



Longcroft Wind Farm

Technical Appendix 10.1

Private Water Supply Risk Assessment

Author	J Cassidy
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1 Introduction

- 1.1.1 ITP Energised has been commissioned by Renewable Energy Systems Ltd. (RES) to undertake a Private Water Supply Risk Assessment (PWSRA). This technical appendix will assess the potential risk to Private Water Supplies (PWS) from Longcroft Wind Farm, the proposed development. The site is defined by the red line as shown on Figure 1. The proposed development will consist of 19 wind turbines with associated infrastructure including new and upgraded access tracks.

2 Background

Scope of Report

- 2.1.1 The scope of the report is to identify PWS in the surrounding area and to determine whether they would be affected by the proposed development.
- 2.1.2 The risk assessment has comprised identification of PWS within the 2km study area through consultation with Scottish Borders Council (SBC), East Lothian Council (ELC) and residents, followed by site visits, desk-based assessment, risk rating and identification of any additional mitigation required.

Private Water Supplies

- 2.1.3 PWS are private supplies which are not regulated by Scottish Water and are operated and maintained by the resident. PWS can vary in scale from supplying one property to supplying several. They consist of a source, any interconnecting tanks and pipework which is distributed to a supply, as defined below.
- Source - where the water is abstracted or collected;
 - Supply - the properties which are supplied by the source;
 - Tank - where the water is stored prior to being used at the supply; and
 - Pipework - the connecting pipework used to distribute water collected from source to supply.
- 2.1.4 PWS can source their water from surface water, groundwater or a combination of both. Source types can include springs, stream abstractions, boreholes and wells.

Study Area

- 2.1.5 A PWS study area of 2km was used to identify and assess PWS within the surrounding area of the proposed development. This is based on professional judgement that there are unlikely to be effects to surface water or groundwater at distances greater than 2km from the site. This study area and methodology has been previously approved by SEPA as suitable, for similar wind farm developments.

Legislation and Guidance

- 2.1.6 The following Scottish Government legislation has been reviewed to inform the assessment methodology of this PWSRA, to ensure comprehensive assessment and any protective measures required are implemented.

- Private Water Supplies (Scotland) Regulations 2006¹;
- The Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017²; and
- The Water Environment (Controlled Activities) (Scotland) Regulations 2011³.

- 2.1.7 To inform the assessment methodology of this PWSRA, the following guidance regarding PWS has been reviewed.

- Drinking Water Quality Regulator for Scotland (DWQR) Guidance for Local Authorities on The Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017⁴;
- Scottish Environment Protection Agency (SEPA) A Practical Guide to The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended) (Version 9.2) 2022⁵; and
- SEPA Land Use Planning System Guidance Note 31 (SEPA LUPS GU31) Guidance on Assessing the Impacts of Development Proposals on

¹ Scottish Government (2006). The Private Water Supplies (Scotland) Regulations 2006. Available at: <https://www.legislation.gov.uk/ssi/2006/209/contents/made> Accessed on 17 October 2023.

² Scottish Government (2017). The Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017. Available at: <https://www.legislation.gov.uk/ssi/2017/282/contents/made> Accessed on 17 October 2023.

³ Scottish Government (2011). The Water Environment (Controlled Activities) (Scotland) Regulations 2011. Available at: <https://www.legislation.gov.uk/ssi/2011/209/contents/made> Accessed on 17 October 2023.

⁴ DWQR (2017) Guidance on the Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017. Available at: <https://dwqr.scot/private-water-supplies/regulatory-guidance-and-information/guidance-on-the-water-intended-for-human-consumption-private-supplies-scotland-regulations-2017/> Accessed on 16 October 2023.

⁵ SEPA. (2022). The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended) A Practical Guide, Version 9.1. Available at <https://www.sepa.org.uk/regulations/water/> Accessed on: 18 October 2023.

Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems (Version 3) 2017⁶.

- 2.1.8 The SEPA LUPS GU31 provides detailed guidance on assessing impacts to groundwater abstractions and therefore PWS which are fully or partly fed by groundwater. This includes detailed infrastructure buffers to be implemented, depending on excavation depths:
- Within 100m radius of all excavations less than 1m in depth; and
 - Within 250m radius of all excavations deeper than 1m in depth.
- 2.1.9 The SEPA guidance also outlines the likely outcomes if maintaining these buffers between infrastructure and groundwater abstractions is unavoidable. In these cases, a detailed risk assessment and site-specific Conceptual Site Model (CSM) will be required, accompanied by mitigation and best practice, likely to include groundwater monitoring.

3 Assessment Methodology

PWS Identification

Desk Based Assessment

Consultation with Council Environmental Health Office

- 3.1.1 Consultation was undertaken with SBC and ELC to gather information on registered PWS within the 2km study area. A response was received from SBC on 4 April 2023 providing names of registered PWS within the council boundary. ELC responded on 14 April 2023, which confirmed there to be no PWS within the 2km study area within their council area.
- 3.1.2 To identify any unregistered PWS in the surrounding area, a desk-based review of additional properties within habitations data was undertaken. From this search an additional two properties were identified, which due to their locations in close proximity to council registered PWS, would likely be supplied by these sources.
- 3.1.3 Following the first round of resident consultation by letter, an additional FOI request was issued to SBC on 3 August 2023, to include for the

⁶ SEPA. (2017). Land Use Planning System SEPA Guidance Note 31 Available at: <https://www.sepa.org.uk/media/144266/lups-gu31-guidance-on-assessing-the-impacts-of-development-proposals-on-groundwater-abstractions-and-groundwater-dependent-terrestrial-ecosystems.pdf> Accessed on: 17 October 2023.

proposed access track and public road, which wasn't within the original study area.

3.1.4 Following this an additional desk-based review of OS mapping was undertaken to identify any properties which may be located within the updated PWS study area. An additional seven properties were added to consultation from this.

3.1.5 Following the first and second round of consultation with the council Environmental Health Office (EHO), the identified PWS and properties were assessed and scoped out in consideration of potential hydrological and hydrogeological connectivity and being located within the 2km study area. From the initial council response and desk based review of maps, there were 43 properties determined to have potential connectivity to the site and were scoped into resident consultation.

Resident Consultation

3.1.6 The first consultation letter to residents was initially issued by ITP Energised on behalf of the applicant to the 30 properties identified from the first round of council consultation in July 2023. The second letters were issued and resent where a response had not been received in August 2023. The letters included an accompanying questionnaire and map for the residents to fill in and return.

3.1.7 There were 10 responses to the letters issued and confirmed the properties to be supplied by PWS. The resident consultation responses are outlined in Annex 2.

3.1.8 ITP Energised undertook an assessment of the property locations and responses received to scope out any properties from further assessment. PWS were scoped out on the following considerations:

- If supplied by Scottish Water Mains;
- If located outwith the 2km study area;
- If supplied by surface water source and hydrologically disconnected by topography and drainage pathways; and
- If supplied by groundwater source and located greater than 250m from the site, in accordance with SEPA LUPS GU31.

3.1.9 Where no further follow up consultation with residents was required, these PWS were scoped out of site-based assessment.

Site Based Assessment

- 3.1.10 Site visits were arranged with residents where responses to letter consultation had been received or contact could be established prior to the site visit. Where contact could not be established prior to the visit, door knocking was undertaken.
- 3.1.11 Site visits were undertaken on the 9 August 2023 and a summary is provided in Table 1. Visits to sources were carried out with permission from the residents. The location of sources were mapped during the site assessment using ArcGIS Field Maps and are shown in Figure 1.

Table 1: Site Visits Undertaken

Property	Source	Site Visit Comments
Longcroft Farm Cottages	Longcroft	Source is located on bankside of Allers Burn. Spring source feeds into header tank on hillside. There is no UV treatment or filter. No supply problems excepting surrounding sheep fields.
Longcroft Farm Soonhope House	Longcroft Farm	Source is header tank with pipes into hillside. Spring is very cold, however, no supply issues despite nearby watercourse often drying up. Additional pipes added to surrounding area to guarantee the supply.
Newmills Farmhouse	Newmills	Source supplied from spring at header tank on wet hillside. The length of pipework into hillside is unknown. There is no UV treatment or filter. There is a second tank downslope where there is a mains inlet. This is where it separates into pipes to separate properties.
Cleekhimin House	Cleekhimin House	Resident not available at time of visit.
Riverside	Riverside	Resident not available at time of visit.

- 3.1.12 Following the results from the site visit and desk-based assessment, PWS that could be scoped out of further assessment are shown in Table 2. A summary of all consultation undertaken is outlined in Table A.2 in Annex 3.

Table 2: PWS Scoped Out

Source	Source Type	Scoped Out
Boghall	Spring	Located in Kelhope Burn catchment which is hydrologically disconnected from the proposed development. Located outwith groundwater abstraction infrastructure buffers.
Dod Cleugh	Spring	
The Lodge	Spring	
Corner House	Borehole	

4 Mitigation

Embedded Mitigation

- 4.1.1 Mitigation embedded into the design of the proposed development has been considered to prevent impacts to surface and groundwater across the site, including those which PWS are hydrologically connected to.
- 4.1.2 Embedded mitigation specific to PWS, included:
- Locating infrastructure outwith the source catchments of PWS; and
 - Maintaining SEPA 100m buffer for infrastructure with excavations shallower than 1m, and 250m buffer for infrastructure with excavations deeper than 1m.

