



Pennant Walters

GLANLLYNFI GARTH WIND FARM

Draft Environmental Statement

Appendix 10D - Private Water Supply Risk Assessment





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1 INTRODUCTION

1.1 GENERAL

- 1.1.1. A Private Water Supply Risk Assessment (PWSRA) has been carried out for water supplies that may be affected during the construction, operation and decommissioning of Glanllynfi Garth Wind Farm (the “Proposed Development”).
- 1.1.2. The Proposed Development is located predominantly within the administrative boundary of Bridgend County Borough Council (BCBC); however, the access track traverses the Rhondda Cynon Taf County Borough Council (RCTCBC) and Neath Port Talbot Council (NPTC) authority areas (see **Chapter 1: Introduction, Figure 1.1: Site Location**). The Proposed Development consists of the following elements:
- Two substations including transformer housing;
 - Two temporary construction compounds;
 - Two temporary site offices;
 - Crane pads and cabling;
 - Access track construction; and
 - Overhead line connection (via wooden pole) to agreed Point of Connection (POC) with National Grid Electricity Distribution (NGED).
- 1.1.3. This document should be read in conjunction with **Chapter 10: Water Environment** of the Environmental Statement (ES) as well as **Figure 10.5 Private Water Supplies**.

1.2 SCOPE

- 1.2.1. This PWSRA forms an Appendix to **Chapter 10: Water Environment** of the Draft Environmental Statement (ES). The purpose of this assessment is to identify private water supplies (PWS) that may be affected by the construction, operation and decommissioning of the Proposed Development, and to set out the proposed approach for assessing and mitigating potential effects on those supplies.
- 1.2.2. At this stage, the assessment has been informed by an initial desk-based review of publicly available information, including licensed abstraction data available from DataMapWales¹, together with the currently available Proposed Development design information. This has been used to identify potential PWS receptors within the study area and to undertake a preliminary screening assessment of potential source-pathway-receptor linkages.
- 1.2.3. Further information will be gathered to inform the Final ES submission. This will include consultation with BCBC, RCTCBC and NPTC (“the relevant local authorities”) regarding records of registered PWS, consultation with relevant landowners and PWS users where required, and targeted site reconnaissance or walkover surveys to confirm the location, nature, use and sensitivity of identified supplies. The findings of this further work will be incorporated into the final PWSRA and used to

¹ Welsh Government (2026) DataMapWales. Available at: <https://datamap.gov.wales/maps/new#/> accessed July 2026.

refine the screening, risk assessment and any required mitigation, monitoring or contingency measures.

1.3 POLICY & GUIDANCE

- 1.3.1. Legislation and guidance related to good practice during the construction of onshore wind farms that has been considered in the preparation of this document is provided within **Chapter 10: Water Environment** of the ES.

2 METHODOLOGY

2.1 GENERAL

- 2.1.1. As set out in **Section 1**, this PWSRA has been informed by a desk-based review of publicly available information to develop an initial understanding of PWS that may be affected by the Proposed Development.
- 2.1.2. Following receipt and review of further site-specific information, the assessment methodology will comprise:
- Completion of further desktop assessment and development of a refined Conceptual Site Model (CSM) informed by the baseline information presented in **Chapter 10: Water Environment** and site surveys;
 - Review of information provided by the relevant authorities, landowners and PWS users to identify and characterise PWS within the study area;
 - Screening of supplies to identify those with a plausible hydrological or hydrogeological connection to the Proposed Development;
 - Targeted site inspections and verification surveys, where required, to confirm the location, nature and sensitivity of identified supplies;
 - Completion of a risk assessment to determine the potential effects of the Proposed Development on identified supplies; and
 - Identification of any mitigation, monitoring or contingency measures required to avoid or minimise adverse effects on private water supplies.

2.2 CONCEPTUAL SITE MODEL

- 2.2.1. A desktop assessment has been used to compile a CSM supported by site condition information that can be found in the existing baseline section of **Chapter 10: Water Environment** of the Draft ES. The CSM may be refined following site-specific walkover surveys by a suitably qualified professional, including walkovers of specific PWS as well as the wider catchment areas.

2.3 SCREENING

- 2.3.1. At the time of writing, an initial review of publicly available information has been undertaken to identify licensed abstractions located within 3 km of the Proposed Development and other potential PWS receptors that may be present within proximity to the Proposed Development identified using OS mapping and aerial imagery.
- 2.3.2. Consultation has been initiated via information requests sent to the relevant local authorities regarding PWS records within a 3 km buffer of the Proposed Development, pending responses.
- 2.3.3. The screening approach that will be applied following receipt of consultation responses is described in Section 4.

2.4 CONSULTATION

- 2.4.1. Consultation will be undertaken with relevant PWS users to obtain further information regarding the nature and use of identified supplies. Subject to the outcome of the screening exercise and availability of contact details, this process may include the issue of letters, questionnaires and mapping to assist in confirming the location and characteristics of supplies.

