Volume 5: Appendix 13.2 – Private Water Supply and Groundwater Abstraction Assessment

Scottish & Southern Electricity Networks
TRANSMISSION

CONTENTS

LIST OF ABBREVIATIONS

BGS – British Geological Survey
CEMP – Construction Environmental Management Plan
CIRIA – Construction Industry Research and Information Association
DTM – Digital Terrain Model
ECoW – Environmental Clerk of Works
EIA – Environmental Impact Assessment
EIAR – Environmental Impact Assessment Report
EPZ – Equipotential Zone
GEMP – General Environmental Management Plans
GPP – Guidance for Pollution Prevention
GWDTE – Groundwater Dependent Terrestrial Ecosystems
LiDAR – Light Detection and Ranging
mAOD – Metres Above Ordnance Datum
NVC – National Vegetation Classification
OHL – Overhead Line
PWS – Private Water Supplies
SEPA – Scottish Environment Protection Agency
SuDs – Sustainable Drainage Systems

1. INTRODUCTION

1.1.1 This appendix details the assessment undertaken to identify Private Water Supplies (PWS) and groundwater abstractions that may be affected by the proposed Kintore to Tealing 400 kV Overhead Line (OHL) and associated infrastructure (the 'Proposed Development') as described in **Volume 1, Chapter 3: Project Description**. This document should be read in conjunction with **Volume 1, Chapter 3: Project Description** and **Volume 2, Chapter 13: Hydrology, Hydrogeology, Geology and Soils** of the Kintore to Tealing 400 kV OHL Environmental Impact Assessment Report (EIAR).

1.1.2 The Proposed Development is located within the administrative boundaries of Angus Council and Aberdeenshire Council. The Site is located between Tealing in Angus and Kintore in Aberdeenshire and is approximately 105.2 km in length. PWS and groundwater abstractions located within a 1 km buffer from the Site boundary have been identified and potential risk to the source and associated properties assessed based on topography and distance from the proposed infrastructure.

1.1.3 Scottish Environment Protection Agency (SEPA) guidance[1] on assessing the effects of developments on groundwater abstractions (including public and private water supplies) states that the relevant buffer zones for groundwater abstractions for all proposed infrastructure, both temporary and permanent are:

- 10 m for all activities;
- 100 m radius of all subsurface activities less than 1 m in depth; and
- 250 m of all subsurface activities deeper than 1 m.

1.1.4 A 250 m buffer was applied to all proposed infrastructure due to uncertainties in excavation depths of the Proposed Development. Excavations for towers will be ~4 m deep. It is likely that most access tracks, working and laydown areas will require excavations of less than 1 m, however, there may be some areas where more than 1 m of cut is required on access tracks, working platforms and equipotential zone (EPZ) locations, dependent on further detailed design. Given the uncertainty, a conservative approach has been taken, assuming a 250 m buffer from all proposed infrastructure. A 250 m buffer was also used for surface water abstractions to account for potential effects arising through surface water runoff.

1.1.5 The assessment methodology follows the methods in **Volume 2, Chapter 13: Hydrology, Hydrogeology, Geology and Soils** to determine the sensitivity of receptor, magnitude of change and significance of effect, as set out in **Table 13.3: Criteria to Assess the Sensitivity of Receptor** and **Table 13.4: Criteria for Estimating the Magnitude of Change** and **Table 13.5: Matrix for Determination of Significance of Effects**.

1.1.6 The SEPA (2024) guidance[1] provides a matrix which shows how both the scale of the effects and the importance of the abstraction must be considered when assessing potential impacts. This is captured in the methodology used herein, as SEPA's matrix is essentially the same as **Table 13.5: Matrix for Determination of Significance of Effects**, which considers magnitude (scale of effect) and sensitivity (importance of the abstraction/PWS) in the same way as the SEPA matrix. The criteria used to estimate the magnitude of effect and sensitivity of the abstraction/PWS are the same as SEPA's suggested criteria. In this assessment an effect assessed to be of **Minor** significance equates to 'Low', and **Negligible** significance equates to 'Negligible/No effect/Unimportant' in the SEPA nomenclature.

