

Prosiect Maen Hir

Solar a Storio Ynni



Preliminary Environmental Information Report Volume I, Chapter 13: Water Resources

Prosiect Maen Hir - September 2024

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13 Water Resources

13.1 Introduction

13.1.1 This chapter assesses the potential likely significant environmental effects (Likely Significant Effects) of the Project on the water environment, including flood risk, drainage, water quality and water supply during the Construction, Operation and Decommissioning Phases of the Project.

13.1.2 It should be noted that this is a preliminary assessment based on the information available at this stage. Additional surveys and assessments are being undertaken as part of the ongoing EIA. These will help inform the technical assessments presented in the ES chapter in due course.

13.1.3 This chapter of the PEIR is supported by the following Figures:

- Figure 13-1: Water Resources Study Area
- Figure 13-2: Maen Hir North Watercourses
- Figure 13-3: Maen Hir Central Watercourses
- Figure 13-4: Maen Hir South 'A' Watercourses
- Figure 13-5: Maen Hir South 'B' Watercourses
- Figure 13-6: Maen Hir North Flood Map for Planning (Rivers and Sea)
- Figure 13-7: Maen Hir Central Flood Map for Planning (Rivers and Sea)
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- Figure 13-10: Maen Hir North Flood Map for Planning (Surface Water and Small Watercourses)
- Figure 13-11: Maen Hir Central Flood Map for Planning (Surface Water and Small Watercourses)
- Figure 13-12: Maen Hir South 'A' Flood Map for Planning (Surface Water and Small Watercourses)
- Figure 13-13: Maen Hir South 'B' Flood Map for Planning (Surface Water and Small Watercourses)
- Figure 13-14: Water Framework Directive River Waterbody Catchments
- Figure 13-15: Maen Hir North Development Advice Map
- Figure 13-16: Maen Hir Central Development Advice Map

- Figure 13-17: Maen Hir South 'A' Development Advice Map
- Figure 13-18: Maen Hir South 'B' Development Advice Map

13.2 Legislation, Policy and Guidance

13.2.1 The ES will be undertaken in accordance with relevant national and local planning and legislative policy relevant to the water environment.

Legislation

- The Water Resources Act 1991 (Amendment) (England and Wales) Regulations, 2009
- Flood and Water Management Act, 2010
- Water Framework Directive 2000/60/EC: Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy.
- Directive 2006/118/EC of the European Parliament and of the Council of 12 December 2006 on the protection of groundwater against pollution and deterioration.

Policy

- Overarching National Policy Statement for Energy (EN-1), 2024
- National Policy Statement for Renewable Energy Infrastructure (EN-3), 2024
- National Policy Statement for Electricity Networks Infrastructure (EN-5), 2024
- Planning Policy Wales Edition 11, 2021
- Technical Advice Note 15: Development and Flood Risk, 2004

Guidance

- Flood Consequence Assessments: Climate change allowances, 2021
- Anglesey and Gwynedd Joint Local Development Plan 2011 – 2026, 2017
- Anglesey and Gwynedd Joint Local Development Plan 2011 - 2026 Review Report, 2022
- Anglesey and Gwynedd Strategic Flood Consequence Assessment (Stage 1), 2016
- Anglesey Local Flood Risk Management Strategy, 2013

- Western Wales River Basin District Preliminary Flood Risk Assessment, 2018

13.3 Engagement and Consultation

13.3.1 The ES assessment is under development in consultation with various stakeholders. Stakeholders being consulted include:

- NRW
- IoACC, acting as LLFA
- Welsh Water
- Canal and River Trust (Wales)

13.3.2 Engagement via email to the above stakeholders has commenced to agree the ES assessment methodology and full responses are yet to be received.

Natural Resources Wales

13.3.3 Engagement with NRW began with NRW in September 2023 to determine what information was held on flood risk for the Project.

13.3.4 NRW provided a detailed response for the Scoping Opinion from the PINS dated 19 December 2023, which has been considered in the preparation of this chapter. Appendix 2-3 outlines how comments in the Scoping Opinion have been addressed. Assessments are ongoing and, where sufficient detail and information is not currently available to address NRW's Scoping Opinion comments, this will be provided in the ES chapter.

13.3.5 Consultation with NRW regarding the scope of assessments is ongoing.

Isle of Anglesey County Council

13.3.6 IoACC, as the LLFA, was consulted by the Applicant in September 2023 to ascertain what information relevant to flood risk and drainage the Council holds, and to begin pre-application discussions relating to future assessment methodology and the LLFA's design requirements. A response was received in January 2024 confirming the LLFA's assessment methodology and design requirements which will be taken into account in the preparation of the outline Surface Water Drainage Strategy.

Welsh Water

- 13.3.7 Welsh Water was consulted by the Applicant in September 2023 to ascertain what information relevant to flood risk and drainage the sewerage undertaker holds, and to begin pre-application discussions relating to future assessment methodology and Welsh Water's design requirements. A response was received in September 2023 confirming the assessment methodology required by Welsh Water which will be taken into account in the preparation of the outline Surface Water Drainage Strategy.

Canal and River Trust (Wales)

- 13.3.8 Canal and River Trust (Wales) were consulted by the Applicant in September 2023 to determine whether they hold any assets within the Study Area. A response was received in September 2023 which confirmed they do not have any canals in Anglesey and, therefore, will not be a consultee for the Application.

13.4 Baseline Conditions

13.4.1 Baseline Surveys

- 13.4.2 Baseline characterisation for this PEIR have been established through desktop study, using available information detailed below:

- Identification of flood risks, typically associated with fluvial and surface water sources, using:
 - NRW's FMfP
 - NRW's DAM
 - NRW's Flood Zones for Surface Water and Small Waterbodies.
 - NRW's Flood Risk from Reservoirs
 - Amlwch Flood Alleviation Model Outputs (January 2023) provided by NRW (supplied October 2023)
- Identification of existing catchment pressures using NRW's Water Watch Wales
- Review of soil, geological and hydrological information using BGS Mapping, NRW Interactive Map Viewer and Phase 1 Geo-Environmental Assessments

Study Area

- 13.4.3 The Water Resources Study Area, for the purposes of this PEIR assessment, is shown in Figure 13-1 and is based on the Zone of Influence (Zol) and defined by the hydrology within the PEIR Boundary and the surrounding area. The Environment Agency's Flood Estimation Handbook Web Service has been used to extract catchment boundaries and identify waterbodies and receptors, such as hydrologically dependent designations, which are hydrologically connected to the Project. As such, the Zol includes all the catchments where there is potential for significant effects, both upstream and downstream. The extent to which such features have been considered within the PEIR assessment has been informed by professional judgement.
- 13.4.4 It is noted that there are some proposed Highway Works located outside of the Water Resources Study Area. This chapter focusses on the Water Resources Study Area which encompasses the Solar PV Site which are those areas proposed for PV Arrays, 33kV/132kV Substations, Access Tracks, cabling, the BESS, and the Project Substation, and omit potential features that may be affected by the Highway Works. Further detail on the effects of the Highways Works will be provided in the ES chapter.
- 13.4.5 Given the large extent of the Study Area, for the purposes of defining the baseline conditions, the Study Area has been divided into four Parcels; Maen Hir North, Maen Hir Central, Maen Hir South A and Maen Hir South B.

Hydrology

- 13.4.6 The watercourses within the Study Area are shown in Figures 13-2 to Figure 13-5. The following subsections describe the watercourses within the Project Parcels.

