Technical Appendix 10.2: Private Water Supplies Assessment

10.1 Executive Summary

10.1.1 There is a potential, if poorly designed and unmitigated, for excavation of soil and bedrock during the construction phase of the Proposed Development to cause localised disruption and interruption to groundwater flow. Interruption of groundwater flow could potentially reduce the supply of groundwater water to private Water Supplies (PWS's) thereby causing an alteration/change in the quality or quantity of and/or the physical or biological characteristics of the PWS. Contamination of groundwater may also cause physical or chemical contamination to the PWS.

10.1.2 There is also a potential for works to alter in-channel or overland flow regimes through excavations, disruption to artificial drains, exposure of bare earth or rock and the construction of new or upgrades to existing watercourse crossings Such activity may affect water quality at PWS from surface water sources.

10.1.3 This Technical Appendix provides a summary of the locations of PWS in the vicinity of the Proposed Development as derived from public data sources and site walkover, and assesses the potential for hydraulic connectivity to the Proposed Development. Underlying geological conditions are also taken into account in assessing the potential for impacts on PWS.

10.1.4 All PWS identified are located at a minimum distance of 1.8 km from the site. It is therefore considered that for PWS reliant on groundwater abstraction, they are highly unlikely to be affected by the Proposed Development.

10.1.5 In respect to PWS from surface water sources, review of the locations of PWS downstream of the site shows identified locations are not in potential hydrological connection to the Proposed Development with regards to abstraction from surface water sources.

10.1.6 While mitigation and best practice measures would be implemented on the Proposed Development, it is concluded that the risk of potential impact to PWS's as a result of the Proposed Development is considered to be negligible.

10.2 Introduction

10.2.1 The purpose of this technical appendix is to identify the location of Private Water Supplies (PWS) relative to the Proposed Development, and to undertake an assessment of the potential for the Proposed Development to impact on any such PWS.

10.3 Baseline

10.3.1 A PWS is considered to be a small abstraction of less than 10 m^3 per day from a source such as a borehole, spring / well, or surface water body.

10.3.2 Scottish Environment Protection Agency (SEPA) typically require that all groundwater abstractions be identified within 100m of proposed roads, tracks and trenches or within 250m from borrow pits and foundations. In addition to screening for PWS within these buffers this assessment also considers further supplies, at a greater distance, in potential hydrological connection to the Proposed Development.

PWS Locations

10.3.3 The Drinking Water Quality Regulator (DWQR) for Scotland enforces the requirements of The Public Water Supplies (Scotland) Regulations 2014. The DWQR Private Water Supply Map[1], which lists both larger (e.g. commercial; regulated supplies (Type A)) and smaller (e.g. domestic; exempt supplies (Type B)) PWS, was reviewed.

10.3.4 A data request was submitted to The Highland Council (THC) and verified against the most recent data available via the THC Open Data dataset[2], last updated on 11 November 2019. There was no evidence of potential PWS locations observed during the site visit and the Applicant reported that no PWS are associated with Stronelairg Wind Farm.

10.3.5 According to the DWQR and THC, there are 14 registered PWS within a 5km radius of the Proposed Development; these have been summarised in Table 1 and Illustrated on Figure 1.

Table 1: PWS Within a 5 km Radius of the Proposed Development

Ref	Name	Type	Properties on Supply	Source	Location	Closest distance to study area
1	PWS Thistle Stop Cafe	A	4	Spring	238341 808009	1.8km south-west
2	PWS No 3 Port Claire	B	1	Unknown	239029 810945	2.1km north-west
3	PWS Inchnacardoch	B	1	Unknown	237195 807514	2.2km south-west
4	Mr S Bremner	N/A	N/A	Unknown	237650 806973	3.0km south-west
5	PWS Lochuanagan	B	1	Unknown	237208 807540	3.1mk south-west

[1] http://dwqr.scot/private-supply/pws-location-map/, accessed 1st May 2019.
[2] https://map-highland.opendata.arcgis.com/datasets/ded172bbade24650bb2c1baec5e0d318_0?geometry=-5.253%2C57.053%2C-3.946%2C57.183, accessed 15th January 2020.