1.1.7 It should be noted that the data on PWS and abstractions is the best available data at the time of writing and is based on consultation with Angus Council, Aberdeen City Council, Aberdeenshire Council, SEPA and local residents via questionnaire surveys, consultation events and property and source visits (**Section 2: Data Sources and Methodology).**

1.1.8 This appendix is supported by **Volume 3, Figures 13.3.1 – 13.3.15: Groundwater Abstractions, Water Supplies and GWDTE** in the EIAR.

[1] SEPA, 2024. *Guidance on Assessing the Impacts of Developments on Groundwater Abstractions*. Available at: https://www.sepa.org.uk/environment/land/planning/guidance-and-advice-notes/

2. DATA SOURCES AND METHODOLOGY

2.1.1 Angus Council, Aberdeen City Council and Aberdeenshire Council were consulted in July 2023 and provided data from their database of properties and businesses supplied by a PWS within a search area of a 1 km buffer from the Site boundary. It is noted that Council data may be incomplete and generally refers to the property (and not source) locations. The Aberdeenshire Council data has the following caveats:

- the information provided is unlikely to represent all of the private water supplies and the properties served within the search area specified;
- the supplies identified may no longer be in use or the properties identified may be served by a different source; and
- Aberdeenshire Council is not responsible for further use or interpretation of the data and all records should be subject to verification.

2.1.2 Within the 1 km search area, Angus Council provided a list of 49 addresses indicated to be served by PWS along with supply type, but no confirmed source locations. Aberdeenshire Council provided the locations of 56 PWS source locations and a list of 467 properties which are supplied by a PWS according to their records. PWS data from Aberdeen City Council data recorded no PWS sources or properties within 1 km of the Proposed Development.

2.1.3 SEPA was consulted in September 2023 and again in October 2024. SEPA provided a list of licensed groundwater abstractions within the search area. There are four licensed groundwater abstractions and several surface water abstractions within the search area.

2.1.4 A detailed assessment and verification of the data was required to establish the definitive locations of existing, and unknown, PWS sources, abstractions and supplied properties that may be potentially affected by the Proposed Development.

2.1.5 The online Scottish Water Asset map[2] was consulted to eliminate groups of properties that are shown to be connected to the Scottish Water mains. PWS questionnaires were then posted to all properties within 1 km from the Site boundary, which have the potential of having a PWS to establish whether they were on a PWS or mains connection and to obtain further information on the PWS, if applicable. A total of 1,301 questionnaires were sent out in June 2024. Several questionnaires that were either not returned or were returned unanswered due to incomplete address information or other inabilities to be delivered were reissued in early September 2024. SSEN Transmission, hereby referred to “The Applicant” also collected PWS information at public consultation events in September and October 2024, providing residents with questionnaires if they had not received them in the post.

2.1.6 In total, 294 individual responses were received from the questionnaires, either via paper, email, consultation events or an online response. A door-knocking exercise to visit properties where information was still lacking was carried out in November 2024 to collect and verify the data. Numerous properties were visited by hydrologists from Kaya Consulting. It should be noted that the residents of some properties are also in discussions with the Applicant, who also collected relevant PWS information to inform this assessment, where possible.

2.1.7 Some information was still outstanding following the property visits. This was due to residents not being at home at the time of the door knocking visit and because information was outstanding from residents who are currently in discussions with the Applicant. Several residents provided returns stating it was not their obligation to provide data or that they would withhold data. Comments and assumptions that have been made for the properties with incomplete information are provided in **Section 3: PWS Assessment** for specific PWS.

