Contents

10. Water Environment

10.1 Introduction

10.1.1 This chapter presents the assessment of the likely significant effects of the Proposed Development with respect to the Water Environment, including flood risk and the Water Framework Directive (WFD). The assessment is based on information obtained to date. It should be read in conjunction with the Proposed Development description provided in **Chapter 4: Description of the Proposed Development**. and with respect to relevant parts of the following chapters:

- **Chapter 8**: **Biodiversity**; and
- **Chapter 11: Ground Conditions.**

10.1.2 This chapter describes:

- the legislation, policy and technical guidance that has informed the assessment (**Section 10.2**);
- consultation and engagement that has been undertaken and how comments from consultees relating to Water Environment have been addressed (**Section 10.3**);
- the methods used for baseline data gathering (**Section 10.4**);
- overall baseline (**Section 10.5**);
- embedded measures relevant to Water Environment (**Section 10.1.1**);
- the scope of the assessment for Water Environment (**Section 10.7**);
- the methods used for the assessment (**Section 10.8**);
- the assessment of Water Environment effects (**Section 10.9);**
- the assessment of cumulative (inter-project) effects (**Section 10.10**);
- a summary of the significance conclusions (**Section 10.10**);
- an outline of further work to be undertaken for the Environmental Statement (ES) (**Section 10.12**).

Limitations and assumptions

10.1.3 The Draft ES has been produced to fulfil the Applicant’s consultation duties and enable consultees to develop an informed view of the likely significant effects of the Proposed Development.

10.1.4 There are no limitations relating to Water Environment that affect the robustness of the assessment of the potential likely significant effects of the Proposed Development.

10.2 Relevant legislation, planning policy and technical guidance

10.2.1 This section identifies the legislation, planning policy and technical guidance that has informed the assessment of effects with respect to Water Environment. Further information on policies relevant to the Project is provided in **Chapter 5: Legislation and policy overview**.

Legislation

10.2.2 A summary of the relevant legislation is given in **Table 10.1**.

Table 10.1 Legislation relevant to the Water Environment assessment

Legislation	Legislative context
Control of Pollution Act 1974[1]	Make further provision with respect to waste disposal, water pollution, noise, atmospheric pollution and public health.
Reservoirs Act 1975[2]	Provides regulation for the operation and maintenance of reservoirs to ensure the design is fit for purpose, and that maintenance (including frequent inspections of reservoir embankments) ensures the condition of the embankments. As a consequence, the chance of them failing and giving rise to flooding problems is remote.
Environmental Protection Act 1990[3]	Makes provision for the improved control of pollution arising from certain industrial and other processes. It re-enacts the provisions of the Control of Pollution Act 1974 relating to waste on land, including modifications to the functions of the regulatory and other authorities concerned in the collection and disposal of waste and makes further provision in relation to such waste.
Land Drainage Act 1991[4] **and 1994**[5]	Stipulates, in combination with the Water Resources Act, that before work on or near an 'Ordinary Watercourse[6]' is carried out, an Ordinary Watercourse Consent is required. The Flood Defence consenting regime for 'Main Rivers[7]', which used to be part of this Act, was replaced by flood risk activities permits under the Environmental Permitting Regulations 2016.

1 UK Government. (1974). Control of Pollution Act 1974. (Online) Available from: https://www.legislation.gov.uk/ukpga/1974/40 (Accessed April 2022).
2 UK Government. (1975). Reservoirs Act 1975. (Online) Available from: https://www.legislation.gov.uk/ukpga/1975/23
3 UK Government. (1990). Environmental Protection Act 1990. (Online) Available from: https://www.legislation.gov.uk/ukpga/1990/43/contents. (Accessed September 2021).
4 UK Government. (1991). Land Drainage Act 1991. (Online) Available from: https://www.legislation.gov.uk/ukpga/1991/59/contents. (Accessed September 2021).
5 UK Government. (1994). Land Drainage Act 1994. (Online) Available from: https://www.legislation.gov.uk/ukpga/1994/25/contents. (Accessed September 2021).
6 An Ordinary Watercourse is any river, stream, brook, ditch, drain, culvert, pipe and any other passage through which water may flow which is not designated as Main River
7 Main rivers are usually larger rivers and streams. They are designated as such and shown on the Main River Map. The Environment Agency carries out maintenance, improvement and construction work on main rivers to manage flood risk.

Legislation	Legislative context
Water Resources Act 1991 (Amendment) (England and Wales) Regulations 2009[8] **Water Act 2003**[9]	States that it is an offence to cause or knowingly permit polluting, noxious, poisonous or any solid waste matter to enter 'Controlled Waters[10]'. The Act was revised by the Water Act 2003, which sets out regulatory controls for water abstraction, water impoundment and protection of water resources. Important for the Project is the potential requirement to obtain a licence for dewatering of engineering works and to ensure that any impact on the environment can be mitigated. Provisions for the regulation of water discharges to controlled waters are set out in the Environmental Permitting (England and Wales) Regulations 2016. These have replaced provisions in the earlier Acts.
Environment Act 1995[11]	Established the Environment Agency (EA) and gave it responsibility for environmental protection and flood defence. Natural Resources Wales (NRW) was formed in April 2013, largely taking over the functions of the Countryside Council for Wales, Forestry Commission Wales and the Environment Agency in Wales
Water Quality (Water Supply) Regulations 2017 (as amended)[12]	Primarily concerned with the quality of water supplied in England for drinking, washing, cooking and food preparation, and for food production, and with arrangements for the publication of information about water quality.
Priority Substances Directive (2008/105/EC) **Revision of the Priority Substances Directive (2013/39/EU)**[13]	Sets out environmental quality standards in the field of water policy for Europe, with the aim of minimising the threat to the aquatic environment and effects such as acute and chronic toxicity to aquatic organisms, accumulation in the ecosystem and losses of habitats and biodiversity, as well as a threat to human health.
The EU Floods Directive (2007/60/EC), as enacted into domestic law by the Flood Risk Regulations 2009[14]	Enacted into domestic law by the Flood Risk Regulations 2009. It requires that in accordance with flood risk management plans, there should be a focus on the prevention of flooding, through avoidance of planned development in present and future flood prone areas, and protection by taking measures to reduce the likelihood of flooding.
Flood and Water Management Act 2010[15]	Sets out the Government's proposals to improve flood risk management, water quality and ensure water supplies are more secure. The Act includes consideration and responsibilities for managing flood risk and consideration of drainage including the use of Sustainable Drainage Systems (SuDS).

8 UK Government. (2009). The Water Resources Act 1991 (Amendment) (England and Wales) Regulations 2009. (Online) Available from: https://www.legislation.gov.uk/uksi/2009/3104/contents/made. (Accessed September 2021).
9 UK Government. (2003). Water Act 2003. (Online) Available from: https://www.legislation.gov.uk/ukpga/2003/37/contents. (Accessed September 2021).
10 This includes territorial waters, coastal waters, inland freshwaters and groundwaters (section 104, Water Resources Act 1991). (Accessed September 2021).
11 UK Government. (1995). Environment Act 1995. (Online) Available from: https://consult.environment-agency.gov.uk/engagement/bostonbarriertwao/results/b.10---environment-act-1995.pdf. (Accessed September 2021).
12 UK Government. (2017). Water Quality (Water Supply) Regulations 2017. (Online) Available from: https://www.legislation.gov.uk/uksi/2000/3184/contents/made (Accessed May 2022).
13 European Parliament. (2013). Directive 2013/39/EU of the European Parliament and of the Council amending Directives 2000/60/EC and 2008/105/EC as regards priority substances in the field of water policy. (Online) Available from: https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:226:0001:0017:EN:PDF (Accessed September 2021).
14 European Parliament. (2007). Directive 2007/60/EC of the European Parliament and of the Council on the assessment and management of flood risks. (Online) Available from: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32007L0060&from=EN (Accessed September 2021).
15 UK Government. (2010). Flood and Water Management Act 2010. (Online) Available from: https://www.legislation.gov.uk/ukpga/2010/29/contents (Accessed September 2021).

Legislation	Legislative context
The Water Environment (Water Framework Directive) (England and Wales) (Amendment) Regulations 2015[16]	Sets out the environmental standards to be used for the second cycle of river basin plans, covering the period 2016-21. Along with the updated Water Environment (WFD) (England and Wales) Regulations 2003, they transpose Directive 2013/39/EC on environmental quality standards for priority substances.
Environment (Wales) Act 2016[17]	Aims to enable resources in Wales to be managed in a more proactive, sustainable and joined-up way and to establish the legislative framework necessary to tackle climate change. Includes provisions relating to land drainage and establishes a Flood and Coastal Erosion Committee which oversees and provides guidance on wider risks and benefits of flood and coastal erosion risk management in Wales.
Private Water Supplies (Wales) Regulations 2017[18]	The Regulations require Local Authorities to monitor Private Water Supplies.
Environmental Permitting (England and Wales) Regulations (EPR), 2016 (as amended)[19]	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.
The European Union (EU) Water Framework Directive (2000/60/EC) (WFD)[20] **as enacted into domestic law by the Water Environment WFD (England and Wales) (Amendment) Regulations 2017**[21]	The EU WFD is enacted into domestic law by the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. A fundamental requirement of the WFD is to attain Good Ecological Status, or Good Ecological Potential within each defined water body, by December 2027 at the latest and to ensure that any deterioration in status is prevented.
Environment Act, 2021[22]	The Environment Act (2021) makes provision for Environmental Improvement Plans (EIPs), including a target based approach for water bodies, aligned with the WFD targets. Currently, only one EIP, the Defra 25-year plan has been produced, which sets out the high level (national aspirations) for the environment.

16 UK Government. (2017). The Water Environment (Water Framework Directive) (England and Wales) Regulations. (Online) Available from: https://www.legislation.gov.uk/uksi/2017/407/contents/made (Accessed September 2021).
17 Welsh Government. (2016). Environment (Wales) Act. (Online) Available from https://gov.wales/sites/default/files/publications/2019-05/environment-wales-act-2016-flood-risk-management-land-drainage.pdf (Accessed September 2021).
18 UK Government. (2017). The Private Water Supplies (Wales) Regulations 2017. (Online) Available from: https://www.legislation.gov.uk/wsi/2017/1041/contents/made Accessed May 2022).
19 UK Government. (2016). The Environmental Permitting (England and Wales) Regulations 2016. (Online) Available from: https://www.legislation.gov.uk/uksi/2016/1154/contents (Accessed September 2021).
20 European Parliament. (2000). Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for Community action in the field of water policy. (Online) Available from: https://eur-lex.europa.eu/resource.html?uri=cellar:5c835afb-2ec6-4577-bdf8-756d3d694eeb.0004.02/DOC_1&format=PDF (Accessed September 2021).
21 UK Government. (2017). The Water Environment (Water Framework Directive) (England and Wales) Regulations. (Online) Available from: https://www.legislation.gov.uk/uksi/2017/407/contents/made (Accessed September 2021).
22 UK Government. (2021). The Environment Act (2021) UK. (Online) Available from: https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted (Accessed September 2021).

Planning policy

10.2.3 A summary of the relevant national and local planning policy is given in **Table 10.2**.

Table 10.2 Planning policy relevant to the Water Environment assessment

Policy	Policy context
National planning policy	
National Development Framework (Future Wales: The National Plan 2040)[23]	This is the national development framework for Wales, which has development plan status. **Policy 8 – Flooding** The policy sets out the requirement for sustainable development which puts a priority on nature-based flood management solutions, as well as supporting strategic growth and regeneration in National and Regional Growth Areas. **Policy 19 – Strategic Policies for Regional Planning** The policy states that environmental consideration when planning developments and managing resources is vital, on a strategic and local scale. Environmental issues identified must be fully assessed and addressed. **Policy 33 – Cardiff, Newport and the Valleys** This policy sets out the ambitions for the Cardiff, Newport and Valleys region of Wales, which includes the Blaenau Gwent county. This is inclusive of development and growth strategies with reference to natural resources, climate change, flooding and biodiversity.
Sustainable Drainage (SuDS) Statutory Guidance, Welsh Government[24]	The SuDS Statutory Guidance establishes the requirements of Schedule 3 of the Flood and Water Management Act 2010; a framework for the approval and adoption of surface water management systems serving new developments. The SuDS Approval Bodies (SABs) are assigned under the same Act, which give local authorities the responsibility to approve drainage systems for new developments. The overall objective of the legislation is to deliver effective, multi-purpose SuDS, which will remain effective for the lifetime of the development.
The National Strategy for Flood and Coastal Erosion Risk Management (FCERM) in Wales, Welsh Government[25]	The National Strategy for FCERM in Wales, as required under the Flood and Water Management Act 2010, set out the management approach for risks associated with flooding and coastal erosion across Wales over a 10-year period. Natural Resource Wales (NRW) are responsible for managing the flood risks from the main rivers and sea across Wales; whilst Local Authorities as Lead Local Flood Authorities (LLFA) are responsible for managing risks associated with surface water, groundwater, and Ordinary Watercourses.

[23] Welsh Government. (2021). National Development Framework (Future Wales). (Online) Available from: https://gov.wales/sites/default/files/publications/2021-02/future-wales-the-national-plan-2040.pdf (Accessed January 2022).
24 Welsh Government. (2019). Sustainable Drainage (SuDS) Statutory Guidance. (Online) Available from https://gov.wales/sites/default/files/publications/2019-06/statutory-guidance.pdf (Accessed December 2021)
25 Welsh Government. (2020). The National Strategy for Flood and Coastal Erosion Risk Management in Wales. (Online) Available at: https://gov.wales/sites/default/files/publications/2021-03/the-national-strategy-for-flood-and-coastal-erosion-risk-management-in-wales.pdf (Accessed December 2021).

Policy	Policy context
Technical Advice Note 15 (TAN15)[26]	Technical Advice Note 15: Development and Flood Risk (TAN15 – July 2004) was produced by the then Welsh Assembly Government (now the Welsh Government). TAN15 provides technical guidance which supplements the policy set out in Planning Policy Wales (Edition 10, December 2018) (Welsh Assembly Government, 2018) in relation to development and flooding, providing a framework within which risks arising from both river and coastal flooding, and from additional run-off from development in any location, can be assessed. Consultation on an updated version of TAN15 has recently been prepared (January 2020). The draft update includes a range of changes to the guidance, in particular it removes reference to the Development Advice Map (DAM) and refers to a "Wales Flood Map" held by NRW. However, the consultation draft clearly states that TAN15 (2004) remains current until such a time that the replacement is confirmed (anticipated to be June 2023). TAN15 (2004) has therefore been used to underpin this assessment. TAN15 is supplemented by the Development Advice Map (DAM) which provides the basis for assessment under TAN15. The DAM was last updated in July 2017. **Justification Test** The Justification Test is intended to assess the appropriateness of proposed developments, based upon location in respect of flood zones and the type of development proposed.
Local planning policy	
Blaenau Gwent County Borough Council Local Development Plan up to 2021 (Adopted November 2012)[27]	**DM1 New Development** This policy set out the sustainability, accessibility and amenity requirements of proposed developments, which must be met in order to receive to approval. New developments are required to have sufficient surface water management systems which make suitable use of SuDS systems where possible. The policy also states that there should be no adverse effects on the water environment or controlled waters, and should aim to improve water quality, where practicable.
Blaenau Gwent County Borough Council Preferred Strategy (Replacement Local Development Plan 2018-2033)[28]	**SP3 Climate Change** This policy sets out the criteria for developments to meet in terms of climate change. The requirements relating to flooding are of relevance, as new developments must aim to minimise flood risk and ensure SuDS systems are incorporated wherever is reasonably practicable. **SP15 Environmental Protection** The policy sets out the development requirements in regard to environmental protections, particularly from pollution. The policy requires developments to demonstrate protections of the water environment and resources from potential pollutant. The Replacement Local Development Plan noted that the Development Management Policies (including DM1) require revision.

26 Welsh Government. 2018. Technical Advice Note 15: Development and Flood Risk. (Online) Available at: https://gov.wales/sites/default/files/publications/2018-09/tan15-development-flood-risk.pdf (Accessed December 2021)
27 Blaenau Gwent CBC. 2012. Local Development Plan up to 2021. (Online) Available at: https://www.blaenau-gwent.gov.uk/fileadmin/documents/Resident/Planning/Written_Statement__without_appendices_.pdf (Accessed December 2021).
28 Blaenau Gwent CBC. 2019. Replacement Local Development Plan 2018-2033, Preferred Strategy. (Online) Available at: https://democracy.blaenau-gwent.gov.uk/documents/s2914/Appendix%201.pdf?LLL=0 (Accessed December 2021).

Technical guidance

10.2.4 A summary of the technical guidance for Water Environment is given in **Table 10.3**.

Table 10.3 Technical guidance relevant to the Water Environment assessment

Technical guidance document	Context
NRW - Flood consequence assessments: climate change allowances[29]	Guidance regarding uplifts to be applied to hydrological modelling inputs to be used to help minimise vulnerability and provide resilience to the impacts of climate change.
PINS Advice Note 18: The Water Framework Directive[30]	This Advice Note has no statutory status and forms part of a suite of advice notes provided by the Planning Inspectorate.
Construction Industry Research and Information Association (CIRIA) reports	
Report C532: Control of Water Pollution from Construction Sites (2001)[31]	Provides practical support for consultants and contractors on how to plan and manage construction projects to control water pollution.
Report C624: Development and Flood Risk - Guidance for the Construction Industry (2004)[32]	Guidance for developers and the construction industry on the implementation of good practice in the assessment and management of flood risk as part of the development process and is intended to promote development that is sustainable in terms of flood risk.
Report C648: Control of Water Pollution from Linear Construction Projects (2006)[33]	Guidance for clients, consultants, designers, contractors, and regulators on how to plan and manage water pollution from linear construction projects.
Report C649: Control of Water Pollution from Linear Construction Projects - Site Guidance (2006)[34]	Guidance specifically aimed at on-site construction personnel working on linear infrastructure construction projects.
Report C650: Environmental Good Practice on Site, second edition (2005)[35]	Provides practical guidance about managing construction on-site to control environmental impacts.