Best Practice Guidance

- 4.1.3 Embedded mitigation and best practice guidance will be implemented across the proposed development to prevent potential impacts to water quantity or quality. To prevent impacts to water quality, best practice mitigation may include:
- Implementation of silt management measures, including silt traps, silt fencing and settlement ponds to prevent and trap sedimentation within surface water run-off.
 - Implementation of careful drainage design including track-side swales to direct flow of surface water and Check dams will be used within the swales to slow the flow of water, decreasing erosion and sedimentation.
 - Implementation of geotextiles materials within tracks and hardstands to create an impermeable layer lining the foundation.

5 Risk Assessment

Addinston

- 5.1.1 Addinston is registered with SBC as a spring abstraction located at E351995, N653162. While consultation responses were received from residents, information regarding the location of the source was not provided, however, the source was confirmed to be a spring and to support drinking and domestic use at Addinston Farm.

- 5.1.2 Due to the lack of information available from residents, the risk assessment of Addinston will be largely based on data from the council register, which places the source at the properties. It is considered likely that the spring source may actually be located on the hillside upslope.
- 5.1.3 As shown in Figure 3, the source is underlain by bedrock of the Great Conglomerate Formation, which is a moderately productive, Class 2B aquifer of the Reston Group. While flow is virtually all through fractures and discontinuities, it is locally productive. The underlying superficial deposits are noted to be low permeability till deposits.
- 5.1.4 If the spring source is located on the hillside upslope of the properties, it would still be underlain by the same bedrock aquifer, however, there are no underlying superficial deposits upslope.
- 5.1.5 As shown in Figure 2, the source is located at the boundary of the Dean Sike and Cleekhimin Burn catchments and would be hydrologically disconnected from the proposed development by Cleekhimin Burn and Soonhope Burn.
- 5.1.6 As shown in Figure 5, PWS Addinston is located 530m from the existing public road. This far exceeds the recommended SEPA infrastructure buffers of 100m and 250m for groundwater abstractions.
- 5.1.7 As the source is assessed to be hydrologically disconnected from the proposed development and outwith the groundwater abstraction 100m and 250m buffers, there is considered to be negligible likelihood of impacts.

Cleekhimin House

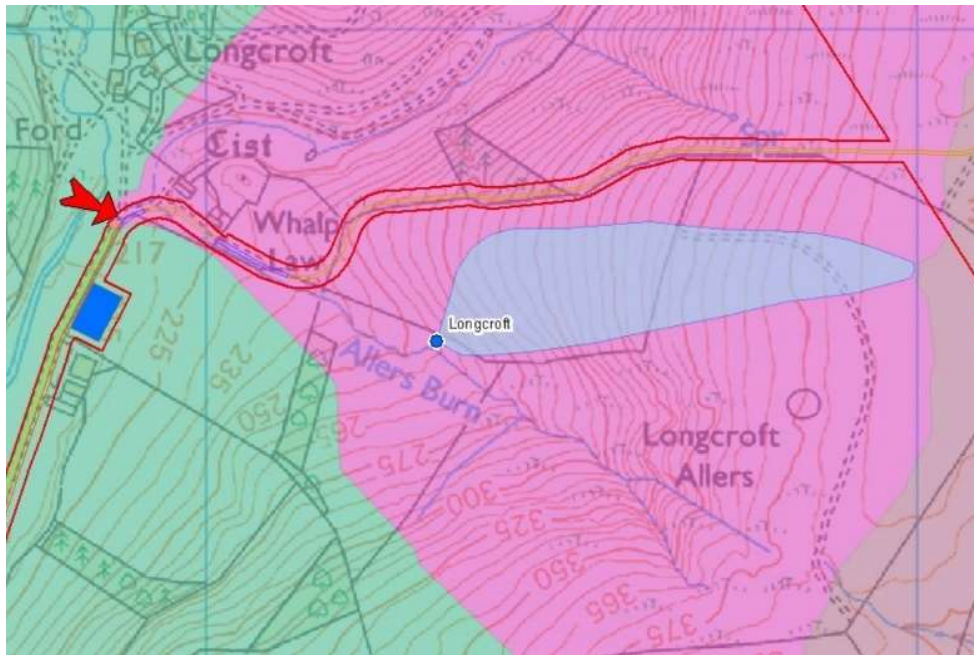
- 5.1.8 From consultation with the resident, PWS Cleekhimin House was confirmed to be a well, located at E352153, N652315. The resident also confirmed that the supply supports domestic use at the property and is not shared. A site visit to the property was undertaken, however, the resident was not in at the time of visit.
- 5.1.9 The well is located in the back garden of the property, in close proximity to the public road and upslope of Cleekhimin Burn. As a well, it is considered to be supplied by surface water runoff, near surface groundwater and potentially underlying groundwater.
- 5.1.10 The bedrock geology underlying the well is the Great Conglomerate Formation, which is a moderately productive, Class 2B aquifer of the Reston Group. While flow is virtually all through fractures and discontinuities, it is locally productive. The underlying superficial deposits are noted to be low permeability till deposits.
- 5.1.11 The well is located in the Cleekhimin Burn catchment and is located approx. 60m upslope of Cleekhimin Burn (see Figure 2).
- 5.1.12 The well is located 20m from an existing public road, and 1.4km from the proposed temporary construction compound. This infrastructure will be utilised for construction traffic and may also be widened in small sections to accommodate construction traffic. While it is unlikely to occur within 100m of the source, however, if it does it would be undertaken following best practice mitigation measures, for as short a time as practicable, under supervision from the onsite ECoW and water quality monitoring would be undertaken at the source for the duration.
- 5.1.13 If there are no road widening works within 100m, therefore there would unlikely to be increased erosion and sedimentation in the area as there will be no earthworks or stockpiling of material. There is unlikely to be an increase in runoff or flood risk as there will no increase in the hardstand. There may be a slightly increased risk of chemical pollution from fuel spills due to increased construction traffic, however, the public road is already utilised by farming plant and logging trucks. In the event of a chemical spill, best practice guidance would be followed and mitigation measures in line with an emergency response plan would be actioned. This implementation would be verified by the onsite Environmental Clerk of

Works (ECoW), including whether water quality sampling at the location of pollution would be required.

Longcroft

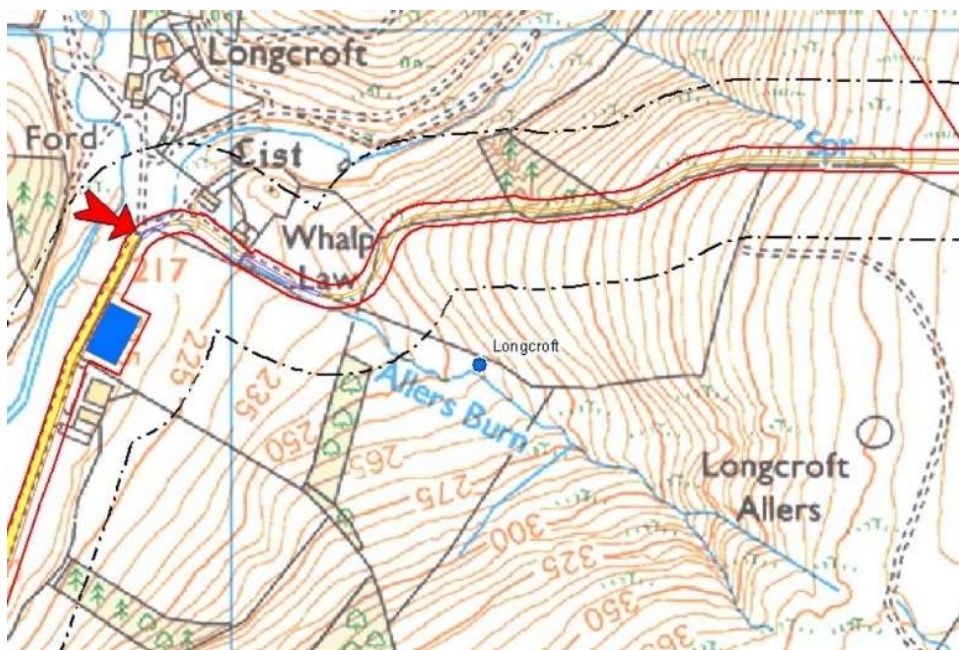
- 5.1.14 PWS Longcroft is registered as a spring source with SBC and during consultation with the onsite resident, it is noted to be located at approx. E353170, N653728.
- 5.1.15 Its infrastructure consists of a holding tank with a pipe into superficial deposits in the hillside. This is then piped downslope along Allers Burn to the Longcroft Cottages, approx. 340m downslope.
- 5.1.16 The bedrock underlying the source is noted as wacke of the Gala Group, described as a turbidite succession. There are no faults or fractures noted in the surrounding area. The bedrock is noted to be a low productivity Class 2C aquifer of 'highly indurated greywackes with limited groundwater in near surface'. At its location there are no underlying superficial deposits noted.
- 5.1.17 Due to its infrastructure, it is likely to be predominantly supplied by near surface groundwater that will largely follow topography and be supplied by rainfall with minimal deeper groundwater influence. There may also be limited supply from surface water runoff.
- 5.1.18 Due to its location, while it is located within the larger Whalplaw Burn catchment, it is located within the Allers Burn sub-catchment. A source catchment has been drawn for the PWS Longcroft, based on topography and GIS modelling, shown in light blue in Drawing 1.