Ref	Name	Type	Properties on Supply	Source	Location	Closest distance to study area
6	PWS Culachy	A	7	Hill run-off	237674 806558	3.2km south-west
7	Mr S Crook	N/A	N/A	Unknown	237319 807113	3.3km south-west
8	PWS Ard Aluinn	B	1	Stream	237352 806958	3.3km south-west
9	PWS 7b Achnacloich	B	1	Stream	235290 808127	4.8km south-west
10	PWS Killin	B	1	Unknown	252646 809055	4.8km north
11	PWS Pine Tops	B	1	Borehole	235206 808083	4.9km south-west
12	PWS 8 Auchterawe	B	1	Hill run-off	235095 808326	4.9km south-west
13	PWS Whinhill	B	1	Borheole	235125 807970	5.0km south-west
14	Robert Weir	N/A	N/A	Unknown	235095 807999	5.0km south-west
15	PWS Killannan Mor	B	1	Stream	241392 813674	4.9km north (north of Loch Ness)
16	PWS Point Clare House	B	1	Steam	241823 813630	4.9km north (north of Loch Ness)

10.3.6 Abstraction for private use is noted to be from surface water sources (stream or runoff) at four locations and from groundwater sources (spring or borehole) at three locations. The sources of abstraction is not known at seven locations, therefore a conservative approach of assuming that these supplies could be from either groundwater or surface water resources should be taken.

Hydrogeology

10.3.7 According to the British Geological Society (BGS) digital map and Hydrogeological and Groundwater Vulnerability Maps of Scotland (1:625,000), the site is underlain by igneous and metamorphic bedrock formations and both are recognised as low productivity aquifers. Such aquifers are characterised as having limited groundwater potential, with small amounts of groundwater limited to near surface weathered zones and secondary fractures (e.g. rare springs). Low productivity aquifers do not widely contain groundwater in exploitable quantities; however, some bedrock formations can locally yield water supplies in sufficient quantities for private/domestic use. The overlying superficial deposits are considered to be generally of low permeability; however, groundwater may be present in sand and gravel lenses, hence locally important aquifers or perched

groundwater bodies may be present, although are unlikely to be continuous over a wide area.

10.4 Potential Impacts

10.4.1 There is a potential, if poorly designed and unmitigated, for excavation of soil and bedrock during the construction phase of the Proposed Development to cause localised disruption and interruption to groundwater flow. Interruption of groundwater flow could potentially reduce the supply of groundwater water to PWS's thereby causing an alteration/change in the quality or quantity of and/or the physical or biological characteristics of the PWS. Contamination of groundwater may also cause physical or chemical contamination to the PWS.

10.4.2 There is also a potential for works to alter in-channel or overland flow regimes through excavations, disruption to artificial drains, exposure of bare earth or rock and the construction of new or upgrades to existing watercourse crossings Such activity may affect water quality at PWS from surface water sources.

10.4.3 All PWS identified are located at a minimum distance of 1.8km from the site. It is therefore considered that for PWS reliant on groundwater abstraction, they are highly unlikely to be affected by the Proposed Development.

10.4.4 Several locations to the south west of the site (PWS Thistle Stop Café, Lochuanagan, Ard Aluinn and Culachy) fall within the River Tarff catchment. All of these locations are hydrologically upgradient of the River Tarff and are therefore not considered to be in potential hydrological connection to the Proposed Development with regards to abstraction from surface water sources.

10.4.5 The 'PWS Killin' is located downstream of the site in the catchment of the River Killin. However, mapping shows the abstraction point to be approximately 360m west of the River Killin and is therefore highly unlikely to be abstracted from a source in connection with the Proposed Development with regards to abstraction from surface water sources.

10.4.6 Further PWS's within a 5km radius of the site are shown to be entirely outwith the catchments associated with the Proposed Development and therefore are not considered to be at risk from construction activity at the site with regards to abstraction from surface water sources.

10.4.7 PWS located at a greater distance than 5km from the site are considered highly unlikely to be within hydrological connection to the site.

10.5 Site Best Practice and Environmental Management

10.5.1 To ensure that all drainage measures employed during the construction phase of the Proposed Development are maintained appropriately and remain effective, the performance of the drainage measures would be monitored.

10.5.2 The construction works would follow best practice principles to be set out within the CEMP. The drainage management works would be supervised by the Ecological Clerk of Works (ECoW). All monitoring and supervision of the drainage management works would be recorded.

10.5.3 The best practice measures to be set out in the CEMP will accord with guidance such as that published by Scottish Natural Heritage (SNH) and SEPA. The following best practice measures are considered applicable to the Proposed Development:

- Engineering activities such as culverts, bridges, watercourse diversions, bank modifications and dams are avoided wherever possible in order to maintain the natural state of the water environment;
- Appropriate buffer zones between water bodies and construction areas are established;
- No large capacity build ups of surface water can occur that could lead to additional loadings being placed on the surrounding ground- that may lead to soil failure, especially in areas with peat stability concerns;
- Any effects on natural flora and fauna are minimised, and there are no indirect impacts on any surrounding designated sites;
- Pollution Prevention and Environmental Protection Legislation are adhered to;
- Works are allowed to progress efficiently without flash wash-out events affecting partially completed sections; and
- The completed development can be suitably operated with the minimum maintenance to the installed drainage systems.

10.6 Conclusions

10.6.1 The assessment has concluded that the risk of potential impact to PWS's as a result of the Proposed Development is considered to be negligible.