2.1.8 A total of 104 PWS sources were identified from the questionnaire responses, Council data, consultation events and property visits. Several of these PWS sources are outside the 1 km buffer. An additional six disused PWS were also confirmed; these PWS are linked to properties which no longer utilise them and have a Scottish Water Mains connection. A total of eight incomplete surveys were returned in which residents had either refused to provide data or

[2] Scottish Water, n.d. Scottish Water Asset Data. Scottish Water GIS Extranet. [Online] Available at: https://sw.cloud.esriuk.com/portal/apps/webappviewer/index.html?id=ee4bc6712ce64290b41b2d998ec7a749.

were not aware of details on their water supply. Many of the questionnaire respondents noted that their properties were supplied by Scottish Water mains, so these were recorded and discounted from the assessment. Of the 104 total confirmed PWS sources identified, only 42 PWS sources (13 of which are assumed) are within 250m of any proposed infrastructure.

2.1.9 **Volume 3, Figures 13.3.1 to 13.3.15: Groundwater Abstractions, Water Supplies and GWDTE** show the locations of PWS abstraction sources, alongside locations of properties served by PWS. The figures are labelled with information on the supply and property names.

2.1.10 Ongoing investigations and discussions with landowners are being conducted by the Applicant to establish the potential PWS sources at assumed PWS properties. This may confirm abstraction source locations, reveal separate supply abstraction sources, or eliminate assumed PWS sources from consideration in future.

3. PWS ASSESSMENT

3.1.1 There are 42 PWS/ groundwater abstractions located within 250 m of the Proposed Development infrastructure, 29 of these are confirmed and 13 of these are assumed (due to a lack of questionnaire response from residents and/or the inability to reach the residents during site surveys at properties where there is insufficient Scottish Water data or nearby questionnaire data to confirm a Mains connection). One surface water abstraction PWS, which is located ~500 m downstream of the Proposed Development, was included in the assessment as it draws water from a watercourse downstream of the infrastructure. Each PWS source/ abstraction and the potential effects from the Proposed Development are described below. Nine confirmed PWS sources are located within 100 m of proposed infrastructure.

3.1.2 In the absence of data on groundwater levels and groundwater flow paths, an analysis of topography and surface water flows paths and the type of PWS was used to infer hydrological and hydrogeological connectivity and identify if the Proposed Development could potentially have an effect on a PWS. **Plates 13.2.1** to **13.2.42** in this report show the surface water indicative flow paths, topography and a 250 m buffer from proposed infrastructure for each PWS.

3.1.3 Flow path analysis was undertaken for sources and properties to assess potential hydrogeological and hydrological connectivity to the Site. Flow routeing was carried out in QGIS software using Light Detection and Ranging (LiDAR) terrain data, where available, or using Ordnance Survey (OS) contour mapping if detailed topographic data was not available. Subsequently, in areas where LiDAR data is unavailable, the assessment figures may only include indicative flow pathways arrows, as opposed to detailed flow paths.

3.1.4 For PWS and abstractions that are sourced from groundwater (wells and/or springs) this assumes that groundwater flows paths are similar to surface water flows paths (a reasonable inference in the absence of groundwater levels and groundwater flow data). The results of the flow routeing analysis were used to determine the potential effect on PWS and what additional mitigation may be required.

3.1.5 The assessment is undertaken assuming that a suite of applied mitigation measures is implemented during construction. Applied mitigation measures are an integral part of the Proposed Development and reflect best practice guidance and recognised industry standards, as well as the Applicant's experience of constructing OHLs. They will comprise a Construction Environmental Management Plan (CEMP) that will comprise, among other requirements, a suite of SSEN Transmission General Environmental Protection Plans (GEMPs) and contractor authored documentation. This will detail general and site-specific measures that will be implemented to avoid or mitigate likely significant effects and that will be effected through planning conditions, construction contract wording or both. These plans and documentation will incorporate best practice guidance and recognised industry standards (eg SEPA guidance, including their *Guidance for Pollution Prevention* (GPPs)[3], CIRIA (Construction Industry Research and Information Association) The SuDS (Sustainable Drainage Systems) Manual[4] and CIRIA control of water pollution guidance[5,6,7]). Forestry felling and removal will follow the good practice guidance and legal requirements set out in Section 9 (Forests and Water) of the *UK Forestry Standard* (2023)[8].

