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Morlais Project
Environmental Statement

Chapter 17: Water Resources and Flood Risk

Volume I

Applicant: Menter Môn Morlais Limited

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Chapter 17: Water Resources and Flood Risk

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GLOSSARY OF ABBREVIATIONS

AONB	Area of Outstanding Natural Beauty
CIA	Cumulative Impact Assessment
CIRIA	Construction Industry Research and Information Association
CMS	Construction Method Statement
DCLG	Department for Communities and Local Government
DCWW	Dŵr Cymru – Welsh Water
DMRB	Design Manual for Roads and Bridges
EA	Environment Agency
EC	European Commission
EIA	Environmental Impact Assessment
ES	Environmental Statement
EU	European Union
FCA	Flood Consequence Assessment
FWMA	Flood and Water Management Act
GEP	Good Ecological Potential
GES	Good Ecological Status
GPP	Guidance for Pollution Prevention
HDD	Horizontal Directional Drilling
IoACC	Isle of Anglesey County Council
LFRMS	Local Flood Risk Management Strategy
LLFA	Lead Local Flood Authorities
LNR	Local Nature Reserve
NRW	Natural Resources Wales
PFRA	Preliminary Flood Risk Assessment
PWS	Private Water Supplies
RBD	River Basin District
RBMP	River Basin Management Plan
RIGS	Regionally Important Geological Site
SAC	Special Area of Conservation
SFCA	Strategic Flood Consequence Assessment
SNCI	Site of Nature Conservation Interest
SPA	Special Protection Area
SPZ	Source Protection Zone
SSSI	Site of Special Scientific Interest
SuDS	Sustainable Drainage System
TAN	Technical Advice Note
WFD	Water Framework Directive

GLOSSARY OF TERMINOLOGY

Aquifer	A body of permeable rock which can contain or transmit groundwater
Catchment	An area where water is collected by the natural landscape, eventually flowing to a river, lake, ocean or groundwater system
Devensian	The most recent Pleistocene glaciation in Britain
Erosion	The process of eroding or being eroded by wind, water or other natural agents
Groundwater	Water held underground in the soil or in pores and crevices in rock
Pelite	A sediment or sedimentary rock composed of very fine clay or mud
Psammite	A sedimentary rock, or sandstone
Sedimentation	The process of particles settling to the bottom of a body of water
Standing water	A pool of water of any size that does not flow
Surface water	Water that collects on the surface of the ground
Watercourse	A natural or artificial channel through which water flows

17. WATER RESOURCES AND FLOOD RISK

17.1. INTRODUCTION

1. This chapter of the Environmental Statement (ES) considers the potential impacts of the Morlais Project (the Project) on water resources and flood risk. An overview of the existing baseline for the proposed landfall and onshore development area is provided, followed by an assessment of the potential impacts and associated mitigation for the construction, operation and decommissioning of the Project. Cumulative impacts with other proposed projects are also considered in **Section 17.6.7**.

2. This chapter has been prepared by Royal HaskoningDHV in accordance with the relevant legislation and policies, adhering to the methodology for Environmental Impact Assessment (EIA) and Cumulative Impact Assessment (CIA) as discussed in **Section 17.4**.

3. Due to the close association between water resources and flood risk, ground conditions and onshore ecology, this chapter should be read in conjunction with **Chapter 18, Ground Conditions and Contamination** and **Chapter 19, Onshore Ecology**.

4. Additional information to support the assessment of impacts on water resources and flood risk is provided separately in the following appendices:

    - **Appendix 17.1** (**Volume III**): Flood Consequence Assessment (FCA); and
    - **Appendix 8.1** (**Volume III**): Water Framework Directive (WFD) Compliance Assessment.

17.2. POLICY, LEGISLATION AND GUIDANCE

5. There are a number of pieces of legislation, policy and guidance applicable to water resources and flood risk. The following sections provide detail on key pieces of international and UK legislation, policy and guidance. Further detail is provided in **Chapter 2, Policy and Legislation**.

17.2.1. Legislation and Policy (International)

17.2.1.1. Water Framework Directive (2000/60/EC)

6. The Water Framework Directive (WFD) (Council Directive 2000/60/EC establishing a framework for community action in the field of water policy) requires that all European Union (EU) Member States must prevent deterioration and protect and enhance the status of aquatic ecosystems. This means that EU Member States must ensure that new schemes do not adversely impact upon the status of aquatic ecosystems, and that historical modifications that are already impacting it need to be addressed.

7. Unlike the EU Birds and Habitats Directives (European Commission (EC) Directive on the Conservation of Wild Birds (2009/147/EC) and EC Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC), respectively), which apply only to designated sites, the WFD applies to all water bodies (rivers, lakes, estuaries, coastal waters and groundwater) including those that are man-made.

17.2.2. Legislation and Policy (National)

17.2.2.1. Water Environment (Water Framework Directive) (England and Wales) Regulations 2017

8. The WFD is transposed into national law by means of the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. The Regulations provide for the implementation of the WFD, from designation of all surface waters (rivers, lakes, estuarine waters, coastal waters and ground waters) as water bodies, and set objectives for the achievement of Good Ecological Status (GES) or Good Ecological Potential (GEP).

17.2.2.2. Water Framework Directive (Standards and Classifications) Directions (England and Wales) 2015

9. The standards used to determine the ecological or chemical status of a water body are provided in the WFD (Standards and Classification) Directions (England and Wales) 2015. This includes the thresholds for determining the status of the biological, hydromorphological, physico-chemical and chemical status of surface water bodies, and the quantitative and chemical status of groundwater bodies.

17.2.2.3. Flood Water Management Act 2010

10. The Flood and Water Management Act (FWMA) aims to improve both flood risk management and the way we manage our water resources by creating clearer roles and responsibilities. This includes a lead role for local authorities in managing local flood risk (from surface water, ground water and ordinary watercourses) and a strategic overview role of all flood risk for Natural Resources Wales (NRW). The FWMA provides opportunities for a comprehensive, risk-based approach on land use planning and flood risk management by local authorities and other key partners.

17.2.2.4. National Policy Statements

11. Although this Project is not seeking a Development Consent Order (DCO), its size (up to 240 MW) means it is of equivalent scale and magnitude as a Nationally Significant Infrastructure Project (NSIP). Guidance that is relevant to assessing impacts on water resources and flood risk for NSIPs are set out within National Policy Statements (NPS) which are the principal decision-making documents for NSIPs.

12. The assessment of potential impacts within this chapter has therefore been undertaken with specific reference to the relevant National Policy Statements (NPS). The specific assessment requirements for water resources and flood risk in the NPS are detailed in the overarching statement for Energy (EN-1) (Department of Energy and Climate Change (DECC) 2011a) as stated in **Table 17-1** below.

Table 17-1 NPS Assessment Requirements Relevant to Water Resources and Flood Risk

NPS Requirement	NPS Reference	ES Reference
Applications for energy projects of 1 hectare or greater in Flood Zone 1 in England or Zone A in Wales and all proposals for energy projects located in Flood Zones 2 and 3 in England or Zones B and C in Wales should be accompanied by a flood risk assessment (FRA). An FRA will also be required where an energy project less than 1 hectare may be subject to sources of flooding other than rivers and the sea (for example surface water), or where the EA, Internal Drainage Board or other body have indicated that there may be drainage problems. This should identify and assess the risks of all forms of flooding to and from the project and demonstrate how these flood risks will be managed, taking climate change into account.	NPS EN-1 Para 5.7.4	A flood risk assessment has been undertaken and is provided in **Appendix 17.1** (**Volume III**)
Applicants for projects which may be affected by, or may add to, flood risk should arrange pre-application discussions with the EA, and, where relevant, other bodies such as Internal Drainage Boards, sewerage undertakers, navigation authorities, highways authorities and reservoir owners and operators. Such discussions should identify the likelihood and possible extent and nature of the flood risk, help scope the FRA, and identify the information that will be required by the IPC to reach a decision on the application when it is submitted. The IPC should advise applicants to undertake these steps where they appear necessary, but have not yet been addressed.	NPS EN-1 Para 5.7.7	See **Section 17.3** and **Chapter 6, Consultation**.
In determining an application for development consent, the IPC should be satisfied that where relevant: ▪ The application is supported by an appropriate FRA; ▪ The Sequential Test has been applied as part of site selection; ▪ A sequential approach has been applied at the site level to minimise risk by directing the most vulnerable uses to areas of lowest flood risk; ▪ The proposal is in line with any relevant national and local flood risk management strategy; ▪ Priority has been given to the use of sustainable drainage systems (SuDs) (as required in the next paragraph on National Standards); and ▪ In flood risk areas the project is appropriately flood resilient and resistant, including safe access and escape routes where required, and that any residual risk can be safely managed over the lifetime of the development.	NPS EN-1 Para 5.7.9	The impact assessment is presented in **Section 17.6,** a flood risk assessment is provided in **Appendix 17.1** (**Volume III**) and mitigation measures are outlined in **Section 17.6.2**, including development of a surface water drainage system
Where the project is likely to have effects on the water environment, the applicant should undertake an assessment of the existing status of, and impacts of the proposed project on, water quality, water resources and physical characteristics of the water environment as part of the ES or equivalent.	NPS EN-1 Para 5.15.12	See **Section 17.5** for details of the existing environment

NPS Requirement	NPS Reference	ES Reference
The ES should in particular describe: ▪ The existing quality of waters affected by the proposed project and the impacts of the proposed project on water quality, noting any relevant existing discharges, proposed new discharges and proposed changes to discharges; ▪ Existing water resources affected by the proposed project and the impacts of the proposed project on water resources, noting any relevant existing abstraction rates, proposed new abstraction rates and proposed changes to abstraction rates (including any impact on or use of mains supplies and reference to Catchment Abstraction Management Strategies); ▪ Existing physical characteristics of the water environment (including quantity and dynamics of flow) affected by the proposed project and any impact of physical modifications to these characteristics; and ▪ Any impacts of the proposed project on water bodies or protected areas under the Water Framework Directive and source protection zones (SPZs) around potable groundwater abstractions.	NPS EN-1 Para 5.15.3	See **Section 17.5** for details of the existing environment
The IPC should satisfy itself that a proposal has regard to the River Basin Management Plans and meets the requirements of the Water Framework Directive (including Article 4.7) and its daughter directives, including those on priority substances and groundwater. The specific objectives for particular river basins are set out in River Basin Management Plans. The IPC should also consider the interactions of the proposed project with other plans such as Water Resources Management Plans and Shoreline/Estuary Management Plans.	NPS EN-1 Para 5.15.6	A Water Framework Directive Compliance Assessment is provided in **Appendix 8.1** (**Volume III**)
The IPC should consider whether mitigation measures are needed over and above any which may form part of the project application. A construction management plan may help codify mitigation at that stage.	NPS EN-1 Para 5.15.8	Mitigation measures are outlined in **Section 17.6.2**
The risk of impacts on the water environment can be reduced through careful design to facilitate adherence to good pollution control practice. For example, designated areas for storage and unloading, with appropriate drainage facilities, should be clearly marked.	NPS EN-1 Para 5.15.9	Mitigation measures are outlined in **Section 17.6.2**
The impact on local water resources can be minimised through planning and design for the efficient use of water, including water recycling.	NPS EN-1 Para 5.15.10	Mitigation measures are outlined in **Section 17.6.2**

17.2.2.5. Planning Policy Wales 2016

13. The planning policy for Wales is set out in the document Planning Policy Wales (Welsh Government, 2016). The planning policy document outlines the Welsh Government's approach to facilitating the delivery of the aims set out in Energy Wales: A Low Carbon Transition (Welsh Government, 2012b), as well as UK wide and European renewable energy targets, including obligations under the Renewable Energy Directive (2009/28/EC).

14. This policy recognises the risk of an increase in the frequency and severity of rainfall events and the increased risk of flooding as a result of this, and sea level rise caused by climate change. During development design, account should be taken of shoreline management plans and measures such as managed realignment. In addition, development should reduce, and must not increase, flood risk arising from river and/or coastal flooding on and off the development site itself. Priority is placed on the protection of the undeveloped floodplain from development and the prevention of cumulative effects of incremental development.

15. The policy stipulates that built development in areas of flood plain that are currently unobstructed should be limited to essential transport and utilities infrastructure. This should be designed and constructed to remain operational at times of flood and should result in no net loss of floodplain storage, should not impeded water flows and not increase flood risk elsewhere.

17.2.3. Legislation and Policy (Regional)

17.2.3.1. Western Wales River Basin Management Plan 2015-2021 Summary

16. The River Basin Management Plan (RBMP) is a strategic document that sets out the objectives that have been set for implementation of the WFD at a regional (River Basin District (RBD)) level. The purpose of a RBMP is to provide a framework for protecting and enhancing the benefits provided by the water environment. To achieve this, and because water and land resources are closely linked, it also informs decisions on land-use planning.

17. The current Western Wales RBMP was published by the Welsh Government and NRW in December 2015. This document sets out the current state of the water environment according to WFD parameters, pressures affecting the water environment, environmental objectives for protecting and improving the waters, programme of measures to improve the water environment and deliver WFD objectives, actions needed to achieve the objectives, progress since the 2009 RBMP, and also informs decisions on land-use planning as water and land resources are closely linked.

17.2.3.2. Preliminary Flood Risk Assessment

18. The Project is located within the Western Wales RBD, for which a Preliminary Flood Risk Assessment (PFRA) was produced by NRW in December 2018, providing an update to the first PFRA produced in 2011. For the second cycle of the Flood Risk Regulations, the focus in Wales is on bringing information about the risk and management of flooding from main rivers, reservoirs, the sea and surface water together in one place. This involves working collaboratively across the Welsh Government, NRW, the Welsh Local Government Association and Lead Local Flood Authorities (LLFAs) to produce the PFRA as an output.

19. The PFRA assesses and identifies those areas within Wales that are most at risk of flooding from any source through assessing past flooding affecting Wales from 2011 onwards and potential adverse consequences of future flooding. It was then used to inform the Anglesey Local Flood Risk Management Strategy (**Section 17.2.4.1**).

17.2.4. Local Planning Policy

17.2.4.1. Anglesey Local Flood Risk Management Strategy (2013)

20. The Isle of Anglesey County Council (IoACC) is the LLFA for Anglesey and produced the Anglesey Local Flood Risk Management Strategy (LFRMS) in February 2013. At present there is no more recent version publicly available, therefore for the purposes of this report the 2013 LFRMS will be used, although it should be noted that this refers to the Environment Agency (EA) due to its publication date. All mentions of the EA are to be replaced by NRW which has taken on all responsibilities previously held by the EA in relation to flood and coastal erosion risk management in Wales.

