation to facilitate compliance with the WFD for all phases of the Proposed Development.
	Structure and substrate of the river bed	**General principles: WE11, Pollution control: WE21-WE23, Drainage management: WE51-WE56** **Flood Risk Activities Permit or Land Drainage Consent: FM12, Design of watercourse crossings: FM14**	**Trenched third party assets:** The construction works associated with trenching in floodplains and/or adjacent to watercourses would result in the short-term exposure and disturbance of ground resulting in the generation of sediment in run-off. This will be managed by control and management measures (principally **WE11 and WE21-23**) such that the levels of fine-grained sediment delivered to adjacent watercourses would be minimised as far as practicable. However, there may be a very minor, short-duration and localised change in the structure and substrate of the river bed associated with delivery and transfer of fine-grained sediment as a result of the works that is temporarily elevated relative to baseline levels. **Underground trenched third party assets watercourse crossing:** The construction works to facilitate underground asset watercourse crossings would result in no perceptible alteration of the substrate of the river bed as the sediment and cross-sectional form that is removed in the trenching process would be reinstated on completion of the trench. However, it would not be possible to replace the exact structure of the river bed which, in many cases, will have evolved over time into a natural grain size and fabric arrangement. Based on a reasonable worst case assumption of 16 trenched cable watercourse crossings ach with a worst case width of 15m, there would be a total of 270m of river trenching across the Study Area during construction/decommissioning. This total trenched length would represent less than 0.5% of the total length of mapped principal watercourse within the Study Area, which itself is a gross underestimation of the total watercourse

Table 3 Underground Third Party Assets (including cable watercourse crossings)			
WFD Element	WFD Sub element	Control and management measures of particular relevance (described further in Table 12.20 in **Document 5.12**)	Assessment of effects on WFD Element
			length within the Study Area. Even based on these reasonable worst case assumptions, the scale of trenching is considered to be minimal. Furthermore, any effects would be short-lived and the structure of the river bed would become re-established following the first significant flow event after completion of the trench. It is possible that, following the reconnection of river flow, there would be a minor pulse of fine-grained sediment transported downstream associated with any loose/unconsolidated sediment that remains following the covering of the trench. However, this is likely to be very short-lived and would be within the normal range of suspended sediment transport rates associated with natural bed/bank disturbance (e.g. small-scale bank erosion). Considering the scale and duration of these activities in the context of the WFD water body size and the RBMP reporting timescales, there is a high degree of confidence that the effects of these localised changes in the river continuity would not have any effect on the WFD water body status. **Effects on hydromorphology quality element:** Based on the criteria set out in Table 12.6 of **Document 5.12**, and considering the implementation of the control and management measures, there would be a Very Low magnitude of change on the structure and substrate of the river bed. There would be no need to provide additional mitigation to facilitate compliance with the WFD for all phases of the Proposed Development.
	Connectivity with groundwater	**Groundwater and dewatering discharges WE41-WE42, Environmental Permit for water discharge activity: WE43** As above, plus: **Flood Risk Activities Permit or Land Drainage Consent: FM12, Design of watercourse crossings: FM14**	**<u>Trenched third party assets:</u>** The works associated with trenching in floodplains and/or adjacent to watercourses would not result in any alteration of the connectivity of river and groundwater bodies as there would be no in-channel works or structures introduced to the channel boundary. Furthermore, any dewatering requirements to facilitate the necessary conditions for cable installation would be of shallow depth, low volume and short duration such that there would be no significant effects on adjacent watercourse baseflow. **<u>Underground trenched third party assets watercourse crossing:</u>** Given the scale of the trenched underground asset installations (Assumed worst case of < 15m in the downstream direction and < 2.5m below the baseline river bed level) and the fact that the cables themselves would not provide any perceptible alteration of the pathway from rivers to the hyporheic zone, there is a high degree of confidence that any localised disturbance of the connectivity between watercourses and the underlying groundwater bodies would be negligible. Considering the scale and duration of any effects in the context of the WFD water body size (both river and groundwater), there is a high degree of confidence that the effects of these localised changes on the connectivity with groundwater would not have any effect on WFD water body status. **Effects on hydromorphology quality element:** Based on the criteria set out in Table 12.6 of **Document 5.12**, and considering the implementation of the control and management measures, there

Table 3 Underground Third Party Assets (including cable watercourse crossings)			
WFD Element	WFD Sub element	Control and management measures of particular relevance (described further in Table 12.20 in **Document 5.12**)	Assessment of effects on WFD Element
			would be a Very Low magnitude of change on connectivity with groundwater. There would be no need to provide additional mitigation to facilitate compliance with the WFD for all phases of the Proposed Development.
	Structure of the riparian zone	None required	**Underground trenched third party assets watercourse crossing:** The installation of underground cables may result in local alterations to the type of riparian vegetation present on the channel margins such that there would be sufficient clearance for periodic cable maintenance and/or repair works during their operational lifetime. However, it is likely that any localised removal of riparian vegetation would be negligible in relation to the length of existing riparian corridors. **Effects on hydromorphology quality element:** Based on the criteria set out in Table 12.6 of **Document 5.12**, and considering the implementation of the control and management measures, there would be a Very Low magnitude of change on the structure of the riparian zone. There would be no need to provide additional mitigation to facilitate compliance with the WFD for all phases of the Proposed Development.
Physico-chemical quality elements Chemical quality elements	Ammonia (Phys-Chem), Phosphate, Dissolved oxygen, Temperature Specific Pollutants, Priority substances and Priority Hazardous substances	**Pollution control: WE21-WE23, Flood Risk Activities Permit or Ordinary Watercourse Consent: FM12, Design of watercourse crossings: FM14, Drainage management: WE51-WE56, including silt management: WE55**	**Underground trenched third party assets watercourse crossings:** Small indirect effects on the existing baseline water quality could occur via the disturbance of contaminated sediments. This could be within the channel and/or on the river banks at the location of trenched underground cable watercourse crossing installations. This risk is greatest in respect of trenched underground cable crossings where a short term 'pulse' of contaminated water quality could propagate downstream once the flow is reconnected following the completion of the trench and the reinstatement of bed and bank materials. However, it could also potentially occur as a result of the short-term soil stockpiling alongside the trenched cable route adjacent to watercourses. Considering the control and management measures (principally **WE21**, **WE52-WE53** and **WE55**), and the scale and duration of any effects in the context of WFD water body size, there is a high degree of confidence that the effects of these localised and short duration changes on water quality would not have any effect on WFD water body status. Where construction works coincide with areas that have a history of mining the risk of ground and groundwater contamination could be increased. Direct effects, specifically on the WFD chemical status, could occur as a result of accidental spillage or leakage of hydrocarbons associated with vehicle/machinery fuels and oils, or metals (from machinery itself) at or adjacent to the location of the trenched cable route and trenched cable watercourse crossing. Whilst the control and management measures (principally **WE21-WE23**) are expected to manage the occurrence of such effects as far as practicable, small residual effects (e.g. slow/gradual leaks directly into or adjacent to the watercourse) cannot be discounted. However, considering the scale and duration of any effects in the context of the WFD water body size, there is a high degree of confidence that the effects of localised and short duration changes in water quality would not have any