3.1.6 The CEMP will capture all mitigation measures required in respect of hydrology and water quality, as identified in the EIAR and in order to comply with relevant legislation. This will be implemented during construction and operation of the Proposed Development. The applied mitigation will include SSEN Transmission's GEMP TG-NET-ENV-512 (Working in or Near Water), TG-NET-ENV-515 (Watercourse Crossings), TG-NET-ENV-519 (Forestry), TG-NET-

[3] Natural Resources Wales (NRW) Northern Ireland Environment Agency (NIEA), SEPA, Guidance for Pollution Prevention (GPPs 1,2,5,6,8,21,22,26) [online]. Available at: https://www.netregs.org.uk/environmental-topics/guidance-for-pollution-prevention-gpp-documents/ [Accessed: 20 May 2025].

[4] Woods Ballard, B., Wilson, S., Udale-Clarke, H. et al., (2015) CIRIA: The SuDS Manual (C753). CIRIA.

[5] Masters-William, H. (2001) Control of water pollution from construction sites. Guidance for consultants and contractors (C532). CIRIA.

[6] Murnane, E, Heap, A, Swain, A (2006) Control of water pollution from linear construction projects. Site guide (C649) CIRIA.

[7] Murnane, E, Heap, A, Swain, A (2006) Control of water pollution from linear construction projects. Technical guide (C648) CIRIA.

[8] Forest Research (2023) The UK Forestry Standard. Forest Research, Farnham, Fifth Edition [online]. Available at: https://www.forestresearch.gov.uk/tools-and-resources/fthr/uk-forestry-standard/ [Accessed 20 May 2025].

ENV-518 (Private Water Supplies), TG-NET-ENV-523 (Bad Weather), GEMP: Soil Management and TG-NET-ENV-520 (Dust Management). The implementation and audit of the measures in the CEMP and GEMP will be overseen by an Environmental Clerk of Works (ECoW). Further details of applied mitigation measures and good practice construction measures are provided in **Volume 2, Chapter 13: Hydrology, Hydrogeology, Geology and Soils**, **Table 13.14: Applied Mitigation**.

3.1.7 The following section describes the detailed assessments of all PWS sources within 250 m of the Proposed Development (**Table 13.2.1: PWS sources and abstractions within 250 m of the Proposed Development**) and is structured from Section A in the south to Section F in the north. This includes the 13 assumed PWS sources.

3.1.8 Given the proximity of the Proposed Development to the 42 PWS sources identified, SSEN Transmission will commit to monitoring all the 42 water supplies before, during and after construction. The monitoring strategy will be developed in consultation with SEPA and will follow SEPA (2024)[1] guidance on monitoring. Baseline monitoring will commence at least 12 months ahead of the development works starting on site and will continue during the construction phase, and for a minimum of 12 months post-construction. A PWS monitoring plan will be provided prior to construction.

Table 13.2.1: PWS sources and abstractions within 250 m of the Proposed Development

ID	Source Name	Source type	Source Easting	Source Northing	PWS Council/ SEPA abstraction reference (if applicable)	No. of properties supplied	Usage	Additional information	Distance from infrastructure
Section A									
1	Balkemback Farm	Spring	338550	738750	CAR/L/1010489	1	Agricultural (other than irrigation)	N/A	The property is ~375m east of tower S205 and 100m north of proposed access to this tower. The spring supply is located ~25 m east of existing track to tower S199
2	Coldstream	Spring x2	339396	739901	N/A	1 - Coldstream	Livestock and general farm use	Fed into storage tank located in the farm	190 m southeast of the proposed, permanent track between towers S196 and S195
			339461	740231					25 m from new, permanent access track near S195; 1 m from tower working compound
3	Nether Arniefoul	Spring (Ironharrow Well)	341009	743799	N/A	Unknown, only 1 confirmed	Domestic	N/A	~280 m east of tower working area
4	Upper Hayston Farm Cottage	Well	340495	745711	N/A	Unknown - the property is on a Scottish Water mains supply. It is assumed that the well may be for farm use	Unknown – possible farm use	N/A	125 m southwest of access track to tower S174