21. The LFRMS highlights steps that need to be taken to improve knowledge of flood risk on the island and work better with organisations and the public towards reducing those risks whilst aiming to balance the needs to communities, the economy and the environment. This is done by pulling together available information on flooding in Anglesey to facilitate ease of access, and subsequently identify authorities and organisations involved and their part in reducing the risk of flooding. Strategic objectives are then outlined for managing flood risk and measures that could be implemented to achieve them.

22. Managing local flood risk in Anglesey is the responsibility of IoACC as an LLFA. Other Risk Management Authorities in the area that have legal responsibilities for the management of flood risk include: NRW, Dŵr Cymru – Welsh Water (DCWW) and North and Mid-Wales Trunk Road Agent.

17.2.4.2. Anglesey Area of Outstanding Natural Beauty Management Plan 2015-2020

23. The Isle of Anglesey Area of Outstanding Natural Beauty (AONB) Management Plan 2015-2020 was produced through collaboration of NRW and IoACC. It determines what actions are required to ensure that the special qualities of the AONB are conserved and enhanced for future generations; including water quality and accessible land and water.

24. The importance of water to the Isle of Anglesey is considered in terms of providing clean drinking water in the fenlands and reedbeds on Anglesey, and through the water catchments, rivers, streams, marshes, bogs and fens which help to regulate surface water flow and drainage of the land to reduce flooding at high rainfall and sustain surface water levels during droughts.

25. Policies NE 2.1, NE 2.2 and NE 2.3 of the AONB Management Plan relate to Soil, Air and Water and require community involvement in protecting soils and water from pollution with monitoring and promotion of water efficiency measures. All policies are translated into an action plan which was produced following public and stakeholder consultation.

26. **Table 17-2** outlines national and regional policies directly relevant to Water Resources and Flood Risk.

Table 17-2 National and Regional Policy Requirements Relevant to Water Resources and Flood Risk

Policy Description	Reference	ES Reference
MPS		
Developments and other activities at the coast and at sea can have adverse effects on transitional waters, coastal waters and marine waters. During the construction, operation and decommissioning phases of developments, there can be increased demand for water, discharges to water and adverse ecological effects resulting from physical modifications to the water environment. There may also be an increased risk of spills and leaks of pollutants into the water environment and the likelihood of transmission of invasive non-native species, for example through construction equipment, and their impacts on ecological water quality need to be considered.	2.6.4.1	Potential impacts to the water environment, including direst disturbance to water bodies, accidental release of contaminants and changes to surface water run off are assessed in **Section 17.7.3**.
Climate change is likely to mean that the UK will experience hotter, drier summers and warmer, wetter winters. There is a likelihood of increased drought, heatwaves, changes in seasonal precipitation and the intensity of weather events such as rainfall leading to flooding.	2.6.7.1	Flood risk and the impact of climate change is assessed in **Section 17.7.3.4** and within the separate FCA (**Appendix 17.1 Volume III**).
Understanding the impacts and effects of climate change is key to maintaining a healthy environment. This will influence how we use and value our coasts and seas both now and in the future. Adaptation, including in the marine environment, is necessary to deal with the potential impacts of these changes which are already in train. Sea level rises, increased flooding and coastal erosion will lead to increased vulnerability for development and significant change along parts of the UK coast.	2.6.7.3	As above
Adapting to the impacts of climate change will also be a priority for terrestrial planning on the coast. Marine planning will need to be compatible with these impacts. This will include ensuring inappropriate types of development are not permitted in those areas most vulnerable to coastal change, or to flooding from coastal waters, while also improving resilience of existing developments to long term climate change.	2.6.7.4	As above
Marine planning will provide an important tool for meeting the long term challenges posed by climate change. To aid planning decisions in taking account of the impacts of climate change, UK Administrations produced a set of UK climate change projections and will be undertaking a UK Climate Change Risk Assessment by 2012 (to be updated every 5 years). The UK has also established the Marine Climate Change Impacts Partnership (MCCIP) which can provide advice to marine plan authorities.	2.6.7.5	As above
Coastal change and coastal flooding are likely to be exacerbated by climate change, with implications for activities and development on the coast. These risks are a major consideration in ensuring that proposed new developments are resilient to climate change over their lifetime.	2.6.8.1	As above

Policy Description	Reference	ES Reference
Draft WNMP		
Resilience to climate change: Proposals should demonstrate that they have considered the impacts of climate change and have incorporated appropriate adaption measures, taking into account Climate Change Risk Assessments for Wales.	SOC_11	As above
Resilience to coastal change and flooding: Proposals should demonstrate how they are resilient to coastal change and flooding over their lifetime.	SOC_08	As above
Cumulative effects Proposals should demonstrate that they have assessed potential cumulative effects and, in order of preference: a) avoid adverse effects; and/or b) minimise effects where they cannot be avoided; and/or c) mitigate effects where they cannot be minimised. If significant adverse effects cannot be adequately addressed, proposals should present a clear and convincing justification for proceeding. Proposals that contribute to positive cumulative effects are encouraged.	GOV_01	Cumulative effects are assessed in **Section 17.7.6**, and in **Chapter 26, Cumulative and In-combination**.
Planning Policy Wales		
Climate change is likely to increase the risk of flooding as a result of sea-level rises, increased storminess and more intense rainfall. Flooding as a hazard involves the consideration of the potential consequences of flooding, as well as the likelihood of an event occurring. Planning authorities should adopt a precautionary approach of positive avoidance of development in areas of flooding from the sea or from rivers. Surface water flooding will affect choice of location and the layout and design of schemes and these factors should be considered at an early stage in formulating development proposals.	6.6.22	Flood risk and the impact of climate change is assessed in **Section 17.7.3.4** and within the separate FCA (**Appendix 17.1 Volume III**).
The continued construction of hard engineered flood defences to protect development in areas of floodplain is not sustainable. Government resources for flood and coastal defences are directed at protecting existing developments and are not available to provide defences in anticipation of future development. Account should be taken of shoreline management plans and measures such as managed realignment, the creation of washlands and flood plain restoration as alternatives to engineered flood defences.	6.6.23	The Project is not proposing to construct hard flood defences, or affect existing flood defences.
Development should reduce, and must not increase, flood risk arising from river and/or coastal flooding on and off the development site itself. The priority should be to protect the undeveloped or unobstructed floodplain from development and to prevent the cumulative effects of incremental development.	6.6.25	Flood risk is assessed in **Section 17.7.3.4** and within the separate FCA (**Appendix 17.1 Volume III**).
Planning authorities should be aware of the risk of surface water flooding, usually caused by heavy rainfall, and ensure developments are designed and planned to minimise potential impacts. Development should not cause additional run-off, which can be achieved by controlling surface water as near to the source as possible by the use of SuDS. Care	6.6.27	Surface water run-off is assessed in **Sections 17.7.3.4** and **17.7.4.1** and mitigation including a drainage strategy is proposed.

Policy Description	Reference	ES Reference
should be taken in places of shallow groundwater or where flooding is caused by combined surface and groundwater processes. In such situations direct infiltration SuDs may not be appropriate. Consultation with drainage bodies and NRW should be undertaken and relevant evidence and information drawn from Area Statements taken into account.		
Anglesey and Gwynedd Joint Local Development Plan (JLDP)		
Proposals should incorporate water conservation measures where practicable, including Sustainable Urban Drainage Systems (SUDS). All proposals should implement flood minimisation or mitigation measures where possible, to reduce surface water run-off and minimise its contribution to flood risk elsewhere.	Policy PCYFF 6: Water Conservation	Surface water run-off is assessed in **Sections 17.7.3.4** and **17.7.4.1** and mitigation including a drainage strategy is proposed.
1. All impacts on landscape character, heritage assets and natural resources have been adequately mitigated, ensuring that the special qualities of all locally, nationally and internationally important landscape, biodiversity and heritage designations, including, where appropriate, their settings are conserved or enhanced; 3. That the proposal is mitigated to ensure that there aren't any significant unacceptable effects on sensitive uses located nearby; 4. Where appropriate, that the proposal does not have a significant unacceptable effect on the quality and supply of water;	Policy ADN 3: Other Renewable Energy and Low Carbon Technologies	The impact assessment and proposed mitigation are provided in **Section 17.7**. A summary is provided in **Table 17-23**.
Proposals for the following types of new non-residential development will be permitted on sites within the CChMA predicted as being at risk from coastal change during the second indicative policy epoch (2026 – 2055), subject to a compliant Flood Consequence Assessment or a Stability Assessment.	Policy ARNA 1: Coastal Change Management Area (CChMA)	A FCA is included in **Appendix 17.1, Volume III**.

17.3. CONSULTATION

27. Consultation undertaken throughout the pre-application phase has informed the approach taken and the information provided in this Chapter. A summary of the comments received from the Environmental Scoping Opinion of particular relevance to surface water and flood risk is provided in **Table 17-3** below.

Table 17-3 Consultation Responses

Consultee	Date / Document	Comment	Response
Planning Inspectorate	2018 Scoping Response	The EIA Regulations require an estimate, by type and quantity, of expected residues and emissions, where relevant. Specific reference should be made to water, air, soil and subsoil pollution, noise, vibration, light, heat, and radiation, where relevant. This information should be provided in a clear and consistent fashion and may be integrated into the relevant aspect assessments.	Impacts on water quality of surface features during construction is considered in **Sections 17.6.4.2**, **17.6.4.3** and **17.6.4.4**. Impacts during operation are considered in **Section 17.6.5.2**.

Consultee	Date / Document	Comment	Response
Planning Inspectorate	2018 Scoping Response	The Scoping Report has only considered potential impacts to water quality in the offshore area. Hydrological features are identified within the onshore scoping area, however the potential for the Proposed Works to impact on the water quality of such features is not considered. Given the limited detail currently available regarding the location of the onshore cable route, any potential impacts to water quality cannot be discounted and should be assessed in the ES. It is also noted that horizontal direction drilling ('HDD') may be used at the chosen landfall location. The ES should address potential risks to both groundwater resources and surface water bodies from HDD activities including leakage of drilling fluid. Any measures to be implemented in order to address such risks or impacts should be explained in the ES and it should be made clear how they will be secured.	Impacts on water quality of surface features during construction is considered in **Sections 17.6.4.2**, **17.6.4.3** and **17.6.4.4**. Impacts during operation are considered in **Section 17.6.5.2**.
Planning Inspectorate	2018 Scoping Response	Crossing of hydrological features: The ES should provide a schedule demonstrating the methods for each crossing and how any such methods have been factored into the assessment.	Heading has been given as a specific methodology for watercourse crossings for large watercourses that cannot be locally diverted. However, it is not anticipated that any water bodies that are too large to be diverted will be encountered. Therefore, heading is unlikely to be used, and open-cut trenching will be assumed as the worst case for the purposes of this assessment. The impact of these methods is assessed in **Section 17.6.4.1**.
Planning Inspectorate	2018 Scoping Response	Water feature survey: The Applicant should undertake a water feature survey along the cable route and around the proposed locations of the onshore structures and compounds. The likely significant effects on the quantity and quality of surface water and groundwater should be assessed.	An Extended Phase 1 Habitat Survey was carried out between September and November 2018, as discussed in **Chapter 19, Onshore Ecology**, which surveyed all water features along the cable route. This was used to inform the characterisation of the baseline environment

Consultee	Date / Document	Comment	Response
			presented in **Section 17.5**.
Planning Inspectorate	2018 Scoping Response	Flood risk: The Scoping Report describes the flood risk in the onshore scoping area. It is recommended that the ES contains figures clearly delineating the levels of flood risk across the site(s) for onshore works.	Flood risk is assessed in **Section 17.6.4.4** and in the Flood Consequence Assessment (FCA) in **Appendix 17.1**. **Volume III**
Planning Inspectorate	2018 Scoping Response	Flood risk: The ES should take into account not only the potential impacts of flood risk to the Proposed Works, but also whether the Proposed Works could increase flood risk elsewhere.	Flood risk is assessed in **Section 17.6.4.4**.
Planning Inspectorate	2018 Scoping Response	Flood risk: The assessment of flood risk should consider the impact of climate change upon flood levels and surface water run-off. The Applicant should make efforts to discuss and agree the appropriate extreme sea levels and climate change allowances with NRW.	Flood risk is assessed in **Section 17.6.4.4**.
Planning Inspectorate	2018 Scoping Response	Water Framework Directive: The consideration of potential impacts to Water Framework Directive waterbodies is welcomed, although the Scoping Report has not identified the existing water body status for the Caernarfon Bay North coastal water body within which the application site is located. The Applicant should demonstrate that the Proposed Works would not affect waterbody status and is advised to follow the WFD assessment framework set out in NRW's response (see **Appendix 1** of this Scoping Opinion).	Water Framework Directive (WFD) issues are considered separately in the WFD Compliance Assessment (**Appendix 8.1 Volume III**).
NRW (for PINS)	2018 Scoping Response	The demonstration zone is located at its nearest point, 0.5km (0.27 nautical miles) from the west coast of Holy Island Anglesey and falls within the Caernarfon Bay North WFD coastal water body which currently has an overall Good status, with a Good chemical status and a good ecological status. We advise that a Preliminary WFD Assessment report is prepared by the applicant in support of the application and, where required, a detailed WFD Compliance Assessment Report be undertaken. We welcome further discussion relating to WFD compliance assessment. We advise that WFD should be considered at an early stage in project planning and included in preapplication discussions to ensure avoidance, mitigation and/or improvement	Compliance with the Water Framework Directive is assessed in **Appendix 8.1 Volume III** WFD Compliance Assessment. The WFD Compliance Assessment follows the method suggested by NRW.

Consultee	Date / Document	Comment	Response
		measures are built in to the project where appropriate to minimise costs for the applicant and to provide the best environmental outcome. The Directive does not specify the format or process to follow for WFD assessments. This allows a flexible and proportionate approach to be undertaken. To aid in the decision-making process, it is recommended that the appraisal of an activity or project is conducted in 3 stages: • Screening: exclude any activities that do not need to go through the scoping or detailed assessment stages • Scoping – identify the quality elements that are potentially at risk from the proposed activity and need further detailed assessment • Detailed assessment – consider the potential impacts of an activity on bodies of surface and ground water, identify ways to avoid or minimise impacts, and identify if an activity may prevent the water body achieving good status or cause deterioration. In the event that an activity may prevent the water body achieving good status or cause deterioration then it may be allowed to proceed if it meets the requirements of Article 4.7. The WFD assessment must consider: • all activities carried out; and, • each stage of the activity, for example construction, operation, maintenance and decommissioning • The WFD compliance assessment process needs to also consider the zone of influence of the project in its entirety and any WFD waterbodies that fall within it, not just where there are direct impacts. • Consideration should be given to whether the potential impacts are short term effects (< 6 years) or will cause a non-temporary/permanent change (e.g. direct habitat loss alteration to sediment transport pathways, interference with migratory fish pathways etc). If the impacts are considered a non-temporary/permanent effect on the biological, chemical or hydro morphological elements of the WFD water body in question then the impact must be carried forward for consideration in the WFD compliance assessment process.	

