Preliminary Environmental Information Report

Chapter 10: Water Environment

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Future Energy Llanwern Limited

Contents

10.0 Water Environment

10.1 Introduction

10.1.1 This Chapter considers the potential for significant impacts on the Water Environment and Flood Risk during the construction, operational and decommissioning phases of the Proposed Development. It sets out the proposed methodology for assessing impacts to the Water Environment and Flood Risk. All potential receptors within the Study Area that have been identified through desktop investigations and a site walkover will be considered in the assessment. The receptors include surface water features (main rivers, ordinary watercourses, other surface water bodies such as ponds, and abstractions), groundwater waterbodies (aquifers, source protection zones (SPZ), and abstractions), and flood risk receptors (to the Site and elsewhere associated with tidal, fluvial, surface water, and other sources).

10.1.2 This Chapter should be read in conjunction with the following chapters:

- **Chapter 2: Description of the Proposed Development**;
- **Chapter 8: Ecology**; and
- **Chapter 16: Ground Conditions**.

10.1.3 This preliminary assessment focusses on the potential impacts to the quality and flow of surface water and groundwater resources but will not assess impacts to terrestrial and aquatic ecology, including wetlands and other aquatic habitats. These aspects will be discussed in **Chapter 8: Ecology**.

10.1.4 This Chapter describes:

- The legislation, policy and technical guidance that has informed the assessment (**Section 10.2**);
- Limitations and assumptions (**Section 10.3**);
- Stakeholder engagement details (**Section 10.4**);
- Description of the methodology underpinning the assessment (**Section 10.5**);
- Description of the Study Area (**Section 10.5**);

- Identification of the potential sensitive receptors within the vicinity of the Site (**Section 10.5**);
- Description of the EIA Significance Criteria (**Section 10.5**);
- Description of the baseline conditions (**Section 10.6**);
- Embedded Design Mitigation (**Section 10.7**);
- Preliminary assessment of likely impacts and effects (**Section 10.8**);
- Consideration of mitigation and enhancement measures to reduce the potential impact of the Proposed Development (**Section 10.9**);
- A description of significant residual effects (**Section 10.10**);
- A description of significant cumulative effects (**Section 10.11**);
- A summary (**Section 10.12**); and
- References (**Section 10.13).**

10.1.5 This Chapter is supported by the following figures as set out in **Table 10-** 1:

Table 10- 1 - Figures associated with Water Environment assessment

Figure number	Drawing Description
10-1	Study Area
10-2	Site Walkover Locations
10-3	Topography Map
10-4	Flood Map for Planning Wales – Recorded Flood Extents
10-5	Flood Map for Planning Wales - Tidal Flood Risk
10-6	Caldicot and Wentlooge 2016 Hydraulic Modelling study 1 in 200-year Tidal Flood Risk - Present Day Scenario
10-7	Caldicot and Wentlooge 2016 Hydraulic Modelling study 1 in 200-year Tidal Flood Risk - 2100 Climate Change Scenario
10-8	Future Extreme Sea Levels Around the UK Coastline Chainage Locations
10-9	Flood Map for Planning Wales - Fluvial Flood Risk
10-10	Flood Map for Planning - Surface Water and Small Watercourse Flood Risk
10-11	Flood Map for Planning - Reservoir Flood Risk

10-12	Surface Water Receptors Map
10-13	Designated Sites Map
10-14	Water Activity Permits Map
10-15	Groundwater Vulnerability Map

10.2 Legislation and Planning Policy

10.2.1 The policy (**Table 10-** 2), legislation (**Table 10-103)** and guidance (

10.2.2

Table 10- 4) relevant to this chapter is set out below.

Table 10- 2 - Planning Policy relevant to Water Environment and Flood Risk

Policy	Policy Context
Overarching National Policy Statement (NPS) for Energy EN-1 (2023) (Ref 10-1)	The Overarching National Policy Statement for Energy (NPS EN-1) (2023) provides the Government's framework for assessing nationally significant energy infrastructure projects. It is relevant to this PEIR assessment as it requires a robust baseline of water quality and resources, consideration of climate change impacts, and compliance with River Basin Management Plans as well as the Water Framework Directive. It also mandates comprehensive flood risk assessments and the integration of mitigation measures within design and construction to prevent significant adverse effects on water bodies and associated receptors.
NPS for Renewable Energy Infrastructure EN-3 (2023) (Ref 10-2)	The National Policy Statement for Renewable Energy Infrastructure (NPS EN-3) (2023) provides technically specific guidance for renewable energy projects. It reinforces EN-1's requirements for establishing a robust water baseline, assessing flood risk, and complying with River Basin Management Plans and the Water Framework Directive. For solar developments, EN-3 highlights the need to manage surface water runoff from large impermeable areas, implement sustainable drainage systems (SuDS), and integrate mitigation measures into the design and construction stages to prevent adverse impacts on water quality and local hydrology.
NPS for Electricity Networks	The National Policy Statement for Electricity Networks Infrastructure (NPS EN-5) (2023) provides specific guidance for nationally significant electrical transmission

Infrastructure EN-5 (2023) (Ref 10-3)	and distribution projects. As well as supporting EN-1's overarching requirements, EN-5 focuses on mitigating impacts caused by construction activities. It instructs the impacts of watercourse crossings and [how]drainage alterations are assessed and ensures that measures to mitigate pollution and sediment mobilisation are put in place. Furthermore, the policy emphasises the importance of Sustainable Drainage Systems (SuDS) and robust drainage strategies, alongside careful route selection to avoid sensitive water bodies wherever possible. Mitigation and monitoring plans to protect the water environment throughout the project lifecycle must also be demonstrated.
Planning Policy Wales (2024) (Ref 10-4)	Planning Policy Wales (PPW) sets out the Welsh Government's land use planning policies and provides the national framework for sustainable development. Chapter 6: Distinctive and Natural Places is particularly relevant to this PEIR, as it outlines requirements for managing water resources and flood risk in development proposals. Section 6.6 (Water and Flood Risk Management) highlights the need to protect water quality, comply with the Water Framework Directive, and incorporate Sustainable Drainage Systems (SuDS) to manage surface water effectively. These considerations ensure that developments minimise cumulative impacts on water bodies, enhance climate resilience, and support long-term environmental well-being.
Monmouthshire County Council Local Development Plan (adopted 2014) (Ref 10-5	Sets out how flood risk will be managed within the local authority area in accordance with national legislation and guidance. It identifies local flood risk zones, critical drainage areas, and priority actions to reduce flood impacts, emphasising SuDS, surface water management and resilience measures to protect people, property and the environment. Relevant local planning policies include: • **Strategic Policy S12** – brings together specific sustainability issues in relation to efficient resource use and flood risk, and provides a framework for sustainable growth which seeks to enable development that both mitigates the causes of climate change and is able to adapt to its likely effects; and • **Policy SD1** – Renewable Energy, which presents the requirements for renewable energy schemes.

Newport City Council Local Development Plan 2011 – 2026 (adopted 2015) (Ref 10-6)	Sets out the long-term vision and framework for development in the area. It includes policies on housing, health, infrastructure, environmental protection and climate resilience as well as identifying land allocations and constraints such as flood risk zones, water quality objectives and biodiversity priorities. The local plan provides the policy context for evaluating potential impacts on water resources, flood risk and ecological receptors, ensuring alignment with local planning objectives, statutory requirements, national policy and the Water Framework Directive. Key relevant policies include: • GP1 – General Development Principles: Climate Change and; • GP5 – General Development Principles: Natural Environment. An updated Local Development Plan extending to 2036 is in progress but not yet formalised so current policies may change.

Table 10-103 - Legislation relevant to the Water Environment and Flood Risk

Legislation	Legislative Context
Flood and Water Management Act (2010) (Ref 10-7)	This Act established Lead Local Flood Authorities (LLFAs) to coordinate local flood risk management, including review and approval of surface water management systems. LLFAs also review and approve drainage strategies for new developments. Schedule 3 of the Act introduces National Standards for Sustainable Drainage Systems (SuDS) with which proposed drainage systems should comply. In Wales, Schedule 3 requires SuDS Approval Body (SAB) consent for most new developments to ensure drainage designs reduce flood risk, improve water quality, and remain resilient.
Flood Risk Regulations (2009) (Ref 10-8)	The Flood Risk Regulations 2009 implement the EU Floods Directive in UK law, requiring Preliminary Flood Risk Assessments, hazard and risk mapping and Flood Risk Management Plans (all reviewed on a six-year cycle) to reduce flood impacts on people, the environment and economic activity. For a PEIR, these regulations provide the legal framework for evaluating flood risk, inform baseline conditions through national and local flood maps, and guide mitigation measures such as SuDS, ensuring

	compliance and integration of flood resilience into project design.
Environmental Permitting (England and Wales) Regulations (2016) (Ref 10-9)	Combines several previous permitting regimes to establish a single, integrated system for regulating activities that could harm the environment or human health, such as waste management, water discharges, and industrial operations. Under these regulations, operators must obtain permits that set conditions on emissions and operational standards, ensuring compliance with UK law and the relevant EU directives.
Land Drainage Act (1991) (Ref 10-10)	Establishes the powers and duties held by the relevant drainage authorities associated with flood risk, as well as the responsibilities for maintenance to reduce flood risk. It requires that consent must be obtained for any works which may affect flow within an ordinary watercourse, such as culverting or installing structures, to regulate changes and minimise flood risk. This legislation underpins local authority and Internal Drainage Board responsibilities for effective watercourse management.
The Water Resources Act (1991) (Ref 10-11)	The Water Resources Act regulates water resources, water quality, pollution control and flood defence. It states that it is an offence to cause or knowingly permit pollution of controlled waters and provides the statutory framework for managing water abstraction and discharge consents. Part II of the Act provides the general structure for the management of water resources, underpinning regulatory controls now enforced by the Environment Agency.
The Environment Act (2021) (Ref 10-12)	Establishes a legal framework for environmental governance in the UK, introducing environmental principles and legally binding long-term targets for air quality, water quality, biodiversity and waste reduction.
The Water Environment (Water Framework Directive) (England and Wales) Regulations (2017) (Ref 10-13)	Implements the EU Water Framework Directive in UK law, creating a catchment-based system for managing rivers, lakes, coastal waters and groundwater. They aim to prevent deterioration and achieve 'good' ecological and chemical status through River Basin Management Plans, monitoring programmes, and measures to protect water resources and associated ecosystems.
The Water Industry Act (1991) (Ref 10-14)	Provides the legal framework for water supply and sewerage services across England and Wales, setting duties for maintaining efficient systems and enforcing standards for water quality, drainage, and environmental protection. The PEIR assessment should ensure that

	developments assess infrastructure capacity, safeguard public health and prevent pollution whilst demonstrating compliance with the statutory requirements for water resource management.
The Water Act (2003) (Ref 10-15)	Modernised water management in England and Wales by introducing stricter abstraction controls, requiring resource and drought planning and empowering the Natural Resources Wales to amend or revoke harmful licences. Therefore, it strengthened environmental protection in line with the EU Water Framework Directive standards. It also reformed regulation through the creation of Ofwat and the Consumer Council for Water and introduced competition by allowing new suppliers to serve non-household (not private homes) customers. It provides the legal framework for sustainable water use and ecological protecting, ensuring developments assess and mitigate impacts on water resources and habitats to meet statutory requirements.
The Water Act (2014) (Ref 10-16)	Built on The Water Act (2003) with a focus on market liberalisation and resilience. It expanded water supply licensing, introduced sewerage licences and allowed all non-household customers to choose their water and sewerage supplier. The Act also strengthened Ofwat's duty to ensure long-term resilience of water and sewerage systems by mandating that companies plan for future challenges such as climate change, population growth and environmental pressures, whilst also improving water resource planning and introducing measures for sustainable drainage and flood risk management.
The Groundwater (Water Framework Directive) (Wales) Direction (2016) (Ref 10-17)	Establishes guidelines for protecting groundwater in Wales, ensuring compliance with the EU Water Framework Directive and the Groundwater Directive (2006/118/EC). It aims to prevent pollution and deterioration of groundwater quality, supporting effective water resource management and maintaining environmental standards.
Well-Being of Future Generations (Wales) Act 2015 (Ref 10-47)	The Act emphasises resilience to climate impacts including flood risk, drainage and water resources, as well as sustainable water management.

Table 10- 4 - Guidance relevant to the Water Environment and Flood Risk

Guidance	Guidance Context

Technical Advice Note (TAN) 14: Coastal Planning (2021) (Ref 10-18)	TAN14 was first published in 1998 by the Welsh Government, with the most recent update occurring in 2021. It provides guidance for local planning authorities on the coastal zone (an area of land and adjacent sea). It ensures that decisions consider shoreline management, flood risk, recreation and environmental protection. It supports sustainable coastal development by requiring alignment with shoreline management plans and mitigation of impacts on water quality, habitats, and coastal processes. TAN14 is relevant to this PEIR as it sets policy principles for assessing and managing risks from erosion, flooding and climate change whilst also safeguarding marine and coastal ecosystems.
Technical Advice Note (TAN) 15: Development flooding and coastal erosion (2025) (Ref 10-19)	TAN15 was formally updated in 2025 by the Welsh Government. It provides the framework for assessing impacts from the risk of flooding from fluvial, tidal and surface water and small watercourses, in addition to coastal erosion. It defines flood zones using the Wales Flood Map and provides guidance on vulnerability classifications for new developments. The PEIR should demonstrate compliance with Welsh planning policy and provide a robust assessment of resilience, drainage and environmental protection.
Environmental Permitting (England and Wales) (Regulations (EPR), 2016 (Ref 10-20)	Replaces the previous 2010 regulations. It provides a consolidated framework for environmental permits and exemptions for waste operations and water discharge activities (previously consented under the Water Resources Act 1991, and the Control of Pollution Act 1974) and groundwater activities. It also sets out the powers, functions, and duties of the regulators.
Guidance for Pollution Prevention (GPP) (Ref 10-21)	Provides guidelines on preventing pollution and protecting the environment during activities such as construction, maintenance and material storage. It has replaced the older Pollution Prevention Guidelines (PPGs) and reflects current legislation and good practice across the UK. GPP documents help businesses and organisations minimise risks to water, land and air by covering topics like drainage management, safe storage of oils and chemicals, spill response and compliance with environmental law.
Clearing the Waters for All (2016) (Ref 10-22)	Published by the Environment Agency to streamline the assessment process for activities in transitional and coastal waters under the Water Framework Directive. It aims to protect, restore and enhance Europe's aquatic ecosystems by achieving good ecological and chemical status in inland,

	coastal (up to one nautical mile) and groundwater bodies. The guidance is structured into three phases: screening, scoping and impact assessment.
Statutory Standards for Sustainable Drainage Systems (2018) (Ref 10-23)	A document that sets out mandatory standards and guidance for the design, construction, operation, and maintenance of Sustainable Drainage Systems (SuDS) in Wales. The document is a statutory framework to standardize SuDS implementation, aiming to reduce flood risk, improve water quality, and deliver environmental and community benefits through sustainable drainage practices.
Design Manual for Road and Bridges (DMRB) LA113 Road Drainage and the Water Environment (2020) (Ref 10-24)	DMRB LA113 (2020) outlines the requirements for managing road drainage and its interaction with the water environment during highway design and construction. It covers flood risk, surface water management, pollution control, and compliance with environmental legislation to protect water quality and habitats. LA113 is relevant as it provides the technical framework for assessing and mitigating impacts from road drainage on watercourses, groundwater, and flood risk, ensuring sustainable design and regulatory compliance.
CIRIA 753 The SuDS Manual (2015) (Ref 10-25)	Provides comprehensive guidance on the design, construction, and maintenance of SuDS for effective use in both new and existing developments. It focuses on managing surface water runoff, improving water quality and enhancing biodiversity, while promoting best practice for integrating SuDS to reduce flood risk and deliver environmental benefits. Its relevance lies in setting out principles and standards for sustainable drainage design, ensuring compliance with planning policy and supporting robust mitigation of hydrological and ecological impacts.
CIRIA 532 Control of Water Pollution from Construction Sites (2001) (Ref 10-26)	Provides industry-standard guidance for controlling water pollution during construction. The Outline Construction Environmental Management Plan (oCEMP) will apply these measures to minimise sediment and contaminant runoff, protect watercourses, and implement pollution prevention techniques such as settlement ponds, silt fencing and spill response protocols. This ensures compliance with UK environmental legislation and minimises potential impacts on surface water, groundwater and ecological receptors.
South East Wales Strategic Flood Consequence	Provides a robust evidence base for Local Planning Authorities (including Newport City Council and

Assessment (2022) (Ref 10-27) (SFCA)	Monmouthshire County Council) to plan development in accordance with Planning Policy Wales and TAN15. It assesses flood risk from rivers, the sea, surface water and small watercourses, groundwater and artificial sources such as reservoirs and sewers using NRW's Flood Map for Planning. The SFCA supports the application of the sequential test, incorporates climate change allowances, and identifies opportunities for sustainable drainage and natural flood management to reduce risk and enable sustainable growth.
The National Strategy for Flood and Coastal Erosion Risk Management (FCERM) in Wales, Welsh Government (Ref 10-48)	The National Strategy for FCERM in Wales, as required under the Flood and Water Management Act 2010, sets out the management approach for risks associated with flooding and coastal erosion across Wales over a 10-year period. NRW is responsible for managing the flood risks from the main rivers and sea across Wales; whilst Local Authorities as Lead Local Flood Authorities (LLFAs) are responsible for managing risks associated with surface water, groundwater and Ordinary Watercourses.
Monmouthshire Local Flood Risk Management Strategy (Environmental Report Draft) (June 2025) (Ref 10-28)	Produced alongside Monmouthshire's draft Local Flood Risk Management Strategy (LFRMS), this report follows the Strategic Environmental Assessment (SEA) process. Its purpose is to assess the potential environmental effects of the LFRMS objectives and actions, ensuring compliance with relevant legislation and sustainability principles. The report presents the SEA methodology, scoping findings, and key environmental criteria, including biodiversity, water environment, climate change, landscape, soils, historic environment, and human health. It evaluates reasonable alternatives, appraises the significance of impacts, and identifies mitigation measures to minimise adverse effects while enhancing positive outcomes. The strategy focuses on managing local flood risks from surface water, groundwater, and ordinary watercourses, while acknowledging other sources such as main rivers and coastal flooding. It also supports sustainable drainage systems (SuDS), climate resilience, and integrated catchment-based approaches, aligning with national policy and statutory requirements.
Severn Preliminary Flood Risk	Developed by the EA and NRW to meet the requirements of the Flood Risk Regulations 2009.

Assessment (Ref 10-29)	Identifies areas within the Severn River Basin District that face significant flood risk, using data from historic flood events as well as modelling future scenarios. The assessment considers fluvial, tidal, surface water, groundwater and artificial flooding, referring to the latest mapping and climate change projections. Its purpose is to provide an evidence base for local authorities (including Newport City Council and Monmouthshire County Council) to guide flood risk planning and prioritise action plans to mitigate the effects on communities, infrastructure and the environment.
Newport Local Flood Risk Management Strategy (Ref 10-30)	Outlines how Newport City Council will manage local flood risk in compliance with the Flood and Water Management Act 2010 and the National Flood and Coastal Erosion Risk Management Strategy for Wales. The focus is on flooding from surface water, groundwater and ordinary watercourses, although it does consider other sources such as rivers, the sea and sewers. Outlines objectives, measures and actions to reduce flood impacts, improve resilience and address climate change risks. Encourages the use of SuDS, natural flood management and integrated planning approaches. Defines roles and responsibilities for the Newport City Council, NRW and other partners.

