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**. of the Draft ES 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 10.11**);
- 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]	Makes 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 August 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 August 2022).
4 UK Government. (1991). Land Drainage Act 1991. (Online) Available from: https://www.legislation.gov.uk/ukpga/1991/59/contents. (Accessed August 2022).
5 UK Government. (1994). Land Drainage Act 1994. (Online) Available from: https://www.legislation.gov.uk/ukpga/1994/25/contents. (Accessed August 2022).
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. Natural Resources Wales 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.. 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
The Water Supply (Water Quality) Regulations 2016 (as amended)[12]	Primarily concerned with the quality of water supplied in England and Wales for drinking, washing, cooking and food preparation, and for food production, and with arrangements for the publication of information about water quality. Further, the Regulations provide the specifications for the methods of analysis of certain parameters and performance characteristics of all parameters.
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 (England and Wales) 2009[14]	Enacted into domestic law by the Flood Risk Regulations (England and Wales) 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 August 2022).
9 UK Government. (2003). Water Act 2003. (Online) Available from: https://www.legislation.gov.uk/ukpga/2003/37/contents. (Accessed August 2022).
10 This includes territorial waters, coastal waters, inland freshwaters and groundwaters (section 104, Water Resources Act 1991). (Accessed August 2022).
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 August 2022).
12 UK Government. (2017). Water Quality (Water Supply) Regulations 2017. (Online) Available from: https://www.legislation.gov.uk/uksi/2000/3184/contents/made (Accessed August 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 August 2022).
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 August 2022).
15 UK Government. (2010). Flood and Water Management Act 2010. (Online) Available from: https://www.legislation.gov.uk/ukpga/2010/29/contents (Accessed August 2022).

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 August 2022).
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 August 2022).
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 August 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 August 2022).
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 August 2022).
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 August 2022).
22 UK Government. (2021). The Environment Act (2021) UK. (Online) Available from: https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted (Accessed August 2022).

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 and Torfaen counties. 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 August 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 August 2022)
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 August 2022).

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 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 August 2022)
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 August 2022).
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 August 2022).

Policy	Policy context
Torfaen County Borough Council Local Development Plan up to 2021 (Adopted December 2013)[29]	The LDP remains extant, and is due to be superseded in October 2022. **S3 Climate Change** This policy sets out the criteria for developments to meet in terms of climate change. The policy requires development proposals to avoid areas susceptible to flooding and reduce surface water run-off through the use of SuDS. **BW1 Natural Environment** The policy sets out the development requirements in regard to avoiding adverse impacts to the natural environment, including pollution, water quality, flooding, designated sites and biodiversity.

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[30]	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[31]	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)[32]	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)[33]	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.

29 Torfaen County Borough council. 2013. Local Development Plan (to 2021). Online) Available at: https://www.torfaen.gov.uk/en/Related-Documents/Forward-Planning/Adopted-Torfaen-LDP-Writen-Statement.pdf (Accessed August 2022)
30 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 August 2022).
31 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 August 2022).
32 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.
33 Lancaster, J., Preene, M. and Marshall, C. 2004. Development and Flood Risk – Guidance for the Construction Industry. C624. London: CIRIA.

Technical guidance document	Context
Report C648: Control of Water Pollution from Linear Construction Projects (2006)[34]	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)[35]	Guidance specifically aimed at on-site construction personnel working on linear infrastructure construction projects.
Report C650: Environmental Good Practice on Site, second edition (2005)[36]	Provides practical guidance about managing construction on-site to control environmental impacts.
Report C651: Environmental Good Practice - Pocket Book (2005)[37]	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)[38]	Comprehensive guidance covering a range of issues pertinent to the management and design of culverts.
Report C692: Environmental Good Practice on Site (2010)[39]	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)[40]	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)[41]	Best practice guidance on the planning, design, construction, operation and maintenance of SuDS to facilitate their effective implementation within developments.

34 Murnane, E., Heap, A. and Swain, A. 2006. Control of Water Pollution from Linear Construction Projects – Technical Guidance. C648. London: CIRIA.
35 Murnane, E., Heap, A. and Swain, A. 2006. Control of water pollution from Linear Construction Projects – Site Guide. C649. London: CIRIA.
36 Charles, P. and Connely, S. 2005. Environmental Good Practice Site Guide (second edition). C650. London: CIRIA.
37 Chant-Hall, G., Charles, P. and Connolly, S. (2005). Environmental good practice on site – pocket book. C651. London: CIRIA.
38 Balkham, M., Fosbeary, C., Kitchen, A. and Rickard, C. (2010). Culvert design and operation guide. C689. London: CIRIA.
39 Audus, I., Charles, P. and Evans, S. (2010). Environmental good practice on site (third edition). C692. London: CIRIA.
40 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.
41 Woods Ballard, S., Wilson, S., Udale-Clarke, H., Illman, S., Scott, T., Ashley, R. and Kellagher, R. (2015). The SuDS Manual. C753. London: CIRIA.

Technical guidance document	Context
Pollution Prevention Guidance Notes (PPGs) and Guidance for Pollution Prevention Notes (GPPs)[42] (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)[43]	Guidance document based on relevant legislation and reflects current good practice.
GPP 2: Above ground oil storage tanks (January 2018)[44]	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)[45]	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.
GPP 5: Works and maintenance in or near water (February 2018)[46]	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)[47]	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)[48]	Guidance based on relevant legislation and setting out current good practice for the safe storage and disposal of used oils.

42 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 August 2022).
43 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 August 2022).
44 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 August 2022).
45 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 August 2022).
46 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 May 2022).
47 Environment Agency (2012) Working at construction and demolition sites: PPG6. Second edition. Bristol: Environment Agency.
48 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 August 2022).

Technical guidance document	Context
GPP 20: Dewatering underground ducts and chambers (January 2018)[49]	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)[50]	Guidelines setting out current best practice for producing an incident response plan.
GPP 22: Dealing with spills (October 2018)[51]	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)[52]	Guidance aimed at site operators and those responsible for the storing and handling of drums and IBCs.

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 06 August 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**.

49 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 August 2022).
50 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 August 2022).
51 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 August 2022).
52 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 August 2022).

Table 10.4 Summary of EIA Scoping Direction responses for Water Environment

Consultee	Consideration	How addressed in this Draft ES
PEDW	ID.33 - Release of pollutants during Construction & Decommissioning phases D.36 – Accidental spillage during construction The Inspectorate agrees that this matter should remain in scope; as NRW stress, groundwater should be considered a receptor in its own right. An appropriate way of addressing this in the ES would be via including the draft CEMP as a technical appendix to the ES, to ensure that the decision maker has some comfort regarding the mitigation measures proposed.	A draft CEMP has been produced to support the Draft ES. This includes embedded environmental measures to prevent the release of pollutants into the water environment (**Section 10.6** (Embedded measures) of the Draft ES).
PEDW	ID.34 – Cumulative effects The Scoping Report only seems to refer to cumulative impacts on hydrology in terms of other wind farm developments. These may not be the only developments which could have cumulative effects on this aspect of the environment, and the applicants should consult the relevant LPAs to determine if there are any other proposals that should be considered.	A cumulative effects assessment (CEA) has been included in the Draft ES (**Section 10.10**), considering all potential developments within the study area.
PEDW	Section 9.2 – SuDS Consent Whilst a separate legislative requirement from planning permission, the Applicant's attention is drawn to the statutory SuDS regime that came into force in Wales in January 2019. The requirement to obtain SuDS consent prior to construction may require iterative design changes that influence the scheme that is to be assessed within the ES and taken through to application. As such, it is recommended that the applicant contact the local SuDS Approval Body early on.	The proposed outline drainage strategy included in **Appendix 10A** (Flood Consequence Assessment (FCA)) will be discussed and agreed in consultation with Caerphilly County Borough Council (CCBC), as the SuDS Approval Body (SAB) and any comments will be incorporated in the Final ES submission.
TCBC	Drainage From a drainage point of view, very little to concern me as the site area is well above the spring line with only a few, 'borne' nature watercourses that maybe affected which will require Ordinary Watercourse Consent if access over them is needed. I do note that the connection to the grid will pass over the Nant Ddu watercourse and several of its tributaries, which I am sure will be the subject of further debate and comment if the proposal goes forward.	The proposed access tracks and grid connection cross a number of watercourses/mapped surface water flowpaths including the Nant Ddu. An assessment of the potential impact of proposed new or modified watercourse crossings on watercourse flow conveyance is provided in **Section 10.9** (Preliminary assessment of Water Environment effects) and embedded environmental measures are set out in **Section 10.6** (Embedded Measures). The future detailed designs of these crossings

Consultee	Consideration	How addressed in this Draft ES
		will be agreed with BGCBC and TCBC and will minimise change to existing watercourse flow conveyance.
NRW	We note in Section 9.6 the mention of groundwater and advise that groundwater should be considered a receptor in its own right. We would also advise considering temporary/longterm changes to groundwater flows as part of the development.	An assessment of the potential impacts of the Proposed Development throughout its lifetime on the local groundwater quality and levels is provided in **Section 10.9** (Preliminary assessment of Water Environment effects) and embedded environmental measures are set out in **Section 10.6** (Embedded Measures). This includes assessment of impacts on: • Groundwater quality due to accidental release of pollution by leaks/spillages of oil/fuel, leaching from excavated soils and concrete leaching during the construction phase; • Groundwater quality due to discharge to ground of potentially polluted water generated from construction activities (e.g., dewatering/water ingress activities, concrete batching, surface water runoff); • Groundwater levels due to dewatering of excavations during the construction phase; and • Groundwater quality due accidental spillage of pollutants (fuel or oil) onto ground during maintenance activities.
NRW	SuDS We also advise giving consideration to the potential knock-on impacts of use of Sustainable Urban Drainage Systems (SuDS) and design appropriately, namely taking account of the potential for introducing pollutant pathways to groundwater.	The Phase 1 Geo-environmental desk study[53] has identified potential localised sources of land contamination on the Proposed Development area which are discussed in detail in **Chapter 11: Ground Conditions** of the Draft ES. The outline drainage strategy included in **Appendix 10A** (FCA) proposes infiltration as a means by which surface water runoff and any groundwater dewatered from excavations is managed on-site. Further investigation of the viability of infiltration will be undertaken through liaison with BGCBC and TCBC and by undertaking soakaway testing exercises. Information from the future Phase 2 Geo-environmental Ground Investigation (details provided in **Chapter 11: Ground Conditions**) will also be considered to assess the potential for introducing

[53] Mynydd Llanhilleth Wind Farm, Phase 1 Geoenvironmental Desk Study (Ref. 807095-WOOD-RP-OG-0002_P01, November 2022).

Consultee	Consideration	How addressed in this Draft ES
		pollutants pathways to groundwater via leaching from contaminated soils.
DCWW	Watermain The proposed development is crossed by a trunk/distribution watermains, the approximate positions being shown on the attached plan. Dwr Cymru Welsh Water as Statutory Undertaker has statutory powers to access our apparatus at all times. I enclose our Conditions for Development near Watermain(s). It may be possible for this watermain to be diverted under Section 185 of the Water Industry Act 1991, the cost of which will be re-charged to the developer. The developer must consult Dwr Cymru Welsh Water before any development commences on site.	An assessment of the potential impacts of the Proposed Development throughout its lifetime on the DCWW watermain is provided in Draft FCA (**Appendix 10A**). Where possible, crossing of the watermain will be avoided (no structure is to be sited within a minimum distance of 3m from the centre line of the pipes). In addition, the measures in DCWW's Conditions for development near water mains will be implemented. Where crossing of the watermain is required by the proposed access road, discussions will be held with DCWW to agree on appropriate design measure (pipeline protection).
DCWW	Water supplies DCWW would request that water supplies are taken into account of any Environmental Impact Assessment for this development site.	An assessment of the potential impacts of the Proposed Development throughout its lifetime on the local water supplies is provided in **Section 10.9** (Preliminary assessment of Water Environment effects) and embedded environmental measures are set out in **Section 10.6** (Embedded Measures). This includes assessment of the impacts below: • Potential change to water quality of a water supply resource (due to accidental release of pollution by leaks/spillages of oil/fuel, leaching from excavated soils and concrete leaching leading or discharge of potentially polluted water generated from construction activities) which may affect the viability of an abstraction; • Potential change to yield of a water supply resource which may affect the viability of an abstraction; and • Potential change to water quality of a water supply resource which may affect the viability of an abstraction during maintenance activities.