Consultee	Date / Document	Comment	Response
NRW (for PINS)	2018 Scoping Response	Please see attached OGN 72 for further consideration. This is NRW's internal guidance document on assessing activities and projects for compliance with the Water Framework Directive. It is worth highlighting that these documents are intended for internal NRW use and therefore some of the links may not work and some content may not be relevant externally.	The OGN 72 has been consulted during the preparation of **Appendix 8.1 Volume III** WFD Compliance Assessment.
NRW (for PINS)	2018 Scoping Response	Please note that since 1st January 2018 the exemption for abstraction of groundwater and dewatering for engineering and quarrying has been removed. An abstraction licence will be required for these activities if there is an intention to abstract over 20m^3/day. Further detail can be obtained from our Water Resources Permitting team (0300 065 3000).	Permitting requirements will be considered as part of post-consent discussions.
NRW (for PINS)	2018 Scoping Response	We are aware that there are a number of private water supplies (PWS) located on the Isle of Anglesey; the local authority Environmental Health Officers will have a register of these. The works have the potential to impact small drinking water supplies such as PWS and we therefore recommend that the local authority is contacted for further advice. The potential impact on small drinking water supplies should be assessed, where significant effects are likely.	Potential impacts on groundwater resources are considered in **Sections 17.6.4.3**, **17.6.5.1** and **17.6.5.2**. The location of private water supplies known to the local authority is discussed in **Section 17.5.4**.
NRW (for PINS)	2018 Scoping Response	Requirements of a Water Feature Survey The applicant must undertake a preliminary site assessment, which should include the following: • Identification of all water features both surface and groundwater (ponds, springs, ditches, culverts etc.) within a 300 metres radius of the site. • Use made of any of these water features. This should include the construction details of wells and boreholes and details of the lithology into which they are installed; • An indication of the flow regime in the spring or surface water feature, for example whether or not the water feature flows throughout the year or dries up during summer months; • Accessibility to the spring/well; • This information should identified on a suitably scaled map (i.e. 1:10,000), tabulated and submitted to Natural Resources Wales. It would be useful for the developer to photograph each of the identified water features during the survey.	An Extended Phase 1 Habitat Survey was carried out between September and November 2018, as discussed in **Chapter 19, Onshore Ecology**, which surveyed all water features along the cable route. This was used to inform the characterisation of the baseline environment presented in **Section 17.5**.

Consultee	Date / Document	Comment	Response
NRW (for PINS)	2018 Scoping Response	Based on the results of the survey the applicant must assess the likely impacts from the development on both quantity and quality of the surface water and groundwater. This should take into consideration both the preferred methods of construction and the assumed hydrogeology in the vicinity of the development.	Potential impacts on groundwater resources are considered in **Sections 17.6.4.3**, **17.6.5.1** and **17.6.5.2**.
NRW (for PINS)	2018 Scoping Response	We may require identified groundwater features to be monitored during the proposed workings and would therefore recommend that the survey be undertaken as soon as possible to enable the developer to carry out suitable baseline monitoring prior to the commencement of workings at the site	Potential impacts on groundwater resources are considered in **Sections 17.6.4.3**, **17.6.5.1** and **17.6.5.2**.
NRW (for PINS)	2018 Scoping Response	With regard to flood risk associated with the landfall and cable route we are generally satisfied with the content of the EIA scoping report in that flood risk will be considered further as part of the ES (see **section 7.3.1.4**). We would advise that the flood maps referred to in footnote 34 show current day risks and do not include any allowances for climate change. Climate change allowances (75 years) would be in line with CL-03-16 (http://gov.wales/topics/planning/policy/policyclarificationletters/2016/cl-03-16-climatechange-allowances-for-planning-purposes/?lang=en).	Flood risk is assessed in **Section 17.6.4.4** and the separate FCA (**Appendix 17.1 Volume III**).
NRW (for PINS)	2018 Scoping Response	Extreme sea levels can be obtained for this coastline for a range of probability flood events including that of climate change allowances. These extreme sea levels would allow for surge conditions but not wave action. To obtain the levels a request may be made to our data distribution team.	Flood risk is assessed in **Section 17.6.4.4** and the separate FCA (**Appendix 17.1 Volume III**).
NRW	2018 Scoping Response	The ES should make reference to any main rivers within the route and directly downstream of the reservoirs referred to. These can be viewed on the NRW Flood Risk Maps (referred to in footnote 34 of the Scoping Report) using “detailed view” to see main river layer. Activities in, over, under or within 8m of a main river may be subject to a Flood Risk Activity Permit under the Environmental Permitting Regulations. These permits are determined by NRW.	None of the works are within 8m of a main river. Permitting requirements will be considered as part of post-consent discussions.
Isle of Anglesey County Council	2017 Scoping Response	Suggest consideration is given to addressing flood risk associated with onshore works. Area A has the least onshore flood risk.	Flood risk is assessed in **Section 17.6.4.4** and the separate FCA (**Appendix 17.1 Volume III**).

17.4. METHODOLOGY

17.4.1. Study Area

28. The study area for water resources and flood risk has been identified on the basis of surface hydrological catchments. Catchments have been included in the study area if they contain or are hydrologically connected to (i.e. upstream of downstream), the proposed works area (**Figure 17-1, Volume II**). The works area includes the onshore infrastructure comprising landfall, landfall substation at Ty-Mawr (hereafter referred to as landfall substation), onshore cable corridor, switchgear building at Parc Cybi (hereafter referred to as switchgear building) and grid connection substation at Orthios (hereafter referred to as grid connection substation). as well as the associated temporary works areas. The NRW WFD water body boundaries (including terrestrial components of transitional and coastal water bodies, which are not designated as separate river water bodies due to their small catchment area) are based on surface hydrological catchments and have therefore been used define surface water receptors.

17.4.2. Data Sources – Desk Study

29. The data sources that have been used to inform the water resources and flood risk baseline are listed in **Table 17-4**.

Table 17-4 Data Sources Features

Data	Year	Coverage	Confidence
Water Watch Wales Cycle 2 Rivers and waterbodies viewer	2019	Regional	High
Wales Water Body Objectives and Measures	2019	Regional	High
British Geological Survey Geoindex	2019	Nationwide	High
Lle Geo-Portal for Wales	2019	Regional	High
Natural Resources Wales' Flood Risk Map Viewer	2019	Regional	High
Water Watch Wales Reason for Not Achieving Good Status information	2019	Regional	High

17.4.3. Impact Assessment Methodology

30. **Chapter 5, EIA Methodology** provides a summary of the general impact assessment method, and the following sections describe the methodology used to assess the potential impacts of the Project on water resources and flood risk in more detail. More detailed methodologies for the FCA and WFD compliance assessment can be found in **Appendix 17.1** (**Volume III**) and **Appendix 8.1** (**Volume III**) respectively.

31. Two key groups of impacts have been identified for the purpose of defining impact significance:

32. Water resources: these are potential effects of the Project on the physical (including hydrology and geomorphology), biological or chemical character of surface waters or groundwater, potentially impacting on secondary receptors such as wetlands or abstractions, and WFD water body status; and

33. Flood risk: these are the potential impacts of the Project on site drainage, conveyance and surface water flooding.

34. Whilst there are clear links between the two impact groups, the assessment of receptor sensitivity and the magnitude of effect may differ. These definitions have been developed with reference to best-practice guidance for the assessment of environmental impacts on water receptors provided by the Department of Transport (2015) and Highways Agency (2008).

17.4.3.1. Sensitivity

35. Receptor sensitivity has been defined with reference to the adaptability, tolerance, recoverability and value of individual receptors. **Table 17-5** provides the criteria for appraisal of the value and sensitivity for identified water resources and flood risk receptors based on professional judgement.

Table 17-5 Definitions of the Different Sensitivity Levels for Water Resources and Flood Risk Receptors

Sensitivity	Definition
High	Receptor has **very limited** capacity to tolerate changes to hydrology, geomorphology, and water quality or flood risk. *Water resources* • Controlled waters with an unmodified, naturally diverse hydrological regime, a naturally diverse geomorphology with no barriers to the operation of natural processes, and good water quality. • Supports habitats or species that are highly sensitive to changes in surface hydrology, geomorphology or water quality. • Supports Principal Aquifer with public water supply abstractions by provision of recharge. • Site is within Inner or Outer Source Protection Zones. *Flood risk* • Highly Vulnerable Land Use, as defined by Technical Advice Note 15 for the Planning Policy Wales (2004). • Land with more than 100 residential properties (after Highways Agency, 2008).
Medium	Receptor has **limited** capacity to tolerate changes to hydrology, geomorphology, and water quality or flood risk. *Water resources* • Controlled waters with hydrology that sustains natural variations, geomorphology that sustains natural processes, and water quality that is not contaminated to the extent that habitat quality is constrained. • Supports or contributes to habitats or species that are sensitive to changes in surface hydrology, geomorphology and/or water quality. • Supports Secondary A or Secondary B Aquifer with water supply abstractions. • Site is within a Catchment Source Protection Zone. *Flood risk* • More Vulnerable Land Use, as defined by Technical Advice Note 15 for the Planning Policy Wales (2004). • Land with between 1 and 100 residential properties or more than 10 industrial premises (after Highways Agency, 2008).

Sensitivity	Definition
Low	Receptor has **moderate** capacity to tolerate changes to hydrology, geomorphology, and water quality or flood risk. *Water resources* • Controlled waters with hydrology that supports limited natural variations, geomorphology that supports limited natural processes and water quality that may constrain some ecological communities. • Supports or contributes to habitats that are not sensitive to changes in surface hydrology, geomorphology or water quality. • Supports Secondary A or Secondary B Aquifer without abstractions. *Flood risk* • Less Vulnerable Land Use, as defined by Technical Advice Note 15 for the Planning Policy Wales (2004). • Land with 10 or fewer industrial properties (after Highways Agency, 2008).
Negligible	Receptor is **generally** tolerant of changes to hydrology, geomorphology, and water quality or flood risk. *Water resources* • Controlled waters with hydrology that does not support natural variations, geomorphology that does not support natural processes and water quality that constrains ecological communities. • Aquatic or water-dependent habitats and/or species are tolerant to changes in hydrology, geomorphology or water quality. • Non-productive strata that does not support groundwater resources. *Flood risk* • Water Compatible Land Use, as defined by Technical Advice Note 15 for the Planning Policy Wales (2004). • Land with limited constraints and a low probability of flooding of residential and industrial properties (after Highways Agency, 2008).

17.4.3.2. Value

36. It should be noted that high value and high sensitivity are not necessarily linked with respect to a particular impact. A receptor could be of high value but have a low sensitivity to an effect. It is therefore important not to inflate the significance of an impact due to the value of the receptor. Instead, the value can be used as a modifier for the sensitivity assigned to the receptor. Definitions for the value of surface waters are provided in **Table 17-6**.

Table 17-6 Definitions of the Value Levels for Water Resources and Flood Risk Receptors

Value	Definition
High	Receptor is an **internationally or nationally important** resource with limited potential for offsetting / compensation. *Water resources*

Value	Definition
	• Supports or contributes to designated habitats or species of international or national importance (e.g. Special Area of Conservation (SAC), Special Protection Area (SPA), and Site of Special Scientific Interest (SSSI)). • Licensed potable abstractions (surface water and groundwater). *Flood risk* • Nationally significant infrastructure. • Internationally or nationally designated planning policy areas.
Medium	Receptor is a **regionally important** resource with limited potential for offsetting / compensation. *Water resources* • Supports or contributes to habitats or species of UK regional value (Site of Nature Conservation Interest (SNCI), Regionally Important Geological Site (RIGS)). • Licensed non-potable abstractions and unlicensed potable abstractions (surface water and groundwater). *Flood risk* • Locally significant infrastructure. • Local planning policy designated sites.
Low	Receptor is a **locally important** resource. *Water resources* • Supports or contributes to habitats or species of local value (e.g. Local Nature Reserve (LNR)). • Unlicensed non-potable abstractions (surface water and groundwater). *Flood risk* • Drainage that does not discharge to Critical Drainage Areas.
Negligible	Receptor is not considered to be an important resource. *Water resources* • Does not support or contribute to habitats or species of particular importance. • No abstractions (surface water and groundwater). *Flood risk* • No significant infrastructure.

17.4.3.3. Magnitude

37. Receptor magnitude has been defined with reference to the spatial extent, duration, frequency and severity of the effect. Impact magnitude is defined in **Table 17-7**.

Table 17-7 Definitions of the Magnitude Levels for Water Resources and Flood Risk Receptors

Value	Definition
High	Fundamental, permanent / irreversible changes, over the whole receptor, and / or fundamental alteration to key characteristics or features of the particular receptors character or distinctiveness. *Water resources* • Permanent changes to geomorphology and/or hydrology that prevent natural processes operating. • Permanent and/or wide scale effects on water quality or availability. • Permanent loss or long-term (>5 years) degradation of a water supply source resulting in prosecution. • Permanent or wide scale degradation of habitat quality. *Flood risk* • Permanent or major change to existing flood risk. • Reduction in on-site flood risk by raising ground level in conjunction with provision of compensation storage. • Increase in off-site flood risk due to raising ground levels without provision of compensation storage. • Failure to meet either sequential or exception test (if applicable).
Medium	Considerable, permanent / irreversible changes, over the majority of the receptor, and / or discernible alteration to key characteristics or features of the particular receptors character or distinctiveness. *Water resources* • Medium-term (1-5 years) effects on water quality or availability. • Medium-term (1-5 years) degradation of a water supply source, possibly resulting in prosecution. • Habitat change over the medium-term (1-5 years). *Flood risk* • Medium-term (1-5 years) or moderate change to existing flood risk. • Possible failure of sequential or exception test (if applicable). • Reduction in off-site flood risk within the local area due to the provision of a managed drainage system.
Low	Discernible, temporary (throughout project duration) change, over a minority of the receptor, and / or limited but discernible alteration to key characteristics or features of the particular receptors character or distinctiveness. *Water resources* • Short-term (<1 year) or local effects on water quality or availability. • Short-term (<1 year) degradation of a water supply source. • Habitat change over the short-term. *Flood risk* • Short-term (<1 year), temporary or minor change to existing flood risk. • Localised increase in on-site or off-site flood risk due to increase in impermeable area. • Passing of sequential and exception test.
Negligible	Discernible, temporary (for part of the project duration) change, or barely discernible change for any length of time, over a small area of the receptor, and/or slight alteration to key characteristics or features of the particular receptors character or distinctiveness. *Water resources* • Intermittent impact on local water quality or availability.

