Killean Wind Farm

Technical Appendix 9.4: Private Water Supply Risk Assessment

Renewable Energy Services Ltd

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1.0 Introduction

This Technical Appendix should be read in conjunction with Chapter 9: Geology, Hydrology and Hydrogeological Assessment of the EIA Report which contains a detailed description of the local hydrology and hydrogeology, flow mechanisms and hydraulic properties of the soils and geology, the embedded mitigation incorporated in the development design, and an assessment of impacts on groundwater and surface water flows and quality.

It considers the potential effects of the Proposed Development on the quality and quantity of water at the Private Water Supply (PWS) sources within the study area which comprises a buffer of 500m from the site boundary as proposed in the Scoping Report. To complete the assessment a conceptual site model is presented which uses a source-pathway-receptor linkage which is used to assess the risk to each PWS. Where necessary mitigation is proposed.

Following consultation with Argyll and Bute Council (ABC) data was received for PWS sources within the study area. This data was then augmented with Ordnance Survey mapping and aerial photography. Additional properties, and potential water users, were also identified following a programme of site-specific field investigation that involved visiting the properties, enquiring about their water use and source, and mapping water abstraction locations.

The location of water sources (boreholes, springs, surface abstractions, etc.) and holding tanks etc. were recorded using a handheld GPS. When residents were unavailable on the day that the survey was conducted, questionnaires were left at properties requesting details of their water source or PWS were provided.

The field investigation was completed in March 2024 by the author of this report. The results of the PWS survey and assessment are presented in Section 2 of this report.

The location of PWS sources is shown on Figure 9.4.1 appended.

Section 3 of this report gives detail of a potential water monitoring schedule and parameter list that could be used to monitor water quality at receptors that have a hydraulic linkage (e.g. pathway) to the Proposed Development. The monitoring frequency, parameter list and reporting programme would be subject to agreement with ABC and the Scottish Environment Protection Agency (SEPA) should consent be granted, and it is expected would be secured by an appropriately worded pre-commencement planning condition.

2.0 Private Water Supply Risk Assessment

Table 2-1 presents information collected from the PWS survey, returned questionnaires, public consultation events, ABC, and desk study. If a source is assessed to have a hydraulic connection (e.g. there is a pathway) to the Proposed Development, mitigation measures have been proposed.

The risk assessment has been completed with reference to SEPA's LUPS-31 guidance[1].

The findings from Table 2-1 can be summarised as follows:

- no confirmed PWS sources are potentially at risk from the Proposed Development;
- the distribution pipework associated with one PWS is potentially at risk from the Proposed Development;
- two properties have confirmed to be on mains; and
- the water supply to three properties, including the properties within Killean Estate, have not been confirmed, however, water supplies to these properties, if present, are not considered to be at risk from the Proposed Development.

Table 2-1: Private Water Supply Risk Assessment

PWS ID (Figure 9.4.1)	Property Name	Data Source and PWS Source Type	Location of PWS Source and Distance from Proposed Development	Details	Potential Complete Source – Pathway – Receptor Linkage	Mitigation and Monitoring
PWS01	Culfuar Farm	Site visit Spring	E 170759 / N 645019 Approximately 340m north of existing access track.	The property is currently derelict and unoccupied. It was confirmed during the site visit the property benefited from a spring fed PWS source. The PWS source is located adjacent to an unnamed tributary of the Killean Burn and therefore water within the spring is likely to be hydraulically connected to the stream.	× PWS source and pipework not considered to be at risk.	None.