2.4.2. The consultation process is expected to:

- Explain the nature of the Proposed Development and the purpose of the assessment;
- Obtain information regarding the source, use and operation of individual PWS;
- Request information on the location of abstractions, storage tanks and associated infrastructure, where known;
- Seek permission, where necessary, for follow-up discussions or site inspections; and
- Obtain information to support the screening process and subsequent risk assessment.

2.4.3. Information obtained through consultation will be incorporated into the final PWSRA and used to refine the understanding of individual supplies, potential source-pathway-receptor linkages, and any mitigation, monitoring or contingency measures that may be required.

2.4.4. A copy of the consultation materials proposed to support this process is provided in **Annex 10D.1** to this PWSRA.

2.5 SITE INSPECTION

2.5.1. Subject to the outcome of the screening exercise, the availability of access permissions, and information obtained through consultation with local authorities, landowners and PWS users, targeted site inspections and hydrological walkover surveys will be undertaken to support the Final ES submission.

2.5.2. Where access is available, surveys will seek to verify the location of PWS abstractions and associated infrastructure, improve understanding of local hydrological and hydrogeological conditions, and obtain additional information on the nature and use of individual supplies. Site inspections may include visual inspection of abstraction locations, storage tanks, treatment systems and associated infrastructure, together with discussions with landowners and PWS users where appropriate.

2.5.3. Information gathered during site inspections will be incorporated into the final PWSRA and used to refine the screening assessment, improve understanding of potential source-pathway-receptor linkages, and inform the detailed risk assessment and any associated mitigation, monitoring or contingency measures.

2.6 RISK ASSESSMENT

GENERAL

2.6.1. A methodology for risk assessment of PWS is contained within the Private Water Supplies Technical Manual². Due to the nature of works being carried out at the Proposed Development, it is deemed impractical to use the methodologies set out in this guidance. When assessing supply compliance with the PWS regulations listed in **Chapter 10** of the Draft ES, local authorities are required to consider factors, such as: proximity of the supply to cattle and wildlife, historical and current land use, and historical maintenance carried out on the supply. While such factors are useful for

² [pws-technical-manual-section-4-risk-assessment-for-private-water-supplies.pdf](#)

understanding the baseline qualities of a supply, they are inappropriate for determining the risk to the PWS during the construction and operation of the Proposed Development, which is based on the Source-Pathway-Receptor model.

- 2.6.2. The methodologies set out are based on WSP's professional experience; however, the guidance will be used where relevant to inform consideration of the factors that may influence the baseline condition and sensitivity of identified supplies.
- 2.6.3. The risk assessment will consider the type of hazard associated with the Proposed Development, the potential for release and exposure, and the likely severity of any resulting impact.
- 2.6.4. The Source-Pathway-Receptor concept model will be used as the underlying framework to assess potential risks posed by the Proposed Development. In this model:
- Source refers to the source of the potential hazard (not to be confused with PWS source);
 - Receptor refers to anything or anyone that could be adversely affected by the hazard (including the source of water supplying the abstraction and associated infrastructure); and
 - Pathway refers to the mechanisms by which the hazard is transmitted to the receptor.
- 2.6.5. Where hydrological or hydrogeological connectivity is identified between a potential contamination source and a receptor via a pathway, a pollutant linkage may exist and the associated risk will be assessed. Where no plausible linkage can be established, the receptor may be screened out from further assessment.
- 2.6.6. For any PWS, it must first be established if there is a risk to mitigate and then, if necessary, mitigation measures to reduce the risk introduced. Such risks are often sufficiently reduced through embedded design and good practice mitigation. In the event a risk remains even after these, then additional mitigation may be required to sufficiently reduce the residual risk.
- 2.6.7. The risk assessment will consider the type of hazard associated with the Proposed Development, together with the probability and magnitude of potential impacts on the identified PWS. The assessment will use information gathered through desk-based review, consultation and site verification (where available) to determine the likelihood and significance of risk to PWS in terms of water quality and water quantity.
- 2.6.8. For the purpose of this assessment a generic approach has been adopted and considers the Proposed Development as the source of hazard, the PWS as the receptor and the natural water environment as the pathway that connects source and receptor.
- 2.6.9. In the presence of an identified unacceptable risk or uncertainty, protection or mitigation should be provided that must ensure the PWS:
- Is adequately preserved in terms of both water flow and water quality; and/or
 - Is replaced by an alternative process whereby potable water is made available on a temporary or permanent basis, as appropriate.
- 2.6.10. Whilst of low national or regional importance, a PWS can be of extremely high local importance to the PWS user. In accordance with definitions presented in **Chapter 10: Water Environment**, PWS providing a domestic supply are considered of Medium Sensitivity. PWS for agricultural supply are of Low Sensitivity.

RISK CRITERIA

- 2.6.11. The potential impact to PWS has been assessed in relation to the probability of an impact occurring on the receiving environment and the receiving environments sensitivity to change.
- 2.6.12. The probability has been classified as high likelihood, likely, low likelihood or unlikely, based on criteria outlined in **Table 2-1** below. The likelihood of any impacts on the quality and quantity of water serving the PWS is influenced by the type of supply and its source abstraction location within the catchment in relation to construction activities.