Drawing 1: PWS Longcroft and Source Catchment



5.1.19 As can be seen from Drawing 1, the Longcroft source catchment is located upslope and is not underlying any civil infrastructure for the proposed development. As shown in Drawing 2, it is also located outwith the 100m infrastructure buffer (shown as black dashed line) upslope from the proposed tracks.

Drawing 2: PWS Longcroft and Infrastructure Buffers



- 5.1.20 The location of the pipe between the holding tank and the properties supplied was not visible during the site walkover. It may cross under the current access track to be upgraded or the new proposed track, however, this is not currently known. During intrusive works, care will be taken to prevent damage to the pipe by slow excavation works to be monitored by the onsite ECoW. If identified, it will be marked and through detailed design redirected under the access tracks.

Longcroft Farm

- 5.1.21 Following consultation with onsite residents, PWS Longcroft Farm was confirmed to be a spring source, located at E352227, N654598.
- 5.1.22 It consists of a pipe into superficial deposits in the hillside, into a large holding tank, which is then piped approx. 300m downslope to the properties it supplies. The residents noted the spring to be very cold and have had no issues, often the spring lasts while the ephemeral watercourse runs dry. In previous years additional pipes have been added to the hillside to increase water supply. During the site walkover the spring was noted to be located in a steeply sloping valley, where there were several flushes.
- 5.1.23 There are no superficial deposits noted underlying the source. The bedrock geology underlying the spring is noted to be located within the Great Conglomerate Formation bedrock, immediately downslope of its boundary with wacke of the Gala Group bedrock. This is a moderately productive, Class 2B aquifer of the Reston Group. While flow is virtually all through fractures and discontinuities, it is locally productive.
- 5.1.24 Based on resident observations and the underlying lithology changes, PWS Longcroft Farm is likely mainly supplied by groundwater which emerges at the contact between the two bedrock aquifers. It is likely minimally fed by surface water overland flow and near surface groundwater flow from precipitation.
- 5.1.25 As shown in Figure 5, PWS Longcroft Farm is located 770m from proposed tracks and 1.2km from the closest wind turbine, T19. This far exceeds the recommended SEPA infrastructure buffers of 100m and 250m for groundwater abstractions.

- 5.1.26 For surface water and near surface contributions to the source, it is located within the Soonhope Burn catchment, upslope of the Soonhope Burn. It is hydrologically disconnected from the site by Hog Hill and Hope Burn.
- 5.1.27 As the source is considered to be hydrologically disconnected from the proposed development and outwith the groundwater abstraction 100m and 250m buffers, there is considered to be negligible likelihood of impacts.

Newmills

- 5.1.28 Following consultation with residents, the source type was confirmed to be a spring and located at E354186, N652217.
- 5.1.29 The source consists of a pipe into superficial deposits in the hillside, into a small holding tank. This is then piped approx. 1.5km to a second tank at approx. E353798, N650710 where the pipes split to the different properties supplied. At this tank there is an inlet for mains water. It is then piped a further 1.5km to properties.
- 5.1.30 The residents commented that it is often not sufficient during a dry spell, which is when the supply is topped up by the mains supply inlet.
- 5.1.31 The Newmills source is located within the Earnsclough Water catchment. It is hydrologically disconnected from the proposed development, however, by Lylestone Hill and Willowcleugh Burn.
- 5.1.32 There are no superficial deposits noted underlying the source, it is located immediately upslope of low permeability till deposits. The bedrock geology underlying the spring is noted to be located within the Great Conglomerate Formation bedrock (see Figure 3), immediately downslope of its boundary with wacke of the Gala Group bedrock. This is a moderately productive, Class 2B aquifer of the Reston Group. While flow is virtually all through fractures and discontinuities, it is locally productive.
- 5.1.33 Based on the underlying geology changes the PWS is likely mainly supplied by groundwater which emerges at the contact between the two bedrock aquifers. It is likely minimally fed by surface water overland flow and near surface groundwater flow from precipitation.
- 5.1.34 As shown in Figure 5, PWS Newmills is located 1.7km from proposed tracks. This far exceeds the recommended SEPA infrastructure buffers of 100m and 250m for groundwater abstractions.

- 5.1.35 As the source is considered to be hydrologically disconnected from the proposed development and outwith the groundwater abstraction 100m and 250m buffers, there is considered to be negligible likelihood of impacts.

Riverside (Woodrigdean)

- 5.1.36 Riverside is registered with SBC as a spring abstraction located at E352163, N652288. No response was received from the resident and was not available during the site visit.
- 5.1.37 Due to the lack of information available from residents, the risk assessment of Riverside will be based on data from the council register, this places the source at the property. It is considered more likely that the spring source is obtained from the hillside upslope.
- 5.1.38 During follow up consultation with Cleekhimin House by phone, the resident confirmed that the property is a PWS and it is not shared, confirming the council held data.
- 5.1.39 The spring source is likely within the Cleekhimin Burn catchment or the sub-catchment associated with the unnamed burn from Lylestone Hill as shown in Figure 2. If in either catchment, it is hydrologically disconnected from the proposed development by the topographic high of Lylestone Hill.
- 5.1.40 The underlying bedrock is the Great Conglomerate Formation, which is a moderately productive, Class 2B aquifer of the Reston Group. While flow is virtually all through fractures and discontinuities, it is locally productive. The underlying superficial deposits are low permeability till, which extend far upslope on Lylestone Hill.
- 5.1.41 The PWS Riverside could potentially be sourcing from both near surface groundwater, which largely follows topography and catchment area, and surface water overland flow.
- 5.1.42 If the source is located where the council indicates, it is located 15m from the public road. If this is the case, as outlined for PWS Cleekhimin House, it would likely only be affected by a fuel spill from construction traffic which would be managed in accordance with the emergency response plan in the Construction Environmental Management Plan (CEMP) and verified by the onsite ECoW. This infrastructure will be utilised for construction traffic and may also be widened in small sections to accommodate construction traffic. While it is unlikely to occur within 100m of the

source, however, if there are road widening works planned it would be undertaken following best practice mitigation measures, for as short a time as practicable, under supervision from the onsite ECoW and water quality monitoring would be undertaken at the source for the duration. If any connecting pipework underlies an area of upgrade works, a watching brief under supervision of the ECoW with redirection of the pipework would be undertaken, similarly to PWS Longcroft.

- 5.1.43 As is considered more likely, if the source located on the upslope hillside it would be unaffected by an increase in construction traffic downslope. The source at its current location is approx. 1.4km from the temporary construction compound.
- 5.1.44 As the source is assessed to be hydrologically disconnected from the proposed development and outwith the groundwater abstraction 100m and 250m buffers, there is considered to be negligible likelihood of impacts.

Burncastle

- 5.1.45 Following consultation with residents, it was noted that the source for PWS Burncastle is located at Burncastle Lodge and is a borehole, located at approx. E354289, N651901. The source is then pumped to Burncastle properties located approx. 830m south-west.
- 5.1.46 The borehole is underlain by alluvium deposits associated with the Earnsclough Water (see Figure 4). It is located on the boundary between wacke of the Gala Group, an unnamed igneous intrusion, and Great Conglomerate Formation bedrock. While these are low to moderately productive bedrock, flow is mainly through fractures and discontinuities. The borehole will likely be predominantly supplied by groundwater which emerges at the contact between these bedrock aquifers.
- 5.1.47 As PWS Burncastle is a groundwater abstraction, when SEPA's infrastructure buffers of 100m and 250m are applied, it is not located within these distances of proposed infrastructure. The borehole is located 2km from proposed tracks.
- 5.1.48 As the source is outwith the groundwater abstraction 100m and 250m buffers, there is considered to be negligible likelihood of impacts.

Lylestane

- 5.1.49 A response from Lylestane Farm confirmed that the properties are supplied by a mains connection and the private source is utilised for livestock and a fire hydrant tank. It is described to be a spring source which is gravity fed and is utilised in the fields downslope.
- 5.1.50 The spring is located at approx. E353201, N652988, which is located within a sub-catchment of an unnamed burn which rises from the southern slope of Lylestone Hill and drains to Cleekhimin Burn to the south-west. The source is hydrologically disconnected from the proposed development by the topographic high of Lylestone Hill.
- 5.1.51 The source is noted to have no underlying superficial deposits. The bedrock geology underlying the spring is noted to be located within the Great Conglomerate Formation, immediately downslope of its boundary with wacke of the Gala Group bedrock. This is a moderately productive, Class 2B aquifer of the Reston Group. While flow is virtually all through fractures and discontinuities, it is locally productive.
- 5.1.52 Based on the underlying geology changes the PWS is likely mainly supplied by groundwater which emerges at the contact between the two bedrock aquifers. It is likely minimally fed by surface water overland flow and near surface groundwater flow from precipitation.
- 5.1.53 As shown in Figure 5, PWS Lylestane is located 715m from public road, and 925m from temporary construction compound. This far exceeds the recommended SEPA infrastructure buffers of 100m and 250m for groundwater abstractions.
- 5.1.54 As the source is considered to be hydrologically disconnected from the proposed development and outwith the groundwater abstraction 100m and 250m buffers, there is considered to be negligible likelihood of impacts.

6 Sensitivity of Receptors

Table 3: PWS Sensitivity

PWS Source	Sensitivity	Justification
Addinston	High	Located on spring, predominantly fed by groundwater.
Cleekhimin House	High	Well source, fed by surface water infiltration and near surface groundwater.
Longcroft	High	Located on spring, fed by surface water infiltration and near surface groundwater.
Longcroft Farm	High	Located on spring, predominantly fed by groundwater.
Newmills	High	Located on spring, predominantly fed by groundwater.
Riverside	High	Located on spring, fed by surface water infiltration and near surface groundwater.
Burncastle	High	Borehole source, fed by groundwater and near-surface groundwater.
Lylestane	High	Located on spring, predominantly fed by groundwater.

