

Annex M - Private Water Supply Risk Assessment

September 2022





ARCUS

CRAIG MURRAIL SUBSTATION

**ANNEX M
PRIVATE WATER SUPPLY RISK ASSESSMENT**

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1 INTRODUCTION AND BACKGROUND

1.1 Overview

Arcus Consultancy Services Limited (Arcus), on behalf of SSEN Transmission (the Applicant) have carried out a Private Water Supply Risk Assessment (PWSRA) in relation to properties with Private Water Supplies (PWS) within the area surrounding Craig Murrail Substation (the Project).

The Development is located approximately 3 km north-east of Lochgilphead, via a forestry access track off the A816, within the Argyll and Bute Council (ABC) area. The location of the Project is shown on **Figure 6.1** within the Environmental Appraisal.

This risk assessment forms **Annex M** to the Craig Murrail Environmental Appraisal, **Chapter 6: Hydrology, Hydrogeology and Geology**.

1.2 Project Description

The Applicant proposes to construct a new 275 kV electricity substation in addition to the construction of a section of new overhead line (OHL) and two new towers to make connections in the vicinity of the existing Craig Murrail substation (located at National Grid Reference 187725 691030), as well as the construction of two temporary access tracks and two new permanent access tracks. This upgrade is required for the existing substation to meet current specification and standards and provide reinforcement to the existing network which will support the continued generation of renewable energy.

The new substation and accompanying infrastructure aspects (hereby known as the Proposed Development) will be subject to Town and Country Planning, while the OHL Tie ins and accompanying towers (hereby known as the Associated Development) will be submitted for Section 37 consent.

1.3 Scope of Assessment

The assessment considers Private Water Supplies within 2 km of the Project, indicated by the Private Water Supply Study Area on **Figure 6.1** of the Environmental Appraisal.

The Project will be accessed by an existing forestry access track to the south which is regularly used for operational activities. This existing forestry track has not been identified for upgrades at the time of reporting, but for the purposes of this assessment will be included should any further upgrades be identified.

1.4 Drainage Impact Assessment

The Drainage Impact Assessment (**Annex K**) provides information on the surface water drainage options for the Project. It is currently proposed that the substation will be underlain by a permeable platform underlain by capping to depths of 1 m, with an area of 2.9 ha. The free draining nature of the platform enables the platform to be utilised for surface water attenuation at the location of the Proposed Development. The impermeable areas within the Proposed Development will be connected to an attenuation pond to the north east of the Site via a piped filter drain system. The pond will enable surface water to be intercepted in accordance with existing topography and flow routes from west to east at the location of the Proposed Development. The outfall to the open land drain is located within the extents of the application boundary of the Proposed Development

2 PRIVATE WATER SUPPLY RISK ASSESSMENT

2.1 Methodology

The Arcus methodology for this PWSRA has been developed historically in conjunction with SEPA and reviewed by several Scottish local authorities. This includes:

- Identification of PWS through consultation with ABC within 2 km of the Private Water Supply Study Area and review of other potential PWS identified using Ordnance Survey (OS) 1:25,000 raster mapping;
- Resident or property owner consultation via letter to those properties identified to be supplied by a PWS;
- A site walkover to verify location and type of PWS;
- Identify the source of water feeding the water supply and its catchment;
- Identify proposed infrastructure and construction activities within the catchment or in proximity to the water supply and its infrastructure (*e.g.* pipes) if required;
- Identify the potential effect on the water supply *i.e.* whether construction of the Development has the potential to change the quality and/or quantity of water at the receptor;
- Determine whether the PWS is at risk; and
- Outline mitigation techniques that will be implemented to minimise any potential impact of construction and operation on drinking water quality, if required.

Where conflicting information has been provided by the supply owner and local authority, information provided by the supply owner has been used.