Table 2-1 – Probability of Impact

Probability	Definition	Examples
High	There is pollutant linkage and an event would appear very likely in the short-term and almost inevitable over the long-term, or there is evidence at the receptor of harm or pollution.	Proposed infrastructure overlies point of abstraction or is immediately upgradient (<100 m); Proposed infrastructure footprint occupies >25% of indicative upgradient abstraction catchment area; Proposed infrastructure will bisect delivery pipework.
Medium	There is pollutant linkage and all the elements are present and in the right place which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short-term and likely over the long-term.	Proposed infrastructure is upgradient and within the vicinity of point of abstraction (>100 m to 250 m); Proposed infrastructure footprint occupies 5-25% of indicative upgradient abstraction catchment.
Low	There is pollutant linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a long period such an event would take place and is less likely in the shorter term.	Proposed infrastructure is within the same catchment area and upgradient but >250 m from point of abstraction; Proposed infrastructure footprint occupies <5% of indicative upgradient abstraction catchment.
Unlikely	There is pollutant linkage but circumstances are such that it is improbable that an event would occur even in the very long-term.	Proposed infrastructure is within the same catchment area and upgradient but >500 m from point of abstraction.

- 2.6.13. As outlined above the potential impacts on the PWS will be assessed taking account of the type of supply and possible connection to the source through the presence/absence of pollutant linkages. The magnitude of potential change to a supply is defined below in **Table 2-2**.

Table 2-2 – Magnitude of Effect

Magnitude	Example
Major	Major change to the hydrological/hydrogeological conditions resulting in temporary or permanent change.
Moderate	Complete disruption to operation of supply, impacting on quality and quantity available. New resource to be identified.
Minor	Detectable change to the hydrological/hydrogeological conditions resulting in non-fundamental temporary or permanent change. Potential new supply is required for a temporary period of time.
Negligible	No detectable change to the hydrological / hydrogeological conditions.

- 2.6.14. The likelihood and magnitude of the potential impacts are combined to define the significance of the risk, as shown in **Table 2-3**. This table provides a guide to assist in the decision making but should not be considered a substitute for professional judgement and interpretation. In some circumstances, the magnitude of effects may be uncertain, and professional judgement remains the most effective manner for identifying the potential significance.
- 2.6.15. The significance of the risk considers the successful implementation of the good practice environmental management practices that will be adopted throughout the works. Should the supply still be considered at risk, further details on specific mitigation and/or monitoring recommendations are provided along with the residual risk.

Table 2-3 – Risk Matrix (Combined Risk)

Probability of Impact	Magnitude of Effect			
	Major	Moderate	Minor	Negligible
High	Very High	High	Medium	Medium/ Low
Medium	High	Medium	Medium/ Low	Low
Low	Medium	Medium/ Low	Low	Negligible
Unlikely	Medium/ Low	Low	Negligible	Negligible

- 2.6.16. The risk categories are further defined in **Table 2-4**.

Table 2-4 – Combined Risk Definitions

Risk	Definition
Very High	There is a high probability that significant harm could arise to a designated receptor from an identified hazard at the site without appropriate mitigation.
High	Significant harm is likely to arise to a designated receptor from an identified hazard at the site without appropriate mitigation.
Medium	It is possible that without appropriate mitigation, harm could arise to a designated receptor, but it is relatively unlikely that any such harm would be severe and if any harm were to occur, it is likely that such harm would be relatively mild.
Low	There is a low possibility that harm could arise to a receptor. In the event of such harm being realised, it is not likely to be severe.
Negligible	Harm is unlikely to be realised or perceived.

- 2.6.17. Very high or high risks, as defined in **Table 2-4** above, are likely to constitute Very Large or Large/Very Large effects, as defined in **Table 10-3** of **Chapter 10** of the Draft ES.

3 CONCEPTUAL SITE MODEL

- 3.1.1. For a pollutant linkage to exist, sources, pathways and receptors must align in a manner that facilitates the transmission of a pollutant (or harm) to a receptor. The main impacts that can be imparted upon a PWS receptor is a degradation in water quality or a reduction in quantity.
- 3.1.2. Information concerning the environmental setting of the Proposed Development and the surrounding area is presented in **Chapter 10** of the Draft ES. Based on the assessment, the following CSM has been prepared for the Proposed Development 1 km study area to support the assessment of potential risks to PWS.
- 3.1.3. Geological and hydrogeological information identifies two main groundwater systems; (1) a shallow system that is largely dependent on surface water runoff and is constrained by topography and (2) a deeper system emerging from the underlying bedrock via fractures and faults as well as more permeable sandstone strata. The former may comprise collection zones that obtain surface runoff and shallow throughflow over large areas which are topographically constrained. Groundwater storage within the bedrock is generally limited and controlled by secondary permeability, with more permeable sandstone units acting as the principal groundwater-bearing horizons and intervening mudstones restricting groundwater movement.
- 3.1.4. The principal hydrological pathways are considered to comprise surface runoff and shallow subsurface throughflow within superficial deposits and weathered bedrock. The upland setting, generally thin soils, and widespread areas of exposed or near-surface sandstone bedrock limit groundwater infiltration and storage, thereby promoting rapid runoff generation. Rainfall is therefore expected to migrate predominantly downslope via overland flow and shallow throughflow before discharging to the network of headwater streams and flush zones. This conceptualisation is supported by the numerous springs shown on 1:25,000 scale Ordnance Survey mapping, which are largely controlled by topography. Overall, the Site is characterised by a runoff-dominated hydrological regime, with shallow, topographically controlled throughflow within soils and weathered bedrock. Consequently, surface water catchments are considered an appropriate proxy for understanding groundwater flow patterns and assessing potential hydrogeological connectivity.
- 3.1.5. Where a PWS is sourced from bedrock groundwater via discrete spring rises that are not related to surface water discharge, it is unlikely these will be readily hydrologically connected with areas immediately upslope owing to the complex assemblage of permeable and impermeable strata and interconnecting fractures.