Table 3 Underground Third Party Assets (including cable watercourse crossings)			
WFD Element	WFD Sub element	Control and management measures of particular relevance (described further in Table 12.20 in **Document 5.12**)	Assessment of effects on WFD Element
			effect on the WFD water body status. **Effects on identified Physico-chemical and Chemical quality elements**: Based on the criteria set out in Table 12.6 of **Document 5.12**, and considering the implementation of the control and management measures, there would be a Very Low magnitude of change associated with underground cables. There would be no need to provide additional mitigation to facilitate compliance with the WFD for all phases of the Proposed Development.
Biological quality elements	Fish, Macrophytes and phytobenthos, and invertebrates	None required	Effects on biological quality elements are almost exclusively associated with changes to the hydromorphology and/or water quality of a watercourse that collectively make up the habitat upon which fish, macrophytes/phytobenthos and invertebrates are dependent. Given that no effects on hydromorphology or water quality (physico-chemical and chemical) WFD element status have been identified as a result of underground, trenched, water course crossings, it is logical to conclude that there would also be no effects on the WFD status of any biological quality elements.
GROUNDWATER BODIES			
Groundwater quantity elements	All	**Drainage management: WE51-WE55, Groundwater and Dewatering Discharges: WE41 and WE43.**	**Underground trenched third party assets watercourse crossings** As identified above, effects on surface water – groundwater connectivity in relation to trenched cables and associated watercourse crossings are expected to be negligible at the groundwater body scale. As a result, there is a high degree of confidence that the same conclusion can be applied to the groundwater quantity elements of groundwater body status which could arise as a result of localised dewatering to facilitate trench installation. **Effects on quantity elements**: Based on the criteria set out in Table 11.4 of **Document 5.11**, and considering the implementation of the control and management measures, there would be a Low magnitude of change associated with trenched cables and associated watercourse crossings. There would be no need to provide mitigation to facilitate compliance with WFD for all phases of the Proposed Development.
Groundwater chemical elements	All	**Pollution control: WE21-WE23, Drainage management: WE51-WE56, WE57-58, Soil stockpile management: FM13 and WE31, Contaminated Land: CL11, CL21, CL23 and CL26.**	**Underground trenched third party assets watercourse crossings** Small indirect effects on the existing baseline water quality could in theory occur via the disturbance or introduction of contaminated sediments during construction, where a pathway to groundwater exists or may be created. Direct effects, specifically on the WFD chemical status, could in theory occur with accidental spillage or leakage of hydrocarbons associated with vehicle/machinery fuels and oils, or metals (from machinery itself) at or adjacent to construction locations for cable trenches, where a pathway to groundwater exists. Whilst the control and management measures are expected to manage the occurrence of such effects as far as practicable, small residual effects (e.g. slow/gradual leaks directly to ground) cannot be discounted. However, considering the control and management

Table 3 Underground Third Party Assets (including cable watercourse crossings)			
WFD Element	WFD Sub element	Control and management measures of particular relevance (described further in Table 12.20 in **Document 5.12**)	Assessment of effects on WFD Element
			measures, and the scale of any effects in the context of the WFD groundwater body size, there is a high degree of confidence that the effects of these localised and short duration changes on groundwater quality would not have any effect on the WFD groundwater body status. **Effects on chemical elements**: Based on the criteria set out in Table 11.4 of **Document 5.11**, and considering the implementation of the control and management measures, there would be a Low magnitude of change associated with third party asset trenches and associated watercourse crossings. There would be no need to provide mitigation to facilitate compliance with the WFD for all phases of the Proposed Development.

Table 4 Tunnel Construction Compounds, THH, CSECs, shafts and tunnel.			
WFD Element	WFD Sub element	Control and management Measures of particular relevance (described further in Table 12.20 in **Document 5.12**)	Assessment of effects on WFD Element
RIVER WATER BODIES			
Hydromorphological Supporting Elements	Quantity and dynamics of flow	**Drainage management: WE51-WE56, Tunnel drainage management plan: WE59** **Pollution control: WE21-WE23, Drainage management: WE51-WE55, and land drainage WE56, Management of dewatering arisings: WE41, WE42, Environmental Permit for water discharge activity: WE43, Tunnel drainage management plan: WE59** **Pollution control: WE21-WE23, Drainage management: WE51-WE55, and land drainage WE56, Management**	**<u>All works apart from shafts and tunnel dewatering / discharge of groundwater and surface water:</u>** There would be no effects on quantity and dynamics of flow as there would be no in-channel works or alterations to the flow regime of any watercourses. Surface water runoff would be managed such that there would be no increase on the flow regime of receiving watercourses. **<u>Shafts dewatering and discharge of dewatered groundwater and surface water runoff:</u>** Dewatering activities would be required to facilitate the construction of the shafts at Braint and Tŷ Fodol. The dewatering volumes are currently anticipated to be modest (30 m^3/day) and relate to groundwater inflow into the shaft base through drainage of the residual water pressure behind the secondary lining. No external dewatering would be required. These volumes would also reflect operation as the shafts would be constructed with a drained lining. In addition, surface water runoff generated in the vicinity of the THH and CSEC would also need to be treated to remove excess suspended solids and any hydrocarbon contamination and attenuated to pre-development rates prior to discharge from the site. There are a range of options proposed for these discharge activities. However, on a reasonable worst-case basis, should it be discharged in full to an adjacent watercourse, then this would be consented via an Environmental Permit that would stipulate restrictions in terms of water quality and quantity **(WE41, WE42, WE43**). For a temporary period, assumed to be 3 months maximum, this may result in higher than normal flow quantities in a small number of adjacent watercourses. **Effects on hydromorphology quality element:** Based on the criteria set out in Table 12.6 of **Document 5.12,** and considering the implementation of the control and management measures, there would be a Low magnitude of change on the quantity and dynamics of flow. It is unlikely that there would be a need to provide additional mitigation to facilitate compliance with the WFD for all phases of the Proposed Development. **<u>Tunnel dewatering and discharge of dewatered groundwater and surface water:</u>** There are two potential construction options for the tunnel. If the tunnel is constructed by Tunnel Boring Machine (TBM) the permanent tunnel lining would be installed as the TBM progresses and the allowable groundwater leakage rate through the tunnel lining would be