2.1.1 Legislation and Guidance

The procedure for identifying and risk assessing PWS is based on the following legislation and guidance:

- The Water Quality (Scotland) Regulations 2010 (WQ Regulations);
- The Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017 ('the Regulations')²;
- The Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017 - Guidance for Local Authorities (v4.0)³;
- Water Environment (Controlled Activities) (Scotland) Regulations 2011⁴; and
- Scottish Environment protection Agency (SEPA) Land Use Planning System Guidance Note 31 2017 v3.0 (LUPS-GU31)⁵.

The PWSRA will assess the risk for all PWS which are located within the following categories outlined by SEPA LUPS-GU31 guidance:

- Groundwater abstractions within 100 m radius of all excavations less than 1 m in depth; and
- Groundwater abstractions within 250 m of all excavations deeper than 1 m.

¹ The Water Quality (Scotland) Regulations 2010 [Online] Available at: <http://www.legislation.gov.uk/ssi/2010/95/contents/made> [Accessed 11/03/2022].

² UK Government (2017) The Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017. Available at: <http://www.legislation.gov.uk/ssi/2017/282/contents/made> [Accessed 11/03/2022].

³ DWQR (2019) The Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017: Guidance for Local Authorities Ver 4.0. Available at: <https://dwqr.scot/media/42030/the-water-intended-for-human-consumption-private-supplies-scotland-regulations-2017-guidance-v4-feb-2019-as-issued.pdf> [Accessed 11/03/2022].

⁴ UK Government (2011) The Water Environment (Controlled Activities) (Scotland) Regulations 2011. Available at: <http://www.legislation.gov.uk/ssi/2011/209/contents/made> Accessed on: [Accessed 11/03/2022].

⁵ SEPA (2017) Land Use Planning System (LUPS) SEPA Guidance Note 31 v3.0. Available at: <https://www.sepa.org.uk/library/content-search/?q=LUPS-GU31&LibGo=Search&page=1> [Accessed 11/03/2022].

2.2 Consultation

2.2.1 Identification of Private Water Supplies through Consultation

On 12th November 2021, a Freedom of information (FoI) request was submitted to Argyll and Bute Council (ABC) to acquire information on registered PWS located within a 2 km radius of the Project.

The FoI response from ABC provided data on all PWS located within the ABC area. The data was georeferenced by an Arcus Hydrologist using ArcGIS Pro to identify those located within a 2 km buffer (‘the Study Area’) of the Project. This process identified seven PWS to be located within the Study Area and are shown on **Figure 6.3** of the Environmental Appraisal. The seven properties identified through this consultation are:

- Badden Farm;
- Blarbuie Farm;
- Cairnbaan Cottage;
- Druimnagaoithe;
- Dunamuck Croft;
- Woodglen; and
- Auchoish.

Consultation with residents and landowners of the aforementioned properties with PWS was conducted on 10 December 2021. A second letter was sent to properties who did not reply to the first round of letters. The second round of letter were sent out on the 4 March 2022. The consultation process was conducted by posting a letter and questionnaire to residents to obtain further information on the PWS supplying their property, as well as a corresponding map indicating the location of each PWS supply. The questionnaire and reasoning for each of the questions are outlined in **Table 1** below.

Table 1: Resident Consultation Questionnaire and Reasoning

Question	Reasoning
Type of supply (with list of options)	Allows for identification of the likely PWS source water and provide an understanding of its potential connectivity to the Development, and developing a source-pathway-receptor model. This allows for an initial level of sensitivity to be applied to the PWS source as part of the final risk assessment.
Use of supply	Aids in developing the source-pathway-receptor model and conceptual site model. Also to attribute sensitivity for the final risk assessment. Also provides information on the likely volumes of water abstracted at the PWS.
Type of water treatment	Understanding of the baseline vulnerability of the source and existing protection measures in place.
Number of people supplied	Provides information on the likely volumes of water abstracted at the PWS. Also helps to attribute sensitivity for the final risk assessment. It is acknowledged that this number can vary, particularly if the PWS supplies a commercial property.
Number of livestock supplied	Provides information on the likely volumes of water abstracted at the PWS. Also to attribute sensitivity for the final risk assessment. It is acknowledged that this number can vary seasonally.