4 SCREENING

4.1 GENERAL

- 4.1.1. An initial review of publicly available information has been undertaken to identify licensed abstractions located within 3 km of the Proposed Development and other potential PWS receptors that may be present within proximity to the Proposed Development identified using OS mapping and aerial imagery. This review has been used to compile a preliminary inventory of potential receptors for consideration within the PWS assessment.
- 4.1.2. Requests for information relating to registered PWS have been submitted to the relevant local authorities, but no responses have been received at the time of writing. The inventory presented within this report is therefore based primarily on publicly available information and should be regarded as preliminary.
- 4.1.3. Following receipt of local authority records, consultation responses and any additional information obtained from landowners and PWS users, the inventory of supplies will be reviewed and updated. A detailed screening exercise will then be undertaken to identify supplies for which a plausible hydrological or hydrogeological linkage to the Proposed Development may exist.
- 4.1.4. The screening assessment will consider factors including:
- Surface water catchment boundaries and channel networks;
 - Aquifer characteristics and potential groundwater flow pathways;
 - Topography and relative elevation;
 - Proximity of abstractions to Proposed Development infrastructure; and
 - Any additional information available relating to abstraction type, source and usage.
- 4.1.5. Supplies for which no plausible source-pathway-receptor linkage can be identified will be screened out from further assessment. Supplies for which a plausible linkage may exist will be taken forward for detailed risk assessment in the Final ES submission.
- 4.1.6. **Table 4-1** presents the preliminary inventory of potential PWS identified from publicly available information.
- 4.1.7. **Figure 10.5** illustrates the locations of licensed abstractions and other potential PWS receptors identified from publicly available information at the time of writing. The figure will be updated as additional information becomes available through consultation and receipt of local authority records.

Table 4-1 – Identified PWS within 3 km of the Proposed Development

Property ID	Property Name	Abstraction Type	Abstraction Grid Reference (Property if unknown*)	Distance to Proposed Development infrastructure (m) (From Property if unknown*)	Potential complete Source-Pathway-Receptor link?	Details	Further Screening / Assessment Required?
647	Pont Rhyd-Y-Cyff	Surface Water	287459, 189463*	Approximately 1.0km downgradient west of southern extent of Proposed Development	Yes	NRW Licensed Abstraction location is indicated to be from watercourse Nant Cwm Du for the purpose of 'production of energy' (hydro-electric power generation). There is no plausible risk anticipated to the continuity of this supply.	No
2358	Bridgend Paper Mill	Surface Water	288030, 187300*	Approximately 2.1km downgradient south of southern extent of Proposed Development	Yes	NRW Licensed Abstraction location is indicated to be from watercourse Llynfi River for the purpose of 'industrial, commercial, public services' (process water). There is no plausible risk anticipated to the continuity of this supply.	No
2359	Bridgend Paper Mill	Surface Water	288030, 187300*	Approximately 2.1km downgradient south of southern extent of Proposed Development	Yes	NRW Licensed Abstraction location is indicated to be from watercourse Llynfi River for the purpose of 'industrial, commercial, public services' (non-evaporative cooling). There is no plausible risk anticipated to the continuity of this supply.	No
2360	Bridgend Paper Mill	Surface Water	288199, 187202*	Approximately 2.2km downgradient south of southern extent of Proposed Development	Yes	NRW Licensed Abstraction location is indicated to be from watercourse Llynfi River for the purpose of 'industrial, commercial, public services' (process water). There is no plausible risk anticipated to the continuity of this supply.	No
2361	Bridgend Paper Mill	Surface Water	288199, 187202*	Approximately 2.2km downgradient south of	Yes	NRW Licensed Abstraction location is indicated to be from watercourse Llynfi River for the purpose of 'industrial, commercial,	No