Technical engagement

10.3.3 Data requests were sent to NRW, BGCBC and TCBC (**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 water environment study area 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. It is considered that any potential impacts on watercourses would be negligible (and therefore scoped out) beyond 1.5km downstream of the 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)[54] (Accessed August 2022)	BGS Geoindex Onshore - Aquifer Designation
Blaenau Gwent County Borough Council (2013)	Microsoft Word - LFRMS SCRUTINY V1 1 Post Consultation.doc (blaenau-gwent.gov.uk)[55] (Accessed August 2022)	Local Flood Risk Management Strategy
Torfaen County Borough Council	https://www.torfaen.gov.uk/en/Related-Documents/Roads-Highways-and-Pavements/Drainage/TorfaenLocalFloodRiskManagementStrategy.pdf[56] (Accessed August 2022)	Local Flood Risk Management Strategy
British Geological Survey (BGS)	Geology of Britain viewer - British Geological Survey (bgs.ac.uk)[57] (Accessed August 2022)	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)[58]	LandIS soilscapes

54 British Geological Survey. (2022). BGS GeoIndex Onshore. (Online) Available at: http://mapapps2.bgs.ac.uk/geoindex/home.html (Accessed August 2022).
55 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 August 2022).
56 Torfaen County Borough Council (2013). Local Flood Risk Management Strategy. (Online) Available at: https://www.torfaen.gov.uk/en/Related-Documents/Roads-Highways-and-Pavements/Drainage/TorfaenLocalFloodRiskManagementStrategy.pdf (Accessed August 2022)
57 British Geological Society. (2022). Geology of Britain Viewer for geological information. (Online) Available at: https://www.bgs.ac.uk/map-viewers/geology-of-britain-viewer/ (Accessed August 2022).
58 LandIS. (2021). Soilscapes soil types viewer - National Soil Resources Institute. Cranfield University. (Online) Available at: http://www.landis.org.uk/soilscapes/ (Accessed August 2022).

Organisation	Data source	Data provided
	(Accessed August 2022)	
Ordnance Survey (OS)	Local Ordnance Survey (OS) mapping	Topography and location of springs
Natural Resources Wales	Lle - Source Protection Zones (SPZ) Merged (gov.wales)[59] (Accessed August 2022)	Geo Portal for Wales (Lle) for Source protection zones
Natural Resources Wales	Water Watch Wales (naturalresourceswales.gov.uk)[60] (Accessed August 2022)	Water Framework Directive (WFD) Cycle 2 Rivers and water bodies for WFD water bodies and status
Natural Resources Wales	Natural Resources Wales / Check your flood risk by postcode[61] (Accessed August 2022)	Flood Risk Maps

Survey work

10.4.3 A hydrology and flood risk walkover survey was undertaken by a WSP E&IS hydrologist in August 2022. 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:

- Farm Road (main access track) crossing points of the Cwmsychan Brook and Blaengaefog Brook from the B4246 junction (SO 25407 04016);
- Proposed substation and construction compound locations, in the upper Nant Ddu catchment (SO 23646 02814);
- Nant Ddu at the Blaensychan Colliery Track (SO 23646 02814) and Gypsy Lane (SO 25995 01986);
- Nant Cyffin headwaters at Blaen-y-cwm road (SO 23209 01225);
- Nant Ffrwd-oer at Tirpentwys Nature Reserve (SO 24432 00235) and Ty-Bwmpyn Road (SO 25597 00702), and;
- Various points across Llanhilleth Common (SO 23774 01936) accessed via footpath from the south.

59 Natural Resource Wales. (2022). Lle - Source Protection Zones (SPZ) Merged. (Online) Available at: http://lle.gov.wales/catalogue/item/SourceProtectionZonesSPZMerged/?lang=en (Accessed August 2022).
60 Natural Resource Wales. (2022). Water Watch Wales. (Online) Available at: https://waterwatchwales.naturalresourceswales.gov.uk/en/ (Accessed August 2022).
61 Natural Resource Wales. (2022). Check your flood risk by postcode. (Online) Available at: https://naturalresources.wales/flooding/check-your-flood-risk-by-postcode/?lang=en (Accessed August 2022).

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 and grid connection

10.5.2 The Proposed Development area covers an area of approximately 267.59 ha (including the access track). The area is largely undeveloped, although it has been subject to coal mining dating back to the mid-19th century as shown on historical mapping. Small areas of land have been built upon more recently including farms and access tracks, but the area is largely dominated by grassland and coniferous woodland. A disused former quarry (known as 'The Canyon') is situated in the southern portion of the Study Area, though excluded from the Wind Farm Development Area.

10.5.3 The closest residential developments are Abertyleri to the northwest, Llanhilleth to the west, Pontypool and Pontnewynydd to the east and Hafodrynys to the south. The A467 is located to the west of the Study Area, whist the A472 and A4043 are situated to the south and east of the site, respectively.

10.5.4 The Proposed Development Area is located primarily on a broad ridge which runs roughly in a north-south direction and leads to Coity Mountain approximately 5km to the north at an elevation of 578mAOD, as shown in **Figure 10.3**. The majority of the Wind Farm Development Area sits at elevations between 350mAOD and 450mAOD across the ridge summit, and the proposed access track via Farm road descends to an elevation of approximately 250mAOD at the junction to the B4246.

10.5.5 The grid connection Corridor runs in a west-east direction along a ridge running north of the Nant Ddu, from an elevation of 410mAOD to 270mAOD.

Rainfall

Wind Farm development and grid connection

10.5.6 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[62]).

62 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 August 2022)

10.5.7 Data for the NRW rain gauge stations Trevethin[63] (4.5 km from the Proposed Development) and Cwmtillery[64] (3.5km from the Proposed Development) indicate average annual rainfall totals of 1573mm/yr (2011-2021) and 1492 mm/yr (1997-2021), respectively.

Hydrology

Wind Farm development

10.5.8 The Proposed Development Area sits on a watershed between the Afon Ebwy Fach/Afon Ebwy catchment to the west, and the Afon Lwyd catchment to the east, both of which are classified as Main Rivers by NRW (**Figure 10.2**).

10.5.9 The Afon Ebwy Fach is situated approximately 900m west of the Proposed Development area and flows south joining the Afon Ebwy at Aberbeeg. At its nearest point, the Afon Ebwy passes within 1km of the southwest limit of the Proposed Development area, and continues flowing south. The Afon Lwyd is situated 2km east of the Proposed Development area and flows south through Pontypool.

10.5.10 The Proposed Development area is intersected by the headwaters of several tributaries of the Afon Ebwy Fach, Afon Ebwy and Afon Lwyd which are classified as Ordinary Watercourses. The headwaters of the Nant Cwmmllwydrew, Nant Cyffin and Nant y Cnyw intersect the west and southwest boundary of the Proposed Development area and drain south into the Afon Ebwy. The headwaters of the Nant Ffwydd-oer, Nant Caws and Nant Ddu intersect the southeast limits of the Proposed Development area and drain east into the Afon Lwyd catchment.

10.5.11 Photos of the Nant Cnyw, Nant Ffrwd-oer, and Nant Ddu are included in **Appendix 10C**. The headwater of the Nant Cnyw was observed from the Blaen-y-Cwm Road (believed to be culverted beneath), with flows in the region of 1l/s (**Error! Reference source not found.**, **Appendix 10C**). The Nant Ffrwd-oer was observed at Tirpentwys Nature Reserve, at which point the watercourse was dry (**Error! Reference source not found., Appendix 10C**). Further downstream at Ty Bwmpym Road, the watercourse appeared more established, with water depths of 0.1m to 0.2m and estimated flows in the region of 2l/s to 3l/s (**Error! Reference source not found., Appendix 10C**).

10.5.12 The Nant Ddu was observed along the Blaensychan Colliery Track, southeast of the proposed substation. The valley bed consists entirely of re-worked material owing to the historical quarry activities, and appears to be highly erodible with incised drainage channels. No surface water flow was evident, though it is unclear whether this was the main watercourse channel (**Error! Reference source not found., Appendix 10C**). The Nant Ddu was also observed at Ty Bwmpyn Road, at which point the watercourse was more established, with estimated flows in the region of 2 l/s to 3 l/s.

10.5.13 Along the access track via Farm Road, the Cwmsychan Brook and Blaengaefog Brook drain east and beneath the road via culverts, and into the Afon Lwyd further east at Abersychan. An additional unnamed tributary joins the Cwmsychan Brook at Abersychan, the headwaters of which are intersected by the access track (**Error! Reference source not found., Appendix 10C**).

10.5.14 The Cwmsychan Brook had an estimated flow of approximately 1l/s to 2/ls (**Error! Reference source not found.** and **Error! Reference source not found.**, **Appendix**

63 Natural Resources Wales. (2022). Trevethin raingauge. (Online) Available at: https://rivers-and-seas.naturalresources.wales/Station/1040? (Accessed August 2022).
64 Natural Resource Wales. (2022). Cwmtillery raingauge. (Online) Available at: https://rivers-and-seas.naturalresources.wales/Station/1035? (Accessed August 2022)

10C), and crosses beneath the existing access track via a culvert. The culvert could not be clearly identified owing to vegetation and lack of access, though appears to be a circular culvert with a diameter of approximately 2m. The Blaengaefog Brook crosses a minor footpath adjacent to the access track and runs beneath Farm Road a further 200m downstream. The watercourse channel was identified at the footpath crossing point and appeared to be entirely dry (Error! Reference source not found.**, Appendix C**). Owing to the dense vegetation, the culvert at both the footpath and Farm Road could not be identified.

10.5.15 Within the wider Study Area, the Nant y Groes drains west into the Afon Ebwy Fach, the headwaters of which are situated approximately 600m northwest of the Proposed Development Area. However, the associated catchment does not intersect the Proposed Development Area and therefore there is deemed to be no hydraulic connectivity (via surface water) to this watercourse.

10.5.16 Additional watercourses within the Study Area include Nant Ffrwd (north), Trosnant Brook (south), Nant y Maelor (east), and the Cwm Llwynau (southwest), all of which are deemed to have no hydrological connectivity to the Proposed Development area.

10.5.17 River flow records are available for the Afon Ebwy at the flow gauging station in Aberbeeg[65], 1600m west of the Proposed Development area, and for the Afon Lwyd at Ponthir[66], 15km southeast (downstream) of the Proposed Development area. 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 (km^2)	Mean Flow (m^3/s)	Q10[1] (m^3/s)	Q95[2] (m^3/s)	BFI[3]	Period of Record
56019 – Ebwy at Aberbeeg	SO209014	71.7	2.68	6.06	0.457	0.51	1984 – 2012
56005 – Lwyd at Ponthir	ST329924	98.1	3.14	6.87	0.64	0.55	1966-1998

[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.

10.5.18 Ecological field surveys detailed in **Chapter 8: Biodiversity** of the Draft ES identified a total of 16 ponds within the Wind Farm development area and considering a 500m buffer. Further review of OS mapping and aerial imagery has identified a further 12 ponds within the water environment study area for this assessment, considering a 1500m buffer. 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)).