Maen Hir North

- 13.4.7 The following Main Rivers flow through Maen Hir North (Figure 13-2) which sits within the Afon Wygyr, Afon Goch Amlwch and Afon Alaw catchments:
- The Afon Wygyr largely flows through the Parcel in a westerly direction.
 - The Afon Tregynrig, a tributary of the Afon Wygyr, flows from the north of the Parcel in a southerly direction and outfalls to the Afon Wygyr in the northern extent of the Parcel.

- The Afon Glasgraig Fawr flows adjacent to the southeast of the Maen Hir North in a southerly direction towards Llyn Alaw.
- The Afon Wen flows to the north of the Parcel in an easterly direction towards Amlwch.
- The Afon Goch flows to the southeast of the Parcel in a northeasterly direction towards Amlwch.
- Downstream of the Parcel, the Afon Nant Y Fran and Afon Maddanen outfall to the Afon Wygyr to the northwest of the Study Area.
- There are also several ordinary watercourses and ditches located across the Parcel.

Maen Hir Central

13.4.8 The following Main Rivers flow through Maen Hir Central (Figure 13-3) which sits within the Afon Alaw and the Afon Alaw Bach catchments:

- The Afon Alaw largely flows through the Parcel in a northerly and westerly direction.
- The Afon Glasgraig Fawr, a tributary of the Afon Alaw, flows towards and through the parcel in a southerly direction and outfalls to the Afon Alaw at the eastern extent of Llyn Alaw.
- Downstream of the Parcel, the Afon Bleiddiau and the Afon Fferam Uchaf outfall to the Afon Tan 'Rallt to the west of the Study Area.
- There are also several ordinary watercourses and ditches located across the Parcel.

Maen Hir South 'A'

13.4.9 The following Main Rivers flow through Maen Hir South 'A' (Figure 13-4) which sits within the Afon Alaw and Afon Goch Dulas catchments:

- The Afon Llandyfrydog flows in a northeasterly direction away from the Parcel.
- The Afon Alaw flows in a northerly direction to the west of the Parcel.
- Downstream of the Parcel, the Afon Rhosybol outfalls to the Afon Goch Dulas.

- There are also several ordinary watercourses and ditches located across the Parcel.

Maen Hir South 'B'

13.4.10 The following Main Rivers flow through Maen Hir South 'B' (Figure 13-5) which sits within the Afon Goch Dulas and Afon Cefni catchments:

- The Afon Ynys Fawr, a tributary of the Afon Goch Dulas, flows through the Parcel in a northerly direction.
- The Afon Cefni largely flows through the Parcel in a southerly direction.
- The Afon Ysgoldy, a tributary of the Afon Cefni, flows through the Parcel in a southerly direction and outfalls to the Afon Cefni downstream of the Parcel.
- Downstream of the Parcel, the Afon Ynys Fawr outfalls to the Afon Goch Dulas.
- Additionally, there are several ordinary watercourses and ditches located across the Parcel.

Flood Risk

13.4.11 The Welsh Government (Ref 13-1) confirmed, in December 2021, that the Flood Map for Planning (FMfP) represents better and more up-to-date information on areas at flood risk than the Development Advice Map (DAM).

13.4.12 Natural Resources Wales (NRW), as part of the Scoping Opinion (Appendix 3-1), have advised that the best and most recent information should be used to screen flood risk, which is considered to be the FMfP and, therefore, this has been used to inform the PEIR. The FMfP is shown in Figure 13-6 to Figure 13-9.

13.4.13 Whilst the FMfP has been used for this PEIR assessment. The DAM has also been considered within this PEIR in line with associated planning policy 'TAN15: Development and Flood Risk' (Ref 13-2) which notes the DAM is the current framework for assessing flood risk to and from new development.

13.4.14 Table 13-1 and Table 13-2 describe the zones outlined within the Development Advice Map and Flood Map for Planning respectively for clarity.

Table 13-1 Development Advice Map

Zone	Description
A	Considered to be at little or no risk of fluvial or tidal/coastal flooding.
B	Areas known to have been flooded in the past evidenced by sedimentary deposits.
C	Based on Environment Agency extreme flood outline, equal to or greater than 0.1% (river, tidal or coastal).
C1	Areas of the floodplain which are developed and served by significant infrastructure, including flood defences.
C2	Areas of the floodplain without significant flood defence infrastructure.

Table 13-2 Flood Map for Planning (Rivers)

Flood Zone	Annual Probability of Flooding (%)
1	Areas with a less than 0.1% (1 in 1000) chance of flooding from rivers in a given year.
2	Areas with 0.1% to 1% (1 in 1000 to 1 in 100) chance of flooding from rivers in a given year, including the effects of climate change.
3	Areas with more than 1% (1 in 100) chance of flooding from rivers in a given year, including the effects of climate change.

Maen Hir North

FMfP

13.4.15 NRW's FMfP shows most of Maen Hir North to be located within Flood Zone 1 (Low Probability) (Figure 13-6). There is an area of Flood Zone 2 (Medium Probability) and 3 (High Probability) located within the centre of the area, associated with the Afon Wygyr. Further downstream of the Parcel, there are also areas of Flood Zone 2 and 3 associated with the Afon Maddanen, the Afon Wen and the Afon Goch.

DAM

13.4.16 NRW's DAM (Figure 13-15) shows most of Maen Hir North to be located within Zone A (considered to be at little or no risk of fluvial or tidal / coastal flooding). There is an area of Zone C2 (areas of the floodplain without significant flood

defence infrastructure, based on the extreme flood outline, equal to or greater than the 1 in 1000-year) located within the centre of the Parcel, associated with the Afon Wygyr which continues downstream towards the northwestern extent of the Study Area. Further downstream of the Parcel, there are also areas of Zone C2 associated with the Afon Maddanen, the Afon Wen and the Afon Goch.

- 13.4.17 There are also small areas of Zone B (areas known to have been flooded in the past) adjacent to the Afon Wygyr, the Afon Maddanen, the Afon Tregynrig, the Afon Wen and the Afon Goch.

Hydraulic Modelling

- 13.4.18 NRW have provided flood extents associated with hydraulic modelling undertaken in 2023 for a Flood Alleviation Scheme (FAS) for the town of Amlwch. The extents have been reviewed and although they are located within the Water Resources Study Area, the distance from the Solar PV Site (at least 600m) means they have limited use for this assessment. Therefore, the extents will not be considered any further in the PEIR assessment.

Maen Hir Central

FMfP

- 13.4.19 NRW's FMfP (Figure 13-7) shows most of Maen Hir Central to be located within Flood Zone 1. There are areas of Flood Zones 2 and 3 located within the centre of the Parcel, associated with Afon Alaw and Llyn Alaw. There are areas of Flood Zone 2 and 3 towards the western extent of the Study Area associated with the Afon Tan 'Rallt and the Afon Fferam Uchaf.

DAM

- 13.4.20 NRW's DAM (Figure 13-16) shows most of Maen Hir Central to be located within Zone A. There is an area of Zone C2 located within the centre of the Parcel, associated with the Afon Alaw and Llyn Alaw. Further downstream of the Parcel, there are also areas of Zone C2 associated with the Afon Tan 'Rallt and the Afon Fferam Uchaf.
- 13.4.21 There are also small areas of Zone B adjacent to the Afon Alaw, Llyn Alaw and the Afon Tan 'Rallt.