[1] SEPA (2017) Land Use Planning System, SEPA Guidance Note 31, Guidance on Assessing the Impacts on Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems, Version 3

PWS ID (Figure 9.4.1)	Property Name	Data Source and PWS Source Type	Location of PWS Source and Distance from Proposed Development	Details	Potential Complete Source – Pathway – Receptor Linkage	Mitigation and Monitoring
				No development is located upstream nor within 250m of the spring. The distribution pipework will also not be affected by the Proposed Development. Therefore, the PWS is not considered to be at risk.		
PWS02	Kilmory	Previous Assessment Stream	E 170583 / N 644955 Approximately 180m north of existing access track	Residents were unavailable and questionnaire not returned at the time of reporting. The previous Killean wind farm planning application states that the property is supplied by a stream fed PWS source. The abstraction takes water from an unnamed tributary of the Killean Burn, the location of which was verified during a site survey. Pipes from the source follow the burn southwards to the existing track before heading west towards the property. No development is located upstream of the PWS source, however, the pipework runs alongside an existing track which may be upgraded as part of the Proposed Development. Given the proximity of the pipework to the track the pipework may be at risk from the Proposed Development.	✓ Distribution pipework only.	Water distribution pipework to be clearly marked and protected.
PWS03	Cruchan Cottage	Returned Questionnaire	E 170098 / N 645397 (property location)	The residents have confirmed that the property benefits from a mains supply.	N/A	None.

PWS ID (Figure 9.4.1)	Property Name	Data Source and PWS Source Type	Location of PWS Source and Distance from Proposed Development	Details	Potential Complete Source – Pathway – Receptor Linkage	Mitigation and Monitoring
		Mains	Approximately 320m north of the proposed access point off A83.			
PWS04	Keeper's Cottage Boatman's Cottage Dolls House	Site visit Mains	E 169616 / N 645143 E 169580 / N 644661 (property locations) Approximately 40m south-west of existing access track.	The residents have confirmed that the properties (four in total) are supplied by mains supply.	N/A	None.
PWS05	Old Mission Cottage	Unconfirmed	E 169578 / N 644617 (property location) Approximately 60m south-west of existing access track.	Residents unavailable and questionnaire not returned at the time of reporting. ABC and previous assessments undertaken at the site do not show that the property is supplied by a PWS. Neighbouring properties are supplied by mains and Scottish Water infrastructure was noted along the A83 near the property. It is therefore considered likely that the property is supplied by mains, although this is unconfirmed. In addition, the property is located approximately 2.5km from the nearest turbine and in a different water catchment..	× PWS source and pipework not considered to be at risk.	None.
PWS06	Caravan	Unconfirmed	E 169609 / N 644606 (property location)	Residents unavailable and questionnaire not returned at the time of reporting. ABC and previous assessments undertaken at the site do not show	× PWS source and pipework not	None.

PWS ID (Figure 9.4.1)	Property Name	Data Source and PWS Source Type	Location of PWS Source and Distance from Proposed Development	Details	Potential Complete Source – Pathway – Receptor Linkage	Mitigation and Monitoring
			Approximately 50m south-west of existing access track.	that the property is supplied by a PWS. Neighbouring properties are supplied by mains and Scottish Water infrastructure was noted along the A83 near the property. It is therefore considered likely that the property is supplied by mains, although this is unconfirmed. In addition, the property is located approximately 2.5km from the nearest turbine and in a different water catchment.	considered to be at risk.	
PWS07	Killean Estate	Unconfirmed	E 169562 / N 644510 E 169553 / N 644450 E 169514 / N 644423 E 169659 / N 644274 E 169849 / N 644396 E 169950 / N 644438 (property locations) Between 150m and 350m south and south-west of existing access track.	Residents unavailable and questionnaire not returned at the time of reporting. At the time of survey works was being undertaken at the estate and it was noted that no one is currently living within the properties within the estate. ABC and previous assessments undertaken at the site do not show that the estate is supplied by a PWS. Neighbouring properties are supplied by mains and Scottish Water infrastructure was noted along the A83 near the property. It is therefore considered likely that the property is supplied by mains, although this is unconfirmed. The nearest turbine is located approximately 2km from the nearest property and four of the properties	× PWS source and pipework not considered to be at risk.	None.