29 Natural Resource Wales. (2018). Flood consequence assessments: climate change allowances. (Online) Available from: https://gov.wales/sites/default/files/publications/2018-11/flood-consequence-assessments.pdf (Accessed September 2021).
30 The Planning Inspectorate. (2017). Advice note eighteen: The Water Framework Directive. (Online) Available from: https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/2017/06/advice_note_18.pdf (Accessed September 2021).
31 Masters-Williams, H., Heap, A., Kitts, H., Greenshaw, L., Davis, S., Fisher, P., Hendrie, M. and Owens, D. 2001. Control of Water Pollution from Construction Sites – Guidance for Consultants and Contractors. C532. London: CIRIA.
32 Lancaster, J., Preene, M. and Marshall, C. 2004. Development and Flood Risk – Guidance for the Construction Industry. C624. London: CIRIA.
33 Murnane, E., Heap, A. and Swain, A. 2006. Control of Water Pollution from Linear Construction Projects – Technical Guidance. C648. London: CIRIA.
34 Murnane, E., Heap, A. and Swain, A. 2006. Control of water pollution from Linear Construction Projects – Site Guide. C649. London: CIRIA.
35 Charles, P. and Connely, S. 2005. Environmental Good Practice Site Guide (second edition). C650. London: CIRIA.

Technical guidance document	Context
Report C651: Environmental Good Practice - Pocket Book (2005)[36]	Contains a series of good practice checklists to follow while working on a project, from design and planning through the construction phase on-site, to project completion.
Report C689: Culvert Design and Operation Guide (2010)[37]	Comprehensive guidance covering a range of issues pertinent to the management and design of culverts.
Report C692: Environmental Good Practice on Site (2010)[38]	General good practice guidance and practical advice for the management of construction sites to minimise environmental impacts.
Report C698: Site Handbook for the Construction of SuDS (2007)[39]	Guidance for site engineers and SuDS practitioners on the construction of SuDS to facilitate their effective implementation within developments.
Report C753: The SuDS Manual (2015)[40]	Best practice guidance on the planning, design, construction, operation and maintenance of SuDS to facilitate their effective implementation within developments.
Pollution Prevention Guidance Notes (PPGs) and Guidance for Pollution Prevention Notes (GPPs)[41] (both are maintained by NetRegs and provide environmental good practice guidance for the whole UK, and environmental regulatory guidance directly to Northern Ireland, Scotland and Wales only.)	
GPP 1: Understanding your environmental responsibilities - good environmental practices (October 2020)[42]	Guidance document based on relevant legislation and reflects current good practice.
GPP 2: Above ground oil storage tanks (January 2018)[43]	Guidance to support the safety of above ground oil storage tanks and minimise the risk of causing pollution.
GPP 3: Use and design of oil separators in surface water drainage systems (March 2022)[44]	Guidelines to support decision making on whether an oil separator is needed for a site, and if so what size and type of separator is appropriate.

36 Chant-Hall, G., Charles, P. and Connolly, S. (2005). Environmental good practice on site – pocket book. C651. London: CIRIA.
37 Balkham, M., Fosbeary, C., Kitchen, A. and Rickard, C. (2010). Culvert design and operation guide. C689. London: CIRIA.
38 Audus, I., Charles, P. and Evans, S. (2010). Environmental good practice on site (third edition). C692. London: CIRIA.
39 Woods Ballard, B., Kellagher, R., Martin, P., Jefferies, C., Bray, R. and Shaffer, P. (2007). Site Handbook for the Construction of SUDS. C698. London: CIRIA.
40 Woods Ballard, S., Wilson, S., Udale-Clarke, H., Illman, S., Scott, T., Ashley, R. and Kellagher, R. (2015). The SuDS Manual. C753. London: CIRIA.
41 NetRegs. (2021). Guidance for Pollution Prevention (GPPs) - Full list. (Online) Available from: https://www.netregs.org.uk/environmental-topics/guidance-for-pollution-prevention-gpp-documents/guidance-for-pollution-prevention-gpps-full-list/ (Accessed September 2021).
42 Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency. (2020). GPP 1: A general guide to preventing pollution. Available at: https://www.netregs.org.uk/media/1835/gpp-1.pdf (Accessed September 2021).
43 Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency (2017). Above ground oil storage tanks: GPP 2. Available at: https://www.netregs.org.uk/media/1475/gpp-2-pdf-jan-2018.pdf (Accessed September 2021).
44 Environment and Heritage Service, Scottish Environmental Protection Agency and Environment Agency (2022). Use and design of oil separators in surface water drainage systems: GPP 3. Available at: https://www.netregs.org.uk/media/1899/guidance-for-pollution-prevention-3-2022-update-v2.pdf (Accessed May 2022).

Technical guidance document	Context
GPP 5: Works and maintenance in or near water (February 2018)[45]	Guidance document based on relevant legislation and setting out current good practice for working in or near water.
PPG 6: Working at construction and demolition sites (2012)[46]	Practical advice and guidance to help prevent pollution from construction and demolition sites. Sets out legislative requirements and good practice measures to reduce the risk of a pollution incident.
GPP 8: Safe storage and disposal of used oils (July 2017)[47]	Guidance based on relevant legislation and setting out current good practice for the safe storage and disposal of used oils.
GPP 20: Dewatering underground ducts and chambers (January 2018)[48]	Guidelines for dewatering underground ducts and chambers, based on relevant legislation and setting out current good practice.
GPP 21: Pollution incident response planning (June 2021)[49]	Guidelines setting out current best practice for producing an incident response plan.
GPP 22: Dealing with spills (October 2018)[50]	Guidance applicable to those responsible for storing and transporting materials that could cause pollution if they spill. It may also be useful for those who respond to spills, or those responsible for transporting or storing waste from spills.
GPP 26 Safe storage - drums and intermediate bulk containers (IBCs) (February 2019)[51]	Guidance aimed at site operators and those responsible for the storing and handling of drums and IBCs.

45 Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency (2018). Works and maintenance in or near water: GPP 5. Version 1.2. Available at: https://www.netregs.org.uk/media/1418/gpp-5-works-and-maintenance-in-or-near-water.pdf?utm_source=website&utm_medium=social&utm_campaign=GPP5%2027112017 (Accessed September 2021).
46 Environment Agency (2012) Working at construction and demolition sites: PPG6. Second edition. Bristol: Environment Agency.
47 Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency (2017). GPP 8 Safe storage and disposal of used oils. Available at: https://www.netregs.org.uk/media/1435/gpp-8-v3-swni.pdf (Accessed September 2021).
48 Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency (n.d.) GPP 20 Dewatering underground ducts and chambers. Available at: https://www.netregs.org.uk/media/1477/gpp-20-publisher-pdf-version.pdf (Accessed September 2021).
49 Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency (2021). GPP 21: Pollution Incident Response Plans. Available at: hthttps://www.netregs.org.uk/media/1436/gpp-21-final.pdf (Accessed May 2022).
50 Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency (2018). Dealing with spills: GPP 22. Version 1. Available at: https://www.netregs.org.uk/media/1643/gpp-22-dealing-with-spills.pdf (Accessed September 2021).
51 Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environmental Protection Agency (2019). GPP 26: Safe storage of Drums and Intermediate Bulk Containers (IBCs). Available at: https://www.netregs.org.uk/media/1885/guidance-for-pollution-prevention-26-2022-updated.pdf (Accessed May 2022).

10.3 Consultation and engagement

Overview

10.3.1 The assessment has been informed by consultation responses and ongoing stakeholder engagement. An overview of the approach to consultation is provided in **Section 2.4** of **Chapter 2: Approach to Environmental Impact Assessment**.

Scoping Direction

10.3.2 A Scoping Direction was issued by PEDW, on behalf of the Welsh Ministers, on 15 June 2021. A summary of the relevant responses received in the Scoping Direction in relation to Water Environment and confirmation of how these have been addressed within the assessment to date is presented in **Table 10.4**.

Table 10.4 Summary of EIA Scoping Direction responses for Water Environment

Consultee	Consideration	How addressed in this Draft ES
PEDW	ID 18: Scoping reference 4.5.2 A CEMP will be an important document in relation to this aspect of the environment. If the final CEMP is not available at the time of completing the ES a draft CEMP should form part of the ES. The applicant's attention is drawn to NRW's comments regarding the CEMP and Pollution Prevention.	A draft CEMP has been produced to support the Draft ES. This includes the embedded environmental measures for the construction phase set out in **Section 10.6** (Embedded measures).
Natural Resources Wales	Surface water The impact of the development on the hydrological regime of the significant identified water bodies should be fully assessed so as not to detrimentally impact upon these receptors. In addition, the impact of the development (such as foundation, proposed services trenches etc) on the hydrogeological regime should also be assessed for the same reason. We note further assessment will be carried out as part of the EIA process.	An assessment of the potential impacts of the Proposed Development throughout its lifetime on the local hydrological and hydrogeological environment is provided in **Section 10.9** (Assessment of Water Environment effects).
Natural Resources Wales	Pollution Prevention A Construction Environmental Management Plan (CEMP) will be required detailing the design and construction methods of any proposed tracks and turbines (including foundation design and likely depth) and the pollution prevention measures that will be put in place to minimise impacts to the water environment. The CEMP should be created following thorough desk study and field surveys and comply with all relevant Guidance for Pollution Prevention (GPPs). To ensure the effectiveness of the CEMP, a water quality	A draft CEMP has been produced to support the Draft ES. This includes the embedded environmental measures for the construction phase set out in **Section 10.6** (Embedded measures) including pollution prevention measures and a water quality monitoring plan (scope to be agreed with NRW). The location of the various elements the Proposed Development is provided in **Figure 10.1.**

Consultee	Consideration	How addressed in this Draft ES
	monitoring plan should be incorporated to manage any effects on water quality during the construction phase of the proposal. Information will be required on the location of any compounds, storage of oil and the foul drainage arrangements required during site construction and operation.	
Natural Resources Wales	Flood Risk We note the Nant Big is the only watercourse within the Proposed Development area. This watercourse flows in the Cwm Big valley, which divides the southern part of the Proposed Development area into west and east sections. We note a Flood Consequence Assessment (FCA) will be submitted in accordance with the TAN15 as the Proposed Development area exceeds 1ha and is within Flood Zone 1. The FCA will demonstrate how flood risk to the Proposed Development and any potential to increase flood risk to third parties due to the Proposed Development, will be managed over its lifetime. As part of this, the effects of climate change will be given due consideration. We note the FCA will include an outline surface water drainage strategy, which will ensure that surface water runoff from the Proposed Development is managed and attenuated on site, so that the risk of flooding is not increased off site. The most suitable surface water drainage strategy for the Proposed Development will be ascertained by undertaking a high-level SuDS Assessment considering the SuDS hierarchy. Having reviewed the Flood Risk Area Wales maps for this location the development site is not within a zone associated with fluvial flood risk. We advise the main concern in relation to flooding and third party impacts would come from surface water flooding and the potential increase in surface run off. An outline surface water drainage strategy would therefore be required and would be reviewed by the LPA. We also advise that any works in the vicinity of the Nant Big may require a Land Drainage Consent, this will be obtained via the LPA.	The Draft FCA report and supporting outline drainage strategy are provided in **Appendix 10A**. The Draft FCA identified that the main flood mechanism at the Proposed Development area is from surface water flooding. Flood risk sources such as fluvial, groundwater, sewer and artificial sources poses a limited risk to the Proposed Development. Where required, a Land Drainage Consent will be sought from the LPA for any works in the vicinity of the Nant Big or any other Ordinary Watercourses.
Natural Resources Wales	Additional Advice We do not consider the following information necessary for inclusion in the ES, however, recommend the Applicant considers this advice when preparing their application.	The location of the various Proposed Development elements is shown on **Figure 10.1** and described in detail **in Chapter 4: Description of the Proposed Development**. An assessment of potential effects on the water environment, including from spillage of

Consultee	Consideration	How addressed in this Draft ES
	Provisional Infrastructure Plan: It would be useful for a provisional wind farm infrastructure plan to be drafted that shows the likely wind turbine locations, foundation design, haul road and cable run locations and any other infrastructure required for the wind farm. A provisional construction plan should also be drafted that highlights how particular aspects of the wind farm will be constructed, how chemicals that will be required during the construction phase will be managed and stored, where particular heavy plant may be required and whether or not dewatering may be required e.g., for foundation construction including the nature and location of the dewatering.	chemicals and discharge of any pumped groundwater, is provided in **Section 10.9**.
Blaenau Gwent County Borough Council	<u>Landscape</u> Whilst the [information provided focuses] largely on the visual impacts of the turbines, the physical impacts on the landscapes fabric characteristics carbon sequestration capacity must also be considered in terms of the overall environmental impacts, particularly in relation to the built elements of roads and ground ancillary installations. A clear understanding of soil/peat loss, hydrology and green infrastructure should be fully explored as well as the consequential impacts of fragmentation of the landscape types.	An assessment of potential effects on the water environment, including hydrology, is provided in **Section 10.9.**

Technical engagement

10.3.3 Data requests were sent to NRW and BGCBC (**Appendix 10B**) to establish the current baseline for the Proposed Development area. A meeting has been arranged with Caerphilly County Borough Council (CCBC), as the SAB, to discuss the proposed drainage strategy and any comments will be incorporated in the final ES submission.

10.4 Data gathering methodology

Study area

10.4.1 The study area for the purposes of this Chapter is defined as the geographic area where direct effects of the Proposed Development on hydrology, hydrogeology and flood risk receptors may occur. The study area shown on **Figure 10.1** covers a 1.5km buffer from the Proposed Development area boundary. Given that the construction works and proposed permanent infrastructure are unlikely to interact directly with watercourses (absence of in-channel permanent works, standoff distance from watercourses), it is considered that any potential impacts on watercourses would be negligible (and therefore scoped out) beyond 1.5km downstream of Site boundary for the Proposed Development. The 1.5km buffer is taken as an initial study area, which was further refined where hydraulic connectivity was not present (for example areas upslope of the Proposed Development were scoped out).

Desk study

10.4.2 A summary of the organisations that have supplied data, together with the nature of that data is outlined in **Table 10.5**.

Table 10.5 Data sources used to inform the Water Environment assessment

Organisation	Data source	Data provided
British Geological Survey (BGS)	GeoIndex - British Geological Survey (bgs.ac.uk)[52] (accessed September 2021)	BGS Geoindex Onshore - Aquifer Designation
Blaenau Gwent County Borough Council (2013)	Microsoft Word - LFRMS SCRUTINY V1 1 Post Consultation.doc (blaenau-gwent.gov.uk)[53] (accessed September 2021)	Local Flood Risk Management Strategy
British Geological Survey (BGS)	Geology of Britain viewer - British Geological Survey (bgs.ac.uk)[54] (accessed September 2021)	Geology of Britain Viewer for geological information
Cranfield University viewer for soil classification	Soilscapes soil types viewer - National Soil Resources Institute. Cranfield University (landis.org.uk)[55] (accessed September 2021)	LandIS soilscapes
Ordnance Survey (OS)	Local Ordnance Survey (OS) mapping	Topography and location of springs
Natural Resources Wales	Lle - Source Protection Zones (SPZ) Merged (gov.wales)[56] (accessed September 2021)	Geo Portal for Wales (Lle) for Source protection zones
Natural Resources Wales	Water Watch Wales (naturalresourceswales.gov.uk)[57] (accessed September 2021)	Water Framework Directive (WFD) Cycle 2 Rivers and water bodies for WFD water bodies and status

52 British Geological Survey. (2021). BGS GeoIndex Onshore. (Online) Available at: http://mapapps2.bgs.ac.uk/geoindex/home.html (Accessed September 2021).
53 Blaenau Gwent County Borough Council, (2013). Local Flood Risk Management Strategy. Blaenau Gwent. (Online) Available at: https://www.blaenau-gwent.gov.uk/media/3ilp4hg2/flood_risk_strategy.pdf (Accessed September 2021).
54 British Geological Society. (2021). Geology of Britain Viewer for geological information. (Online) Available at: https://www.bgs.ac.uk/map-viewers/geology-of-britain-viewer/ (Accessed September 2021).
55 LandIS. (2021). Soilscapes soil types viewer - National Soil Resources Institute. Cranfield University. (Online) Available at: http://www.landis.org.uk/soilscapes/ (Accessed September 2021).
56 Natural Resource Wales. (2021). Lle - Source Protection Zones (SPZ) Merged. (Online) Available at: http://lle.gov.wales/catalogue/item/SourceProtectionZonesSPZMerged/?lang=en (Accessed September 2021).
57 Natural Resource Wales. (2021). Water Watch Wales. (Online) Available at: https://waterwatchwales.naturalresourceswales.gov.uk/en/ (Accessed September 2021).