Value	Definition
	• Intermittent or no degradation of a water supply source. • Very slight local changes to habitat that have no observable impact on dependent receptors. *Flood risk* • Intermittent or very minor change to existing flood risk. • Highly localised increase in on-site or off-site flood risk due to increase in impermeable area.

17.4.3.4. Impact Significance

38. The potential significance of an impact is a function of the sensitivity and value of the receptor and the magnitude of the effect (noting that value and sensitivity are not necessarily linked, as detailed in **Section 17.4.3.2**).

39. The significance is derived using an impact significance matrix, as shown in **Table 17-8**. Definitions of each level of significance are provided in **Table 17-9**.

40. Assessment of impact significance is qualitative and reliant on professional experience, interpretation and judgement. The matrix should therefore be viewed as a framework to aid understanding of how a judgement has been reached, rather than as a prescriptive, formulaic tool. Note that impacts may be adverse or beneficial.

41. Effects that result in major or moderate impacts are considered to be 'significant' in EIA terms. Adverse significant impacts may require mitigation; beneficial significant impacts could contribute to the case in favour of the project.

Table 17-8 Impact Significance Matrix

		Negative Magnitude				Beneficial Magnitude			
		High	**Medium**	**Low**	**Negligible**	**Negligible**	**Low**	**Medium**	**High**
Sensitivity	**High**	*Major*	*Major*	*Moderate*	*Minor*	*Minor*	*Moderate*	*Major*	*Major*
	Medium	*Major*	*Moderate*	*Minor*	*Minor*	*Minor*	*Minor*	*Moderate*	*Major*
	Low	*Moderate*	*Minor*	*Minor*	*Negligible*	*Negligible*	*Minor*	*Minor*	*Moderate*
	Negligible	*Minor*	*Negligible*	*Negligible*	*Negligible*	*Negligible*	*Negligible*	*Negligible*	*Minor*

Table 17-9 Impact Significance Definitions

Significance	Definition
Major	Very large or large change in receptor condition, both adverse or beneficial, which are likely to be important considerations at a regional or district level because they contribute to achieving national, regional or local objectives, or, could result in exceedance of statutory objectives and / or breaches of legislation.
Moderate	Intermediate change in receptor condition, which are likely to be important considerations at a local level.

Significance	Definition
Minor	Small change in receptor condition, which may be raised as local issues but are unlikely to be important in the decision making process.
Negligible	No discernible change in receptor condition.
No change	No impact, therefore no change in receptor condition.

42. Following initial assessment, if the impact does not require additional mitigation (or none is possible) the residual impact will remain the same. If, however, additional mitigation is proposed there will be an assessment of the post-mitigation residual impact.

17.4.4. Cumulative Impact Assessment

43. **Chapter 5, EIA Methodology** provides a general methodology with regards to the Cumulative Impact Assessment (CIA). The potential for cumulative effects has been considered for the construction, operation and decommissioning of the onshore development area with other onshore projects.

44. Cumulative impacts are considered where the onshore development area has the potential to overlap with similar impacts arising from:

- Recent development, either built or under construction (which is not considered as part of the baseline);
- Approved development, awaiting implantation; and
- Proposals awaiting determination within the planning process with design information in the public domain.

45. The CIA involves consideration of whether impacts on a receptor can occur on a cumulative basis between the Project and other activities, projects and plans for which sufficient information regarding location and scale exist.

17.5. EXISTING ENVIRONMENT

This section covers the freshwater surface water bodies and groundwater and does not consider coastal water bodies. However, information is provided on coastal water bodies for context as the surface watercourses within the study area drain into these. Marine water and sediment quality are discussed in **Chapter 8, Marine Water and Sediment Quality**.

17.5.1. Surface Water Drainage

46. The preferred option for the onshore cable route is for it to be excavated into the local road network where possible. This road network crosses or runs adjacent to a number of un-named ordinary watercourses comprising small, spring-fed drains and streams which are the responsibility of the local authority as the LLFA.

47. Fourteen surface water features have been identified as potentially being crossed or interacted with by the Project. These are shown in **Figure 17-1 (Volume II)** and listed in **Table 17-10** below:

Table 17-10 Surface water features located within the works area

Water Feature Number	Grid Reference	Description
1	SH21788163	Stream at landfall running adjacent to the road and over the cliff within HDD footprint.
2	SH22098057	Drain passing under the road near Ty-Mawr.
3	SH23698060 - SH23428001	Stream running adjacent to Porth Dafarch Road from Valley of the Rocks towards Porth Dafarch Beach, crossing under the road at SH23458019. Interacts with onshore cable corridor.
4	SH24518077	Area of spring-fed marshy ground with drains adjacent to Holyhead Leisure Centre interacts with onshore cable corridor; however, this may now be diverted to avoid this.
5	SH24828092	Drains to the northeast of the football ground at Holyhead Leisure Centre, crossed by the onshore cable corridor.
6	SH24888096	
7	SH25058102 - SH25158102	Drainage pond between roundabouts on Parc Cybi Road and B4545 may interact with the onshore cable corridor.
8	SH25208098	Drain adjacent to Parc Cybi Road between Tyddyn-pioden and the road interacts with onshore cable corridor.
9	SH25728091 - SH25878083	Drain adjacent to A55 leading to the pond, may interact with Horizontal Directional Drilling (HDD) area for grid connection substation.
10	SH25938078	SuDS pond adjacent to A55 road may interact with HDD area for grid connection substation.
11	SH26208077	Drain running adjacent to the A55 road on the northern side, potential overlap with HDD area.
12	SH26218065	Drain crossing under A55 within woodland towards Aluminium works may interact with HDD area for grid connection substation.
13	SH26598048	Second drain crossing beneath the A55 may interact with HDD area for grid connection substation.
14	SH27078045	Drain running adjacent to bridge that passes over A55 may interact with HDD area for grid connection substation.

48. The surface drainage features are not included within the catchments of any river water bodies under the WFD, because their catchment areas are too small to be considered as a water body in their own right. However, the terrestrial catchments are considered to be part of the transitional or coastal water bodies into which they drain.

49. The landfall is located in an area of the coastal fringe which drains into the sea, therefore two WFD coastal water bodies are considered as shown in **Figure 17-2** (**Volume II**):

50. Caernarfon Bay North (GB621010380000) which has an area of 135.19 km^2, stretching from where the Menai Strait enters St. George's Channel, round Anglesey to the area just north of Holyhead.

51. At the Project's eastern edge it is in close proximity to the Holyhead Strait (GB681010450000), which has an area of 7.29 km^2 and receives drainage from any ordinary watercourses present in that area.

52. Impacts on coastal waters bodies are discussed in **Chapter 8, Marine Water and Sediment Quality** and are not discussed further in this chapter. Further information on WFD compliance is provided in the separate WFD Compliance Assessment (**Appendix 8.1**).

17.5.2. Water Quality

53. As the surface water features within the onshore development area comprise small streams and drainage ditches and are ordinary watercourses, there is no available data relating to their water quality.

54. Data presented in the NRW Cycle 2 Rivers and water bodies WFD Data Download spreadsheet (accessed March 2019), indicate that water quality in the Caernarfon Bay North coastal water body is good, and that in the Holyhead Strait coastal water body is moderate.

17.5.3. Flood Risk

55. The NRW Development Advice Map shows that the onshore development area is located within Zone A, apart from four small areas on the foreshore at landfall which are within Zone C2 and are without significant flood defence infrastructure. There are no records of historical flooding from rivers, the sea, groundwater or surface water. The coastal frontage at landfall includes four areas classified as being low risk (i.e. between 1 in 1,000 (0.1 %) and 1 in 100 (1 %) chance of flooding from the sea each year. Further north, there are two areas classified as being at high risk (i.e. greater than 1 in 30 (30 %) chance of flooding each year.

56. The Isle of Anglesey Strategic Flood Consequence Assessment (SFCA) states that groundwater is not considered to be a significant source of flooding, and the Western Wales RBD PFRA states that groundwater flood events in Wales are rare.

57. The onshore cable corridor intersects areas classified as low (between 1 in 1000 (0.1 %) and 1 in 100 (1 %) chance), medium (between 1 in 100 (1 %) and 1 in 30 (30 %) chance) and high (greater than 1 in 30 (30 %) chance) risk of flooding from surface water. Areas of medium risk include an area to the east of Ty-Mawr Farm and along the road at Dafarch North.

58. The NRW Development Advice Map shows that the grid connection points are located entirely within Zone A with both the Parc Cybi and Orthios grid connection points intersecting an area of low (i.e. between 1 in 1,000 (0.1%) and 1 in 100 (1%) chance) of flooding from surface water each year. There is no risk of flooding from other sources.

59. A more detailed description of the baseline flood risk in the onshore development area is provided in the FCA (**Appendix 17.1 Volume III**).

17.5.4. Groundwater

60. The proposed Project is underlain by the Ynys Mon Secondary B Aquifer (GB41002G204400) spanning both the bedrock and superficial drift. The bedrock is made up of the South Stack psammite and pelite formation and the New Harbour Group schist and psammite group. The superficial deposit consists of Devensian till and small areas of glaciofluvial Devensian sand and gravel deposits.

61. The aquifer throughout the majority of Holy Island is of high vulnerability except for where the Project makes landfall where it is medium vulnerability. The quantitative status of the groundwater throughout northern Wales including Anglesey is good; however, the chemical status over most of Anglesey including Holy Island is poor. This has been attributed to the chemical dependent surface water body status through a source of probably diffuse pollution from mining and quarrying via abandoned mines.

62. There are no Source Protection Zones (SPZ) in the onshore development area, suggesting that the groundwater is not abstracted for public water supply, therefore reducing its likelihood to be sensitive to change. There are Private Water Supplies (PWS) within the area as shown in **Figure 17-3** (**Volume II**). However, none are present within 250 m of the onshore development area for which impacts are assessed for groundwater.

17.5.5. Designated Sites

63. The landfall is located within the Holy Island Coast SSSI, the Holy Island Coast SAC and Holy Island Coast SPA which all follow the coast of Holy Island around its western extent. The Holyhead Strait and Caernarfon Bay North water bodies are covered by the Anglesey Terns Marine SPA. The Holyhead Strait contains the Beddmanarch-Cymyran SSSI, and the Caernarfon Bay North is covered by the North Anglesey Marine candidate SAC:

64. Anglesey Terns Marine SPA is classified due to its population of breeding Arctic terns (*Sterna paradisae*), common terns (*Sterna hirundo*), roseate terns (*Sterna dougllii*) and sandwich tern (*Sterna sandvicensis*) the populations of which should all be stable or increasing.

65. Beddmanarch-Cymyran SSSI comprises shallow waters with areas of mud flats, saltmarsh and sandflats with large areas of seagrass lying between the Holy Island and mainland Anglesey. These support a wide range of wintering water-birds.

66. North Anglesey Marine candidate SAC stretches from the north coast of the Isle of Anglesey into the Irish Sea and has been identified as an area of importance for the harbour porpoise (*Phocoena phocoena*), as well as incorporating a range of other habitats.

67. Glannau Ynys Gybi / Holy Island Coast SAC includes a variety of Annex I habitats that are the reason for designation: vegetated sea cliffs of the Atlantic (and Baltic) Coasts comprising maritime heath with spotted rock rose *Tuberaria guttata* and extensive cliff-crevice and grassland communities. It is also the most important site in North Wales for European dry heaths.

68. Glannau Ynys Gybi / Holy Island Coast SPA supports a resident population of chough *Pyrrhocorax pyrrhocorax* which depends on diverse mix of habitats.

69. Glannau Ynys Gybi / Holy Island Coast SSSI is a component of the SAC and SPA and is designated for a variety of vascular plants (heathland and maritime species), birds (seabirds, peregrine, chough and heathland species), invertebrates and geology.

70. None of the designations listed above contain relevant features likely to be impacted by the Project, particularly when their size is considered in relation to the small scale of the works associated with the Project.

71. There are no terrestrial designations that are directly crossed by onshore infrastructure that are relevant to surface water features. However, the Tre Wilmot SSSI lies approximately 350 m away at its closest point. This is designated for its large area of acidic heath, lowland heath and associated heathland vegetation communities. The lower-lying areas support relevant features including wet heath or peatland communities with species such as crossleaved heath *Erica tetralix*, purple moor-grass *Molinia caerulea* and creeping willow *Salix repens*. However, this is not hydrologically connected to the works area, and water receptors are therefore unlikely to be impacted. Further information regarding designated sites can be found in **Chapter 19, Onshore Ecology.**

17.5.6. Sensitivity and Value of Receptors

72. As described in **Section 17.5.1**, the surface water receptors are made up of a series of small spring-fed drainage channels and streams. The value and sensitivity of each watercourse as described in **Table 17-10** is given below in **Table 17-11**. Any parts of the surface water network that are not included in Ordnance Survey datasets are considered to be part of the nearest downstream watercourse. The sensitivity of each surface water receptor has been defined based on the geomorphological (i.e. physical habitat), hydrological and water quality characteristics described in **Section 17.5.1**. The value has been defined with reference to the ecological value of the receptors and any connected habitats, including the presence of designated sites (see **Section 17.5.5**).

73. Three of the surface water features identified in **Section 17.5.1** appear to drain south or south-east into the Caernarfon Bay coastal water body with the remaining springs and drains appearing to remain as surface or ground water in the form of ponds and sinks. In many cases they appear to have been culverted or straightened next to or under roads or around residential properties and field boundaries in places; but are natural over the remainder of their courses. They are unlikely to encounter any sources of contamination due to the small, rural nature of their catchments and are not within a SPZ.

Table 17-11 Sensitivity and Value of Receptors

Water Feature Number	Sensitivity	Justification of Sensitivity	Value	Justification of Value
1	Medium	Appears to be a small low-energy watercourse which drains over the cliff to the beach at landfall.	High	Runs through an area of marshy grassland and drains into coastal area making up a SSSI, SPA and SAC.
2	Negligible	Low-energy watercourse with limited geomorphological variation and heavily overgrown.	Negligible	Does not contribute to habitats or species of particular interest.
3	Medium	Small watercourse which appears unmodified.	High	Runs through an area of marshy grassland and drains into coastal area making up a SSSI, SPA and SAC.
4	Low	Area of marshy grassland containing undefined drains.	Low	Marshy grassland constitutes a habitat of interest and local value.