Table 4 Tunnel Construction Compounds, THH, CSECs, shafts and tunnel.			
WFD Element	WFD Sub element	Control and management Measures of particular relevance (described further in Table 12.20 in **Document 5.12**)	Assessment of effects on WFD Element
		of dewatering arisings: WE41, WE42, Environmental Permit for water discharge activity: WE43, Tunnel drainage management plan: WE59	reduced to 0.1 litres/m^2/day (British Tunnelling Society Specification for 'Capillary Dampness'). For the 4km tunnel with an internal diameter of 4m, this equates to a groundwater inflow rate of approximately 5 m^3/day. If the tunnel is constructed by drill and blast, open-face excavation for the entire length of the tunnel would be undertaken prior to the installation of the secondary tunnel lining. The estimated groundwater inflow rates are therefore much higher and are estimated to be a maximum of 900 m^3/day to the Braint THH and 250 m^3/day to the Tŷ Fodol THH, although these maximum values would only be attained during a very narrow time window (the former on breakthrough/connection of the two ends of the tunnel, and the latter immediately before breakthrough). During operation, using either construction method, the groundwater inflow rate would be estimated to be approximately 5m^3/day, as a consequence of leakage into the tunnel. Once removed from the tunnel by dewatering, there are a range of options proposed for the discharge of this water **(WE59)**. However, on a reasonable worst-case basis, should it be discharged in full to an adjacent watercourse, then this would be consented via an Environmental Permit that would stipulate restrictions in terms of water quality and quantity (**WE41, WE42, WE43**). **Effects on hydromorphology quality element:** Based on the criteria set out in Table 12.6 of **Document 5.12,** and considering the implementation of the control and management measures, there would be a Low magnitude of change on the quantity and dynamics of flow. It is unlikely that there would be a need to provide additional mitigation to facilitate compliance with the WFD for all phases of the Proposed Development.
	Connectivity with groundwater	None required **Pollution control: WE21-WE23, Drainage management: WE51-WE55, Management of dewatering arisings: WE41, WE42, Environmental Permit for water discharge activity: WE43, Tunnel drainage management plan: WE59**	**<u>All works apart from shaft and tunnel dewatering / discharge of groundwater and surface water:</u>** If required, any ditch diversions to accommodate the new infrastructure would be set within the same substrate as the baseline watercourses and there would be no hard bed reinforcement installed to limit the pathway for connectivity with the hyporheic zone. Therefore, there would be no effects on connectivity between river and groundwater bodies. **<u>Shaft dewatering and discharge of dewatered groundwater and surface water:</u>** The direct effects of dewatering activities to construct the tunnel shaft on river baseflow (i.e. the groundwater-surface water pathway) are considered against the groundwater WFD assessment criteria. None of the proposed works would involve activities or structures that would limit or restrict the pathway between surface water in watercourses and the hyporheic zone / shallow groundwater zone. Furthermore, dewatering activities to construct the tunnel shaft are expected to last for a period of ~3 months (maximum duration) and would cease following the installation of a watertight retaining structure (caisson) within the superficial deposits. This would isolate

Table 4 Tunnel Construction Compounds, THH, CSECs, shafts and tunnel.			
WFD Element	WFD Sub element	Control and management Measures of particular relevance (described further in Table 12.20 in **Document 5.12**)	Assessment of effects on WFD Element
			groundwater ingress in the superficial deposits from the shafts and tunnel. Furthermore, dewatering volumes are currently anticipated to be relatively modest (30m^3/day as a maximum worst case). As a result of these modest dewatering volumes relative to the volume of water typically stored in the groundwater bodies at both tunnelling sites, the relatively short duration of dewatering (3 months maximum) relative to the duration of a River Basin Planning cycle (6 years), and the fully reversible nature of any effects, it is predicted that there would be a negligible effect on the connectivity of surface and ground water bodies. **Effects on hydromorphology quality element:** Based on the criteria set out in Table 12.6 of **Document 5.12**, and considering the implementation of the control and management measures, there would be a Negligible magnitude of change on the connectivity with groundwater. There would be no need to provide additional mitigation to facilitate compliance with the WFD for all phases of the Proposed Development.
	Structure of the riparian zone	None available	**Effects on hydromorphology quality element:** Based on the criteria set out in Table 12.6 of **Document 5.12**, and considering the implementation of the control and management measures, there would be a Very Low magnitude of change on the structure of the riparian zone. There would be no need to provide additional mitigation to facilitate compliance with the WFD for all phases of the Proposed Development.
Physico-chemical quality elements Chemical quality elements	Ammonia, Phosphate, Dissolved oxygen, Temperature Specific Pollutants, Priority substances and Priority Hazardous substances	**Pollution control: WE21-WE23, Drainage management: WE51-WE55, Management of dewatering arisings: WE41, WE42, Environmental Permit for water discharge activity: WE43, Tunnel drainage management plan: WE59, Silt management: WE55**	Small indirect effects on the existing baseline water quality could occur via the disturbance of contaminated surface sediments during the groundworks and soil storage associated with the main tunnel sites and shafts. This could result in a short term ‘pulse’ of contaminated water quality that could propagate downstream during high rainfall events and/or floods. Considering the control and management measures (principally **WE21-WE23, WE59**), and the scale and duration of any effects in the context of the WFD water body size, there is a high degree of confidence that the effects of these localised and short duration changes on water quality would not have any effect on the WFD water body status. Direct effects, specifically on the WFD chemical status, could be associated with accidental spillage or leakage of hydrocarbons from vehicle/machinery fuels and oils, or metals (from machinery itself) that could have a pathway to the adjacent watercourse network. Whilst the control and management measures are expected to manage the occurrence of such effects as far as practicable, small residual effects (e.g. slow/gradual leaks directly into or adjacent to the watercourse) cannot be discounted. The potential for discharge of dewatered groundwater introduces a further risk to the water