Organisation	Data source	Data provided
Natural Resources Wales	Natural Resources Wales / Check your flood risk by postcode[58] (accessed September 2021)	Flood Risk Maps

Survey work

10.4.3 A hydrology and flood risk walkover survey was undertaken by a Wood hydrologist on 25 August 2021. The objective of the walkover was to visit areas identified within the desk-based review, as being of particular hydrological, hydrogeological or flood risk interest. This included any area with potential to impact the surface water environment or be at risk of flooding due to the proximity of certain construction and operational activities to watercourses and flood zones. Photographs from the site visit are provided within **Appendix 10C**. The locations visited during the site visit included:

- The Afon Ebwy at Cwm (NGR: SO1874904500);
- The Afon Ebwy Fach at Six Bells (NGR: SO2206103072);
- The Nant Big upstream and downstream (NGR: SO2000004616/ SO2053201982);
- Downstream of confluence of the Nant Big and Afon Ebwy (NGR: SO2077301895);
- Confluence of Afon Ebwy and Afon Ebwy Fach (NGR: SO2096901817); and
- Ponds within the Proposed Development area.

10.5 Overall baseline

Current baseline

10.5.1 This section provides a review of the current baseline environmental characteristics for the Proposed Development and wider study area, with particular reference to the water environment. The current baseline is described separately for the Wind Farm Development and the Grid Connection corridor which are collectively referred to as the Proposed Development (**Figure 10.1**). Key hydrological features within the Water Environment study area are identified on **Figure 10.2**.

Land use and topography

Wind Farm development

10.5.2 The Proposed Development area covers an area of approximately 235 ha. Historical maps show that the area has been undeveloped since the 19th century. Small areas of land have been built upon more recently including farms, a solar farm and access tracks, but the area is largely dominated by grassland and both deciduous and coniferous woodland. The

58 Natural Resource Wales. (2021). Check your flood risk by postcode. (Online) Available at: https://naturalresources.wales/flooding/check-your-flood-risk-by-postcode/?lang=en (Accessed September 2021).

closest residential developments are Cwm to the west, Abertillery to the east and Brynithel to the south. The A4046 and A467 roads are located to the west and east, respectively, of the Proposed Development area connecting Brynithel with Ebbw Vale and Brynmawr (**Figure 10.2**).

10.5.3 The proposed wind farm development is located on the Mynydd Carn-y-Cefn ridge which runs NNW-SSE between Afon Ebbw valley to the west and Afon Ebbw Fach valley to the east. Generally, the ridge slopes to the south falling from 440mAOD in the northern edge of the Proposed Development area to 260mAOD in the south-eastern edge close to Aberbeeg. The Proposed Development boundary is v-shaped with the Cwm Big valley in the centre dividing the ridge into western and eastern sections. The Cwm Big valley is only accessible via forestry tracks due to the valley side steepness, which increases and becomes wooded towards the south (**Figure 10.1**).

Grid Connection

10.5.4 The Grid Connection corridor is located on the western face of the Mynydd Carn-y-Cefn slope extending from the ridge to the A4046 road. The highest elevation is approximately 410mAOD, whilst the lowest elevation is 210mAOD at the road level (**Figure 10.2**). The Grid Connection Corridor is mainly covered by woodland, with access via some informal tracks and footpaths. The OS mapping indicates that historically the area was part of a former quarry. A group of houses, identified as the Gables, are located within the Grid Connection corridor. There are no other residential properties within the vicinity of the Grid Connection.

Rainfall

Wind Farm development and Grid Connection

10.5.5 Wales is characterised by weather that is often cloudy, wet and windy but mild. Rainfall varies widely, with the highest average annual totals being recorded in the central upland spine from Snowdonia to the Brecon Beacons (Met Office, 2016[59]).

10.5.6 Data for the Met Office stations Tredegar - Bryn Back Park No. 2[60] (10.9 km from the Proposed Development) and Cwmtillery[61] (2.5km from the Proposed Development) indicate a long-term total annual rainfall of 1674.2mm/yr (1981 - 2010) and 1836.4 mm/yr (2020 to 2021) respectively.

59 Met Office, (2016). UK Regional Climate Summaries: Wales. (Online) Available at: https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/weather/learn-about/uk-past-events/regional-climates/wales_-climate---met-office.pdf (accessed September 2021)
60 Met Office. (2021). Tredegar. (Online) Available at: https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages/gcjww0udy (Accessed September 2021).
61 Natural Resource Wales. (2021). Cwmtillery rain gauge. (Online) Available at: https://rivers-and-seas.naturalresources.wales/Station/1035? (Accessed September 2021)

Hydrology

Wind Farm development

10.5.7 There are three watercourses and several smaller tributaries in the vicinity of the Wind Farm development area: Afon Ebwy to the east, Nant Big in the centre and the Afon Ebwy Fach to the west of the Proposed Development (**Figure 10.2**). The Afon Ebwy and Afon Ebwy Fach are classified by NRW as Main Rivers whilst the Nant Big is an Ordinary Watercourse.

10.5.8 The Nant Big flows in the Cwm Big valley, which divides the southern part of the Wind Farm development area into west and east sections (**Figure 10.2**). OS mapping shows that the Nant Big issues in the centre of the Wind Farm development area and flows south through the steep sided Cwm Big valley before joining the Afon Ebwy approximately 400m south of the wind farm development area. During the site visit on 25 August 2021 the upper channel of the Nant Big within the Proposed Development boundary was dry, which is likely due to low seasonal summer groundwater levels and low rainfall rates. A spring draining into the Nant Big was also identified during the site visit approximately 400m north from the Nant Big's confluence with the Afon Ebwy (SO2065002360). No other springs were identified within the Wind Farm development area.

10.5.9 A soil bund across the very upper valley/channel of the Nant Big, was observed in the upper reaches of the Nant Big near the existing access track crossing (SO1998004648) (**Figure 10.2**). There was limited flow in the Nant Big and some ponding was observed upstream of the soil bund.

10.5.10 The Afon Ebwy flows in the Ebwy valley in a south-east direction within 0.2km of the western edge of the Wind Farm development area. A number of tributaries join the Afon Ebwy including the Nant Merddog in Cwm, network of unnamed surface drains in Tallistown, Nant Big in Aberbeeg, the Afon Ebwy Fach in Aberbeeg and the Nant Brunant and Nant Gwynt at Glandwr (**Figure 10.2**). After the confluence with Afon Ebwy Fach, the Afon Ebwy continues to flow south beyond the Water Environment study area and joins the River Usk estuary south of Newport Docks, approximately 20km south of the Wind Farm development area.

10.5.11 The Afon Ebwy Fach flows within 0.25km east of the Wind Farm development area, initially in a southeast direction upstream of Abertillery and then in a southwest direction. The Nant Ystruth joins the Afon Ebwy Fach in Blaina and the river continues to flow south to Abertillery, parallel with the A467. In Abertillery, the Afon Tyleri and Nant y Groes join the Afon Ebwy Fach. The Ebwy Fach continues flowing south before bending southwest around the base of the Mynydd Carn-y-Cefn ridge and joins the Afon Ebwy in Aberbeeg (**Figure 10.2**).

10.5.12 River flow records are available for the Afon Ebwy at the flow gauging station in Aberbeeg, these are presented in **Table 10.6**.

Table 10.6 Summary of river flows recorded for the Afon Ebwy at Aberbeeg

Gauge ref and name	NGR	Catchment area (km²)	Mean Flow (m³/s)	Q10[1] (m³/s)	Q95[2] (m³/s)	BFI[3]	Period of Record
56019 - Ebwy at Aberbeeg	SO209014	71.7	2.68	6.06	0.457	0.51	1984 - 2012

Notes: *Source: National River Flow Archive[62]
[1]Q10: the flow that is equalled or exceeded 10% of the time – an index of high flow.
[2]Q95: the flow that is equalled or exceeded 95% of the time – an index of low flow.
[3]BFI: baseflow index, the proportion of the total river flow that is derived from gradual release from groundwater storage, as opposed to rapid surface or near-surface runoff.

10.5.13 Ecological field surveys detailed in **Chapter 8: Biodiversity** identified various ponds within the study area. Those that have a potential hydrological connectivity with the Proposed Development (downslope and within the same hydrological catchment) are shown on **Figure 10.2** and listed in **Table 10.7**. A number of these ponds are non-statutory biodiversity designated sites (Sites of Importance for Nature Conservation (SINC)).

Table 10.7 Ponds within the study area with potential hydrological connectivity to the Wind Farm development area

Pond ID*	Description	Distance from Wind Farm Development boundary (km)	Biodiversity designation
1	Approximate elevation 400mAOD. The pond has average habitat suitability for Great Crested Newts (GCNs) and is not considered to be a priority habitat.	Within boundary	-
3 to 10 and 17	Approximate elevation 360 to 377mAOD. The pond has good habitat suitability for GCN.	Within boundary	SINC Pond Group 3
11A	Approximate elevation 435mAOD. The pond has poor habitat suitability for GCN.	0.1 NE	-
12	Approximate elevation 420mAOD. The pond has below average habitat suitability for GCN.	Within boundary	-
13	Approximate elevation . The pond has poor habitat suitability for GCN	Within boundary	-
15	Approximate elevation 410mAOD. The pond has below average habitat suitability for GCN.	Within boundary	-
16	Approximate elevation 385mAOD. The pond has good habitat suitability for GCN	Within boundary	SINC Craig I Deri Pond
19	Approximate elevation . The pond has average habitat suitability for GCN.	Within boundary	-

62 National River Flow Archive (2017). 56019 - Ebbw at Aberbeeg (Online) Available at: https://nrfa.ceh.ac.uk/data/station/meanflow/56019 (Accessed September 2021)

Pond ID*	Description	Distance from Wind Farm Development boundary (km)	Biodiversity designation
21	Approximate elevation 365mAOD. The pond has good habitat suitability for GCN.	0.1 S	SINC Arail Pond
23 to 25	Approximate elevation 385 to 390mAOD. The pond has good habitat suitability for GCN.	Within boundary	SINC Coetgae Pond

Note: *ID as assigned in **Chapter 8: Biodiversity**

Grid Connection

10.5.14 The Grid Connection is located within the Afon Ebwy catchment which flows approximately 0.13 km west, at its closest, of the Grid Connection corridor. The OS mapping shows a spring (NGR: SO1910204171) and a tributary of the Afon Ebwy Fach within the Grid Connection corridor. No ponds were identified in the desk-based study.

Geology and Soils

Wind Farm development

10.5.15 The BGS online geology mapping indicates that there are no significant superficial deposits within the Wind Farm development area. In the wider area superficial deposits are present in the valley floors: the Afon Ebwy, Afon Ebwy Fach and Nant Big flow over alluvium deposits (clay, silt, sand and gravel). The Afon Ebwy is also underlain by Head Deposits (clay, silt, sand, and gravel) and Till in its upper reaches near Cwm and Fluvioglacial Deposits (sand and gravel) in its lower reaches before confluence with the Afon Ebwy Fach. The Afon Ebwy Fach is also underlain by Head Deposits (clay, silt, sand and gravel) and Till.

10.5.16 The Wind Farm development area is entirely underlain by the Carboniferous South Wales Upper Coal Measures Formation which in this area comprises the Hughes Member. The Carboniferous South Wales Upper Coal Measures Formation is described as grey (productive) coal-bearing mudstones/siltstones with seat-earths and minor grey, quartz-rich sandstones, coals, and ironstones. There are numerous coal seams within the sequence, most of which have been worked. The Hughes Member comprises mainly sandstones with small, localised areas of mudstone and siltstone.

10.5.17 The LANDIS[63] mapping indicates that the majority of the Wind Farm development area is covered with freely draining acid loamy soils over rock, with areas to the east, at higher elevations, it is shown to be very acid loamy upland soils with a wet peaty surface.

10.5.18 A Phase 1 peat depth survey was undertaken by Wood during September 2021[64] and is provided in **Chapter 11: Ground Conditions**. Based on the findings of the survey, which

63 Cranfield Soil and Agrifood Institute. (2021). Soilscapes Map, (Online) Available from: http://www.landis.org.uk/soilscapes/ (Accessed October 2021).
64 Wood PLC. (2021). Mynydd Carn y Cefn Wind Farm – Peat Depth Survey Report, Doc Ref: 42863-WOOD-XX-XX-RP-OG-0001_S2_P01.1.

reported minor peat depths in the range of between 0.00m and 0.30m, it was concluded that peat is not present across the Wind Farm development area.

10.5.19 A historical inert waste disposal site and historical mining waste (remediated) were identified within the Proposed Development area (**Chapter 11: Ground Conditions**). Due to these historical activities, it is likely that there is localised ground contamination, or where larger sources are present, contamination at low enough concentrations, which do not pose a significant risk to site users.

Grid Connection

10.5.20 The Grid Connection corridor is underlain by the South Wales Upper Coal Measures comprising the Hughes Member across most of the area as well as the Rhonda and Brithdir Members (Pennant Sandstones with thin mudstone / siltstone and seat-earth interbeds and mainly thin coals) in the Afon Ebwy valley. There is no superficial cover except for a small area of superficial deposit to the west, identified as Head Deposits underlying the Afon Ebwy.

10.5.21 The LANDIS[63] mapping indicates that Grid Connection corridor is covered with freely draining acid loamy soils over rock.

Hydrogeology

Wind Farm development

10.5.22 The South Wales Upper Coal Measures and the alluvium deposits underlying the Wind Farm development area and wider study area are classified by NRW as Secondary A Aquifers. Secondary A Aquifers are defined as *"permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers"*. These are generally aquifers formerly classified as minor aquifers. The Till and Head Deposits are classified as Secondary Undifferentiated aquifers. These are assigned in cases where it has not been possible to attribute either category Secondary A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.

10.5.23 The South Wales Upper Coal Measures underlying the Water Environment study area is a designated WFD groundwater body (SE Valleys Carboniferous Coal Measures GB40902G201900) and achieved 'Good' quantitative status and 'Poor' chemical status in the 2016 WFD classification (Cycle 2).

10.5.24 Groundwater underlying the Wind Farm development area is considered to be of low sensitivity. This is due to the likely impacts associated with former coal mining activities, which is indicated by the presence of mine water treatment schemes to the north of the Wind Farm development area.

10.5.25 The Wind Farm development area and the wider study area are not within a Source Protection Zone (SPZ). The closest SPZ is located within 4.2km to the east and north of the Wind Farm development area. SPZs show the risk of contamination from any activities that might cause pollution to public drinking water supplies.

Grid Connection

10.5.26 The Grid Connection corridor and wider Water Environment study area are underlain by the South Wales Upper Coal Measures which is a Secondary A Aquifer and WFD groundwater body (SE Valleys Carboniferous Coal Measures GB40902G201900). Similar to the Wind Farm development area, local groundwater is considered to be of low sensitivity due to former coal mining activities.

10.5.27 The Grid Connection corridor and wider study area do not lie within a SPZ for a public water supply.

Water Resources - Abstractions

Wind Farm development

10.5.28 The South East Valleys Abstraction Licensing Strategy[65] which encompasses the Wind Farm development area, indicates that both the Afon Ebwy and Afon Ebwy Fach have water resources available at least 50% of the time. However, there is no water available during low flows.

10.5.29 According to the data provided by NRW, there are no licensed groundwater and surface water abstractions within the Wind Farm development area. Within the wider study area there are two abstraction licences, both for non-drinking water purposes, one from groundwater and the other from surface water. Details on these abstractions are provided in **Table 10.8**.

Table 10.8 Licensed water abstractions within study area

Permit no.	NGR	Source type	Purpose	Abstraction volume (m3/hour)	Distance from Proposed Development boundary (km)	Scoped in/Scoped out
WA/056/0063 /0008 (3 abstractions)	SO217 037	Surface Water (Afon Ebwy Fach)	Other environmental improvements - gas works weir	No information	0.4 E	Scoped in Abstraction is downstream of the Wind Farm development area.
WA/056/0063 /0007	SO219 036	Groundwater	Pollution Remediation - Borehole at Vivian Colliery	342	0.5 E	Scoped in Abstraction is downslope (and likely downgradient) of the Wind Farm development area

65 NRW (2017) South East Valleys Abstraction Licensing Strategy: A licensing strategy to manage water resources sustainably. (Online) Available at: sev-licensing-strategy-final-nov-17.pdf (naturalresources.wales) (Accessed April 2022)

10.5.30 Data provided by BGCBC indicates that there are no private abstractions within the Wind Farm development area, but a small number are present within the wider study area (details provided in **Table 10.9**).

Table 10.9 Private Water Abstractions within study area

Reference	NGR	Source type	Abstraction volume (m^3/day)	Distance from Wind Farm Development Boundary (km)	Scoped in/Scoped out
9309	SO 21150 03150	Spring	4	0.1 S	Scoped in (downslope and likely downgradient of Proposed Development)
35247	SO 20473 05278	Spring	0	0.4 E	Scoped in (downslope and likely downgradient of Proposed Development)
33220	SO 21991 04103	Spring	2	0.8 E	Scoped out (upslope and unlikely to be downgradient of the Proposed Development)
12994	SO 19088 04175	Spring	2	Within the Grid Connection corridor	Scoped in (downslope and likely downgradient of Proposed Development)
38122	SO 19504 02217	Spring	2	0.9 SW	Scoped Out (within different surface water catchment and unlikely to be downgradient of the Proposed Development)
38506	SO 22445 04698	Spring	2	1.5 E	Scoped Out (not downslope and unlikely to be downgradient) of the Proposed Development)

Grid Connection

10.5.31 The South East Valleys Abstraction Licensing Strategy[65] which encompasses the Grid Connection corridor, indicates that both the Afon Ebwy and Afon Ebwy Fach have water resources available at least 50% of the time. However, there is no water available during low flows.