Maen Hir South 'A'

FMfP

- 13.4.22 NRW's FMfP (Figure 13-8) shows most of Maen Hir South 'A' to be located within Flood Zone 1. There are areas of Flood Zones 2 and 3 located within the Parcel associated with the Afon Llandyfrydog and the Afon Aalaw. Further downstream of the Parcel, there are areas of Flood Zone 2 and 3 associated with the Afon Rhosybol and the Afon Goch Dulas.

DAM

- 13.4.23 NRW's DAM (Figure 13-17) shows the majority of Maen Hir South 'A' to be located within Zone A. There is an area of Zone C2 located within the Study Area, associated with the Afon Alaw, Afon Llandyfrydog, Afon Rhosybol and the Afon Goch Dulas.
- 13.4.24 There are also small areas of Zone B adjacent to the Afon Alaw, the Afon Llandyfrydog, the Afon Rhosybol and the Afon Goch Dulas.

Maen Hir South 'B'

FMfP

- 13.4.25 NRW's FMfP (Figure 13-9) shows most of Maen Hir South 'B' to be located within Flood Zone 1. There are areas of Flood Zones 2 and 3 located within the centre of the Parcel associated with the Afon Cefni, the Afon Ysgoldy and the Afon Ynys Fawr.

DAM

- 13.4.26 NRW's DAM (Figure 13-18) shows the majority of Maen Hir South 'B' to be located within Zone A. There is an area of Zone C2 located within the centre of the Parcel associated with the Afon Cefni, Afon Ysgoldy and the Afon Ynys Fawr.
- 13.4.27 There are also small areas of Zone B adjacent to the Afon Cefni, Afon Ysgoldy, Afon Ynys Fawr and ordinary watercourses.

Ordinary Watercourses and Ditches

- 13.4.28 The Surface Water and Small Watercourses Flood Zones mapping shows parts of the Study Area to be at risk from ordinary watercourses and ditches, as shown in Figure 13-10 to Figure 13-13. The flooding generally correlates with the location of existing surface waterbodies as well as topographical features, such as depressions and valley lines. These ordinary watercourses and ditches are not represented within the DAM.

Coastal

- 13.4.29 NRW's FMfP shows most of the Water Resources Study Area to be located in Flood Zone 1. However, the northwest and east of the Water Resources Study Area is shown to be marginally located within Flood Zones 2 and 3 attributed to sea sources. Although there are extents located within the Water Resources Study Area, they are located at least 2.5km downstream of the Solar PV Site and, therefore, flood risk from this source is negligible. As such, coastal flood risk will not be considered further in this PEIR assessment.

Reservoirs

- 13.4.30 The flood risk from reservoir extent associated with Llyn Alaw is located downstream of the Study Area. The Study Area is also not located within any areas shown to be at risk of flooding from Llyn Cefni. As the Study Area will not be affected in the event of reservoir failure, flood risk from reservoirs will, therefore, not be considered further in the assessment.

Surface Water – Quantity

- 13.4.31 It is understood from a desktop review of available information that the majority of the Study Area is covered by permeable surfacing and not served by any positive surface water drainage systems, other than informal land drainage systems. Existing highways may be served by highway drainage and/or a surface water network. Rainfall is believed to infiltrate into the ground, where geological and hydrogeological conditions allow, and then runoff at surface level once the infiltration capacity of the ground has been exceeded. Any runoff generated will likely be directed to local surface waterbodies.

- 13.4.32 The surface water and small watercourses FMfP mapping shows areas of ponding throughout the Former Oil Depot. This ponding is largely expected to originate within the Former Oil Depot and is associated with the site's topography and areas of hardstanding.
- 13.4.33 The surface water and small watercourses mapping indicates surface water flood risk is present as Flood Zone 2 and 3 throughout the Study Area.

Groundwater

- 13.4.34 As described in Chapter 12 (Ground Conditions) of this PEIR, the British Geological Survey (BGS) indicates that the Study Area is predominantly underlain by superficial deposits of Devensian Till. However, Alluvium is mapped locally adjacent to watercourses and Glaciofluvial Deposits are also mapped sporadically. Peat is mapped locally in the areas where Alluvium is indicated to be present to the east of Llyn Alaw. Superficial deposits are locally absent at sporadic locations across the Study Area, which often corresponds with rock outcrops at ground level.
- 13.4.35 Bedrock is indicated to predominantly comprise the New Harbour Group, South Stack Formation, Ordovician Rocks, Coedana Complex, Coedana Granite, Central Anglesey Shear Zone and Berw Shear Zone and Gwna Group, with localised igneous intrusions sporadically mapped across the Study Area.
- 13.4.36 The Till is categorised as an undifferentiated Secondary Aquifer whilst the Alluvium and Glaciofluvial Deposits are both categorised as a Secondary A Aquifer (permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers). Most bedrock geologies mapped underlying the Study Area are categorised as Secondary B Aquifers (predominantly lower permeability layers which may store / yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering); however, there is a minor area categorised as Secondary A Aquifers located adjacent to the eastern extent of the Study Area.

13.4.37 The Water Resources Study Area is not indicated to be within a Groundwater Source Protection Zone and there is no Groundwater Protection Zone within at least a 1km radius of the Study Area.

13.4.38 There are several private groundwater supplies located within the Study Area. The location of these supplies is still being identified and further detail will be provided in the ES.

Water Quality

Surface Water Quality

13.4.39 Seven Water Framework Directive (WFD) river waterbody catchments are mapped across the Study Area, and are shown in Figure 13-14:

- The Afon Goch Amlwch River Waterbody Catchment, which has a WFD overall waterbody quality classification of 'moderate', with an ecological status of 'moderate' and a 'moderate' chemical status.
- The Afon Wygyr River Waterbody Catchment, which has a WFD overall waterbody quality classification of 'moderate', with an ecological status of 'moderate' and a 'high' chemical status.
- The Afon Alaw River Waterbody Catchment, which has a WFD overall waterbody quality classification of 'good', with an ecological status of 'good' and a 'high' chemical status.
- The Afon Alaw Bach River Waterbody Catchment, which has a WFD overall waterbody quality classification of 'moderate', with an ecological status of 'moderate' and a 'high' chemical status.
- The Afon Goch Dulas Waterbody Catchment, which has a WFD overall waterbody quality classification of 'moderate', with an ecological status of 'moderate' and a 'moderate' chemical status.
- The Afon Cefni (Reservoir West) Waterbody Catchment, which has a WFD overall waterbody quality classification of 'good', with an ecological status of 'good' and a 'high' chemical status.
- The Afon Cefni (Reservoir East) Waterbody Catchment, which has a WFD overall waterbody quality classification of 'good', with an ecological status of 'good' and a 'high' chemical status.

13.4.40 Two WFD lake waterbodies are mapped within the Study Area:

- The Llyn Alaw Lake Waterbody, which has a WFD overall waterbody quality classification of 'moderate', with an ecological status of 'moderate' and a 'high' chemical status.
- The Cefni Reservoir, which has a WFD overall waterbody quality classification of 'moderate', with an ecological status of 'moderate' and a 'high' chemical status.

13.4.41 There are no drinking water protected river catchment areas within the Study Area. However, Llyn Alaw and Llyn Cefni are designated as a Drinking Water Protected Area (Lake) and are both assessed as 'at risk' due to Algae, Nutrients, Taste & Odour and Pesticides.

Groundwater Quality

13.4.42 One WFD groundwater body catchment is mapped across the entire Study Area. The Ynys Môn GW catchment has a WFD overall waterbody quality classification of 'poor'.

13.4.43 The Water Resources Study Area is located within the Ynys Mon Secondary Groundwater Drinking Water Protected Area.