Water Feature Number	Sensitivity	Justification of Sensitivity	Value	Justification of Value
5	Low	Low-energy modified drain adjacent to scrub and amenity grassland.	Negligible	Does not appear to drain into or contribute to any protected area and does not contribute to habitats or species of particular interest.
6	Low	Low-energy modified drain adjacent to scrub and amenity grassland.	Negligible	Does not appear to drain into or contribute to any protected area and does not contribute to habitats or species of particular interest.
7	Negligible	Heavily modified waterbody that appears to have been created as a result of road construction.	Negligible	Does not appear to show connectivity to other surface water bodies and does not contribute to habitats or species of particular interest.
8	Negligible	Low-energy modified drain adjacent to scrub and amenity grassland.	Negligible	Does not appear to show connectivity to other surface water bodies and does not contribute to habitats or species of particular interest.
9	Negligible	Low-energy modified drain adjacent to scrub and amenity grassland.	Negligible	Does not appear to show connectivity to other surface water bodies and does not contribute to habitats or species of particular interest.
10	Low	Pond with limited ecological value located within an area of scrub and semi-improved grassland.	Low	Not located in a protected area and does not contribute to local value.
11	Negligible	Low-energy modified drain adjacent to aluminium works running through scrub.	Negligible	Does not appear to show connectivity to other surface water bodies and does not contribute to habitats or species of particular interest.
12	Negligible	Low-energy modified drain adjacent to scrub and amenity grassland.	Negligible	Does not appear to show connectivity to other surface water bodies and does not contribute to habitats or species of particular interest.
13	Negligible	Low-energy modified drain adjacent to scrub and amenity grassland.	Negligible	Does not appear to show connectivity to other surface water bodies and does not contribute to habitats or species of particular interest.
14	Negligible	Low-energy modified drain adjacent to scrub and amenity grassland.	Negligible	Does not appear to show connectivity to other surface water bodies and does not contribute to habitats or species of particular interest.

Water Feature Number	Sensitivity	Justification of Sensitivity	Value	Justification of Value
Ynys Mon Secondary B Aquifer	Medium	As discussed in **Section 17.5.4**, this water body has a poor chemical status and is therefore considered to have medium sensitivity.	Low	It is designated as a Secondary B aquifer, and there is a lack of SPZ within 2 km of the project area.

17.6. IMPACT ASSESSMENT

17.6.1. Overview of Potential Impacts

74. Following the methodology presented in **Section 17.4.3** above, the impacts associated with the water resource receptors described in **Section 17.5** have been assessed and are presented in this section. Where measures over and above the embedded mitigation described in **Section 17.6.2** are required to avoid, reduce, remedy/compensate or enhance the adverse impacts of the Project, this information has been provided.

75. The nature of the surface water drainage system consisting of small water bodies, drainage systems and standing water which drain into coastal water bodies means that they do not have defined catchment areas. The methodology for crossing the watercourses is likely to be the same for all surface waterbodies, therefore the impact assessment will be similar throughout. Therefore, for ease and simplicity of assessment these have been separated into groups according to type of water feature and also sensitivity and value as described in **Table 17-12** below. Groundwater has been assessed separately.

Table 17-12 Grouping of Water Features

Receptor	Water features included	Description/Justification	Sensitivity	Value
Natural streams	1, 3	Small, natural watercourses which are relatively unmodified and drain over the cliff into designated sites.	Medium	High
Modified watercourses	2, 5, 6, 7, 8, 9, 11, 12, 13, 14	Small drains running along field boundaries, adjacent to roads, or through fields which appear overgrown and may only hold water on a seasonal basis. Do not contribute to designated sites.	Negligible	Negligible
Area of marshy grassland containing undefined drains.	4	Appears to be semi-natural, running through marshy grassland, increasing its value.	Low	Low
Standing water	10	Pond with limited ecological value located within an area of scrub and semi-improved grassland. May be part of SuDS for the road.	Low	Low

17.6.2. Mitigation

76. Embedding mitigation into the project design is a type of primary mitigation and is an inherent aspect of the EIA process. A full account of embedded mitigation measures is contained in **Chapter 4, Project Description**. Where embedded mitigation measures have been developed into the design of the Project with specific regard to water resources and flood risk, these are described in **Table 17-13**. Additional mitigation measures are also included to follow best practice and policy requirements. These mitigation measures are described in **Table 17-14**.

Table 17-13 Embedded Mitigation Measures for Water Resources and Flood Risk

Parameter	Mitigation Measures Embedded into the Project Design
General	
Foul Drainage	Foul drainage (e.g. from construction welfare facilities) will be collected through a mains connection to an existing mains sewer (if a suitable connection is available) or collected in a septic tank located within the development boundary and transported off site for disposal at a licensed facility. The specific approach will be determined during detailed design with consideration of the availability of mains connections and the number of working hours for site attendees.
Landfall Substation, Switchgear Building and Grid Connection Substation (operational phase)	
Foul Drainage	Foul drainage at the landfall substation, switchgear building and grid connection substation will be collected through a mains connection to the existing local authority sewer system (if a suitable connection is available) or collected in a septic tank located within the onshore development area and transported off site for disposal at a licensed facility.

Table 17-14 Additional Mitigation through Best Practice and Policy for Water Resources and Flood Risk

Parameter	Mitigation Measures through Best Practice and Policy
General	
Sediment Management	A Construction Method Statement (CMS) and Code of Construction Practice (CoCP) (**Document MOR/RHDHV/DOC/0076, Outline Code of Construction Practice**) will be developed for the construction activities and will adhere to construction industry good practice guidance as detailed in the Construction Industry Research and Information Association (CIRIA)'s 'Control of water pollution from construction sites: Guidance for consultants and contractors (C532)' (2001). In addition, Guidance for Pollution Prevention (GPPs) from NRW, Scottish Environment Protection Agency and the Northern Ireland Environment Agency; specifically, GPP5 should be adhered to. Specific measures to control sediment supply that will be captured within the CMS include: • Subsoil exposure will be minimised, and strips of undisturbed vegetation will be retained on the edge of the working area where possible; • On-site retention of sediment will be maximised by routing all drainage through the site drainage system; • The drainage system will include measures to intercept sediment runoff at source. Suitable filters will be used to remove sediment from any water discharged into the surface drainage network; • Additional measures will be included in parts of the working area that are in proximity to surface drainage channels; and • Soil and sediment accumulation on road surfaces will be minimised as reasonably practicable by cleaning the wheels of vehicles leaving site and, where required, clearance of the road surface. Traffic movement would be restricted to minimise the potential for surface disturbance.

Parameter	Mitigation Measures through Best Practice and Policy
General	
Surface Drainage	Following construction and engineering design work, a surface water drainage system will be developed as part of a Sustainable Drainage System (SuDS). The detail of this is included in **Document MOR/RHDHV/DOC/0076, Outline Code of Construction Practice**. This will involve collecting run off from roads and buildings at the landfall substation, switchgear building and grid connection substation and using oil interceptors and bund pumps to discharge the water with all contaminants removed. The drainage system will also be designed to manage any residual risks to groundwater flooding, where appropriate (e.g. by conveying groundwater at the surface away from key infrastructure and into the on-site drainage network). Generally, the aim will be to discharge surface water runoff as high up the following hierarchy of drainage options as reasonably practicable: i) into the ground (infiltration); ii) to a surface water body; iii) to a surface water sewer, highway drain or another drainage system; or iv) to a combined sewer.

77. Any further mitigation measures suggested within this chapter are therefore considered to be additional to this mitigation.

17.6.3. Worst Case Scenario

78. This section identifies the realistic worst-case parameters associated with the Project. This includes all onshore infrastructure including the grid connection infrastructure that the Project will require for ultimate connection to national electricity grid.

79. **Table 17-15** identifies those realistic worst-case parameters of the onshore infrastructure that are relevant to potential impacts on water resources and flood risk during construction, operation and decommissioning phases of the Project. Please refer to **Chapter 4, Project Description** for more detail regarding specific activities, and their durations, which fall within the construction phase.

Table 17-15 Realistic Worst Case Scenarios

Impact	Parameter	Notes
Construction		
Impacts related to the landfall (HDD option)	▪ Up to nine cable tails at landfall. ▪ Up to nine separate drills; each up to 550 m long, nominally 450 mm diameter. ▪ Separation of 10 m between HDD entry points. ▪ Separation of 20 m between HDD exit points. ▪ Total drill cuttings volume could be up to 900 m^3 (total amount for all 9 drills). ▪ Temporary works area up to 120 m x 70 m (total area for HDD rig, site office and equipment plus laydown area).	Landfall to be achieved via HDD unless this method is not feasible. No beach access required.
Impacts related to the landfall (trenched option)	▪ Up to nine cable tails at landfall.	Worst-case scenario if HDD is not feasible.

Impact	Parameter	Notes
	▪ Up to nine separate shallow trenches (slots within the cliff face), each between 480 m and 740 m long. ▪ Individual trench widths of up to 600 mm. Or a single trench with all nine cables laid within it of approximately 10 m width and 0.5 m to 1.2 m deep ▪ Duct or split pipe over 370 m to 550 m of each cable, up to 350 mm external diameter. ▪ Total material removed could be up to 8,880 m^3; however, the majority would be replaced to backfill the trench after the ducts / cables were installed. ▪ Temporary works area up to 100 m x 50 m (for site office and equipment plus laydown area).	
Transition pits	There will be one transition pit, up to 15 m x 85 m x 1.5 m deep, equating to a footprint of 1,275 m^2, excavated volume 1,912.5 m^3 in addition to trenching excavation or HDD cutting volumes. The final volume is subject to confirmation of geology and drill geometry.	
Landfall substation and associated buildings	▪ A fenced site compound with hardstanding which would house a grid transformer and connection terminations within an area approximately 80 m by 80 m. Within this would be three separate buildings of approximately 62 m by 22.5 m by 7 m high, the second will be 28 m by 10 m by 7 m high and the third 8 m by 8 m by 7 m. The estimated total footprint of the landfall substation compound is 6,400 m^2. ▪ The two buildings will include a control building for housing switch gear, and a welfare area which would be likely to consist of a site office and welfare facilities including an area of hardstanding for parking. ▪ In addition, a temporary construction compound and laydown area will also be created, estimated up to 50 m x 100 m, or equivalent area.	Hard standing will be in the form of hard core or tarmac surfaces on or adjacent to access roads within the substation, pertaining to the 5 m to 7 m wide perimeter access road. Outdoor areas within the compound will have a layer of crushed rock or gravel approximately 80 mm to 150 mm thick.
Impacts related to the onshore cable corridor	▪ The onshore cable route would feature up to two 132 kV cable circuits. Each	Trenching will be undertaken using a large excavator to dig up

Impact	Parameter	Notes
	circuit would consist of three power cables plus a fibre optic cable. This results in up to six power cables and two fibre optic cables in total. ▪ Up to 8.1 km total route length with the cable trenched into the local road network as much as practicable. ▪ Up to 110 mm diameter cable for each circuit (up to six in total). ▪ The cables will be laid within ducts, in trenches up to 1.5 m wide by 1.7 m deep. Joint bays will be required every 200 m to 900m along the cable route. Each joint bay will be up to 15 m by 3 m by 1.5 m in size and will be constructed with a concrete base and timber frame. Provision will be made for an earth link box of 1.5 m by 1.5 m within proximity to each joint bay. Up to 20 joint bays may be required. ▪ Approximately 20 m by 7 m of hardstanding will be required around each joint bay to provide enough space for the cable pulling works. ▪ Up to 30 m working width will be required for plant access, lay down of equipment, top soil, spoil and trench shoring. ▪ HDD will be used to install the cable under the A55 road and the railway line requiring approximately 150 m drill length. Up to two crossings each involving six drills will be possible, with two site areas prepared for each HDD crossing.	the ground along the route, with a rock breaker being required along some sections.
Impacts related to the switchgear building	▪ Infrastructure consisting of a 33 kV switchboard room and metering room within building up to 9.4 m by 5 m by 4 m. ▪ To be located northeast of the existing substation with a footprint of 38 m^2.	
Impacts relating to the grid connection substation	▪ Grid connection substation compound will be 104 m by 62 m by 9 m, containing up to seven battery containers, three substation buildings, a static synchronous compensator (STATCOM)	

Impact	Parameter	Notes
	building and external air cooled reactors and cooling units. ▪ Overall footprint of 6,448 m^2.	
Operation		
Impacts related to the landfall substation	▪ A fenced site compound with hardstanding which would house a grid transformer and connection terminations within an area approximately 80 m by 80 m. Within this would be three separate buildings of approximately 62 m by 22.5 m by 7 m high, the second will be 28 m by 10 m by 7 m high and the third 8 m by 8 m by 7 m. The estimated total footprint of the landfall substation compound is 6,400 m^2. There will be hard standing 5 m to 7 m wide from the South Stack Road or Lon Isallt road to any outdoor equipment compound or the plant access, and outdoor areas other than hard standing comprising crushed rock or gravel to approximately 80-150 mm thick.	
Impacts related to the onshore cable corridor	▪ Joint pits will be required every 200-900m along the cable route with approximately 20m x 7m of hardstanding required around each one.	
Impacts related to the switchgear building and grid connection substation	▪ Operational footprints of 38 m^2 and 6,448 m^2 respectively.	
Decommissioning		
Although contractual details have not been finalised, decommissioning of individual devices and arrays is likely to be the responsibility of the individual tenants. However, Menter Môn holds ultimate responsibility and the decommissioning of general infrastructure will be the responsibility of Menter Môn. At this stage, decommissioning of onshore electrical infrastructure is expected to consist primarily of removal of the landfall substation, switchgear building and grid connection substation. Offshore decommissioning methodologies would vary considerably between devices but would be expected to be similar to the construction phase in reverse. For the purpose of this ES, it is assumed that cables are required to be removed as this represents the worst-case scenario in terms of impacts.		

17.6.4. Potential Impacts During Construction

80. Four potential impacts on water resources and flood risk receptors resulting from the construction stage have been identified. These are:

- Direct disturbance of surface water bodies;
- Increased sediment supply;

- Accidental release of contaminants; and
- Changes to surface water runoff and flood risk.

81. Where the onshore works encounter a surface water body, a trenched crossing technique is likely to constitute the worst-case scenario in terms of impacts to surface water bodies. In terms of impacts to groundwater resulting from crossing of surface water bodies, the worst-case scenario is likely to be a trenchless technique such as HDD (or equivalent) which will cause maximum below-ground disturbance. These impacts are discussed in detail in the subsequent sub-sections.