65 National River Flow Archive (2022). 56019 - Ebbw at Aberbeeg (Online) Available at: https://nrfa.ceh.ac.uk/data/station/meanflow/56019 (Accessed August 2022)
66 National River Flow Archive (2022). 56005 – Lwyd at Ponthir (Online) Available at: https://nrfa.ceh.ac.uk/data/station/meanflow/56005 (Accessed August 2022)

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)	Pond biodiversity designation
P1	Pond forms part of the Tirpentwys Cut SINC. Approximate elevation of 350m AOD.	Within boundary	Tirpentwys Cut SINC
P2	Pond forms part of the Tirpentwys Cut SINC. Approximate elevation of 332m AOD.	Within boundary	Tirpentwys Cut SINC
P2A	Pond forms part of the Tirpentwys Cut SINC. Approximate elevation of 330m AOD.	Within boundary	Tirpentwys Cut SINC
P3	Pond forms part of the Tirpentwys Cut SINC. Approximate elevation of 355m AOD.	Within boundary	Tirpentwys Cut SINC
P4	Approximate elevation of 384m AOD.	Within boundary	-
P6	Approximate elevation of 444m AOD.	300m NW	-
P7	Approximate elevation of 404m AOD.	Within boundary	-
P7A	Approximate elevation of 404m AOD.	Within boundary	-
P8	Pond forms part of the Tirpentwys Cut SINC. Approximate elevation of 352m AOD.	Within boundary	Tirpentwys Cut SINC
P9	Pond forms part of the Tirpentwys Cut SINC. Approximate elevation of 371m AOD.	Within boundary	Tirpentwys Cut SINC
P10	Pond forms part of the Tirpentwys Cut SINC. Approximate elevation of 357m AOD.	Within boundary	Tirpentwys Cut SINC
P11	Approximate elevation of 324m AOD.	500m N	-
P12	Approximate elevation of 352m AOD.	300m E	-
P13	Approximate elevation of 275m AOD.	500m S	-
P14	Approximate elevation of 274m AOD.	500m S	-
P17	Approximate elevation of 251m AOD.	200m SE	-
P20	Approximate elevation of 272m AOD.	500m N	-

Note: *ID as assigned in **Chapter 8: Biodiversity** of the Draft ES for ponds P1 to P14. Ponds P17 and P20 have been identified within the wider Water Environment study area based on review of OS mapping and assigned an ID.

grid connection

10.5.19 The grid connection runs across a ridge of high ground on the northern valley face of the Nant Ddu watercourse and extends east of the Proposed Development area near to Pistyll-gwyn. Owing to the location on a topographic ridge, the grid connection corridor has no interaction with any watercourses.

Wind Farm development

10.5.20 The BGS online geology mapping indicates that there are limited superficial deposits across the study area, primarily following the valley floors. The Afon Ebwy Fach, Afon Ebwy and Afon Lwyd flow over Quaternary deposits of alluvium (clay, silt, sand and gravel), head (clay, silt, sand and gravel), and till. The northern portion of the study area is underlain by till deposits that sit across the ridge at the headwaters of the Nant Ddu. In addition, a band of alluvium follows the Nant Ddu valley floor eastward towards the confluence with the Afon Lwyd.

10.5.21 The study area is underlain by the Carboniferous South Wales Upper Coal Measures Formation. This 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 South Wales Upper Coal Measures Formation comprises the Grovesend Formation and Hughes Member (mostly sandstone with smaller areas of sandstone, mudstone, and siltstone), which underlay the majority of the Study Area. Across the wider area of interest, the Rhonda and Brithdir Members (Pennant Sandstones with thin mudstone/siltstone and seat-earth interbeds and mainly thin coals) underlay the Afon Ebwy Fach, Afon Ebwy and Afon Lwyd valleys.

10.5.22 The LANDIS Soilscapes mapping indicates that the soils within the study area comprise of restored soils from quarry and opencast spoil (in the centre and south areas), very acid loamy upland soil with a wet peaty surface (along the ridge line extending north to Coity Mountain) and freely draining acid loamy soils over rock (situated within the outer edges of the Study Area typically at lower elevations). The wider area of interest to the west and east is predominantly underlain by freely draining acid loamy soils over rock.

10.5.23 A peat depth survey was carried out by Wood (now WSP E&IS) in September 2021, and summarised in **Chapter 11: Ground Conditions** of the Draft ES. The survey indicates that there is very little peat present across the Proposed Development area with true peat (i.e. peat ≥0.4m) only recorded at two isolated survey locations in the east of the Site.

grid connection

10.5.24 The BGS mapping indicates no superficial deposits underlying the grid connection corridor.

10.5.25 The grid connection corridor spans several geological formations running from the proposed substation site and downslope towards Pontnewynydd. The upper portion of the grid connection is underlain by the Carboniferous South Wales Upper Coal Measures Formation, whilst the corridor intersects bands of Brithdir Member (Sandstone), Deri Formation (Mudstone, Siltstone and Sandstone) and South Wales Middle Coal Measures Formation (Mudstone, Siltstone and Sandstone) along the route moving east.

10.5.26 LANDIS Soilscapes mapping indicates that the grid connection corridor is underlain primarily by freely draining acid loamy soils over rock, with a region of restored soils in the low-lying area towards Pontnewynydd.

Hydrogeology

Wind Farm development

10.5.27 The South Wales Upper Coal Measures and the alluvium deposits underlying the 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*".

10.5.28 The study area and the wider area of interest are not within a Source Protection Zone (SPZ). The closest SPZ is located within 3km to the northeast of the study area. SPZs show the risk of contamination from any activities that might cause pollution to public drinking water supplies.

grid connection

10.5.29 The bedrock geology underling the grid connection corridor is similarly classified as Secondary A Aquifer.

10.5.30 The grid connection corridor does not intersect a SPZ.

Water Resources - Abstractions

Wind Farm development and grid connection

10.5.31 The South East Valleys Abstraction Licensing Strategy[67] which encompasses the Proposed 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.

10.5.32 According to the NRW Licensed Water Abstractions dataset, there are no licensed groundwater and surface water abstractions within the Proposed Development area. Within the wider study area there are four abstraction licences, all of which are for public water supply purposes. Each of these are from surface water sources. Details on these abstractions are provided in **Table 10.8**.

67 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 August 2022)

Table 10.8 Licensed water abstractions within study area*

Permit no.	NGR	Source type	Purpose	Max hourly abstraction volume (m^3/hour)	Distance from Proposed Development boundary (km)	Scoped in/Scoped out
20/56/12/0050	SO 24830556	Surface Water	Public Water Supply	59.1	0.75 N	**Scoped out** as abstraction is upslope from Proposed Development.
20/56/12/0047 (5 points)	SO 27112 04981	Surface Water (Groundwater fed spring)	Public Water Supply	190.9	1.2 NE	**Scoped out** as abstraction is upslope from Proposed Development.
20/56/12/0048	SO 2721 0337	Surface Water (Groundwater fed spring)	Public Water Supply	27.3	1.4 E	**Scoped out** as abstraction is upslope from Proposed Development.

Notes: *Contains Natural Resources Wales information © Natural Resources Wales and Database Right. All rights Reserved.

10.5.33 Data provided by TCBC indicates that there are no private abstractions within the Proposed Development area, but 19 abstractions are present within the wider study area (details provided in **Table 10.9**).

10.5.34 No information on private water abstractions was available from BGCBC.

Table 10.9 Private Water Abstractions within study area

Name	NGR	Source	Usage	Distance from Wind Farm Development Boundary (km)	Scoped In/Out
Ty'r Beili Farm	SO2508004497	Spring	Domestic use	0.6 N	**Scoped out** as abstraction is upslope from Proposed Development.
Bracken Cottage	SO2571103653	Spring	Single, domestic use	0.5 SE	**Scoped in** as abstraction is downstream of Proposed Development.
Swn-Y-Dwr	SO2586503275	Spring	Domestic use	1.0 SE	**Scoped in** as abstraction is downstream of Proposed Development.

Name	NGR	Source	Usage	Distance from Wind Farm Development Boundary (km)	Scoped In/Out
Hole In The Wall	SO2586703251	Spring	Domestic use	1.0 SE	**Scoped in** as abstraction is downstream of Proposed Development.
Pistyll Gwyn Farm	SO2579602318	Spring	Domestic use	0.3 S	**Scoped in** as abstraction is downstream of Proposed Development.
Hollybush Cottage	SO2617101989	Well	Domestic use	1.4 SE	**Scoped in** as abstraction is downstream of Proposed Development.
Nant Ddu Farm	SO2572101889	Spring	Domestic use	0.9 E	**Scoped in** as abstraction is downstream of Proposed Development.
Little Talocher Farm	SO2575101869	Spring	Domestic use	0.9 E	**Scoped in** as abstraction is downstream of Proposed Development.
Talocher Farm	SO2575101869	Spring and Stream	Domestic use, shared supply	0.9 E	**Scoped in** as abstraction is downstream of Proposed Development.
Talocher Bungalow	SO2575801861	Spring and Stream	Domestic use, shared supply	0.9 E	**Scoped in** as abstraction is downstream of Proposed Development.
Crispin Bungalow	SO2619800113	Spring	Domestic use	1.3 SE	**Scoped out** as there is no conceivable hydrological conductivity to the abstraction from the Proposed Development.
High Path Bungalow	SO2620400138	Spring	Domestic use	1.3 SE	**Scoped out** as there is no conceivable hydrological conductivity to the abstraction from the Proposed Development.
Ty Celyn	SO2622900137	Spring	Domestic use	1.3 SE	**Scoped out** as there is no conceivable hydrological conductivity to the abstraction from the Proposed Development.
Pentranch Cottage	SO2676001182	Well	Domestic use	1.8 E	**Scoped out** as there is no conceivable hydrological

Name	NGR	Source	Usage	Distance from Wind Farm Development Boundary (km)	Scoped In/Out
					conductivity to the abstraction from the Proposed Development.
Pentranch Farm	SO2682901149	Spring	Domestic use	1.8 E	**Scoped out** as there is no conceivable hydrological conductivity to the abstraction from the Proposed Development.
Tyr-Ewen Farm	SO2327700019	Spring	Domestic use, shared supply	0.9 S	**Scoped out** as there is no conceivable hydrological conductivity to the abstraction from the Proposed Development
Blaen-Llwynau Barn	ST2333399930	Spring	Domestic use, shared supply	0.9 S	**Scoped out** as there is no conceivable hydrological conductivity to the abstraction from the Proposed Development
Ty'r Hen Forwyn	ST2349799832	Spring	Domestic use	0.9 S	**Scoped out** as there is no conceivable hydrological conductivity to the abstraction from the Proposed Development

Water Resources - Discharges

Wind Farm development and grid connection

10.5.35 Data provided by NRW indicates there are no discharge consents within the Wind Farm development area or grid connection corridor. There are a total of 3 and 24 discharge consents to groundwater and surface water respectively within the wider study area. A total of 23 of these consents are held by Welsh Water Ltd. The discharges are distributed across the watercourses as follows:

- Eleven associated with the Afon Lwyd;
- Six associated with the Afon Ebwy Fach;
- Three with the Afon Ebwy;
- Two associated with the Nant Ffrwd;
- One associated with the Nant Ffrwd-Oer; and
- One associated with the Blaengaefog Brook.

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. The driving element for not achieving 'Good' WFD status was based on the chemical dependent surface water body status.

Table 10.10 Summary of the WFD groundwater bodies and associated status definitions within study area

	SE Valleys Carboniferous Coal Measures
Type	Groundwater
Water body identifier	GB40902G201900
NRW area	WA South East
HMWB	Natural
Overall status	Poor
Chemical status	Poor

Notes: Source: https://cyfoethnaturiolcymru.sharefile.eu/share/view/sc8f1ea840a594d32a5ac24f3aa3c2350 (Accessed August 2022). Status definitions from 2021 WFD classification (Cycle 3).

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 Fach (source to confluence with Afon Ebwy) surface water body to the east of the Proposed Development area;
- The Afon Ebwy (confluence of Afon Ebwy Fach to Maes-glas) surface water body to the south of the Proposed Development area; and
- The Afon Lwyd (source to Monmouthshire and Brecon Canal).