Property ID	Property Name	Abstraction Type	Abstraction Grid Reference (Property if unknown*)	Distance to Proposed Development infrastructure (m) (From Property if unknown*)	Potential complete Source-Pathway-Receptor link?	Details	Further Screening / Assessment Required?
				southern extent of Proposed Development		public services' (non-evaporative cooling). There is no plausible risk anticipated to the continuity of this supply.	
1	Blaencaerau Farm	Unknown	286968, 194759*	Approximately 1.6km downgradient north of the northern extent of the Proposed Development	Yes	Unknown – property identified on OS mapping as potentially having PWS	Yes
2	Bryn Llefrith	Unknown	285967, 193556*	Approximately 1.0km downgradient north-west of the northern extent of the Proposed Development	Yes	Unknown – property identified on OS mapping as potentially having PWS	Yes
3	Blaen Cwmdu	Unknown	287732, 192126*	Approximately 0.4km downgradient west of the northern extent of the Proposed Development	Yes	Unknown – property identified on OS mapping as potentially having PWS	Yes
4	Bryn Rhug Farm	Unknown	286665, 191850*	Approximately 0.9km downgradient west of the northern extent of the Proposed Development	Yes	Unknown – property identified on OS mapping as potentially having PWS	Yes
5	Bryndefaid	Unknown	288246, 191609*	Approximately 0.4km downgradient west of the central extent of the Proposed Development	Yes	Unknown – property identified on OS mapping as potentially having PWS	Yes
6	Cwmdu isaf	Unknown	287803, 190569*	Approximately 1.0km downgradient west of the central extent of the Proposed Development	Yes	Unknown – property identified on OS mapping as potentially having PWS	Yes

Property ID	Property Name	Abstraction Type	Abstraction Grid Reference (Property if unknown*)	Distance to Proposed Development infrastructure (m) (From Property if unknown*)	Potential complete Source-Pathway-Receptor link?	Details	Further Screening / Assessment Required?
7	Gelliheblig	Unknown	287750, 189609*	Approximately 0.6km downgradient west of the southern extent of the Proposed Development	Yes	Unknown – property identified on OS mapping as potentially having PWS	Yes
8	Cynhordy	Unknown	288280, 189312*	Approximately 0.3km downgradient south-west of the southern extent of the Proposed Development	Yes	Unknown – property identified on OS mapping as potentially having PWS	Yes
9	Cynhordy Farm	Unknown	288417, 188908*	Approximately 0.5km downgradient south of the southern extent of the Proposed Development	Yes	Unknown – property identified on OS mapping as potentially having PWS	Yes
10	Cwmcedfyw	Unknown	288891, 188752*	Approximately 0.6km downgradient south of the southern extent of the Proposed Development	Yes	Unknown – property identified on OS mapping as potentially having PWS	Yes
11	Craig-yr-hudol	Unknown	289176, 188621*	Approximately 0.9km downgradient south of the southern extent of the Proposed Development	Yes	Unknown – property identified on OS mapping as potentially having PWS	Yes

5 RISK ASSESSMENT

5.1 GENERAL

- 5.1.1. The nature of the potential risk to the PWS abstraction is either a reduction in water volume or adverse change in the quality of the water.
- 5.1.2. Risk management techniques involve managing one or more of the components in the Source-Pathway-Receptor chain. Where practical, actual or potential pollutant linkages should be broken to eliminate the risk of a hazard impacting the receptor and where a residual risk remains, management controls and contingency arrangements should be implemented to minimise risks to an acceptable level.
- 5.1.3. The risk assessment process involves identifying the probability of an impact and the likely magnitude of change at the receptor and assumes that embedded and good practice mitigation have been successfully implemented. This is based on a more detailed consideration of a PWS with reference to the CSM presented in **Section 3**. In the event the risk remains elevated, then additional mitigation will be used to further reduce the residual risk.

5.2 HAZARDS

- 5.2.1. The main hazards which can manifest at a PWS are related to degradation in quality or quantity. The specific activities and operations associated with the Proposed Development which have the potential to impact water quality and quantity have been adapted from CIRIA guidance documents³ and are presented below.
- Activities potentially affecting water quality:
 - Accidental discharges of fuels / oils / chemicals as a result of spillages;
 - Accidental discharge of effluent as a result of spillages;
 - Introduction and release of concrete materials;
 - Discharge of sediment from surface water networks; and
 - Accidental damage to the supply delivery infrastructure.
 - Activities potentially affecting water quantity:
 - Modification of overland flow pathways (e.g. installation of new drainage and addition of impermeable surfaces); and
 - Modification of groundwater flow pathways (e.g. removal of superficial sediments, additional of impermeable surfaces, and associated dewatering).
- 5.2.2. Point source pollution may arise from accidental releases of fuels / chemicals / effluent from a discrete location. Such sources may introduce contaminants of potential concern into surface waters

³ ISBN: 978-0-86017-755-5 CIRIA Groundwater control: design and practice (second edition) (C750) (April 2016)

or groundwater depending on the circumstance of the incident. This could include the accidental release of fuels or oils during construction, or the leaching of transformer oils or chemicals from permanent infrastructure such as the on-site substations. Other point source pollution may include the pouring of concrete foundations, or specific discharges from damaged or inadequate drainage networks.

- 5.2.3. Diffuse source pollution may arise from non-point source specific activities such as the discharge of water from drainage networks. In such circumstances, isolated and discrete discharges may not pose a source of contamination; however, cumulatively these can combine to amplify the risk under more confining conditions such as within a watercourse.
- 5.2.4. A full list of the impacts considered to have the potential to effect hydrological receptors arising from the Proposed Development are presented in **Chapter 10: Water Environment** of the Draft ES.