17.6.4.1. Construction Impact 1: Direct Disturbance of Surface Water Bodies

82. Fourteen water features have been identified as being crossed by, or interacting with, the onshore development area, as shown on **Figure 17-1** (**Volume II**) and listed in **Table 17-10**. There is therefore the potential to directly alter the geomorphology, hydrology and any physical habitat value associated with these water features. Throughout the onshore cable corridor, it is assumed that when watercourses are encountered, the trench would be diverted off the road into an adjacent field or verge to allow watercourses to be crossed using a trenched technique. This process would involve using temporary dams (composed of sand bags, straw bales and ditching clay, or another suitable technique) installed upstream and downstream of the crossing point. The cable trench would then be excavated in the area of dry river bed between the dams, with flow maintained through the use of a temporary pump or flume. This technique represents the worst-case scenario in terms of impact to surface water bodies, and it is expected that in the event that any alternative method of crossing is used, it would result in a lesser impact.

83. The installation of the cable trench using the trenching method described above will directly disturb the bed and banks of the affected watercourses and could potentially result in geomorphological instability (e.g. due to enhanced scour and increased sediment supply) and the direct loss of natural geomorphological features (and associated physical habitat niches), both where the trench is located and a short distance up and downstream. However, this would be a temporary impact provided that the bed and banks are reinstated to their original level, position, planform and profile.

84. The presence of temporary dams could potentially result in reduced flow and sediment conveyance (particularly of coarse sediment), create upstream impoundment and affect patterns of erosion and sedimentation. Changes to flow conditions could also result in a reduction in the dissolved oxygen concentrations supported in the watercourses upstream of the impoundment. These activities could therefore reduce the physical habitat value of the watercourse for aquatic plants, invertebrates and fish species. The temporary dams could also act as a barrier to the movement of aquatic organisms. However, these impacts are considered to be temporary (i.e. confined to the duration of construction) and would be reversed once the temporary impounding structures were removed (i.e. as a result of natural bed scour and sediment transport processes, which would remobilise any accumulations of unconsolidated fine sediments once the normal flow regime has been reinstated).

85. In the event that trenching is used at landfall, rather than HDD; there is a small drainage channel (Watercourse 1) which travels over the cliff within the trenching area which may be vulnerable to disturbance. However, it is expected that due to its location on the southern edge of the site

boundary it will not be disturbed and that cables, where laid, will avoid the watercourse. Therefore, there is unlikely to be any mechanisms for direct disturbance.

86. The impacts on each receptor resulting from the direct disturbance are summarised in **Table 17-16**.

17.6.4.1.1. Mitigation

87. The following additional measures would be applied to reduce the impacts associated with the trenched crossing of the unnamed watercourses which will potentially be affected:

- To ensure that there are no adverse impacts resulting from the installation of temporary dams, Mentor Môn will seek (in so far as practicable) to minimise the amount of time that temporary dams are in place, flumes or pumps would be adequately sized to maintain flows downstream of the obstruction whilst minimising upstream impoundment and scour protection would be used to protect the bed downstream of the dam from higher energy flows at the outlet of the flumes or pumps. Furthermore, a fish rescue (if necessary) would be undertaken in the area between the temporary dams prior to dewatering;

- Cable ducts would typically be installed 2 m below the bed of the watercourses (sufficient to account for climate-related changes in fluvial flows and erosion). This would be dependent upon local geology and geomorphological risks (e.g. bed scour and channel instability) and avoid exposure during periods of higher energy flow where the bed could be mobilised;

- Vegetation would not be removed from the banks unless necessary to undertake the works; any vegetation removal would be restricted to the smallest practicable footprint; and

- Where possible, localised improvements to the geomorphology and in-channel habitats will be considered where the watercourse is crossed using open cut techniques. This will include sympathetic reinstatement of banks (e.g. by replacing re-sectioned banks with more natural profiles that are typical of the natural geomorphology of the watercourse). Note that any improvements would be restricted to within the works area of the proposed Project.

17.6.4.1.2. Residual Impact

88. Following the implementation of these additional mitigation measures, the potential for impacts associated with the trenched crossing of the natural streams as detailed in **Table 17-16**, would be reduced to a negligible magnitude. The residual impact resulting from the direct disturbance of surface water bodies would therefore be minor adverse for natural streams and negligible for the drains in the marshy grassland.

89. There are no impacts on groundwater associated with direct disturbance to surface water bodies.

Table 17-16 Impacts Resulting from the Direct Disturbance of Surface Water Bodies

Receptor	Sensitivity	Value	Assessment	Magnitude prior to mitigation	Significance prior to mitigation	Magnitude following mitigation	Residual impact
Natural streams	Medium	High	As these streams are of higher value due to their natural and apparently unmodified form, the potential for impact associated with a trenched crossing is slightly higher. However, any changes are considered to be temporary and reversible once structures have been removed and bed and banks have been reinstated. In addition, for watercourse 1 which occurs at landfall, it is expected that HDD processes will avoid this watercourse completely.	Low	Minor adverse	Negligible	Minor adverse
Modified watercourses	Negligible	Negligible	Due to the nature of these watercourse as heavily overgrown or negligible value, heavily modified watercourses, they are unlikely to be negatively affected. Works will be temporary and reversible once structures have been removed and banks reinstated therefore no impact is predicted.	No impact	-	-	-
Area of marshy grassland containing undefined drains.	Low	Low	As this watercourse includes an area of marshy grassland, it is possible it may experience a slightly higher impact. Works will be temporary and reversible and may be diverted to avoid this area of habitat.	Low	Minor adverse	Negligible	Negligible
Standing water	Low	Low	This water body lies within an area considered for HDD, therefore will not experience any direct disturbance if this methodology goes ahead. It is likely to be bypassed by the onshore cables.	No impact	-	-	-
Ynys Mon groundwater body	Medium	Low	There are no mechanisms for groundwater to be impacted by the direct disturbance of surface water bodies.	No impact	-	-	-

17.6.4.2. Construction Impact 2: Increased Sediment Supply

90. Construction activities in the onshore development area will involve earthworks and create areas of bare ground by removing surface vegetation cover and excavating the cable trench, although in areas where the onshore cable route is trenched into the road (intended to be the majority of the route) this is likely to be limited. These construction activities could increase the potential for the erosion of soil particulates, resulting in an increase in the supply of fine sediment (e.g. clays, silts and fine sands) to surface watercourses through surface runoff and the erosion of exposed soils.

91. Increased sediment supply could affect the geomorphology of watercourses by increasing turbidity in the water column and encouraging enhanced deposition of fine sediment on the bed of the channel. Furthermore, increased sediment loads could potentially smother existing bed habitats, reduce light penetration and reduce dissolved oxygen concentration, adversely affecting stream biota (e.g. macrophytes, aquatic invertebrates and fish) and adversely affecting the quality of in-channel habitats. Site preparation, ground excavations and other construction activities which have the potential to increase sediment supply will take place across the onshore development area.

92. The impacts on each receptor resulting from increased sedimentation are discussed in **Table 17-17**.

17.6.4.2.1. Mitigation

93. The Project will include a range of mitigation measures to reduce the potential for an increase in the supply of fine sediment will be included in the Code of Construction Practice (CoCP) (**Document MOR/RHDHV/DOC/0076, Outline Code of Construction Practice**) to prevent the release of sediment into surface watercourses. This will adhere to construction industry good practice guidance as detailed in the Construction Industry Research and Information Association (CIRIA)'s 'Control of water pollution from construction sites: Guidance for consultants and contractors (C532)' (2001).

- The area of open ground (including exposed topsoil and subsoil) at any one time will be minimised by confining onshore cable installation activities to defined work fronts that will be operative for a short period only;
- Topsoil will be stored and reinstated;
- Strips of undisturbed vegetation will be retained on the edge of the working area where possible;
- Where surface vegetation has been removed, it will be reseeded to prevent future runoff (excluding arable crops);
- Hardstanding will be used in mobilisation areas;
- On-site retention of sediment will be maximised by routing all drainage through the site drainage system;
- The drainage system will include measures to intercept sediment runoff at source. Suitable filters will be used to remove sediment from any water discharged into the surface drainage network;

- Additional measures will be included in parts of the working area that are in proximity to surface drainage channels; and
- Soil and sediment accumulation on road surfaces will be minimised as reasonably practicable by cleaning the wheels of vehicles leaving site and, where required, clearance of the road surface. Traffic movement would be restricted to minimise the potential for surface disturbance.

17.6.4.2.2. Residual Impact

94. The additional mitigation measures will reduce sediment supply to watercourses from the working area and are an important and integral part of best practice construction methodology to help ensure that sediment supply is not increased. The magnitude of the impact is therefore predicted to reduce to negligible in the surface water network and catchments of the two coastal waterbodies. The residual impact resulting from changes to sediment supply would therefore be minor adverse for natural streams and negligible for other affected watercourses (**Table 17-17**).

95. There are no anticipated impacts on groundwater.

Table 17-17 Impacts Resulting from Increased Sediment Supply

Receptor	Sensitivity	Value	Assessment	Magnitude prior to mitigation	Significance prior to mitigation	Magnitude following mitigation	Residual impact
Natural streams	Medium	High	As these streams are of higher value due to their natural and relatively unmodified form, the potential for impact associated with an increase in sedimentation is slightly higher as their capacity to hold sediment is low due to their small size. However, the current methodology involving trenching into the road will require a sequenced construction method. This will mean a limited amount of bare ground is exposed at any one time, and impacts will be temporary with working areas being restored following installation of the cable trench.	Medium	Moderate adverse	Negligible	Minor adverse
Modified watercourses	Negligible	Negligible	Due to the nature of these water bodies as heavily overgrown or negligible value, heavily modified watercourses, they are unlikely to be adversely affected. In some cases, it does not appear that they flow or are connected to other watercourses.	Medium	Negligible	Negligible	Negligible
Area of marshy grassland containing undefined drains.	Low	Low	As this water body includes an area of marshy grassland, it is possible it may experience a slightly higher impact. Works will be temporary and reversible and may be diverted to avoid this area of habitat.	Medium	Minor adverse	Negligible	Negligible
Standing water	Low	Low	With the current methodology, it is unclear what the impacts are likely to be for this water body. However, it lies within an area considered for HDD, and therefore will not experience any direct disturbance if this HDD is used.	No impact	-	-	-
Ynys Mon groundwater body	Medium	Low	There are no mechanisms for groundwater to be impacted by increased sedimentation.	No impact	-	-	-

17.6.4.3. Construction Impact 3: Accidental Release of Contaminants

96. There is the potential for the accidental release of lubricants, fuels and oils from construction machinery through spillage, leakage and in-wash from vehicle storage areas after rainfall and direct release from construction machinery working in and adjacent to surface watercourses. There is also the potential for accidental release of foul waters (from welfare facilities) and construction materials (including concrete and inert drilling fluids) into the surface waters and connected groundwaters during construction.

97. If a significant leakage or spillage occurs, there is the potential for adverse impacts upon water quality if contaminants enter the surface drainage network or percolate into groundwater. These water quality impacts have the potential to adversely affect ecology (particularly fish and macroinvertebrates; see **Chapter 19, Onshore Ecology**) if pollutant concentrations are sufficiently high.

98. Construction activities which disturb the ground will include excavation for trenching throughout the onshore cable route, HDD due to take place beneath the A55 road and adjacent railway line and any other uses of HDD; for example, if it is decided to use this method to cross watercourses or other roads. These activities could potentially introduce contaminants into the underlying groundwater bodies (particularly shallow aquifers) and could therefore adversely affect the quality of the underlying groundwater (including the secondary B aquifer) and could potentially impact upon any licensed and unlicensed abstractions within it.

99. The scale of the potential impact upon a surface catchment or body of groundwater is likely to be proportional to the area of each catchment that would be affected during construction (i.e. the total footprint of construction activities). The impacts on each receptor resulting from the accidental release of contaminants are shown in **Table 17-18** below.

17.6.4.3.1. Mitigation

100. Specific measures relating to pollution prevention will be captured within a CoCP (**Document MOR/RHDHV/DOC/0076, Outline Code of Construction Practice**). These measures will help to mitigate the accidental release of contaminants by preventing the immediate discharge of contaminated water from the onshore cable corridor into the surface drainage network:

- Concrete and cement mixing and washing areas will be situated at least 10 m away from the nearest watercourse. These will incorporate settlement and recirculation systems to allow water to be re-used. All washing out of equipment will be undertaken in a contained area, and all water will be collected for off-site disposal;
- All fuels, oils, lubricants and other chemicals will be stored in an impermeable bund with at least 110 % of the stored capacity. Damaged containers will be removed from site. All refuelling will take place in a dedicated impermeable area, using a bunded bowser. The refuelling and fuel storage area will be located at least 10 m from the nearest watercourse. Biodegradable oils will be used where possible; and
- Spill kits will be available on site at all times. Sand bags or stop logs will also be available for deployment on the outlets from the site drainage system in case of emergency spillages.

101. Furthermore, the potential for impacts associated with the accidental release of fuels, oils, lubricants, construction materials, foul waters and other contaminants will be reduced by the following additional measures:

- Buffer strips of vegetation will be retained adjacent to the watercourses, where possible, to intercept surface runoff and any dissolved or particulate contaminants associated with it; and

- Cable installation activities will be designed to ensure that they will not affect groundwater in any significant manner. The majority of excavations will be shallow (approximately 1.7 m deep), except for instances where HDD (or a similar method) is used. Details of where this will occur is to be confirmed.

102. As there are no impacts on groundwater quality, there are not anticipated to be any impacts on private water abstractions. However, any abstractions within the onshore cable corridor will be verified with the landowners prior to construction, and suitable mitigation measures employed at that point to ensure no adverse effects on water supplies occur.

17.6.4.3.2. Residual Impact

103. Following the implementation of these additional mitigation measures, the potential for accidental release of contaminants from construction activities is reduced to an effect of negligible magnitude within the surface watercourses and groundwater body. The residual impact resulting from the accidental release of fuels, oils, lubricants, foul waters and construction materials would therefore be minor adverse for natural streams and the Ynys Mon groundwater body and negligible for other watercourses (**Table 17-18**).