Question	Reasoning
Volume of water abstracted (m³)	<p>Allows for initial assessment on the catchment or 'zone of influence' of the water supply. This is the likely area the supply is draining water from. This informs an understanding of the PWS potential connectivity to the Development.</p> <p>For example, a large groundwater abstraction further from the Development may be hydrologically connected due to its larger zone of influence. A smaller abstraction, closer to the Development, may not be hydrologically connected because it has a very small zone of influence. It is acknowledged that this is often unknown or estimated by residents.</p>
Any comment of the condition of your water supply	<p>This informs an understanding of the existing level of vulnerability of the PWS and potential need for additional protection measures.</p> <p>For example, PWS that have previously been influenced by quantity reductions during drought periods may be more vulnerable than those who have not experienced this.</p> <p>Any information regarding previous water quality issues or quantity issues can inform an understanding of where the water is likely to be sourced from and the pathway it takes to get to the property.</p>

2.3 Site Visit

Following consultation with ABC and SSEN, a hydrological site walkover focusing on properties that may have potential hydrological connectivity to the Project was carried out on 15th March 2022. Information was collected from the residents in line with the requirements set out in **Table 1** if a supply was present.

2.4 Review of properties consulted

Table 2 below outlines the properties consulted either by letter or visited during site walkovers.

Table 2: Properties with potential PWS within PWS Study Area

Properties	Grid Reference	Distance from Development	Supply present / type	Comment
Badden Farm	186334 688683	1.43 km south of Site	No	During PWS visit, resident confirmed that the property was previously served by a PWS which is no longer in use. PWS scoped out of further assessment.
Blarbuie Farm Blarbuie House	187821 688989	1.57 km south of Site	Yes – surface water	Letter response received from residents – supply fed from Blarbuie reservoir. Private water supply scoped into assessment.
Cairnbaan Cottages	182969 690862	1.34 km west of Site	Unknown	PWS hydrologically disconnected by intervening topography and is situated in a separate hydrological catchment from the access tracks. PWS scoped out of further assessment

Properties	Grid Reference	Distance from Development	Supply present / type	Comment
Druimnagaoithe	185609 690163	650 m south of the Site	No	Residents confirmed property is on mains supply during site visit. PWS scoped out of further assessment.
Dunamuck Croft	184166 691149	215 m north west of Site	Unknown	PWS is located upslope of Project access tracks and is therefore hydrologically disconnected. PWS scoped out of further assessment.
Woodglen	182732 690985	1.58 km west of the Site	Unknown	PWS hydrologically disconnected by intervening topography and is situated in a separate hydrological catchment from the access tracks. PWS scoped out of further assessment
Auchoish	186732 690381	381 m south of Site	Yes – surface water	Letter response received by Arcus from residents previously in relation to nearby project. Supply is located downslope of the existing access tracks. Private water supply scoped into assessment.

The following private water supplies have therefore been scoped into further assessment:

- PWS Auchoish
- PWS Blarbuie Farm.

3 RISK ASSESSMENT

3.1 Introduction

A PWSRA was undertaken in accordance with 'Guidance on Assessing the Impacts of Windfarm Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems' – whilst this guidance is primarily for windfarm developments, the principles outlined within assessment of impacts to new infrastructure projects can be used for reference⁶. The summary of the risk assessment of properties with PWS within 2 km of the Project is provided in **Table 6**.

The risk assessment reviewed desk-based information associated with PWS, including geological maps, historical maps and surface water catchments. Where locations of the PWS water source are provided, this detail was overlain with mapped infrastructure associated with the Project to inform an initial source-pathway-receptor model.