10.3 Assessment Assumptions and Limitations

10.3.1 The following limitations and assumptions have been identified and considered in this Chapter:

- This assessment has relied upon the accuracy and level of detail of the documented data sources reviewed as part of the desktop assessment.
- All baseline data has been collated from freely available sources for a desk-based study.
- The Proposed Development is in an area that is mostly influenced by tidal flood risk with a small fluvial flood risk contribution. It is assumed that no flood compensation will be required for loss of existing tidal floodplain storage caused by the Proposed Development and the requirements for compensatory fluvial floodplain storage will be assessed at full Flood Consequence Assessment (FCA) stage, where applicable.

- The design of the Proposed Development is not considered to be final at the time of writing this PEIR. The final layout will consider the ongoing consultation with statutory consultees, and the assessment will be revised, where necessary, at ES stage.
- The assessment of significance of effects (surface and groundwater receptors) is based on design information available at the time of writing. As design development is ongoing this could be subject to change. Any updates will be assessed in the EIA and reported in the ES.
- In preparing this Chapter, a key assumption has been that ground investigation works will be a requirement for, and undertaken to inform detailed design of, the Proposed Development. Where critical design features exist geotechnically and hydrogeologically, precautionary assumptions and assessment have been made with respect to groundwater receptors that may be directly and/or indirectly affected by the Proposed Development. As this data becomes available (post submission of EIA) the Applicant will re-engage with key stakeholders to discuss risks to receptors (surface water and groundwater) and the potential requirement for mitigation.
- At the time of writing, screw piling is proposed at a depth of 2 – 3m for the construction of the solar panels and invertors. This is an indicative depth and is subject to change as the proposed design develops and more information becomes available following ground investigations. At the time of writing no information regarding the transformer foundations has been provided. Therefore, a preliminary assessment of potential impacts from localised excavations for the Proposed Development on groundwater resources and aquifers has been completed in this PEIR.
- A surface water drainage strategy (SWDS) is being produced and will be submitted alongside the ES. At the time of writing, the SWDS is not available and therefore potential impacts and likely mitigation are assumed based on best standard design practices. The principles of the proposed SWDS can be found in the flood risk section of this PEIR chapter but it is assumed that detailed design information for the drainage of the Proposed Development will be made available for the completion of the ES.
- Existing hydraulic modelling data has been considered and analysed to inform the assessment of tidal and fluvial flood risk, but additional hydraulic modelling may be necessary to inform and support the ES.
- Monitoring of water quality (surface water and groundwater) and hydrometric survey has not been undertaken and is not deemed necessary to inform the assessment of potential impacts arising from the Proposed Development.

10.4 Stakeholder Engagement

10.4.1 **Table 10-5** summarises the elements to be scoped in for further assessment from the Scoping Report that was submitted in December 2024, in addition to justification as to why they were scoped in for further assessment.

Table 10-5 - Elements scoped in for further assessment

Element	Phase	Scoped In	Scoped Out	Justification
Quality of surface water and groundwater resources	Construction, Operation and Decommissioning	✓		Construction and decommissioning works have the potential to impact the quality of water resources from increased pollution risk and any potential works to surface water features. The methodology of construction and details of the proposed works are uncertain at this stage. Operation of the Proposed Development has the potential to pose risk to the quality of the water resources from routine runoff and spillage. Details of operational activities are uncertain at this stage.
Private water abstractions	Construction, Operation and Decommissioning	✓		There is the potential for physical impacts to private abstractions located within the Proposed Development area and Study Area that may be impacted during construction (surface water and groundwater quality and flow).

Element	Phase	Scoped In	Scoped Out	Justification
				It is considered unlikely that the Proposed Development would pose a permanent risk to private abstractions during operation, but as details of the proposed works are uncertain at this stage this is currently scoped in.
Ground Water Dependent Terrestrial Ecosystems (GWDTE)	Construction, Operation and Decommissioning	✓		Initially scoped out as it was considered unlikely that the Proposed Development would pose risk to the identified GWDTE that is located upstream of the Site. Scoped in at PEIR stage in response to Planning Inspectorate comment 3.6.2 dated 29th January 2025.
Water Framework Directive (WFD) Water Bodies	Construction, Operation and Decommissioning	✓		There is the potential for direct and indirect impacts on WFD waterbodies based on available information for the Proposed Development and the proximity of identified WFD waterbodies.
Flood risk receptors	Construction, Operation and Decommissioning	✓		Construction, operation and decommissioning of the Proposed Development may temporarily or permanently increase surface water runoff, reduce watercourse flow conveyance, reduce the capacity of the existing fluvial floodplain storage

Element	Phase	Scoped In	Scoped Out	Justification
				and/or impact the existing flood flows.
Proposed Development	Construction, Operation and Decommissioning	✓		Part of the Proposed Development site is located within an area identified to be at flood risk.

10.4.2 Following submission of the Scoping Report, the Applicant received an EIA Scoping Opinion (**Appendix 1D**) from the Planning Inspectorate (on behalf of the Secretary of State) on 29th January 2025, including formal responses from statutory consultees. The comments from the Planning Inspectorate and other statutory consultees with relevance to the Water Environment are summarised in **Table 10-6** below. Consultation emails have also been summarised in **Table 10-7.**

Table 10-6: Main matters raised during consultation

Consultee	Main matter raised	How has the concern been addressed	Location of response in chapter
Planning Inspectorate (Study Area)	The Scoping Report proposes to scope this matter out on the basis that a 1.5 kilometre (km) radius from the Red Line Boundary is considered sufficient, based on professional judgement, to encompass all relevant aspects. The Scoping Report does not clearly justify the water resources study area. The Inspectorate considers that the ES should clearly define the study area based on the ZoI, the hydrology of the site and potential for significant effects. Consideration of	The justification of the water resources Study Area will be addressed as part of this PEIR / the ES, subject to design information.	**Section 10.6**

	upstream receptors should also be included where appropriate.		
Planning Inspectorate (Magor Marsh)	This matter is proposed to be scoped out on the basis that the identified Groundwater Dependent Terrestrial Ecosystem (GWDTE) is located upstream from the site and so is unlikely to be impacted. It is noted in Table 10-11 and Para 10.7.4 that potential indirect impacts to Magor Marsh Nature reserve GWDTE have been identified. This is in contradiction to the justification provided for scoping this matter out. As such, the Inspectorate is not content to scope this matter out. The ES should assess all potentially significant impacts to Magor Marsh Nature reserve GWDTE.	The potential impacts to Magor Marsh Nature Reserve will be scoped in and addressed as part of this PEIR / the ES, subject to design information.	**Sections 10.7, 10.8, 10.9, 10.11 & 10.12**
Planning Inspectorate (Reen Maintenance)	A number of reens are located within the site boundary. The placement of structures associated with the proposed development should not hinder the maintenance of reens and consideration of potential impacts of the Proposed Development on the maintenance of reens should be provided within the ES. The applicant's attention is drawn to NRW's response to consultation (Appendix 2 of this Opinion) in this regard.	Maintenance of the reens will be addressed as part of this PEIR / the ES, subject to design information.	**Sections 10.7, 10.8, 10.9, 10.11 & 10.12**
Planning Inspectorate (Water Quality Monitoring)	The applicant's attention is drawn to NRW's response to consultation (Appendix 2 of this Opinion) regarding the need for any reen and	Water quality monitoring is not required to inform the assessment of effects within this	**Not addressed within this Chapter.**

	ditch surveys to inform water quality monitoring.	Chapter. However, water quality monitoring will be recommended as construction mitigation.	
Planning Inspectorate (WFD Water Bodies)	The Scoping Report identifies the potential for contamination of surface water and groundwater bodies. Given the geographic location of the proposed development, the ES should consider the potential impacts on WFD water bodies. The applicant's attention is drawn to the Inspectorate's advice page: Advice on the Water Framework Directive in this regard. The ES should explain the relationship between the proposed development and any relevant water bodies in relation to the current relevant River Basin Management Plan. The ES should provide a WFD assessment (or a screening assessment detailing why a full assessment is not required) to inform the ES assessment. The approach and findings should be agreed with NRW.	A WFD Screening and Scoping Assessment will be undertaken and submitted alongside the final ES Chapter. An indicative assessment of potentially significant impacts to WFD waterbodies within the Study Area has been undertaken in this PEIR with the outcomes presented in Assessment of Significant Effects (section 10.8).	**Sections 10.7, 10.8, 10.9, 10.11 & 10.12**

Table 10-7: Matters raised through consultation emails

Consultee	Consultation Date	Consultation Details	Details of Response
NRW	24th June 2025	Following a review of the Caldicot and Wentlooge (solar farm) modelling outputs and reports, an inquiry was submitted to NRW. According to the model (initially provided by	A response was received on 8 July 2025. NRW advised that determining whether a 40-year Lifetime of Development (LoD) is appropriate for this development, and whether it adequately reflects climate

		NRW), the Site does not flood under the present-day 0.5% AEP (1 in 200) Annual Exceedance Probability (AEP) event, but with climate change (CC) allowances, flood depths could reach up to 3m. Given the 40-year design life, NRW was asked whether a layout based on the 0.5% (1 in 200) AEP event, including a suitable climate change allowance for a 40-year projection, would be acceptable, considering the limited climate change impact expected within that timeframe. It was confirmed that all infrastructure would be decommissioned at the end of its design life. Additionally, guidance was requested on permissions required for proposed temporary and permanent watercourse crossings, due to their ecological and drainage significance.	change impacts, is the responsibility of the determining body. As this is a Nationally Significant Infrastructure Project (NSIP), NRW recommended confirming and agreeing on parameters with PINS. Their advice was to present all relevant scenarios, supported by a clear explanation and justification for the proposed design life. Regarding watercourses, NRW confirmed that a Flood Risk Activity Permit (FRAP) may be required for any works affecting statutory main rivers within or near to the Site, including access arrangements. For other watercourses or reens within the Gwent Levels Internal Drainage District (IDD) that are not designated as main rivers, a Land Drainage Consent may be necessary. NRW also provided links with further guidance.
NRW	12th September 2025	A data request was submitted to confirm if the Caldicot and Wentlooge hydraulic modelling (originally sent over in early 2024) was the most up to date and therefore, appropriate for the assessment.	A response was received on the 18th September 2025. NRW confirmed that the modelling already provided is the most up to date model and that there have been no updates in the area.
NRW	30th September 2025	A data request was submitted seeking information on the tidal flood defences. In particular, the standard of protection, crest height, records of any defects, maintenance schedules and any records of defence overtopping events.	An initial response was received on the 30th September 2025 which provided some initial data links and then a full response was received on the 12th November 2025. This response was received too late for consideration within this PEIR Chapter, but it will

			be used to inform the ES Chapter and FCA.
NRW	17th October	A data request was made to NRW regarding predicted flood levels or predicted sea level rise data which could inform flood depth calculations over the lifetime of the development (40-year). A further approach was made with a suggestion of a Teams discussion in order to discuss the approach to the FCA and any site-specific information that NRW would want to see included within the FCA.	A response was received on the 23rd October 2025, providing links to publicly available data and the data request form. NRW expects the LoD to be agreed with the determining body and recommends including all relevant LoDs (e.g. 40-year and 75-year) should be considered for a comprehensive FCA. NRW has no site-specific information to contribute but advises that the FCA aligns with Figure 2 – Technical Requirements of an FCA (TAN15: Development, Flooding and Coastal Erosion). Additionally, NRW advises that solar panels and other sensitive infrastructure, particularly electrical components must comply with Figure 5 of TAN15. Panels should be securely fixed to the ground to withstand potential sea defence breaches over the site's lifetime.
Newport County Council	6th October	A data request was submitted seeking details on any specific flooding incidents from all relevant sources (tidal, fluvial, surface water and small watercourses, groundwater and artificial). It also requested information on any current or planned flood remediation developments at the Site or nearby, as well as any	A response was not received in time for consideration in this PEIR chapter. Further consultation will take place to inform the ES Chapter.

		additional flood risk insights that are not publicly available online.	
Welsh Water	6th October	A data request was submitted to Welsh Water seeking information regarding any available plans showing surface water and foul water sewerage assets, records of flooding incidents caused by sewerage infrastructure issues, and any additional insight into how the site is drained in relation to their remit.	A response was not received in time for consideration in this PEIR chapter. Further consultation will take place to inform the ES Chapter.

10.5 Assessment Methodology

10.5.1 The text in this Chapter presents the information gathered and the assessment approach used to date for this PEIR, preliminary FCA and WFD screening and scoping exercise. The approach to the assessment for the construction, operation and decommissioning phases of the Proposed Development will continue to be discussed, with a view to reaching agreement with the LLFA, Sustainable Drainage Approval Body (SAB) and NRW, as appropriate.

10.5.2 The assessment of the potential impacts of the Proposed Development on the water environment and flood risk has been undertaken in line with the legislation, policy and guidance described in **Section 10.2**.

10.5.3 Further detailed assessments will be provided within the ES for surface water features, groundwater, WFD designated water bodies and flood risk (with a preliminary assessment of the risk of flooding being included in this PEIR Chapter).

Study Area

Surface Water and Flood Risk

10.5.4 The surface water Study Area is defined as the PEIR Assessment Boundary for the Proposed Development with a 1.5km buffer for surface water features and flood risk receptors. A 1.5km Study Area buffer has been deemed appropriate as consideration of receptors beyond this extent is generally considered

disproportionate. Receptors beyond this extent would also not be expected to contribute to impacts to the Proposed Development due to hydrological connectivity and the presence of urban areas and major highways. Specific sensitive receptors that are greater than 1.5km from the Site have been considered where hydraulic connectivity suggests impacts could occur.

10.5.5 The Study Area is demonstrated on the Water Environment Receptors map in **Figure 10-11** and **Figure 10-12**. The Study Area considers surface water features, flood risk receptors, and water dependent conservation sites (surface water) that may be directly connected hydrologically to the Study Area through the extensive reen network. This is in line with DMRB Guidance LA113 Road Drainage and Water Environment (Ref 10-24). Although this guidance is applicable to road schemes, it is considered a robust framework for the assessment of risks to the water environment within the Study Area.

10.5.6 The Study Area is unlikely to change significantly as the Proposed Development progresses. If the footprint of the Proposed Development changes, any newly identified and affected receptors will be included in the buffer specified for surface water and flood risk.

WFD Designated Water Bodies

10.5.7 The 1.5km Study Area also captures potential impacts on the following WFD Designated Water Bodies:

- Severn Estuary;
- Monks Ditch;
- Windmill Reen (Yoke Reen); and
- Mill Reen.

Groundwater

10.5.8 The groundwater Study Area encompasses groundwater receptors including groundwater waterbodies or water dependent conservation sites (GWDTEs) located within 5km of the PEIR Assessment Boundary. Receptors outside of the 5km Study Area will be considered if they are deemed to be hydrologically / hydrogeologically linked. This is in line with DMRB LA113 (Ref 10-24). The distance is considered

appropriate for the assessment of direct and indirect effects on groundwater receptors potentially at risk from changes to groundwater quantity and quality from the Proposed Development.

Potentially Significant Effects

10.5.9 As set out in the EIA Scoping Report (**Appendix 1C**), the following effects are considered to be potentially significant and have been considered further in this assessment.

Construction and Decommissioning Phases

10.5.10 During construction, it is considered likely that significant effects to surface water features, groundwater features, and flood risk receptors could arise from:

- Pollution risks to adjacent watercourses and to ground from spillage of fuels or other harmful substances that may spill directly into or migrate to downstream surface water and groundwater receptors;
- Pollution risk to adjacent watercourses from sedimentation caused by surface water runoff from areas of bare earth, construction materials such as aggregate, stockpiles of topsoil or discharge of groundwater dewatering, with potential transport to downstream receptors;
- Impact to watercourses associated with the construction of watercourse crossings, diversions or other physical modifications;
- Impact to quality attributes and WFD classification of the WFD monitored waterbodies within the Study Area;
- Direct impact or changes to groundwater receptors and aquifers, either within the footprint of the Proposed Development or as a result of changes to groundwater flows and levels associated with potential dewatering activities;
- Loss or changes to GWDTEs as a result of severance of habitat or as a result of changes to groundwater flows and levels associated with dewatering activities; and
- Potential for increased flood risk associated with temporary works in areas identified to be at risk of flooding or creation of groundwater flow barriers from intrusive earthworks that extend below the groundwater table.

10.5.11 For the purposes of this PEIR, the potential for significant impacts through the decommissioning phase is assumed to be the same as through the construction phase.

Operational Phase

10.5.12 During operation, it is considered likely that significant effects to surface water features, groundwater features and flood risk could arise from:

- Polluted surface water runoff and spillage risks that may migrate or be discharged to surface water features or groundwater resources either directly or via the proposed drainage system;
- Impact to watercourses associated with the permanent presence of watercourse crossings, diversions or other physical modifications;
- Impact to quality attributes and WFD classification of the WFD monitored waterbodies within the Study Area ;
- Increased rates and volumes of surface water runoff or changes to catchment hydrology from a change to current land use;
- Increased flood risk to people, property and infrastructure located in the Study Area from changes to flood flow conveyance and storage; and
- Flood risk to the Proposed Development from construction of the Proposed Development in areas identified to be at risk of flooding.

Sensitive Receptors

10.5.13 The sensitive receptors identified for this assessment include:

- Surface water features (including main rivers, ordinary watercourses, waterbodies, designated sites, the Severn estuary and surface water abstractions);
- Groundwater receptors (including superficial and bedrock aquifers, GWDTEs, and groundwater abstractions); and
- Flood risk receptors (including risks to the Proposed Development and to people, property and infrastructure elsewhere).

Baseline Data Collection

10.5.14 A desk-based data collection exercise has been undertaken, including a review of available information to determine the baseline conditions in the relevant geographical areas of effect.

10.5.15 The key sources of information used to determine the baseline water environment and flood risk conditions are:

- British Geology Survey (BGS) GeoIndex Onshore; (Ref 10-31)

- British Geology Survey (BGS) Geology Viewer; (Ref 10-32)
- Cranfield University LandIS Soilscapes Viewer; (Ref 10-33)
- Local Ordnance Survey (OS) Mapping; (Ref 10-34)
- Welsh Government Data Map Wales; (Ref 10-35)
- Natural Resource Wales (NRW) Water Watch Wales Map Gallery (Ref 10-36) ;
- Natural Resource Wales (NRW) Caldicot and Wentlooge 2016 Flood Model Data;
- Natural Resource Wales (NRW) Shoreline Management Plan (Uskmouth Power Station point to Sudbrook point (north of M4 Severn crossing) CALD1) (Ref 10-39);
- Natural Resource Wales (NRW) Caldicot and Wentlooge Coastal Summary Report (Ref 10-40); and
- Natural Resource Wales (NRW) Severn Estuary Flood Risk Management Strategy (Ref 10-41).

Site Visit

10.5.16 A two-day site visit was undertaken on 11th – 12th September 2025. The purpose of the Site visit was to confirm previously conducted desktop survey findings and inform further assessments of the water environment. Across the two days, visits were made to watercourses within the PEIR Assessment Boundary, River Severn flood defences and the proposed locations of potentially sensitive infrastructure. The locations visited on the Site visit can be found in **Figure 10-2**.

Surface Water and Groundwater Resources

10.5.17 The assessment of the effects during the construction and operation phases has been undertaken following the principles set out within the Design Manual for Roads and Bridges (DMRB) LA 113 – Road Drainage and the Water Environment (Ref 10-24). Although not directly applicable to the nature of the Proposed Development, the DMRB guidance provides a good basis for assessing effects of developments on the water environment.

10.5.18 The assessment of potentially significant impacts to surface water and groundwater resources through the construction, operation and decommissioning phases is qualitative.