Table 17-18 Impacts Resulting from Accidental Release of Contaminants

Receptor	Sensitivity	Value	Assessment	Magnitude prior to mitigation	Significance prior to mitigation	Magnitude following mitigation	Residual impact
Natural streams	Medium	High	As these streams are of high value and flow into designated areas, they have a higher potential to experience a high impact due to the sensitivity of the areas they drain into. Where open cut crossing techniques are used to traverse water bodies, there is a direct route for contaminants released during construction to easily enter the surface drainage system. However, the proposed sequential method of construction will mean that a limited area of disturbed ground will be created at any one time, with the method of trenching into the road reducing the potential for sedimentation and runoff.	Medium	Moderate adverse	Negligible	Minor adverse
Modified watercourses	Negligible	Negligible	Due to the nature of these watercourses as heavily overgrown or negligible value, heavily modified waterbodies, they are unlikely to be adversely affected. Works will be temporary and reversible once structures have been removed and banks reinstated therefore no impact is predicted.	Medium	Negligible	Negligible	Negligible
Area of marshy grassland containing undefined drains.	Low	Low	As this waterbody includes an area of marshy grassland, it is possible it may experience a slightly higher impact. Works will be temporary and reversible and may be diverted to avoid this area of habitat.	Medium	Minor adverse	Negligible	Negligible
Standing water	Low	Low	With the current methodology, it is unclear what the impacts are likely to be for this waterbody. However, it lies within an area considered for HDD, and therefore will not experience any direct disturbance if HDD is used.	No impact	-	-	-

Receptor	Sensitivity	Value	Assessment	Magnitude prior to mitigation	Significance prior to mitigation	Magnitude following mitigation	Residual impact
Ynys Mon groundwater body	Medium	Low	The Ynys Mon Secondary Aquifer covers 623.22 km^2 in total, incorporating a large proportion of the Isle of Anglesey. Two areas of HDD are currently scheduled to take place: at landfall, and where the cable route crosses the A55 road and railway line; however, these are spatially limited, meaning that any adverse impacts are likely to be spatially limited too. Any impacts are likely to be spatially constrained and unlikely to affect water supplies, including private abstractions (shown on **Figure 17-3, Volume II**) of which none are located within 250 m of the onshore infrastructure.	Medium	Moderate adverse	Negligible	Minor adverse

17.6.4.4. Construction Impact 4: Changes to Surface Water Runoff and Flood Risk

104. The initial site preparation and construction activities associated with the proposed onshore development area have the potential to alter surface water flows and drainage patterns by:

- Altering existing flow paths and changing the distribution of surface drainage across development sites and along the onshore cable route;
- Reducing infiltration and increasing surface runoff as a result of soil compaction by construction vehicles;
- De-watering the cable trench and removal of the water through infiltration or discharge into the surface drainage network;
- Increasing the proportion of impermeable surfaces in a catchment and therefore reducing infiltration. The development of surface infrastructure also has the potential to change surface flows and infiltration rates as a result of changes to land use (i.e. by increasing the proportion of impermeable surfaces in a drainage catchment) and alter site runoff characteristics;
- Temporary changes to surface water flows as a result of the trenched crossing of any watercourses, particularly if the capacity of any pumps, flumes and temporary watercourse crossings is exceeded; and
- Changes to subsurface flow patterns resulting from changes to infiltration rates, surface flows and the installation of impermeable subsurface infrastructure.

105. It is important to note that the changes to surface water runoff and flood risk assessed in detail for each catchment below are expected to be relatively localised and would not be sufficient to cause a major accident or disaster.

106. The project design includes embedded mitigation measures to control surface water runoff during the construction phase, including the creation of drainage channels to intercept water from the cable trench and onshore cable corridor, as described in more detail in **Section 17.6.2**. These measures will help to control the release of surface waters from the onshore development activities and prevent changes to surface runoff and flood risk. With embedded mitigation measures in place, the magnitude of effect is considered to be low.

107. The impacts on each receptor resulting from increased surface water runoff are summarised in **Table 17-19**.

17.6.4.4.1. Mitigation

108. NRW Development Advice Map contained within Technical Advice Note (TAN) 15 advises that for development in Zone A the justification test is not applicable and surface water requirements apply.

109. Changes in surface water runoff as a result of the increase in impermeable area from the landfall substation, switchgear building and grid connection substation will be attenuated and discharged at a controlled rate, in consultation with the LLFA (IoACC) and NRW. The controlled runoff rate will be equivalent to the greenfield runoff rate.

110. As surface water requirements apply, it is recommended that the development includes embedded mitigation measures (**Section 17.6.2**). Additional measures to be included are, but not limited to, the following:

- Development of a drainage strategy including use of swales to allow for drainage of excess surface water from the site;
- Use of permeable surfacing where applicable;
- Use of flood-resilient building materials e.g. concrete floors and walling; and
- Raised electrical infrastructure to prevent flooding of critical infrastructure during a surface water flood event.

111. The drainage strategy will be developed according to the principles of the SuDS discharge hierarchy. Generally, the aim will be to discharge surface water runoff as high up the following hierarchy of drainage options as reasonably practicable:

- Into the ground (infiltration);
- To a surface water body;
- To a surface water sewer, highway drain or another drainage system; or
- To a combined sewer.

17.6.4.4.2. Residual Impact

112. Following the implementation of these additional mitigation measures, the potential for increased surface runoff and flood risk is reduced to an effect of negligible magnitude for modified watercourses and minor adverse for natural streams and the Ynys Mon groundwater body (**Table 17-19**).

Table 17-19 Impacts Resulting from Increased Surface Water Runoff and Flood Risk

Receptor	Sensitivity	Value	Assessment	Magnitude prior to mitigation	Significance prior to mitigation	Magnitude following mitigation	Residual impact
Natural streams	Medium	High	There is no risk of flooding from rivers in the works area. The onshore development area intercepts Watercourse 1 and 2, as shown in **Figure 17-1, Volume II**, in an area of high risk i.e. greater than 1 in 30 chance of flooding from surface water every year.	Low	Minor adverse	Negligible	Minor adverse
Modified watercourses	Negligible	Negligible	The onshore development area (including onshore cable corridor, landfall substation, switchgear building and grid connection substation) will be altered at this point to avoid the marshy habitat this encompasses.	Medium	Negligible	Negligible	Negligible
Standing water	Low	Low	These water features are not located in areas of surface water flood risk, and are in Zone A.	No impact	-	-	-
Ynys Mon groundwater body	Medium	Low	The majority of the landfall substation, switchgear building and grid connection substation areas show limited potential for groundwater flooding to occur, regions of potential for groundwater flooding to occur to facilities below ground level, and potential for groundwater flooding to occur at the surface. However, groundwater flooding is rare in Wales according to the Western Wales RBD PFRA.	Low	Minor adverse	Negligible	Minor adverse

17.6.5. Potential Impacts During Operation

113. Two potential impacts on water resources and flood risk receptors resulting from the operational stage have been identified:

- Changes to surface water runoff, groundwater flows and flood risk; and
- Supply of fine sediment and other contaminants.

114. These impacts are discussed in detail in the subsequent subsections.

17.6.5.1. Operational Impact 1: Changes to Surface Water Runoff, Groundwater Flows and Flood Risk

115. The permanent above-ground infrastructure, including the landfall substation, switchgear building and grid connection substation and any new, permanent access tracks will result in permanent changes to land use. In most cases, the change in use from existing greenfield agricultural land use is likely to create a permanent increase in impermeable area. Although permeable surface treatments will be used where possible, jointing pits along the onshore cable route and the substations are expected to comprise impermeable surfaces, with associated infrastructure such as roads also comprising impermeable surfaces.

116. An increase in the proportion of impermeable surfaces in a sub-catchment will result in a corresponding decrease in local infiltration and an increase in surface runoff. Furthermore, the presence of the buried cable ducting along the onshore cable route will introduce an impermeable barrier that has the potential to impact upon subsurface flow routes and change the distribution of groundwater by changing subsurface flow patterns and forcing water to move upwards (i.e. towards the surface) or downwards (away from the surface).

117. There is therefore potential for changes in surface water runoff resulting from the increase in impermeable areas and changes to subsurface flows. These could be sufficient to impact upon the hydrology of the surface water system.

118. As well as impacts on geomorphology and in-channel habitats, changes to surface drainage patterns could also increase flood risk to third party land and property, especially if the discharge of any drainage is not sufficiently controlled. Furthermore, watercourse crossing locations have the potential to increase flood risk elsewhere should they not be reinstated to pre-construction channel capacities (i.e. any reductions in channel capacity could increase local flood risk).

119. As detailed in **Section 17.6.2**, the project will include embedded mitigation measures to reduce the potential for impact. This includes limiting discharge from the landfall substation, switchgear building and grid connection substation to the greenfield runoff rate.

120. The impacts on each receptor resulting from increased surface water runoff, altered subsurface flows and changes to flood risk are summarised in **Table 17-20**.

17.6.5.1.1. Mitigation

121. As surface water requirements apply, it is recommended that the development includes embedded mitigation measures. Additional measures should include, but not be limited to, the following:

- Development of a drainage strategy including use of swales to allow for drainage of excess surface water from the site;
- Use of permeable surfacing where applicable;
- Use of flood-resilient building materials e.g. concrete floors and walling; and
- Raised electrical infrastructure to prevent flooding of critical infrastructure during a surface water flood event.

122. The drainage strategy will be developed according to the principles of the SuDS discharge hierarchy (see **Section 17.7.3.4**). Generally, the aim will be to discharge surface water runoff as high up the following hierarchy of drainage options as reasonably practicable.

17.6.5.1.2. Residual Impact

The residual impact resulting from any changes in surface water runoff, groundwater flows and flood risk will be minor adverse or negligible (**Table 17-20**).

Table 17-20 Impacts Resulting from Changes to Surface Water Runoff, Groundwater Flows and Flood Risk During Operation

Receptor	Sensitivity	Value	Assessment	Magnitude prior to mitigation	Significance prior to mitigation	Magnitude following mitigation	Residual impact
Natural streams	Medium	High	Within the landfall area and the vicinity of the landfall substation there will be an increase in the proportion of impermeable land, however due to the elevated position of the landfall area, this will not be at risk of flooding. In addition, with mitigation measures implemented including a drainage strategy, there will be no impact on the overall surface water runoff and flood risk during operation.	Low	Minor adverse	Negligible	Minor adverse
Modified watercourses	Negligible	Negligible	Throughout the onshore cable corridor, switchgear building and grid connection substation locations; the Project is located in Zone A. As the onshore cable route is being trenched into the road where possible, once operational the Project will not lead to any overall increase in impermeable ground.	Low	Negligible	Negligible	Negligible
Area of marshy grassland containing undefined drains.	Low	Low	Throughout the onshore cable corridor, switchgear building and grid connection substation locations; the Project is located in Zone A. As the onshore cable route is being trenched into the road where possible, once operational the Project will not lead to any overall increase in impermeable ground.	Medium	Minor adverse	Negligible	Negligible
Standing water	Low	Low	These water features are not located in areas of surface water flood risk, and are in Zone A.	No impact	-	-	-
Ynys Mon groundwater body	Medium	Low	The majority of the landfall, landfall substation, switchgear building and grid connection substation locations have limited potential for groundwater flooding to occur, regions of potential for groundwater flooding to occur to facilities below ground level, and potential for groundwater flooding to occur at the surface. However, groundwater flooding is rare in Wales according to the Western Wales RBD PFRA. In addition, as the onshore cable route is only being buried to the shallow depth of	Low	Minor adverse	Negligible	Minor adverse

Receptor	Sensitivity	Value	Assessment	Magnitude prior to mitigation	Significance prior to mitigation	Magnitude following mitigation	Residual impact
			1.7 m, its impacts will be localised and small scale in the context of the overall groundwater body. Any HDD works will have a short term impact on groundwater and will not result in a long term effect on groundwater flows.				

17.6.5.2. Operational Impact 2: Supply of Fine Sediment and Other Contaminants

123. The operation of the proposed Project, including planned and unplanned maintenance at the landfall substation, switchgear building and grid connection substation and along the onshore cable corridor, could result in the supply of fine sediment, fuels, oils and lubricants from the road network and other impermeable surfaces. This could potentially affect the geomorphology and water quality in the surface drainage network.

124. There is potential for an increase in sediment supply to surface waters during operation via mechanisms such as enhanced surface runoff from the permanent above-ground development (**Section 17.6.5.1**), which could impact upon the geomorphology and surface water quality of the river water bodies, and consequently impact upon aquatic ecology. Furthermore, there is potential for the supply of contaminants to surface waters during operation through surface runoff or accidental spillage or leakage of fuel oils or lubricants from vehicles during operational activities, which could impact upon surface water quality and that of connected groundwaters. This could have subsequent impacts upon aquatic ecology and the use of water resources for licensed and unlicensed abstractions. The impacts on each receptor resulting from the accidental release of contaminants are shown in **Table 17-21** below.

17.6.5.2.1. Mitigation

125. The following measures will be employed to prevent the release of contaminants during operation:

- All fuels, oils, lubricants and other chemicals will be stored in an impermeable bund with at least 110 % of the stored capacity;
- All refuelling will take place in a dedicated impermeable area, using a bunded bowser;
- The refuelling and fuel storage area will be located at least 10 m from the nearest watercourse;
- Biodegradable oils will be used where possible; and
- Damaged containers will be removed from site;
- Spill kits will be available on site at all times. Sand bags or stop logs will also be available for deployment on the outlets from the site drainage system in case of emergency.

126. The negligible impact along the onshore cable route means that there is no requirement to introduce further mitigation measures in any of the watercourses and their catchment areas, or to prevent the direct contamination of groundwater.

127. As there are no impacts on groundwater quality, there will be no impacts on private water abstractions; however, any abstractions within the onshore cable corridor will be verified with the landowners prior to construction, and suitable mitigation measures employed at that point to ensure no adverse effects on water supplies occur.

17.6.5.2.2. Residual Impact

128. The effect will remain negligible or minor adverse in all water features listed in **Table 17-10**, and the underlying groundwater. The residual impact resulting from the supply of sediment and contaminants during the operation of the project would therefore be minor adverse.