7 Magnitude of Impact

Table 4: PWS Magnitude of Impact

PWS Source	Sensitivity	Justification
Addinston	Negligible	Outwith infrastructure buffers, hydrologically disconnected by watercourses and topography.
Cleekhimin House	Negligible	While located within infrastructure buffers, there will be no upgrades to the track.
Longcroft	Low	Outwith infrastructure buffers, and no proposed development infrastructure within source catchment. PWS infrastructure may be crossed by proposed track.
Longcroft Farm	Negligible	Outwith infrastructure buffers, hydrologically disconnected by watercourses and topography.
Newmills	Negligible	Outwith infrastructure buffers, hydrologically disconnected by watercourses and topography.
Riverside	Negligible	While located within infrastructure buffers, there will be no upgrades to the track.
Burncastle	Negligible	Outwith infrastructure buffers.
Lylestane	Negligible	Outwith infrastructure buffers, hydrologically disconnected by watercourses and topography.

8 Significance of Impact

Table 5: PWS Significance of Impact

PWS Source	Significance	Justification
Addinston	Minor	No additional mitigation required.
Cleekhimin House	Minor	No additional mitigation required.
Longcroft	Moderate	Additional mitigation required.
Longcroft Farm	Minor	No additional mitigation required.
Newmills	Minor	No additional mitigation required.
Riverside	Minor	No additional mitigation required.
Burncastle	Minor	No additional mitigation required.
Lylestane	Minor	No additional mitigation required.

9 Additional Mitigation

- 9.1.1 The potential impact to PWS Longcroft is assessed to be of moderate significance. This is due to the low magnitude of impact as a result of potential impact to the connecting infrastructure between the PWS holding tank and properties supplied. There is considered to be negli
- 9.1.2 gible magnitude of impact to the water quality or quantity of the source abstraction itself.
- 9.1.3 To ensure the continued water quantity at the supply, during construction of the proposed track and upgrades to existing track, a watching brief will be employed, with excavation to be closely monitored by onsite ECoW. If pipework associated with the PWS is identified this will be marked and a detailed design strategy to either lay the pipework under the track or redirect it, to maintain supply.
- 9.1.4 As the potential impact to all other PWS is assessed to be of low significance, additional mitigation measures are considered to not be required. Best practice guidance and standard mitigation measures will be employed to protect hydrological and hydrogeological receptors.

10 Residual Effects

- 10.1.1 As noted above, no significant potential environmental effects were identified for PWS, taking account of embedded and good practice mitigation, and additional mitigation measures for PWS Longcroft.

Annex 1 Figures


















LONGCROFT WIND FARM PWSRA

FIGURE 1 STUDY AREA

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2023 LICENCE NUMBER 0100031673.

KEY

-  Site Boundary
-  Turbines
-  Watercourse Crossing
-  Temporary Construction Compound
-  Temp Concrete Batching Plant
-  Substation Compound
-  Site Entrance
-  Hardstandings
-  Borrow Pit Search Areas
-  Battery Storage Compound
-  Upgraded Tracks
-  Proposed Tracks
-  Existing Public Road
-  PWS Study Area (2 km)
-  PWS Sources

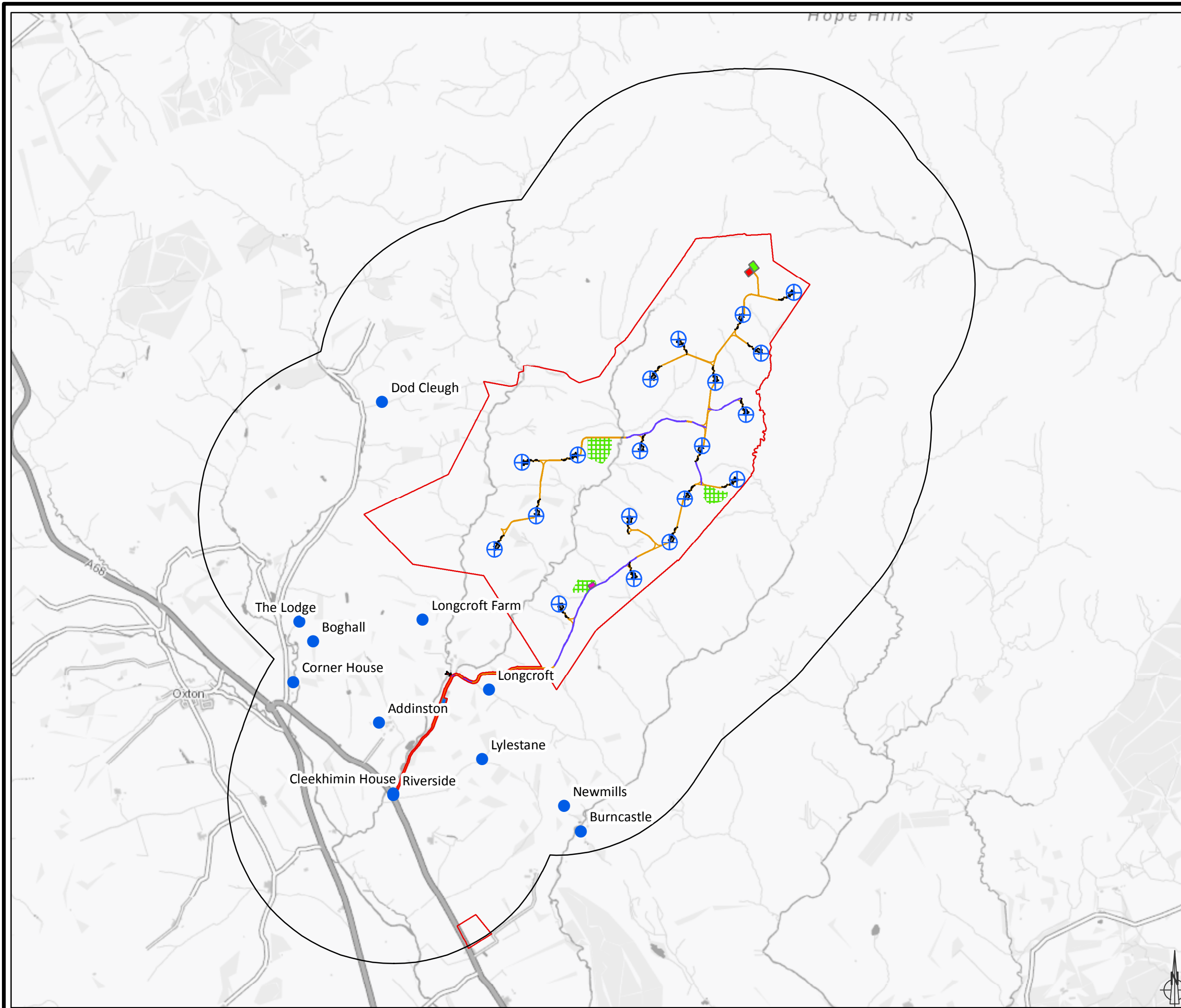
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DRAWING NUMBER

SCALE - 1:45,000 @ A3

ENVIRONMENTAL IMPACT ASSESSMENT REPORT 2023

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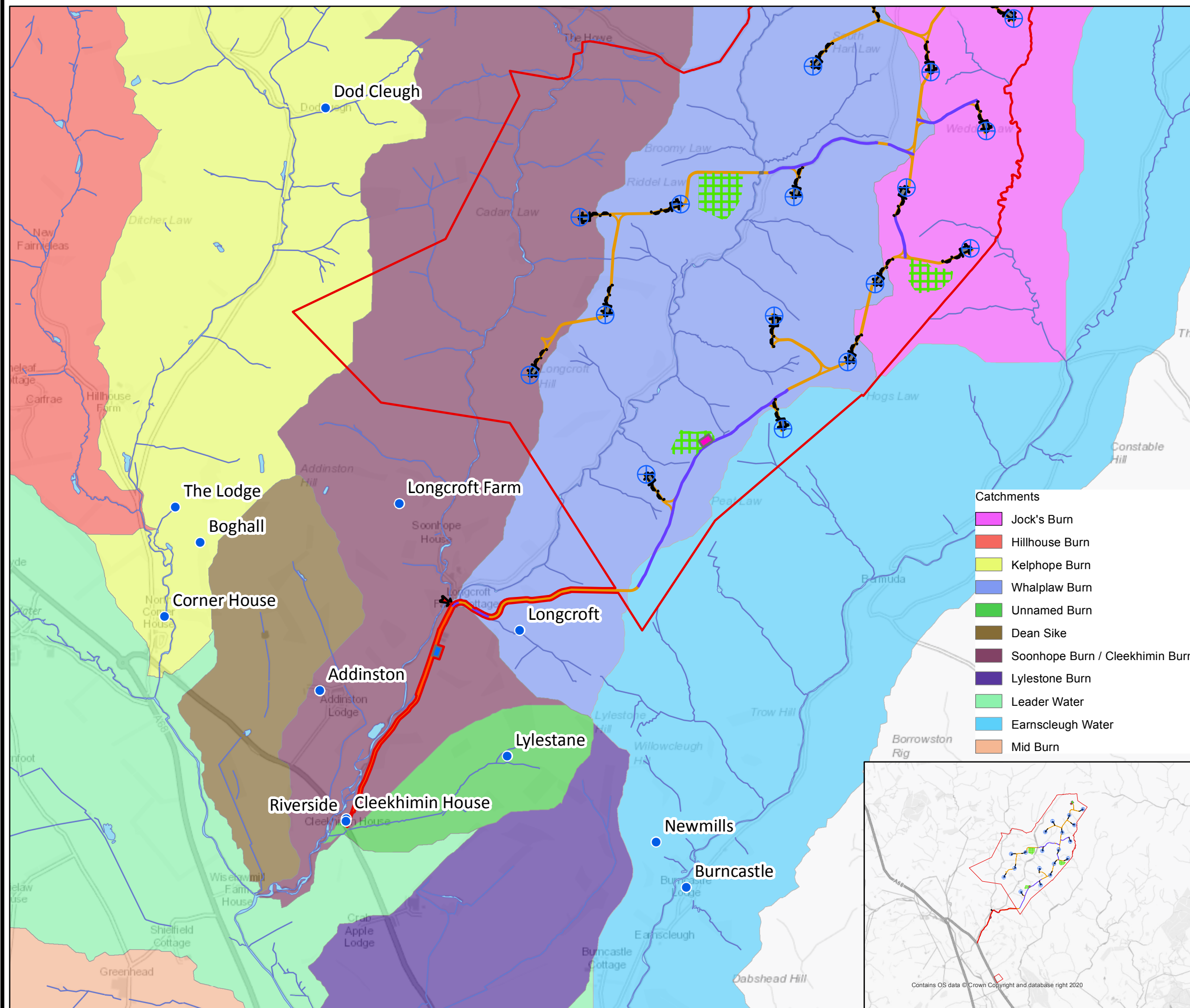