10.5.39 The Afon Ebwy and Afon Lwyd WFD surface water bodies achieved an overall classification of 'Moderate' in the 2021 WFD classification (Cycle 3), whilst the Afon Ebwy Fach achieved a classification of 'Poor' (**Table 10.11**).

Table 10.11 Summary of the WFD surface water bodies and associated status definitions within study area

	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	Afon Lwyd (source to Mon and Brecon Canal) Surface Water Body
Type	River	River	River
Water body identifier	GB109056032880	GB109056026910	GB109056032912
Catchment	South East Valleys	South East Valleys	South East Valleys
HMWB	No	Yes	No
Overall status	Poor	Moderate	Moderate
Ecological status	Poor	Moderate	Moderate
Chemical status	High	Moderate	High

Notes: Source: https://cyfoethnaturiolcymru.sharefile.eu/share/view/sc8f1ea840a594d32a5ac24f3aa3c2350 (Accessed August 2022). Status definitions from 2021 WFD classification (Cycle 3).

10.5.40 The driving elements[68] for the Afon Ebwy not achieving 'Good' WFD status is based upon impacts to fish and polycyclic aromatic hydrocarbons (PAHs) within the river. The driving factors within the Afon Ebwy Fach and Afon Lwyd were fish, and fish and phosphorous pollution, respectively. Local targeted measures for the watercourses relate to improved control of diffuse and point source pollutants, as well as improvements to the river hydrogeomorphology for habitat or fish passage. A WFD assessment has been carried out and is provided in **Appendix 10D**.

10.5.41 No groundwater quality data was available from NRW (**Appendix 10B**). Surface water quality data (1976-2022) was received from NRW for several stations located within the study area (**Appendix 10B**). The water quality monitoring data is summarised in **Table 10.12,** showing the mean values for some of the key surface water quality parameters (where measured). No monitoring stations on the Afon Lwyd are located within the Study Area, therefore the nearest available station has been included.

Table 10.12 Summary of the NRW water quality monitoring data within the vicinity of the Study Area

Station Name	Watercourse	Distance from Proposed Development (km)	NGR	BOD (mg/l)	Ammonia* (mgN/l)	pH	Chloride (mg/l)	Iron (µg/l)
D/S Of Graigwen Mine, Graig Du Farm	-	0.5 N	SO2510804383	-	-	-	-	44.13

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

Station Name	Watercourse	Distance from Proposed Development (km)	NGR	BOD (mg/l)	Ammonia* (mgN/l)	pH	Chloride (mg/l)	Iron (µg/l)
Ebbw Fawr D/S Conf Ebbw Fach	Afon Ebwy	2.0 SW	SO2096001472	3.35	0.0091	7.95	17.94	-
River Ebbw 100m D/S Of Disch.	Afon Ebbw Fach	1.4 W	SO2210003150	-	0.0004	7.51	16.61	2032.12
Ebbw Fach U/S Minewater	Afon Ebbw Fach	1.4 W	SO2200003400	-	-	7.73	-	99.25
Ebbw Fach 30m U/S Six Bells	Afon Ebbw Fach	1.4 W	SO2197103444	-	-	8.13	-	71.23
Ebbw Fach D/S Minewater (2)	Afon Ebbw Fach	1.4 W	SO2206303080	-	-	7.89	-	153.81
Ebbw Fach @ Aberbeeg	Afon Ebbw Fach	1.7 W	SO2095401937	1.70	0.0013	7.92	25.28	84.74
R Ebbw Fach Woodland Terrace	Afon Ebbw Fach	1.4 W	SO2129002310	1.75	0.0018	7.83	22.31	84.94
R Ebbw Fach, Six Bells Bridge	Afon Ebbw Fach	1.4 W	SO2210003100	-	0.0016	8.10	28.44	-
Afon Lwyd Cwmavon Bridge	Afon Lwyd	2.4 NE	SO2697006430	2.15	0.0015	7.94	31.18	88.10
Nant Cyffin D/S Blaencyffin Small Mine	Nant Cyffin	0.05 W	SO2297001681	-	0.0010	7.99	15.43	6723.42
Nant Ddu U/S Conf N Ffrwd Oer	Nant Ddu	1.8 NE	SO2650801709	1.19	0.0007	7.69	12.30	123.59
Nant Ffrwd	Nant Ffrwd	1.0 E	SO2704303897	1.23	0.0021	7.65	11.72	150.81
N Ffrwd-Oer U/S Conf.Nant Ddu	Nant Ffrwd-Oer	1.8 SE	SO2660001640	1.30	0.0027	7.53	17.74	544.51

Notes: * Ammonia un-ionised as N

10.5.42 Mean Biological Oxygen Demand (BOD) values are typically around 1-3m/l which indicates low/no organic pollution Ammonia concentrations are low and similar across all monitoring sites. Average pH across the monitoring sites is similar, ranging between 7.51 to 8.13 and indicating that the watercourses are slightly basic. Mean chloride concentrations are low (11.72-31.18mg/l) and similar across the monitoring locations. Mean iron concentrations typically range between 40 and 150mg/l (natural background) with higher concentrations at measured in Ffrwd-Oer upstream of confluence with Nant Ddu (544mg/l), Afon Ebbw at Disch (2032mg/l) and Nant Cyffin downstream of Blaencyffin Small Mine (6723mg/l)..

Flood Risk

Terminology

10.5.43 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 has a 1% chance of being exceeded in any year. **Table 10.13** 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.

10.5.44 Technical Advice Note 15: Development and Flood Risk (TAN15 – July 2004)[69] 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 11, 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 runoff from development in any location, can be assessed. Consultation on an updated version of TAN15 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 the Development Advice Map (DAM) and refers to a Flood Map for Planning (FMfP) held by NRW. However, the consultation draft clearly 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.

10.5.45 The updated FMfP mapping and Flood Risk Assessment Wales Map have been used as a further reference point for the assessment of flood risk to the Proposed Development, given that this is understood to be a more contemporary dataset utilising the latest and improved datasets.

10.5.46 A Draft Flood Consequence Assessment (FCA) has been prepared and included as **Appendix 10A**. The flood risk summary is provided in the sub-sections below.

Table 10.13 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	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

[69] Welsh Government. 2004. *Technical Advice Note 15: Development and Flood Risk*. Planning Policy Wales. (Online) Available from: https://gov.wales/sites/default/files/publications/2018-09/tan15-development-flood-risk.pdf (Accessed August 2022).

WAG TAN15 DAM Flood Zone	NRW Flood Zones	Probability of flooding	AEP	Definition
significant flood defences)				
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 Flood Risk

Wind Farm development

10.5.47 The Flood Map for Planning (FMfP) (Rivers) (**Figure 10A.4, Appendix A**) shows that the Wind Farm development area lies primarily within an area of very low risk of fluvial flooding (corresponding to Flood Zone A on the Development Advice Map (DAM)) and Flood Zone 1 in the FMfP. However, the proposed access route to the operational Wind Farm development intersects Flood Zone C2 (without significant flood defence infrastructure) in the DAM and Flood Zone 3 in the FMfP, associated with the Cwmsychan Brook and Nant Ffrwd (**Figure 10A.5, Appendix A**).

10.5.48 Owing to the higher resolution of the modelling outputs, the FMfP (surface water and small watercourses) has been used to provide an improved indication of the flood risk to the area. The mapping indicates a narrow band of Flood Zone 3 through the road, coincident with the watercourse centreline (**Figure 10A.6a and Figure 10A.6c, Appendix A)**, though it is acknowledged that the road crossing appears to have been represented using a 2D 'cut' approach without explicit representation of the culvert (estimated to be a 2m diameter circular culvert, inspected on the Site visit). Therefore, the flood risk mapping across the road at this crossing point is erronous.

grid connection

10.5.49 The grid connection corridor runs across the northern valley face of the Nant Dbu across a ridge at elevations of approximately 270m AOD to 400m AOD. This is entirely within a region of very low risk of fluvial flooding (corresponding to Flood Zone A in the DAM (**Figure 10A.5, Appendix A**) and Flood Zone 1 in the FMfP (**Figure 10A.4, Appendix A**), and hence the risk of fluvial flooding is considered to be negligible.

Tidal Flood Risk

Wind Farm development and grid connection

10.5.50 Given the minimum elevation of the Proposed Development Area exceeding 250mAOD, there is considered to be no risk of flooding from the sea.

Surface Water Flood Risk

Wind Farm development and grid connection

10.5.51 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.

10.5.52 The FMfP – surface water and small watercourses (**Figure 10A.6a, Appendix 10A**) gives an indication of the broad areas likely to be at risk of surface water flooding at present, i.e. areas where surface water would be expected to flow or pond. The mapping shows that most of the Proposed Development is at very low risk of flooding from this source (Flood Zone 1; <0.1% AEP probability of flooding in a given year), reflective of the general topography of the Proposed Development and locality across a ridge summit. Flood Zones 2 and 3 are coincident with minor flowpaths and depressions within the Wind Farm development area, including the headwaters of the Nant Caws, Nant Ffrwd-oer, Nant y Cnyw, and Nant Dbu.

10.5.53 In addition, a band of elevated risk (Flood Zones 2 and 3) is shown in the central-eastern portion of the Proposed Development across Mynydd Llanhilleth Common, consistent with a shallow valley observed on the Site walkover (**Figure 10A.6b, Appendix 10A**). The mapping indicates that surface water is anticipated to accumulate and flow in a northwest direction towards the headwaters of the Nant Ddu.

Groundwater Flood Risk

Wind Farm development and grid connection

10.5.54 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.

10.5.55 Both the BGCBC5 and TCBC7 Local Flood Risk Management Strategies state that there are no reports of historical groundwater flooding within the borough area.

10.5.56 The Wind Farm development area has some sparse superficial deposits of Till though the central portion of the Proposed Development Area, and is underlain by a bedrock of mudstones, siltstone and sandstone. Local BGS boreholes show that the underlying bedrock (Hughes Member) consists of a cyclical sequence of sandstone, mudstone, siltstone and coal seam layers. The Hughes Member is classified as a Secondary A aquifer.

10.5.57 Although groundwater emergence may be possible, any flows are expected to be limited/small as the Proposed Development Area is on a topographic high and the underlying geology comprises bands of both higher and lower permeability bedrock layers. The elevated topography is likely to channel surface water to the valley floors relatively quickly, limiting the amount of percolation and increasing the amount of surface runoff. This is consistent with the EA Areas Susceptible to Groundwater Flooding (AStGWF) Map presented in the BGCBC FRMS[5] which shows that the risk of groundwater flooding in the western portion of the Proposed Development area (within the BGCBC administrative area) is less than 25%. Regions of elevated risk in the surrounding area are coincident with the low-lying river valleys.

Sewer Flood Risk

Wind Farm development

10.5.58 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.

10.5.59 The Wind Farm development area is primarily situated away from developed areas (due to its elevation), and it is anticipated that few sewer networks underlay the Proposed Development for which water levels could feasibly rise to an extent which would generate flooding. A small section of the Farm Road access track intersects the edge of Abersychan town. Whilst sewer flooding could occur in this area, any water that surcharged would be anticipated to drain into the Blaengaefog Brook. Similarly, any flows surcharging from minor sewer systems associated with nearby farm buildings would be expected to be minimal/intercepted by the local watercourses.

10.5.60 DCWW have indicated on the EIA Scoping Direction (**Table 10.4**) that a watermain crosses the Proposed Development area. The watermain intersects Mynydd Llanhilleth Common running in a northwest-southeast direction and running south into the Nant Ffrwd-oer valley. Based on topography levels, it is envisaged that potential flooding originating from breach or surcharge of the watermain in the northern area would drain north, eventually discharging to the Nant Ddu. Similarly, any flooding originating from the watermain in the southern portion of the Wind Farm development area is anticipated to drain to the Nant Ffrwd-oer. The watermain is intersected by a new proposed access track.

grid connection

10.5.61 The grid connection corridor runs across an elevated ridge which is entirely undeveloped. There is no interaction with the DCWW watermain as identified above, and consequently it is anticipated that few (if any) sewers underlay the corridor.