Other Designations

13.4.44 There are statutory ecologically designated sites within and adjacent to the Water Resources Study Area. The location of these is provided as Figures 7-4 in Chapter 7: Ecology. These statutory designated sites include:

- Mynydd Parys Site of Special Scientific Interest (SSSI), located approximately 1.3km to the east of Maen Hir North.
- Llyn Alaw SSSI, located adjacent to Maen Hir Central.
- Salbri SSSI, located approximately 0.5km to the north of Maen Hir Central.
- Llyn Hafodol and Cor Clegyrog SSSI, located approximately 150m to the north of Maen Hir Central.
- Fferam Uchaf SSSI, located approximately 1.3km to the southwest of Maen Hir Central.

- Maen Gwyn SSSI, located approximately 0.8km to the west of Maen Hir South 'B'.
- Corsydd Mon SAC / Cors Erddreniniog SSSI, located approximately 450m to the east of Maen Hir South. Although outside of the Study Area, it has been included due to its hydrological connectivity.

13.4.45 With the exception of Maen Gwyn SSSI and Fferam Uchaf SSSI, which are designated for their geological interest, the SSSIs are designated for their ecological interest and have hydrological connectivity to the Study Area.

13.4.46 Llyn Hafodol and Cor Clegyrog SSSI and Corsydd Mon SAC / Cors Erddreniniog SSSI are also designated as groundwater dependent terrestrial ecosystems.

Foul Water

13.4.47 The Study Area is located within Welsh Water's sewerage area, although it is not currently served by a positive foul water drainage system.

Future Baseline

13.4.48 Fluvial and surface water flooding may increase due to the expected increase in frequency and intensity of extreme rainfall events as a consequence of climate change. Further information of the effect of climate change is included in Chapter 14: Climate Change.

13.4.49 NRW's Climate Change Allowances and Flood Consequence Assessments guidance (2021) will be used to assess the impact of climate change. The Project falls within the West Wales River Basin District and, therefore, the peak river flow allowances for this District will be considered in the ES Chapter, where necessary. The rainfall allowances set out in the guidance will also be used in the development of the outline Surface Water Drainage Strategy for the Project Substation, BESS and 33kV/132kV Substations and will be presented in the ES.

13.4.50 The Likely Significant Effects of climate change will inform the outline Surface Water Drainage Strategy for the Project, with the drainage system designed to ensure there is no significant increase in the rate of runoff discharged from the Solar PV Site, accounting for future climate change.

- 13.4.51 The Likely Significant Effects of climate change will also be considered as part of the Flood Consequence Assessment (FCA) and Sustainable Drainage Statement (SDS) and presented in the ES chapter.

13.5 Assessment Methodology

Assessment Scope

Scoped In

- 13.5.1 Based on an initial baseline assessment and identification of potential environmental impact, the following matters are proposed to be scoped in across all phases of the Project:

- Flood risk
- Surface water - quantity
- Water quality
- Potable water
- Foul water - quantity and quality

Scoped Out

- Risk of flooding from reservoir inundation
- Coastal flooding

- 13.5.2 Potential Likely Significant Effects on human health due to exposure to ground contamination are assessed in Chapter 11: Ground Conditions and Chapter 13: Human Health.

Overview

- 13.5.3 The assessment approach for the ES is being developed through consultations with stakeholders including NRW, Isle of Anglesey County Council (IoACC) (in its role as the Lead Local Flood Authority (LLFA)), Welsh Water and the Canal and River Trust.
- 13.5.4 Consultation with NRW is ongoing with regards to the requirements and scope for any hydrological and / or water quality monitoring/modelling which will be included in the ES.
- 13.5.5 The ES will cross-reference a FCA report, a WFD report, and a SDS report and accompanying the outline Surface Water Drainage Strategy, which will be

appended to the ES. These documents will include the results of any water quality sampling/monitoring and hydrological modelling undertaken to address requirements raised in the Scoping Opinion.

- 13.5.6 This PEIR assessment consider the Construction, Operation and Decommissioning Phases of the Project and will take account of the potential influence of climate change on the surface water and flood risk receptors.
- 13.5.7 Climate change is integral to assessing the Likely Significant Effects of a project on water resources, in terms of potential changes to rainfall, river flows, and water resource demand and quality. The adoption of climate change allowances will be based on the NRW latest guidance which utilises the 'UK Climate Projections 2018' (UKCP18) (Ref 13-3).

WFD Assessment

- 13.5.8 A WFD Assessment will be undertaken in support of the ES. The assessment is based on the source-pathway-receptor model and identifies the potential pollutant linkages between the sources identified in the screening process on the receptors identified in the scoping process. The assessment considers the potential for the Project to have an adverse effect on the water quality of the identified WFD water bodies only. The assessment is desk-based and the sources of information used to inform each stage of the assessment are outlined in the following sections.

WFD Screening

- 13.5.9 The screening process identifies the potential sources of pollution that could cause a deterioration in water quality of the WFD water body. All identified activities and components related to the Project are identified and those which are not considered to cause effect to water body water quality are 'screened-out'. All other activities which are considered to have potential to cause effect are 'screened-in' and considered in the scoping stage.

WFD Scoping

- 13.5.10 The scoping process identifies the risks of the 'screened-in' activities to potential receptors. The WFD water bodies which are hydrologically connected to the Project, either directly or in-directly, are identified. Indirectly connected being

water bodies that are connected to the Project via other water bodies e.g. downstream water bodies.

WFD Impact Assessment

13.5.11 The assessment identified the potential impacts of the 'screened-in activities' on to potential receptors. The assessment will identify ways to avoid or minimise the impact of the Project and will show if the Project may cause deterioration of current WFD status or jeopardise the water body achieving good status.

Determining Significance of Effect

13.5.12 The approach to assessing and assigning significance to an environmental effect is derived from a variety of sources including, legislative requirements, topic-specific guidance, standards and codes of practice, the EIA Regulations, advice from statutory consultees and other stakeholders and the expert judgement of the team undertaking the EIA.

13.5.13 The significance of effects arising from the Project will be established through a combination of the identification of receptor sensitivity and magnitude of potential impacts. Table 13-3 and Table 13-5 below present the proposed criteria and thresholds for the assessment of receptor sensitivity and of the magnitude of potential impacts.

Receptor Sensitivity/Importance/Value

Table 13-3 Framework for Determining Sensitivity of Water Resources and Ground Conditions Receptors

Receptor Sensitivity	Sensitivity Description
High	<ul style="list-style-type: none"> • A large, medium, or small waterbody with a WFD Quality classification of “High”, “Good”, “Moderate” or “Poor” and / or a Current Chemical Quality classification of “Good”. • The hydrological receptor and downstream environment have limited capacity to attenuate natural fluctuations in hydrochemistry and cannot absorb further changes without fundamentally altering its baseline characteristics / natural processes.