10.5.32 Data provided by NRW indicates that there are no licensed groundwater and surface water abstractions within the Grid Connection corridor. Within the wider study area there are two abstraction licences as discussed above for the Wind Farm development (details provided in **Table 10.8**)**Error! Reference source not found.**.

10.5.33 According to data provided by BGCBC, there is one private abstraction within the Grid Connection corridor and a further five private abstractions within the wider study area (details provided in **Table 10.9**).

Water Resources - Discharges

Wind Farm development

10.5.34 Data provided by NRW indicates there are no discharge consents within the Wind Farm development area. There are a total of 16 discharge consents to surface water within the wider study area, all of which are held by the same permit holder. The discharges are distributed across the watercourses as follows; 14 are associated with the Afon Ebwy Fach, three with the Afon Ebwy and one with the Afon Tillery (a tributary to the Afon Ebwy Fach). No data was provided for consented discharge volumes. There is one licenced discharge to land within the wider study area.

Grid Connection

10.5.35 According to the data provided by NRW, there are no discharge consents located within the Grid Connection corridor. As described above there are 16 discharge consents to surface water within the wider study area.

Water Quality

Wind Farm development and Grid Connection

10.5.36 As part of the WFD, River Basin Management Plans (RBMPs) have been prepared for all of the river basin districts in England and Wales. The RBMPs are designed to protect and improve the water quality of the water environment by advising on which actions should be taken to tackle water related issues. This includes measures to improve water quality in rivers, lakes, estuaries, coasts and in groundwater. The Water Environment study area is covered by the RBMP for the Severn River Basin District.

10.5.37 The Wind Farm development area, Grid Connection corridor and wider study area are underlain by a WFD reportable groundwater body identified as the SE Valleys Carboniferous Coal Measures (GB40902G201900). The groundwater body has an Overall WFD status of 'Good'. However, it is classified as 'Poor' in terms of its Chemical status.

10.5.38 The Proposed Development area and wider study area crosses three WFD surface water body catchments which have a hydrological connectivity with the Proposed Development:

- The Afon Ebwy (source to confluence with Afon Ebwy Fach) surface water body in the west of the Proposed Development area;
- The Afon Ebwy Fach (source to confluence with Afon Ebwy) surface water body in the east of the Proposed Development area;
- The Afon Ebwy (confluence of Afon Ebwy Fach to Maes-glas) surface water body to the south; and

10.5.39 The Afon Ebwy and Afon Ebwy Fach WFD surface water bodies achieved an overall classification of 'Moderate' in the 2018 WFD classification (Cycle 2) (**Table 10.10**).

Table 10.10 Summary of the WFD surface water body and its associated status definitions within study area

WFD Water Body	Afon Ebwy (source to confluence with Afon Ebwy Fach) Surface Water Body	Afon Ebwy Fach (source to confluence with Afon Ebwy) Surface Water Body	Afon Ebwy (confluence of Afon Ebwy Fach to Maes-glas) Surface Water Body
Type	River	River	River
Water body identifier	GB109056032900	GB109056032880	GB109056026910
Catchment	South East Valleys	South East Valleys	South East Valleys
HMWB	No	No	No
Overall status [a]	Moderate	Moderate	Moderate
Ecological status [a]	Moderate	Moderate	Moderate
Chemical status [a]	Good	Good	Fail

Notes: Source: https://nrw.maps.arcgis.com/apps/webappviewer/index.html?id=2176397a06d64731af8b21fd69a143f6 (Accessed September 2021). Status definitions from 2018 WFD classification (Cycle 2).

10.5.40 The reasons given[66] for the Afon Ebwy not achieving 'Good' WFD status is based upon impacts to fish, ecological indicators and phosphate levels within the river. Whilst in the Afon Ebwy Fach the reason for not achieving good is associated with fish and invertebrate ecological indicators. Local targeted measures for both watercourses relate to improved control of diffuse and point source pollutants, as well as improvements to the river hydrogeomorphology for habitat or fish passage.

10.5.41 No groundwater quality data was available from NRW (**Appendix 10B**). Surface water quality data (1990-2021) was received from NRW for the Afon Ebwy and Afon Ebwy Fach for stations located within the Water Environment study area (**Appendix 10B**). Water quality is generally similar for both watercourses with average pH ranging between 7.51 and 7.93, Biological Oxygen Demand (BOD) between 1.38 to 3.35 mg/l, ammonia between 0.05 and 1.69 mg/l and chloride between 13 and 33 mg/l except in the upper reaches of Afon Ebwy where, average chloride concentrations are about 110mg/l.

Flood Risk

Terminology

10.5.42 In this report, the probability of a flood occurring is expressed in terms of Annual Exceedance Probability (AEP), which is the inverse of the annual maximum return period. For example, the 100-year flood can be expressed as the 1% AEP flood, i.e., a flood that

66 See: Natural Resources Wales (2022). Water Watch Wales (Online) Available at: https://waterwatchwales.naturalresourceswales.gov.uk/en/ (Accessed September 2021)

has a 1% chance of being exceeded in any year. **Table 10.11** is provided to clarify the use of the AEP terminology as well as a description of the flood band definitions as used by the NRW, and the Welsh Flood Zones set out in the Welsh Assembly Government's Technical Advice Note 15 (TAN-15) Development Advice Map (DAM) and associated guidance.

Table 10.11 Flood Zone definitions and associated annual exceedance probability

WAG TAN15 DAM Flood Zone	NRW Flood Zones	Probability of flooding	AEP	Definition
Flood Zone A	Flood Zone 1	Low Probability	<0.1% AEP of river or sea flooding	Land with less than 1 in 1,000 probability of flooding from rivers or the sea, in any given year
Flood Zone C1 (developed and served by significant flood defences) / Flood Zone C2 (no significant flood defences)	Flood Zone 2	Medium Probability	1% to 0.1% AEP of river flooding 0.5% to 0.1% AEP of sea flooding	Land with between a 1 in 100 and 1 in 1,000 of river flooding; or land having between a 1 in 200 and 1 in 1,000 probability of sea flooding
Flood Zone B	N/A	N/A	N/A	Geological indicators of flooding
N/A	Flood Zone 3	High Probability	>1% AEP of river flooding >0.5% AEP of sea flooding	Land having a 1 in 100 or greater probability of river flooding in any year; or Land having a 1 in 200 probability or greater of sea flooding in any year.

Fluvial and Tidal Flood Risk

10.5.43 As set out in Section 10.2, consultation on an updated version of TAN15 (2004) has been completed (January 2020) and is due for release on 1st June 2023. The draft update includes a range of changes to the guidance, in particular it removes reference to DAM and refers to the Flood Map for Planning held by NRW. However, the consultation draft states that TAN15 (2004) remains current until such a time that the replacement is confirmed. TAN15 (2004) has therefore been used to underpin this assessment.

10.5.44 The Flood Risk Assessment Wales map - Flood Risk from Rivers (**Figure 10.3**) shows that the Proposed Development area lies entirely within an area of very low risk of fluvial flooding. The DAM shows that the Proposed Development area is located in Flood Zone A (very low risk of fluvial flooding) (**Figure 10.4**). The closest areas of high flood risk are associated with the Afon Ebwy 0.15km to the west of the Grid Connection corridor and the Afon Ebwy Fach 0.25km to the east of the Wind Farm development area.

10.5.45 It is noted that fluvial flood mapping only maps the flood risk associated with the larger watercourses, as such the small watercourses at the site do not have mapped fluvial Flood Zones. For these watercourses, the Surface Water Flood Risk map (**Figure 10.5**) provides an indication of the extent of flood risk.

10.5.46 The risk of flooding from the sea is minimal due to the elevation of the Proposed Development area and wider study area, which ranges between from 440mAOD in the north to 260mAOD in the southern edge, at the closest point to Aberbeeg.

10.5.47 This suggests that the risk of fluvial flooding to the Proposed Development is low. The locality is not at risk of tidal flooding on account of the elevation above sea level.

Surface Water Flood Risk

10.5.48 Surface water flooding occurs when the intensity of rainfall is greater than the local drainage and infiltration capacity, causing water to flow overland. Where low-points or barriers to flow are present, particularly deep areas of flooding may occur. These areas are not limited to river corridors or floodplains.

10.5.49 The Flood Risk Assessment Wales map – Flood risk from surface water and small watercourses (**Figure 10.5**) shows that most of the Proposed Development area is at very low risk of flooding from this source. Small areas of low to high flood risk are shown on localised lower-lying areas associated with ponds/lakes and the Nant Big.

10.5.50 The mapping also shows a surface water flow pathway starting at 440mAOD in the north of the Wind Farm development area, to the east of Turbine 1, and draining south towards Nant Big. A soil bund and existing access track currently cross the flow pathway (**Figure 10.2**). The closest areas of high flood risk are associated with the Afon Ebwy 0.15km to the west of the Grid Connection corridor and the Afon Ebwy Fach 0.25km to the east of the Wind Farm development.

10.5.51 Overall, the risk of surface water run-on is very low due to the location of the Proposed Development on a topographic high. This indicates that, for the most part, it will be surface water runoff originating from the development proposals which would be the primary surface water flooding consideration.

Groundwater Flood Risk

10.5.52 Groundwater flooding occurs as a result of water issuing to the surface from the underlying aquifers. This tends to occur after long periods of sustained high rainfall, with areas most at risk being situated on permeable geology and low-lying compared to the local water table.

10.5.53 The Proposed Development is underlain by South Wales Upper Coal Measures which consists of a cyclical sequence of sandstone, mudstone, siltstone and coal seam layers (Secondary A aquifer). There is limited superficial cover. The potential for encountering groundwater during excavations is considered to be limited. Where groundwater may be encountered, it is likely to be perched and in small quantities. This is due to the Proposed Development area being at a topographic high and the underlying geology comprising bands of both higher and lower permeability bedrock layers. This is consistent with the EA

Areas Susceptible to Groundwater Flooding Map[67] which shows that the risk of groundwater flooding in the Proposed Development area is less than 25%, and in the wider study area the risk is up to 50%, except for the area west of Glyndwr where the risk increases to up to 75%.

10.5.54 This suggests that although some groundwater may be encountered during excavations in the Proposed Development area, groundwater is unlikely to be found in significant quantities, and is not considered to be a significant potential flood risk.

Sewer Flood Risk

10.5.55 Sewer flooding occurs when the local capacity of the underground drainage network is exceeded resulting in the surcharging of water to the surface. The discharge of the drainage network into watercourses can also be affected by overall system capacity (i.e., where pumped), or high-water levels in the receiving waters obstructing the drainage of network outfalls.

10.5.56 The Proposed Development is situated away from developed areas due to its elevation, and it is anticipated that there are few sewer drainage networks in the Proposed Development area within which water levels could feasibly rise to an extent that would result in flooding of the site. Any flows surcharging from minor sewer systems associated with nearby farm buildings would be expected to be minimal/intercepted by the local watercourses. In the wider area sewer drainage networks serve the towns/villages of Cwm, Abertillery, Aberbeeg and Llanhilleth but these are at significantly lower elevations (210mAOD) than the Proposed Development (230mAOD).

10.5.57 On this basis, owing to the lack of source, the risk of sewer flooding in the area is considered to be low and is not considered further in this assessment.

Artificial Flood Risk

10.5.58 The NRW Reservoir Flood Risk Map (**Figure 10.6**) shows that the Proposed Development is not located within an area of reservoir flood risk. In the wider area, flooding from artificial sources is predicted along the Afon Ebwy, Afon Ebwy Fach and a tributary near Abertillery associated with breach/failure of reservoirs, at least 3km to the north/northeast of the Proposed Development. No raised bodies of water are proposed as part of the development. On this basis risk of flooding from artificial sources in the area is considered to be low and is not considered further in this assessment.

Biodiversity sites

10.5.59 A number of designated sites for biodiversity conservation have been identified within the Water Environment study area and surroundings in **Chapter 8: Biodiversity**. These include one statutory designated site (Cwm Merddog Woodlands SSSI) and several non-statutory designated sites (SINCs). Cwm Merddog Woodlands SSSI is an actively managed beech

67 Provided in Blaenau Gwent County Borough Council (2013) Local Flood Risk Management Strategy (Online) Available at: http://democracy.blaenau-gwent.gov.uk/Data/Ordinary%20Meeting%20of%20the%20Council/201307111400/Agenda/att220.pdf (Accessed September 2021)

and yew woodlands upstream of, and unlikely to be affected by, the Proposed Development. A description of the SINCs which have a water component, and therefore could potentially be impacted by the Proposed Development is provided in **Table 10.12**, where information is available. Additional information on the conservation sites will be collected through further consultation with stakeholders during the next stages of the EIA in order to confirm the sites which are considered to be water-dependant and therefore likely to be affected by the Proposed Development.

Table 10.12 Summary of water-dependent nature conservation sites with potential hydrological connectivity to the Proposed Development

Site	Ecological interest	OS Grid Reference	Distance (km) from Proposed Development boundary	Hydrological/hydrogeological connectivity
Statutory nature conservation sites within study area				
Cwm Merddog Woodlands SSSI	Actively managed beech and yew woodlands	SO18750 06369	1.1 NW	Upstream of the Proposed Development, with no potential pathway for hydrological connectivity, and therefore unlikely to be affected. **Scoped out of the assessment**
Non-statutory nature conservation sites within study area				
Arail Pond SINC	Unimproved and semi-improved acid grassland. 40% of the pond is open water.	SO21180322	Within boundary	In proximity of proposed wind turbine. Therefore, there are potential impacts to the SINC. **Scoped in to the assessment.**
Coetgae Pond SINC	*	SO21080352	Within boundary	In proximity of proposed wind turbine. Therefore, there are potential impacts to the SINC. **Scoped in to the assessment.**
Craig y Deri Pond SINC	*	SO20000349	Within boundary	In proximity of proposed wind turbine. Therefore, there are potential impacts to the SINC. **Scoped in to the assessment.**
Mynydd Pen-y-Fan, South East of Manmoel SINC	Marshy grassland / flush vegetation and small pond with at least 12 indicator species. Semi-improved acid grassland with at least 7 indicator species.	SO193015	1.4 W	Located on the opposite side of the Afon Ebwy valley to the Proposed Development Therefore, there is no potential hydrological pathway, and the site is unlikely to be affected. **Scoped out of the assessment**
Nant Gwynt Woodland SINC, Glandwr	Broad-leaved woodland with an assemblage of semi-natural indicator species. Semi-improved acid grassland. Includes Nant	SO207009	1.3 S	Tributary to Afon Ebwy with no hydrological connectivity to the Proposed Development. It is therefore unlikely to be affected. **Scoped out of the assessment**

Site	Ecological interest	OS Grid Reference	Distance (km) from Proposed Development boundary	Hydrological/hydrogeological connectivity
	Gwynt, Nant Brunant and field drains			
Pen-y-Fan Pond and Meadows SINC, West of Pentwyn	Marshy grassland / flush vegetation, semi-improved neutral grassland and acid grassland / heath. Standing open water with diverse bank-side and aquatic vegetation.	SO196007	1.9 S	Located on the opposite side of the Afon Ebwy valley to the Proposed Development. Therefore, there is no potential hydrological pathway, and the site is unlikely to be affected. **Scoped out of the assessment**
Pond Group 3 SINC	Series of man-made ponds	SO20090365	Within boundary	In proximity to a proposed wind turbine. Therefore, there are potential impacts to the SINC. **Scoped in to the assessment.**
River Ebwy Fach SINC	Significant linear wildlife corridor, associated with the Afon Ebwy and Afon Ebwy Fach Main Rivers.	SO21190221	0.6 S	Includes the Afon Ebwy and Afon Ebwy Fach river channels downstream of the Proposed Development. There is potential that the Proposed Development could affect the SINC. **Scoped in to the assessment**
Twyn y Bleiddiaid SINC, South East of Manmoel	Marshy grassland. Semi-improved acid grassland and field drains	SO187027	1.2 W	Located on the opposite side of the Afon Ebwy valley to the Proposed Development. Therefore, there is no potential hydrological pathway, and the site is unlikely to be affected. **Scoped out of the assessment**
Roseheyworth Community Woodlands	A patchwork of intergrading woodland types and associated areas of grassland, mire and heath all under the influence of the site's hydrological patterns.	SO206058	0.8 NE	Located on the opposite side of the Afon Ebwy Fach valley to the Proposed Development. Therefore, there is no potential hydrological pathway, and the site is unlikely to be affected. **Scoped out of the assessment.**

Notes: * No information available.

Future baseline

10.5.60 Water Environment baseline conditions may change even if the Proposed Development is not built, for the following reasons:

- Climate change will result in increased rainfall seasonality, with generally wetter winters and drier summers, high-intensity rainfall events will become more common. This will lead to greater variation in river flows (low flows and high flows), and increases in flood risk;

- The location and rate of surface water and groundwater abstractions in the area could vary over time and may result in changes to the WFD surface water and groundwater body status and SPZ designations;
- Improvements to WFD water body status associated with improvements to individual quality elements (i.e., phosphate reduction) would result in higher-quality, more sensitive water bodies; and
- Other new development (e.g., urbanisation settlements) along the valley bottoms may result in changes in hydrological baseline such as surface water runoff (flow and pathways) and increase the number of development receptors.