Artificial Flood Risk

Wind Farm development and grid connection

10.5.62 The NRW Reservoir Flood Risk Map 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 Afon Lwyd associated with breach/failure of reservoirs (**Figure 10A.7, Appendix 10A**). 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

10.5.63 A number of designated sites for biodiversity conservation have been identified within the Water Environment study area and surroundings in **Chapter 8: Biodiversity** of the Draft ES. There are no internationally or nationally designated sites for biodiversity within the Proposed Development area. The closest statutory designated site is Ty'r Hen Forwyn SSSI, a species rich neutral grassland situated approximately 0.7km south of the southern boundary of the study area. Ty'r Hen Forwyn SSSI may have a small proportion of water

dependent components (bogs, marshes, water fringed vegetation, fens), although these are unlikely to be affected by the Proposed Development given that there are no direct hydrological links to the Proposed Development (Ty'r Hen Forwyn SSSI sits within a separate sub-catchment of the wider Afon Ebwy).

10.5.64 There are several non-statutory designated sites within the study area which have a water component, and therefore can potentially be impacted by the Proposed Development (**Table 10.14)**. These include several Sites of Importance for Nature Conservation (SINCs) and a Local Nature Reserve.

Table 10.14 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				
Ty'r Hen Forwyn SSSI	Species-rich neutral grassland and association of this habitat with others including acid grassland, scrub, bracken and well-developed hedgerows.	ST 23635 99786	0.7km (S)	Located on a different sub-catchment of the wider Afon Ebwy. 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				
Tirpentwys Cut SINC	Supports a mosaic of habitats including bog habitats and flushes, standing open water, post-industrial quarry and rock exposures.	SO 23487 01383	Within Proposed Development area	Within Proposed Development area and in proximity to several wind farms and access tracks. **Scoped into the assessment**
Tirpentwys Local Nature Reserve	Acid grassland on colliery spoil, ponds and watercourses, rush pasture, Ancient Woodland	SO 247999	0.3km (S)	Situated along the Nant Ffrwd-oer watercourse corridor, and immediately south of the Proposed Development area. There is potential that the Proposed Development could affect the SINC. **Scoped into the assessment**
Cwm Farm Pond SINC	Pond	ST 22890 99535	1.2km (S)	No potential pathway for hydrological connectivity, and therefore unlikely to be affected. **Scoped out of the assessment**
Swyffryd Ganol Pond SINC	Pond	ST 22327 99387	1.1km (W)	No potential pathway for hydrological connectivity, and 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
Cefn Crib Bog SINC	Marshy grassland	SO 23526 00156	0.7km (S)	No potential pathway for hydrological connectivity, and therefore unlikely to be affected. **Scoped out of the assessment**
Afon Ebwy Fach SINC	Significant linear wildlife corridor, associated with the Afon Ebwy and Afon Ebwy Fach Main Rivers.	SO 22073 03065	1.1km (W)	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 into the assessment**
Afon Ebwy SINC	Significant linear wildlife corridor, associated with the Afon Ebwy and Afon Ebwy Fach Main Rivers.	SO 20969 01803	1.0km (SW)	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 into the assessment**
Ebbw River South Tip Section SINC	Significant linear wildlife corridor, associated with the Afon Ebwy and Afon Ebwy Fach Main Rivers.	ST 22012 99825	1.1km (SW)	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 into the assessment**

Future baseline

10.5.65 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 (i.e. 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 10.15** 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 10.15 Summary of the embedded environmental measures

Receptor	Potential changes and effects	Embedded measures	Compliance mechanism
Construction Phase			
Aquatic environment receptors Watercourses (Nant Cwmmllwydrew, Nant Cyffin, Nant y Cnyw, Nant y Caws, Nant Ffrwd-oer, Nant ddu, Blaengaefog Brook, Cwmsychan Brook (and unnamed tributary), Afon Ebwy Fach, Afon Ebbw, and Afon Lwyd), WFD surface water bodies (Afon Ebwy, Afon Ebwy Fach and Afon Lwyd) and their tributaries), ponds and non-statutory biodiversity sites.	Temporary increase in sediment-loading of surface water runoff or dewatering activities 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 non-statutory biodiversity 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. ID2- Water Management Plan (WMP) Implementation of an appropriate Water Management Plan (WMP) 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 on-site 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. ID3 – Water discharges Further investigation of the viability of infiltration as a means by which surface water runoff and any groundwater dewatered from excavations (e.g., excavations associated with turbine foundations and underground cables) could be discharged to ground will be undertaken through liaison with BGCBC and TCBC and by undertaking soakaway testing exercises. Information from the future Phase 2 Geo-environmental Ground Investigation (details provided in **Chapter 11: Ground Conditions**) will also be considered to assess the potential for introducing pollutants pathways to groundwater via leaching from contaminated soils. 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 CCBC. Dewatering would be suspended if a flood alert or flood warning is in	CEMP CEMP CEMP

Receptor	Potential changes and effects	Embedded measures	Compliance mechanism
		place downstream (and the discharges from the Proposed Development site 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.	
		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 on-site 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.	CEMP CEMP
		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.	
Aquatic environment receptors Watercourses (Nant Cwmmllwydrew, Nant Cyffin, Nant y Cnyw, Nant y Caws, Nant Ffrwd-oer, Nant ddu, Blaengaefog Brook, Cwmsychan Brook (and unnamed tributary), WFD surface water bodies (Afon Ebwy, Afon Ebwy Fach and Afon Lwyd) 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 (WMP), ID3 (Water discharges), ID5 (Materials Management Plan) and ID5 (Soil stockpiles) ID6 - Standoff distance No works will be undertaken within 3m of any watercourse (other than for watercourse crossings and drainage mitigation). Any works within 8m of non-tidal Main River will be subject to a Flood Risk Activity Permit (FRAP) from NRW. Any works within 8m of an Ordinary Watercourse will be subject to a Land Drainage Consent (LDC) from the relevant LLFAs. ID7 - Watercourse/surface water flow path crossings Access tracks crossing mapped surface water flow paths or watercourses will require appropriately sized culverts. The design of any culverts will be confirmed as part of the detailed drainage design.	CEMP CEMP CEMP CEMP

Receptor	Potential changes and effects	Embedded measures	Compliance mechanism
		The capacity of any existing culverts should be maintained at a minimum in instances where updates may be required associated with access track improvements and widening. Any new culverts required will be sized at the detailed design stage and will be subject to consent from the relevant LLFAs. Where the proposed underground cable crosses mapped surface water flow paths, each crossing will be individually reviewed / surveyed during detailed design (which will occur subsequent to gaining planning consent) to confirm the crossing methodology employed. It is anticipated that open cut crossing methodology will predominantly be used. ID8 - Underground cables The underground cables linking the turbines to the substation and the substation to the electrical connection point will be constructed in discrete sections with the reinstatement process commenced in as short a timeframe as practicable.	
Aquatic environment receptors Watercourses (Nant Cwmmllwydrew, Nant Cyffin, Nant y Cnyw, Nant y Caws, Nant Ffrwd-oer, Nant ddu, Blaengaefog Brook, Cwmsychan Brook (and unnamed tributary), WFD surface water bodies (Afon Ebwy, Afon Ebwy Fach and Afon Lwyd) 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 (WMP), 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

Receptor	Potential changes and effects	Embedded measures	Compliance mechanism
Aquatic environment receptors Watercourses (Nant Cwmmllwydrew, Nant Cyffin, Nant y Cnyw, Nant y Caws, Nant Ffrwd-oer, Nant ddu, Blaengaefog Brook, Cwmsychan Brook (and unnamed tributary), WFD surface water bodies (Afon Ebwy, Afon Ebwy Fach and Afon Lwyd) 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 and deterioration in the conditions supporting local conservation Sites	See measures ID1 (Good working practices), ID2 (WMP), ID3 (Water discharges) and ID4 (Materials Management Plan)	CEMP
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 (WMP), 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 Abersychan (east), Pontnewynnydd (east), Llanhilleth (southwest), and Six Bells (west).	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 (WMP) and ID5 (Water discharges).	CEMP

Receptor	Potential changes and effects	Embedded measures	Compliance mechanism
Flood risk receptors People, property, and infrastructure at risk of flooding (downslope and adjacent to the Proposed Development area including properties at Abersychan (east), Pontnewynnydd (east), Llanhilleth (southwest), and Six Bells (west).	Changes to watercourse flow conveyance as a result of new or modified temporary watercourse crossings (e.g., culvert or bridge).	See measure ID7 (Watercourse/surface water flow path crossings)	CEMP
Operational Phase			
Aquatic environment receptors Watercourses (Nant Cwmmllwydrew, Nant Cyffin, Nant y Cnyw, Nant y Caws, Nant Ffrwd-oer, Nant ddu, Blaengaefog Brook, Cwmsychan Brook (and unnamed tributary), WFD surface water bodies (Afon Ebwy, Afon Ebwy Fach and Afon Lwyd) and their tributaries), ponds springs, SE Valleys Carboniferous Coal Measures and SINCs	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.	See measure ID3 (Water discharges) ID10 – Detailed drainage design Detailed drainage design for the operational wind farm development, utilising SuDS principles, including attenuation storage where necessary, to ensure sufficient capacity is available on Site 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. ID11 – 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 DNS planning condition

Receptor	Potential changes and effects	Embedded measures	Compliance mechanism
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), ID10 (Detailed Drainage Design) and ID11 (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 Abersychan (east), Pontnewynnydd (east), Llanhilleth (southwest), and Six Bells (west).	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 ID10 (Detailed Drainage Design)	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 Abersychan (east), Pontnewynnydd (east), Llanhilleth (southwest), and Six Bells (west).	Changes to watercourse flow conveyance as a result of new or modified temporary watercourse crossings (e.g., culvert or bridge).	See measures ID7 (Watercourse/surface water flow path crossings)	DNS planning condition
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 Draft FCA (**Appendix 10A**) 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 10.16**. The location of these receptors is shown in **Figure 10.4**.

Table 10.16 Water Environment receptors subject to potential effects

Receptor	Receptor ID	Reason for consideration
Aquatic environment receptors - watercourses		
Nant Cwmllwydrew	WC1	Ordinary Watercourse. Not designated as a WFD surface waterbody. Discharges into the Afon Ebwy Fach (Main River and WFD surface water body). Potential for impacts on water quality of Nant Cwmllwydrew and downstream watercourse Afon Ebwy Fach.
Nant Cyffin	WC2	Ordinary Watercourse. Not designated as a WFD surface water body. Discharges into the Afon Ebwy (Main River and WFD surface waterbody). Potential for impacts on water quality of Nant Cyffin and downstream watercourse Afon Ebwy.
Nant y Cnyw	WC3	Ordinary Watercourse. Not designated as a WFD surface water body. Discharges into the Afon Ebwy (Main River and WFD surface waterbody). Potential for impacts on water quality of Nant Cyffin and downstream watercourse Afon Ebwy.
Nant Ffwydd-oer	WC4	Ordinary Watercourse. Designated WFD surface waterbody (part of Afon Lwyd WFD surface waterbody), with overall 'Poor Status'. Potential for impacts on WFD status as a result of changes to water quality.
Nant Caws	WC5	Ordinary Watercourse. Not designated as a WFD surface water body. Discharges into the Nant Ffrwd-oer (part of Afon Lwyd WFD surface waterbody), with overall 'Poor Status'. Potential for impacts on water quality of Nant Caws and downstream watercourse Nant Ffrwd-oer.
Nant Ddu	WC6	Ordinary Watercourse. Designated WFD surface waterbody (part of Afon Lwyd WFD surface waterbody), with overall 'Poor' Status. Potential for impacts on WFD status as a result of changes to water quality.
Cwmsychan Brook	WC7	Ordinary Watercourse. Designated WFD surface waterbodies (part of Afon Lwyd WFD surface waterbody), with overall 'Poor' Status. Potential for impacts on WFD status as a result of changes to water quality.
Unnamed watercourse	WC8	Ordinary Watercourse, tributary of the Cwmsychan Brook. Not designated as WFD surface waterbody. Discharges into the Afon Lwyd (Main River and WFD surface waterbody). Potential for impacts on water quality of this watercourse.
Blaengaefog Brook	WC9	Ordinary Watercourse, tributary of the Cwmsychan Brook. Not designated as WFD surface waterbody. Discharges into the Afon Lwyd (Main River and WFD surface waterbody). Potential for impacts on water quality of this watercourse.
Afon Ebwy Fach	WC10	Main River. Designated WFD surface waterbody, with overall 'Moderate' Status.
Afon Ebwy	WC11	Main River. Designated WFD surface waterbody, with overall 'Moderate' Status.