10.5.19 The assessment will be developed, where necessary, during the preparation of the ES to account for any changes in the design of the Proposed Development. No quantitative analysis, additional site survey or monitoring has bene undertaken or is currently proposed to inform the ES, although the ES will be updated to reflect ongoing consultation with NRW, the findings of the River Condition Assessment surveys undertaken to inform the Net Benefit for Biodiversity (NBB) calculations, and other topographic survey data that may be collected to inform the engineering design to develop understanding of the baseline environment and impact assessment.

10.5.20 At the time of writing, screw piling is proposed at a depth of 2 – 3m for the construction of Solar Panels and Inverters. This is an indicative depth and is subject to change as the proposed design develops. At the time of writing, a preliminary assessment of potential impacts from localised excavations for the Proposed Development on groundwater resources and aquifers has been completed in this PEIR. This assessment will be considered in more detail at ES stage once more information regarding intrusive earthworks has been provided. Further reference will be made in the ES to the risks associated with such activities and measures that will be adopted to reduce/minimise the risk.

10.5.21 The SWDS for the Proposed Development is in the process of being developed but at the time of writing has not been completed and, as such, will not be considered in this PEIR. Consideration has however been given to the governing principles that will form the basis of the drainage strategy. The management of surface, foul and effluent drainage will be considered accordingly at ES stage, as required.

Flood Consequences Assessment

FCA Approach

10.5.22 A standalone FCA will be produced and appended to the ES chapter. The findings of the FCA will be cross-referenced in the ES where necessary. The assessment will be informed by, but not limited to:

- Freely available online mapping and hydraulic modelling studies made available by NRW;
- Statutory feedback from consultees in the Scoping Opinion (received January 2025);

- Additional consultation with stakeholders;
- Findings from 2025 site visit; and
- Freely available online data sources as outlined in the Baseline Data Collection section.

10.5.23 The FCA will be undertaken in accordance with the guidance outlined in the TAN15 (Ref 10-19) and supporting Planning Policy Wales to assess the potential risk of flooding to the Proposed Development, as well as to assess the potential impacts of the Proposed Development on flood risk to people and property elsewhere.

10.5.24 A preliminary assessment of flood risk has been undertaken to inform this PEIR. This assessment has mostly remained qualitative with the exception of climate change calculations undertaken to estimate future impacts of climate change on tidal flood levels. A calculation method is proposed in this PEIR in addition to the calculated values and potential implications on mitigation requirements for infrastructure elements. As the FCA and ES progress, consultation will be undertaken with NRW to agree the methodology and requirements of the assessment.

10.5.25 The assessment of other sources of flooding, including fluvial, surface water, groundwater and artificial sources such as reservoirs & canals, drainage systems and site-generated surface water runoff, will continue to be assessed qualitatively at ES stage unless there is deemed to be a need for quantitative assessment following statutory consultation.

10.5.26 A SWDS is being developed and will be presented in full at ES stage. The guiding principles of the SWDS are presented at PEIR stage, however, and these principles will inform the preliminary assessment of flood risk below, where necessary.

Technical Advice Note 15 (TAN15)

10.5.27 In accordance with the proposed methodology in the Scoping Report, this preliminary assessment of flood risk impacts has been undertaken in accordance with the TAN15 guidance. TAN15 offers guidance regarding where new development should be located with respect to flood risk and coastal erosion. It factors in the risk posed to development from multiple sources of flooding, including

rivers and sea and surface water, and also the vulnerability classification for new development.

10.5.28 Section 6 of TAN15 outlines the requirements for an FCA that would be submitted for planning purposes. It defines the objectives of an FCA to develop a full appreciation of the risk and consequences of flooding on the development and the risk and consequences of the development on flood risk elsewhere. A range of events must be considered, up to the 0.1% (1 in 1000) AEP flood event, as well as climate change in line with Welsh Government guidance. Figure 2 in TAN15 outlines several technical requirements of an FCA; this preliminary FCA has been produced in accordance with these technical requirements, which are referenced where applicable.

Flood Zone and Vulnerability Classification Definitions

10.5.29 **Table 10-8** offers definitions of flood zones according to TAN15 (Ref 10-19) (derived from **Figure 10-1**) and **Table 10-9** summarises the vulnerability classifications.

Table 10-8: TAN15 flood zone definitions

Flood Zone	Fluvial Flood Risk	Tidal Flood Risk	Surface Water and Small Watercourses Flood Risk
Flood Zone 2	Less than 1% (1 in 100) but greater than 0.1% (1 in 1000) chance of flooding in a given year, including climate change.	Less than 0.5% (1 in 200) but greater than 0.1% (1 in 1000) chance of flooding in a given year, including climate change.	Less than 1% (1 in 100) but greater than 0.1% (1 in 1000) chance of flooding in a given year, including climate change.
Flood Zone 3	A greater than 1% (1 in 100) chance of flooding in a given year, including climate change.	A greater than 0.5% (1 in 200) chance of flooding in a given year, including climate change.	A greater than 1% (1 in 100) chance of flooding in a given year, including climate change.
TAN15 Defended Zones	Areas where flood risk management infrastructure provides a minimum standard of protection against	Areas where flood risk management infrastructure provides a minimum standard of protection against flooding from the sea	Not applicable.

	flooding from rivers of 1 in 100 (plus climate change and freeboard).	of 1 in 200 (plus climate change and freeboard).

Table 10-9: TAN15 development vulnerability classification

Vulnerability Classifications	Examples
Highly Vulnerable	All residential premises (including hotels, Traveller sites, caravan parks and camping sites). Schools and childcare establishments, colleges and universities. Hospitals and GP surgeries. Especially vulnerable industrial development (e.g. power generating and distribution elements of power stations, transformers, chemical plants, incinerators), and waste disposal sites. Emergency services, including ambulance stations, fire stations, police stations, command centres, emergency depots. Buildings used to provide emergency shelter in time of flood.
Less Vulnerable	General industrial, employment, commercial and retail development. Transport and utilities infrastructure. Car parks. Mineral extraction sites and associated processing facilities (excluding waste disposal sites). Public buildings including libraries, community centres and leisure centres (excluding those identified as in Highly Vulnerable category and emergency shelters). Places of worship. Cemeteries. Equipped play areas. **Renewable energy generation facilities** (excluding hydro generation)
Water Compatible	Boatyards, marinas and essential works required at mooring basins. Development associated with canals. Flood defences and management infrastructure.

	Open spaces (excluding equipped play areas). Hydro renewable energy generation.

10.5.30 In accordance with the definitions in **Table 10-9** above, the Proposed Development is classified as Less Vulnerable for the purposes of this FCA as the Proposed Development will be a renewable energy generation facility. While this classification is different to the classification proposed in the EIA Scoping Report, it should be noted that the latest revision of TAN15 was formally adopted in March 2025 which was after the Scoping Report was submitted. “Renewable energy generation facilities” was newly added to the 2025 revision of TAN15 (Ref 10-19) as a Less Vulnerable classification; therefore, it is deemed appropriate to re-classify the Proposed Development as Less Vulnerable for this FCA on the understanding that there are more sensitive elements within the Proposed Development that will require flood risk mitigation measures to provide protection.

Acceptability of Flood Consequences

10.5.31 Section 11 of TAN15 (Ref 10-19) contains details regarding the acceptability criteria for flooding consequences. The following conditions should be met as part of a submitted FCA:

- No increase in flooding elsewhere;
- Occupiers aware of flood risk;
- Escape/evacuation routes present;
- Flood emergency plans and procedures agreed and in place;
- Flood resistant and resilient design; and
- Acceptable consequences for type of use.

10.5.32 There should be minimal risk to life, minimal disruption to people living and working in the area, minimal potential damage to property, minimal impact on flood risk from the Proposed Development and minimal disruption to the sustainable management of natural resources.

10.5.33 Figure 5 within TAN15 offers details regarding the required design standard for which new development must be free from flooding in accordance with its

vulnerability classification. This is reproduced in **Table 10-10** below:

Table 10-10: TAN15 Design Standards

Tan15 Vulnerability Classification		Flooding from Rivers	Flooding from the Sea
Highly vulnerable development	Emergency Services (command centres and hubs)	0.1% (1 in 1000) + Climate Change	0.1% (1 in 1000) + Climate Change
	All other types	1% (1 in 100) + Climate Change	0.5% (1 in 200) + Climate Change
Less vulnerable development **Water compatible development that may be occupied by people**		1% (1 in 100) + Climate Change	0.5% (1 in 200) + Climate Change

10.5.34 TAN15 includes a section on tolerable conditions and managing consequences during an extreme flood event. The tolerable flood depth and velocities for a flood event with a probability of 0.1%, including climate change, of happening, are as follows:

- A maximum flood depth of 600 millimetres (mm) and velocity of 0.15 metres/second (m/s) for highly vulnerable development; and
- A maximum flood depth of 600mm and velocity of 0.3 m/s for less vulnerable development, infrastructure associated with highly vulnerable development (such as car parks and access tracks) and water compatible development.

10.5.35 It also states that despite these tolerances being offered, each site would be considered on an individual basis.

Resilient Design

10.5.36 TAN15 places emphasis on ensuring that new development is resilient and resistant to the impacts of flooding in both the present-day and future climate change scenarios. TAN15 obligates applicants to include flood resilience measures at both site and property level where development is to be located in Flood Zone 2 and 3 and the TAN15 Defended Zone.

10.5.37 The aims of Site-level resilience measures should include preventing the amount of excess flood water that reaches the site and also effectively managing any flood

waters that do reach the site. Suggestions of resilience measures are included within TAN15. These include, but are not limited to, re-directing flood flows and management of flood waters through effective implementation of green infrastructure.

10.5.38 Another integral aim of TAN15 is ensuring that safe access and egress to any new development is not impeded by flood waters in both the present-day and future climate change scenarios. This is true for all developments within Flood Zone 2 and 3 and the TAN15 Defended Zones.

Water Framework Directive

10.5.39 A standalone WFD assessment is being produced in parallel to the ES. A staged approach has been adopted that follows Planning Inspectorate Guidance: Water Framework Directive (2025) (Ref 10-37) and Clearing the Waters for All (2023) (Ref 10-19). Stage 1 (WFD Screening) and Stage 2 (WFD Scooping) will be completed to determine whether a full WFD assessment is required for the Proposed Development. If a full WFD assessment is required, the outputs will be included in the EIA and cross-referenced in the ES where necessary.

10.5.40 The WFD Screening and Scoping assessment comprises a qualitative assessment informed by desk-based sources of information and site walkover. The findings of the assessment will be presented to the NRW to inform agreement on the requirement for full WFD assessment.

Significance Criteria

10.5.41 As discussed above, the assessment of the effects during construction and operation phases will be undertaken following the principles set out within the Design Manual for Roads and Bridges (DMRB) LA 113 – Road Drainage and the Water Environment. The DMRB LA 113 promotes the following approach:

- Estimation of the sensitivity of the receptor. Examples of the value and sensitivity of the feature or resource is shown in **Table 10-11**;
- Estimation of the magnitude of the impact. The magnitude of an impact is estimated based on the potential size or scale of change compared to the

baseline and is independent to the sensitivity of the receptor as shown in **Table 10-12**; and

- Assessment of the significance of the effect. The overall significance of the effect is determined by combining the sensitivity of the receptor (**Table 10-11**) and the magnitude of the impact (**Table 10-12**). The significance of effect matrix is shown in **Table 10-13**.

Table 10-11: Criteria to Determine Receptor Sensitivity, adapted from DMRB LA113

Sensitivity	General criteria	Surface Water	Groundwater	Flood Risk
Very High	Nationally significant receptor of high sensitivity	WFD classification shown in a River Basin Management Plan (RBMP) and Q95 ≥ 1.0 m3/s. Site protected/designated under EC or UK legislation (Special Area of Conservation (SAC), SPA, Site of Special Scientific Interest (SSSI), Ramsar site, salmonid water)/Species protected by EC legislation.	Principal aquifer providing a regionally important resource and/or supporting a site protected under EC and UK Legislation. Groundwater locally supports GWDTE. Source Protection Zone (SPZ) 1.	Highly vulnerable development.
High	Locally significant receptor of high sensitivity	Watercourse having a WFD classification shown in a RBMP and Q95 <1.0 m3 /s. Species protected under EC or UK legislation.	Principal aquifer providing locally important resource or supporting a river ecosystem. Groundwater supports GWDTE. SPZ 2.	Highly vulnerable development.
Medium	Of moderate quality and rarity	Watercourse not having a WFD classification shown in the RBMP and Q95 >0.001 m3 /s.	Aquifer providing water for agricultural or industrial use with limited	Less vulnerable development.

			connection to surface water. SPZ 3.	
Low	Lower quality	Watercourse not having a WFD classification shown in the RBMP and Q95 ≤0.001 m3 /s.	Unproductive strata.	Water compatible development.
Negligible	Attribute of very low quality	Water features within the Proposed Development which form part of the drainage system with no other allocation.		

10.5.42 Embedded mitigation, as set out in **Section 10.7**, will be considered in determining the magnitude of change. The magnitude of impact is set out in **Table 10-12**.

Table 10-12: Magnitude of Impact Criteria, adapted from DMRB LA113

Magnitude of Impact	Criteria	Examples	
High Adverse	Results in loss of attribute and / or quality and integrity of the attribute	Surface water	Loss or extensive change to a fishery. Loss of regionally important public water supply. Loss or extensive change to a designated nature conservation site. Reduction in water body WFD classification.
		Groundwater	Loss of, or extensive change to, an aquifer. Loss of regionally important water supply. Potential high risk of pollution to groundwater from routine runoff. Loss of, or extensive change to GWDTE or baseflow contribution to protected surface water bodies. Reduction in water body WFD classification.

			Loss or significant damage to major structures through subsidence or similar effects.
		Flood risk	Increase in peak flood level (> 100 mm)*.
Medium Adverse	Results in effect on integrity of attribute, or loss of part of attribute	Surface water	Partial loss in productivity of a fishery. Degradation of regionally important public water supply or loss of major commercial / industrial / agricultural supplies. Contribution to reduction in water body WFD classification.
		Groundwater	Partial loss or change to an aquifer. Degradation of regionally important public water supply or loss of significant commercial/ industrial/ agricultural supplies. Potential medium risk of pollution to groundwater from routine runoff. Partial loss of the integrity of GWDTE. Contribution to reduction in water body WFD classification. Damage to major structures through subsidence or similar effects or loss of minor structures.
		Flood risk	Increase in peak flood level > 50 mm*.
Low Adverse	Results in some measurable change in attributes, quality or vulnerability	Surface water Groundwater	Minor effects on water supplies. Potential low risk of pollution to groundwater from routine runoff. Minor effects on an aquifer, GWDTEs, abstractions and structures.

		Flood risk	Increase in peak flood level > 10 mm*.
Negligible	Results in effect on attribute, but of insufficient magnitude to affect the use or integrity	Surface water	No risk identified to water supplies. Unlikely to affect the integrity of the water environment.
		Groundwater	No measurable impact upon an aquifer and/or groundwater. Unlikely to affect the integrity of the water environment.
		Flood risk	Negligible change to peak flood level (≤ +/- 10mm).
No Change	Results in no change to the receptor	No loss or alteration of characteristics, features or elements; no observable impact in either direction.	
Low Beneficial	Results in some beneficial effect on attribute or a reduced risk of adverse effect occurring	Surface water	Potential for slight reduction in pollution to a surface water body, but insufficient to cause noticeable benefit in quality, fishery productivity or biodiversity.
		Groundwater	Potential for slight reduction in pollution to a groundwater body, but insufficient to cause noticeable benefit in quality, baseflow or GWDTE. Reduction of groundwater hazard to existing structures. Reductions in waterlogging and groundwater flooding.
		Flood risk	Creation of flood storage and decrease in peak flood level > 10 mm*.
Medium Beneficial	Results in moderate improvement of attribute quality	Surface Water	Moderate improvement to a fishery / designated nature conservation site. Potential increase in the productivity of a fishery.

			Reduced pollution of a receiving water body or reduced risk of spillage.
			Contribution to improvement in water body WFD classification.
		Groundwater	Reduced pollution of a receiving water body or reduced risk of spillage.
			Contribution to improvement in water body WFD classification.
			Improvement in groundwater Catchment Abstraction Management Strategy (CAMS) (or equivalent) classification.
			Support to significant improvements in damaged GWDTE.
		Flood risk	Creation of flood storage and decrease in peak flood level > 50 mm*.
High Beneficial	Results in major improvement of attribute quality	Surface water	Significant improvement to a fishery / designated nature conservation site.
			Removal of existing polluting discharge or removing the likelihood of polluting discharges occurring.
			Improvement in water body WFD classification.
		Groundwater	Removal of existing polluting discharge to an aquifer or removing the likelihood of polluting discharges occurring.
			Recharge of an aquifer.
			Improvement in water body WFD classification.

	Flood risk	Creation of flood storage and decrease in peak flood level> 100 mm*.

*Beyond model tolerance.

10.5.43 The terminology related to the significance of effects set up in DMRB Volume 11, Section 3, Part 10 (LA113) (Ref 10-24) has been followed and used to define the significance of the effects identified:

- Major effect: where the Proposed Development could be expected to have a very significant effect (either beneficial or adverse) on receptors.
- Moderate effect: where the Proposed Development could be expected to have a noticeable effect (either beneficial or adverse) on receptors.
- Minor effect: where the Proposed Development could be expected to result in a small, barely noticeable effect (either beneficial or adverse) on receptors.
- Negligible: where no discernible effect is expected as a result of the Proposed Development on receptors.

10.5.44 The significance of potential impacts is classified by considering both the sensitivity of the receptor (**Table 10-11**) and the magnitude of impact (**Table 10-12**), using the matrix shown in **Table 10-13**, adapted from Table 3.8.1 of DMRB LA104 (Ref 10-38). Noting that, where the significance of the effect is described as between two levels professional judgement is used to identify a level of significance. Only Moderate and Major effects are considered to be significant. The Table below shows the Matrix of Assessment of Significance used for this report.

Table 10-13: Matrix for Assessment of Significance (adapted from DMRB LA 104)

		Magnitude of Impact				
		No Change	**Negligible**	**Low**	**Medium**	**High**
Sensitivity of Receptor	**Very High**	Neutral	Minor	Moderate or Major	Major	Major
	High	Neutral	Minor	Minor or Moderate	Moderate or Major	Major
	Medium	Neutral	Neutral or Minor	Minor	Moderate	Moderate or Major

Low	Neutral	Neutral or Minor	Neutral or Minor	Minor	Minor or Moderate
Negligible	Neutral	Neutral	Neutral or Minor	Neutral or Minor	Minor

10.6 Baseline Conditions

10.6.1 This section provides a description of the current baseline conditions with respect to the water environment, including surface water, groundwater and flood risk.

Surface Water Features and Water Quality

10.6.2 Surface water features identified within the Study Area are shown in **Figure 10-12**. The key features identified include:

- The Severn Estuary;
- Monks Ditch;
- Windmill Reen (Yoke Reen);
- Mill Reen;
- Elver Pill Reen;
- Cold Harbour Reen;
- Collister Pill;
- Back Ditch;
- New Middle Road Reen;
- Ridings & 100 Perches;
- Petty Reen & Stutwall Link;
- Greenmoor & Links;
- Prat & Bridewell; and
- A network of ditches and small watercourses.

Severn Estuary

10.6.3 The Severn Estuary is located along the southern border of the PEIR Assessment Boundary and is classified as a transitional and coastal waterbody (TRaC). The waterbody is located within the Wye TRaC management catchment and Severn

Lower operational catchment.