PWS ID (Figure 9.4.1)	Property Name	Data Source and PWS Source Type	Location of PWS Source and Distance from Proposed Development	Details	Potential Complete Source – Pathway – Receptor Linkage	Mitigation and Monitoring
				are located within a different surface water catchment to the Proposed Development.		

3.0 Example Monitoring Protocol and Intervention Strategy

Pre-development monitoring data can be used to establish baseline water levels and quality and assessment or trigger values to which routine monitoring data collected during construction can be compared against.

The monitoring suite, monitoring locations, monitoring frequency and intervention strategy would be agreed with ABC and SEPA prior to any works being undertaken. It is anticipated that this would be secured by an appropriately worded pre-commencement planning condition agreed between the Applicant, ABC and SEPA. Table 3-1 however, shows an example protocol which could be used as a basis to agree a water monitoring protocol with relevant consultees.

Table 3-1: Example Monitoring Protocol

Location	Frequency	Determinand Suite
• Killean Estate Licenced Abstraction • Carradale Burn • Killean Burn • Allt Chaltuinn • Allt Achadh a'Choirce	Monthly prior to and during construction	Field Sampling • pH • Redox • Conductivity • Dissolved Oxygen • Water Level Extractive Samples • pH • Alkalinity (total and bicarbonate) • Suspended solids • Colour • Organic carbon (total and dissolved) • Electrical conductivity • Chloride • Orthophosphate • Sulphate • Nitrate, nitrite and ammonium • Hydrocarbons • Aluminium (total + dissolved) • Calcium (total + dissolved) • Iron (total + dissolved) • Copper (total + dissolved) • Magnesium (total + dissolved) • Manganese (total + dissolved) • Potassium (total + dissolved)

Location	Frequency	Determinand Suite
		• Sodium (total + dissolved) • BOD • COD • TON • Bicarbonate • Ammoniacal nitrogen • Total Coliforms (PWS only) • E Coli (PWS only) • Enterococci (PWS only)

* Monitoring locations, suite, and frequency to be agreed with Statutory Consultees

3.1 Monitoring and Reporting Personnel

The monitoring and reporting would be undertaken by appropriately experienced and trained staff.

3.2 Monitoring Methodology

Water samples would be collected following guidance within SEPA, July 2003, Guidance on Monitoring of Landfill Leachate, Groundwater and Surface Water, v2 (specifically Section 9 thereof).

Prevailing weather conditions, qualitative flow conditions as well as other visual indicators would be recorded in order to aid the sample reporting.

The water samples would be placed directly into appropriate sterile bottles, which would be labelled and dispatched to a UKAS accredited laboratory under chilled conditions and accompanied by the relevant chain of custody documentation.

3.3 Intervention Strategy

In the unlikely event that the routine monitoring data recorded potential pollution an investigation would be undertaken and an intervention strategy would be implemented. The details of this would be agreed prior to any construction and secured by an appropriately worded pre-commencement planning condition.

3.3.1 Alerting Potentially Affected Properties

Contact details (land and mobile numbers / email addresses) for private water supply users would be maintained by site management at all times.

In the event that monitoring data collected at any private water supply is above the baseline monitoring record and above prescribed regulatory standards then property owners would be advised and repeat water sampling undertaken (if agreed with the property owners). Property owners would be advised within 24 hours of receipt of monitoring results. Repeat water sampling would be undertaken as soon as reasonably practicable and within 72 hours.

Details of any affected property would be reported to ABC within the timeframe agreed with ABC when the monitoring programme was agreed and finalised.