Receptor Sensitivity	Sensitivity Description
	<ul style="list-style-type: none"> • The hydrological receptor is of high environmental importance or is designated as having national or international importance, such as SACs and SSSIs. • The hydrological receptor is designated for supporting ecological interest. • The hydrological receptor acts as an active floodplain or other flood defence. • The hydrological receptor will support abstractions for public water supply or private water abstractions for more than twenty-five people. • Abstractions used for the production of mass-produced food and drinks. • Local groundwater constitutes a valuable resource because of its high quality and yield, e.g., aquifer(s) of local or regional value, statutorily designated nature conservation sites (e.g., SACs and SSSIs) dependent on groundwater.
Moderate	<ul style="list-style-type: none"> • The hydrological receptor and downstream environment will have some capacity to attenuate natural fluctuations in hydrochemistry but cannot absorb certain changes without fundamentally altering its baseline characteristics / natural processes. • The hydrological receptor is of regional environmental importance (such as Local Nature Reserves), as defined by the NRW. • The hydrological receptor does not act as an active floodplain or other flood defence. • The hydrological receptor supports abstractions for public water supply or private water abstractions for up to twenty-five people. • Areas containing geological features of designated regional importance including Regionally Important Geological/Geomorphological Sites (RIGS), considered worthy of protection for their historic or aesthetic importance. • Aquifer of limited value (less than local) as water quality does not allow potable or other quality sensitive uses. Exploitation of local groundwater is not far-reaching. • Local areas of nature conservation known to be sensitive to groundwater effects.

Receptor Sensitivity	Sensitivity Description
Low	<ul style="list-style-type: none"> • A large, medium, or small waterbody with a WFD Quality classification of “Bad” and / or a Current Chemical Quality classification of “Fail”. • The hydrological receptor and downstream environment will have capacity to attenuate natural fluctuations in hydrochemistry but can absorb any changes without fundamentally altering its baseline characteristics / natural processes. • The hydrological receptor is not of regional, national, or international environmental importance. • The hydrological receptor is not designated for supporting freshwater ecological interest. • The hydrological receptor does not act as an active floodplain or other flood defence. • The hydrological receptor is not used for recreational use. • The hydrological receptor does not support abstractions for public water supply or private water abstractions. • Geological features or geology not protected and not considered worthy of specific protection. • Poor groundwater quality and / or very low permeability make exploitation of groundwater unfeasible. Changes to groundwater not expected to affect local ecology.

Summary of Receptors and Sensitivity

13.5.14 The potential receptors and their sensitivity in terms of flood risk, water quality and quantity are described below in Table 13-4. Future information on how the sensitivity of receptors has been identified is provided in Table 13-3.

Table 13-4 Potential Sensitivity of Receptors

Category	Receptor	Type of Effect	Sensitivity	Reason for Sensitivity
Human Health	Construction workers	Flood Risk	High	Risk to human health
	Site users	Flood Risk	High	Risk to human health
	Downstream human receptors (e.g. residents and workers in Amlwch, Cemaes, City Dulas, Llandyfrydog, Llangyllog and smaller, isolated settlements)	Flood Risk	High	Risk to human health
	Potable Water	Water Quality	High	Risk to human health
Waterbodies (lakes / reservoirs)	Llyn Alaw	Water Quality	High	Llyn Alaw Waterbody Moderate WFD Classification Drinking Water Protected Area (lakes) – classed as ‘at risk’ due to algae, nutrients, taste and odour, pesticides
		Water Quantity	High	Supports abstractions for public water supply or private water abstractions for more than twenty-five people
	Llyn Cefni	Water Quality	High	Cefni Reservoir Waterbody Moderate WFD Classification Drinking Water Protected Area (lakes) – classed as at risk due to algae, nutrients, taste and odour, pesticides

Category	Receptor	Type of Effect	Sensitivity	Reason for Sensitivity
		Water Quantity	High	Supports abstractions for public water supply or private water abstractions for more than twenty-five people
Waterbodies (rivers)	The Afon Wygyr River Waterbody Catchment (Afon Wygyr, Afon Tregynrig)	Water Quality	High	Overall Moderate WFD Classification
	The Afon Alaw River Waterbody Catchment (Afon Alaw, Afon Glasgraig Fawr)	Water Quality	High	Overall Good WFD Classification
	The Afon Goch Amlwch River Waterbody Catchment (Afon Goch, Afon Wen)	Water Quality	High	Overall Moderate WFD Classification
	The Afon Alaw Bach River Waterbody Catchment (Afon Tan 'Rallt)	Water Quality	High	Overall Moderate WFD Classification
	The Afon Goch Dulas Waterbody Catchment (Afon Goch Dulas, Afon Llandyfydog, Afon Ynys Fawr)	Water Quality	High	Overall Moderate WFD Classification
	The Afon Cefni (Reservoir West) Waterbody Catchment (Afon Wynys Fawr, Afon Cefni, Afon Ysgoldy)	Water Quality	High	Overall Good WFD Classification

Category	Receptor	Type of Effect	Sensitivity	Reason for Sensitivity
	The Afon Cefni (Reservoir East) Waterbody Catchment (Afon Cefni)	Water Quality	High	Overall Good WFD Classification
	Rivers: Afon Wygyr, Afon Tregynrig, Afon Alaw, Afon Glasgraig Fawr, Afon Goch, Afon Wen, Afon Tan 'Rallt, Afon Goch Dulas, Afon Llandyfrydog, Afon Ynys Fawr, Afon Cefni, Afon Ysgoldy	Water Quantity	High	Sensitivity to changes in flow quantities and regime
	Smaller watercourses and drains	Water Quantity	Moderate	Sensitivity to changes in flow quantities and regime.
Groundwater	Ynys Mon Secondary Groundwater Body	Water Quality	High	Overall Poor WFD Classification
	Ynys Mon Secondary Groundwater Drinking Water Protected Area	Water Quality	High	Classed as not at risk of failing to meet drinking water quality objectives
	Private Groundwater Supplies	Water Quantity and Quality	Moderate	Supports abstractions for public water supply or private water abstractions for up to twenty-five people
Environmental Designations	Mynydd Parys SSSI	Water Quantity and Quality	High	Designated for biological interest
	Llyn Alaw SSSI	Water Quantity and Quality	High	Designated for biological interest

Category	Receptor	Type of Effect	Sensitivity	Reason for Sensitivity
	Salbri SSSI	Water Quantity and Quality	High	Designated for biological interest
	Llyn Hafodol and Cor Clegyrog SSSI	Water Quantity and Quality	High	Groundwater Dependent Terrestrial Ecosystem
	Cors Erddreniniog SSSI Corsydd Mon / Anglesey Fens Special Area of Conservation (SAC)	Water Quantity and Quality	High	Groundwater Dependent Terrestrial Ecosystem

Magnitude of Impact

Table 13-5 Framework for Determining Magnitude of Change

Magnitude of Effect	Magnitude Description
High	<ul style="list-style-type: none"> • A short- or long-term major shift in hydrochemistry or hydrological conditions sufficient to negatively change the ecology of the receptor. This change would equate to a downgrading of a WFD Quality classification. • A sufficiently material increase in the probability of flooding onsite and offsite, adding to the area of land which requires protection by flood prevention measures or affecting the ability of the functional flood plain to attenuate the effects of flooding by storing flood water. • A major (greater than 50%) or total loss of a geological receptor or peat habitat site, or where there would be complete severance of a site such as to fundamentally affect the integrity of the site (e.g., blocking hydrological connectivity). • Major permanent or long-term negative change (i.e., degradation of quality) to groundwater quality or a reduction in the available yield. • Major permanent or long-term negative change to geological receptor. • Changes to quality or water table level will cause harm to local ecology or will lead to flooding issue. • A major permanent or long-term negative change to geological receptor, such as the alteration of pH or drying out of peat. • Changes to groundwater quality or water table level that will negatively alter local ecology or will lead to a groundwater flooding issue.
Moderate	<ul style="list-style-type: none"> • A moderate increase in the probability of flooding onsite and offsite, adding to the area of land which requires protection by flood prevention measures or affecting the ability of the functional flood plain to attenuate the effects of flooding by storing flood water. • A loss of part (approximately 15% to 50%) of a geological receptor or peat habitat site, major severance, major effects to its integrity as a feature, or disturbance such that the value of the site would be affected but could still function.