LONGCROFT WIND FARM PWSRA

FIGURE 2.0

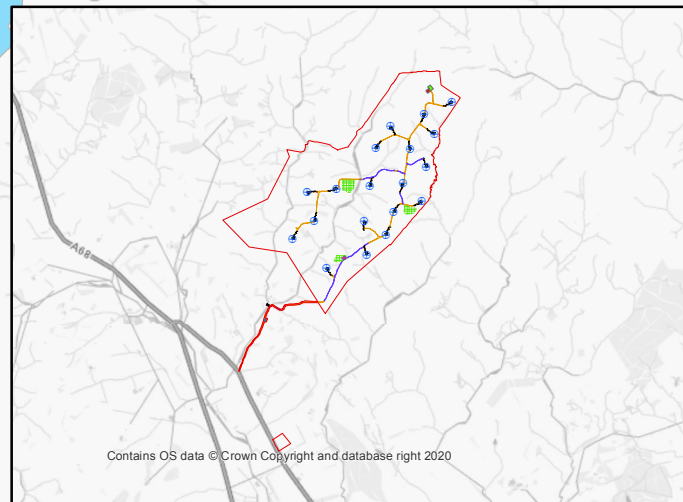
SURFACE HYDROLOGY

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- Catchments**
- Jock's Burn
 - Hillhouse Burn
 - Kelphope Burn
 - Whalplaw Burn
 - Unnamed Burn
 - Dean Sike
 - Soonhope Burn / Cleekhimin Burn
 - Lylestone Burn
 - Leader Water
 - Earnsclough Water
 - Mid Burn

- KEY**
- Site Boundary
 - Turbines
 - Watercourse Crossing
 - Temporary Construction Compound
 - Temp Concrete Batching Plant
 - Substation Compound
 - Site Entrance
 - Hardstandings
 - Borrow Pit Search Areas
 - Battery Storage Compound
 - Upgraded Tracks
 - Proposed Tracks
 - Existing Public Road
 - Watercourses
 - Waterbodies
 - PWS Sources



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LONGCROFT WIND FARM PWSRA

FIGURE 3 SUPERFICIAL GEOLOGY

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KEY

- Site Boundary
- Turbines
- Watercourse Crossing
- Temporary Construction Compound
- Temp Concrete Batching Plant
- Substation Compound
- Site Entrance
- Hardstandings
- Borrow Pit Search Areas
- Battery Storage Compound
- Upgraded Tracks
- Proposed Tracks
- Existing Public Road
- PWS Sources

Superficial Deposits

- Alluvium- Clay, Silt, Sand and Gravel
- Peat- Peat
- Till, Devensian - Diamiction
- Superficial theme not mapped

LAYOUT DWG
04728-RES-LAY-DR-PE-003

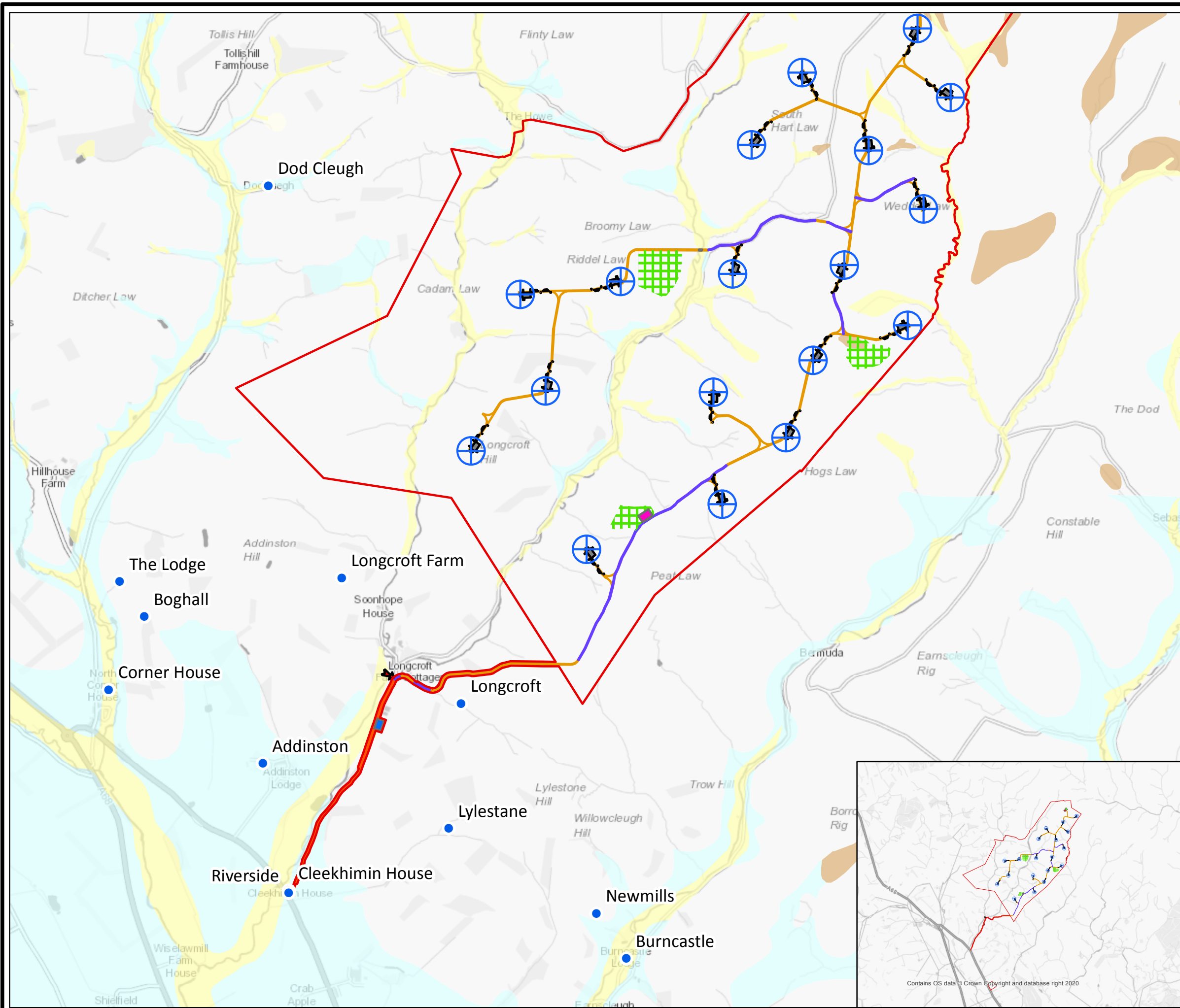
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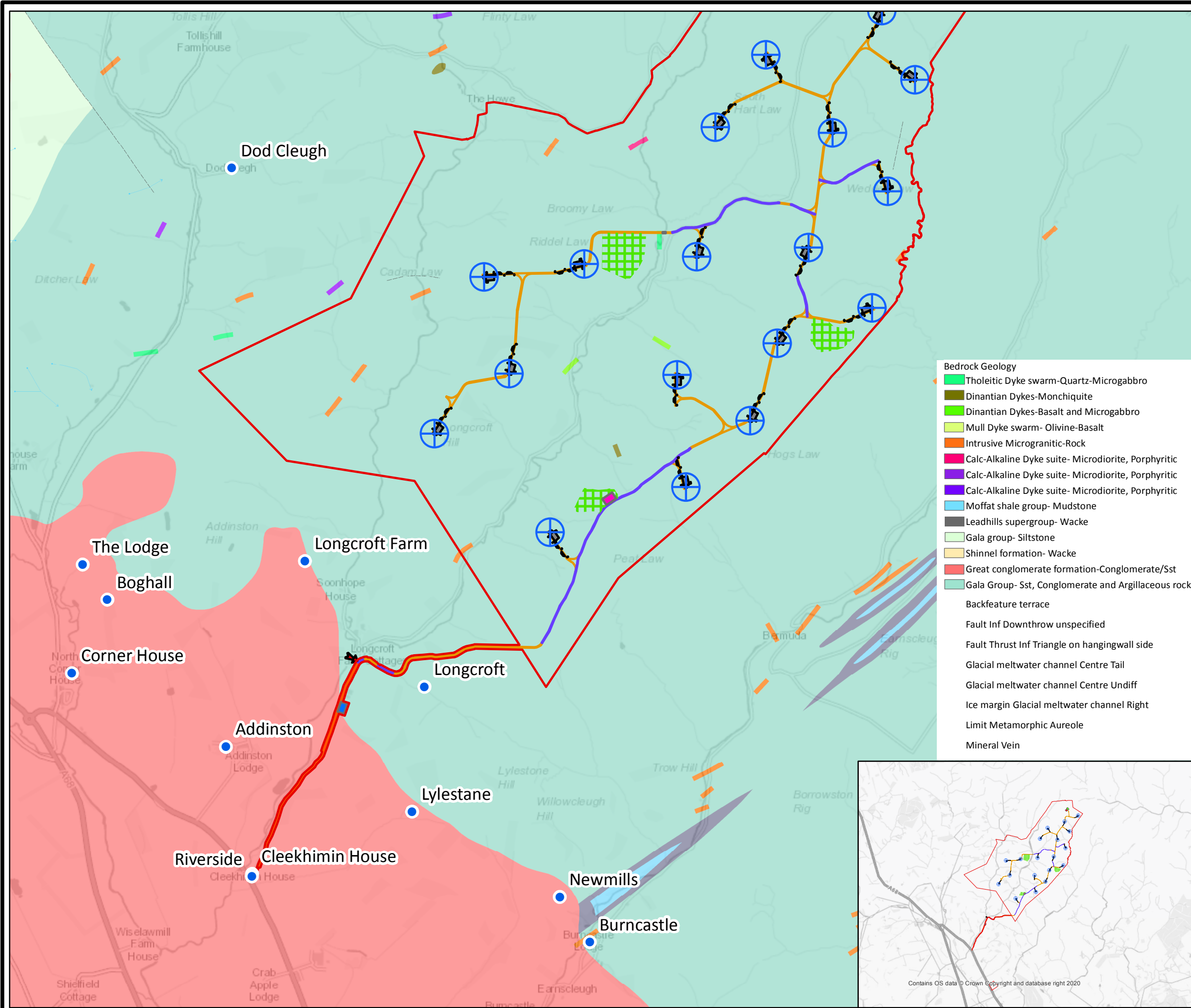
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**LONGCROFT WIND FARM
PWSRA**