Following the initial desk-based review, PWS and associated properties are identified as potentially 'at-risk' or 'not at-risk' from the Project. The level of risk is attributed to each of the PWS based on the sensitivity level of the receptor (source water, distribution infrastructure and point of supply), the criteria of which is outlined in **Table 3**, combined with the level of magnitude of impact, for which the criteria is outline in **Table 4**.

The resultant level of risk is based on the risk matrix outlined in **Table 5**.

Table 3. Estimating the Sensitivity of Receptors

Sensitivity of Receptor	Definition
High	The hydrological receptor will support abstractions for public water supply, or private water abstractions for domestic supply and / or 100 livestock (at any given point in the year) and/ or is used for the mass-production of food and drinks.
Medium	Hydrological receptor supports abstractions for PWS for limited agricultural use (at any given point in the year), or where mains water supply is available.
Low	The hydrological receptor does not support abstractions for public water supply or private water abstractions
Negligible	The receptor is resistant to change and is of little environmental value.

Table 4. Magnitude of Potential Impacts

Magnitude of Change	Description
High	A major permanent or long-term negative change to groundwater quality or available yield.
Medium	The yield of existing supplies may be reduced or quality slightly deteriorated.
Low	Any changes to quality, quantity or continuity do not result in a perceptible alteration to baseline conditions.
Negligible	No effect from Development to water quality, quantity or continuity on the basis of non-existent pathway in the 'source-pathway-receptor' model (this may be determined following avoidance and / or mitigation measures).

⁶ SEPA (2014) *Guidance on Assessing the Impacts of Windfarm Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems* [Online]. Available at: http://www.sepa.org.uk/media/143868/lupsgu31_planning_guidance_on_groundwater_abstractions.pdf [Accessed 07/01/2022].

Table 5. Risk Matrix

Magnitude of Effect	Sensitivity of Resource or Receptor				
	Very High	High	Medium	Low	Negligible
High	Major	Major	Moderate	Moderate	Minor
Medium	Major	Moderate	Moderate	Minor	Negligible
Low	Moderate	Moderate	Minor	Negligible	Negligible
Negligible	Minor	Minor	Negligible	Negligible	Negligible

3.2 Identification of PWS

The details of the identified PWS and their hydrological connectivity to the Project are outlined in **Table 6** below, based upon a desk-based risk assessment, letter and questionnaire (consultation) responses and the site walkover.

Table 6. Confirmed Private Water Supplies

Grid Reference (of supply)	PWS Auchoish	PWS Blarbuie Farm
Source Distance to Infrastructure	263 m south of existing access tracks 0.8 km south-west of the new access tracks	2 km south of existing access tracks 2.05 km south of new access tracks
Source of supply (type)	Small reservoir fed by two existing burns	Reservoir
Use(s)	Domestic	Domestic
PWS Type	Domestic	Domestic
Surface Water catchment	Unnamed tributary of the Auchoish Burn (within wider Badden Burn catchment)	Blarbuie Burn

Based on the criteria in **Table 3** both PWS Auchoish and PWS Blarbuie Farm are of a **high** sensitivity as they are domestic supplies.

3.3 Potential Hydrological connectivity

3.3.1 Introduction

The sections below provide a review of potential hydrogeological connectivity between the Development and each supply. The conceptual site model (source, pathway, receptor) approach is outlined below:

- **Source** – pollutants or sediment from the site during construction or during operation phases (should drainage system fail, however this is very unlikely);
- **Pathway** – as the Project includes a drainage system, any run-off would capture, treat and discharge run-off to the nearest watercourse in line with the Drainage Assessment. Therefore, these pathways would consider the following construction phase impacts:
 - Run-off via overland flow; and
 - Infiltration into the underlying superficial and bedrock aquifers.

- **Receptor** – each private water supply is considered as a receptor within this assessment.

Figure 6.3 shows the location of each private water supply in relation to the project and the hydrological catchments that they are located in.