Table 4 Tunnel Construction Compounds, THH, CSECs, shafts and tunnel.			
WFD Element	WFD Sub element	Control and management Measures of particular relevance (described further in Table 12.20 in **Document 5.12**)	Assessment of effects on WFD Element
			quality of the receiving watercourse (should this option be selected), but would be regulated by an Environmental Permit (**WE43**) that would stipulate thresholds for water quality that would not be allowed to fall below the relevant Environmental Quality Standards. Alternative measures for management of saline water are proposed in **WE59**. The implementation of these measures would not lead to any effects on WFD chemical status. Considering the control and management measures, and the scale and duration of any effects in the context of WFD water body size, there is a high degree of confidence that the effects of these localised and short duration changes on water quality would not have any effect on WFD water body status. **Effects on identified Physico-chemical and Chemical quality elements:** Based on the criteria set out in Table 12.6 of **Document 5.12**, and considering the implementation of the control and management measures, there would be a Low magnitude of change associated with works at the tunnel construction compounds. There would be no need to provide additional mitigation to facilitate compliance with the WFD for all phases of the Proposed Development.
Biological quality elements	Fish, Macrophytes and phytobenthos, and invertebrates	None required	Effects on biological quality elements are almost exclusively associated with changes to the hydromorphology and/or water quality of a watercourse that collectively make up the habitat upon which fish, macrophytes/phytobenthos and invertebrates are dependent. Given that no effects on hydromorphology or water quality (physico-chemical and chemical) WFD element status have been identified as a result of the tunnel works, it is logical to conclude that there would also be no effects on the WFD status of any biological quality elements.
GROUNDWATER BODIES			
Groundwater Quantity elements	Quantitative dependent surface water body status	None required	Dewatering activities would be required to facilitate the construction of the shafts at Braint and Tŷ Fodol. The dewatering volumes are currently anticipated to be very modest (30 m^3/day) and relate to groundwater inflow into the shaft base through drainage of the residual water pressure behind the secondary lining. No external dewatering would be required. These volumes would also reflect operation as the shafts would be constructed with a drained lining. The dewatering techniques and geology in the vicinity of the tunnel head houses (as described in **Document 5.11**) is such that the dewatering would have only a very localised effect with an estimated Steady State Radius of Influence of 23m and 36m at the Braint and Tŷ Fodol shafts, respectively. **Effects on quantitative dependent surface water body status element**: Based on the criteria set out in Table 12.6 of **Document 5.12**, there would be a Negligible magnitude of change on dependent surface water body status. There would be no need to provide

Table 4 Tunnel Construction Compounds, THH, CSECs, shafts and tunnel.			
WFD Element	WFD Sub element	Control and management Measures of particular relevance (described further in Table 12.20 in **Document 5.12**)	Assessment of effects on WFD Element
			additional mitigation to facilitate compliance with WFD for all phases of the Proposed Development.
	Groundwater dependent terrestrial ecosystems (GWDTEs)	None required	The identified GWDTEs (as identified in **Document 5.11**) are not within the same groundwater bodies as the shafts, tunnel, tunnel head houses or any associated activities. Therefore, there is no potential for effect on GWDTEs associated with these activities.
	Water balance	None required	Dewatering activities would be required to facilitate the construction of the shafts at Braint and Tŷ Fodol. The dewatering volumes are currently anticipated to be modest (30m^3/day) and relate to groundwater inflow into the shaft through drainage of the residual water pressure behind the secondary lining. No external dewatering would be required. These volumes would also reflect operation as the shafts would be constructed with a drained lining. The dewatering techniques and geology in the vicinity of the tunnel head houses (as described in **Document 5.11**) is such that the dewatering would have only a very localised effect with an estimated Steady State Radius of Influence of 23m and 36m at the Braint and Tŷ Fodol shafts, respectively. No groundwater abstractions have been identified within 220m of either shaft. The construction and operation of the tunnel has the potential to have an impact on groundwater through groundwater inflow into the tunnel. If the tunnel is constructed by Tunnel Boring Machine (TBM) the permanent tunnel lining would be installed as the TBM progresses and the allowable groundwater leakage rate through the tunnel lining would be 0.1 litres/m^2/day (British Tunnelling Society Specification for 'Capillary Dampness'). For the 4 km tunnel with internal diameter of 4 m, the groundwater inflow rate would therefore be approximately 5 m^3/day. If the tunnel is constructed by drill and blast, open-face excavation for the entire length of the tunnel would be undertaken prior to the installation of the secondary tunnel lining. The estimated groundwater inflow rates are therefore estimated to be higher, up to a maximum of 900 m^3/day to the Braint THH and 250 m^3/day to the Tŷ Fodol THH. It is important to note that these are maximum values that would only be experienced in a very narrow time window (the former following breakthrough/connection of the tunnels from both sides of the Menai Strait, into 'one tunnel', and the latter immediately prior to breakthrough). These values reduce significantly as the 'waterproof' secondary lining is installed. During operation, using either construction method, the groundwater inflow rate would be estimated to be approximately 5m^3/day. Therefore, the small change to groundwater availability associated with dewatering would be expected to have a negligible effect on groundwater resource availability and therefore the overall water balance. **Effects on water balance element:** Based on the criteria set out in Table 11.4 of