Receptor	Receptor ID	Reason for consideration
Afon Lwyd	WC12	Main River. Designated WFD surface waterbody, with overall 'Poor' Status.
Aquatic environment receptors - Aquifers		
SE Valleys Carboniferous Coal Measures WFD Groundwater body	AQ1	WFD groundwater body. Potential for impacts on WFD status as a result of changes to groundwater quality.
Aquatic environment receptors – Ponds P1 to P20 (ID's based on Chapter 8: Biodiversity of the Draft ES)		8 ponds within the Proposed Development area and a further 9 ponds in the wider study area. Some of the ponds are non-statutory biodiversity designated Sites (SINCs). Potential for impacts on water quality of the ponds.
Aquatic environment receptors – Springs SP		Total of 21 springs in the study area. Potential for impacts on water quality of the springs.
Aquatic environment receptors – Non-statutory nature conservation Sites		
Tirpentwys Cut SINC	C1	The site supports a mosaic of habitats including bog habitats and flushes and standing open water.
Afon Ebwy Fach SINC	C2	Significant linear wildlife corridor, associated with the Afon Ebwy and Afon Ebwy Fach Main Rivers. Potential for impacts on water quality of Afon Ebwy and Afon Ebwy Fach.
Afon Ebwy SINC	C3	
Ebbw River South Tip Section SINC	C4	
Tirpentwys Local Nature Reserve	C5	Acid grassland on colliery spoil, ponds and watercourses. Potential for impact on water quality of ponds and watercourses (Nant Ffrwd-oer and Nant Caws).
Water resource receptors		
Private water supply, spring (Bracken cottage)	WR1	Located 0.5km southeast of the Proposed Development. Potential increase in pressures on local water resources due to changes to water quality and quantity.
Private water supply, spring (Swn-y-Dwr)	WR2	Located 1.0km southeast of the Proposed Development. Potential increase in pressures on local water resources due to changes to water quality and quantity.
Private water supply, spring (Hole in the Wall)	WR3	Located 1.0km southeast of the Proposed Development. Potential increase in pressures on local water resources due to changes to water quality and quantity.
Private water supply, spring (Pistyll Gwyn farm)	WR4	Located 0.3km south of the Proposed Development. Potential increase in pressures on local water resources due to changes to water quality and quantity.
Private water supply, well (Hollybush Farm)	WR5	Located 1.4km southeast of the Proposed Development. Potential increase in pressures on local water resources due to changes to water quality and quantity.

Receptor	Receptor ID	Reason for consideration
Private water supply, well (Nant Ddu Farm)	WR6	Located 0.9km east of the Proposed Development. Potential increase in pressures on local water resources due to changes to water quality and quantity.
Private water supply, spring (Little Talocher Farm)	WR7	Located 0.9km east of the Proposed Development. Potential increase in pressures on local water resources due to changes to water quality and quantity.
Private water supply, spring and stream (Talocher Farm)	WR8	Located 0.9km east of the Proposed Development. Potential increase in pressures on local water resources due to changes to water quality and quantity.
Private water supply, spring and stream (Talocher Bungalow)	WR9	Located 0.9km east of the Proposed Development. 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 Ffrwd-oer, Pontnewynyd	FR1	Humans/properties/infrastructure downslope of the Proposed Development to the east, and at existing High risk of surface water flooding (associated with the Nant Ffrwd-oer). Potential for increased flood risk due to changes in surface water runoff rates and volumes.
Residential properties, industry/business properties located in and around Six Bells, Abertillery	FR2	Humans/properties/infrastructure downslope of the Proposed Development to the west, and at existing Medium-Low risk of surface water flooding (associated with the Nant Cwmmllywydrew). Potential for increased flood risk due to changes in surface water runoff rates and volumes.
Residential properties, industry/business properties located in and around Blaen-Cyffin Road, Llanhilleth	FR3	Humans/properties/infrastructure downslope of the Proposed Development to the southwest, and at existing Medium-High risk of surface water flooding (associated with the Nant Cyffin). Potential for increased flood risk due to changes in surface water runoff rates and volumes.
Residential properties, industry/business properties located in and around Regent Street, Llanhilleth	FR4	Humans/properties/infrastructure downslope of the Proposed Development to the southwest, and at existing Medium-Low risk of surface water flooding (associated with the Nant Cnyw). Potential for increased flood risk due to changes in surface water runoff rates and volumes.
Residential and farm buildings at Little Tal-ochor Farm	FR5	Humans/properties/infrastructure downslope of the Proposed Development to the southeast, and at existing Medium-High risk of surface water flooding (associated with the Nant Caws). Potential for increased flood risk due to changes in surface water runoff rates and volumes.

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 Cwmmllwydrew, Nant Cyffin, Nant y Cnyw, Nant Caws, Nant Ffrwd-oer, Nant Ddu, Cwmsychan brook (and unnamed tributary), Blaengaefog Brook, WFD

surface water bodies Afon Ebwy, Afon Ebwy Fach and Afon Lwyd, the underlying aquifer (SE Valleys Carboniferous Coal Measures WFD groundwater body), ponds and springs.

10.7.10 Potential effects on the WFD water bodies have been considered in the WFD Assessment (**Appendix 10D)**, 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.

10.7.11 The Proposed Development is located across the Afon Ebwy/Afon Ebwy Fach and Afon Lwyd water body catchments, which are reportable WFD surface water bodies. The Proposed Development does not directly interact with any of these Main Rivers; as such any impacts would occur via various tributaries (Ordinary Watercourses) draining from the Proposed Development Area.

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** of the Draft ES, 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 nine private abstractions from various springs, wells and stream located within the wider study area, and have some degree of hydrological conductivity to the Proposed Development.

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 Draft FCA (**Appendix 10A**) 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 Draft FCA (**Appendix 10A)** has identified various potential flood risk receptors in the vicinity of the Proposed Development. This includes residential properties, industry and business properties and farm buildings.

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 10.17**.

Table 10.17 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 in 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. 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 or from leaching of contaminants in soils during infiltration to ground 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 biodiversity sites. Potential change in groundwater levels due to dewatering resulting in decrease in groundwater baseflow to 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 Potential change to yield 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.

Receptor type*	Relevant assessment criteria	Likely significant effects
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):
  - There would be no effects on water quantity and hydromorphology arising from the presence of the grid connection infrastructure (underground cable) and therefore these effects are scoped out; and
  - All water environment effects associated with routine inspection and maintenance activities of the grid connection (underground cable). 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** of the Draft ES, 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 10.18** 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 10.18 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

Sensitivity	Criteria	Receptor type*	Examples
			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.
	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

Sensitivity	Criteria	Receptor type*	Examples
			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 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.

Sensitivity	Criteria	Receptor type*	Examples
	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; and
- Flood risk – humans, properties and infrastructure.

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

10.1.1 **Table 10.19** 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 10.19 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 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.

Magnitude	Criteria	Receptor type*	Example**, ***
		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.
		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.

Magnitude	Criteria	Receptor type*	Example**, ***
		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

10.8.6 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 10.20,** with *'Major'* and *'Moderate'* effects taken to be *'Significant'*. Significance can be *'Beneficial'*, *'Adverse'* or *'Neutral'*.

Table 10.20 Significance evaluation matrix relating to the water environment

Value/importance/value	Magnitude of change: High	Medium	Low	Very Low
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.

10.8.7 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 10.21**. The sensitivity of each receptor has been determined in accordance with the criteria set out in **Table 10.18**.

10.9.3 The assessment of impacts on the individual WFD elements is provided in **Appendix 10D** (WFD Assessment) which concludes that the significance of effects is **Not Significant**. The assessment has assumed that in the future all watercourses will achieve WFD Good Ecological Status and have been assessed as such.

Table 10.21 Aquatic receptors considered under this assessment

Receptor	Receptor ID	Sensitivity	Rationale
Watercourses			
Nant Cwmllwydrew	WC1	Low	Ordinary Watercourse. Not designated as a WFD surface water body. Discharges into the Afon Ebwy Fach (Main River and WFD surface water body).
Nant Cyffin	WC2	Low	Ordinary Watercourse. Not designated as a WFD surface water body. Discharges into the Afon Ebwy (Main River and WFD surface water body).
Nant y Cnyw	WC3	Low	Ordinary Watercourse. Not designated as a WFD surface water body. Discharges into the Afon Ebwy (Main River and WFD surface water body).
Nant Ffwydd-oer	WC4	Medium	Ordinary Watercourse. Designated WFD surface waterbody (part of the Afon Lwyd WFD surface waterbody), with overall 'Poor Status'.
Nant Caws	WC5	Low	Not designated as a WFD surface water body. Discharges into the Nant Ffrwd-oer (part of the Afon Lwyd WFD surface waterbody).
Nant Ddu	WC6	Medium	Ordinary Watercourse. Designated WFD surface waterbody (part of the Afon Lwyd WFD surface waterbody), with overall 'Poor' Status.
Cwmsychan Brook	WC7	Low	Ordinary Watercourse. Not designated as a WFD surface water body. Discharges into the Afon Lwyd (Main River and WFD surface water body).
Unnamed watercourse	WC8	Low	Ordinary Watercourse, tributary of the Cwmsychan Brook. Not designated as a WFD surface water body. Discharges into the Afon Lwyd (Main River and WFD surface water body).
Blaengaefog Brook	WC9	Low	Ordinary Watercourse, tributary of the Cwmsychan Brook. Not designated as a WFD surface water body. Discharges into the Afon Lwyd (Main River and WFD surface water body).
Afon Ebwy Fach	WC10	Medium	Main River. Designated WFD surface waterbody, with overall 'Moderate' Status.
Afon Ebwy	WC11	Medium	Main River. Designated WFD surface waterbody, with overall 'Moderate' Status.
Afon Lwyd	WC12	Medium	Main River. Designated WFD surface waterbody, with overall 'Poor' Status.
Aquifers			
SE Valleys Carboniferous Coal Measures	AQ1	Low	Designated WFD groundwater body with 'Poor' Overall WFD status. Groundwater quality likely impacted by former coal mining activities.

Receptor	Receptor ID	Sensitivity	Rationale
			Underlies the full extent of the Proposed Development area and wider study area.
Ponds			
Ponds (various locations)		Very Low	Ponds not designated for biodiversity conservation. Ponds within non-statutory nature conservation Sites
Springs			
Springs (various locations)		Very Low Low	Springs used for private domestic water supply. Springs not used for water supply.
Conditions supporting non-statutory nature conservation sites			
Tirpentwys Cut SINC		C1	Site with a local nature conservation designation (SINC), where the designation is based specifically on aquatic features.
Afon Ebwy Fach SINC		C2	Site with a local nature conservation designation (SINC), where the designation is based specifically on aquatic features.
Afon Ebwy SINC		C3	Site with a local nature conservation designation (SINC), where the designation is based specifically on aquatic features.
Ebbw River South Tip Section SINC		C4	Site with a local nature conservation designation (SINC), where the designation is based specifically on aquatic features.
Tirpentwys Local Nature Reserve		C5	Site with a local nature conservation designation (Local Nature Reserve), where the designation is based specifically on aquatic features.