ID	Source Name	Source type	Source Easting	Source Northing	PWS Council/ SEPA abstraction reference (if applicable)	No. of properties supplied	Usage	Additional information	Distance from infrastructure
Section B									
5	Ballindarg Burn	Watercourse	340700	750200	CAR/L/1010577	1 - Upper Drumgley Farm	Agriculture	Abstraction along a 560 m section of the Ballindarg Burn	245 m west of S163; 216 m west of the temporary access track leading to S164
6	Balmadity	Watercourse	350591	762220	N/A	2 - Balmadity Cottage, Boggie Cottage	Domestic	-	251 m north of Tower S120 and 180 m north of proposed access track
Section C									
7	Dalladies	Spring	362350	768040	CAR/L/1010417	1 - Dalladies Farm	Abstraction for agricultural irrigation (mobile plant) and drinking water supply	-	250 m northwest of existing track for proposed upgrade leading to S81
8	Mains of Drumhendry	Assumed PWS-source type unknown	364489	769292	N/A	Unknown	Unknown	Unknown	Unknown, assumed ~190 m northwest of tower S73 working area
9	Whins Farm	Assumed PWS-source type unknown	366191	770323	N/A	Unknown	Unknown	Unknown	Unknown, assumed ~ 20 m south of existing track for upgrade and 45 m north of proposed new stone temporary track
10	Cowieshill	Well	367297	772134	N/A	1 - Cowieshill Farmhouse	Domestic	-	165 m to S60; 112 m to proposed access trackway
11	Hairyholm	Assumed PWS-source type unknown	366914	772042	N/A	Unknown	Unknown	Unknown	Unknown, assumed ~ 25 m northeast of proposed new stone temporary track

ID	Source Name	Source type	Source Easting	Source Northing	PWS Council/ SEPA abstraction reference (if applicable)	No. of properties supplied	Usage	Additional information	Distance from infrastructure
12	Coldstream Farm (Laurencekirk)	Assumed PWS-source type unknown	366660	772205	N/A	Unknown	Unknown	Unknown	Unknown, assumed 140 m northwest of proposed new stone temporary track and 40 m southwest of existing track proposed for upgrade
13	Coldstream Cottage	Assumed PWS-source type unknown	366585	772374	N/A	Unknown	Unknown	Unknown	Unknown, assumed ~ 20 m northwest of existing track proposed for upgrade
14	Parkhouse	Assumed PWS-source type unknown	366473	772621	N/A	Unknown	Unknown	Unknown	Unknown, assumed ~120 m northwest of existing track proposed for upgrade
15	Thornton Estate	Well	368122	772979	N/A	N/A	N/A	-	185 m northwest of temporary access track to Tower S56
Section D									
16	Black Burn	Watercourse	368650	773310	CAR/L/1010555	1 -The Bent	Abstraction for agriculture	Abstraction along a ~1.3 km section of the Black Burn	OHL span across the Black Burn; 120 m west of tower S55
17	Ducat Water	Watercourse	369300	774160	CAR/L/1010555	1 - The Bent	Abstraction for agriculture	Abstraction along an ~4.6 km section of the Ducat Water	OHL span across the Ducat Water; 86 m north of tower S50. 25 m from tower working areas
18	Cairnton Properties	Assumed PWS-source type unknown	372271	776971	N/A	Unknown	Unknown	Unknown	Unknown, assumed ~50m from proposed existing track for upgrade