Table 4 Tunnel Construction Compounds, THH, CSECs, shafts and tunnel.			
WFD Element	WFD Sub element	Control and management Measures of particular relevance (described further in Table 12.20 in **Document 5.12**)	Assessment of effects on WFD Element
			Document 5.11 there would be a Low magnitude of change to the water balance. There would be no need to provide additional mitigation to facilitate compliance with the WFD for all phases of the Proposed Development.
Groundwater chemical elements	Chemical dependent surface water body status	**Pollution control: WE21-23, Tunnel dewatering: WE42, Environmental permit for water discharge: WE43, Tunnel drainage management plan: WE59, Intrusive ground investigations: CL11, Watching brief for contaminated land: CL21, Risk assessment and remedial strategy: CL22**	As set out below in relation to the chemical status test, while there are potential sources of effects on groundwater quality associated with the tunnel construction and related activities, these would be managed through control and management measures and would be limited in duration and extent. There would be very limited potential for any localised changes to groundwater quality to influence the status of any surface water body. **Effects on the chemical dependent surface water body element**: Based on the criteria set out in Table 12.6 of **Document 5.12**, and considering the implementation of the control and management measures, there would be a negligible magnitude of change associated with works at the tunnel sites and the tunnel itself. There would be no need to provide additional mitigation to facilitate compliance with WFD for all phases of the Proposed Development.
	Groundwater dependent terrestrial ecosystems (GWDTEs)	**None required**	See quantity element of GWDTEs assessment.
	Saline and other intrusions	**Tunnel drainage management plan: WE59, Management of saline water: WE510**	Groundwater monitoring from wells used to input into the design on the tunnel have so far found the groundwater to be fresh as opposed to saline, with chemical testing having very low chloride levels. There also appears to be no appreciable trend in water quality with distance to the Menai Strait. It is assumed that saline groundwater (derived from the Menai Strait) if encountered would only be within the tunnel over a 900m length, which is greater than 150m horizontally from the mean high-water mark of the Menai Strait. Of the estimated maximum groundwater inflow during construction of 900 m^3/day to the Braint THH (after breakthrough) and 250 m^3/day to the Tŷ Fodol THH (before breakthrough) it is estimated 250m^3/day could be saline to Braint (zero to Tŷ Fodol). Temporary sumps and groundwater pumping would be used within the tunnel during construction to separate saline and fresh water inflows **(WE510)**. During operation only a small amount of the total groundwater inflow of 5 m^3/day would be expected to be saline. As a result, based on the evidence available and the anticipated rates of dewatering, a negligible effect on saline intrusion is anticipated. Whilst there is currently no evidence of saline intrusion, groundwater quality monitoring will be carried out during shaft dewatering

Table 4 Tunnel Construction Compounds, THH, CSECs, shafts and tunnel.			
WFD Element	WFD Sub element	Control and management Measures of particular relevance (described further in Table 12.20 in **Document 5.12**)	Assessment of effects on WFD Element
			to establish whether such an issue arises. **Effects on saline intrusions element:** Based on the criteria set out in Table 11.4 of **Document 5.11**, there would be a Low magnitude of change due to possible saline intrusion into the groundwater. There would be no need to provide additional mitigation to facilitate compliance with the WFD for all phases of the Proposed Development.
	General chemical test	**Pollution control: WE21-23, Tunnel dewatering: WE42, Environmental permit for water discharge: WE43, Tunnel drainage management plan: WE59, Control of blowout: WE511, Intrusive ground investigations: CL11, Watching brief for contaminated land: CL21, Risk assessment and remedial strategy: CL22.**	The Ynys Mon Secondary and Llyn and Eryri groundwater bodies where the shaft locations are proposed are both classified as being at Poor status for this test. Indirect effects on water quality could occur via the disturbance of contaminated sediments at the surface or arisings during shaft or tunnel excavations. Under measure **CL11**, appropriate intrusive ground investigations will be carried out to identify any contamination of soil or groundwater. During construction, a watching brief will be maintained for any potential sources of contamination (**CL22**). In both cases, if contamination were identified, a remediation strategy will be devised and agreed with the regulatory authorities. Direct effects could be associated with accidental spillage or leakage of hydrocarbons from vehicle/machinery fuels and oils, or metals (from machinery itself). Any spills or leaks at the surface could potentially infiltrate to groundwater where a pathway exists, while any spills or leaks within the tunnel or shaft could reach groundwater prior to installation of the impermeable caisson. The control and management measures will manage the occurrence of such effects as far as practicable, although small residual effects (e.g. slow/gradual leaks) cannot be discounted. However, given the restricted groundwater flow in this area associated with the generally low permeability rocks and sediments, it is unlikely that any such residual effects would influence the chemical status of the groundwater on a groundwater body scale, or the ability of the groundwater body to achieve Good status. **Effects on the groundwater chemical test element:** Based on the criteria set out in Table 11.4 of **Document 5.11**, and considering the implementation of the control and management measures, there would be a Low magnitude of change associated with works at the tunnel sites and the tunnel itself. There would be no need to provide additional mitigation to facilitate compliance with the WFD for all phases of the Proposed Development.
TRANSITIONAL/COASTAL WATER BODIES			
The impacts of the tunnel construction compounds, THHs, CSECs, tunnels and shafts are considered within the assessment of the WFD catchment water bodies. It is considered that the control and management measures associated with these activities provide a sufficient level of protection for effects transmitted downstream from upstream freshwater water bodies. Any residual effects would be very minimal given the distance from the Order Limits to the coastal and transitional water bodies as well as the considerable dilution associated with the pathway of the effects to these receptors. There would be no effects on the WFD status of any of the Transitional and Coastal water bodies in the Study Area as a result of the tunnel construction compounds, THHs, CSECs,			