10.6 Embedded measures

10.6.1 A range of environmental measures have been embedded into the Proposed Development as outlined in **Section 4.8** of this Draft ES. **Table 10.13** outlines how these embedded measures will influence the Water Environment assessment. As a consequence, the potential effects of the Proposed Development are evaluated with these embedded measures in place.

Table 10.13 Summary of the embedded environmental measures

Receptor	Potential changes and effects	Embedded measures	Compliance mechanism
Construction Phase			
Aquatic environment receptors Watercourses (Nant Big, WFD surface water bodies (Afon Ebwy and Afon Ebwy Fach) and their tributaries), ponds and SINCs	Temporary increase in sediment-loading of surface water runoff from construction areas leading to deterioration in the surface water quality environment, deterioration in the status of WFD surface water bodies and deterioration in the conditions supporting local conservation sites	ID1 - Good working practices Good working practices will be implemented during construction, with adherence to the Construction Environmental Management Plan (CEMP), which will be secured through a planning consent requirement, and relevant guidance. A monitoring schedule will be implemented by the contractor to ensure that the measures taken to protect the water environment are effective.	CEMP
		ID2- Water Management Plan (WMP) Implementation of an appropriate Water Management Plan for the construction phase of the Proposed Development, utilising SuDS principles, including collection, conveyance and attenuation/infiltration storage where suitable. Suitable temporary silt fencing, bunding and water quality measures (i.e., silt capture to maintain storage volume) will be included in the design of these works. Sufficient capacity will be provided onsite to hold runoff prior to discharge runoff to ground and/or any water discharge into watercourses is limited to greenfield rates. A water quality monitoring programme will be agreed with NRW and implemented prior, during and following construction.	CEMP
		ID3 – Water discharges Further investigation of the viability of infiltration as a means by which surface water runoff could be discharged to ground will be undertaken through liaison with BGCBC and by undertaking soakaway testing exercise. In the case that the soakaway testing concludes that infiltration is not solely sufficient in managing runoff, and discharge to the watercourses is required, this will be subject to a Consent from the NRW and CCBC and dewatering would be suspended if a flood alert or flood warning is in place downstream (and the on-site discharges could feasibly contribute to the flood event). Any groundwater dewatered from excavations (e.g., excavations associated with turbine foundation, OHL wooden poles and underground cables linking the turbines to the substation) will be discharged to adjacent ground, away from watercourses as far as possible. If infiltration is not possible, and discharge to the watercourses is required, this will be subject to a Consent	CEMP

Receptor	Potential changes and effects	Embedded measures	Compliance mechanism
		from the NRW and CCBC and dewatering would be suspended if a flood alert or flood warning is in place downstream (and the on-site discharges could feasibly contribute to the flood event). Any discharge to surface water would be restricted to the greenfield runoff rate and will be treated in a suitable basin/trench before discharging.	CEMP
		ID4 - Materials Management Plan Excavated materials during construction works should be segregated and stored/ re-used on-site in accordance with a Materials Management Plan (in compliance with the CL:AIRE Definition of Waste: Code of Practice). Any temporary onsite storage of excavated materials suspected or confirmed to be contaminated will be on impermeable sheeting, covered over and with adequate leachate / runoff drainage to prevent migration of contaminants from the stockpile. Materials will be segregated where possible to prevent cross-contamination occurring. Such materials will only be reused if they are confirmed as suitable for use in line with the requirements of the Materials Management Plan. ID5 – Soil stockpiles Stockpiles will be appropriately maintained and have the minimum lifespan possible, with materials being reinstated as construction works progress. Where these remain in situ for 3 months or longer, seeding management techniques will be used.	CEMP
Aquatic environment receptors Watercourses (Nant Big, WFD surface water bodies (Afon Ebwy and Afon Ebwy Fach) and their tributaries)	Potential effects on the hydromorphology and flow conveyance as a result of increased sediment inputs or direct watercourse disturbance.	See measures ID1 (Good working practices), ID2 (DMP), ID3 (Water discharges), ID5 (Materials Management Plan) and ID5 (Soil stockpiles)	CEMP
		ID6 - Standoff distance No works will be undertaken within 20m of any watercourse (other than for watercourse crossings and drainage mitigation).	CEMP
		ID7 - Watercourse crossings If watercourse crossings are required to enable access over any watercourses, these would be appropriately sized to maintain existing flow conveyance.	CEMP

Receptor	Potential changes and effects	Embedded measures	Compliance mechanism
		ID8 - Underground cables The underground cables linking the turbines to the substation will be constructed in discrete sections with the reinstatement process commenced in as short a timeframe as practicable.	CEMP
Aquatic environment receptors Watercourses (Nant Big, WFD surface water bodies (Afon Ebwy and Afon Ebwy Fach) and their tributaries,) ponds, springs, SE Valleys Carboniferous Coal Measures and SINCs	Accidental release of pollution into surface water or ground by leaks/spillages of oil/fuel, leaching from excavated soils and concrete leaching leading to deterioration in the surface water and groundwater quality environment, deterioration in the status of WFD water bodies and deterioration in the conditions supporting local conservation sites.	See measures ID1 (Good working practices), ID2 (DMP), ID3 (Water discharges) and ID4 (Materials Management Plan) ID9 – Fuel, oil and chemicals storage (construction phase) Areas of construction compounds that are used for fuel storage, plant maintenance and refuelling will be surfaced with fully impermeable materials to prevent any infiltration of contaminated runoff and contain bunding. An effective accident response protocol will be developed to ensure any spillages or potential pollution incidents are dealt with appropriately including the provision of containment for spills of contaminated liquids. Plant and machinery will be maintained to minimise the risks of oil leaks or similar. Any tanks containing oils, fuels and chemicals will be double skinned. There will be a bunded capacity of 100% of the maximum tank volume for non-hazardous fluids. For fuels or oils the bund capacity will be the larger of 110% of the largest tank volume for single tank bunds, (or, in the case of multi tank bunds, 110% of the largest tank capacity or 25% of the combined tank capacity, whichever is the largest). Fuel storage will be in accordance with Pollution Prevention Guidelines (PPGs). All stores of fuel will be located at least 20m from any watercourses and away from areas at risk of flooding.	CEMP CEMP
Aquatic environment receptors Watercourses (Nant Big, WFD surface water bodies (Afon Ebwy and Afon Ebwy Fach) and their tributaries,) ponds, springs, SE Valleys Carboniferous Coal Measures and SINCs	Discharge of potentially polluted water generated from construction activities (e.g., dewatering/water ingress activities, concrete batching, surface water runoff) into surface water or groundwater leading to deterioration in the surface water and groundwater quality environment, deterioration in the status of WFD water bodies	See measures ID1 (Good working practices), ID2 (DMP), ID3 (Water discharges) and ID4 (Materials Management Plan)	CEMP

Receptor	Potential changes and effects	Embedded measures	Compliance mechanism
	and deterioration in the conditions supporting local conservation sites		
Water resources receptors Private and licensed water abstractions	Potential change to water quality of a water supply resource which may affect the viability of an abstraction	See measures ID1 (Good working practices), ID2 (DMP), ID3 (Water discharges), ID4 (Fuel/oil/chemicals storage) and ID5 (Materials Management Plan)	CEMP
Flood risk receptors People, property, and infrastructure at risk of flooding (downslope and adjacent to the Proposed Development area including properties at Cwm (west), Abertillery (east) and Aberbeeg (south).	Changes to surface water flood risk due to changes in runoff rates resulting from ground disturbance and creation of impermeable surfaces (e.g., temporary construction compound (TCC), access tracks, crane pads)	See measures ID4 (DMP) and ID5 (Water discharges).	CEMP
Flood risk receptors People, property, and infrastructure at risk of flooding (downslope and adjacent to the Proposed Development area including properties at Cwm (west), Abertillery (east) and Aberbeeg (south).	Changes to watercourse flow conveyance as a result of new or modified temporary watercourse crossings (e.g., culvert or bridge).	See measure ID7 (Temporary watercourse crossings) ID10 - Crossing of surface water flow path The existing soil bund which intersects a mapped surface water flow path in the central part of the Proposed Development Site for the wind farm will be removed and replaced with an engineered access track with a pipe culvert to convey flows from existing drainage pathway. The design on the pipe culvert will be confirmed as part of the detailed drainage design. It is suggested that the inlet to the pipe be raised, to maintain attenuation of some surface water upstream of the crossing and regulate flows released to the downstream channel.	CEMP
Operational Phase			
Aquatic environment receptors Watercourses	Accidental spillage of pollutants (fuel or oil) during maintenance activities leading to deterioration	See measure ID3 (Water discharges) ID11 – Detailed drainage design	DNS planning condition

Receptor	Potential changes and effects	Embedded measures	Compliance mechanism
(Nant Big, WFD surface water bodies (Afon Ebwy and Afon Ebwy Fach) and their tributaries), ponds springs, SE Valleys Carboniferous Coal Measures and SINCs	in the surface water and groundwater quality environment, deterioration in the status of WFD water bodies and deterioration in the conditions supporting local conservation sites.	Detailed drainage design for the operational wind farm development, utilising SuDS principles, including attenuation storage where necessary, to ensure sufficient capacity is available onsite to discharge runoff to ground and/or any water discharge into watercourses is limited to greenfield rates. The detailed design will be prepared in accordance with the Drainage Strategy for the operational wind farm development, which will accompany the ES. ID12 – Fuel, oil and chemicals usage (operational phase) Following the construction phase there will be no requirement for fuel, oil or chemicals to be stored on site, however, small quantities of fuel/oil/chemicals may need to be brought onto site for maintenance activities. In these cases, only the minimum quantities possible should be brought on to site and must be removed from site following completion of works, The fuel/oil/chemicals must be kept in the appropriate containers and sealed when not used for refuelling. An effective accident response protocol will be developed to ensure any spillages or potential pollution incidents are dealt with appropriately including the provision of containment for spills of contaminated liquids. Plant and machinery will be maintained to minimise the risks of oil leaks or similar.	DNS planning condition DNS planning condition
Water resources receptors private and licensed water abstractions	Potential change to water quality of a water supply resource which may affect the viability of an abstraction	See measures ID3 (Water discharges), ID11 (Detailed Drainage Design) and ID12 (Fuel/oil/chemicals storage (operational phase))	DNS planning condition
Flood risk receptors People, property, and infrastructure at risk of flooding (downslope and adjacent to the Proposed Development area including properties at Cwm (west), Abertillery (east) and Aberbeeg (south).	Changes to surface water flood risk due to changes in runoff rates resulting creation of impermeable surfaces (e.g., substation, access tracks, crane pads)	See measures ID3 (Water discharges) and ID11 (Detailed Drainage Design)	DNS planning condition
Flood risk receptors	Changes to watercourse flow conveyance as a result of new or	See measures ID7 - Watercourse crossings and ID10 (Crossing of surface water flow path)	DNS planning condition

Receptor	Potential changes and effects	Embedded measures	Compliance mechanism
People, property, and infrastructure at risk of flooding (downslope and adjacent to the Proposed Development area including properties at Cwm (west), Abertillery (east) and Aberbeeg (south).	modified temporary watercourse crossings (e.g., culvert or bridge).		
Decommissioning			
It is anticipated that similar measures to those embedded into the project design for the construction phase will be implemented.			

10.7 Scope of the assessment

10.7.1 The scope of the following assessment is based upon a review of the baseline information detailed in **Section 10.5** and is to be confirmed through a review of additional data sources, observations from the site visit and further consultation with stakeholders.

Spatial Scope

10.7.2 The spatial scope of the Water Environment assessment covers the area of the Proposed Development, in addition to the associated Water Environment study area which is defined in **Section 10.4**, and shown in **Figure 10.1**. The study area was defined as a 1.5km buffer around the Proposed Development boundary. The Water Environment study area was further refined where hydraulic connectivity was not present (for example areas upslope of the Proposed Development were scoped out).

10.7.3 The spatial scope for the flood risk receptors includes people, property and infrastructure which would be at risk should flooding be influenced by the Proposed Development. Within this Water Environment chapter, only the potential effects to third party receptors are considered. The Flood Consequence Assessment (FCA) assesses aspects of the development itself, in addition to third party receptors, in regard to increased flood risk.

Temporal Scope

10.7.4 The temporal scope of the hydrology assessment is aligned with the period over which the Proposed Development will be carried out; inclusive of the construction, operational and decommissioning phases, as detailed below.

10.7.5 This will be achieved by considering the NPS EN-1 climate change emission scenarios appropriate for the Proposed Development's lifetime. The assessment has taken into account potential impacts on current and future water quality and hydromorphology using approaches consistent with the WFD.

10.7.6 The wind farm will be designed with an operational life of 30 years. At the end of this period the Applicant has three options; to decommission the wind farm and dismantle and remove the turbines; to apply for an extension to the operating period using existing equipment; or apply to install new equipment on the Site. For the purposes of this assessment, it is assumed that the wind farm will be decommissioned.

Potential receptors

10.7.7 Three types of receptors have been identified with respect to the hydrology assessment:

- Aquatic environment receptors;
- Water resources receptors; and
- Flood risk receptors (people, property, and infrastructure at risk of flooding).

10.7.8 The principal Water Environment receptors within each of these broad receptor types are summarised in **Table 10.14**. The location of these receptors is shown in **Figure 10.7**.

Table 10.14 Water Environment receptors subject to potential effects

Receptor	Receptor ID	Reason for consideration
Aquatic environment receptors - watercourses		
Nant Big and tributaries	WC1	Ordinary Watercourse which issues within the Wind Farm development area and flows to the south. Discharges into Afon Ebwy. Potential for impacts on water quality of Nant Big and downstream watercourse Afon Ebwy.
Afon Ebwy and tributaries	WC2	Main River and WFD surface water body. The Nant Big joins the Afon Ebwy to the south of the Wind Farm development area. Potential for impacts on WFD status as a result of changes to water quality.
Afon Ebwy Fach and tributaries	WC3	Main River and WFD surface water body and joins Afon Ebwy downstream of its confluence with the Nant Big. Potential for impacts on WFD status as a result of changes to water quality.
Aquatic environment receptors - Aquifers		
SE Valleys Carboniferous Coal Measures WFD Groundwater body	WC4	WFD groundwater body. Potential for impacts on WFD status as a result of changes to water quality.
Aquatic environment receptors - Ponds		Various small ponds within or adjacent Proposed Development area. Some of the ponds are non-statutory biodiversity designated sites (SINCs).
Aquatic environment receptors - Springs		Two springs within the Proposed Development area. Potential for impacts on water quality of the springs.
Aquatic environment receptors – Non-statutory nature conservation sites		
Arail Pond SINC	C1	Locally designated sites within the Proposed Development area which support water dependent habitats and species.
Coetgae Pond SINC	C2	
Craig y Deri Pond SINC	C3	
Pond Group 3 SINC	C4	
Ebwy Fach SINC	C5	Linear wildlife corridor, associated with the Afon Ebwy and Afon Ebwy Fach Main Rivers 0.6 km south (downstream) of the Proposed Development boundary.
Water resource receptors		
Licenced surface water abstractions from the Afon Ebwy Fach	WR1	Abstraction (WA/056/0063/0007) located approximately 0.4 km east of the Proposed Development (downslope). Potential increase in pressures on local water resources due to changes to water quality.

Receptor	Receptor ID	Reason for consideration
Licenced groundwater abstraction from SE Valleys Carboniferous Coal Measures	WR2	Abstraction (WA/056/0063/0007) located approximately 0.5 km east of the Proposed Development (downslope ad likely downgradient). Potential increase in pressures on local water resources due to changes to water quality.
Private water supply, spring PWS 9309	WR3	Located within the Grid Connection corridor. Potential increase in pressures on local water resources due to changes to water quality and quantity.
Private water supply, spring PWS 35247	WR4	Located within 0.4km east of the Proposed Development boundary (downslope of and likely downgradient). Potential increase in pressures on local water resources due to changes to water quality and quantity.
Private water supply, spring PWS 12994	WR5	Located within the Grid Connection corridor. Potential increase in pressures on local water resources due to changes to water quality and quantity.
Flood Risk receptors		
Residential properties, industry/business properties located in and around Cwm	FR1	Humans/properties/infrastructure downslope of the Proposed Development to the west. Potential for increased flood risk due to changes in surface water runoff rates and volumes.
Residential properties, industry/business properties located in and around Abertyleri	FR2	Humans/properties/infrastructure downslope of the Proposed Development to the east. Potential for increased flood risk due to changes in surface water runoff rates and volumes.
Residential properties, industry/business properties located in and around Aberbeeg	FR3	Humans/properties/infrastructure downslope of the Proposed Development to the south. Potential for increased flood risk due to changes in surface water runoff rates and volumes.
Residential and farm buildings at Arail Farm	FR4	Located within the Proposed Development area. Potential for increased flood risk due to changes in surface water runoff rates and volumes.
Residential and farm buildings at Hafod-y-dafal Farm	FR5	Located within the Proposed Development area. Potential for increased flood risk due to changes in surface water runoff rates and volumes.
Solar Farm	FR6	Located within the Proposed Development area. Potential for increased flood risk due to changes in surface water runoff rates and volumes.