**FIGURE 4
BEDROCK GEOLOGY**

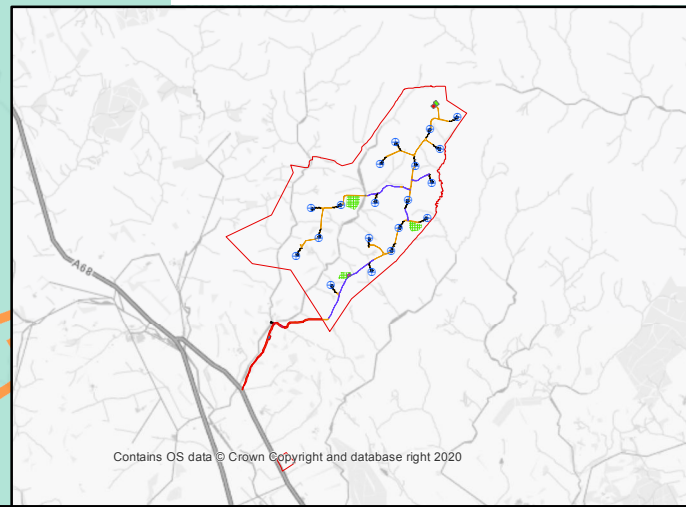
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- Bedrock Geology**
- Tholeiitic Dyke swarm-Quartz-Microgabbro
 - Dinantian Dykes-Monchiquite
 - Dinantian Dykes-Basalt and Microgabbro
 - Mull Dyke swarm- Olivine-Basalt
 - Intrusive Microgranitic-Rock
 - Calc-Alkaline Dyke suite- Microdiorite, Porphyritic
 - Calc-Alkaline Dyke suite- Microdiorite, Porphyritic
 - Calc-Alkaline Dyke suite- Microdiorite, Porphyritic
 - Moffat shale group- Mudstone
 - Leadhills supergroup- Wacke
 - Gala group- Siltstone
 - Shinnel formation- Wacke
 - Great conglomerate formation-Conglomerate/Sst
 - Gala Group- Sst, Conglomerate and Argillaceous rock
- Backfeature terrace**
- Fault Inf Downthrow unspecified**
- Fault Thrust Inf Triangle on hangingwall side**
- Glacial meltwater channel Centre Tail**
- Glacial meltwater channel Centre Undiff**
- Ice margin Glacial meltwater channel Right**
- Limit Metamorphic Aureole**
- Mineral Vein**

KEY

- Site Boundary
- ⊕ Turbines
- Watercourse Crossing
- Temporary Construction Compound
- Temp Concrete Batching Plant
- Substation Compound
- Site Entrance
- Hardstandings
- Borrow Pit Search Areas
- Battery Storage Compound
- Upgraded Tracks
- Proposed Tracks
- Existing Public Road
- PWS Sources



LAYOUT DWG: 04728-RES-LAY-DR-PE-003 T-LAYOUT NO.: PSCOLCF02

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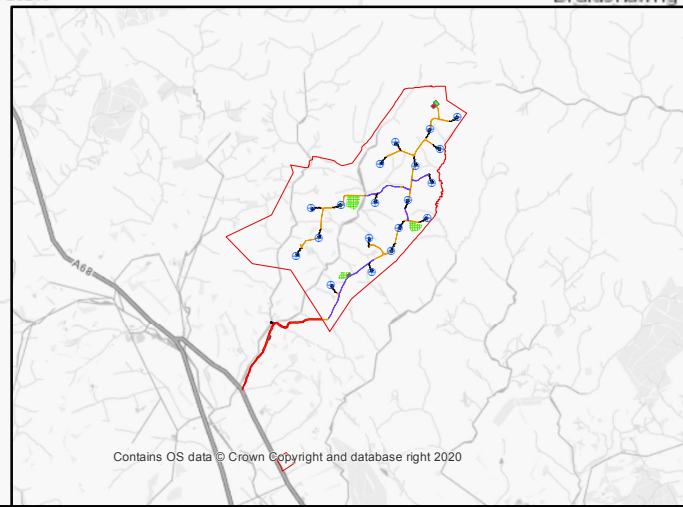
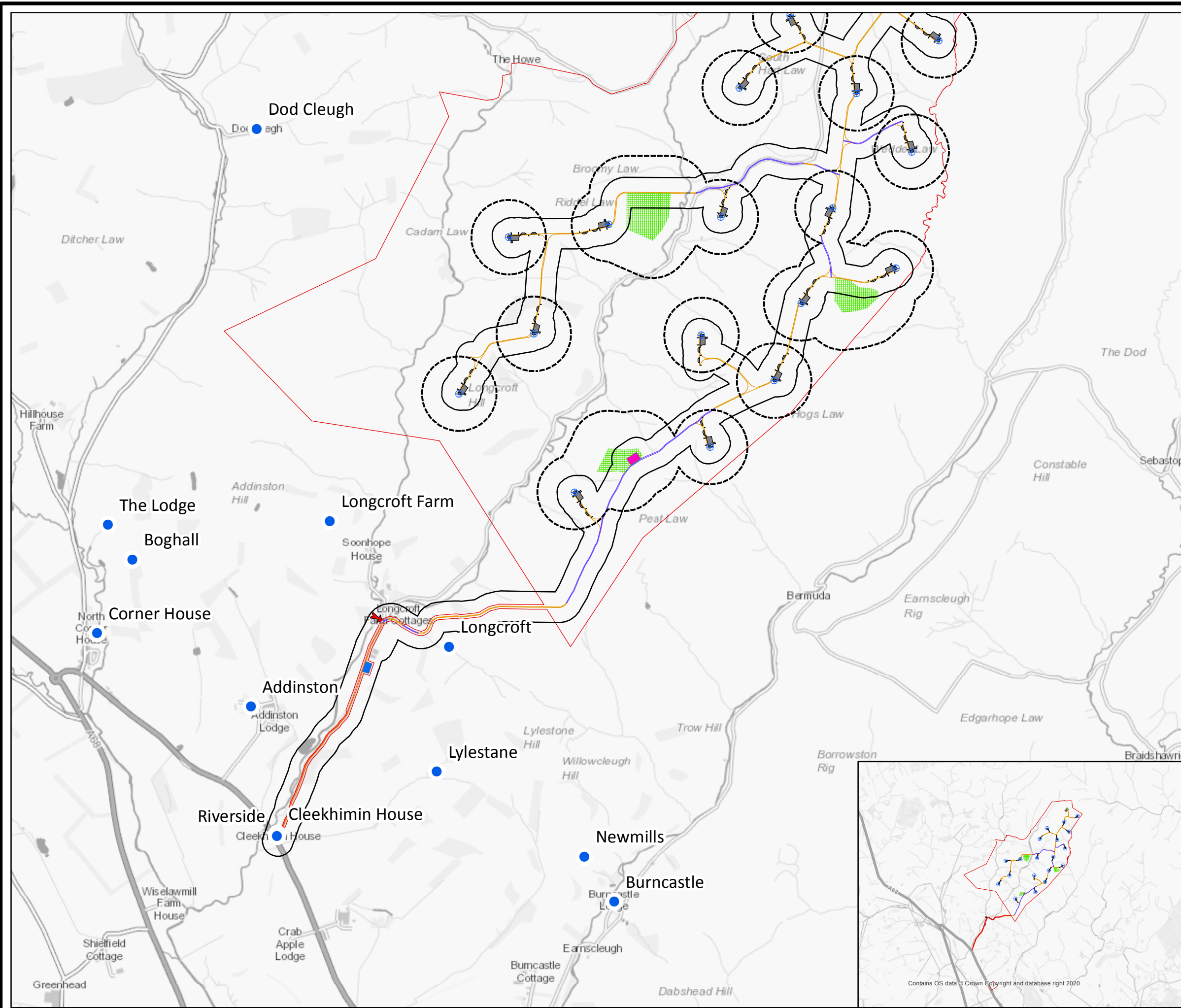
LONGCROFT WIND FARM PWSRA