5.3 STANDARD GOOD PRACTICE MITIGATION

- 5.3.1. Good practice mitigation measures will be implemented as outlined in the site-specific Pollution Prevention Plans and Drainage Management Plans as part of the Construction Environmental Management Plan (CEMP) for the Proposed Development. The site-specific CEMP will facilitate the implementation of industry good practice measures in such a manner as to prevent or minimise effects on the surface and groundwater environment.
- 5.3.2. An Outline CEMP summarising good practice mitigation measures relevant to the safeguarding of PWS is provided as part of the ES (see **Appendix 4A**).
- 5.3.3. Prior to construction the appointed contractor may undertake additional investigation to confirm abstraction locations for PWS. Where required, this PWSRA should be updated to accommodate new information.

5.4 ADDITIONAL MEASURES

- 5.4.1. While good practice should assist with mitigating the risks to PWS, some additional measures specific to the risks may be required. Additional measures that may be implemented are described below.

Further Investigation and Demarcation

- 5.4.2. Following completion of the screening and risk assessment process, it may be necessary to undertake further investigation to verify the location of PWS abstraction infrastructure, storage tanks and distribution pipework where uncertainties remain. Such investigations may include review of available records, discussions with supply owners and, where appropriate, non-intrusive survey techniques.
- 5.4.3. Where required, appropriate protection measures will be implemented to safeguard water quality, water quantity and supply continuity. These may include demarcation or protection of abstraction infrastructure, identification of pipe routes, and communication of sensitive infrastructure locations to construction personnel through site inductions, toolbox talks and construction documentation.

Suitable Engineering Solution

- 5.4.4. Following completion of the screening and risk assessment process, it will be determined whether any PWS infrastructure could be affected by the construction, operation or decommissioning of the Proposed Development. Where a risk to PWS infrastructure is identified, appropriate engineering or

construction measures will be developed to maintain the quality, quantity and continuity of the supply. Such measures may include amendments to infrastructure layouts, refinement of construction methodologies, protection of existing supply infrastructure, or the implementation of specific crossing or excavation details where PWS pipework or associated infrastructure is located, in proximity to construction works.

- 5.4.5. The appointed contractor will be responsible for establishing a dialogue with PWS users to ensure the appropriate communication of construction programmes.
- 5.4.6. PWS abstraction locations and associated infrastructure shall be communicated to construction personnel via the provision of detailed mapping and/or toolbox talks conducted by the Principal Contractor.

Alternative Water Supply

- 5.4.7. Where the risk assessment identifies that a PWS could be subject to adverse effects on water quality, water quantity or supply continuity, the need for an alternative water supply will be considered. The requirement for, and nature of, any alternative supply arrangements will be determined following completion of the screening process, consultation, site inspections and detailed risk assessment.
- 5.4.8. Where required, alternative supply arrangements will be developed in consultation with the affected landowner, PWS user and relevant local authority. Potential measures may include temporary water supply provision during construction activities, improvements to existing infrastructure, connection to an alternative potable water source where feasible, or implementation of other suitable measures to maintain water quality, quantity and continuity of supply.
- 5.4.9. Any supply-specific alternative water supply requirements identified through the final assessment will be presented within the Final ES submission and incorporated into a PWS Monitoring Plan and Method Statement (PWSMMS), where appropriate.

5.5 PWS MONITORING & METHOD STATEMENT

- 5.5.1. Prior to construction, a PWSMMS will be prepared detailing all mitigation measures to be delivered to secure the quality, quantity and continuity of water supplies which may be affected by the Proposed Development. The PWSMMS will also contain contact information for the Construction Site Manager (or similar) that will be provided to the PWS User prior to construction. PWS Users will be informed of any planned works that may affect their supply.

MONITORING ARRANGEMENTS

- 5.5.2. A water level and quality monitoring programme will be undertaken prior to and during construction. The PWSMMS shall include water quality sampling methods and shall specify abstraction points. Post-construction monitoring would also be completed to ensure there is no long-term impact on water quality or quantity that could be associated with the Proposed Development.
- 5.5.3. The PWS water monitoring programme will be aligned with the CEMP including the wider surface water or groundwater monitoring programme related to the Proposed Development, i.e. sampling, frequency, and analysis suite (with exception to taste) are matched at the surface water monitoring locations. The document would also outline any site-specific additional mitigation outlined in the PWSRA relevant to each PWS.

- 5.5.4. The monitoring arrangements would be discussed with NRW and the relevant local authorities post-consent. An example monitoring strategy is included in **Annex 10D.2**.

CONTINGENCY ARRANGEMENTS

- 5.5.5. The PWSMMS will also include a pollution response plan and contingency measures that would detail responsibilities and lines of communication between appointed contractor, PWS users and other stakeholders. Contact details (land and mobile numbers / email addresses) for PWS users would be maintained by the appointed contractor at all times.
- 5.5.6. Contingency measures will include details of provisions of alternative water supplies on a temporary and permanent basis in the event of an unforeseen impact on the existing PWS arising from the construction and operation of the Proposed Development as follows:
- Provision of bottled potable water in the event of a short or transient disruption of a water supply (bottled water would be retained on site ready for quick dispatch to any affected property); and
 - Provision of an alternative water source (e.g. spring, borehole, alternative surface water abstraction location) in the very unlikely event of a permanent disruption of a water supply.
- 5.5.7. In the event of an alternative water source being implemented the relevant local authorities would be advised as soon as is practical.