10.6.4 The Severn Estuary is referenced in NRW's Data Map Wales as Severn Lower (GB530905415401). Transitional Waterbodies Cycle 3 (interim 2024) monitoring awards ecological status as moderate and chemical status as moderate, with overall status awarded as moderate. The waterbody is designated as heavily modified. The driving elements listed for this status include:

- Moderate Invertebrates;
- Moderate Mercury and Its Compounds;
- Moderate Polycyclic Aromatic Hydrocarbons; and
- Moderate Mitigation Assessment.

Monks Ditch and Windmill Reen (Yoke Reen)

10.6.5 The Monks Ditch (referenced in **Figure 10-12**) flows from north to south approximately 500m to the west of the PEIR Assessment Boundary. Monks Ditch is a designated Main River under the jurisdiction of NRW and is tidally influenced. According to NRW's Data Map Wales, Monks Ditch originates in Wentwood mountain peak, approximately 7.8km upstream of the Site. It flows into Goldcliff Pill and ultimately the Severn Estuary. The watercourse flows through Gwent Levels (Whitson & Nash and Goldcliff) SSSI and Newport Wetlands SSSI downstream of the Site. Monks Ditch is a monitored WFD waterbody and is referenced in NRW's Data Map Wales as Monks Ditch – source to Wainbridge (GB109056026850).

10.6.6 The Windmill Reen (Yoke Reen) flows from north to south through the Site (referenced in **Figure 10-12**). Windmill Reen (Yoke Reen) is a designated Main River under the jurisdiction of NRW and is tidally influenced. The watercourse originates at the confluence of New Middle Road Reen and Newcut Reen, approximately 50m upstream of the Site. Windmill Reen (Yoke Reen) flows through Gwent Levels (Whitson & Redwick and Llandevenny) SSSI and into the Severn Estuary within the PEIR Assessment Boundary. According to NRW's Data Map for Wales, the Windmill Reen (Yoke Reen) is a monitored WFD waterbody and is referenced as Monks Ditch - Wainbridge to mouth (GB109056026810).

10.6.7 NRW undertakes periodic monitoring of WFD waterbodies and publishes results on

Data Map Wales. River Waterbodies Cycle 3 (interim 2024) monitoring awards ecological status as moderate and chemical status as high to both channels, with overall status awarded as moderate for both channels. Both channels are classified as artificial waterbodies. The driving elements listed for this status include:

- Moderate Macrophytes and Phytobenthos Combined – Monks Ditch;
- Moderate Ammonia – Windmill Reen (Yoke Reen);
- Poor Phosphate – Windmill Reen (Yoke Reen); and
- Moderate Mitigation Assessment – Monks Ditch and Windmill Reen (Yoke Reen).

Mill Reen

10.6.8 Mill Reen (referenced in **Figure 10-12**) flows north to south through the eastern part of the PEIR Assessment Boundary. It is a designated Main River under the jurisdiction of NRW and is tidally influenced. According to NRW's Data Map Wales, Mill Reen originates west of Grange Wood, approximately 4.1km upstream of the Site and flows directly into the Severn Estuary, outside of the PEIR Assessment Boundary. Mill Reen flows through Gwent Levels (Magor and Undy) SSSI within the PEIR Assessment Boundary.

10.6.9 Mill Reen is a monitored WFD waterbody and is referenced in NRW's Data Map Wales as Mill Reen - source to R Severn Estuary (GB109056026860). River Waterbodies Cycle 3 (interim 2024) monitoring awards ecological status as moderate and chemical status as high to Mill Reen, with overall status awarded as moderate. The watercourse is designated as artificial. The driving element listed for this status is a moderate Mitigation Assessment.

Other Watercourses and Ditches

10.6.10 Elver Pill Reen is a designated Main River under the jurisdiction of NRW. The watercourse flows from north to south, flowing adjacent to the PEIR Assessment Boundary and through the PEIR Assessment Boundary at the western end of the Site. The watercourse is approximately 2.4km in length and is hydraulically connected to New Middle Road Reen outside of the PEIR Assessment Boundary. According to NRW's Data Map Wales, Elver Pill Reen originates just south of

Queen's Way, approximately 800m upstream of the Site and flows into Back Ditch prior to discharging into the Severn Estuary.

10.6.11 New Middle Road Reen is a designated Main River under the jurisdiction of NRW and located within the Study Area. The watercourse flows from east to west immediately adjacent to and approximately 50m upstream of the Site. The watercourse is approximately 1.6km in length and is hydraulically connected to Newcut Reen, Middle Road Reen, Greenmoor & Links, and Ridings & 100 Perches. New Middle Road Reen discharges into Elver Pill Reen and Windmill Reen (Yoke Reen).

10.6.12 Ridings & 100 Perches is a designated Main River under the jurisdiction of NRW located within the Study Area. The watercourse flows from north to south, to the north of the PEIR Assessment Boundary and the A4810. According to NRW's Data Map Wales, the watercourse originates west of Wilcrick, approximately 2.4km upstream from the Site. The watercourse is approximately 2 km in length and is hydraulically connected to Greenmoor & Links and New Middle Road Reen where it discharges to.

10.6.13 Greenmoor & Links is a designated Main River under the jurisdiction of NRW and located within the Study Area. The watercourse flows from north to south, to the north of the PEIR Assessment Boundary and the A4810. According to NRW's Data Map Wales, the watercourse is fed by two ordinary watercourses (New Cut Reen and Wilcrick Moor Reen), approximately 940m upstream of the Site. The watercourse is approximately 1.4km in length and is hydraulically connected to Ridings & 100 Perches and New Middle Road Reen where it discharges to.

10.6.14 Petty Reen & Stutwall Link is a designated Main River under the jurisdiction of NRW and located within the Study Area. The watercourse flows from west to east along the A4810 and is located to the north of the PEIR Assessment Boundary. According to NRW's Data Map Wales, the watercourse is fed by Ridings & 100 Perches, approximately 940m upstream of the Site. The watercourse is approximately 2.7km in length and is hydraulically connected to Greenmoor & Links and Cold Harbour Reen where it discharges to.

10.6.15 Cold Harbour Reen is a designated Main River under the jurisdiction of NRW and located within the PEIR Assessment Boundary. The watercourse flows from north to south through the eastern end of the Site. The watercourse is approximately 2.6km in length and is hydraulically connected to Petty Reen & Stutwall Link and Whitewall Reen. According to NRW's Data Map Wales, Cold Harbour Reen originates just west of Magor Marsh nature reserve, approximately 1.8km upstream of the Site, and flows into Back Ditch prior to discharging into the Severn Estuary.

10.6.16 Prat & Bridewell Reen is a designated Main River under the jurisdiction of NRW and located within the Study Area. The watercourse flows from west to east and is located to the north of the easternmost part of the Site. According to NRW's Data Map Wales, Prat & Bridewell Reen originates south of Undy, approximately 730m upstream of the Site. The watercourse is approximately 1.4km in length and is hydraulically connected to Collister Pill where it discharges to.

10.6.17 Collister Pill is a designated Main River under the jurisdiction of NRW and located within the Study Area. The watercourse flows from north to south, approximately 970m to the east of the PEIR Assessment Boundary. According to NRW's Data Map Wales, Collister Pill originates just north of its confluence with Prat & Bridewell Reen, approximately 1.1km upstream from the Site. The watercourse is approximately 1.3km in length and is hydraulically connected to Prat & Bridewell Reen and Back Ditch, where it flows into prior to discharging to the Severn Estuary.

10.6.18 Back Ditch is a designated Main River under the jurisdiction of NRW located along the southern extent of the PEIR Assessment Boundary. The watercourse flows from west to east adjacent to the Severn Estuary and inland from the NRW maintained coastal defence. According to NRW's Data Map Wales, Back Ditch originates southeast of Whitson, approximately 100m downstream from the Site. The watercourse is approximately 7.5km in length and is hydraulically connected to the following watercourses prior to discharging to the Severn Estuary:

- Elver Pill Reen;
- Windmill Reen (Yoke Reen);
- Cold Harbour Reen;
- Mill Reen; and

- Collister Pill Reen.

10.6.19 A network of ordinary watercourses and ditches also cover the Site and Study Area. These are under the management of NRW. The ordinary watercourses within the Study Area are shown in **Figure 10-12** and include:

- Monkscroft Reen;
- Chapel Reen;
- Saltmarsh Reen;
- Middle Road Reen;
- Newcut Reen;
- Wilcrick Moor Reen;
- Bareland Street Reen;
- Cockenton Reen;
- Whitewall Reen;
- Old Convenient Reen; and
- Prat Reen.

10.6.20 During the Site visit conducted on the 11th and 12th September 2025, it was noted that many of the reens were choked with aquatic vegetation with no perceptible flow.

Designated Sites

10.6.21 The Gwent Levels consists of six Sites of Special Scientific Interest (SSSIs). The PEIR Assessment Boundary is located within the following:

- Gwent Levels – Whitson SSSI;
- Gwent Levels – Redwick and Llandevenny SSSI; and
- Gwent Levels – Magor and Undy SSSI.

10.6.22 Within the PEIR Assessment Boundary, Monks Ditch, Windmill Reen (Yoke Reen) and Mill Reen flow through Gwent Levels – Whitson SSSI and Gwent Levels – Redwick and Llandevenny SSSI. The network of reens and water management practices in the Gwent Levels support a range of aquatic plants which in turn, support other wildlife. A diverse community of aquatic and terrestrial insects, invertebrates, otters and water voles inhabit the reens, ditches and their banks. Further information regarding the designation is provided within **Chapter 8: Ecology.**

10.6.23 The Severn Estuary is located to the south of the PEIR Assessment Boundary and is designated as SSSI, Special Protection Area (SPA), Special Area of Conservation (SAC) and Ramsar. These sites are designated for their internationally important numbers of overwintering birds.

10.6.24 In addition, the following designated sites were identified outside of the PEIR Assessment Boundary but within the Study Area and in hydrological connectivity with the Site:

- Gwent Levels - Nash and Goldcliff SSSI: located approximately 150m west of the westernmost extent of the Site, on the western bank of Monks Ditch; and
- Newport Wetlands SSSI: located approximately 1km west of the westernmost extent of the Site, at the confluence of Monks Ditch with the Severn Estuary.

10.6.25 The designated sites related to the water environment and located within the PEIR Assessment Boundary are shown in **Figure 10-13**.

Surface Water Abstractions and Discharge Consents

10.6.26 NRW were consulted in relation to the active, licensed surface water abstractions and discharge consents within the Study Area.

10.6.27 Data Map Wales Licensed Water Abstractions dataset shows no licensed groundwater or surface water abstractions within the Study Area.

10.6.28 Data Map Wales Permitted Discharges dataset shows several permitted discharges to surface waters within the Study Area. Of these, only one permitted discharge (AC0111201) is located within the PEIR Assessment Boundary. The discharge consents with the Study Area are shown in **Figure 10-14** and summarised in **Table 10-14** below.

Table 10-14: Water Activity Permits (discharge consents) in the study area

Consent Registration	Location (NGR)	Discharge Type	Receiving waters
CB3294ZB	ST 43792 85901	Sewage - non Water Undertaker	Unnamed drain of Prat Reen

AC0111201	ST 43630 85030	Sewage - Water Undertaker	Unspecified
AN0304001	ST 43762 84571	Sewage - Water Undertaker	River Severn Estuary
DB3596ZC	ST 37288 86099	Sewage - non Water Undertaker	Green Moor Reen
AN0387801	ST 36706 83024	Sewage - non Water Undertaker	Chapel Pill
AB3998FB	ST 36270 83538	Sewage - non Water Undertaker	Chapel Reen
YP3228XS	ST 36387 83035	Sewage - non Water Undertaker	Groundwater via infiltration system
AN0260701	ST 40300 86400	Sewage - non Water Undertaker	Bareland Street Reen
AN0393102	ST 40203 86366	Trade	Greenmoor & Links
AN0393103	ST 40272 86117	Trade	Petty Reen & Stutwall Link
AN0368201	ST 39948 86174	Trade	Gwent Levels Ree System
AN0393101	ST 40020 86075	Trade	Petty Reen & Stutwall Link
DB3494FH	ST 36775 86823	Trade	Monks Ditch
AB3198CX	ST 42943 86649	Sewage - non Water Undertaker	Mill Reen
BB3394HK	ST 43068 86439	Sewage - non Water Undertaker	Mill Reen
AN0231401	ST 44060 87270	Sewage - Water Undertaker	Tributary of Prat Reen
AN0055101	ST 44080 86980	Sewage - Water Undertaker	Prat Reen

Existing Drainage

10.6.29 Surface water within the PEIR Assessment Boundary is managed through an established rainfall-driven drainage network that discharges into the Severn Estuary via tide-locked watercourses and reens. The Gwent Levels drainage system is

actively regulated through sluice gates, enabling seasonal variations in water levels to support both land drainage and environmental management objectives. Routine maintenance, including clearance and dredging of principal reens, is essential to sustain system performance. NRW are responsible for the management of the Gwent Levels drainage system.

10.6.30 A desk-based assessment shows that many of the smaller watercourses and reens are not interconnected, resulting in isolated water retention. Smaller reens are often hydraulically enclosed by higher ground, resulting in retained water and lateral spread of exceedance flows across the Site because of very shallow gradients and minimal elevation differences. This produces temporary storage, ponding and low-velocity runoff within sub-catchments defined by the existing drainage network.

10.6.31 Site gradients are typically very shallow, in some areas as low as 1 in 1000, which restricts conveyance and results in low-velocity runoff. Groundwater influence may be significant in deeper reens and watercourses, and tidal variation is controlled by flow-regulating structures on the Severn Estuary and adjacent rivers.

10.6.32 Dwr Cymru Welsh Water (DCWW) were consulted on the 6th October 2025 to request additional information on existing drainage assets across the Study Area. At the time of writing, no response has been received; further consultation will be carried out to inform the SWDS that is being produced and drainage features across the Study Area will be looked at it more detail in the ES Chapter and Proposed SWDS.

Flood Risk

Flood Defences

10.6.33 The PEIR Assessment Boundary is currently defended by embankments, incorporating rock revetment along the seaward slope as well as a concrete wall at the crest.

10.6.34 According to Data Map Wales (lidar data) (**Ref 10-35**), tidal defence crest levels are typically set between approximately 8.5 - 9.5m AOD, which is approximately 2.5 to 3m AOD higher than the reclaimed land behind. However, according to Data Map Wales, a low point of 7.8m AOD is present approximately 60m west of Elver Pill Reen (approximately 0.5m – 1m lower than the typical height of the defence) and a high point of 10.11m AOD is present immediately south of Cold Harbour Reen.

10.6.35 According to data received from NRW, the Standard of Protection for the sea defences varies between 0.5% AEP and 2% AEP. Much of the western area of the Study Area and PEIR Assessment Boundary benefits from a 0.5% AEP Standard of Protection and is labelled as a TAN15 Defended Zone in the Flood Map for Planning. The region of the Study Area that benefits from 2% AEP Standard of Protection is to the east, roughly south of Magor, and is therefore not considered to be in a TAN15 protected area as it does not reach the minimum standard of protection as defined in the Flood Map for Planning.

10.6.36 At the time of writing no information has been received from NRW regarding the condition of the flood defences.

10.6.37 The flood defences protecting the Site are all maintained by NRW. Their ID numbers, approximate length and corresponding Standard of Protection are presented in **Table 10-15** below, whilst **Figure 10.5** offers a visual representation of the defences and the TAN15 defended zone.

Table 10-15: NRW flood defence data summary

NRW Flood Defence ID	Approximate Length (m)	Standard of Protection
EMB1501029	2728	0.5% AEP
EMB1501279	1316	0.5% AEP
EMB1500598	2455	0.5% AEP
EMB1500470	1078	0.5% AEP
EMB1500043	305	2% AEP
EMB1500524	255	2% AEP
EMB1501169	94	2% AEP
EMB1501214	339	2% AEP

10.6.38 The Shoreline Management Plan (Uskmouth Power Station point to Sudbrook point (north of M4 Severn crossing) CALD1) (Ref 10-39) produced by NRW advises that "In the short term, investment in defences is likely to be required. Defence alignment should be considered, to create habitat and manage the impact of sea level rise.".

10.6.39 Furthermore, their 'Hold the Line' strategy from 0 to 20 years, from 20 to 50 years and from 50 to 100 years (2005 through to 2105) states that "Where protection is currently provided by coastal defence structures or managed beaches, and the intention is to retain a defence along approximately the current alignment. This will involve replacing defences when needed. Defence type, method and standard of protection may be modified over time."

Historical Flooding

10.6.40 According to the Caldicot and Wentlooge Coastal Summary Report (Ref 10-40) and the Severn Estuary Flood Risk Management Strategy (Ref 10-41), the Severn Estuary area, which includes the Caldicot Levels area and adjacent areas, has a long history of flooding instances through the 1980s and up to as recently as 2014. In 1981 there was a 1% AEP flood event producing sea levels of up to 8.40m AOD at Newport Docks caused by extreme weather conditions and high tides. As a result of this event, properties near the Marshes on the west bank of the River Usk (430 houses, 30 trading premises and 20 commercial properties) flooded with an average depth of around 0.3 m. The Caldicot and Wentlooge Coastal Summary Report summarises findings that the sea defences prevented flood damage to 50,000 properties.

10.6.41 The flooding event in 2014 was caused by high tides and a rare storm event, producing sea levels with heights of up to 8.03m AOD in Newport. Despite the adverse weather conditions and over 1000 evacuation warnings being issued, a total of less than 20 properties flooded across the Tintern and Goldcliff areas.

10.6.42 While the locations of the recorded flood instances vary across the Severn Estuary region and are not all within the PEIR Assessment Boundary for the Proposed Development, previous studies have demonstrated the importance of the flood defences and the potential for significant impact across the region.

Recorded Flood Extents

10.6.43 In addition to the historical flooding identified above, the Flood Map for Planning's Recorded Flood Extents layer has also been checked for additional evidence of flooding instances. There are no recorded flood extents within the PEIR Assessment Boundary but there is a recorded flood extent approximately 1.5km to the west of the PEIR Assessment Boundary on the bank of the River Usk. Limited information is offered regarding the flooding event other than it was recorded in 1981. This is likely consistent with the 1981 flood instance at Newport Docks.

Tidal Flood Risk

Flood Map for Planning

10.6.44 The Flood Map for Planning categorises tidal flood risk in the following way:

- **Flood Zone 2**: Areas with 0.1% to 0.5% (1 in 1000 to 1 in 200) chance of flooding from the sea in a given year, including the effects of climate change;
- **Flood Zone 3**: Areas with more than 0.5% (1 in 200) chance of flooding from the sea in a given year, including the effects of climate change; and
- **TAN15 Defended Zones**: The area that benefits from Risk Management Authority flood defences with the minimum Standard of Protection of 0.5% (1 in 200) (present-day) for the sea.

10.6.45 A review of NRW's Flood Map for Planning shows that the entire PEIR Assessment Boundary lies within Flood Zone 3 as per the definition provided above. Flood Zone 3 extends across the PEIR Assessment Boundary when compared with flood zones from other sources (discussed below) which shows that tidal flooding is the dominant source of flooding in the area. The Flood Zone 3 extent includes an uplift for climate change in addition to the present-day scenario and does not take the presence of flood defences into account, with the actual present-day scenario likely to be at lower risk when the flood defences are considered and climate change impacts not considered. Note that NRW hydraulic modelling has been undertaken for a 2015 present-day scenario, the results of which are discussed below and the flood depths shown in **Figure 10-6**.