Receptor	Receptor ID	Reason for consideration
Cwm to Cardiff Railway	FR7	Humans/properties/infrastructure downslope of the Proposed Development to the west. Potential for increased flood risk due to changes in surface water runoff rates and volumes.
A4046 road	FR8	Road located downslope of the Proposed Development to the west. Potential for increased flood risk due to changes in surface water runoff rates and volumes.
A467 road	FR9	Road located downslope of the Proposed Development to the east. Potential for increased flood risk due to changes in surface water runoff rates and volumes.
Residential properties, industry/business properties located in and around Glandwr	FR10	Located downstream of the Proposed Development, within the study area. Potential for changes in flows in the Afon Ebwy and Afon Ebwy Fach to increase flood risk to these receptors.

Aquatic environment receptors

10.7.9 The aquatic environment receptors represent a range of potential habitats, species, interactions and pathways that may be affected as a result of the Proposed Development, during the construction, operation and decommission phases of its lifespan. This includes watercourses (Nant Big, the WFD water bodies Afon Ebwy and Afon Ebwy Fach), underlying aquifer (SE Valleys Carboniferous Coal Measures WFD groundwater body), ponds and springs. The location of these receptors is shown in **Figure 10.7**.

10.7.10 Potential effects on the WFD water bodies are considered within this assessment, in a manner which reflects the WFD approach. The assessment has assumed that in the future all watercourses will achieve WFD Good Ecological Status and have been assessed as such. As such a separate WFD assessment has not been undertaken to support this assessment. The findings of this initial assessment will inform later stages of assessment as to whether a WFD should be completed to support the ES.

10.7.11 The Proposed Development is located across the Afon Ebwy and Afon Ebwy Fach water body catchments, which are both reportable surface water body WFD. The Proposed Development does not directly interact with either of the Main Rivers; as such any impacts would occur via the Nant Big, an Ordinary Watercourse that confluences with the Afon Ebwy downstream of the Site boundary, or via surface water runoff discharged to the river.

10.7.12 Specific consideration has also been given to the non-statutory designated SINCs, which are located within the Proposed Development area. The sites scoped in for further assessment all support water-dependent habitats, as identified within the baseline analysis, which have potential connectivity with the Proposed Development activities.

10.7.13 Potential effects on specific species and aquatic and riparian biodiversity are assessed within **Chapter 8: Biodiversity**, which should be read in conjunction with this assessment.

Water resource receptors

10.7.14 The water resources identified within the study area are dependent on surface water and groundwater bodies and springs. Any impact as a result of the Proposed Development to the water bodies or springs would have subsequent impact on the water resources. On this basis full consideration has been given of the rights of local water users (primarily abstractors) within this assessment. Potential derogation of these rights as a result of the Proposed Development could occur through reduction in water quantity or deterioration in water quality.

10.7.15 According to the baseline analysis there are three licenced surface water abstractions from the Afon Ebwy Fach and four private abstractions from various springs located within the study area. The location of the water resource receptors is shown in **Figure 10.7**.

Flood risk receptors

10.7.16 Flood risk receptors are defined within this assessment as people, property and infrastructure that could be at risk of flooding. The FCA undertaken for this Proposed Development informs the baseline flood risk across the study area. Where a flood risk to an identified receptor exists within the baseline environment it is important that this assessment recognises the potential change in risk arising from the Proposed Development.

10.7.17 Review of the available OS mapping and aerial imagery in the FCA has identified various potential flood risk receptors in the vicinity of the Proposed Development. This includes residential properties, industry and business properties, farm buildings and transport infrastructure downslope of the Proposed Development including roads (A4046 and A467) and the railway (Cwm to Cardiff).

Likely significant effects

10.7.18 The effects on Water Environment receptors which have the potential to be significant and have been taken forward for detailed assessment are summarised in **Table 10.15**.

Table 10.15 Likely significant effects on water environment receptors scoped in for further assessment

Receptor type*	Relevant assessment criteria	Likely significant effects
Construction Phase		
Aquatic environment receptors	WFD (Standards and Classification) Directions (England and Wales) 2015	Temporary increase sediment-loading of surface water runoff from construction areas leading to deterioration in the water quality environment of the aquatic environment receptors Potential effects on the hydromorphology and flow conveyance as a result of increased sediment inputs or direct watercourse disturbance.

Receptor type*	Relevant assessment criteria	Likely significant effects
		Accidental release of pollution into the water environment by leaks/spillages of oil/fuel, leaching from excavated soils and concrete leaching leading to deterioration. Discharge of potentially polluted water generated from construction activities (e.g., dewatering/water ingress activities, concrete batching, surface water runoff) into surface water or groundwater leading to deterioration in the water quality of the water environment receptors
Water resource receptors	WFD (Standards and Classification) Directions (England and Wales) 2015	Potential change to water quality of a water supply resource which may affect the viability of an abstraction
Flood risk receptors (third party receptors)	TAN-15	Changes to surface water flood risk due to changes in runoff rates resulting from ground disturbance and creation of impermeable surfaces (e.g., TCC, access tracks, crane pads) Changes to watercourse flow conveyance as a result of new or modified temporary watercourse
Operational Phase		
Aquatic environment receptors	WFD (Standards and Classification) Directions (England and Wales) 2015	Accidental spillage of pollutants (fuel or oil) during maintenance activities leading to deterioration in the water quality of the aquatic environment receptors.
Water resource receptors	WFD (Standards and Classification) Directions (England and Wales) 2015	Potential change to water quality of a water supply resource which may affect the viability of an abstraction
Flood risk receptors (third party receptors)	TAN-15	Changes to surface water flood risk due to changes in runoff rates resulting from ground disturbance and creation of impermeable surfaces (e.g., TCC, access tracks, crane pads) Changes to watercourse flow conveyance as a result of new or modified temporary watercourse

10.7.19 The potential effects below have been excluded from further assessment i.e., 'scoped out', on the basis that the effects are not considered likely to be significant:

- Wind Farm Development (construction and operational phases)
  - Flood risk from tidal, groundwater, sewer and artificial sources. As discussed in **Section 10.5** (Flood Risk), these flood sources pose a low risk to the Proposed Development and therefore are scoped out of the assessment.

- Grid Connection corridor (operational phase)
  - Water quantity and hydromorphology effects arising from the presence of OHL infrastructure. All wooden poles would be located a minimum distance away from any watercourses. The impact arising from the presence of the OHL wooden poles on water flows and levels, and watercourse morphology is therefore scoped out; and
  - All water environment effects associated with routine inspection and maintenance activities of the OHL infrastructure. These activities would result in minimal disturbance of surface soils or watercourses. Best practice measures in line with NetRegs PPGs and GPPs would be incorporated into operational procedures to ensure that the risk of accidental release of pollutants into the water environment is minimised. There would be no impact from these activities on third party flood risk receptors and they are scoped out of the assessment.
- Wind Farm development and Grid Connection corridor (decommissioning phases)
  - It is envisaged that those activities and potential effects that are scoped out of the construction phase can also be scoped out for the future decommissioning phase

10.8 Assessment methodology

10.8.1 The generic project-wide approach to the assessment methodology is set out in **Chapter 2: Approach to Environmental Impact Assessment**, and specifically in **Sections 2.5** to **2.8**. However, whilst this has informed the approach that has been used in this Water Environment assessment, it is necessary to set out how this methodology has been applied, and adapted as appropriate, to address the specific needs of this Water Environment assessment.

10.8.2 The significance of an effect resulting from the Proposed Development is primarily determined by the value of a given water feature and the magnitude of the effect. In terms of the hydrology, the key determinants of magnitude relate to surface water quantity (level and flow), and water quality. Depending on the effects on surface water flows, there may also be indirect effects on downstream morphology and sediment dynamics, river water quality and flood risk. The method and criteria used to determine value, magnitude, and significance of effect are described in the sections below.

Determination of significance

10.8.3 The EIA Regulations recognise that developments will affect different environmental elements to differing degrees, and that not all of these are of sufficient concern to warrant detailed investigation or assessment through the EIA process. The EIA Regulations identify those environmental resources that warrant investigation as those that are "*likely to be significantly affected by the development*".

10.8.4 The EIA Regulations do not define significance and it will be necessary to state how this will be defined for the EIA. The significance of an effect resulting from a development during construction or operation is most commonly assessed by reference to the sensitivity (or value) of a receptor and the magnitude of the effect. This approach provides a mechanism for identifying areas where mitigation measures may be required and to identify the most appropriate measures to alleviate the risk presented by the development.

10.8.5 **Table 10.16** details the basis for assessing receptor sensitivity. The value of water features is normally related to the importance of the surface water or groundwater feature that might be at risk from effects. The criteria used by Wood in the assessment of water feature value are semi-quantitative, so professional judgement by the assessor has been required.

Table 10.16 Establishing the sensitivity of water receptors

Sensitivity	Criteria	Receptor type*	Examples
High	Features with a high yield, quality or rarity with little potential for substitution.	Aquatic environment	Conditions supporting a site with an international conservation designation (Special Area of Conservation (SAC), Special Protection Area (SPA), Ramsar site), where the designation is based specifically on aquatic features. WFD surface water body (or part thereof) with overall High status, also any associated upstream non-reportable WFD surface water body or non-WFD surface water body. WFD surface water body (or part thereof) with High status for morphology.
	Water use supporting human health and economic activity at a regional scale.	Water use	Regionally important public surface water or groundwater supply (and associated catchment/GWMU) or permitted discharge.
	Features with a high vulnerability to flooding.	Flood risk	Land use type defined as 'Emergency Services' in the TAN15 development categories (e.g., hospitals, ambulance/police stations that are required to operate during flooding and buildings used to provide emergency shelter in time of flood) and essential infrastructure equivalent (i.e. critical national infrastructure, such as essential transport and utility infrastructure).
Medium	Features with a medium yield, quality or rarity, with a limited potential for substitution.	Aquatic environment	Conditions supporting a site with a national conservation designation (e.g., SSSI, National Nature Reserve (NNR)), where the designation is based specifically on aquatic features. WFD surface water body (or part thereof) with overall 'Good' status/potential, also any associated upstream non-reportable WFD surface water body or non-WFD surface water body. WFD groundwater body (or part thereof) with overall 'Good' status.
	Medium quality watercourse morphology	Watercourse morphology	A watercourse in natural equilibrium and exhibiting a natural range of fluvial processes and morphological features, with little or no modification or anthropogenic influence.

Sensitivity	Criteria	Receptor type*	Examples
	Water use supporting human health and economic activity at a local scale.	Water use	Local public surface water and groundwater supply (and associated catchment/GWMU) or permitted discharge. Licensed non-public surface water and groundwater supply abstraction (and associated groundwater catchment) which is relatively large relative to available resource, or where raw water quality is a critical issue, e.g., industrial process water, or permitted discharge.
	Features with a medium vulnerability to flooding.	Flood risk	Land use type defined as 'Highly vulnerable development' in the TAN15 development categories (e.g., educational institutions, most types of residential development and vulnerable industrial development)
Low	Features with a low yield, quality or rarity, with some potential for substitution.	Aquatic environment	Conditions supporting a site with a local conservation designation (e.g., SINC, Local Nature Reserve (LNR), County Wildlife Site (CWS)), where the designation is based specifically on aquatic features, or an undesignated but highly/moderately water-dependent ecosystem, including a Local Wildlife Site (LWS) and a GWDTE. WFD surface water body (or part thereof) with overall Moderate or lower status/potential, also any associated upstream non-reportable WFD surface water body or non-WFD surface water body. Groundwater body (or part thereof) with overall Poor status.
	Low quality watercourse morphology	Watercourse morphology	A watercourse showing signs of modification and recovery to a natural equilibrium, and currently exhibiting a limited range of fluvial processes and morphological features affected by modification or anthropogenic influence.
	Water use supporting human health and economic activity at household/individual business scale.	Water use	Licensed non-public surface water and groundwater supply abstraction (and associated catchment/GWMU), which is relatively small relative to available resource, or where raw water quality is not critical, e.g., cooling water, spray irrigation, mineral washing or permitted discharge. Unlicensed potable surface water and groundwater abstraction (and associated catchment) e.g., private domestic water supply, well, spring or permitted discharge.
	Features with a low vulnerability to flooding.	Flood risk	Land use type defined as 'Less vulnerable development' in the TAN15 development categories excluding water compatible development equivalent (e.g., general industrial, employment, commercial

Sensitivity	Criteria	Receptor type*	Examples
			and retail development, transport and utilities infrastructure, mineral extraction sites (except sand and gravel)).
Very Low	Commonplace features with very low yield or quality with good potential for substitution.	Aquatic environment	Conditions supporting an undesignated and low water-dependent ecosystem, including an LWS, GWDTE and pond. Non-reportable WFD surface water body (or part thereof), or non-WFD surface water body, not associated with any downstream WFD surface water body. Non-reportable WFD groundwater body (or part thereof), or non-WFD groundwater body.
	Very low quality watercourse morphology	Watercourse morphology	A highly-modified watercourse changed by channel modification or other anthropogenic pressures, currently exhibiting no active flow processes or morphological diversity.
	Water use does not support human health, and of only limited economic benefit.	Water use	Unlicensed non-potable surface water and groundwater abstraction (and associated catchment) e.g., livestock supply.
	Features that are resilient to flooding.	Flood risk	Land use type defined as 'Other' paragraph 5.3 in the TAN15 development categories which are 'water compatible' development equivalent (e.g., amenity open space, nature conservation and biodiversity, sand and gravel workings, docks, marinas, flood control infrastructure, water transmission infrastructure) and undeveloped land.

*Receptor types map onto receptor lists as follows:
- Aquatic environment –watercourses, springs and ponds and conditions supporting designated conservation sites
- Water use – springs, abstractions, WFD surface water bodies, aquifers/WFD groundwater bodies
- Flood risk – humans, properties and infrastructure.

The watercourse morphology receptor type is only relevant when 'in-channel' works are proposed.

10.8.6 **Table 10.17** details the basis for assessing magnitude of change. The magnitude of change on water receptors is independent of the value of the receptor, and its assessment is semi-quantitative, based professional judgement.

Table 10.17 Establishing the magnitude of change

Magnitude	Criteria	Receptor type*	Example**, ***
High	Results in major change to feature, of sufficient magnitude to affect its use/integrity.	Aquatic environment	Deterioration in river flow regime, morphology, or water quality, leading to sustained, permanent or long-term breach of relevant Conservation Objectives (COs) or non-temporary downgrading (deterioration) of status of WFD surface water body (including

Magnitude	Criteria	Receptor type[*]	Example[**, ***]
			downgrading of individual WFD elements) or dependent receptors, or resulting in the inability of the surface water body to attain Good status in line with the measures identified in the RBMP. Deterioration in groundwater levels, flows or water quality, leading to non-temporary downgrading of status of WFD groundwater body or dependent receptors, or the inability of the groundwater body to attain Good status in line with the measures identified in the RBMP.
		Watercourse morphology	Loss or extensive damage to geomorphological habitat and processes due to extensive modification and/or fine sediment input. Replacement of a large extent of the natural bed and/or banks with artificial material. Extensive change to channel planform.
		Water use	Complete or severely reduced water availability and/or quality, compromising the ability of water users to abstract.
		Flood risk	Change in flood risk resulting in potential loss of life or major damage to the property or infrastructure.
Medium	Results in noticeable change to feature, of sufficient magnitude to affect its use/integrity in some circumstances.	Aquatic environment	Deterioration in river flow regime, morphology or water quality, leading to periodic, short-term and reversible breaches of relevant COs, or potential temporary downgrading of status of surface water body status (including potential temporary downgrading of individual WFD elements) or dependent receptors, although not affecting the ability of the surface water body to achieve future WFD objectives. Deterioration in groundwater levels, flows or water quality, leading to potential temporary downgrading of status of WFD groundwater body or dependent receptors, although not affecting the ability of the groundwater body to achieve future WFD objectives.
		Watercourse morphology	Partial loss or damage to geomorphological habitat and processes due to modifications and/or fine sediment input. Replacement of the natural bed and/or banks with artificial material (total length is more than 3% of water body length).
		Water use	Moderate reduction in water availability and/or quality, which may compromise the ability of the water user to abstract on a temporary basis or for limited periods, with no longer-term impact on the purpose for which the water is used.

Magnitude	Criteria	Receptor type*	Example**, ***
		Flood risk	Change in flood risk resulting in potential for moderate damage to the property or infrastructure.
Low	Results in minor change to feature, with insufficient magnitude to affect its use/integrity in most circumstances.	Aquatic environment	Slight change in river flow regime, morphology or water quality, but remaining generally within COs, and with no short-term or permanent change to status of WFD surface water body (of overall status or element status) or dependent receptors. Slight deterioration in groundwater levels, flows or water quality, but with no short-term or permanent downgrading of status of WFD groundwater body or dependent receptors.
		Watercourse morphology	Slight change or deviation from baseline conditions, or partial loss or damage or improvement/ gain to in channel habitat and geomorphological processes due to modifications and/or fine sediment input.
		Water use	Minor reduction in water availability and/or quality, but unlikely to affect the ability of a water user to abstract.
		Flood risk	Change in flood risk resulting in potential for minor damage to property or infrastructure.
Very Low	Results in little or no change to feature, with insufficient magnitude to affect its use/integrity	Aquatic environment	No or very slight change in river flow regime or surface water quality, and no consequences in terms of COs or status of WFD surface water body or dependent receptors. No or very slight change in groundwater levels or groundwater quality, and no consequences in terms of status of WFD groundwater body or dependent receptors.
		Watercourse morphology	Very slight change from surface water baseline conditions, approximating to a 'no change' situation.
		Water use	No, or very slight change in water availability or quality and no change in ability of the water user to exercise licenced rights or continue with small private abstraction.
		Flood risk	Increased frequency of flood flows, but which does not pose an increased risk to property or infrastructure.