Table 4 Tunnel Construction Compounds, THH, CSECs, shafts and tunnel.			
WFD Element	WFD Sub element	Control and management Measures of particular relevance (described further in Table 12.20 in **Document 5.12**)	Assessment of effects on WFD Element
tunnels and shafts. The effects of the tunnel itself directly on the relevant coastal water body (the Menai Strait) are considered below.			
Chemical quality elements	All	**Tunnel drainage management plan: WE59, Control of blowout: WE511**	Depending on the ground conditions, drilling fluids used should the tunnel be constructed using a tunnel boring machine (TBM) may be injected under pressure, which can result in a pressure blowout. Blowouts result where the drilling fluids crack or weaken fissures in the surrounding rock and result in a release of pressure at the surface. TBM blowout events may pose a risk to water quality as a result of the release of potentially contaminating drilling fluids into the aquatic environment. TBM blowouts are relatively rare events caused by pressure differentials and ground conditions. If the TBM encounters a fissure or fracture there is potential for low density bentonite to escape to the surface through connecting channels. The TBM will be operated in accordance with best practice that will minimise the risk of pressure differentials as far as possible (**WE511**). Should an event occur, the volume of drilling fluid released is likely to be very small in comparison to the volume of the receiving groundwater body. **Effects on chemical status:** Based on the criteria set out in Table 12.6 of **Document 5.12**, and considering the implementation of the control and management measures, there would be a Very Low magnitude of change associated with tunnel construction. There would be no need to provide additional mitigation to facilitate compliance with the WFD for all phases of the Proposed Development.

Annex D

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Technical note:
Approach to the Water Framework Directive Assessment for the North Wales Connection Project

March 2017
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1. Introduction

1.1 Context and purpose of this note

1.1.1 The North Wales Connection (NWC) Project is a Nationally Significant Infrastructure Project (NSIP)[1], which will be authorised by a Development Consent Order (DCO). The decision will be made by the Secretary of State for Energy and Climate Change, as advised by the Planning inspectorate (PINS). Further to this, Natural Resources Wales (NRW) is the relevant permitting authority in relation to its role in issuing Environmental Permits under the *Environmental Permitting (England and Wales) Regulations 2010* (as amended), and other consents. Local Planning Authorities may also be required to make decisions on applications for permissions associated with the Project. Each of these bodies is required to take account of the requirements of the Water Framework Directive (WFD) in making their regulatory decisions.

1.1.2 The purpose of this technical note is to provide an initial reference point to assure NRW that the appropriate process is being followed to demonstrate that the NWC Project is compliant with the objectives of the WFD.

1.1.3 A single WFD assessment to cover all aspects of WFD compliance is likely to facilitate the regulatory decision-making process. This is especially true of the NWC Project, which has the potential to affect river, lake, estuarine, coastal and groundwater water bodies. A single WFD assessment also has benefit of being able to make conclusions on WFD compliance based on the outputs of numerous ES chapters in one dedicated place.

1.1.4 In Wales, whilst the responsibility for ensuring that the WFD is implemented lies with NRW, all public bodies have a duty to 'have regard' to the objectives of the WFD in exercising their functions. Public bodies include the Isle of Anglesey County Council and Gwynedd Council – the Lead Local Flood Authorities (LLFAs) who are responsible for consenting works in Ordinary Watercourses[2] associated with the Project. Failure to take account of WFD requirements by any permitting authority could provide grounds for a challenge to a decision to a Development Consent Order once granted.

1.2 The legislative context – Water Framework Directive

1.2.1 The WFD[3] came into force in 2000 and was transposed into UK law in 2003, with the principal aims of protecting and improving the water environment and promoting the sustainable use of water. Environmental Quality Standards (EQSs) for priority substances were set by the daughter directive to the WFD (the EQS Directive[4] and subsequent amendments[5] [6] (EQSD)) and the Groundwater Directive[7]. The environmental objectives of the WFD and its daughter directives are to:

- prevent deterioration of aquatic ecosystems;

[1] As defined in Part 3 of the Planning Act 2008 (as amended).
[2] Works in, near or liable to affect watercourses will be subject to control via an NRW Flood Risk Activities Permit for Main Rivers or a LLFA Land Drainage Consent for Ordinary Watercourses
[3] *Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy* (the Water Framework Directive).
[4] *Directive 2008/105/EC of the European Parliament and of the Council of 16 December 2008 on environmental quality standards in the field of water policy, amending and subsequently repealing Council Directives 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC and amending Directive 2000/60/EC of the European Parliament and of the Council* (the Priority Substances Directive).
[5] *Directive 2013/39/EU of the European Parliament and of the Council of 12 August 2013 amending Directives 2000/60/EC and 2008/105/EC as regards priority substances in the field of water policy.*
[6] *The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015.*
[7] *Directive 2006/118/EC of the European Parliament and of the Council of 12 December 2006 on the protection of groundwater against pollution and deterioration* (the Groundwater Directive*) including Commission Directive 2014/80/EU which amends Annex II of the original Directive 2006/118/EC.*

- protect, enhance and restore water bodies to good status; which is based on ecology (with its supporting hydromorphological and physico-chemical factors) and chemical factors for surface water, and water quantity and chemical status for groundwater;
- comply with water related standards and objectives for environmentally protected areas established under other European Union (EU) legislation;
- progressively reduce pollution from priority substances and cease or phase out discharges from priority hazardous substances; and
- prevent or limit input of pollutants into groundwater and reverse any significant or sustained upward trends in the concentration of any groundwater pollutant.

1.2.2 The WFD sets a default objective for all rivers, lakes, estuaries, groundwater and coastal water bodies to achieve good status by 2027 at the latest. Where it is not possible to achieve good status by 2027, alternate water body objectives can be set. The current (baseline) status, and the measures required to achieve the 2027 status objective are set out, for each water body, in the relevant river basin management plans (RBMPs), as prepared by the EA every six years. The first RBMPs were published in 2009, and the current Cycle 2 RBMPs were published in December 2015. The plans provide the baseline condition of the water environment at the time of publication, and indicate the measures needed to achieve their target status.