10.6.46 To account for the protection offered by the flood defences, the mapping also shows that the western area of the PEIR Assessment Boundary, to the west of Whitewall Road and south of Magor, is within the TAN15 Defended Zone as per the definition above. Therefore, while all elements of the Proposed Development, including access, temporary and permanent access tracks, transformer stations and the proposed substation, are shown to be at high risk of tidal flooding in the climate change scenario, much of this infrastructure benefits from the 0.5% AEP Standard of Protection offered by the sea flood defences. The area to the east lies outside the TAN15 Defended Zone, which corresponds to the lower 2% AEP Standard of Protection offered by the sea flood defences at this location.

10.6.47 The mapping also shows that the PEIR Assessment Boundary and the wider Study Area both lie within the Anchor Head to Lavernock Point Shoreline Management Plan (SMP), specifically within the CALD1 policy unit area. This unit states that the preferred policy up to 2105 is to “Hold the Line”.

10.6.48 While this policy should in theory maintain adequate levels of protection up to 2105, there remains the chance that maintenance, management and upgrade schedules to the defences might not prove to be adequate in ensuring the necessary level of protection continues to be provided. This would therefore leave the Proposed Development vulnerable to impacts from wave overtopping, particularly where the Standard of Protection is lower to the east.

Hydraulic Modelling

10.6.49 In addition to the Flood Map for Planning, NRW has provided the Caldicot and Wentlooge 2016 Hydraulic Modelling study. The accompanying modelling report confirms that the dominant source of flooding at Caldicot Levels is tidal flooding but with a small fluvial contribution. Several tidal flooding return periods were presented as part of the modelling study; among them the 0.5% AEP present day scenario as well as the 0.5% AEP climate change scenario up to 2115, which has been looked at to inform this preliminary assessment of tidal flood risk.

10.6.50 **Figure 10-6** and **Figure 10-7** show the modelled flood depths in the 0.5% AEP present day and climate change scenarios respectively; there is a significant difference between the two scenarios. The present-day scenario shows that there

are flood depths within the wider Study Area of up to 3m but the area within the PEIR Assessment Boundary itself contains no evidence of flooding, with depths modelled at 0m. The flood depths of up to 3m to the west and east of the PEIR Assessment Boundary are likely attributed to flooding from the Severn Estuary to the west and overtopping of flood defences with a lower Standard of Protection to the east. The findings presented in the 0.5% AEP present-day flood risk scenario are broadly consistent with both the Flood Map for Planning and also the evidence of historical flooding instances presented above.

10.6.51 The 2115 climate change scenario is assumed to have been modelled while keeping the crest levels and Standard of Protection of the flood defences unchanged from the present-day scenario. While the Standard of Protection would be expected to degrade over time, this represents a scenario whereby no maintenance, management or upgrade work is done to the defences that are expected to be undertaken in line with the “Hold the Line” policy, therefore showing a higher level of risk than might be expected.

10.6.52 The pattern of depth distribution suggests that flooding predicted during the 2115 climate change scenario could be attributed to overtopping further to the east where the defence crest levels are lower. This appears evident due to the depths immediately behind these defences generally being greater than those immediately behind defences to the west, and given that the depths further away from the defences are greater.

10.6.53 In the modelled 2115 climate change scenario, the entirety of the PEIR Assessment Boundary and much of the wider Study Area are shown to have flood depths varying between 0.15m and up to 3m in some locations. Within the PEIR Assessment Boundary itself, depths of up to around 1.5m have been modelled with the greatest depths being located further to the north between the A4810 and the location of the proposed substation. The implication from the findings of this modelling study is that access and egress to the Proposed Development and transformer stations and the substation could be subject to flood depths of up to 1.5m and therefore require mitigation. There would also be implications to activities through the construction phase, in addition to the level of risk to temporary compounds and laydown areas.

10.6.54 While reviewing this hydraulic modelling study, it was also considered that the operational lifetime of the Proposed Development is 40 years, therefore being operational up to around 2080 before being fully decommissioned. The depths shown in the modelling study for the 2115 climate change scenario are therefore not deemed to be representative of the risk over the operational phase of the Proposed Development. Designing flood risk mitigation measures in accordance with the findings of this study would therefore be overly conservative.

10.6.55 In line with this, additional sources have been consulted and calculations undertaken to estimate the flood depths over the 40-year lifetime of the Proposed Development.

2080 Climate Change Projection

10.6.56 In order to estimate the level of flood risk over the lifetime of the Proposed Development, reference was made to a calculation method implemented as part of Gwent Farmers' Community Solar Scheme on behalf of Nextenergy Solar Holdings III Ltd in 2020 (Ref 10-42). This is a solar farm that is located between the PEIR Assessment Boundary and the Severn Estuary outfall; replication of this method has been deemed appropriate for several reasons:

- The FCA undertaken in support of the solar farm development is dated March 2020 and therefore was completed relatively recently;
- The close proximity of this site to the PEIR Assessment Boundary suggests that the flood constraints and the level of risk from all sources, including tidal, are synonymous with the Proposed Development; and
- As it is a solar farm that has been developed, the vulnerability classification and sensitivity of the associated infrastructure is assumed to be the same as the Proposed Development.

10.6.57 NRW were consulted on what the most appropriate way to proceed would be and for relevant data on sea level rises to aid in the calculation of flood depths. Details of this consultation can be found in **Section 10.4**. Their response outlined that a range of scenarios should be investigated, and the approval of the applied method would be a matter for the Planning Inspectorate.

10.6.58 The calculation method applied in the 2020 FCA for the adjacent site involved future flood levels being derived by applying predicted rises in sea levels (provided by NRW) to the modelling results from the 2016 Caldicot and Wentlooge modelling

study. Sea level rise data was provided in epochs and was multiplied by the number of years within each epoch to calculate the total rise in levels over the design life of the development. This sea level rise was then applied to the modelling data provided by NRW.

10.6.59 Slight modifications have been made to the calculation method applied to the 2020 FCA to reflect changes to available baseline data. The key difference is that sea level rise data is not available in the same epoch format as it was for the 2020 FCA for the adjoining site. Instead, estimated mean sea level rises have been derived in accordance with Table 3 of the Welsh Government's Climate Change Allowance guidance (Ref 10-43). These values can be found in the **Table 10-16** below:

Table 10-16: Estimated mean sea level rises

Local Authority Area	Allowance (Percentile)	Mean Sea Level Rise (m) by 2100 (UKCP18 baseline 1981-2000)	Mean Sea Level Rise (m) by 2120 (UKCP18 baseline 1981-2000)
Newport	70th	0.85	1.01
	95th	1.11	1.33
Monmouthshire	70th	0.85	1.01
	95th	1.11	1.33

10.6.60 The mean sea level rise of 1.11m has been added to the 2015 flood depths in the 0.5% AEP present-day scenario from the 2016 Caldicot and Wentlooge hydraulic modelling study.

10.6.61 Given that the lifetime of the Proposed Development up to decommissioning is up to 2080, the 2100 value of 1.11m is the value for 20 years beyond the decommissioning year, this value can be considered to be conservative. It is also the 95th percentile value, meaning it represents a more conservative estimate of the mean sea level rise and therefore a worst-case scenario.

Flood Defence Overtopping

10.6.62 High level calculations have been undertaken to estimate the risk of wave

overtopping. Data from the dataset "Future extreme sea levels around the UK coastline using standard method, 2020 – 2021" was extracted for use in the calculations. Sea levels at multiple locations along the British coastline for a range of return periods were ascertained; extreme sea levels for the 0.5% AEP have been used for the calculations to correspond with the Standard of Protection offered along the majority of sea front. The location of the chainages where the sea levels are extracted from can be found in **Figure 10-8**.

10.6.63 The estimated mean sea level rise by 2100 of 0.85m (70th percentile allowance) 1.11m (95th percentile allowance) were added to the 0.5% AEP extreme sea levels to determine the extreme sea levels by 2100. These values are shown in the **Table 10-17** below:

Table 10-17: Estimation of sea level rises

Chainage (as shown in Figure 10-8)	0.5% AEP Extreme Sea Levels (ESL) (m)	0.5% AEP ESL + 2100 Mean Sea Level Rise (70%)	0.5% AEP ESL + 2100 Mean Sea Level Rise (95%)
382	9.541	10.391	10.651
384	9.421	10.271	10.531
386	9.301	10.151	10.411
388	9.191	10.041	10.301
390	9.081	9.931	10.191
392	8.981	9.831	10.091
394	8.881	9.731	9.991
396	8.801	9.651	9.911
398	8.721	9.571	9.831
400	8.650	9.500	9.760
402	8.580	9.430	9.690

10.6.64 A more detailed assessment of the likelihood of wave overtopping will be undertaken in the FCA. These high-level calculations have been undertaken only to offer an indication of the likelihood of overtopping.

10.6.65 Given that the general crest level of the sea defences is around 9.5mAOD, the values in **Table 10-17** suggest that there could be a chance of overtopping.

Fluvial Flood Risk

10.6.66 The Flood Map for Planning categorises fluvial flood risk in the following way:

- **Rivers flood Zone 1:** Areas with less than 0.1% (1 in 1,000) chance of flooding from rivers in a given year, including the effects of climate change.
- **Rivers Flood Zone 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.
- **Rivers Flood Zone 3:** Areas with more than 1% (1 in 100) chance of flooding from rivers in a given year, including the effects of climate change.
- **TAN15 Defended Zones:** Area that benefits from Risk Management Authority flood defences with the minimum standard of protection of 1% AEP (1 in 100) (present day) for rivers.

10.6.67 Most of the Study Area is within Flood Zone 1, indicating a low risk of fluvial flooding in both the present day and climate change scenarios. However, there are areas in the eastern extent of the Study Area, particularly towards the northern boundary, that are located within Flood Zone 2 and 3 and are therefore at medium to high risk of fluvial flooding in both the present day and climate change scenarios. Consequently, mitigation would need to be considered, with a focus on site access and egress, construction tracks and sensitive infrastructure.

10.6.68 According to the proposed layout plan and **Figure 10-9**, site entrances 5, 6 and 7 are all situated within areas of Flood Zone 2 and 3. In addition, construction haul routes (4.5m wide) are present across the PEIR Assessment Boundary, including in areas that have been identified as at risk.

10.6.69 The proposed layout plan and **Figure 10-9** indicate that sensitive infrastructure in the form of five 2.9m high Transformer Stations (6000 kVA) are also situated within Flood Zones 2 and 3.

10.6.70 A fluvial flood risk model was requested via a data request to NRW. However, confirmation was received that only the Caldicot and Wentlooge hydraulic modelling

study was available for the Study Area. This modelling study considers only a minor contribution from fluvial flooding and detailed data regarding fluvial flood risk is not available. The dominant source of flood risk to the Proposed Development is however tidal.

Surface Water and Small Watercourses Flood Risk

10.6.71 The Flood Map for Planning categorises Surface Water and Small Watercourses flood risk in the following way:

- **Very Low:** Very low means that each year, this area has a chance of flooding of less than 1 in 1000 (0.1%).
- **Low:** Low means that each year, this area has a chance of flooding between 1 in 1000 (0.1%) and 1 in 100 (1%).
- **Medium:** Medium means that each year, this area has a chance of flooding between 1 in 100 (1%) and 1 in 30 (3.3%).
- **High:** High means that each year, this area has a chance of flooding of greater than 1 in 30 (3.3%).

10.6.72 The Flood Map for Planning shows the majority of the Study Area to be at Very Low risk of flooding from surface water and small watercourses. There are areas across the Study Area that are considered to be at low risk; and with a couple of small areas of medium risk situated in the western region of the Study Area, approximately 240m east of Meres Reen with the Transformer Station TXN3 being the closest form of sensitive infrastructure c. 75m south. The majority of these low and medium risk areas are shown to be confined within the embankments of the various reens and ditches. NRW's Flood Map for Planning suggests that there are no significant areas of flooding or significant overland flow paths.

Groundwater Flood Risk

10.6.73 Groundwater flooding occurs when the natural water table rises above ground level or when water flows from natural springs. This typically transpires after sustained periods of heavy rainfall as the ground becomes saturated and often affects low-lying areas. High groundwater levels can therefore be determined by geological, hydrogeological, topographic and water table recharge phenomena.

10.6.74 Despite groundwater flooding not being displayed on the Flood Map for Planning, NRW do confirm (on their “Understanding your flood risk” page) that flooding can be caused by other sources that are not shown including groundwater from underground aquifers (**Ref 10-44**).

10.6.75 According to British Geological Survey (BGS) viewer (**Ref 10-32**), the Study Area is underlain by a superficial geology of tidal flat deposits including clay and silts as well as a mudstone bedrock. Furthermore, according to Cranfield University Landis Soil Viewer, the underlying soil is loamy and clayey, typical of tidal flats with naturally high groundwater.

10.6.76 The BGS Borehole records in the area support this as they suggest relatively thick layers of peat, soft clays and alluvium materials (loose, unconsolidated sediments deposited by water) which are characteristic of low permeability. These soils are effective at retaining water and slow down infiltration often resulting in high water tables.

10.6.77 Although the PEIR Assessment Boundary is located within an area of naturally high water tables, the extensive network of reens and drainage channels managed by NRW likely contributes to the management of groundwater flood risk. This is because these systems facilitate drainage by providing pathways, allowing groundwater to be channelled away from saturated ground. Furthermore, they can lower the water table by intercepting groundwater. The continuous movement of water helps to prevent soil saturation, which in turn reduces the chance of groundwater flooding. Finally, the reens in the area are managed by sluice gates which helps to control and manage water levels seasonally maintaining groundwater levels across the Site.

10.6.78 The overall groundwater flood risk for the PIER Assessment Boundary has therefore been assessed to be low**.** It should be caveated, however, that there are no groundwater flood maps on any of the relevant LFRAs or SFRAs.

Artificial Sources Flood Risk

10.6.79 The Flood Risk from Reservoirs mapping shows the worst-case scenario for the area that could be flooded if a large reservoir (a reservoir that holds over 10 000 cubic

metres of water) were to fail and release the water it holds. The reservoir flood maps indicate that the risk of reservoir flooding to the Proposed Development is low.

10.6.80 The Flood Map for Planning suggests that the PEIR Assessment Boundary lies outside of the reservoir flood risk extent, but the wider Study Area is partly within the extents. The closest at-risk area is 0.8km west of the PEIR Assessment Boundary, which originates from 'Uskmouth Lagoons' (Gwent Levels Wetlands Reserve). There is an additional at-risk area approximately 4km north of the PEIR Assessment Boundary originating from Wentwood Reservoir.

10.6.81 Given that reservoirs are strictly monitored and impacts resulting from the nearest reservoirs are considered unlikely, the overall flood risk from reservoirs to the PEIR Assessment Boundary has been assessed to be low.

10.6.82 There are no natural lakes or canals within the immediate vicinity of the PEIR Assessment Boundary. According to Canal and River Trust mapping, the nearest canal is Monmouthshire and Brecon Canal, situated approximately 7km northwest of the Site. Furthermore, the nearest natural lake is Llyn Syfaddan, approximately 46km northwest of the Site. Consequently, the risk of flooding from canals and lakes has been assessed to be very low to negligible.

10.6.83 As the Site is primarily greenfield, it is assumed that drainage is provided by field drains and open channels. However, there are some areas of hardstanding, particularly towards the northwestern corner of the Site. Consequently, some sewerage infrastructure may be present although this has not yet been confirmed as no detailed consultations have been undertaken at this stage. Based on current information, the risk of flooding from drainage infrastructure is considered to be low.

10.6.84 Several industrial water retention basins / storage ponds are located north of the PEIR Assessment Boundary and surrounding the Llanwern Steelworks site. At the time of writing, information on their condition, storage capacity and likelihood of a breach occurring is unavailable. However, given their limited hydrological connectivity to the assessment area and assumption that these will not be raised features, the risk of flooding from these retention basins is considered to be low.

Groundwater Abstractions

10.6.85 The Study Area does not fall within a Source Protection Zone (SPZ). The closest SPZ is approximately 4.5 km north east of the Site and according to Data Map Wales.

10.6.86 According to NRW's Data Map Wales there are no groundwater abstractions with the Study Area. No data/information has been made available through consultation to date on small private (unlicenced) water supplies. These relate to abstractions with quantities < 20m^3/d that do not require a licence or groundwater investigation consent from NRW. If received, further data and information regarding abstractions in the Study Area will be presented at ES stage.

Groundwater Quality

10.6.87 The groundwater vulnerability map (Ref 10-32) shows the vulnerability of groundwater to a pollutant discharged at ground level based on the hydrological, geological, hydrogeological and soil properties within a single square kilometre. The Site is largely designated as Low groundwater vulnerability with small patches of High groundwater vulnerability in the south of the Site which means that these areas can transmit pollution to groundwater more easily. The Site is designated as a Secondary Aquifer.

10.6.88 According to NRW's Data Map Wales the Site lies within the Usk Devonian Old Red Sandstone groundwater water body (WFD Groundwater Body ID GB40902G201700) that is classified as Good status based on the 2015 dataset. Within the north-east of the Study Area lies the Usk and Wye Southern Carboniferous Limestone groundwater water body (WFD Groundwater Body ID GB40901G206300) that is classified as Good status based on the 2015 dataset. Both groundwater bodies are protected under the Drinking Waters Directive 2020 (Ref 10-45). The reasons are listed for both groundwater bodies achieving a Good status:

- Drinking Water Protection Area;
- Groundwater Chemical Trends;
- Groundwater Dependent Terrestrial Ecosystem – Chemical Status;
- Groundwater – Surface Water Chemical Interaction; and

- Saline Intrusion – Chemical Component.

10.6.89 No additional groundwater quality data has been provided for the Proposed Development through consultation to date. Any further data that is obtained will inform the EIA and will be reported in the ES.

Groundwater Dependant Terrestrial Ecosystems (GWDTE)

10.6.90 Based on Water Watch Wales (Ref 10-36), one GWDTE is identified within the Study Area. Magor Marsh nature reserve is located approximately 600m north and upstream of the Site and is managed by Gwent Wildlife Trust. The SSSI has an area of approximately 23ha and has an GWDTE ID of 205 and an SSSI ID of 33WHB. Magor Marsh is an area of natural fenland and is home to a diverse range of wildlife.

Surface Water and Groundwater Receptor Importance

10.6.91 Following this assessment of baseline conditions within the Study Area, **Table 10-18** below provides a summary of the sensitivity of surface water and groundwater receptors within the Study Area. These sensitivities have been allocated based on the criteria outlined in **Table 10-11**. The surface water receptor sensitivities are based on factors such as size and scale, WFD classification and designations under EC or UK legislation, and the groundwater sensitivities are based on factors such as strata productivity and whether the groundwater supports GWDTE.

Table 10-19: Sensitivity of Receptors

Receptors	Sensitivity
Monks Ditch, Windmill Reen (Yoke Reen), Mill Reen	High
Elver Pill Reen, Cold Harbour Reen, Collister Pill, Back Ditch, New Middle Road Reen, Ridings & 100 Perches, Petty Reen & Stutwall Link, Greenmoor & Links, Prat & Bridewell Reen	High
Hare's Reen, Parish Reen, Crabtree Reen, Meres Reen, Bowleaze Reen, Cock Street Reen, Cockenton Reen, South Row Reen, Whitewall Reen, Prat Reen and Chapel Reen.	Low to High
Severn Estuary	Very High
Usk Devonian Old Red Sandstone	Medium

Usk and Wye Southern Carboniferous Limestone	Low
Private water supplies (if present)	Low
Magor Marsh nature reserve	Very High
Residential properties, childcare facilities, vulnerable industry/business properties	High to Very High
Agricultural land, sewage treatment works, less vulnerable industry/business properties	Medium
The Proposed Development	Medium

10.7 Embedded Design Mitigation

10.7.1 This section sets out the embedded design, mitigation and enhancement measures relevant to the Water Environment and Flood Risk. The measures outlined here will be necessary to address the significant impacts outlined in **Section 10-8**.