*The watercourse morphology receptor type is only relevant when 'in-channel' works are proposed.
**For the purposes of this assessment of change, relevant WFD elements for surface water body classification include:

- all biological quality elements e.g., fish, macrophytes, invertebrates;
- all physico-chemical quality elements e.g., dissolved oxygen, phosphate;
- hydromorphological supporting elements;
- the mitigation measures assessment.

Significance evaluation methodology

10.8.7 The significance of water-related effects is derived by considering both the value of the feature and the magnitude of change. In this assessment, effects are considered to be significant or not significant according to the matrix in **Table 10.18,** with *'Major'* and *'Moderate'* effects taken to be *'Significant'*. Significance can be *'Beneficial'*, *'Adverse'* or *'Neutral'*.

Table 10.18 Significance evaluation matrix relating to the water environment

		Magnitude of change			
		High	**Medium**	**Low**	**Very Low**
Value/importance/value	**High**	Major (Significant)	Major (Significant)	Moderate (Potentially significant)	Minor (Not significant)
	Medium	Major (Significant)	Moderate (Potentially significant)	Minor (Not significant)	Negligible (Not significant)
	Low	Moderate (Potentially significant)	Minor (Not significant)	Negligible (Not significant)	Negligible (Not significant)
	Very Low	Minor (Not significant)	Negligible (Not significant)	Negligible (Not significant)	Negligible (Not significant)

Note: 'Significant' effects are those identified as 'Major'. 'Moderate' effects would normally be deemed to be 'significant'. However, there may be some exceptions, depending on the application of professional judgment.

10.8.8 In this assessment, only the potential and residual significance of change with respect to the water environment (groundwater levels, flows and quality, and river flows, quality and morphology) and flood risk are considered. It is important to recognise that a *'Significant'* change in the water environment does not necessarily result in a *'Significant'* change to ecological features. Indeed, because of the different benchmarks and magnitude criteria used by the two assessments, it is possible that a *'Not Significant'* change in the water environment can still sit alongside a *'Significant'* change in an associated ecological water feature, and vice-versa.

10.9 Assessment of Water Environment effects

10.9.1 This section provides an assessment of hydrology-related effects and will be reviewed in light of statutory consultation feedback, further stakeholder engagement and evolution of the detailed design of the Proposed Development.

Assessment of effects on aquatic environment receptors

10.9.2 This section summarises the aquatic environment receptors taken forward in this assessment, which are listed in **Table 10.19**. The sensitivity of each receptor has been determined in accordance with the criteria set out in **Table 10.16.** The assessment of impacts in this section and Chapter 8: Biodiversity concludes that significant effects on individual WFD elements are Not Significant. This assessment will be combined in a single WFD Assessment report and any comments on the proposed methodology (**Appendix 10D**) will be incorporated in the final ES submission.

Table 10.19 Aquatic environment receptors considered under this assessment

Receptor ID	Receptor	Sensitivity	Rationale
Watercourses			
WC1	Nant Big	Low	Not designated as a WFD surface water body. Discharges into the Afon Ebwy (Main River and WFD surface water body). Ordinary Watercourse.
WC2	Afon Ebwy	Medium	Designated WFD surface water body with 'Moderate' Overall WFD status. Main River.
WC3	Afon Ebwy Fach	Medium	Designated WFD surface water body with 'Moderate' Overall WFD status. Main River. Supports three licensed non-public abstractions approximately 0.4km east of the Proposed Development
Aquifers			
AQ1	SE Valleys Carboniferous Coal Measures	Low	Designated WFD groundwater body with 'Poor' Overall WFD status. Groundwater quality likely impacted by former coal mining activities. Supported licensed supply (non-drinking water). Underlies the full extent of the Proposed Development area and Water Environment Study Area.
Conditions supporting non-statutory nature conservation sites			
C1	Arail Pond SINC	Low	Site with a local nature conservation designation (SINC), where the designation is based specifically on aquatic features.
C2	Coetgae Pond SINC	Low	Site with a local nature conservation designation (SINC), where the designation is specifically dependent on aquatic features.
C3	Craig y Deri Pond SINC	Low	Site with a local nature conservation designation (SINC), where the designation is based specifically on aquatic features.
C4	Pond Group 3 SINC	Low	Site with a local nature conservation designation (SINC), where the designation is based specifically on aquatic features.

Receptor ID	Receptor	Sensitivity	Rationale
C5	Ebwy Fach SINC	Low	Site with a local nature conservation designation (SINC), where the designation is based specifically on aquatic features.
Ponds			
Various locations	Ponds	Very low	Not designated for biodiversity conservation Average habitat suitability for GCN.
Springs			
Various locations	Springs	Very low	Not used for water supply

Construction phase

Temporary increase sediment-loading of surface water runoff from construction areas leading to deterioration in the surface water quality environment, deterioration in the status of WFD surface water bodies and deterioration in the conditions supporting local conservation sites

10.9.3 Construction works associated with the Proposed Development have the potential to generate sediment-laden runoff. Activities that could potentially produce sediment-laden runoff include:

- Runoff from the temporary construction compound (TCC), internal access tracks and working areas;
- Excavation works associated with the construction of the substation and wind turbine foundations, crane pads and OHL wooden poles; and
- Temporary use and management of soil stockpiles.

10.9.4 The proposed embedded environmental measures to limit sediment-laden runoff are set out in **Table 10.13**. These measures would be secured through a planning condition, likely via the CEMP.

10.9.5 The magnitude of potential effects of sediment-laden runoff on the aquatic environment receptors is determined to be Low, in regard to the Nant Big, Afon Ebwy, Afon Ebwy Fach and Very Low for the local biodiversity sites and ponds.

10.9.6 Consideration of the magnitude of change to the aquatic environment receptors, in conjunction with their determined sensitivity (Medium for Afon Ebwy and Afon Ebwy Fach**,** Low for Nant Big and local biodiversity sites; and Very Low for the ponds), finds that the significance of effects to the aquatic environment receptors is **Not Significant**.

Potential effects on the hydromorphology and flow conveyance as a result of increased sediment inputs or direct watercourse disturbance

10.9.7 Any potential increases in sediment-laden runoff could also result in increased silt deposition within watercourses network affecting the hydromorphology of the watercourses. Those measures described above and detailed in **Table 10.13** to limit sediment-laden runoff will also prevent any resultant sediment deposition and changes to watercourse hydromorphology such that the magnitude of change on the hydromorphology and flow conveyance of the watercourses is Very Low for Afon Ebwy and Afon Ebwy Fach and Low for Nant Big. The magnitude of change is higher for the Nant Big because of the limited dilution available and location within the Proposed Development area compared to Afon Ebwy and Afon Ebwy Fach which have large dilution capacity and are located 0.25km downstream of the Proposed Development.

10.9.8 Consideration of the sensitivity of the Nant Big (Low) and Afon Ebwy and Afon Ebwy Fach (Medium) in combination with the potential magnitude of change to the receptors, finds that the significance of effects to the aquatic environment receptors is **Not Significant**.

Accidental release of pollution by leaks/spillages of oil/fuel, leaching from excavated soils and concrete leaching leading to deterioration in the surface water and groundwater quality environment, deterioration in the status of WFD water bodies and deterioration in the conditions supporting local conservation sites

10.9.9 Construction works have the potential to further affect water quality conditions and therefore aquatic environment receptors (and water resource receptors) within associated water features via:

- Accidental spillage of fuel, oil or other chemicals used during construction.
- Mobilisation/leaching of contaminants, where present, from soils during excavation works.
- Concrete leaching.

10.9.10 The proposed embedded measures to prevent surface and groundwater water pollution are set out in **Table 10.13**.

10.9.11 The magnitude of change from all identified potential effects of mobilisation of contaminants from contaminated soil, accidental spillages of oils/fuel and concrete leaching is determined to be Very Low in regard to the Afon Ebwy, Afon Ebwy Fach and Low in regard to Nant Big, local biodiversity sites, ponds and springs. The sensitivity of the aquatic environment receptors (Medium for Afon Ebwy and Afon Ebwy Fach and Low for Nant Big, local biodiversity sites; and Very Low for the ponds and springs) in combination with the potential magnitude of change acting upon them is found to be, in this assessment, **Not Significant**.

Discharge of potentially polluted water generated from construction activities (e.g., dewatering/water ingress activities, concrete batching, surface water runoff) into surface water or groundwater leading to deterioration in the surface water and groundwater quality environment, deterioration in the status of WFD water bodies and deterioration in the conditions supporting local conservation sites

10.9.12 Discharge of water generated from construction activities into surface water or groundwater has the potential to affect water quality conditions and therefore aquatic environment receptors (and water resource receptors) within associated water features via:

- Potentially polluted groundwater and water ingress pumped from excavations. Baseline groundwater quality is likely to be poor due to impacts associated with former coal mining activities in the area.
- Potentially polluted surface water runoff (e.g., suspended solids).
- Concrete leaching.

10.9.13 Those measures described above and detailed in **Table 10.13** to prevent surface water and groundwater pollution from accidental release of pollution will also prevent pollution of water generated in the construction activities which will be treated prior to discharge into surface water or groundwater.

10.9.14 The magnitude of change from the identified potential effects resulting from deterioration of water quality is determined to be Very Low in regard to Afon Ebwy, Afon Ebwy Fach, local biodiversity sites, ponds and springs and Low with regard to Nant Big. The magnitude of change is higher for the Nant Big and ponds because of the limited dilution available and location within the Proposed Development area. The sensitivity of the aquatic environment receptors (Medium for Afon Ebwy and Afon Ebwy Fach, Low for Nant Big and local biodiversity sites; and Very Low for the ponds and springs) in combination with the potential magnitude of change acting upon them is found to be, in this assessment, **Not Significant**.

Operational phase

Accidental spillage of pollutants (fuel or oil) during maintenance activities leading to deterioration in the surface water and groundwater quality environment, deterioration in the status of WFD water bodies and deterioration in the conditions supporting local conservation sites

10.9.15 Following the construction phase small quantities of fuel/oil/chemicals would need to be brought onto site for the maintenance activities. The embedded measures for the operation phase of the development listed in **Table 10.13**, include measures to control the potential impacts of accidental fuel, oil or chemical release as a result of maintenance activities onsite.

10.9.16 The magnitude of change from the identified potential effects resulting from deterioration of water quality is determined to be Very Low in regard to the Nant Big, Afon Ebwy, Afon Ebwy Fach, local biodiversity sites, ponds and springs. The sensitivity of the aquatic environment receptors (Medium for Afon Ebwy, Afon Ebwy Fach**,** Low for Nant Big, SE Valleys Carboniferous Coal Measures and SINC and local biodiversity sites; and Very Low for the ponds and springs) in combination with the potential magnitude of change acting upon them is found to be **Not Significant**.

Assessment of effects on water resource receptors

10.9.17 This section summarises the water resource receptors taken forward in this assessment, which are listed in **Table 10.20**. The sensitivity of each receptor has been determined in accordance with the criteria set out in **Table 10.16**. The receptors are shown on **Figure 10.7**.

Table 10.20 Water resource receptors considered under this assessment

Receptor ID	Receptor	Sensitivity	Rationale
WR1	Surface water abstractions from the Afon Ebwy Fach	Low	Licensed abstractions Local non-public surface water abstraction, which is considered to be small relative to available resource. Abstraction is for gas works weir (raw water quality is not critical).
WR2	Groundwater abstraction from SE Valleys Carboniferous Coal Measures	Low	Licensed abstraction Local non-public groundwater supply abstraction, which is considered to be small relative to available resource. Abstraction is for pollution remediation works (raw water quality is not critical).
WR3	Abstraction from spring	Very Low	Private surface water supply, which is considered to be small relative to available resource.
WR4	Abstraction from spring	Very Low	Private surface water supply, which is considered to be small relative to available resource.
WR5	Abstraction from spring	Very Low	Private surface water supply, which is considered to be small relative to available resource.

Construction phase

Potential change to water quality of a water supply resource which may affect the viability of an abstraction

10.9.18 Those activities with the potential to affect the water resources receptors (licensed and unlicensed non-public water supply abstractions) via potential changes to the water quality of watercourses and aquifer (potential for increases in sediment laden runoff or pollution by leaks/spillages of oil/fuel, leaching from excavated soils and concrete leaching for example), together with the embedded measures associated with these, are presented in the aquatic environment receptors section above.

10.9.19 The magnitude of change from all the identified potential effects on the water resource receptors, is considered to be Very Low. Taking into account the receptor sensitivity (Low for the licensed water abstractions and Very Low for the private water abstractions) in combination with the potential magnitude of change acting upon them, finds that the significance of effects on the water resource receptors from the construction of the Proposed Development is **Not Significant**.

Operational phase

Potential change to water quality of a water supply resource which may affect the viability of an abstraction

10.9.20 Those activities with the potential to affect the water resources receptors via potential changes to the water quality of watercourses upstream of the receptor (potential for change in water quality via accidental spillage/release of pollutants), together with the embedded measures associated with these, are presented in the aquatic environment receptors section above.

10.9.21 The magnitude of change from all the identified potential effects on the water resource receptors, is considered to be Very Low. Taking into account the receptor sensitivity (Low for the licensed water abstractions and Very Low for the private water abstractions) in combination with the potential magnitude of change acting upon them, finds that the significance of effects on the water resource receptors from the operational phase of the Proposed Development is **Not Significant**.

Assessment of effects on flood risk receptors

10.9.22 The following summarises the flood risk receptor groups taken forward in this assessment, which are listed in **Table 10.21.** The sensitivity of these receptors has been identified in accordance with the criteria outlined in **Table 10.16**. The receptors are shown on **Figure 10.7**. Surface water flooding was identified as the key flood risk mechanisms at the Proposed Development in **Section 10.5** and is discussed further below.

Table 10.21 Flood risk receptors considered under this assessment

Receptor ID	Receptor	Sensitivity	Rationale
FR1	Residential properties, industry/business properties located in and around Cwm	Medium	Land use type defined as 'Highly vulnerable development' under the TAN15 guidance.
FR2	Residential properties, industry/business properties located in and around Abertillery	Medium	Land use type defined as 'Highly vulnerable development' under the TAN15 guidance.
FR3	Residential properties, industry/business properties located in and around Aberbeeg	Medium	Land use type defined as 'Highly vulnerable development' under the TAN15 guidance.
FR4	Residential and farm buildings at Arail Farm	Medium	Land use type defined as 'Highly vulnerable development' under the TAN15 guidance.
FR5	Residential and farm buildings at Hafod-y-dafal Farm	Medium	Land use type defined as 'Highly vulnerable development' under the TAN15 guidance.
FR6	Solar Farm	Low	Land use type defined as 'Less vulnerable development' under TAN15.
FR7	Cwm to Cardiff Railway	Low	Land use type defined as 'Less vulnerable development' under the TAN15 guidance.

Receptor ID	Receptor	Sensitivity	Rationale
FR8	A4046 road	Low	Land use type defined as 'Less vulnerable development' under the TAN15 guidance.
FR9	A467 road	Low	Land use type defined as 'Less vulnerable development' under the TAN15 guidance.
FR10	Residential properties, industry/business properties located in and around Glandwr	Medium	Land use type defined as 'Highly vulnerable development' (residential properties) and 'Less vulnerable development' (general industry/business properties) under the TAN15 guidance.

Construction and operational phase

Changes to surface water flood risk due to changes in runoff rates resulting from ground disturbance and creation of impermeable surfaces (e.g., TCC, access tracks, crane pads)

10.9.23 During the construction and operational phases of the Proposed Development new areas of hardstanding / compacted ground (e.g. crane pads and substation), although localised and of limited extent, have the potential to increase the overall extent of low permeability surfaces. Without effective surface water management measures, this could lead to a potential increase in runoff rates and a subsequent increase in risk of flooding to the flood risk receptors.

10.9.24 As outlined in the FCA, a DMP (for the construction phase) and Detailed Drainage Design (for operational phase), will be prepared to manage surface runoff utilising SuDS principles including attenuation storage where necessary. Surface water runoff will be discharged to ground and/or to watercourses. Further investigation of the viability of infiltration as a means by which surface water runoff could be discharged to ground will be undertaken post- ES, through liaison with BGCBC/CCBC and by undertaking soakaway testing exercise. In the case that the soakaway testing concludes that infiltration is not solely sufficient in managing runoff, and discharge to the watercourses is required, this will be subject to a Consent from the NRW or BGCBC.

10.9.25 It is concluded that the Proposed Development during the construction and operational phases, with the specified embedded environmental measures in place (**Table 10.13**) will not result in increases in surface water runoff, as such the magnitude of change is considered to be Very Low. The sensitivity of the flood risk receptors (Medium for residential properties, and Low for the solar farm and transport infrastructure), in combination with the magnitude of change acting upon the receptors, concludes that the significance of effects on the flood risk receptors is **Not Significant**.

