

Annex L - Private Water Supply Risk Assessment

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ARCUS

AN SUIDHE SUBSTATION

**ANNEX L
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 produced a Private Water Supply Risk Assessment (PWSRA) which contains an assessment relating to properties with Private Water Supplies (PWS) within the area surrounding An Suidhe Substation and OHL (overhead line) Tie Ins (the Project).

The Project is located approximately 5 km south-west of Inveraray, immediately north of the A83, neighbouring the existing An Suidhe Substation and within the Argyll and Bute Council (ABC) area. The location of the Project is shown on **Figure 1.1** within the Environmental Appraisal.

This risk assessment forms Annex L to the An Suidhe Environmental Appraisal, **Chapter 6: Hydrology, Hydrogeology and Geology Appraisal**.

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 six new towers to make connections in the vicinity of the existing An Suidhe substation (located at National Grid Reference 204861 705524). This upgrade is required for the existing substation to 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 where no upgrades are required. The Environmental Appraisal confirms that effects relating to the use of the access track during both the construction and operational phase has been scoped out of potential effects.

This risk assessment therefore does not cover supplies within 2 km of the access route.

1.4 Drainage Impact Assessment

The Drainage Impact Assessment (**Annex J**) provides information on the surface water drainage options for the Proposed Development. It is currently proposed that 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 outfall to the open land drain is located within the extents of the application boundary of the Proposed Development. The Proposed Development will be unoccupied throughout the operational phase excluding ad hoc maintenance visits and will therefore not require a main connected foul water drainage solution.

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;
- Consultation with land agents via a consultation form;
- A site walkover to verify location and type of PWS (where required);
- 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 2010¹ (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 12 November 2021, a Freedom of information (FoI) request was submitted to ABC to acquire information on registered PWS located within a 2 km radius of the Hydrology Study Area (shown in **Figure 6.1**).

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 PWS Study Area') of the Project. This process identified two PWS to be located within the Private Water Supply Study Area and are shown on **Figure 6.5** of the Environmental Appraisal. The two properties identified through this consultation are:

- Kilbride Chalet; and
- Saunach Kennels.

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 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 Study Area

| Property | Grid Reference | Distance from the Project | Supply Present? | Comment |
|--------------------|------------------|--|-----------------|--|
| 2 Kilbride Cottage | 207070 705215 | 1.99 km east of the Project and on raised topography (130 m AOD) | No | Property scoped out of assessment. Resident confirmed on mains supply. |
| Saunach Kennels | 206184 705024 | 1.2 km south east and Downslope of the Project (40 m AOD) | Yes | Private water supply scoped into assessment Confirmation required supply not abstracting from Douglas Water. |

As outlined in the **Table 2**, 2 Kilbride Cottage has been scoped out of further assessment as the property was confirmed to be on a mains water supply. As no response was received from Saunach Kennels, the location of the potential PWS source was unknown and so further assessment has been undertaken below.

2.4 Site Visit

Following consultation with ABC, a hydrological site walkover focusing on properties that may have potential hydrological connectivity to the Project was carried out on 15 March 2022. One property was visited (Saunach Kennels).

Information was collected from the residents, in line with the requirements set out in **Table 1** if a supply was present.

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 change, 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: Criteria for Sensitivity of Receptors

| Sensitivity of Receptor | Definition |
|-------------------------|---|
| High | The hydrological receptor will support abstractions for public water supply, or private water abstractions which supply more than 25 people 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: Criteria for Magnitude of Change

| 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 Change | Sensitivity of Resource or Receptor | | | |
|---------------------|-------------------------------------|------------|------------|------------|
| | High | Medium | Low | Negligible |
| High | Major | Moderate | Moderate | Minor |
| Medium | Moderate | Moderate | Minor | Negligible |
| Low | Moderate | Minor | Negligible | Negligible |
| Negligible | 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

| PWS Name | PWS Saunach kennels |
|-----------------------------------|---|
| Distance to Infrastructure | Approximately 1.2 km south east and downslope of the Project |
| Source of supply (type) | Spring |
| Use(s) | Domestic |
| PWS Type | Type B |
| Bedrock Geology | Ardrihaig phyllite formation - semipelite, calcareous |
| Superficial Deposits | Till Devensian Diamicton |
| Hydrogeology | Low productivity aquifer. Small amounts of groundwater in near surface weathered zone and secondary fractures and rare springs. |
| Groundwater Classification | Good |

3.3 Potential Hydrogeological Connectivity

3.3.1 Introduction

The section below provides a review of potential hydrogeological connectivity between the Project and PWS at Saunach Kennels. The conceptual site model (source, pathway, receptor) approach is outlined below:

- **Source** – pollutants or sediment from both the substation and overhead line elements of the Project during construction or during operation phases (should drainage system fail);
- **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** – the PWS is considered as a receptor within this assessment.

3.3.2 PWS Saunach Kennels

The supply was confirmed to be for domestic use only to one property. The PWS source was located approximately 340 m north of the property in a field used for agricultural

purposes. The source was confirmed to be an underground spring which collected into a storage tank before being connected to the property via an underground pipe which connects to the property to the south.

The source is located approximately 1.1 km south east of the Project and has been disconnected from the Project by the Douglas Water. Therefore, due to the intervening topography and hydrological features there is no hydrological or hydrogeological connectivity (pathway) between the Project and Saunach Kennels PWS (the Receptor) therefore no further risk assessment required.

3.4 Summary

A review of the baseline conditions and information supplied during the PWS site visit for Saunach Kennels in relation to the Project confirms there is no hydrological connectivity.

4 SUMMARY

This PWSRA identified two properties within 2 km which may have a PWS. One property was scoped out during the consultation stage of the PWSRA.

The PWSRA concludes that the PWS at Saunach Kennels is hydrologically disconnected from the Project due to the location from the Project and intervening hydrological features, specifically, Douglas Water, which acts as a hydrological barrier between the PWS and the Project.

On this basis, this PWSRA concludes that the PWS identified is not hydrologically connected to the Project, and therefore will be no effect from the Project to the PWS water quality, quantity or continuity, on the basis of a non-existent pathway in the 'source-pathway-receptor' model.