Magnitude of Effect	Magnitude Description
	<ul style="list-style-type: none"> • Changes to the local groundwater regime may slightly affect the use of the receptor. • The yield of existing supplies may be reduced or quality slightly deteriorated. • Fundamental negative changes to local habitats may occur, resulting in impaired functionality.
Low	<ul style="list-style-type: none"> • A detectable non-detrimental change to the baseline hydrochemistry or hydrological environment. This change would not reduce the WFD Current Ecological Quality classification. • A marginal increase in the probability of flooding onsite and offsite, adding to the area of land which requires protection by flood prevention measures or affecting the ability of the functional flood plain to attenuate the effects of flooding by storing flood water. • A detectable but non-material effect on the receptor or a moderate effect on its integrity as a feature or where there would be a minor severance or disturbance such that the functionality of the receptor would not be affected. • Changes to groundwater quality, levels or yields that do not represent a risk to existing baseline conditions or ecology.
Negligible	<ul style="list-style-type: none"> • No perceptible changes to the baseline hydrochemistry or hydrological environment. • No change to the WFD water quality classification. • No increase in the probability of flooding onsite and offsite. • A slight or negligible change from baseline condition of geological resources. • Change hardly discernible, approximating to a 'no change' in geological condition.

Significance of Effect

13.5.15 The predicted significance of the effect is determined through a standard method of assessment and based on professional judgement, considering both the sensitivity of the receptor and the magnitude of the potential impact as shown in Table 13-6. Effects of moderate significance or greater are generally considered significant but this is tested with professional judgement.

Table 13-6 Framework for Assessment of the Significance of Effect

Magnitude of Impact	Sensitivity of Resource or Receptor		
	High	Moderate	Low
High	Major	Major	Minor
Moderate	Major	Moderate	Minor
Low	Moderate	Minor-Moderate	Negligible
Negligible	Negligible	Negligible	Negligible

Assumptions and Limitations

- 13.5.16 There is some degree of inherent uncertainty within the assessment process. In all cases, where uncertainty exists, or where difficulties are encountered, these have been identified, together with details of the measures that will be taken to reduce the uncertainty as far as reasonably practicable for the ES.
- 13.5.17 This PEIR is based on a desktop study using available data from NRW and BGS. The NRW data used to inform this chapter is understood to be the latest available data.
- 13.5.18 There will always be some element of uncertainty regarding future trends in environmental conditions and climate.
- 13.5.19 The level of understanding will be consolidated and advanced through further work including a FCA, SDS and WFD Assessment which will be included as appendices to the ES.

13.6 Embedded Mitigation

13.6.1 The following section outlines the principles that have been embedded into the design and construction of Maen Hir. These measures remove potential significant effects as far as practicable and are inherent to the Project.

Design

13.6.2 The following offsets from water resources to mitigate against flood risk, minimise ground disturbance and mobilisation of sediment and pollutants into the watercourse, and to allow access to watercourses for maintenance:

- 10m watercourse buffers except for watercourse crossings along Access Tracks.
- Avoid PV Arrays within Flood zones 2 and 3.
- 10m buffer from ponds.
- 50m buffer from the edge of Llyn Alaw.

13.6.3 The following Mitigation will also be embedded into the Project design:

- The Solar PV Site will utilise existing access road and tracks and watercourse crossings already in place, where practicable, to:
 - minimise ground disturbance and habitat removal, and
 - minimise the need for further watercourse crossings.
- The internal Access Tracks will be constructed of compacted stone with excavation kept to a minimum.
- Where new crossings are required, or existing culverted crossings are proposed to be replaced, these will be designed as clear-span bridges or culverts that are designed to not adversely impact on flow. The design of the crossing will be subject to approval by the drainage authority.
- Horizontal Directional Drilling (HDD) will also be utilised, where possible, to direct cabling underneath watercourses.
- Where drainage is required for PV Arrays, Transformers, a ditch or a swale, with check dams, may be located downhill of the internal Access Tracks, row of solar arrays and/or at the field peripheries, to intercept any potential surface water runoff and promote infiltration of surface water.

13.6.4 The layout of the Solar PV Site has been designed to exclude fields that contain large areas of Flood Zones 2 and 3 to mitigate against the risk of flooding (see Figures 13-2 to 13-13).

13.6.5 The Project Substation, BESS and Community Solar Project where they will be potentially located within the Former Oil Depot would be located within Flood Zones 2 and 3 of the Surface Water and Small Watercourses FMfP; however, this risk will be mitigated through the outline Surface Water Drainage Strategy embedded within the Project design.

- 13.6.6 The outline Surface Water Drainage Strategy will be submitted with the DCO Application, to provide further details on the measures to control surface water for the Project. The proposed BESS and Project Substation will be served by a formal drainage system, which will either manage surface water at source via infiltration, or attenuate surface water flows to be discharge to the surrounding watercourse network(s) at greenfield rates.
- 13.6.7 The proposed surface water drainage systems associated with the BESS and Project Substation will have appropriate Sustainable Drainage Systems (SuDS) to treat surface water prior to discharge, under normal conditions.
- 13.6.8 The surface drainage systems associated with the BESS compounds will include a penstock (or an equally suitable drainage solution based on the topography and geotechnical study of the site during detailed design) that can be automatically closed in the event of a fire to capture any potentially contaminated water within the site, noting that the use of water is subject to BESS chemistry selected and Fire and Rescue Services (FRS) and National Fire Chief Council (NFCC) guidance. Under normal conditions, the penstock will be open to allow water to drain freely from the proposed drainage system.
- 13.6.9 Individual BESS containers/enclosure designs will be required to incorporate the most advanced fire detection and suppression systems, including adhering to the UL9450 and NPFA 855 standards, as well as conform to local and industry standards. Battery chemistry bespoke fire detection and suppression systems (FDSS) will be fitted to containers.

Construction, Operation and Decommissioning

- 13.6.10 The outline Water Management Plan (oWMP) describes water management measures to control surface water runoff and to drain hardstanding and other structures during the Construction, Operation and Decommissioning Phases of the Project and will form part of a Pollution Prevention Plan (PPP). The PPP will be incorporated into the CEMP (based on the oCEMP), which will be secured via a DCO requirement and will be approved by the local planning authority in consultation with NRW prior to commencement of the Construction Phase.

- 13.6.11 The CEMP will be developed in accordance with Guidance for Pollution Prevention 5: works or maintenance in or near water (GPP 5) and will include measures to avoid pollution from concrete use, silt and oil and chemicals as well as incident response.
- 13.6.12 The PPP will set out measures to be employed to avoid or mitigate potential pollution for all phases of the Project and will also include an Incident Plan to be followed should a pollution event occur. This plan will be produced following consultation and agreement with NRW and all appropriate personnel working on the construction site will be trained in its use. The Construction Project Manager will have specific responsibility for implementation of the CEMP.
- 13.6.13 Method statements will also be applied, which will follow the principles laid out in relevant Construction Industry Research and Information Association (CIRIA) guidance and the principles of the Guidance for Pollution Prevention documents.
- 13.6.14 An outline Soil Management Plan (oSMP) will be prepared and secured via DCO requirement that will set out the time periods when soils are suitable for being trafficked over and include control measures to avoid and mitigate soil compaction.
- 13.6.15 An outline Battery Storage Safety Management Plan (oBSSP) will be prepared, and secured via DCO requirement, that will set out the key fire safety provision for the BESS and include measure to fire reduction and protection measures.