FIGURE 5 PROPOSED DEVELOPMENT

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KEY

- Site Boundary
- Turbines
- Watercourse Crossing
- Temporary Construction Compound
- Temp Concrete Batching Plant
- Substation Compound
- Site Entrance
- Hardstandings
- Borrow Pit Search Areas
- Battery Storage Compound
- Upgraded Tracks
- Proposed Tracks
- Existing Public Road
- Infrastructure Buffer (100 m)
- Infrastructure Buffer (250 m)
- PWS Sources



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Annex 2 Example Consultation Questionnaire

Name & Address:

Contact Details:

Are you happy for ITP Energised to contact you with any queries with regards to this form? YES/NO

*Please provide as much information as you can for the relevant questions below.***1. Is your property connected to a water mains supply? YES/NO***If YES, please return this sheet to ITP Energised in the envelope enclosed.**If NO, please answer the following question.**(If your property is both connected to the mains and has a private supply, please answer the following questions with respect to the private supply)***2. Please indicate what type(s) of private water supply you have:**Spring-fed Watercourse Supply Borehole Other / Unknown **3. Spring Fed Source(s)**

Location of Spring:

Is your spring water gravity fed or pumped to your holding tank? GRAVITY / PUMPED / UNKNOWN

4. Borehole Supply

Location of Borehole:

Does your borehole have a pump? YES / NO / UNKNOWN

What is the depth of the borehole?

5. Watercourse Supply

Location of Supply:

Name of Watercourse:

6. Other / Unknown Source(s)

Please provide what details you have including likely source location, water treatment, quantities used, etc.

7. Please indicate what you use your water supply for:Drinking Domestic Livestock Other **8. Please provide details of water treatment, if known:**None Filter UV Other

9. Do you share your supply with other properties? If yes, please list below.

10. Further Information (e.g. notes on water quality, historical problems, pumping rates / volumes / yields etc.):

Annex 3 PWS Screening

Table A.1: PWS Consultation Responses

Property Ref	Property	Source Type	Location Known	Comments
1	Addinston Farmhouse	Spring	Not provided	Spring-fed, used for drinking and domestic purposes.
2	No.1 Addinston Farm Cottage	Not provided	Not provided	Details not provided, queried the paid benefits for the scheme which is ongoing.
8	Boghall	Spring	Yes	Spring fed, used for drinking and domestic, no treatment or filters.
19	Soonhope House	Not provided	Not provided	Contacted by email to request stamped envelope for response.
20	Newmills Farm	Unknown - from a hillside	Not provided	Used for drinking domestic and livestock, gathered from hillside with no treatment, when not sufficient during dry spells uses mains water. Shared with Newbigging Walls.
23	Newbigging Walls	Spring	Yes	Unknown if gravity or spring fed. Used for drinking, domestic and livestock. Details of UV and Filter. Shares supply with Newmills Farm.
28	Burnden	Spring	No	Used for drinking and domestic. Has UV and filter. Shares supply with Boghall.
32	Mid House	Borehole	Yes	Property is supplied by borehole, approx. 27 m depth to pump, used for domestic and drinking. Shares source with Corner House and North Corner House
33	North Corner House	Borehole	Yes	Property is supplied by a approx.30 m deep borehole, used for domestic and drinking. Shares source with Corner House and Mid House
37	Lylestane Farm	Mains / Spring and Stream abstraction	Yes	Supply from Lylestone Hill, gravity fed, used for livestock and fire hydrant tank. Supplies utilised in Longcroft fields. Farm is connected to mains for drinking and domestic.

Table A.2: PWS Consultation and Site Visit Summary

Property Ref	Property	Source Name	Source Type	Letter Consultation	Site Visit	Consultation Summary
1	Addinston Farmhouse	Addinston	PWS - Spring	Response received September 2023. Confirmed the source type however not location. Confirmed did not want to be contacted further (provided no contact details) and asked to contact owner.	No site visit undertaken as response not received prior to site visits.	Assessment of Addinston source based on council register information.
2	No. 1 Addinston Farm Cottage	Addinston	PWS - Spring	Response received August 2023. Did not complete consultation questionnaire. Would complete details only following consultation regarding paid benefits.	No site visit undertaken as response not received prior to site visits.	Assessment of Addinston source based on council register information.
3	No. 2 Addinston Farm Cottage	Addinston	PWS - Spring	No response to consultation.	No site visit undertaken.	Assessment of Addinston source based on council register information.
4	No. 3 Addinston Farm Cottage	Addinston				
5	No. 4 Addinston Farm Cottage	Addinston				
6	The Lodge	Addinston				
7	The Bungalow	Addinston				
8	Boghall	Boghall	PWS - Spring	Response received September 2023. Confirmed source type and location.	No site visit undertaken as response not received prior to site visits.	Assessment based on Boghall (Ref 8) resident consultation.
9	Boghall House	Boghall	PWS - Spring	No response to consultation.		

Property Ref	Property	Source Name	Source Type	Letter Consultation	Site Visit	Consultation Summary
10	Glencroft	Boghall			No site visit undertaken.	Assessment based on Boghall (Ref 8) resident consultation.
11	Cleekhimin House	Cleekhimin House	Groundwater - Well	No initial response to letter consultation. Following second consultation letter, resident responded and undertook consultation by phone. Confirmed type and location of source. Also provided details of Riverside source.	Not present during site visit.	Assessment based on Cleekhimin House (Ref 11) resident consultation.
12	Dod Cleugh	Dod Cleugh	PWS - Spring	No response to consultation.	No site visit undertaken.	Assessment of Dod Cleugh source based on council register information.
13	Tollishill	Dod Cleugh				
14	1 Longcroft Farm Cottages	Longcroft	PWS - Spring	No response to consultation.	Site visit undertaken to source following consultation with shepherd and resident if Longcroft Farmhouse.	The assessment of Longcroft source will be based on consultation with Longcroft Farmhouse and observations during site visit.
15	2 Longcroft Farm Cottages	Longcroft				
16	3 Longcroft Farm Cottages	Longcroft				
17	4 Longcroft Farm Cottages	Longcroft				
18	Longcroft Farmhouse	Longcroft Farm	PWS - Spring	No response to consultation.	During site visit undertook consultation with	The assessment of Longcroft Farm source will be based on Longcroft Farmhouse and

Property Ref	Property	Source Name	Source Type	Letter Consultation	Site Visit	Consultation Summary
					resident who due to being onsite shepherd could provide source type and location of sources Longcroft and Longcroft Farm.	Soonhope House resident's consultation during site visit.
19	Soonhope House	Longcroft Farm	PWS - Spring	Responded to consultation in July 2023. Requested a stamped envelope for a response.	During site visit undertook consultation onsite with resident. Confirmed source type and location, visited source onsite.	The assessment of Longcroft Farm source will be based on Longcroft Farmhouse and Soonhope House resident's consultation during site visit.
20	Newmills Farmhouse	Newmills	PWS - Spring	Responded to consultation in July 2023. Could not confirm supply type or location other than from a hillside.	Visit to Newbigging Walls Farmhouse (Ref 23) undertaken.	The assessment of Newmills source will be based on consultation with Newmills Farmhouse and Newbigging Walls Farmhouse and observations during site visit.
21	1 Newmills Farm Cottages	Newmills	PWS - Spring	No response to consultation.	Visit to Newbigging Walls Farmhouse (Ref 23) undertaken.	The assessment of Newmills source will be based on consultation with Newmills Farmhouse and Newbigging Walls Farmhouse and observations during site visit.
22	2 Newmills Farm Cottages	Newmills				

Property Ref	Property	Source Name	Source Type	Letter Consultation	Site Visit	Consultation Summary
23	Newbigging Walls Farmhouse	Newmills	PWS - Spring	Responded to consultation in July 2023. Confirmed supply type and location.	Visited property to undertake onsite consultation and confirmed sourced from spring on hillside and is topped up by Mains during dry spells.	The assessment of Newmills source will be based on consultation with Newmills Farmhouse and Newbigging Walls Farmhouse and observations during site visit.
24	The Old Mill	Newmills	PWS - Spring	No response to consultation.	Visit to Newbigging Walls Farmhouse (Ref 23) undertaken.	The assessment of Newmills source will be based on consultation with Newmills Farmhouse and Newbigging Walls Farmhouse and observations during site visit.
25	Riverside (Woodrigdean)	Riverside	PWS - Spring	No response to consultation. During phone consultation with Cleekhimin House resident, confirmed that property had a PWS and it was not shared.	Not present during site visit.	Assessment of Riverside source will be based on council register information and local knowledge provided by Cleekhimin House resident.
26	The Lodge	The Lodge	PWS - Spring	No response to consultation.	No site visit undertaken.	Assessment of The Lodge source based on council register information.
27	Mill View	The Lodge				
28	Burnden	Boghall	PWS - Spring	Responded to consultation in July 2023. Confirmed shared same supply as Boghall rather than council register of The Lodge.	No site visit undertaken.	Assessment based on Boghall (Ref 8) resident consultation.