Construction Mitigation Measures

Construction Environmental Management Plan

10.7.2 An Outline Construction Environmental Management Plan (oCEMP) has been prepared for the works (**Appendix 2A**). The oCEMP summarises the key principles to manage risks to the water environment and flood risk receptors. It will form the basis of the full Construction Environmental Management Plan (CEMP) which will be provided by the appointed contractor prior to works commencing. An Outline Decommissioning Environmental Management Plan (oDEMP) has also been prepared (**Appendix 2B**).

10.7.3 The CEMP will outline how construction activities will be undertaken and include method statements for the proposed works, a Construction Phase drainage strategy, and details of materials to be used. The instructions and construction method statements contained within the CEMP will inform onsite staff of how the carry out works in a way that reduces the risk of contaminating the surrounding environment. This includes working in adverse weather conditions and managing complaints and environmental incidents.

10.7.4 The oCEMP references industry-standard best practice and guidance including, but not limited to, the following:

- CIRIA C532: Control of Water Pollution from Construction Sites;
- CIRIA C741: Environmental Good Practice on Site Guide;
- Guidance for Pollution Prevention (GPP). This will replace the Pollution Prevention Guidelines (PPG) when published. While they have not yet been replaced, the PPG should be followed for best practice.

10.7.5 A Commitments Register (**Appendix 19A**) has been produced in conjunction with this PEIR and includes the following:

- A CEMP will be required with sensitive timings of works, detailed method statements and measures to protect reens from pollution and siltation (**Commitment Reference C-21**);
- The Proposed Development will include the use of appropriate drainage design, the use of runoff and sediment control measures where necessary and through the implementation of good working practice and adherence to an oCEMP (**Commitment Reference C-45**) and;
- The CEMP will include:
    - Adoption of best practice pollution prevention, drainage control, and waste management procedures;
    - Control of drainage and sediment runoff from excavation areas and any access tracks;
    - Agreement on watercourse crossing schedule (method and type of structure);
    - Control of drainage and sediment runoff during the construction of watercourse crossings (where applicable);
    - Control of concrete pouring; and
    - Appropriate design of foundation installation, the management of soil water levels and the potential to generate excessive quantities of groundwater contaminated sediments (**Commitment Reference C-46**).

10.7.6 The embedded mitigation measures listed below are required to minimise impacts of the Proposed Development to the water environment through the Construction Phase:

- Exposed surface to be minimised by removing vegetation only when necessary, and keeping gradients as shallow as possible to ensure materials do not flow as far and fast during periods of prolonged heavy rainfall;

- Use of heavy machinery near waterbodies should be minimised as far as reasonably practicable and stockpiles should not be located within 10m of surface water features;
- All entry and exit points should have wheel wash facilities in place with machinery cleaned in accordance with best practice;
- Surface water runoff should be captured and settled out in accordance with best practice and guidance, with contaminants being removed prior to disposal;
- Runoff should be treated at source to ensure hydrocarbon removal is carried out in accordance with guidelines and permits;
- The use of drip trays under machinery at risk of causing leaks or spillages should be incorporated wherever necessary to reduce the risk of contaminated runoff polluting sensitive surface water features;
- Areas that pose greater risks of contamination by spillage should be located appropriately, as far away from surface water features as practicable;
- Refuelling of machinery and HGVs should be carried out in bunded areas with a 10m buffer zone between the areas and surface water features and drainage assets;
- Hazardous substances should be contained within fully bunded (and lined) impermeable areas within adequate storage capacity plus an appropriate safety margin;
- Fit-for-purpose means of containing spillages should be located at suitable locations across the Site, such as absorption materials;
- Concrete washout would take place in designated washout areas, and construction materials such as cement would be mixed a suitable distance from surface water features; and
- Appropriate and effective management of polluting substances and sediments throughput construction processes.

10.7.7 The appointed contractor will be required to prepare a Construction Phase drainage strategy that effectively manages surface water runoff during the construction phase to prevent pollution risk to the water environment. This will need to be an adaptive strategy that responds to the evolving nature of the construction site, with focus on the interception, treatment and safe management of surface water runoff that could otherwise migrate directly or indirectly to receiving waterbodies.

10.7.8 The detailed CEMP will be supported by method statements prepared by the

appointed contractor for works in close proximity to sensitive receptors. It is recommended that these are developed in consultation with the relevant authorities and include but not limited to the following:

- The Severn Estuary;
- Monks Ditch;
- Windmill Reen (Yoke Reen);
- Mill Reen;
- Elver Pill Reen;
- Cold Harbour Reen; and
- Back Ditch.

Flood Risk

10.7.9 Works that are carried out within the mapped Flood Zones or in close proximity to NRW flood defences would require a Flood Risk Activities Permit (FRAP). This would be secured prior to works in these areas commencing. This would be of particular relevance to the works proposed within the existing floodplain and works proposed within proximity of existing flood defences and/or Main Rivers.

10.7.10 It is expected that any temporary access tracks required during construction will be removed, with the ground reinstated to pre-development levels.

10.7.11 Consideration will be given to the condition of infrastructure that may be affected by construction activities, including but not limited to the structural condition of existing culverts, existing reen crossings and drainage lines.

10.7.12 The Contractor will be required to prepare a Construction Phase flood response plan that sets out roles and responsibilities, triggers to identify potential flood risk, and the protocols to be followed in the event of notified flood risk to ensure the safety of Site operatives and appropriate pollution control.

10.7.13 This section will be revised during the preparation of the ES once further details of the Proposed Development and construction methods/sequencing are available.

Operational Mitigation Measures

Embedded Design

10.7.14 An Operational Environmental Management Plan will be secured as a requirement of the DCO. Measures to mitigate potential effects during operation of the Proposed Development are likely to be embedded within the design of the Proposed Development. These include flood defence measures, drainage proposals and pollution prevention controls.

Flood Risk

10.7.15 The design of the Proposed Development will take flood risks into account and incorporate appropriate flood defence and mitigation measures. This will consider the risk of overtopping of existing flood defences and the residual flood risk to the Proposed Development in the event of a breach in the existing flood defences. Mitigation measures will be incorporated into the design and operation of the Proposed Development as required. At this stage it is likely that these will include land raising, constructing certain sensitive infrastructure on raised plinths, and/or localised flood defence measures such as bunding of individual tanks. It is not possible to provide certainty on the likely measures that will be embedded in the design at this stage although further information regarding the approach to informing these measures is provided below.

10.7.16 The design of flood defence measures will provide appropriate protection to sensitive elements of the Proposed Development for the design event, taken to be the 0.5% AEP tidal event with an appropriate climate change allowance applied using the Upper End climate change scenario and inclusion of appropriate freeboard. The design of flood defence measures and application of climate change allowances will also take the design life of the Proposed Development into account. This design development is ongoing and subject of consultation with NRW. At this stage of the developing design, measures may include raising the Transformers 1.5 to 2m above adjacent ground levels. The Solar Panels themselves will be raised above adjacent ground levels (approximately 1m to the bottom edge) but can be designed for partial submersion during an extreme flood event.

10.7.17 The layout of the Proposed Development will take a sequential approach to the location of new infrastructure, locating much of the development away from areas at

greatest flood risk where possible. It may however be considered essential to locate certain infrastructure in areas of flood risk.

10.7.18 The assessment will consider potential increased risk to people and property elsewhere caused by the construction of the Proposed Development in areas at tidal and fluvial flood risk. This will be informed by comparison of baseline and future baseline scenarios for the present day and with climate change allowance and mitigation incorporated into the Proposed Development as required. If deemed to be required, floodplain compensation may need to be provided for any loss of fluvial floodplain. The need for works in areas at fluvial flood risk and the need for fluvial floodplain compensation will be confirmed during the preparation of the FCA.

10.7.19 The design of flood defence measures will also give consideration to the need for environmental protection should a flood event occur, for example if infrastructure located within areas of flood risk may experience flooding and could result in release of harmful substances. Areas deemed to pose pollution risk will be protected up to the 0.5% AEP tidal event with an appropriate climate change allowance over the design life of the Proposed Development.

10.7.20 The approach and proposed management of flood risk will be discussed with NRW, SAB and LLFA throughout the course of the assessment.

Drainage Strategy

10.7.21 The Proposed Development will be served by an onsite drainage system for the management of surface water, to be consistent with Schedule 3 of the Flood and Water Management Act 2010 and the Statutory National Standards for Sustainable Drainage Systems in Wales. It is expected that surface water will ultimately be discharged to the Severn Estuary. The drainage system will be designed to mirror the existing drainage arrangements as closely as possible, ensuring that flood risk to the Proposed Development and elsewhere is appropriately managed at source and the risk of unacceptable pollution to identified surface water and groundwater receptors is minimised as much as possible.

10.7.22 The design will manage runoff at source and provide attenuation for 1% AEP storm event with 40% climate change allowance to peak rainfall intensity for the Severn

River Basin District, in line with relevant guidance for the 2050s. Runoff rates and volumes will be controlled to meet Standard S2 of the Statutory National Standards for Sustainable Drainage Systems in Wales. However, due to the Site's specific characteristics and the Proposed Development's limited 40-year operational lifespan, there is potential to consider a reduced attenuation design storm event, subject to consultation and agreement with the LLFA, SAB and NRW.

10.7.23 Runoff from impermeable areas including access roads, substations and associated compounds will be managed through attenuation ditches integrated with the existing land drainage system. These ditches are intended primarily for storage rather than conveyance, following existing topography and operating on hydraulic head principles. Controlled overflows will direct excess water towards penstock locations and designated discharge points. This storage-led approach is the most practicable option for linear infrastructure in locations where site levels prevent conventional piped connections to larger attenuation facilities. The primary objective is maintaining the existing runoff regime on site, ensuring that the current flow regime is maintained and that any risks associated with alterations in runoff are effectively mitigated.

10.7.24 The PV Arrays will be elevated to maintain existing drainage flow paths and will be managed by a low-intervention approach to preserve greenfield runoff conditions beneath the panels. Runoff will occur at the lower edges of the panels and may lead to localised ponding; however, significant increases in runoff velocity are not anticipated given the predominantly gentle site gradients, which reach up to approximately 1 in 2000 across the fields. Any local effects are expected to remain contained within individual sub-catchments bounded by drainage channels, although they could cumulatively influence water levels in main channels fitted with flow control devices.

10.7.25 Water levels across fields and the wider network will be managed using shallow ditches with penstocks to retain water at source and distribute stormwater locally. Discharge points have been identified, and new channels will be designed to a minimum depth of 0.6m.

10.7.26 While cumulative downstream effects are possible where multiple discharges

combine in larger channels following heavy rainfall, the emphasis on storage over conveyance reduces peak runoff and seeks to maintain discharge rates at pre-development (Qbar) levels, thereby managing flood risk.

10.7.27 The drainage system relies on slow-moving or stagnant water; hence sediment accumulation is anticipated. Vegetation within ditches will assist in trapping sediment and reducing pollutant transport, supporting water quality. Ongoing routine maintenance will be required to ensure long-term system performance and to protect the receiving environment.

Other Measures

10.7.28 The safe operation of the Proposed Development will be paramount to the protection of the water environment and subject to rigorous controls that will form part of the required permit applications. The management of surface water runoff from these areas will also be considered as part of the SWDS and monitoring/treatment processes incorporated as required.

10.7.29 The Proposed Development does not require a water supply, and no groundwater or surface water abstractions are proposed.

10.7.30 More information regarding the design, mitigations and enhancement measures are detailed in **Chapter 2: Description of the Proposed Development**.

Net Benefit for Biodiversity

10.7.31 Opportunities to implement a Net Benefit for Biodiversity (NBB) are being considered for the Proposed Development, including the potential to enhance surface water features through active land management. Opportunities for incorporation are being considered in areas both on and adjacent to the Site and will be considered on an ongoing basis as further design details are confirmed.

10.8 Assessment of Likely Impacts and Effects

10.8.1 This section details the preliminary assessment of likely impacts and effects of the Proposed Development during both the construction and operation phases. As discussed previously, decommissioning has not been assessed separately at this time as risks are considered similar to those experienced during construction.

10.8.2 Impacts to Ecology, including sensitive and/or aquatic species and habitats, are discussed in **Chapter 8: Ecology**.

Construction Phase

10.8.3 A preliminary assessment of the potentially significant effects to the Water Environment and Flood Risk through the construction phase is summarised in **Table 10-19**, **Table 10-20**, and **Table 10-21**.

10.8.4 The construction assessment presented in this Chapter is appropriate for the construction programme, although this will be assessed and confirmed in the ES. An assessment of effects on morphology will be completed within the WFD and submitted at ES stage.

Table 10-19: Summary of Effect on Surface Water Receptors during Construction

Receptor	Sensitivity of Receptor	Effect	Preliminary Magnitude of Impact	Preliminary Significance of Effect
Severn Estuary	Very High	Increased pollution risks from spillage of fuels or other harmful substances.	Negligible – Given the tidal nature of the Severn Estuary and lack of works proposed in direct proximity to the waterbody, the potential impacts are unlikely to result in the loss or degradation of the integrity of the receptor. Construction will be completed in line with the Guidance to Pollution Prevention principles (Ref 10-46) and oCEMP (**Appendix 2A**) as embedded mitigation.	Minor (**Not Significant**)
Severn Estuary	Very High	Risk of increased sedimentation.	No Change – Given the size and tidal nature of the Severn Estuary, potential risks associated with increased sedimentation are highly unlikely to result in a measurable change in attributes, quality or vulnerability.	Neutral (**Not Significant**)
Monks Ditch, Windmill	High	Increased pollution risks from	Negligible Adverse –Works proposed directly in the watercourses are limited to	Minor (**Not Significant**)

Reen (Yoke Reen), Mill Reen		spillage of fuels or other harmful substances.	watercourse crossings for construction access tracks and cable crossings. At the time of writing approximately 3 watercourse crossings are proposed for Mill Reen and 2 are proposed for Windmill Reen (Yoke Reen). Cable crossings are proposed via bridges or underground routes via HDD and will not require direct construction within the channel. Other works will be undertaken adjacent to the bank top. Construction will be completed in line with best practise and the principles outlined in the Guidance to Pollution Prevention (Ref 10-46) and oCEMP (**Appendix 2A**) as embedded mitigation. Topography at the Site is very flat and will limit pollution migration. Flow within the watercourses is also very slow and will facilitate quick pollution containment if required. Risk of pollution risk is considered to be very low.	
Monks Ditch, Windmill Reen (Yoke Reen), Mill Reen	High	Risk of increased sedimentation.	Low Adverse –Works proposed directly in the watercourse are limited to watercourse crossings for construction access tracks and cable crossings. At the time of writing approximately 3 watercourse crossings are proposed for Mill Reen and 2 are proposed for Windmill Reen (Yoke Reen). Cable crossings are proposed via bridges or underground routes and will not require direct construction within the channel. Other works will be undertaken adjacent to the bank top. Sediment could potentially discharge to the watercourse with localised and temporary effect.	Minor or Moderate (**Significant**)

			Construction will be completed in line with best practise and the principles outlined in the Guidance to Pollution Prevention (Ref 10-46) and oCEMP (**Appendix 2A**) as embedded mitigation. Topography at the Site is very flat and will limit sediment migration. Flow within the watercourses is also very slow and sediment will settle quickly.	
Monks Ditch, Windmill Reen (Yoke Reen), Mill Reen	High	Potential for damage to existing watercourse crossings (culverts and bridges) that could lead to water quality impact.	Negligible – Appropriate access roads and hardstanding will be used for construction traffic and haulage. Appropriate inspection and mitigation, to prevent collapse or damage to these assets, will be implemented.	Minor (**Not Significant**)
Monks Ditch, Windmill Reen (Yoke Reen), Mill Reen	High	Impact to watercourse quality attributes from temporary culverting or other physical modifications.	Low Adverse – At the time of writing no temporary culverting is proposed. Watercourse crossings for access tracks are required for Mill Reen and Windmill Reen (Yoke Reen) and will result in minor modification to the bank profiles and bank tops of the reens.	Minor or Moderate (**Significant**)
Elver Pill Reen, Cold Harbour Reen, Collister Pill,	High	Increased pollution risks from spillage of fuels or other harmful	Negligible Adverse –Works proposed directly in the watercourse are limited to watercourse crossings for construction access tracks and cable crossings. At the time of writing 1 watercourse crossing is	Minor (**Not Significant**)

Back Ditch		substances.	proposed for the each of the following: Cold Harbour Reen and Elver Pill Reen. Cable crossings are proposed via bridges or underground routes and will not require direct construction within the channel. Other works will be undertaken adjacent to the bank top. Construction will be completed in line with best practise and the principles outlined in the Guidance to Pollution Prevention (Ref 10-46) and oCEMP (**Appendix 2A**) as embedded mitigation. Topography at the Site is very flat and will limit pollution migration. Flow within the watercourses is also very slow and will facilitate quick pollution containment if required. Risk of pollution risk is considered to be very low.	
Elver Pill Reen, Cold Harbour Reen, Collister Pill, Back Ditch	High	Risk of increased sedimentation.	Low Adverse – Works proposed directly in the watercourse are limited to watercourse crossings for construction access tracks and cable crossings. At the time of writing 1 watercourse crossing is proposed for the each of the following: Cold Harbour Reen and Elver Pill Reen. Cable crossings are proposed via bridges or underground routes and will not require direct construction within the channel. Other works will be undertaken adjacent to the bank top. Pollutants and sediment could potentially discharge to the watercourse with localised and temporary effect. Construction will be completed in line with best practise and the principles outlined in the Guidance to Pollution Prevention (Ref 10-46) and oCEMP (**Appendix 2A**) as	Minor or Moderate (**Significant**)

			embedded mitigation. Topography at the Site is very flat and will limit sediment migration. Flow within the watercourses is also very slow and sediment will settle quickly.	
Elver Pill Reen, Cold Harbour Reen, Collister Pill, Back Ditch	High	Potential for damage to existing watercourse crossings (culverts and bridges) that could lead to water quality impact.	Negligible – Appropriate access roads and hardstanding will be used for construction traffic and haulage. Appropriate inspection and mitigation, to prevent collapse or damage to these assets, will be implemented.	Minor (**Not Significant**)
Elver Pill Reen, Cold Harbour Reen, Collister Pill, Back Ditch	High	Impact to watercourse quality attributes from temporary culverting or other physical modifications.	Low Adverse – At the time of writing no temporary culverting is proposed. Watercourse crossings for access tracks are required for Cold Harbour Reen and Elver Pill Reen and will result in minor modification to the bank profiles and bank tops of the reens. Construction will be completed in line with best practise and the principles outlined in the Guidance to Pollution Prevention (Ref 10-46) and oCEMP (**Appendix 2A**) as embedded mitigation.	Minor or Moderate (**Significant**)
Ordinary watercourses and ditches	Low to High	Increased pollution risks from spillage of fuels or other harmful	Negligible Adverse –Works proposed directly in the watercourse are limited to watercourse crossings for construction access tracks and cable crossings. Cable crossings are proposed via bridges or underground routes and will not	Neutral to Minor (**Not Significant**)

		substances.	require direct construction within the channel. Other works will be undertaken adjacent to the bank top. Construction will be completed in line with best practise and the principles outlined in the Guidance to Pollution Prevention (Ref 10-46) and oCEMP (**Appendix 2A**) as embedded mitigation. Topography at the Site is very flat and will limit pollution migration. Flow within the watercourses is also very slow and will facilitate quick pollution containment if required. Risk of pollution risk is considered to be very low.	
Ordinary watercourses and ditches	Low to High	Risk of increased sedimentation.	Low Adverse –Works proposed directly in the watercourse are limited to watercourse crossings for construction access tracks and cable crossings. Cable crossings are proposed via bridges or underground routes and will not require direct construction within the channel. Other works will be undertaken adjacent to the bank top. Pollutants and sediment could potentially discharge to the watercourse with localised and temporary effect. Construction will be completed in line with best practise and the principles outlined in the Guidance to Pollution Prevention (Ref 10-46) and oCEMP (**Appendix 2A**) as embedded mitigation. Topography at the Site is very flat and will limit sediment migration. Flow within the watercourses is also very slow and sediment will settle quickly.	Neutral to Moderate (**Significant**)