3.4 Provision of Alternative Water Supplies

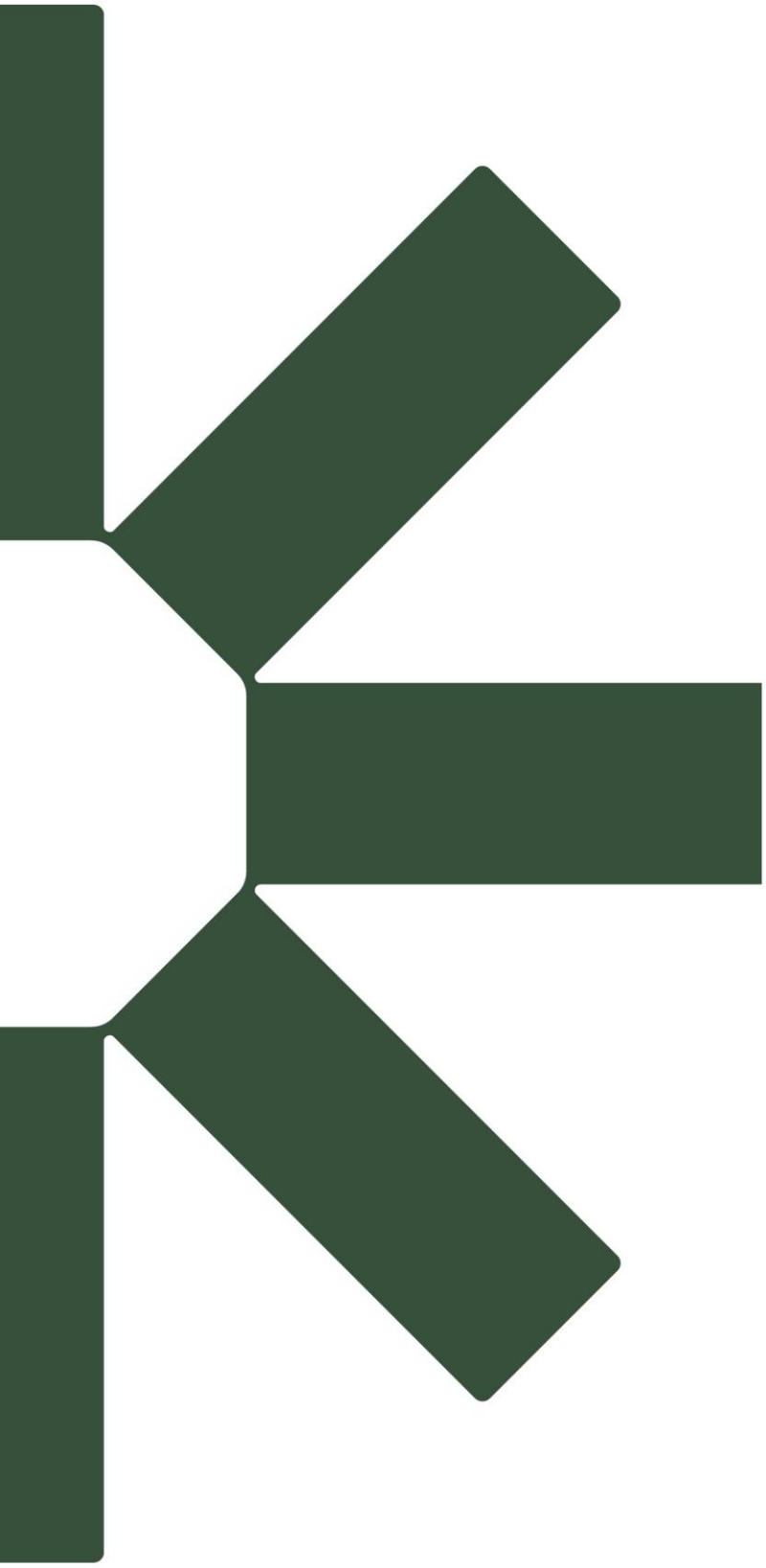
The Applicant commits to maintaining the yield and wholesomeness of water supplies.

The following measures may be deployed in the unlikely event a private water supply is impaired by the works:

- provision of bottled potable water in the event of a short or transient derogation 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 event of a permanent derogation of a water supply.

In the event of an alternative water source being implemented ABC would be advised as soon as is practical.

Figures



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