Wind Farm development and grid connection - 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

10.9.4 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 TCC, internal access tracks and working areas;
- Excavation works associated with the construction of the substation, wind turbine foundations, crane pads and underground cables; and
- Temporary use and management of soil stockpiles.

10.9.5 The proposed embedded environmental measures to limit sediment-laden runoff are set out in **Table 10.15**. These measures would be secured through a planning condition, likely via the CEMP and include implementing good working practices and adherence to the

CEMP; in addition to specific measures relating to the draft Water Management Plan (WMP) (**Appendix B of Draft CEMP**), implementation of a water quality monitoring programme, and suitable management of soil stockpiles and excavated materials. The WMP will utilise SuDS principles to reduce the discharge to greenfield runoff rates and prevent pollution of the water environment.

10.9.6 Construction of the access tracks and grid connection includes a small number of crossings of mapped surface water flow paths below (**Table 3.2** and **Figure 10A.6** of the Draft FCA in **Appendix 10A**). It is anticipated that the consenting powers of BGCBC and TCBC will be enforced to ensure that the future detailed designs of these crossings will limit sediment-laden runoff.

- Access roads: total of eight crossings of Ordinary Watercourse and non-WFD surface waterbodies comprising one crossing of Blaengaefog Brook, one crossing of Cwmsychan Brook, two crossings of minor ditches (tributaries of Nant Ddu), two crossings of flowpath across Mynydd Llanhilleth Common (tributary of Nant Ddu) and two crossings of a minor tributary of the Nant Ffrwd-oer; and
- grid connection (underground cable): three crossings of tributaries of the Nant Ddu (Ordinary Watercourse and WFD surface waterbody).

10.9.7 The magnitude of potential effects of sediment-laden runoff on the aquatic environment receptors with the proposed embedded environmental measures in place is determined to be Low, in regard to the Blaengaefog Brook, Cwmsychan Brook (and unnamed tributary), Nant Cwmmllwydrey, Nant Cyffin, Nant y Cnyw, Nant Caws, Nant Ffrwd-oer, Nant Ddu, Afon Ebwy, Afon Ebwy Fach and Afon Lwyd, and Very Low for the local biodiversity Sites and ponds.

10.9.8 Consideration of the magnitude of change to the aquatic environment receptors (Very Low to Low), in conjunction with their determined sensitivity (Medium for Afon Ebwy Fach, Afon Ebwy, Afon Lwyd, Nant Ffrwd-oer and Nant Ddu; Low for Blaengaefog Brook, Cwmsychan Brook (and unnamed tributary), Nant Cwmmllwydrey, Nant Cyffin, Nant y Cnyw, Nant Caws, local biodiversity Sites and Very Low to Low for springs and ponds), finds that the significance of effects to the aquatic environment receptors in this preliminary assessment is **Not Significant**.

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

10.9.9 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 10.15** 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 the Main Rivers Afon Ebwy Fach, Afon Ebwy, and Afon Lwyd, and Low for the Ordinary Watercourses adjacent to the Proposed Development area. The magnitude of change is higher for the Ordinary Watercourses because of the limited dilution available and location within the Proposed Development area compared to Afon Ebwy Fach, Afon Ebwy and Afon Lwyd which have large dilution capacity and are located at a greater distance from the Proposed Development.

10.9.10 Consideration of the sensitivity of the Ordinary Watercourses (Low to Medium) and the Main Rivers Afon Ebwy Fach, Afon Ebwy and Afon Lwyd (Medium) in combination with the potential magnitude of change to the receptors (Very low to Low), finds that the significance of effects to the aquatic environment receptors in this preliminary assessment 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

10.9.11 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; and
- Concrete leaching.

10.9.12 The proposed embedded measures to prevent surface and groundwater water pollution are set out in **Table 10.15**.

10.9.13 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 Fach, Afon Ebwy and Afon Lwyd, and Low in regard to adjacent Ordinary Watercourses, local biodiversity sites, ponds and springs. The sensitivity of the aquatic environment receptors (Medium for Afon Ebwy Fach, Afon Ebwy, Afon Lwyd, Nant Ffrwd-oer and Nant Ddu; Low for Blaengaefog Brook, Cwmsychan Brook (and unnamed tributary), Nant Cwmmllwydrey, Nant Cyffin, Nant y Cnyw, Nant Caws, local biodiversity Sites and Very Low to Low for springs ponds) in combination with the potential magnitude of change acting upon them is found to be, in this preliminary 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 or from leaching of contaminants in soils during infiltration to ground 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 biodiversity sites

10.9.14 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);
- Discharge of surface runoff and any pumped groundwater to ground via infiltration resulting in contaminant leaching from contaminated soils. The Phase 1 Geo-environmental desk study[70] has identified potential localised sources of land contamination on the Proposed Development area which are discussed in detail in **Chapter 11: Ground Conditions** of the Draft ES; and
- Concrete leaching.

[70] Mynydd Llanhilleth Wind Farm, Phase 1 Geoenvironmental Desk Study (Ref. 807095-WOOD-RP-OG-0002_P01, November 2022).

10.9.15 Those measures described above and detailed in **Table 10.15** 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.

10.9.16 The viability of infiltration as a means by which surface water runoff and any groundwater dewatered from excavations could be discharged to ground will be undertaken through liaison with BGCBC and TCBC and by undertaking soakaway testing exercises. Information from the future Phase 2 Geo-environmental Ground Investigation (details provided in **Chapter 11: Ground Conditions**) will also be considered to assess the potential for introducing pollutant pathways to groundwater via leaching from contaminated soils. The magnitude of change from the identified potential effects resulting from deterioration of water quality, with the embedded measures in place (**Table 10.15**), is determined to be Very Low in regard to the Main Rivers Afon Ebwy Fach, Afon Ebwy, Afon Lwyd, local biodiversity sites, ponds and springs and Low with regard to the adjacent Ordinary Watercourses. The magnitude of change is lower for Afon Ebwy Fach, Afon Ebwy, Afon Lwyd compared to the Ordinary Watercourses adjacent to the Proposed Development, due to the large dilution capacity and greater distance from the Proposed Development. higher for the adjacent ordinary watercourses because of the limited dilution available and location within the Proposed Development area.

10.9.17 The sensitivity of the aquatic environment receptors (Very Low, Low and Medium) in combination with the potential magnitude of change acting upon them (Very Low and Low) is found to be, in this preliminary assessment, **Not Significant**.

Potential change in groundwater levels due to dewatering resulting in decrease in groundwater baseflow to aquatic environment receptors

10.9.18 Dewatering of excavations has the potential to lead to a decline in local groundwater levels and subsequent decline in groundwater baseflow to watercourses and springs, deterioration in WFD water bodies status and conditions supporting biodiversity sites within the study area.

10.9.19 Excavations associated with the construction phase are of limited duration, footprint and depth including the turbine foundations (20m diameter x 4m depth) and underground cables (width between 0.60m and 1.5m and depth up to 1.5m). In addition, the potential for encountering groundwater during excavations into the Coal Measures is considered to be limited, and where encountered, it is likely to be of low sensitivity, perched and in small quantities (coal-bearing mudstones/siltstones with minor sandstones and ironstones).

10.9.20 The magnitude of change from the identified potential effects resulting from dewatering activities is determined to be Low taking into account the duration, depth and footprint of the excavations and limited potential for encountering groundwater during excavations. The sensitivity of the aquatic environment receptors (Very Low to Medium) in combination with the potential magnitude of change acting upon them is found to be, in this preliminary assessment, **Not Significant**.

Wind Farm development - 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

10.9.21 Following the construction phase, small quantities of fuel/oil/chemicals would need to be brought onto the Wind Farm development for maintenance activities. The embedded

measures for the operational phase of the development listed in **Table 10.15**, include measures to control the potential impacts of accidental fuel, oil or chemical release as a result of maintenance activities.

10.9.22 The magnitude of change from the identified potential effects resulting from deterioration of water quality is determined to be Very Low regarding the adjacent watercourses, local biodiversity sites, ponds and springs. The sensitivity of the aquatic environment receptors (Medium for Afon Ebwy Fach, Afon Ebwy, Afon Lwyd, Nant Ffrwd-oer and Nant Ddu; Low for Blaengaefog Brook, Cwmsychan Brook, Nant Cwmmllwydrey, Nant Cyffin, Nant y Cnyw, Nant Caws and local biodiversity sites and Very Low to Low for the springs and ponds) in combination with the potential magnitude of change acting upon them is found to be, in this preliminary assessment, **Not Significant**.

Assessment of effects on water resource receptors

10.9.23 This section summarises the water resource receptors taken forward in this assessment, which are listed in **Table 10.22**. The sensitivity of each receptor has been determined in accordance with the criteria set out in **Table 10.18**.

Table 10.22 Water resource receptors considered under this assessment

Receptor	Receptor ID	Sensitivity	Rationale
Private water supply, spring (Bracken cottage)	WR1	Low	Private domestic water supply (assumed potable as worst-case scenario), which is considered to be small relative to available resource.
Private water supply, spring (Swn-y-Dwr)	WR2		
Private water supply, spring (Hole in the Wall)	WR3		
Private water supply, spring (Pistyll Gwyn farm)	WR4		
Private water supply, well (Hollybush Farm)	WR5		
Private water supply, well (Nant Ddu Farm)	WR6		
Private water supply, spring (Little Talocher Farm)	WR7		
Private water supply, spring and stream (Talocher Farm)	WR8		
Private water supply, spring and stream (Talocher Bungalow)	WR9		

Wind Farm development and grid connection - Construction phase

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

10.9.24 Those activities with the potential to affect the water resources receptors 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.

10.9.25 With the embedded measures in place (**Table 10.15**), 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) in combination with the potential magnitude of change acting upon them (Very Low), finds that the significance of effects on the water resource receptors from the construction of the Proposed Development is, in this preliminary assessment, **Not Significant**.

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

10.9.26 Dewatering of excavations has the potential to lead to a decline in local groundwater levels and subsequent decline in groundwater baseflow to watercourses and springs and decline in the yield (or even derogation) of the private water abstractions within the study area.

10.9.27 There are no private water abstractions within 300m of excavations associated with the construction of the Wind Farm development and grid connection (underground cable), respectively (**Figure 10.7**). As discussed in the Assessment of effects on aquatic environment receptors above, excavations associated with the construction phase are of limited duration, footprint and depth. In addition, the potential for encountering groundwater during excavations is considered to be limited, and where encountered, it is likely to be of low sensitivity, perched and in small quantities given the underlying geology (Coal Measures Formation). This suggests that the magnitude of change from the potential effects of dewatering activities on local groundwater levels and private abstractions is Low in this preliminary assessment.

10.9.28 The magnitude of change from the identified potential effects resulting from dewatering activities on the water resource receptors (private water abstractions), is determined to be Low taking into account the duration, depth and footprint of the excavations and limited potential for encountering groundwater during excavations. The sensitivity of the water resource receptors (Low) in combination with the potential magnitude of change acting upon them and with the specified embedded environmental measures in place, is found to be, in this preliminary assessment, **Not Significant**.

Wind Farm development - Operational phase

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

10.9.29 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. The magnitude of change from all the identified potential effects on the water resource receptors with the embedded measures in place, is considered to be Very Low.