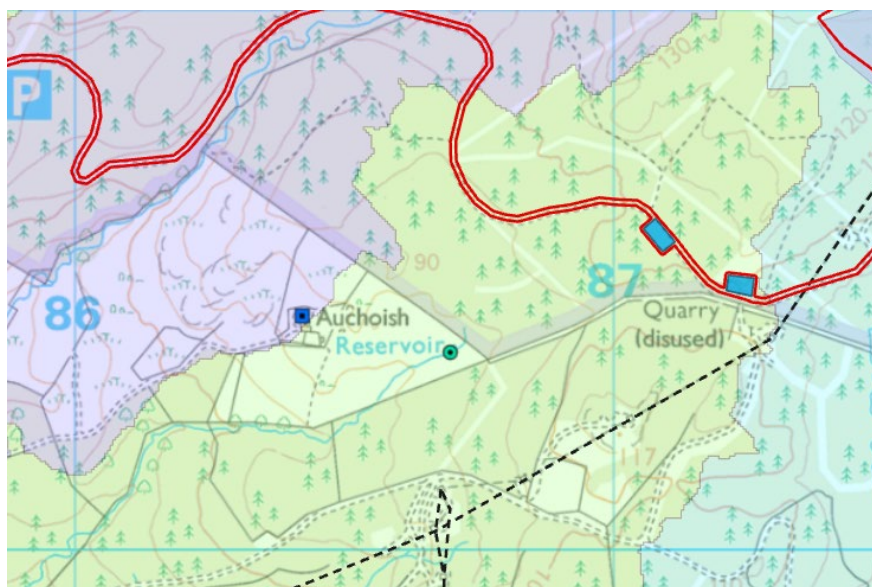
3.3.2 PWS Auchoish

Information was provided to Arcus through private water supply consultation. The letter response confirmed a PWS is present at Auchoish and in use at the property. A PWS inspection was attempted during the Site visit, however the property was unoccupied and so visual inspection was not possible.

The source of the PWS (located at NR 86700 90362) is stated to be a small reservoir along fed by two small streams (feeder streams of Auchoish Burn), approximately 284 m east of the property as shown in Plate 3.1. The figure shows the source (green circle) feeds into two holding tanks before being supplied to the property (blue circle) in relation to the PWS source located at a small reservoir approximately 284 m east of the property. The supply has a UV filter as well as three sediment filters and is for domestic use.

Consultation feedback highlighted that the supply has suffered from discoloration and contamination of the water supply during construction of the existing access tracks.

Plate 3.1 PWS Auchoish



The PWS is hydrologically disconnected from the substation works associated with the Proposed Substation development, as well as the construction of the OHL (the Associated Development) as these works are located within the Dippin Burn. However, the supply located downslope of the existing access tracks where there may be track upgrades and the presence of two temporary construction areas (shown on **Figure 3.1** as two blue rectangles) located within the wider Baden Burn catchment.

The construction of the temporary working areas will be limited in its construction, with vehicles and plants using both the track and temporary working areas during the construction phase. Excavation works in these areas are likely to be limited in depth (circa 1m depth).

There is potential for impacts to water quality during the construction phase, however, mitigation in place outlined within the Water Construction Management Plan (**Annex N**) including the provision of surface water quality monitoring and good practice measures on site will reduce the magnitude of these impacts. In relation to water quantity, due to their