Ordinary watercourses and ditches	Low to High	Potential for damage to existing watercourse crossings (culverts and bridges) that could lead to water quality impact.	Negligible – Appropriate access roads and hardstanding will be used for construction traffic and haulage. Appropriate inspection and mitigation, to prevent collapse or damage to these assets, will be implemented.	Neutral to Minor (**Not Significant**)
Ordinary watercourses and ditches	Low to High	Impact to watercourse quality attributes from temporary culverting or other physical modifications.	Low Adverse – At the time of writing no temporary culverting is proposed. Watercourse crossings for access tracks are required and will result in minor modification to the bank profiles and bank tops of the ordinary watercourses and ditches. Construction will be completed in line with best practise and the principles outlined in the Guidance to Pollution Prevention (Ref 10-46) and oCEMP (**Appendix 2A**) as embedded mitigation.	Neutral to Moderate (**Significant**)

Table 10-20: Summary of Effect on Groundwater Receptors during Construction

Receptor	Sensitivity of Receptor	Effect	Preliminary Magnitude of Impact	Preliminary Significance of Effect
Usk Devonian Old Red Sandstone	Medium	Impacts to groundwater quantity (level and flow) and quality.	Medium Adverse - potential temporary loss of water from storage and reduction in water levels (locally) within Secondary aquifer from construction phase activities (i.e., intrusive	Moderate (**Significant**)

			earthworks that extend below the groundwater table) and groundwater control measures i.e., dewatering. Potential increased pollution risk from spillage of fuel and other harmful substances.	
Usk and Wye Southern Carboniferous Limestone	Low	Impacts to groundwater quantity (level and flow) and quality.	Low Adverse – located to the north-east of the Study Area but outside the PEIR Assessment Boundary. Potential temporary loss of water from storage and reduction in water levels (locally) within aquifers from construction phase activities (i.e., intrusive earthworks that extend below the groundwater table) and groundwater control measures i.e., dewatering. Potential increased pollution risk from spillage of fuel and other harmful substances.	Neutral or Minor (**Not Significant**)
Private water supplies	Low	Potential reduction in water level (locally) within the Secondary aquifer due to groundwater control measures.	Medium Adverse - No data/information has been made available through consultation to date on small private (unlicenced) water supplies. Scoped in at this stage. Further assessment of impact will be completed at ES stage after further consultation.	Minor (**Not Significant**)
GWDTE - Magor Marsh	Very High	Potential indirect impact to groundwater	Low Adverse – Magor Marsh is located approximately 600m to	Moderate (**Significant**)

nature reserve		quantity (level and flow) and quality.	the north of the PEIR Assessment Boundary. Considering the proximity of Magor Marsh to the construction phase activities proposed within the Site there is a potential indirect risk to groundwater quantity and quality if these sites are hydrogeological connected.	
GWDTE - Magor Marsh nature reserve	Very High	Potential reduction in water level (locally) within aquifers due to groundwater control measures if sites are hydrogeological connected.	Low Adverse – Magor Marsh is located approximately 600m to the north of the PEIR Assessment Boundary. Considering the proximity of Magor Marsh to the construction phase activities proposed within the Site there is a potential indirect risk to groundwater quantity and quality if these sites are hydrogeological connected.	Moderate (**Significant**)

Table 10-21: Summary of Effect on Flood Risk Receptors during Construction

Receptor	Sensitivity of Receptor	Effect	Preliminary Magnitude of Impact	Preliminary Significance of Effect
Residential properties, childcare facilities, vulnerable industry/business properties	High to Very High	Increased flood risk from temporary construction works within/adjacent to the floodplain.	Negligible – The majority of the Proposed Development is located in areas at low flood risk when the presence of flood defences are taken into account. Care will be taken when working close to existing flood defences. Potential effects associated with the permanent works over the design life of the Proposed	Minor (**Not Significant**)

			Development are assessed as operational effects.	
Agricultural land, sewage treatment works, less vulnerable industry/business properties	Medium	Increased flood risk from temporary construction works within/adjacent to the floodplain.	Negligible – The majority of the Proposed Development is located in areas at low flood risk when the presence of flood defences are taken into account. Care will be taken when working close to existing flood defences. Potential effects associated with the permanent works over the design life of the Proposed Development are assessed as operational effects.	Neutral (**Not Significant**)
The Proposed Development	Medium	Increased flood risk from temporary construction works within/adjacent to the floodplain.	Negligible – The majority of the Proposed Development is located in areas at low flood risk when the presence of flood defences are taken into account. Care will be taken when working close to existing flood defences. Potential effects associated with the permanent works over the design life of the Proposed Development are assessed as operational effects.	Neutral (**Not Significant**)
Residential properties, childcare facilities, vulnerable industry/business properties	High to Very High	Potential damage, obstruction or modification of existing flood defence infrastructure.	Negligible – Existing flood defence infrastructure will be retained during construction of the Proposed Development with no expected change to form or function. Works within 16m of flood defences will be subject to a FRAP. Consideration will also be given to maintenance access requirements during construction.	Minor (**Not Significant**)
Agricultural land, sewage treatment	Medium	Potential damage, obstruction or	Negligible – Existing flood defence infrastructure will be retained during construction of the Proposed Development	Neutral (**Not Significant**)

works, less vulnerable industry/business properties		modification of existing flood defence infrastructure.	with no expected change to form or function. Works within 16m of flood defences will be subject to a FRAP. Consideration will also be given to maintenance access requirements during construction.	
The Proposed Development	Medium	Potential damage, obstruction or modification of existing flood defence infrastructure.	Negligible – Existing flood defence infrastructure will be retained during construction of the Proposed Development with no expected change to form or function. Works within 16m of flood defences will be subject to a FRAP. Consideration will also be given to maintenance access requirements during construction.	Neutral (**Not Significant**)

Operation Phase

10.8.5 A preliminary assessment of the potentially significant effects to the water environment and flood risk through the operational phase is summarised in **Table 10-22**, **Table 10-23**, and **Table 10-24**. A conservative approach of the assessment of likely potential significant effects has been adopted based on design information available at the time of writing and uncertainties regarding proposed mitigation.

10.8.6 An assessment of effects on morphology will be completed within the WFD and submitted at ES stage.

Table 10-22: Summary of Effect on Surface Water Receptors during Operation

Receptor	Sensitivity of Receptor	Effect	Preliminary Magnitude of Impact	Preliminary Significance of Effect
Severn Estuary	Very High	Polluted surface water runoff and spillage risks containing	Negligible – An appropriate surface water drainage system will be implemented that will incorporate	Minor (**Not Significant**)

		silts, hydrocarbons or other harmful chemicals.	appropriate pollution control and maintenance measures to mitigate the risk of pollution during operation. The operation of the Proposed Development will also include appropriate monitoring and control of environmental risks.	
Monks Ditch, Windmill Reen (Yoke Reen), Mill Reen	High	Polluted surface water runoff and spillage risks containing silts, hydrocarbons or other harmful chemicals.	Negligible – An appropriate surface water drainage system will be implemented that will incorporate appropriate pollution control and maintenance measures to mitigate the risk of pollution during operation. The operation of the Proposed Development will also include appropriate monitoring and control of environmental risks.	Minor (**Not Significant**)
Elver Pill Reen, Cold Harbour Reen, Collister Pill, Back Ditch	High	Polluted surface water runoff and spillage risks containing silts, hydrocarbons or other harmful chemicals.	Negligible – An appropriate surface water drainage system will be implemented that will incorporate appropriate pollution control and maintenance measures to mitigate the risk of pollution during operation. The operation of the Proposed Development will also include appropriate monitoring and control of environmental risks.	Minor (**Not Significant**)

Ordinary watercourses and ditches	Low to High	Polluted surface water runoff and spillage risks containing silts, hydrocarbons or other harmful chemicals.	Negligible – An appropriate surface water drainage system will be implemented that will incorporate appropriate pollution control and maintenance measures to mitigate the risk of pollution during operation. The operation of the Proposed Development will also include appropriate monitoring and control of environmental risks.	Neutral to Minor (**Not Significant**)

Table 10-24: Summary of Effect on Groundwater Receptors during Operation

Receptor	Sensitivity of Receptor	Effect	Preliminary Magnitude of Impact	Preliminary Significance of Effect
Usk Devonian Old Red Sandstone **Usk and Wye Southern Carboniferous Limestone**	Medium to Low	Impacts to groundwater quantity (level and flow) and quality.	Negligible – The surface water drainage system will incorporate appropriate pollution control and maintenance measures to mitigate the risk of pollution during operation. Below ground structures are not considered to be of sufficient size to interrupt natural groundwater levels or flows. Below ground cable routes may cause a localised effect to groundwater levels and flows but of a local and insignificant magnitude.	Neutral (**Not Significant**)
GWDTE - Magor Marsh	Very High	Impacts to groundwater	No Change – The receptor is located to the north of the	Neutral (**Not Significant**)

nature reserve		quantity (level and flow) and quality.	PEIR Assessment Boundary. The surface water drainage system will incorporate appropriate pollution control and maintenance measures to mitigate the risk of pollution during operation. Below ground structures are not considered to be of sufficient size to interrupt natural groundwater levels or flows. Below ground cable routes may cause a localise effect to groundwater levels and flows but of a local and insignificant magnitude. .	

Table 10-24: Summary of Effect on Flood Risk Receptors during Operation

Receptor	Sensitivity of Receptor	Effect	Preliminary Magnitude of Impact	Preliminary Significance of Effect
Residential properties, childcare facilities, vulnerable industry/business properties	High to Very High	Potential for increased surface water flood risk due to an increase in impermeable area and surface runoff.	Negligible – An appropriate surface water drainage system will be implemented that will limit surface water runoff to no more than existing and demonstrate betterment where reasonably practicable.	Minor (**Not Significant**)
Agricultural land, sewage treatment works, less vulnerable industry/business properties	Medium	Potential for increased surface water flood risk due to an increase in impermeable area and	Negligible – An appropriate surface water drainage system will be implemented that will limit surface water runoff to no more than existing and demonstrate betterment	Neutral (**Not Significant**)

		surface runoff.	where reasonably practicable.	
The Proposed Development	Medium	Potential for increased surface water flood risk due to an increase in impermeable area and surface runoff.	Low Adverse – The potential for impacts from new impermeable surfacing, for example the Solar Panels, is acknowledged as a potential risk. However, there is a commitment to implementing appropriate mitigation in for the form of a SWDS to limit surface water runoff. Any further mitigation measures required beyond the SWDS and best practice flood prevention measures will be discussed with NRW and the LLFA, as required.	Minor (**Not Significant**)
Residential properties, childcare facilities, vulnerable industry/business properties	High to Very High	Increased flood risk from changes to flood flow conveyance and storage.	Negligible Adverse – Works within areas of flood risk are considered unlikely to adversely affect flood risk to adjacent urban areas given the low density nature of the Proposed Development and ability of flood waters to flow through the Proposed Development. The risk will be assessed further in the FCA.	Minor (**Not Significant**)
Agricultural land, sewage treatment works, less vulnerable industry/business properties	Medium	Increased flood risk from changes to flood flow	Low Adverse – Works within areas of flood risk are considered unlikely to significantly affect flood risk to adjacent land given the	Minor (**Not Significant**)

		conveyance and storage.	low density nature of the Proposed Development and ability of flood waters to flow through the Proposed Development. Some minor increase may occur during a tidal breach event when flood waters may enter the Site in a more rapid way that from overtopping. The risk will be assessed further in the FCA.	
The Proposed Development	Medium	Increased flood risk due to the location of the Proposed Development in an area of flood risk.	Low Adverse – The Proposed Development is identified to be at flood risk. Sensitive infrastructure will be protected, including elements that may pose pollution risk. The Solar Panels will be raised above ground level but can withstand submersion during extreme events. The risk will be assessed further in the FCA.	Minor (**Not Significant**)
Residential properties, childcare facilities, vulnerable industry/business properties **Agricultural land, sewage treatment works, less vulnerable industry/business properties**	Medium to Very High	Potential for increased flood risk from structures that extend below the groundwater table forming groundwater flow barriers.	No Change – The Site likely has high groundwater levels but as discussed in **Section 10.5**, groundwater flood risk is assessed as low. If groundwater flooding occurs, this would be local to the Site and not considered likely to affect receptors elsewhere.	Neutral (**Not Significant**)

The Proposed Development	Medium	Potential for increased flood risk from structures that extend below the groundwater table forming groundwater flow barriers.	Negligible – The Site likely has high groundwater levels but as discussed in **Section 10.5**, groundwater flood risk is assessed as low. Mitigation proposed to manage risks from tidal and fluvial flooding would protect the Proposed Development against any low risk of groundwater flooding.	Minor (**Not Significant**)

10.9 Additional Monitoring, Mitigation and Enhancement Measures

10.9.1 This section sets out the preliminary additional design, mitigation, and enhancement measures relevant to the Water Environment and Flood Risk.

10.9.2 The details of the required mitigation beyond the current design commitments are yet to be determined. However, it is expected that further mitigation identified as necessary will be incorporated into the design of the Proposed Development.

Construction Phase

10.9.3 The appointed contractor will prepare a full detailed CEMP, which will contain measures to protect both surface and groundwater quality, and other water resource aspects. The need for additional mitigation measures during construction will be determined through ongoing consultation with NRW and reported in the ES.

10.9.4 Examples of potentially appropriate additional mitigation measures are as follows:

- Water quality monitoring before and during construction activities that have the potential to effect water quality in receiving water bodies;
- Installation of barriers adjacent to sensitive water features to intercept polluted surface water runoff; and
- A piling method which does not allow the ‘dragging down’ of contaminants and does not create preferential pathways from the near-surface soils to

the aquifers where required depending onsite conditions. It is anticipated that the appropriate piling method will be determined as detailed design progresses following additional assessment of the ground conditions i.e., completion of intrusive ground investigation to obtain site-specific geotechnical and geo-environmental data to inform detailed design and through consultation with relevant stakeholders.

Operation Phase

10.9.5 No further additional design, mitigation or enhancement measures are proposed for the water environment and flood risk at this stage but will be considered and confirmed as part of the ES as the design develops, in acknowledgement that there are likely significant adverse effects that have been identified at this preliminary stage. Additional mitigation and enhancement measures will be considered within the proposed drainage strategy.

Monitoring

10.9.6 No need for water monitoring has been identified at this stage but will be considered as part of the ES as the design develops. The need for monitoring will be derived through ongoing consultation with NRW and reported in the ES.

10.10 Residual Effects and Conclusions

10.10.1 **Table 10-25** and **Table 10-26** below summarises the residual effects associated with the construction and operational phases of the Proposed Development. The tables below assume that the detail of what is proposed further to the principles and mitigation set out in **Section 9.7** to **Section 9.9** will be specifically effective to reduce the effects.

Table 10-25: Summary of Residual Effects (Construction and Decommissioning)

Receptor	Description of impact	Significance of effect without additional mitigation / enhancement	Residual effect after additional mitigation / enhancement
Severn Estuary	Polluted surface water runoff and spillage risks containing silts,	Minor (Not Significant)	Minor (**Not Significant**) – A CEMP will identify further mitigation

	hydrocarbons or other harmful chemicals.		measures to be included within the construction methodology. This will be assessed at ES stage as the design develops.
Severn Estuary	Risk of increased sedimentation.	Neutral (Not Significant)	Neutral (**Not Significant**) – A CEMP will identify further mitigation measures to be included within the construction methodology. This will be assessed at ES stage as the design develops.
Monks Ditch, Windmill Reen (Yoke Reen), Mill Reen	Polluted surface water runoff and spillage risks containing silts, hydrocarbons or other harmful chemicals.	Minor (Not Significant)	Minor (**Not Significant**) – A CEMP will identify further mitigation measures to be included within the construction methodology. This will be assessed at ES stage as the design develops.
Monks Ditch, Windmill Reen (Yoke Reen), Mill Reen	Risk of increased sedimentation.	Minor or Moderate (Significant)	Minor or Moderate (**Significant**) – A CEMP will identify further mitigation measures to be included within the construction methodology. This will be assessed at ES stage as the design develops.
Monks Ditch, Windmill Reen	Potential for damage to existing watercourse crossings (culverts	Minor (Not Significant)	Minor (**Not Significant**) – A CEMP will identify further mitigation

(Yoke Reen), Mill Reen	and bridges) that could lead to water quality impact.		measures to be included within the construction methodology. This will be assessed at ES stage as the design develops.
Monks Ditch, Windmill Reen (Yoke Reen), Mill Reen	Impact to watercourse quality attributes from temporary culverting or other physical modifications.	Minor or Moderate (Significant)	Minor or Moderate (**Significant**) – A CEMP will identify further mitigation measures to be included within the construction methodology. This will be assessed at ES stage as the design develops.
Elver Pill Reen, Cold Harbour Reen, Collister Pill, Back Ditch	Polluted surface water runoff and spillage risks containing silts, hydrocarbons or other harmful chemicals.	Minor (Not Significant)	Minor (**Not Significant**) – A CEMP will identify further mitigation measures to be included within the construction methodology. This will be assessed at ES stage as the design develops.
Elver Pill Reen, Cold Harbour Reen, Collister Pill, Back Ditch	Risk of increased sedimentation.	Minor or Moderate (Significant)	Minor or Moderate (**Significant**) – A CEMP will identify further mitigation measures to be included within the construction methodology. This will be assessed at ES stage as the design develops.
Elver Pill Reen, Cold Harbour	Potential for damage to existing watercourse crossings (culverts	Minor (Not Significant)	Minor (**Not Significant**) – A CEMP will identify further mitigation