1.2.3 For surface water bodies (rivers, lakes, estuaries and coastal waters), overall waterbody status has an ecological and a chemical component. Ecological status is measured on the scale of high, good, moderate, poor and bad. Chemical status is measured as good or fail, based on the presence or absence of priority substances which present a risk to the environment. Good ecological status (GES) is defined as a slight variation from undisturbed natural conditions, with minimal distortion arising from human activity. The ecological status of water bodies is determined by examining biological elements (e.g. fish, invertebrates, plants) and a number of supporting elements and conditions, including physico-chemical (e.g. metals and organic compounds), and hydromorphological (e.g. depth, width, flow, and 'structure') factors.

1.2.4 Whilst GES is defined as a slight variation from undisturbed conditions in 'natural' water bodies, surface waterbodies can also be designated as artificial and heavily modified water bodies (AWBs and HMWBs) where there has been significant human influence on the nature of the water body. These waterbodies are considered to be unable to achieve GES. Instead, AWBs and HMWBs have a target to achieve good ecological potential (GEP), which recognises their important uses, whilst making sure ecology is protected as far as possible. The ecological potential for AWBs and HMWBs is also measured on the scale high, good, moderate, poor and bad. The chemical status of these water bodies is measured in the same way as for natural water bodies.

1.2.5 For groundwater bodies, good status has a quantitative and a chemical component. Together these provide a single final classification: good or poor status. Quantitative status is evaluated on the basis of overall aquifer water balance, impacts of abstraction on dependent surface waters or wetlands and potential for saline intrusion. Chemical status is evaluated on the basis of evidence for impacts of poor water quality on dependent surface waters or wetlands or deterioration of the quality of groundwater used for potable supply.

2. Structure of the WFD assessment

2.1.1 The WFD assessment is proposed to be an appendix to the Environmental Statement (ES), and will be structured as follows:

- Section 1 will discuss the legislative requirements of the WFD;
- Section 2 will provide an overview of the methodology that will be adopted in order to undertake the WFD assessment;
- Section 3 will provide further details of the NWC Project that are relevant to the water environment, and will signpost to other project-related documents/descriptions where necessary;

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- Section 4 will set out the WFD baseline for all of the river, lake, groundwater, estuarine and coastal water bodies in the Study Area;
- Section 5 will set out the process that has been followed to 'screen' the proposed NWC Project activities to gain a better understanding of those that are low risk ('screened out') and those that require further assessment ('screened in');
- Section 6 will set out the process that has been followed to undertake a further / detailed assessment on those relatively 'high-risk' activities that were screened in as part of Section 5; and
- Section 7 will take the outputs from Sections 5 and 6, and will provide a statement of compliance with the objectives of the WFD.

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3. Overview of the WFD assessment approach

3.1 WFD requirements

3.1.1 All aspects of construction and operation of the Project will need to be assessed to determine whether they will have an effect on WFD water bodies. Decommissioning effects are likely to be similar to, but of a lower magnitude than, construction stage effects. They will be assessed as such in the WFD assessment and against a future baseline environment. Accordingly, the WFD assessment needs to consider the following key questions:

- At the water body level, on a non-temporary basis, will the project result in deterioration of any of the WFD classification components from one status class to the next, (e.g. from good to moderate) irrespective of whether or not it results in the lowering of overall status?
- Will the Project prevent the assessed water body from achieving GES or GEP or, where relevant, any alternative objective?
- Will the Project, in combination with other projects, contribute towards a cumulative deterioration of WFD status or prevent the cumulative enhancement of status in the long term (up to 2027)?
- Will the Project compromise the achievement of the WFD objectives in multiple water bodies that are hydrologically linked?
- Can the Project assist in the delivery of any RBMP measures as part of achieving water body objectives?

3.1.2 Assessment against WFD objectives may include consideration of additional or more stringent standards applied to protected areas if these are present, including standards set by other relevant EU legislation. For example, a new scheme will not be considered to be compliant with the WFD if it will have an adverse impact on the conservation objectives of a Natura 2000 protected area (unless the tests for overriding public interest under Article 6.4 of the Habitats Directive are met) or designated bathing waters.

3.1.3 The potential impact will be assessed for each specific component of the scheme that may interact with or pose a potential risk to a water body or protected area. Interactions between these components in terms of effects on water bodies will also be assessed.

3.2 Available guidance

3.2.1 At present the principal source of relevant guidance on WFD Compliance Assessment in the UK is the Environment Agency (EA). However, the only publicly available guidance is *Clearing the Waters for All*[8], which relates specifically to activities in estuarine or coastal water bodies that require a Marine Licence, which would not be required as part of the NWC Project. It interprets the 'no deterioration criterion' as applying to each element as well as the overall status classification of the water body. This approach is consistent with a recent European Court of Justice case[9] (known as the 'Bund' case) on dredging activities in Germany, where deterioration of supporting elements that do not lead to overall water body status deterioration was in fact ruled to be in breach of the objectives of the WFD.

3.2.2 The cycle 2 RBMPs indicate that within-class deterioration of any constituent element (i.e. an effect that results in the lowering of the quality of an element that does not result in a lowering of the

[8] Environment Agency (2016) *Clearing the Waters for All: How to assess the impact of your activity in estuarine (transitional) and coastal waters for the Water Framework Directive (WFD).* Available at https://www.gov.uk/guidance/water-framework-directive-assessment-estuarine-and-coastal-waters

[9] Definition of deterioration under the Water Framework Directive: implications for new projects – Jan Brooke available at http://www.cmscoms.com/?p=4281 and also the official summary of the case at: http://curia.europa.eu/jcms/upload/docs/application/pdf/2015-07/cp150074en.pdf

status of that element) is permissible, but should be limited as far as practicable. There are two exceptions to this: first, where the water body is at the lowest possible class (bad ecological status/potential) where no such within class deterioration is allowed and, second, elements that are at high status (with the exception of morphology), which may be allowed to deteriorate to good status provided a number of additional conditions are met.

3.2.3 For our work on the proposed North West Coast Connection project the EA have made available to AmecFW their position statement on WFD assessment of new physical works in rivers (position 488_10, revised 2015 edition), which we propose to use to assess WFD effects on river water bodies. There is no available guidance on the WFD assessment of lake or groundwater water bodies. However, various SNIFFER (Scotland and Northern Ireland Foundation for Environmental Research) and UKTAG (UK Technical Advisory Group – for the WFD) guidance documents will be used to support the assessment.