Table 17-21 Impacts Resulting from the Supply of Fine Sediment and Other Contaminants during Operation

Receptor	Sensitivity	Value	Assessment	Magnitude prior to mitigation	Significance prior to mitigation	Magnitude following mitigation	Residual impact
Natural streams	Medium	High	The landfall substation compound will be located within approximately 20 0m from stream 1, and therefore may lead to an increased run-off of sediment, and potentially contaminants, into the stream during rainfall events compared to current conditions. However, embedded mitigation measures including water treatment, permeable hard standing where possible and specified drainage systems will reduce this impact with the ultimate aim to maintain surface water flows at greenfield levels. Watercourse 2 is unlikely to experience adverse impacts as a result of the operation of the Project.	Low	Minor adverse	Negligible	Minor adverse
Modified watercourses	Negligible	Negligible	The majority of these watercourses are crossed by the onshore cable route. They do not appear to experience much flow, and most are not located in areas where the amount of impermeable ground is going to significantly increase. Mitigation associated with the landfall substation, switchgear building and grid connection substation include drainage systems and water treatment measures which will reduce the likelihood of impact associated with supply of sediment and contaminants.	Low	Negligible	Negligible	Negligible
Area of marshy grassland containing undefined drains.	Low	Low	This watercourse is unlikely to experience an increase in sediment and contaminant supply during operation due to its location some distance from the landfall substation, switchgear building and grid connection substation . Areas of hardstanding may increase the area of impermeable ground, but at the time of assessment there is no definite position for these.	No impact	-	-	-

Receptor	Sensitivity	Value	Assessment	Magnitude prior to mitigation	Significance prior to mitigation	Magnitude following mitigation	Residual impact
Standing water	Low	Low	This pond is located within the area identified for HDD for crossing under the A55 and the railway. As such it is already located adjacent to a source of run off and potential contaminants. Once the Project is operational, this water feature is likely to be separated from areas of hardstanding by the road itself and will experience negligible additional sediment and contaminant supply as a result of the Project. In addition, embedded mitigation measures including drainage systems at the landfall substation, switchgear building and grid connection substation will help to reduce the impact.	Low	Negligible	Negligible	No Impact
Ynys Mon groundwater body	Medium	Low	There is no requirement to undertake routine maintenance of the onshore cable route, and therefore no potential for groundwater contamination from plant along the onshore cable route (although it is possible that some planned and unplanned activities may be necessary through the operational life of the Project). The cable itself is only buried to 1.7 m depth across a narrow width and is therefore unlikely to impact on groundwater flows. Furthermore, the embedded mitigation measures described in **Section 17.6.2** will control the accidental release of foul drainage and surface water drainage (including potential contaminants from operational plant that could enter surface and groundwaters) from the operational Project.	Negligible	Minor adverse	Negligible	Minor adverse

17.6.6. Potential Impacts During Decommissioning

129. No decision has been made regarding the final decommissioning policy for the onshore infrastructure of the proposed Project as it is recognised that industry best practice, rules and legislation change over time.

130. However, the decommissioning of the Project is expected to consist primarily of removal of the landfall substation, switchgear building and grid connection substation. It is expected that the onshore cables will be removed and recycled, with the transition bays and cable ducts (where used) left in situ. The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and agreed with the regulator. A decommissioning plan will be provided. As such, for the purposes of a worst-case scenario, impacts no greater than those identified for the construction phase are expected for the decommissioning phase.

17.6.7. Cumulative Impacts

131. This section describes the CIA for water resources and flood risk, taking into consideration other plans, projects and activities. This has been undertaken as a two-stage process, with the first stage comprising assessing all the impacts from the previous sections for the potential to act cumulatively with other projects. This summary assessment is set out in **Table 17-22** below.

Table 17-22 Potential Cumulative Impacts

Impact	Potential for Cumulative Impact	Data Confidence	Rationale
Construction			
Impact 1: Direct disturbance of surface water bodies	Yes	Medium	Impacts to water bodies may be exacerbated by other projects
Impact 2: Increased sediment supply	Yes	Medium	Impacts to water bodies may be exacerbated by other projects
Impact 3: Accidental release of contaminants	Yes	Medium	Impacts to water bodies may be exacerbated by other projects
Impact 4: Disruption of groundwater levels and flows	Yes	Medium	Impacts to water bodies may be exacerbated by other projects
Impact 5: Changes surface water runoff and flood risk	Yes	Medium	Impacts to water bodies may be exacerbated by other projects
Operation			
Impact 1: Changes to Surface Water Runoff, Groundwater Flows and Flood Risk	Yes	Medium	Impacts to water bodies may be exacerbated by other projects
Impact 2: Supply of fine sediment and other contaminants	Yes	Medium	Impacts to water bodies may be exacerbated by other projects
Decommissioning			
Contractual details relating to decommissioning are yet to be finalised, however the ultimate responsibility for the decommissioning of the general onshore electrical infrastructure will lie with Menter Môn. At this stage, this is expected to consist primarily of removal of the landfall substation, switchgear building and grid connection substation.			

132. The second stage of the CIA is an assessment of whether there is spatial or temporal overlap between the extent of potential effects of the onshore development area, and the extent of potential effects of other projects scoped into the CIA on the same receptors. To identify whether this may happen, the potential nature and extent of effects arising from all projects scoped into the CIA have been identified and any overlaps between these and the effects identified above. Where there is an overlap, an assessment of the cumulative magnitude of effect is provided.

133. Projects taking place in the marine areas surrounding Holy Island and Anglesey have been scoped out due to the limited potential for impacts to act cumulatively between marine and terrestrial freshwater bodies. In addition, due to the small-scale nature of the onshore development area and its island location in respect of surface water bodies, those projects at a greater distance than 10 km away have also been scoped out. In addition, those projects relating to change of use of existing buildings or conversion of residential properties have been scoped out as there is no mechanism for them act impact cumulatively with the Project on the water environment.

134. **Table 17-23** summarises those projects which have been scoped into the CIA due to their temporal or spatial overlap with the potential effects arising from the project. The remainder of the section details the nature of cumulative impacts against all those receptors scoped in for cumulative assessment.

135. The assessment set out in **Table 17-23** demonstrates that there is no potential for cumulative impacts arising between the proposed onshore elements of the Project and other proposed onshore developments in the study area.

Table 17-23 Summary of Projects Considered for the CIA in Relation to the Water Resources and Flood Risk

Project	Status	Distance from Morlais Tidal Array Project (km)	Included in CIA	Rationale
Penrhos Coastal Park, Holy Island Resort	Planning permission granted, construction expected to be completed by 2021	< 1 km	No	Project components located adjacent to the Holy Island Resort proposed project area are being constructed on land that formed part of the demolished aluminium works and are therefore unlikely to increase the area of impermeable surface in this location. In addition, the Holy Island Resort includes areas of parkland and landscaping in addition to its 500 holiday cottages and leisure facilities which will assist with drainage. As such, no cumulative effects on onshore water resources and flood risk are anticipated as a result of the co-location of these two projects.
Industrial unit at Parc Cybi	Planning permission granted, construction status unknown	Overlaps with the project area at the HDD location for the proposed grid substation connection.	No	The small scale of the proposed new industrial unit, together with the extensive mitigation measures to prevent the supply of sediment and contaminants during construction mean that there are not considered to be any cumulative impacts associated with these two projects.
Roadking Parc Cybi	Planning permission granted, construction status unknown	0 km	No	This relates to the discharge of conditions including foul surface water and land drainage schemes associated with this development. Due to the provision of land drainage measures and the small scale of the project there are unlikely to be any cumulative effects with the Project.
Breakwater Country Park	Application validated and awaiting decision	Approx. 1.6 km	No	This application is for alterations and extensions to elements of Breakwater Country Park and the creation of a heritage play area and associated landscaping. Due to the distance from the works area and the limited surface water connectivity in this area, impacts are likely to be highly localised to each project, and therefore will not act cumulatively with each other.
Penrhos Industrial Estate	Planning permission validated, awaiting decision	<1 km (approx. 0.5 km)	No	The small-scale nature of the works on an existing industrial estate within which a drainage system will already exist means there are unlikely to be any cumulative impacts. In addition, the two projects are separated by the road and railway line, reducing connectivity of surface water flows between the two areas.
Holyhead Premier Inn	Operational	0 km	No	There are no major construction works associated with this project which could impact on water resources or flood risk to act cumulatively with the Project.
A5025 Highway	Consented, Construction Status unknown	2.5 km	No	This scheme is located across the Cymyran Strait, and although 2.5 km away at its closest location, the remainder of the works are located further away. There is no hydrological

Project	Status	Distance from Morlais Tidal Array Project (km)	Included in CIA	Rationale
				connectivity in terms of surface water systems and flood risk, therefore there is no mechanism for impact on the water environment.
Reclamation adjacent to Terminal 4 of the Port of Holyhead	Scoping report submitted 28/04/3017	2 km	No	No mechanism for this project to impact upon the water environment has been identified and therefore there is no potential for cumulative impacts to occur.

17.6.8. Inter-relationships

136. **Table 17-24** lists the inter-relationships between this chapter and other chapters within the ES.

Table 17-24 Inter-topic relationships

Topic and description	Related Chapter	Where addressed in this Chapter	Rationale
Ground Conditions and Contamination	Chapter 18, Ground Conditions and Contamination	**Section 17.5.4** (groundwater); **Section 17.6** (all impacts)	Both chapters consider the impacts on Groundwater resources and contamination with regard to aquifers and water supply.
Marine water and sediment quality	Chapter 8, Marine Water and Sediment Quality	**Section 17.5** (existing environment)	Both chapters consider the potential impacts of the project on water resources. Coastal water bodies are considered in this chapter only as a baseline and are not taken further.
Onshore Ecology	Chapter 19, Onshore Ecology	**Section 17.5.5** (designated sites) and **Section 17.5.6**	Both chapters consider the potential impacts on designated sites, which also influence the sensitivity and value of the water bodies.

17.6.9. Interactions

137. The impacts identified and assessed in this chapter have the potential to interact with each other, which could give rise to synergistic impacts as a result of that interaction. The worst case impacts assessed within this chapter take these interactions into account and for the impact assessments are considered conservative and robust. For clarity, the areas of interaction between impacts are presented in **Table 17-25**, along with an indication as to whether the interaction may give rise to synergistic impacts.

Table 17-25 Potential Interactions between Impacts

Potential interaction between impacts				
Construction	1 Direct disturbance of surface water bodies	2 Increased sediment supply	3 Accidental release of contaminants	4 Changes to surface water runoff and flood risk
1 Direct disturbance of surface water bodies	-	Yes	Yes	Yes
2 Increased sediment supply	Yes	-	Yes	Yes
3 Accidental release of sediment	Yes	Yes	-	Yes
4 Changes to surface water runoff and flood risk	Yes	Yes	Yes	-
Operation	1 Changes to surface water runoff, groundwater flows and flood risk		2 Supply of fine sediment and contaminants	
1 Changes to surface water runoff, groundwater flows and flood risk	-		Yes	
2 Supply of fine sediment and contaminants	Yes		-	

17.7. SUMMARY

138. A summary of the findings of the ES for water resources and flood risk is presented in **Table 17-26**. In accordance with the assessment methodology, this table should only be used in conjunction with the additional narrative explanations provided in **Section 17.4.3**. This demonstrates that, post mitigation, all impacts have a maximum residual impact of minor adverse. There will therefore be no impacts resulting from the Project that are considered to be significant in EIA terms (i.e. moderate or major adverse).

Table 17-26 Potential Impacts Identified for Water Resources and Flood Risk

Potential Impact	Receptor	Sensitivity	Value	Magnitude	Significance	Additional Mitigation Measures	Residual Impact
Construction							
Impact 1: Direct disturbance of surface water bodies	Natural streams	Medium	High	Low	Minor adverse	Measures to minimise the impacts of temporary watercourse crossings, install infrastructure below the active bed of the channel, and reinstate bed and banks.	Minor adverse
	Modified watercourses	Negligible	Negligible	No impact	-		-
	Area of marshy grassland containing undefined drains	Low	Low	Low	Minor adverse		Negligible
	Standing water	Low	Low	No impact	-		-
	Ynys Mon groundwater body	Medium	Low	No impact	-		-
Impact 2: Increased sediment supply	Natural streams	Medium	High	Medium	Moderate adverse	Additional construction best practice measures to manage sediment and surface drainage, including Guidance for Pollution Prevention (GPPs) from NRW, Scottish Environment Protection Agency and the Northern Ireland Environment Agency; specifically GPP5.	Minor adverse
	Modified watercourses	Negligible	Negligible	Medium	Minor adverse		Negligible
	Area of marshy grassland containing undefined drains.	Low	Low	Medium	Minor adverse		Negligible
	Standing water	Low	Low	No impact	-		-
	Ynys Mon groundwater body	Medium	Low	No impact	-		-
Impact 3: Accidental release of contaminants	Natural streams	Medium	High	Medium	Minor adverse	A construction method statement will be produced in line with best practice guidance on pollution control measures.	Minor adverse
	Modified watercourses	Negligible	Negligible	Medium	Negligible		Negligible
	Area of marshy grassland containing undefined drains	Low	Low	Medium	Minor adverse		Negligible
	Standing water	Low	Low	No impact	-		-
	Ynys Mon groundwater body	Medium	Low	Medium	Moderate adverse		Minor adverse
Impact 4: Increased	Natural streams	Medium	High	Low	Minor adverse	Measures to minimise impact of temporary culverts, if	Minor adverse
	Modified watercourses	Negligible	Negligible	Medium	Negligible		Negligible

Potential Impact	Receptor	Sensitivity	Value	Magnitude	Significance	Additional Mitigation Measures	Residual Impact
surface water runoff and flood risk	Area of marshy grassland containing undefined drains	Low	Low	Medium	Minor adverse	applicable, including the creation of drainage changes to manage construction drainage.	Negligible
	Standing water	Low	Low	No impact	-		-
	Ynys Mon groundwater body	Medium	Low	Low	Minor adverse		Minor adverse
Operation							
Impact 5: Changes to surface water runoff, groundwater flows and flood risk	Natural streams	Medium	High	Low	Minor adverse	A surface water drainage plan will be developed, particularly for the substation locations.	Minor adverse
	Modified watercourses	Negligible	Negligible	Low	Negligible		Negligible
	Area of marshy grassland containing undefined drains	Low	Low	Medium	Minor adverse		Negligible
	Standing water	Low	Low	No impact	-		-
	Ynys Mon groundwater body	Medium	Low	Low	Minor adverse		Minor adverse
Impact 6: Supply of fine sediment and other contaminants	Natural streams	Medium	High	Low	Minor adverse	Surface water drainage system will include oil interceptors and bund pumps.	Minor adverse
	Modified watercourses	Negligible	Negligible	Low	Negligible		Negligible
	Area of marshy grassland containing undefined drains	Low	Low	No impact	-		-
	Standing water	Low	Low	Low	Negligible		No Impact
	Ynys Mon groundwater body	Medium	Low	Low	Minor adverse		Minor adverse
Decommissioning							
Contractual details relating to decommissioning are yet to be finalised, however the ultimate responsibility for the decommissioning of the general onshore electrical infrastructure will lie with Menter Mon. At this stage, this is expected to consist primarily of removal of the landfall substation, switchgear building and grid connection substation.							

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