13.7 Preliminary Assessment of Likely Significant Effects

Construction Phase

- 13.7.1 This section describes the Likely Significant Effects from water resource matters during the construction activities of the Project.
- Installation of Mounting Structures
 - Construction of BESS, Power Conditioning System (PCS), Transformer and substation foundations
 - Construction and operation of temporary Construction Compounds
 - Use of existing, and construction of new, Access Tracks for the construction of the Solar PV Site

- Construction of hardstanding and installation of security fencing
- Installation of cabling including trenches and HDD

13.7.2 Impacts on water resources resulting from the Construction Phase include:

- Changes to surface water runoff, groundwater and flood risk
- Accidental spillages or releases of contaminants
- Increased sediment.

13.7.3 The potential Likely Significant Effects associated with the Construction Phase of the Project are considered to be temporary and short duration.

Flood Risk

13.7.4 Research detailed within the 'Hydrological Response of Solar Farms' (Ref 13-4), 'Biodiversity Guidance for Solar Development' (Ref 13-5) and 'Technical Information note TIN101: Solar Parks: Maximising Environmental Benefits' (Ref 13-6) concludes that the development of solar panels over a grassy field does not have a significant effect on the volume of runoff, the peak discharge, nor the time to peak. It is therefore anticipated that the Solar PV Site will not have a significant effect in relation to increasing flood risk onsite and to the downstream catchment.

13.7.5 The movement of heavy machinery across the permeable areas within the Solar PV Site may result in compaction of soil within the PEIR Boundary. Compaction of soil can result in an increase to surface water runoff. The oSMP will secure measures to avoid and mitigate the risk of soil compaction during the Construction Phase.

13.7.6 Other elements of the Project, such as the Project Substation, BESS, Access Tracks, Construction Compounds and the 33kV/132kV Substations, may increase the impermeable area within the Solar PV Site. However, these areas will be served by a drainage system, embedded within the Project design, which incorporates SuDS to prevent an increase in surface water runoff. In addition to preventing an increase in surface water runoff, the outline Surface Water Drainage Strategy for the BESS in the Former Oil Depot will formalise the existing surface water runoff regime, mitigating the risk from the surface water ponding

shown in the FMfP. The details of the outline Surface Water Drainage Strategy will be included in the ES chapter.

- 13.7.7 Therefore, the effect of the Solar PV Site on flood risk is **Negligible** due to the **Negligible** magnitude impact on **High** sensitivity receptors (construction workers and downstream receptors) and, therefore, **not significant**.

Obstruction or Alteration to Flows

- 13.7.8 Without the embedded Mitigation, the Solar PV Site could result in impedance of overland flood flow routes, loss / disturbance to existing surface water bodies, and adverse impacts on potable water supply (Llyn Alaw and Llyn Cefni, private groundwater supplies), through the temporary or permanent obstruction of watercourse and ditch channels. Alteration of the flow regime could also result in degradation of environmental receptors, such as the hydrologically linked SSSIs, and the groundwater dependent terrestrial ecosystems, such as Cors Erddreniniog SAC. Llyn Alaw and Llyn Cefni are sensitive to water levels; any reduction in flows feeding the reservoirs could lead to increased incidents of algal blooms as a result of lower water levels.
- 13.7.9 The use of existing access routes and designing new crossings to avoid any adverse impact on flows, as set out in the embedded Mitigation, will minimise the potential for obstruction of flow compared to the baseline conditions, and subsequently any negative effect on hydrogeomorphological processes such as sediment transport and channel migration.
- 13.7.10 Therefore, the effect of the Solar PV Site on surface water flow is considered **Negligible**, due to a **Negligible** magnitude impact on **High** sensitivity receptors (watercourses and ditches, reservoirs, and SSSIs).
- 13.7.11 The effect on public and / or private water supplies fed by groundwater flow will be identified and mitigation measures set out as the Project design progresses and will be included within the ES chapter.
- Water Quality***
- 13.7.12 The Construction Phase has the potential to adversely affect water quality in receiving waterbodies through uncontrolled release of substances such as

solvents, cleaning agents, paints and other chemicals, liquids, or solids, used or stored onsite.

- 13.7.13 Any release of these substances either directly into Llyn Alaw or Llyn Cefni, or into the watercourses feeding the reservoirs, would adversely affect the quality of the water, not just for potable water supply but also for the ecology utilising the reservoirs. A potential secondary effect of the release of pollutants would be a risk of algal blooms as a result of any increased nutrient load in the water.
- 13.7.14 Groundworks required within the Former Oil Depot may result in the mobilisation of localised contamination as the Made Ground may contain leachable contaminants. The effect of localised contamination on groundwater is discussed in Chapter 11: Ground Conditions.
- 13.7.15 Suspended solids are one of the most common causes of water pollution from construction sites. These emanate from excavations, exposed ground or stockpiles, plant and wheel washing, build-up of dust and mud on roads, or pumping of contaminated surface waters and groundwater. Extreme rainfall events could exacerbate runoff rates and the mobilisation of suspended solids has the potential to affect ecological habitats, block watercourses and alter flow regimes. Additionally, suspended solids from construction work, particularly from intrusive earthworks for foundations and sewers, could create pathways to local groundwater.
- 13.7.16 However, the offsets from watercourses and implementation of measures secured through the oWMP and oCEMP will mitigate the effects from uncontrolled release of substances and suspended solids.
- 13.7.17 The Construction Phase also has the potential to adversely affect the hydrogeomorphology of watercourses within the Water Resources Study Area. Construction activities near to watercourse banks may lead to erosion and instability and any activities that may result in impediment of flow, such as installation of new watercourse crossings, could affect sediment transport within the watercourse and, subsequently, natural channel migration.
- 13.7.18 The offsets from watercourses and the embedded Mitigation of using existing crossings wherever possible, designing new crossings to avoid any adverse

impact on flow, and HDD for cabling under watercourses will mitigate against any adverse effects on hydrogeomorphology and sediment transport. Further detail will be provided in the WFD assessment and ES chapter.

13.7.19 A WFD Assessment will be undertaken which will consider the potential for the Solar PV Site to have an adverse effect on the water quality of the WFD waterbodies within the Study Area. The WFD will form an appendix to the ES chapter.

13.7.20 The Mitigation embedded into the design of the Solar PV Site, such as the outline Surface Water Drainage Strategy, oCEMP and oWMP are such that the effect of the construction of the Solar PV Site on water quality is considered to be **Negligible** due to a **Negligible magnitude** impact on **High sensitivity** receptors. As such, the effect is considered to be **Not Significant**.

Potable Water Supply

13.7.21 Potential for Likely Significant Effects on potable water supplies will be assessed in the ES when the Project design has developed further.

Foul Water - Quantity and Quality

13.7.22 At this stage, it is not known what foul infrastructure will be required for construction. The details of any foul infrastructure will be determined as the Project progresses and will be included in the ES chapter.

Operational Phase

13.7.23 Operational activities that could potentially affect water resources include:

- Changes to flow regimes
 - Altered flow regime in watercourses (increased or decreased flow) as a result of changes to existing, or new, river crossings
 - Increased or decreased surface runoff rates
 - Altered surface runoff rates from impermeable surfaces affecting flow regimes in watercourses and reservoirs due to increased or decreased flow entering these waterbodies.
 - Changes to watercourse sediment pathways and channel morphology due to changes in flow

- Reduced pollutants entering waterbodies, including rivers and Llyn Alaw and Llyn Cefni, as well groundwater as a result of reduced agricultural chemical application
- Potential risk of contamination of water resources due to minor spills caused maintenance vehicles or in the event of a fire.