10.9.30 Taking into account the receptor sensitivity (Low) in combination with the potential magnitude of change acting upon them (Very Low), 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

10.9.31 The following summarises the flood risk receptor groups taken forward in this assessment, which are listed in **Table 10.23**. The sensitivity of these receptors has been identified in accordance with the criteria outlined in **Table 10.18**. 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 10.23 Flood risk receptors considered under this assessment

Receptor	Receptor ID	Sensitivity	Rationale
Residential properties, industry/business properties located in and around Cwm Ffrwd-oer, Pontnewynyd	FR1	Medium	Land use type defined as 'Highly vulnerable development' under the TAN15 guidance.
Residential properties, industry/business properties located in and around Six Bells, Abertillery	FR2	Medium	Land use type defined as 'Highly vulnerable development' under the TAN15 guidance.
Residential properties, industry/business properties located in and around Blaen-Cyffin Road, Llanhilleth	FR3	Medium	Land use type defined as 'Highly vulnerable development' under the TAN15 guidance.
Residential properties, industry/business properties located in and around Regent Street, Llanhilleth	FR4	Medium	Land use type defined as 'Highly vulnerable development' under the TAN15 guidance.
Residential and farm buildings at Little Tal-ochor Farm	FR5	Medium	Land use type defined as 'Highly vulnerable development' under the TAN15 guidance.

Wind Farm development and grid connection - 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)

10.9.32 During the construction and operational phases of the Wind Farm development and grid connection, 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.

10.9.33 As outlined in the Draft FCA (**Appendix 10A**), a WMP for the construction phase of the Wind Farm development and grid connection and Detailed Drainage Design for operational phase of the Wind Farm development, 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, TCBC and CCBC and by undertaking soakaway testing exercises. 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 CCBC.

10.9.34 It is concluded that the Proposed Development during the construction and operational phases, with the specified embedded environmental measures in place (**Table 10.15**) 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, given these are primarily residential), 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

10.9.35 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.

10.9.36 Construction of the access tracks and grid connection includes a small number of crossings of mapped surface water flow paths/watercourses below (Table 3.2 and **Figure 10A.6** of the FCA in **Appendix 10A**). The future detailed designs of these crossings will be agreed with BGCBC and TCBC and will minimise change to existing watercourse flow conveyance (embedded measures in **Table 10.15**).

- Access roads: total of eight crossings of Ordinary Watercourse and non-WFD surface waterbodies comprising one crossing of Blaengaefog Brook, one crossing of Cwmsychan Brook, two crossings of minor ditches (tributaries of Nant Ddu), two crossings of flowpath across Mynydd Llanhilleth Common (tributary of Nant Ddu) and two crossings of a minor tributary of the Nant Ffrwd-oer; and
- grid connection (underground cable): three crossings of tributaries of the Nant Ddu (Ordinary Watercourse and WFD surface waterbody).

10.9.37 The magnitude of change from the potential effects associated with the watercourse/surface water flow paths crossings, with the specified embedded environmental measures in place (**Table 10.15**), is determined to be Very Low. The sensitivity of the flood risk receptors (Medium), in combination with the magnitude of change acting upon the receptors, concludes that the significance of effects on the flood risk receptors is, in this preliminary assessment, **Not Significant**.

Wind Farm development and grid connection – Decommissioning Phase

10.9.38 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 outline drainage strategy included in the Draft FCA (**Appendix 10A**) 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. Decommissioning of the Proposed Development with the specified embedded

environmental measures in place (**Table 10.15**), would not result in increases in the rate of surface runoff and therefore the potential magnitude of the effects is Very Low.

10.9.39 Consideration of the sensitivity of the flood risk receptors (Medium)in combination with the potential magnitude of change acting upon the receptors (Very Low), concludes that the significance of effects on the flood risk receptors is, in this preliminary assessment, **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** has been applied for the CEA to ensure direct and indirect cumulative effects can be appropriately identified and assessed.

10.10.3 A tiered approach to the CEA has been set out in **Chapter 2: Approach to Environmental Impact Assessment** of the Draft ES 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: Approach to Environmental Impact Assessment** of the Draft ES 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: Approach to Environmental Impact Assessment** of the Draft ES that fall within the hydrology study area are considered in this CEA, as discussed in **Table 10.24**.

10.10.6 A simple qualitative assessment (as justified in **Table 10.24**) of the potential for significant cumulative effects to arise is carried out in **Table 10.25**. 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 10.24 Developments to be considered as part of the Water Environment 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 Abertillery wind farm development site is located on the Afon Ebwy Fach and Afon Lwyd catchment divide. The development site is located approximately 1.5km north of the Proposed Development. A simple qualitative assessment of cumulative hydrological effects has been carried out (in Table 10.25 below).
Abertillery Wind Farm - Anemometer Mast	Anemometer Mast	Blaenau Gwent CBC C/2021/0262	Planning decision pending	2	The anemometer mast development site is located on the Afon Ebwy Fach and Afon Lwyd catchment divide. The development site is located approximately 1.5km north of the Proposed Development. A simple qualitative assessment of cumulative hydrological effects has been carried out (in Table 10.25 below).

Table 10.25 CEA for Water Environment

Project	Discussion
Abertillery Wind Farm and associated Anemometer Mast	The project Scoping Report[71], produced May 2021, provides details on the wind farm development. Both the Abertillery development site and the Proposed Development are located across the Afon Ebwy Fach and Afon Lwyd catchment divide. The development site is located approximately 1.5km to the north 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. 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 (1.5km), it is determined that any cumulative effects would be negligible and therefore Not Significant.

[71] RWE Renewables UK Ltd.2021. Abertillery Wind Farm Scoping Report.

10.11 Significance conclusions

10.11.1 A summary of the results of the Water Environment assessment is provided in **Table 10.26**.

Table 10.26 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 Cwmmllwydrew, Nant Cyffin, Nant y Cnyw, Nant y Caws, Nant Ffrwd-oer, Nant Ddu, Blaengaefog Brook, Cwmsychan Brook (and unnamed tributary), WFD surface water bodies (Afon Ebwy, Afon Ebwy Fach and Afon Lwyd)) 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 WMP. 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 Cwmmllwydrew, Nant Cyffin, Nant y Cnyw, Nant y Caws, Nant Ffrwd-oer, Nant Ddu, Blaengaefog Brook, Cwmsychan Brook (and unnamed tributary), WFD surface water bodies (Afon Ebwy, Afon Ebwy Fach and Afon Lwyd)) 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 to Minor (Not Significant)	Effective implementation of the embedded measures designed to avoid the release of silt-laden runoff.
Aquatic environment receptors Watercourses (Nant Cwmmllwydrew, Nant Cyffin, Nant y Cnyw, Nant y Caws, Nant Ffrwd-oer, Nant Ddu,	Very low (least sensitive) to	Very Low and Low	Negligible to Minor	Implementation of the embedded measures designed to prevent pollution of surface water and groundwater. These include appropriate pollution

Receptor and summary of predicted effects	Sensitivity/ importance/ value of receptor[1]	Magnitude of change[2]	Significance[3]	Summary rationale
Cwmsychan brook, WFD surface water bodies (Afon Ebwy, Afon Ebwy Fach and Afon Lwyd)) 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 of WFD waterbodies and deterioration in the conditions supporting local conservation Sites.	Medium (most sensitive)		(Not Significant)	prevention measures in line with recommended guidance, pollution incident response planning, water quality monitoring programme, implementation of the WMP 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. The use of sulphate resistant concrete is recommended.
Aquatic environment receptors Watercourses (Nant Cwmmllwydrew, Nant Cyffin, Nant y Cnyw, Nant y Caws, Nant Ffrwd-oer, Nant ddu, Blaengaefog Brook, Cwmsychan Brook (and unnamed tributary), WFD surface water bodies (Afon Ebwy, Afon Ebwy Fach and Afon Lwyd)) 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 or from leaching of contaminants in soils during infiltration to ground 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 biodiversity sites.	Very low (least sensitive) to Medium (most sensitive)	Very Low and Low	Negligible to Minor (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 WMP 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. Further investigation of the viability of infiltration will be undertaken through liaison with BGCBC and TCBC and by considering information from the future Phase 2 Geo-environmental Ground Investigation.

Receptor and summary of predicted effects	Sensitivity/ importance/ value of receptor[1]	Magnitude of change[2]	Significance[3]	Summary rationale
Aquatic environment receptors Watercourses (Nant Cwmmllwydrew, Nant Cyffin, Nant y Cnyw, Nant y Caws, Nant Ffrwd-oer, Nant ddu, Blaengaefog Brook, Cwmsychan Brook (and unnamed tributary), WFD surface water bodies (Afon Ebwy, Afon Ebwy Fach and Afon Lwyd)) and their tributaries, ponds, springs, SE Valleys Carboniferous Coal Measures aquifer and SINCs **Potential Effect** Potential change in groundwater levels due to dewatering resulting in decrease in groundwater baseflow to aquatic environment receptors	Very low (least sensitive) to Medium (most sensitive)	Low	Negligible to Minor (Not Significant)	Limited duration, depth and footprint of the excavations and limited potential for encountering groundwater during excavations.
Water resource receptors Private abstractions **Potential Effect** Potential change to water quality of a water supply resource which may affect the viability of an abstraction	Low	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).
Water resource receptors Private abstractions **Potential Effect** Potential change to yield of a water supply resource which may affect the viability of an abstraction	Low	Low	Negligible (Not Significant)	Limited duration, depth and footprint of the excavations and limited potential for encountering groundwater during excavations.
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	Medium	Very Low	Negligible (Not Significant)	Limited land take and change in impermeable area. Implementation via WMP 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
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 Six Bells (west), Llanhilleth (southwest), and Cwm Ffrwd (southeast) **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	Medium	Very Low	Negligible (Not Significant)	Access tracks crossing mapped surface water flow paths or watercourses will require appropriately sized culverts. The design of any culverts will be confirmed as part of the detailed drainage design. The capacity of any existing culverts should be maintained at a minimum in instances where updates may be required associated with access track improvements and widening. Any new culverts required will be sized at the detailed design stage and will be subject to consent from the relevant LLFAs. Where the proposed underground cable crosses mapped surface water flow paths, each crossing will be individually reviewed / surveyed during detailed design (which will occur subsequent to gaining planning consent) to confirm the crossing methodology employed. It is anticipated that open cut crossing methodology will predominantly be used.
Operational phase				
Aquatic environment receptors Watercourses (Nant Cwmmllwydrew, Nant Cyffin, Nant y Cnyw, Nant y Caws, Nant Ffrwd-oer, Nant ddu, Blaengaefog Brook, Cwmsychan Brook (and unnamed tributary), WFD surface water bodies (Afon Ebwy, Afon Ebwy Fach and Afon Lwyd)) and their tributaries, ponds	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 on Site. These include appropriate maintenance of vehicles, equipment and wind turbines, development and implementation of a Detailed Drainage Design and an accidental spill

Receptor and summary of predicted effects	Sensitivity/ importance/ value of receptor[1]	Magnitude of change[2]	Significance[3]	Summary rationale
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.				response protocol and implementation of standard best practice when using equipment or refuelling.
Water resource receptors Private abstractions **Potential Effect** Potential change to water quality of a water supply resource which may affect the viability of an abstraction during maintenance activities	Low	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).
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 Six Bells (west), Llanhilleth (southwest), and Cwm Ffrwd (southeast) **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)	Medium	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 Six Bells (west), Llanhilleth (southwest), and Cwm Ffrwd (southeast)	Medium	Very Low	Negligible (Not Significant)	Access tracks crossing mapped surface water flow paths or watercourses will require appropriately sized culverts. The design of any culverts will be confirmed as part of the detailed drainage design.

Receptor and summary of predicted effects	Sensitivity/ importance/ value of receptor[1]	Magnitude of change[2]	Significance[3]	Summary rationale
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				The capacity of any existing culverts should be maintained at a minimum in instances where updates may be required associated with access track improvements and widening. Any new culverts required will be sized at the detailed design stage and will be subject to consent from the relevant LLFAs. Where the proposed underground cable crosses mapped surface water flow paths, each crossing will be individually reviewed / surveyed during detailed design (which will occur subsequent to gaining planning consent) to confirm the crossing methodology employed. It is anticipated that open cut crossing methodology will predominantly be used.

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 surface water runoff management in consultation with CCBC will be incorporated in the final ES submission.