5.6 FURTHER RISK ASSESSMENT SUMMARY

Following completion of data collection, consultation and site verification, supplies with plausible source-pathway-receptor linkages will be taken forward for detailed risk assessment. The results will be presented in **Table 5-1** in the Final ES submission.

Table 5-1 - Risk assessment of PWS sources that could be impacted by the Proposed Development.

ID	Name	Abstraction Type	Probability	Magnitude of Impact	Risk	Mitigation	Residual Risk

6 CONCLUSION

- 6.1.1. A PWSRA is being undertaken to identify and assess PWS that may be affected by the construction, operation and decommissioning of the Proposed Development. At the time of writing, the assessment has been informed by a desk-based review of publicly available information, including licensed abstraction records, mapping, aerial imagery and baseline hydrological and hydrogeological information presented within **Chapter 10: Water Environment**. The information currently available has been used to identify an initial inventory of potential PWS receptors within and surrounding the study area.
- 6.1.2. Requests for information relating to registered PWS have been submitted to the relevant authorities. Additional information will also be sought through consultation with landowners and PWS users and, where appropriate, through targeted site inspections and verification surveys.
- 6.1.3. Following receipt and review of this information, the inventory of identified supplies will be updated and a detailed screening exercise undertaken to identify supplies for which a plausible source-pathway-receptor linkage to the Proposed Development may exist. Supplies identified as requiring further consideration will be taken forward for detailed risk assessment.
- 6.1.4. The final PWSRA will assess potential effects on both water quality and water quantity and will identify any mitigation, monitoring and contingency measures considered necessary to safeguard affected supplies. Where appropriate, these measures will be incorporated into the CEMP and any subsequent PWSMMS.
- 6.1.5. The findings of the detailed screening and risk assessment, together with any proposed mitigation requirements and residual effects, will be presented within the Final ES submission.

Annex 10D.1

COPY OF PWS QUESTIONNAIRE





PRIVATE WATER SUPPLY QUESTIONNAIRE

Your details

Name:

.....

Property name and address:

.....

.....
....

Telephone number and/or email address:

.....

If you are a tenant, please also provide your landlord's contact details:

Name:

.....

Address:

.....

Telephone number and/or email address:

.....

Supply source type *(Please tick or specify if other)*

Borehole (please indicate approx. depth below) ☐ Well ☐ Spring ☐ River ☐

Lake ☐ Pond ☐ Stream ☐ Surface water ☐ Mains (Scottish Water) ☐

Other:

.....

Supply source location

Source of supply known and marked on enclosed map? Yes ☐ No ☐

Approximate grid coordinates of source of supply:

.....

Is water fed into a storage tank or reservoir prior to distribution? Yes ☐ No ☐



If yes, please provide grid coordinates for location of storage tank:

.....

Supply uses *(Please tell us what the water is used for at your property – please tick as appropriate and tell us any other uses not listed)*

Domestic use ☐

Holiday let ☐

B&B/Hotel ☐

Catering ☐

Dairy farm ☐

Brewery ☐

Residential care home ☐

Tenanted property ☐

Livestock drinking water ☐

Other:

Supply usage

Number people supplied (approximately):

.....

Number of animals supplied (approximately):

.....

Type of animals (if applicable):

.....

Approximate volume of water abstracted (m³/day):

.....

Supply water treatment and condition *(Please tick or specify if other)*

Type of water treatment:

Chlorination ☐
☐

UV with pre-filter ☐

UV without pre-filter ☐

Filtration

Other:

.....

Is the water supply checked periodically (for condition and maintenance): Yes ☐ No ☐

Has the supply been risk assessed formally by owner/council/others to date? Yes ☐ No ☐

If so, approximately when was this conducted:

.....



Any comment on the condition/quality/yield of your water supply:

.....

.....
...

.....
...

Supply users

Please provide the addresses of any other properties on the same supply as you, including name and telephone number if known (continue on the enclosed Additional Information Sheet if required):

.....
...

.....
...

.....
...

.....

Annex 10D.2

EXAMPLE MONITORING STRATEGY



Introduction

PWS Monitoring is recommended at properties that maintain a PWS source and where there is a source-pathway-receptor linkage to the Proposed Development.

Preconstruction monitoring can be used to establish baseline water levels and quality, assessment and trigger values to which routine monitoring data collected during construction can be compared against. These can be used to benchmark the effectiveness of pollution mitigation.

The final monitoring arrangements including the analytical suite, locations, frequency and escalation procedure will be outlined in the PWSMS and will be agreed with NRW and the relevant local authorities and is expected to be secured by way of planning condition.

Methodology

PWS Monitoring would be undertaken by an appropriately qualified and experienced contractor.