13.7.24 The potential Likely Significant Effects of the operation of the Solar PV Site are similar to those discussed under the Construction Phase and include:

- Changes to surface water runoff, groundwater and flood risk
- Accidental spillages or releases of contaminants
- Increased sediment

13.7.25 However, the magnitude of the impacts is expected to be less during operation due to there being less activity and ground disturbance. The replacement of PV Modules and the replacement of batteries within the BESS will not involve any groundworks.

Flood Risk

13.7.26 The Mitigation embedded into the design of the Solar PV Site, such as the outline Surface Water Drainage Strategy, oOEMP and oWMP are such that the effect of the operation of the Solar PV Site on flood risk is considered to be Negligible due to a Negligible magnitude impact on High sensitivity receptors. As such, the effect is considered to be Not Significant. There may be **Minor Beneficial** effects in the form of a reduced risk of flooding in more extreme events because of reduced rates of discharge from the BESS and Project Substation sites into local watercourses because of the outline Surface Water Drainage Strategy.

Water Quality

13.7.27 In the unlikely event of a fire during the Operational Phase, the embedded design of the Solar PV Site provided Mitigation against pollutants entering waterbodies or groundwater.

13.7.28 The fire Mitigation embedded within the Project design, such as the inclusion of penstocks within the proposed surface drainage systems associated with the

BESS and the oBSSP will capture any potentially contaminated water within the site in the event of a fire.

- 13.7.29 The effect of a fire on water quality is considered to be **Negligible** due to a **Negligible magnitude** impact on **High sensitivity** receptors. As such, the effect is considered to be **Not Significant**.
- 13.7.30 The Drinking Water Protected Areas of Llyn Alaw and Llyn Cefni are both assessed as 'at risk' due to Algae, Nutrients, Taste & Odour and Pesticides. Where land Parcels are currently arable agricultural uses in the baseline, a **Minor Beneficial** effect may be seen because of a reduction in agricultural pesticides, such as phosphates and nitrates, that would otherwise have the potential to enter the water environment and these reservoirs. This is due to the **Low magnitude** positive impact on **High sensitivity** receptors (reservoirs, rivers and drainage ditches, groundwater and SSSIs).

Potable Water Supply

- 13.7.31 At this stage, it is not known what potable water will be required for operation. The details of any potable infrastructure will be determined as the Project progresses and will be included in the ES chapter.

Foul Water - Quantity and Quality

- 13.7.32 At this stage, it is not known what foul infrastructure will be required for operation. The details of any foul infrastructure will be determined as the Project progresses and will be included in the ES chapter.

Decommissioning Phase

- 13.7.33 It is expected that the effects of decommissioning would be of a lesser magnitude than those during construction as construction vehicles will use existing tracks, where practicable, and activities such as piling and new watercourse crossings would not be required. Additionally, many of the activities associated with the construction of the Project such as laying of cables will not be relevant during decommissioning. The Decommissioning Phase will also be undertaken under the oDEMP. The significance of effects is considered to be **Negligible** due to a **Negligible** magnitude. As such, the effect of decommissioning on water resources is considered to be **Not Significant**.

13.8 Additional Mitigation

13.8.1 No additional Mitigation is proposed at this stage.

13.9 Residual Effects

13.9.1 In the absence of additional Mitigation, the residual effects are the same as the potential effects set out in Section 13.5.

13.10 Effect Interactions

13.10.1 The effects set out in this chapter have the potential for interactions with effects relating to receptors considered under the following other chapters:

- Ecology (Chapter 7)
- Ground Conditions (Chapter 11)
- Climate Change (Chapter 14)
- Health (Chapter 17)

Ecology

13.10.2 Effects on the ecological classification of watercourses because of changes to the quantity and / or quality of water resources within the Study Area will be considered through the preparation of a WFD Assessment and through the Mitigation set out within this chapter.

13.10.3 The effects of the Project on aquatic habitats and species are assessed in the Ecology chapter which has been informed by this assessment on water quality.

Ground Conditions

13.10.4 Contaminated land is considered in Chapter 11: Ground Conditions chapter which includes an assessment of the risk of mobilisation of localised contamination during construction and decommissioning, in particular at the Former Oil Depot, which could affect water resources receptors. This has informed the PEIR assessment presented in Section 13.5.

Climate Change

13.10.5 Increased flood risk associated with climate change has been taken into account in this chapter and the FCA which makes an allowance for climate change. Future changes to rainfall intensity will also be taken into account in the outline Surface Water Drainage Strategy.

Health

- 13.10.6 The assessment of potential Likely Significant Effects on human health as a result of changes to hydrological regimes and / or contamination of potable water supplies in Chapter 17: Human Health has been informed by this chapter.

13.11 References

- Ref 13-1 Further Letter Sent by the Welsh Government to Local Authorities on the Pause of TAN 15 (Welsh Government, December 2021)
- Ref 13-2 Technical Advice Note 15: Development and Flood Risk (Welsh Assembly Government, July 2004)
- Ref 13-3 UK Climate Projections 2018' (UKCP18)
- Ref 13-4 The Water Resources Act 1991 (Amendment) (England and Wales) Regulations 2009
- Ref 13-5 Flood and Water Management Act (2010)
- Ref 13-6 Water Framework Directive (WFD) 2000/60/EC: Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy
- Ref 13-7 Directive 2006/118/EC of the European Parliament and of the Council of 12 December 2006 on the protection of groundwater against pollution and deterioration
- Ref 13-8 Overarching National Policy Statement for Energy (EN-1), Department of Energy and Climate Change, Present to Parliament pursuant to Section 5(9) of the Planning Act 2008 (November 2023)
- Ref 13-9 National Policy Statement for Renewable Energy Infrastructure (EN-3) (Department for Energy Security & Net Zero, November 2023)
- Ref 13-10 Planning Policy Wales Edition 11 (Welsh Government, February 2021)
- Ref 13-11 Flood Consequence Assessments: Climate Change allowances (Welsh Government Planning Policy Branch, September 2021)
- Ref 13-12 Anglesey and Gwynedd Joint Local Development Plan 2011 - 2026 (Isle of Anglesey County Council and Gwynedd Council, July 2017)
- Ref 13-13 Anglesey and Gwynedd Joint Local Development Plan 2011 - 2026 Review Report (Isle of Anglesey County Council and Gwynedd Council, March 2022)

- Ref 13-14 Strategic Flood Consequence Assessment (Stage 1) (Isle of Anglesey County Council and Gwynedd Council, March 2016)
- Ref 13-15 Anglesey Local Flood Risk Management Strategy (Isle of Anglesey County Council, February 2013)
- Ref 13-16 Western Wales River Basin District Preliminary Flood Risk Assessment Report (Natural Resources Wales, December 2018)
- Ref 13-17 Hydrologic Response of Solar Farms, Journal of Hydrologic Engineering (Cook and McCuen, 2013)
- Ref 13-18 Biodiversity Guidance for Solar Development (BRE, 2014)
- Ref 13-19 TIN101: Solar Parks: Maximising Environmental Benefits (Natural England, 2011)
- Ref 13-20 Guidance for Pollution Prevention: Works and Maintenance in or near Water: GPP 5. Version 1.2 (Natural Resources Wales / Cyfoeth Naturiol Cymru, February 2018)