3.2.4 Given the absence of available guidance, we request NRW's approval for / input to this general approach.

3.3 Assessment process

3.3.1 The WFD assessment will comprise the following stages:

- Stage 1: Pre-screening;
- Stage 2: Screening;
- Stage 3: Further assessment; and, if required,
- Stage 4: Identification and evaluation of measures; and
- Stage 5: Article 4.7 considerations.

Stage 1 – Pre-screening

3.3.2 The EA guidance[10] identifies certain types of project which do not require specific applications for permission but can be undertaken under existing general powers and provisions, such as developments authorised through the General Permitted Development Order[11]. The guidance indicates that such projects can be identified at the pre-screening stage as not requiring a WFD assessment. It also identifies certain types of maintenance activity where assessment is not required. All such activities are screened out of the WFD assessment.

3.3.3 However, in the case of the NWC Project, the proposed development has the potential to have effects on the water environment and requires permissions which must be supported by environmental information. Nor is it a continuation of a previously permitted activity. Therefore, there is no doubt that a WFD compliance assessment is required to support applications for a DCO, Environmental Permits and potentially other permissions.

Stage 2 – Screening

3.3.4 In terms of screening new physical works, the EA 488_10 guidance provides a protocol for screening development proposals based upon the type and scale of activities that are being undertaken. Some low risk activities are screened out altogether, some are only screened in if they exceed a certain scale, and others activities are screened in regardless of scale.

3.3.5 A similar process is set out for screening against water quality elements, based on EQS values provided in the WFD Directions.

[10] Environment Agency (2015) position *488_10 "Protecting and improving the water environment: WFD compliance of physical works in rivers"*
[11] *The Town and Country Planning (General Permitted Development) (England) Order 2015* (as amended)

3.3.6 The activities that cannot be screened out are retained for further assessment (Stage 3). Those activities that are screened out are considered to be compliant with the WFD, and no further assessment is necessary.

3.3.7 Where screening thresholds have not been defined under WFD or in supporting regulatory guidance, screening will involve expert judgement that is supplemented by available evidence and is agreed with NRW as part of ongoing dialogue.

3.3.8 As many Project activities/infrastructure types are proposed within the majority of WFD water bodies, the screening process employed in this WFD assessment provides a generic screening outcome based on WFD water body categories. For example, access track watercourse crossings are screened once, rather than being screened separately for each of the many water bodies where access track watercourse crossings are proposed. As the design of the access track watercourse crossings would not alter significantly from water body to water body the screening outcome would be the same for all water bodies, and so undertaking the same screening process multiple times would cause unnecessary repetition in the assessment.

Stage 3 – Further assessment

3.3.9 For the activities that are 'screened in' at Stage 2, further assessment will be undertaken. This will include the activities that are considered to pose enough of a potential risk to warrant further consideration so that the appropriate level of confidence can be reached to determine whether they are WFD compliant. This will involve examination of sources of potential effect, pathways by which water bodies could be affected and consideration of effects on each WFD quality element (receptors) for each WFD water body type (river, coastal, estuarine, lake, groundwater). Although there is no formally published guidance on how to undertake a WFD further assessment previous experience indicates that an evidence-based expert judgement approach to determining WFD compliance is generally supported by regulatory bodies.

3.3.10 A fundamental requirement of the further assessment will be to evaluate the effectiveness of any design principles and environmental measures that have been produced, through the EIA process, in order to reduce/minimise the effects on the water environment. The screening undertaken at Stage 2 is designed to be relatively quick and so the further assessment undertaken at Stage 3 will be the first time that these principles/measures are considered.

3.3.11 The precise scope of the further assessment, in terms of the activities to be considered and quality elements likely to be affected, will be agreed with the NRW in a consultation meeting once the screening outcomes have been discussed/agreed. Outstanding data gaps will also be identified at this stage, and agreement reached on how to address these.

3.3.12 Conventionally, a further assessment would consider the range of different activities that may be proposed in different WFD water bodies, as part of the proposed development. However, as discussed in para 3.3.8, the majority of activities/infrastructure types will not vary in design from water body to water body, and the environmental measures that are proposed would be applied across all water bodies. Therefore, a generic further assessment of each activity / infrastructure type will be provided. This will then be cross-referenced to each relevant WFD water body in the study area so that permitting authorities can have a WFD assessment reference point for each individual water body that indicates the type and intensity of development and any factors which are relevant to specific water bodies.

Stage 4 – Identification and evaluation of measures

3.3.13 Where the assessment has identified an activity which causes a risk of non-compliance with the WFD but which may become compliant with mitigation, the mitigation required will be detailed. Where measures cannot be identified that will result in WFD compliance and no suitable alternatives can be identified, the provisions of Article 4.7 of the Directive will need to be invoked (Stage 5). However, in the case of the NWC Project, this is unlikely to be necessary.

Stage 5 – Article 4.7 consideration

3.3.14 The provisions of Article 4.7 will only apply where:

- failure to meet good groundwater status, GES or GEP or to prevent deterioration in status arises from new modifications to the physical characteristics of the water body or alteration of groundwater levels; or
- failure to prevent deterioration from high to good overall status of a surface water body is the result of new sustainable human development activities.

3.3.15 Although it is not anticipated, if the assessment shows that the scheme will not be compliant with WFD requirements, documentation will be prepared to justify permitting of the development under the provisions of Article 4.7 of the WFD. This will need to demonstrate that the following conditions are met:

- all practicable mitigation has been incorporated;
- there are no significantly better environmental options;
- the scheme is of overriding public interest and/or the benefits of the scheme outweigh the benefits of WFD compliance; and
- the reasons for the modifications to the water body are reported in the next RBMP.

3.3.16 The relevant permitting authority in relation to each application for permission to proceed with the project is responsible to deciding whether the Article 4.7 conditions have been met if this route is invoked.

4. Delivery of the WFD assessment

4.1.1 The final WFD assessment is proposed to be delivered as an appendix to the Water Quality, Resources and Flood Risk ES chapter.

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Author	Reviewer
……. [redacted]	……. [redacted]

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