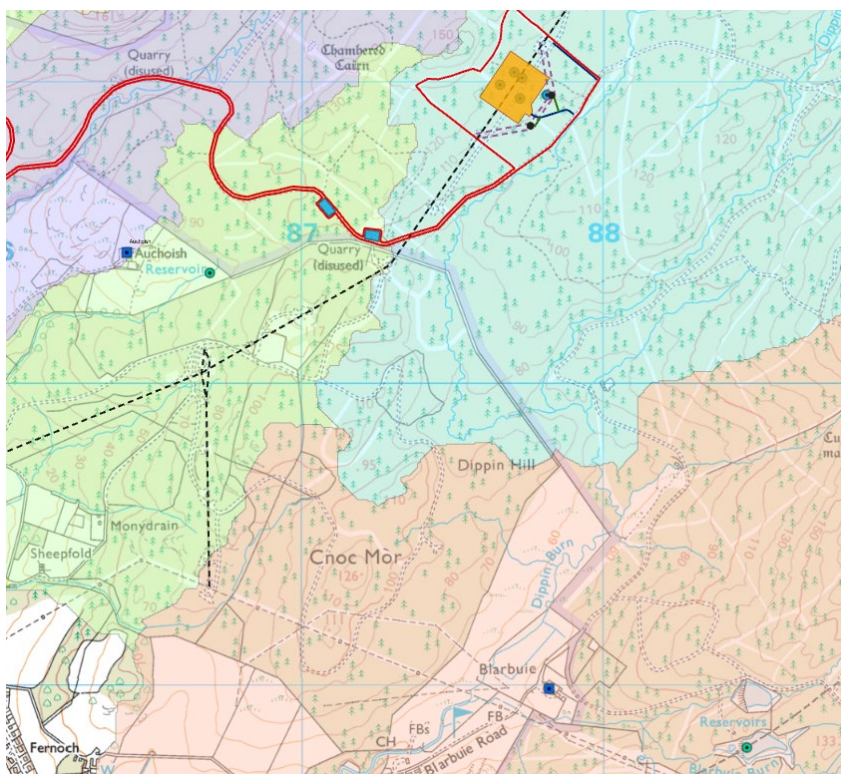
location within the catchment there is unlikely to be any noticeable changes in flow with no localised changes in hydrological flow around the two areas of hardstanding.

Based on the embedded mitigation above, there would be a **Negligible** magnitude with a resulting **Minor** effect.

3.3.3 PWS Blarbuie Farm

Information was provided to Arcus via a returned consultation letter. The letter stated that there was a single PWS in use, the source of which was Blarbuie Reservoir (grid reference: NR 88479 88791) located 690 m south-east of the property as shown in **Plate 3.2**. Water is served to these properties via pipe which runs from the reservoir. The response confirms the supply feeds two properties, Blarbuie House and Blarbuie Farm, for domestic supply use. The source is located 2 km south-east of the Project but is hydrologically disconnected from the development by the Dippin Burn.

Plate 3.2 PWS Blarbuie Farm



As a result, there is a **Negligible** magnitude on the supply on the basis that there is no complete pollutant pathway with a **Negligible/Minor** effect.

4 PROVISION OF MEASURES TO MINIMISE THE IMPACT ON DRINKING WATER QUALITY DURING CONSTRUCTION

The desk-based PWSRA identified PWS Auchoish as a drinking water receptor within 2 km of the Project with a hydrological connection, with the supplies at the other six properties scoped out from further assessment.

Industry good practice measures will be implemented at the Project to protect the water environment for PWS Auchoish. Full details of water management measures and mitigation are provided within the Water Construction and Environmental Management Plan (WCEMP) (**Annex N**) for the Project. This includes a full surface water monitoring programme and mitigation measures throughout the construction phase to manage risks relating to pollution, sediment and water quality.

5 SUMMARY

The PWSRA identified seven properties within 2km which may have a PWS – all identified through consultation with Argyll and Bute Council. Six supplies within 2km were scoped out at baseline or through assessment as having no hydrological connection to the Proposed Development.

Further consultation is required with landowners to determine the timing of any future works within the catchment to ensure there are no cumulative effects and existing water quality issues are resolved.

The PWSRA concludes that the surface water fed supply at PWS Auchoish is hydrologically connected to the Project. Through the implementation of measures summarised in Section 4 and outlined fully in **Annex N**, the resulting effects on the supply will be **Negligible**.