Changes to surface water flow conveyance arising from the presence of new or modified permanent watercourse crossings

10.9.26 If not appropriately designed, any temporary and permanent (access) crossings of watercourses have the potential to adversely affect flow conveyance within the affected watercourses and therefore to influence flood depths. If watercourse crossings are required to enable access over any watercourses, these would be appropriately sized to maintain existing flow conveyance. In addition, access crossing of a mapped surface water flow path in the central part of the Wind Farm development will include engineering of the access track with a pipe culvert to convey flows from existing drainage pathway.

10.9.27 The magnitude of change from the potential effects associated with the watercourse crossing improvements is determined to be Very Low. The sensitivity of the flood risk receptors (Medium for residential properties, and Low for the solar farm and transport infrastructure), in combination with the magnitude of change acting upon the receptors, concludes that the significance of effects on the flood risk receptors is **Not Significant**.

Decommissioning Phase

10.9.28 Future decommissioning phase effects are considered to be similar to construction phase effects, although with a lesser duration of less than one year and against a future baseline which accounts for the anticipated impacts of climate change on the water environment. The drainage assessment provided in the FCA includes a climate change allowance of 40% (precautionary upper end estimate up to 2080s) which suggests that similar sized SuDS features as used during the operational phase are required to control runoff to greenfield discharge rates in the decommissioning phase.

10.9.29 Decommissioning of the Proposed Development would not result in increases in the rate of surface runoff and therefore the potential magnitude of the effects are Very Low. Consideration of the sensitivity of the flood risk receptor groups (Medium for residential properties, and Low for the solar farm and transport infrastructure), in combination with the potential magnitude of change acting upon the receptors, concludes that the significance of effects on the flood risk receptors is **Not Significant**.

10.10 Assessment of cumulative (inter-project) effects

Introduction

10.10.1 A Cumulative Effects Assessment (CEA) has been undertaken for the Proposed Development which examines the result from the combined effects of the Proposed Development with other developments on the same hydrology or flood risk receptor and the contribution of the Proposed Development to those impacts.

Cumulative effects assessment

10.10.2 For hydrology, the study area outlined in **Section 10.4** of **Chapter 10: Hydrology**, has been applied for the CEA to ensure direct and indirect cumulative effects can be appropriately identified and assessed. To summarise, the study area covers the extent encompassed within a 1.5km buffer of the Proposed Development, which has been further refined through a review of potential hydraulic connectivity. The study area is shown in **Figure 10.1, Chapter 10: Hydrology.**

10.10.3 A tiered approach to the CEA has been set out in **Chapter 2: Approach to Environmental Impact Assessment, Section 2.8** and can be summarised as follows:

- Tier 1: developments under construction, permitted applications, and submitted applications;
- Tier 2: Other DNS developments where a Scoping Report has been submitted to PEDW; and
- Tier 3: Other DNS developments where a Scoping Report has not yet been submitted to PEDW, or where developments are identified in Development Plans or other plans as appropriate.

10.10.4 Only those developments in the short list in **Chapter 2** that fall within the hydrology study area have significant potential to result in cumulative effects with the Proposed Development. All developments falling outside the hydrology study area are excluded from the CEA on the basis that either:

- there is no pathway for cumulative hydrological effects; or
- the embedded measures that will be included in the other developments are suitable to fully avoid, manage and if appropriate mitigate potential water environment effects associated with that development.

10.10.5 On the basis of the above, the specific developments contained within the short list in **Chapter 2** that fall within the hydrology Study Area are considered in this CEA, as discussed in **Table 10.22.**

10.10.6 A simple qualitative assessment (as justified in **Table 10.22**) of the potential for significant cumulative effects to arise is carried out in **Table 10.23**. This indicates that there is no potential for the developments contained within the short list to result in significant cumulative effects with the Proposed Development.

Table 10.22 Developments to be considered as part of the Hydrology CEA

Development Name	Development type	Project	Status	Tier	Level of detail of CEA to be adopted
Abertillery Wind Farm	Wind farm	DNS/3278009	Scoping stage – submitted 03/09/21	2	The wind farm development site is located within the Afon Ebwy Fach catchment, which is also overlapped by the Proposed Development. The development site is located approximately 1.2km to the east of the Proposed Development. A simple qualitative assessment of cumulative hydrological effects has been carried out (in Table 10.24 below).
Abertillery Wind Farm - Anemometer Mast	Anemometer Mast	Blaenau Gwent CBC C/2021/0262	Planning decision pending	2	The development site is located within the Afon Ebwy Fach catchment, which is also overlapped by the Proposed Development. The development site is located approximately 1.2km to the east of the Proposed Development. A simple qualitative assessment of cumulative hydrological effects has been carried out (in Table 10.24 below).

Development Name	Development type	Project	Status	Tier	Level of detail of CEA to be adopted
Hillcrest View	Residential development	Blaenau Gwent CBC C/2020/0043 C/2020/0109	Approved 09/09/2020	1	The residential development site is located within the Afon Ebwy Fach catchment, which is also overlapped by the Proposed Development. The development site is located approximately 0.6km to the east of the Proposed Development. A simple qualitative assessment of cumulative hydrological effects has been carried out (in Table 10.24 below).

Table 10.23 CEA for Hydrology

Project	Discussion
Abertillery Wind Farm and associated Anemometer Mast	The project Scoping Report[68], produced May 2021, provides details on the wind farm development. Both the development site and the Proposed Development are located within the Afon Ebwy Fach catchment; although the development is located to the east of the Afon Ebwy Fach whilst the Proposed Development is to the west. The development site is located approximately 1.2km to the east of the Proposed Development, near to Abertillery. The development proposals for the wind farm includes "*up to seven turbines and associated infrastructure will be constructed on the site*" and for the anemometer mast as "*temporary erection (for a period of up to 5 years) of an anemometry mast of up to 100m in height, with anchoring points*" and covers an area 385ha and 0.79ha respectively. The Afon Ebwy Fach catchment covers a total area of 2807ha. The Scoping Report does not provide details of temporal scope relating to the anemometry mast. On the basis that the development sites will have a suite of effective embedded measures of high level confidence (agreed via planning), it is expected that the potential effects to hydrology receptors, as a result of the Abertillery Wind Farm and associated Anemometer Mast development, will be not significant. In combination with the distance from the Proposed Development (1.2km), it is determined that any cumulative effects would be negligible and therefore not significant.
Hillcrest View	Information is provided on this site via the Planning Application Report[69], produced on 24th August 2020. Both the residential development site and the Proposed Development are located within the Afon Ebwy Fach catchment; although the residential development is located to the east of Afon Ebwy Fach whilst the Proposed Development is to the west. The residential development site is located approximately 0.6km to the east of the Proposed Development, within Cwmtillery. The residential development will comprise the construction of 28 houses, within the site area (0.9 hectares). The Planning Application Report advises that construction will begin before August 2025 but there are no details provided on the expected completion date of the development. The Design and Access Statement which was submitted in support of the application states that "*The flood map shows no flood risk to the site – The redirection of surface water to existing water courses is planned, together with cut off drains to the rear of the site to protect the new houses. Current water run off issues reported locally appear to be the result of lack of past maintenance due to silted up or blocked chambers.*" The Afon Ebwy Fach catchment

[68] RWE Renewables UK Ltd.2021. Abertillery Wind Farm Scoping Report.
[69] Blaenau Gwent County Borough Council. 2020. Planning Application Report: Hillcrest View.

Project	Discussion
	covers a total area of 2807ha, whilst the development site covers 0.9ha, which in comparison is very small. It is assumed that effective embedded measures (agreed via planning) will be successfully implemented during the development of site, including good industry practice measures for runoff and silt management and pollution prevention (e.g. Pollution Prevention Guidance notes and CIRIA's Environmental Good Practice). Furthermore, it is assumed that runoff from any new permanent, impermeable surfaces associated with the project would be appropriately managed to rates agreed with the SAB and BGCBC. On this basis it is determined that the potential effects to hydrology receptors as a result of the Hillcrest View development will be not significant. As such any cumulative effects between the development site and the Proposed Development would be negligible and therefore not significant.

10.11 Significance conclusions

10.11.1 A summary of the results of the Water Environment assessment is provided in **Table 10.24**.

wood.

Table 10.24 Summary of significance of effects

Receptor and summary of predicted effects	Sensitivity/ importance/ value of receptor[1]	Magnitude of change[2]	Significance[3]	Summary rationale
Construction (and Decommissioning) phase				
Aquatic environment receptors Watercourses (Nant Big, WFD surface water bodies (Afon Ebwy and Afon Ebwy Fach) and their tributaries), ponds, SINCs **Potential Effect** Temporary increase sediment-loading of surface water runoff from construction areas leading to deterioration in the surface water quality environment, deterioration in the status of WFD surface water bodies and deterioration in the conditions supporting local conservation sites	Very Low (least sensitive) to Medium (most sensitive)	Very Low and Low	Negligible to Minor (Not Significant)	Adoption of suitable embedded measures to limit sediment-laden runoff including standard good working practices, maintaining the stand-off distances from watercourses, appropriate management of soil stockpiles, development and implementation of a DMP. Utilising SuDS principles, including collection, conveyance and attenuation/infiltration storage. Suitable temporary silt fencing, bunding and water quality measures (i.e., silt capture to maintain storage volume) will be included in the design of these works.
Aquatic environment receptors Watercourses (Nant Big, WFD surface water bodies (Afon Ebwy and Afon Ebwy Fach) and their tributaries) **Potential Effect** Potential effects on the hydromorphology and flow conveyance as a result of increased sediment inputs or direct watercourse disturbance.	Low (least sensitive) to Medium (most sensitive)	Very Low and Low	Negligible (Not Significant)	Effective implementation of the embedded measures designed to avoid the release of silt-laden runoff.
Aquatic environment receptors Watercourses (Nant Big, WFD surface water bodies (Afon Ebwy and Afon Ebwy Fach) and their tributaries,) ponds, springs, SINCs and SE Valleys Carboniferous Coal Measures aquifer. **Potential Effect** Accidental release of pollution into surface water or ground by leaks/spillages of oil/fuel, leaching from excavated soils and concrete leaching leading to deterioration in the surface water and groundwater quality environment, deterioration in the status	Very low (least sensitive) to Medium (most sensitive)	Very Low and Low	Negligible (Not Significant)	Implementation of the embedded measures designed to prevent pollution of surface water and groundwater. These include appropriate pollution prevention measures in line with recommended guidance, pollution incident response planning, water quality monitoring programme, implementation of the DMP for the construction phase, fuel and oil storage design, and development and implementation of a Materials Management Plan to manage potentially contaminated

Receptor and summary of predicted effects	Sensitivity/ importance/ value of receptor[1]	Magnitude of change[2]	Significance[3]	Summary rationale
of WFD waterbodies and deterioration in the conditions supporting local conservation sites.				excavated material. If concrete batching is to happen on site, appropriate controls and water treatment facilities are to be agreed with NRW prior to construction. The use of sulphate resistant concrete is recommended.
Aquatic environment receptors Watercourses (Nant Big, WFD surface water bodies (Afon Ebwy and Afon Ebwy Fach) and their tributaries,) ponds, springs, SE Valleys Carboniferous Coal Measures aquifer and SINCs **Potential Effect** Discharge of potentially polluted water generated from construction activities (e.g., dewatering/water ingress activities, concrete batching, surface water runoff) into surface water or groundwater leading to deterioration in the surface water and groundwater quality environment, deterioration in the status of WFD waterbodies and deterioration in the conditions supporting local conservation sites	Very low (least sensitive) to Medium (most sensitive)	Very Low and Low	Negligible (Not Significant)	Implementation of the embedded measures designed to prevent pollution of surface water and groundwater. These include appropriate pollution prevention measures in line with recommended guidance, pollution incident response planning, water quality monitoring programme, implementation of the DMP for the construction phase, fuel and oil storage design, and development and implementation of a Materials Management Plan to manage potentially contaminated excavated material. If concrete batching is to happen on site, appropriate controls and water treatment facilities are to be agreed with NRW prior to construction.
Water resource receptors Licensed and private abstractions) **Potential Effect** Potential change to water quality of a water supply resource which may affect the viability of an abstraction	Very low (least sensitive) to Low (most sensitive)	Very Low	Negligible (Not Significant)	Implementation of embedded measures designed to prevent pollution of surface water and groundwater and to limit sediment-laden runoff (set out above for the aquatic environment receptors).
Flood risk receptors (third party receptors) People, property, and infrastructure at risk of flooding (downslope and adjacent to the Proposed Development area including properties at Cwm (west), Abertillery (east) and Aberbeeg (south) **Potential effect**	Low (least sensitive) to Medium (most sensitive)	Very Low	Negligible (Not Significant)	Limited land take and change in impermeable area. Implementation via DMP of embedded measures designed to provide runoff control/storage using SuDS to ensure no increase in runoff.

Receptor and summary of predicted effects	Sensitivity/ importance/ value of receptor[1]	Magnitude of change[2]	Significance[3]	Summary rationale
Changes to surface water flood risk due to changes in runoff rates resulting from ground disturbance and creation of impermeable surfaces (e.g., TCC, access tracks, crane pads)				
Flood risk receptors (third party receptors) People, property, and infrastructure at risk of flooding (downslope and adjacent to the Proposed Development area including properties at Cwm (west), Abertillery (east) and Aberbeeg (south). **Potential effect** Changes to surface water flow conveyance arising from the presence of new or modified permanent watercourse crossings. This has the potential to increase the risk of flooding to flood risk receptors	Low (least sensitive) to Medium (most sensitive)	Very Low	Negligible (Not Significant)	If watercourse crossings are required appropriate design will be agreed with NRW to maintain existing flow conveyance. In addition, access crossing of a mapped surface water flow path in the central part of the Wind Farm development will include engineering of the access track with a pipe culvert to convey flows from existing drainage pathway.
Operational phase				
Aquatic environment receptors Watercourses (Nant Big, WFD surface water bodies (Afon Ebwy and Afon Ebwy Fach) and their tributaries), ponds springs, SE Valleys Carboniferous Coal Measures aquifer and SINCs **Potential Effect** Accidental spillage o pollutants (fuel or oil) during maintenance activities leading to deterioration in the surface water and groundwater quality environment, deterioration in the status of WFD waterbodies and deterioration in the conditions supporting local conservation sites.	Very Low (least sensitive) to Medium (most sensitive)	Very Low	Negligible (Not Significant)	Implementation of embedded measures to control the potential impacts of accidental fuel, oil or chemical release as a result of maintenance activities onsite. These include appropriate maintenance of vehicles, equipment and wind turbines, development and implementation of a Detailed Drainage Design and an accidental spill response protocol and implementation of standard best practice when using equipment or refuelling.
Water resource receptors Licensed and private abstractions **Potential Effect** Potential change to water quality of a water supply resource which may affect the viability of an abstraction	Very Low (least sensitive) to Low (most sensitive)	Very Low	Negligible (Not Significant)	Implementation of embedded measures designed to prevent pollution of surface water and groundwater (set out above for aquatic environment receptors).

Receptor and summary of predicted effects	Sensitivity/ importance/ value of receptor[1]	Magnitude of change[2]	Significance[3]	Summary rationale
Flood risk receptors (third party receptors) People, property, and infrastructure at risk of flooding (downslope and adjacent to the Proposed Development area including properties at Cwm (west), Abertillery (east) and Aberbeeg (south). **Potential effect** Changes to surface water flood risk due to changes in runoff rates resulting from ground disturbance and creation of impermeable surfaces (e.g., TCC, access tracks, crane pads)	Low (least sensitive) to Medium (most sensitive)	Very Low	Negligible (Not Significant)	Limited land take and change in impermeable area. Implementation via Detailed Drainage Design of embedded measures designed to provide runoff control/storage using SuDS to ensure no increase in runoff.
Flood risk receptors (third party receptors) People, property, and infrastructure at risk of flooding (downslope and adjacent to the Proposed Development area including properties at Cwm (west), Abertillery (east) and Aberbeeg (south). **Potential effect** Changes to surface water flow conveyance arising from the presence of new or modified permanent watercourse crossings. This has the potential to increase the risk of flooding to flood risk receptors	Low (least sensitive) to Medium (most sensitive)	Very Low	Negligible (Not Significant)	If watercourse crossings are required appropriate design will be agreed with NRW to maintain existing flow conveyance. In addition, access crossing of a mapped surface water flow path in the central part of the Wind Farm development will include engineering of the access track with a pipe culvert to convey flows from existing drainage pathway.

1. The sensitivity/importance/value of a receptor is defined using the criteria set out in **Section 10.8** and is defined as Very Low, Low, Medium and High.
2. The magnitude of change on a receptor resulting from activities relating to the development is defined using the criteria set out in **Section 10.8** and is defined as Very Low, Low, Medium and High.
3. The significance of the environmental effects is based on the combination of the sensitivity/importance/value of a receptor and the magnitude of change and is expressed as Major (significant), Moderate (potentially significant) or Minor/Negligible (not significant), subject to the evaluation methodology outlined in **Section 10.8**.

10.12 Further work to be undertaken

10.12.1 Further details of the proposed drainage strategy in consultation with CCBC will be incorporated in the final ES submission. The assessment of impacts on individual WFD elements provided in **Section 10.9** and **Chapter 8: Biodiversity** will be combined in a single WFD Assessment report and any comments on the proposed methodology (**Appendix 10D**) will be incorporated in the final ES submission.