Property Ref	Property	Source Name	Source Type	Letter Consultation	Site Visit	Consultation Summary
				Could not confirm other PWS details as had newly moved to property.		
29	Burncastle Lodge	Burncastle	PWS - Borehole	No response to consultation.	Visit to Valley View (Ref 45) undertaken.	PWS assessment based on onsite consultation with Valley View (Ref 45) resident.
30	Soonhope Bothy	Longcroft Farm	PWS - Spring	No response to consultation.	Site visit undertaken following consultation with Soonhope House.	The assessment of Longcroft Farm source will be based on Longcroft Farmhouse and Soonhope House resident's consultation during site visit.
31	Corner House	Corner House	PWS - Borehole	No response to consultation. See consultation response from properties Ref 32 and Ref 33.	No site visit undertaken.	Assessment based on Mid House (Ref 32) and North Corner House (Ref 33) resident consultation.
32	Mid House	Corner House	PWS - Borehole	Response received September 2023. Confirmed supplied by borehole and supply shared with Corner House and North Corner House. Confirmed location in garden.	No site visit undertaken.	The assessment of Corner House source will be based on Mid House and North Corner House resident's response to letter consultation.
33	North Corner House	Corner House	PWS - Borehole	Response received September 2023. Confirmed supplied by borehole and supply shared with Corner House and North Corner House.	No site visit undertaken.	The assessment of Corner House source will be based on Mid House and North Corner House resident's response to letter consultation.

Property Ref	Property	Source Name	Source Type	Letter Consultation	Site Visit	Consultation Summary
34	Burncastle Farmhouse	Burncastle	PWS - Borehole	No response to consultation.	Visit to Valley View (Ref 45) undertaken.	PWS assessment based on onsite consultation with Valley View (Ref 45) resident.
35	Burncastle Farm Cottage	Burncastle				
36	Burncastle Farm	Burncastle				
37	Lylestane Farm	Lylestane	Mains, Spring and Stream Abstraction	A response was received in September 2023. Confirming that the private supply is utilised for livestock and fire hydrant only.	No site visit undertaken as response not received prior to site visits. Response from resident confirmed location.	The assessment of Lylestane source will be based on Lylestane Farm resident's response to letter consultation.
38	1 Lylestane Farm Cottage	Unconfirmed	Unconfirmed, not on council EHO register.	No response to consultation.	No site visit undertaken.	Based on lack of resident responses and not being held on council PWS register, these properties are scoped out of assessment.
39	2 Lylestane Farm Cottage	Unconfirmed				
40	3 Lylestane Farm Cottage	Unconfirmed				
41	4 Lylestane Farm Cottage	Unconfirmed				
42	5 Lylestane Farm Cottage	Unconfirmed				
43	6 Lylestane Farm Cottage	Unconfirmed				

Property Ref	Property	Source Name	Source Type	Letter Consultation	Site Visit	Consultation Summary
44	Burncastle Farm Bothy	Burncastle	PWS - Borehole	No letter consultation issued; properties identified during site visit.	Visit to Valley View (Ref 45) undertaken.	PWS assessment based on onsite consultation with Valley View (Ref 45) resident.
45	Valley View	Burncastle	PWS - Borehole	No letter consultation issued; properties identified during site visit.	During site visits, door knocking led to consultation with Valley View resident who confirmed all properties on Burncastle Estate are supplied by borehole at Burncastle Lodge in valley. Supply is pumped to tank at Burncastle Farmhouse which is then used for drinking, domestic and livestock.	The assessment of Burncastle source will be based on Valley View resident's response during site visit consultation.
46	1 Percy Cottage	Burncastle	PWS - Borehole	No letter consultation issued; properties identified during site visit.	Visit to Valley View (Ref 45) undertaken.	PWS assessment based on onsite consultation with Valley View (Ref 45) resident.
47	2 Percy Cottage	Burncastle				
48	Cooks Cottage	Burncastle				
49	Burncastle Estate	Burncastle				
50	Earnsclough	Burncastle				

Table A.3: Summary of PWS Assessment

Source Name	No. of properties supplied	Source Type	Approx. Source Location	Approx. distance from proposed development	Justification
Addinston	7	Spring	351995, 653162	Located 530m from existing public road	Spring likely sources from the south side of Addinston Hill, where there are several springs marked. This would far exceed the required infrastructure buffers from the turbines and infrastructure to the north and the distance from the public access road to the south east. While likely situated within the Dean Sike or Cleekhimin Burn catchment, it would be disconnected from the site by either the Cleekhimin Burn or Hope Burn.
Boghall	4	Spring	351060, 654240	Located 1.7km from existing public road, and temporary construction compound.	Located within the Kelhope Burn catchment, there is no proposed development infrastructure within this catchment. It is also located outwith the 100m and 250m groundwater abstraction buffers and is therefore scoped out of further mitigation.
Cleekhimin House	1	Well	352161, 652330	Located 20m from existing public road, and 1.4km from temporary construction compound.	The well would potentially source from surface water runoff and near surface groundwater. It is located in close proximity to the Cleekhimin Burn within its catchment. While it is located downslope of the public road which will be utilised this is unlikely to increase sedimentation to the PWS due to no works planned and current trackside drainage. In the unlikely event of fuel spill upslope of the PWS, emergency procedures outlined within the CEMP would be enacted.
Dod Cleugh	2	Spring	352032, 657039	Located 1.8km from T17.	Located in Kelhope Burn catchment, where no proposed development infrastructure is located within. The spring source is hydrologically disconnected by topography and by Soonhope Burn. It is not located within abstraction infrastructure buffers.
Longcroft	4	Spring	353277, 653623	Located 180m from proposed tracks.	The spring is located in close proximity to Allers Burn within its sub-catchment, within the Whalplaw Burn catchment. It is located outwith the 100m infrastructure buffer from the proposed tracks, and there is no proposed infrastructure within its source catchment.

Source Name	No. of properties supplied	Source Type	Approx. Source Location	Approx. distance from proposed development	Justification
					Its pipe connecting to infrastructure follows the burn downslope and will likely cross over the proposed track which will need to be marked and redirected under the proposed track.
Longcroft Farm	3	Spring	352291, 654503	Located 770m from proposed tracks and 1.2km from T19.	While the spring source is located within the Cleekhimin Burn catchment, it is hydrologically disconnected from the site by Soonhope Burn and Hope Burn. It is located outwith the 100m and 250m infrastructure buffers.
Newmills	5	Spring	354239, 652218	Located 1.7km from proposed tracks.	While located within Earnscleugh Water catchment which partly underlies the site, it is hydrologically disconnected by Lylestone Hill and Willowcleugh Burn. The spring is also located outwith the 100m and 250m infrastructure buffers.
Riverside	1	Spring	352168, 652293	Located 15m from existing public road and 1.4km from temporary construction compound.	While the spring is noted by the council to be downslope, based on resident feedback from Cleekhimin House and its source type as a spring it is likely to source from the southern slopes of Lylestone Hill. It is hydrologically disconnected from new infrastructure by Allers Burn and Lylestone Hill. Similar to Cleekhimin House it would only likely be an increased risk due to construction traffic along the public road. In the event of a fuel spill, an emergency response plan as noted within the CEMP would be employed and residents notified.
The Lodge	2	Spring	351034, 654382	Located 1.9km from existing public road, and temporary construction compound.	Located within the Kelhope Burn catchment, there is no proposed development infrastructure within this catchment. It is also located outwith the 100m and 250m groundwater abstraction buffers and is therefore scoped out of further mitigation.
Burncastle	11	Borehole	354359, 651920	Located 2km from proposed tracks.	While located within Earnscleugh Water catchment which is also partly underlying the site, it is hydrologically disconnected by Earnscleugh Water. The borehole is also located outwith the 100m and 250m infrastructure buffers.

Source Name	No. of properties supplied	Source Type	Approx. Source Location	Approx. distance from proposed development	Justification
Corner House	3	Borehole	350726, 653775	Located 1.6km from existing public road, and 1.8km from temporary construction compound.	Located within the Kelphope Burn catchment, there is no proposed development infrastructure within this catchment. It is also disconnected from infrastructure by Addinston Hill and Kelphope Burn. It is also located outwith the 100m and 250m groundwater abstraction buffers and is therefore scoped out of further mitigation.
Lylestane	7	Mains, spring and stream abstraction	353131, 652842	Located 715m from existing public road, and 925m from temporary construction compound.	Located in a separate hydrological catchment from the site and is hydrologically disconnected from the proposed development by Lylestone Hill. It is also located outwith the 100m and 250m infrastructure buffers.