Reen, Collister Pill, Back Ditch	and bridges) that could lead to water quality impact.		measures to be included within the construction methodology. This will be assessed at ES stage as the design develops.
Elver Pill Reen, Cold Harbour Reen, Collister Pill, Back Ditch	Impact to watercourse quality attributes from temporary culverting or other physical modifications.	Minor or Moderate (Significant)	Minor or Moderate (**Significant**) – A CEMP will identify further mitigation measures to be included within the construction methodology. This will be assessed at ES stage as the design develops.
Ordinary watercourses and ditches	Polluted surface water runoff and spillage risks containing silts, hydrocarbons or other harmful chemicals.	Neutral to Minor (Not Significant)	Neutral to Minor (Not Significant) – A CEMP will identify further mitigation measures to be included within the construction methodology. This will be assessed at ES stage as the design develops.
Ordinary watercourses and ditches	Risk of increased sedimentation.	Neutral to Moderate (Significant)	Neutral to Moderate (**Significant**) – A CEMP will identify further mitigation measures to be included within the construction methodology. This will be assessed at ES stage as the design develops.
Ordinary watercourses and ditches	Potential for damage to existing watercourse crossings (culverts	Neutral to Minor (Not Significant)	Neutral to Minor (**Not Significant**) – A CEMP will identify further mitigation

	and bridges) that could lead to water quality impact.		measures to be included within the construction methodology. This will be assessed at ES stage as the design develops.
Ordinary watercourses and ditches	Impact to watercourse quality attributes from temporary culverting or other physical modifications.	Neutral to Moderate (Significant)	Neutral to Moderate (**Significant**) – A CEMP will identify further mitigation measures to be included within the construction methodology. This will be assessed at ES stage as the design develops.
Usk Devonian Old Red Sandstone	Impacts to groundwater quantity (level and flow) and quality.	Moderate (Significant)	Moderate (**Significant**) – A CEMP will identify further mitigation measures to be included within the construction methodology. This will be assessed at ES stage as the design develops.
Usk and Wye Southern Carboniferous Limestone	Impacts to groundwater quantity (level and flow) and quality.	Neutral to Minor (Not Significant)	Neutral to Minor (**Not Significant**) – A CEMP will identify further mitigation measures to be included within the construction methodology. This will be assessed at ES stage as the design develops.
Private Water Supplies	Potential reduction in water level (locally) within the Secondary aquifer	Minor (Not Significant)	Minor (**Not Significant**) – A CEMP will identify further mitigation

	due to groundwater control measures.		measures to be included within the construction methodology. This will be assessed at ES stage as the design develops.
GWDTE - Magor Marsh nature reserve	Potential indirect impact to groundwater quantity (level and flow) and quality.	Moderate (Significant)	Moderate (**Significant**) – A CEMP will identify further mitigation measures to be included within the construction methodology. This will be assessed at ES stage as the design develops.
GWDTE - Magor Marsh nature reserve	Potential reduction in water level (locally) within aquifers due to groundwater control measures if sites are hydrogeological connected.	Moderate (Significant)	Moderate (**Significant**) – A CEMP will identify further mitigation measures to be included within the construction methodology. This will be assessed at ES stage as the design develops.
Residential properties, childcare facilities, vulnerable industry/business properties	Increased flood risk from temporary construction works within/adjacent to the floodplain.	Minor (Not Significant)	Minor (**Not Significant**) – A CEMP will identify further mitigation measures to be included within the construction methodology. This will be assessed at ES stage as the design develops.
Residential properties, childcare facilities, vulnerable	Potential damage, obstruction or modification of existing flood	Minor (Not Significant)	Minor (**Not Significant**) – A CEMP will identify further mitigation

industry/business properties	defence infrastructure.		measures to be included within the construction methodology. This will be assessed at ES stage as the design develops.
Agricultural land, sewage treatment works, less vulnerable industry/business properties	Increased flood risk from temporary construction works within/adjacent to the floodplain.	Neutral (Not Significant)	Neutral (**Not Significant**) – A CEMP will identify further mitigation measures to be included within the construction methodology. This will be assessed at ES stage as the design develops.
Agricultural land, sewage treatment works, less vulnerable industry/business properties	Potential damage, obstruction or modification of existing flood defence infrastructure.	Neutral (Not Significant)	Neutral (**Not Significant**) – A CEMP will identify further mitigation measures to be included within the construction methodology. This will be assessed at ES stage as the design develops.
The Proposed Development	Increased flood risk from temporary construction works within/adjacent to the floodplain.	Neutral (Not Significant)	Neutral (**Not Significant**) – A CEMP will identify further mitigation measures to be included within the construction methodology. This will be assessed at ES stage as the design develops.
The Proposed Development	Potential damage, obstruction or modification of existing flood	Neutral (Not Significant)	Neutral (**Not Significant**) – A CEMP will identify further mitigation

	defence infrastructure.		measures to be included within the construction methodology. This will be assessed at ES stage as the design develops.

Table 10-26: Summary of Residual Effects (Operation)

Receptor	Description of impact	Significance of effect without additional mitigation / enhancement	Residual effect after additional mitigation / enhancement
Severn Estuary	Polluted surface water runoff and spillage risks containing silts, hydrocarbons or other harmful chemicals.	Minor (Not Significant)	Minor (**Not Significant**) – The SWDS will identify further mitigation measures to be included. This will be assessed at ES stage as the design develops.
Monks Ditch, Windmill Reen (Yoke Reen), Mill Reen	Polluted surface water runoff and spillage risks containing silts, hydrocarbons or other harmful chemicals.	Minor (Not Significant)	Minor (**Not Significant**) – The SWDS will identify further mitigation measures to be included. This will be assessed at ES stage as the design develops.
Elver Pill Reen, Cold Harbour Reen, Collister Pill, Back Ditch	Polluted surface water runoff and spillage risks containing silts, hydrocarbons or	Minor (Not Significant)	Minor (**Not Significant**) – The SWDS will identify further mitigation measures to be included. This will

	other harmful chemicals.		be assessed at ES stage as the design develops.
Ordinary watercourses and ditches	Polluted surface water runoff and spillage risks containing silts, hydrocarbons or other harmful chemicals.	Neutral to Minor (Not Significant)	Neutral to Minor (**Not Significant**) – The SWDS will identify further mitigation measures to be included. This will be assessed at ES stage as the design develops.
Usk Devonian Old Red Sandstone	Impacts to groundwater quantity (level and flow) and quality.	Neutral (Not Significant)	Neutral (**Not Significant**) – Additional mitigation measures will be assessed at ES stage within the FCA.
Usk and Wye Southern Carboniferous Limestone	Impacts to groundwater quantity (level and flow) and quality.	Neutral (Not Significant)	Neutral (**Not Significant**) – Additional mitigation measures will be assessed at ES stage within the FCA.
GWDTE - Magor Marsh nature reserve	Impacts to groundwater quantity (level and flow) and quality.	Neutral (Not Significant)	Neutral (**Not Significant**) – Additional mitigation measures will be assessed at ES stage within the FCA.
Residential properties, childcare facilities, vulnerable industry/business properties	Potential for increased surface water flood risk due to an increase in impermeable area and surface runoff.	Minor (Not Significant)	Minor (**Not Significant**) – Additional mitigation measures will be assessed at ES stage within the FCA.
Agricultural land, sewage treatment works, less	Potential for increased surface water flood risk due	Neutral (Not Significant)	Neutral (**Not Significant**) – Additional mitigation

vulnerable industry/business properties	to an increase in impermeable area and surface runoff.		measures will be assessed at ES stage within the FCA.
The Proposed Development	Potential for increased surface water flood risk due to an increase in impermeable area and surface runoff.	Minor (Not Significant)	Minor (**Not Significant**) – Additional mitigation measures will be assessed at ES stage within the FCA.
Residential properties, childcare facilities, vulnerable industry/business properties	Increased flood risk from changes to flood flow conveyance and storage.	Minor (Not Significant)	Minor (**Not Significant**) – Additional mitigation measures will be assessed at ES stage within the FCA.
Agricultural land, sewage treatment works, less vulnerable industry/business properties	Increased flood risk from changes to flood flow conveyance and storage.	Minor (Not Significant)	Minor (**Not Significant**) – Additional mitigation measures will be assessed at ES stage within the FCA.
The Proposed Development	Increased flood risk from changes to flood flow conveyance and storage.	Minor (Not Significant)	Minor (**Not Significant**) – Additional mitigation measures will be assessed at ES stage within the FCA.
Residential properties, childcare facilities, vulnerable industry/business properties	Potential for increased flood risk from structures that extend below the groundwater table forming groundwater flow barriers.	Neutral (Not Significant)	Neutral (**Not Significant**) – Additional mitigation measures will be assessed at ES stage within the FCA.
Agricultural land, sewage treatment works, less	Potential for increased flood risk from structures that	Neutral (Not Significant)	Neutral (**Not Significant**) – Additional mitigation

vulnerable industry/business properties	extend below the groundwater table forming groundwater flow barriers.		measures will be assessed at ES stage within the FCA.
The Proposed Development	Potential for increased flood risk from structures that extend below the groundwater table forming groundwater flow barriers.	Minor (Not Significant)	Minor (**Not Significant**) – Additional mitigation measures will be assessed at ES stage within the FCA.

10.11 Cumulative Effects

10.11.1 The cumulative schemes located within 1.5km of the Proposed Development, have been considered as part of the cumulative assessment and are presented in **Table 10-28**. Planning decisions are provided as stated at the time of writing.

Table 10-28: Summary of Cumulative Effect assessment

Planning Authority Area	Ref.	Summary of Development	Planning Decision	Distance from Proposed Development (approx.)	Potential for Cumulative Impacts
Monmouthshire County Council	DM/2022/01490	Change of use of 2 no. bays from agricultural to B2/B8 uses.	Approved	5 metres	Low potential – **Not Significant**. The Proposed Development is located outside of the Site and approximately 115 m west of Mill Reen, a WFD watercourse. The proposed drainage does not discharge to Mill Reen and therefore cumulative impacts during operation are considered to be low.

					The Proposed Development is located in close proximity to a proposed access track; however, the application is for a change of use and therefore no increase in construction traffic is expected.
Monmouthshire County Council	DM/2025/00147	Agricultural building for storage of plant and farm machinery.	Pending Consideration-Recommendation and/or Committee	27 metres	Low potential – **Not Significant.** The Proposed Development is located outside of the Site and approximately 350 m from the nearest ordinary watercourse, Prat Reen. The Proposed Development is located in close proximity to a proposed access track. Therefore, an increase in HGV traffic is expected in the event of overlapping construction periods; however, embedded mitigation in the form of a CEMP will be in place during the construction phase.
Monmouthshire County Council	DM/2023/00161	Commencement of building works to convert barn into annex in accordance with planning permission ref DM/2017/00923.	Approved	433 m	Negligible – **Not Significant**. The Proposed Development is located outside of the Site and approximately 115 m south of the nearest ordinary watercourse, Cockenton Reen. The application is for a conversion of an existing building meaning limited HGV

					traffic is expected and an increase in surface water runoff into the reen network is unlikely to be significant.
Monmouthshire County Council	DM/2021/00293	Retrospective planning consent for the change of use of former agricultural buildings to a B2 vehicle repair/restoration. Erection of security gates at the site entrance.	Approved	863 m	Negligible – **Not Significant**. The Proposed Development is located outside of the Site and approximately 130 m north of the nearest Main River, Prat & Bridewell. The application is for the retrospective change of use of an existing building meaning no HGV traffic is expected and an increase in surface water runoff into the reen network is unlikely to be significant.
Monmouthshire County Council	DM/2020/01639	Retrospective planning permission for an underground HV cable and ancillary GRP substation.	Approved	947 m	Negligible – **Not Significant**. The Proposed Development is located outside of the Site and the Study Area.
Monmouthshire County Council	DM/2022/00690	Erection of a new Air Source Heat Pumps enclosure and siting of Mechanical Ventilation Heat Recovery unit and supply and extract ductwork on the flat roof.	Approved	1.1 km	Negligible – **Not Significant**. The Proposed Development is located outside of the Site and approximately 525 m north of Main River Prat & Bridewell. The Proposed Development is located 1.1 km north of the Site and therefore cumulative impacts during the construction

					phase are considered to be negligible. Embedded mitigation in the form of a surface water drainage strategy will be in place for the Site and therefore, cumulative impacts during operation are considered to be negligible.
Newport City Council	22/0349	Reserved matters application relating to access, appearance, landscaping, layout and scale pursuant to outline planning permission 92/0875 for erection of detached industrial building, offices and associated works (as varied by 18/1234 for use of building for b1 (business) and/or b2 (general industrial) and partial discharge of condition 02 (phasing programme).	Approved	1.15 km	Negligible – **Not Significant**. The Proposed Development is located outside of the Site and approximately 30 m east of ordinary watercourse Wilcrick Moor Reen and 215m north of ordinary watercourse Bareland Street Reen. The Proposed Development is located 1.15 km north of the Site and therefore cumulative impacts during the construction phase are considered to be negligible. Embedded mitigation in the form of a surface water drainage strategy will be in place for the Site and therefore, cumulative impacts during operation are considered to be negligible.
Newport City Council	25/0176	Reserved matters application relating to layout, scale, appearance, access and landscaping for	Approved	1.18 km	Negligible – **Not Significant**. The Proposed Development is located outside of the Site and

		4 no. commercial units (use class b1, b2, b8) pursuant to outline planning permission 06/0471 for a mixed use regeneration of the former llanwern steelworks and partial discharge of conditions 01 (reserved matters), 08 (materials), 09 (details of hard landscaped access), 10 (boundary treatments), 11 (management strategy for maintenance of open space), 12 (off street parking and cycle parking), 15 (emergency access), 16 (details of roads/cycle ways/footways), 18 (estate roads), 22 (street lighting and car parking areas), 24 (site levels), 33 (surface water disposal), 34 (foul and surface water drainage), 39 (sustainability statement) and 43 (firefighting access).			approximately 810 m north of Main River Elver Pill Reen. The Proposed Development is located 1.18 km north of the Site and embedded mitigation in the form of a CEMP will be in place. Therefore, cumulative impacts during the construction phase are considered to be negligible. Embedded mitigation in the form of a surface water drainage strategy will be in place for the Site and therefore, cumulative impacts during operation are considered to be negligible.
Newport City Council	25/0177	Reserved matters application relating to layout, scale, appearance, access and landscaping for 3 no. commercial units (use class b1,	Awaiting Decision	1.18 km	Negligible – **Not Significant**. The Proposed Development is located outside of the Site and approximately 810 m north of Main River

		b2, b8) pursuant to outline planning permission 06/0471 for a mixed use regeneration of the former llanwern steelworks and partial discharge of conditions 01 (reserved matters), 08 (materials), 09 (details of hard landscaped access), 10 (boundary treatments), 11 (management strategy for maintenance of open space), 12 (off street parking and cycle parking), 15 (emergency access), 16 (details of roads/cycleways/footways), 18 (estate roads), 22 (street lighting and car parking areas), 24 (site levels), 33 (surface water disposal), 34 (foul and surface water drainage), 39 (sustainability statement) and 43 (firefighting access).			Elver Pill Reen. The Proposed Development is located 1.18 km north of the Site and embedded mitigation in the form of a CEMP will be in place. Therefore, cumulative impacts during the construction phase are considered to be negligible. Embedded mitigation in the form of a surface water drainage strategy will be in place for the Site and therefore, cumulative impacts during operation are considered to be negligible.
Newport City Council	25/0152	Reserved matters application relating to layout, scale, appearance, access and landscaping for residential development at phase4e/4g	Awaiting Decision	1.18 km	Negligible – **Not Significant**. The Proposed Development is located outside of the Site and approximately 810 m north of Main River Elver Pill Reen. The

		pursuant to outline planning permission 06/0471 for a mixed use regeneration of the former Llanwern steelworks and partial discharge of conditions 01 (reserved matters), 06 (recreational areas), 08 (materials), 09 (details of hard landscaped access), 10 (boundary treatments), 11 (management strategy for maintenance of open space), 12 (off street parking and cycle parking), 15 (emergency access), 16 (details of roads/cycleways/footways), 18 (estate roads), 22 (street lighting and car parking areas), 24 (site levels), 33 (surface water disposal, 34 (foul and surface water drainage), 39 (sustainability statement) and 43 (firefighting access).			Proposed Development is located 1.18 km north of the Site and embedded mitigation in the form of a CEMP will be in place. Therefore, cumulative impacts during the construction phase are considered to be negligible. Embedded mitigation in the form of a surface water drainage strategy will be in place for the Site and therefore, cumulative impacts during operation are considered to be negligible.
Newport City Council	23/0440	Strategic Site H47 - Reserved matters application for 176 dwellings and associated works on phase 4d, pursuant to outline planning	Awaiting Decision	1.29 km	Low potential – **Not Significant**. The Proposed Development is located outside of the Site and approximately 833 m east of WFD

		permission 06/0471 for the redevelopment of site to create a mixed use urban extension.			watercourse Monks Ditch. The Proposed Development is located 1.29 km north of the Site and embedded mitigation in the form of a CEMP will be in place. Therefore, cumulative impacts during the construction phase are considered to be low. Embedded mitigation in the form of a surface water drainage strategy will be in place for the Site and therefore, cumulative impacts during operation are considered to be low.
Monmouthshire County Council	DM/2023/01031	Revised CTMP for planning decision DM/2021/01000.	Approved	1.35 km	Negligible – **Not Significant**. The Proposed Development is located outside of the Site and approximately 525 m north of Main River Prat & Bridewell. The Proposed Development is located 1.35 km north of the Site and therefore cumulative impacts during the construction phase are considered to be negligible. Embedded mitigation in the form of a surface water drainage strategy will be in place for the Site and therefore, cumulative impacts during operation are considered to be negligible.

Monmouthshire County Council	DM/2023/01479	T1 (Yew) reduce height by 2-3m. T3 (Yew) reduce back over clients side by 1m. G2 (Ivy) trim back to 0.5 from wall, neatly. G5 (Conifer hedge) reduce to uniform height and trim level.	Approved	1.36 km	Negligible – **Not Significant**. The Proposed Development is located outside of the Site and approximately 245 m northeast of Main River Cold Harbour Reen, 380 m west of WFD watercourse Mill Reen, and 80 m north of SSSI Magor Marsh nature reserve. The Proposed Development is located 1.36 km north of the Site and therefore cumulative impacts during the construction phase are considered to be negligible. Embedded mitigation in the form of a surface water drainage strategy will be in place for the Site and therefore, cumulative impacts during operation are considered to be negligible.
Monmouthshire County Council	DM/2021/00358	Provision of 5575m2 B1 employment space on parcel C1.	Pending Consideration-Recommendation and/or Committee	1.45 km	Negligible – **Not Significant**. The Proposed Development is located outside of the Site and approximately 690 m north of Main River Prat & Bridewell. The Proposed Development is located 1.45 km north of the Site and therefore cumulative impacts during the construction phase are considered to be negligible.

Embedded mitigation in the form of a surface water drainage strategy will be in place for the Site and therefore, cumulative impacts during operation are considered to be negligible.

10.12 Summary

10.12.1 A preliminary assessment of the likely effects to the Water Environment and Flood Risk arising from the construction and operation of the Proposed Development has been undertaken.

10.12.2 The Proposed Development will result in a minor (adverse) effect on the water environment and flood risk due to the construction of Solar Panels, Grid Connection Infrastructure, Transformers, reen crossings, and new permanent access tracks. Given the relatively small number of access tracks and reen crossings required in comparison to the size of the PEIR Assessment Boundary, and the implementation of embedded mitigation measures, it is concluded that the effect during the construction phase is not significant in EIA terms. As the Proposed Development develops and an oCEMP is completed, additional specific mitigation and enhancement measures will be identified to further reduce impact to the water environment and flood risk.

10.12.3 The Proposed Development will result in a minor (adverse) effect in the water environment and flood risk due to the increased surface water runoff. Insufficient information is available at the time of writing to assess the impact of additional mitigation and enhancement measures during the operation phase. At ES stage, a proposed SWDS will be completed, and further assessment will be completed. At this stage, it is concluded that the effect during operation of the Proposed Development, is not significant in EIA terms.

10.12.4 Further work to be completed and included in the ES comprises of:

- Continued consultation with stakeholders to discuss the Proposed Development and proposed mitigation;
- The Water Environment and Flood Consequences Assessments will be further developed and refined based on any relevant responses to the statutory consultation;
- The gaps in the assessment identified within this Chapter (e.g. FCA, drainage strategy, and WFD assessment) will be completed and outcomes confirmed within the ES;
- The detailed assessment within the ES will involve a review of the Water Environment and Flood Risk assessment presented in this Chapter, based on further information as part of ongoing design development;
- Identify appropriate piling method as detailed design progresses following additional assessment of the ground condition i.e., completion of intrusive ground investigation to obtain site-specific geotechnical and geo-environmental data to inform detailed design and through consultation with the relevant stakeholders. A piling risk assessment (to inform the detailed design) will be undertaken (Appendix 3C: Geology and Soils Technical Note (Volume 3));
- Additional intrusive ground investigation works will be required in order to provide information associated with detailed design but the intrusive works will not be carried out in advance of submission of the ES Chapter.

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