Monitoring methods will include visual and extractive, with the former comprising pictures and notes on water conditions, weather, pollution, etc. The latter involves the collection of a water sample from the abstraction with analysis at a suitably accredited laboratory. All samples will be dispatched to the laboratory, under chilled conditions accompanied with the relevant chain of custody documentation. All samples will be dispatched to the laboratory within 24 hours of being collected.

An example analytical suite along with trigger values (assessment criteria) against which water quality results should be benchmarked is provided below.

Table B.1 - Example Monitoring Analytical Suite

Parameter	Units	Limit of Detection**	Method	Assessment Criteria*
pH	-	-	Probe	6.5-9.5
Colour	Pt/Co	1	Colorimetric	20
Electrical Conductivity	uS/cm	10	Potentiometric	2500
Alkalinity (as CaCO ₃)	mgCaCO ₃ /L	3	Discrete Analyser	-
Calcium (dissolved)	mg/L	0.012	ICP-OES	-
Magnesium (dissolved)	mg/L	0.005	ICP-OES	-
Potassium (dissolved)	mg/L	0.025	ICP-OES	-
Sodium (dissolved)	mg/L	0.01	ICP-OES	200
Sulphate as SO ₄	mg/L	0.045	ICP-OES	250
Chloride	mg/L	0.15	Discrete Analyser	250
Orthophosphate (as PO ₄)	µg/L	62	Discrete Analyser	-
Nitrate (as NO ₃)	mg/L	0.05	Colorimetric	50

Aluminium (dissolved)	µg/L	1	ICP-MS	200
Selenium (dissolved)	µg/L	0.6	ICP-MS	10
Iron (dissolved)	µg/L	0.004	ICP-OES	200
Manganese (dissolved)	µg/L	0.05	ICP-MS	50
Zinc (dissolved)	µg/L	0.5	ICP-MS	5000
Copper (dissolved)	µg/L	0.5	ICP-MS	10
Suspended Solids	mg/L	2	Gravimetric	-
Turbidity	NTU	1	Spectrophotometry	4
Dissolved Organic Carbon (DOC)	mg/L	0.1	TOC Analyser	-
TPH CWG inc BTEX & MTBE	µg/L	1 - 10	GC/MS	10
Total coliforms	MPN/100ml	0	-	0
E.coli	MPN/100ml	0	-	0
Enterococci	cfu/100mls	0	-	0
<i>*PCV values taken from Statutory Instrument No. 209 - The Private Water Supplies (Scotland) Regulations 2006. Available at https://www.legislation.gov.uk/ssi/2006/209/pdfs/ssi_20060209_en.pdf (accessed May 2024).</i> <i>Total Petroleum Hydrocarbon Criteria Working Group (TPH CWG) PCV value taken from Statutory Instrument No. 2790 – The Private Water Supplies Regulations 1991 (revoked). Available at http://www.legislation.gov.uk/ukssi/1991/2790/made (accessed May 2024).</i>				
<i>**Actual LOD may vary and can be confirmed with the nominated laboratory if required by the LPA</i>				

Frequency and Duration

During the baseline (pre-construction) monitoring, at least six monitoring visits should be undertaken across a minimum of six months and ideally capture a variety of flow and weather conditions. During the construction phase, monitoring should be monthly, but additional ad-hoc monitoring may also be required in the event of a spurious result or pollution incident. A period of post-construction monitoring should be undertaken with the frequency and duration subject to consultation with NRW and the relevant local authorities.

Reporting

Reports summarising the results of water monitoring should be provided following the completion of each phase. Additional reporting requirements during the construction phase may be subject to consultation with NRW and the relevant local authorities.

Trigger Levels and Escalation Procedures

Trigger levels refer to monitoring parameter threshold values, indicative of an environmental incident that may affect a PWS, at which actions must be taken. Actions could also be required following the reporting of an incident by the Principal Contractor. In the event of a potential incident or trigger level being reached, the Principal Contractor and the Environmental Clerk of Works (EnvCoW) would undertake a preliminary assessment to decide whether an incident requires an immediate stop to works. This should be undertaken as soon as possible following an incident being reported. In the event of a stop to works, a proportionate investigation should be undertaken to determine the cause for the impact and complete actions to minimise / mitigate any effects. Communication of any incident potentially affecting a PWS should be undertaken by the Project Manager or delegated representative as soon as possible. Depending on the scale of the incident, NRW and the relevant local authorities may also need to be notified.

It is not proposed that the results of monitoring would trigger suspension of the construction works unless the results of the above assessment indicated a high risk to water quality if work is continued. Where exceedances have been recorded, a re-test of the samples may be requested, or confirmatory samples collected for confirmation of water quality degradation. This protocol should be included to avoid unnecessary cessation of site works on the basis of single results. Should works be suspended as a result of the monitoring values, the source of the problem would be investigated with emergency monitoring being undertaken and will continue whilst mitigation measures are being implemented. The duration of emergency monitoring will be determined based on the severity of the incident and following consultation with the Principal Contractor and the EnvCoW, and works would resume following consultation and approval with NRW and the relevant local authorities.



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