ID	Source Name	Source type	Source Easting	Source Northing	PWS Council/ SEPA abstraction reference (if applicable)	No. of properties supplied	Usage	Additional information	Distance from infrastructure
19	Cushnie Farm	Spring	375213	77890	50036	1 - Cushnie Farm	Farm use	-	178 m south of the proposed temporary access track leading to S28
20	Burnhead of Monboddo	Spring	374568	779182	N/A	1 - Burnhead of Monboddo	Domestic, livestock, general farm use	Has never dried up	245 m from tower S28
		Stream – Hungeral Burn	374562	779237				Likely serves horses at the property	255 m from S28; 37 m south of proposed access trackway
21	Wattieston House	Assumed PWS-source type unknown	375211	779461	N/A	Unknown	Unknown	Unknown	Unknown, assume ~ 220 m proposed new temporary access track
22	Inches Cottage and Farm	Well (Subsurface spring)	376649	782341	N/A	At least 12 including Inches Cottage and Farm, Glenbervie Church and Ice Cream Factory	Domestic, livestock, general farm use, commercial	Supplies at least 18 m^3/day, subject to testing by Aberdeenshire Council as it is a Type A1 supply	245 m east of tower S17 working area
23	Cotbank	Well or spring	376767	782760	N/A	9 houses, 2 farms and 3 steadings, serving up to 24 individuals	Domestic, livestock, general farm use, commercial	One of three sources supplying properties in the surrounding area. Resident did not narrow down the source type	27 m southeast of new temporary track between S16 and S15. 65 m south of tower S15
24	Jacksbank	Spring	376846	782985	N/A	4 - Jacksbank Farm, Jacksbank House, 1 + 2 Jacksbank Cottages	Domestic, livestock, general farm use	Supplies 10 people and 200 cattle; partially goes dry in the Summer	172 m northwest of tower S15
		Borehole	376796	783226					190 m northwest of working area around tower S14
25	Blererno	Well	377924	782921	71650	2 properties at Blererno Cottages	Domestic		103 m east of the existing track leading to Jacksbank Wind Farm

ID	Source Name	Source type	Source Easting	Source Northing	PWS Council/ SEPA abstraction reference (if applicable)	No. of properties supplied	Usage	Additional information	Distance from infrastructure
									which is to be upgraded for the Proposed Development
26	Fetteresso Substation	Rainfall-fed	378997	785876	175	1 Commercial - Substation	Commercial	-	70 m north of existing access track for upgrade
Section E									
27	Stonehouse Cottage[9]	Watercourse-Cowie Water	377060	787835	N/A	1 - Stonehouse Cottage	Domestic	Water supply used for 30 years, never had any issues	~500 m downstream of existing track for upgrade
28	Tillybreak	Watercourse-unnamed tributary of the Cowie Water	378290	788376	N/A	1 - Tillybreak	Unknown	-	30 m south of existing track for upgrade
29	Monearn Lodge	Borehole	377349	791741	N/A	1 - Monearn Lodge	Unknown	-	~150 m south of existing track for upgrade
30	Meikledams	Assumed PWS-source type unknown	377162	794889	N/A	Unknown	Unknown	Unknown	Unknown, assumed ~ 240 m northwest of tower N68, 230 m south of existing track for upgrade
31	Wester Durris	Spring	376591	795591	N/A	At least 3, including Wester Durris, Wester Durris Cottage and Milton, potentially Wainsgate	Domestic, potentially general farm use	N/A	~190 m west of existing track for upgrade ~244 m southwest of alignment deviation tower 492R working area

[9] The PWS abstraction is ~500 m downstream of the Proposed Development but is included in the assessment as it is a surface water abstraction which draws water from a watercourse that is downstream of the proposed infrastructure.

ID	Source Name	Source type	Source Easting	Source Northing	PWS Council/ SEPA abstraction reference (if applicable)	No. of properties supplied	Usage	Additional information	Distance from infrastructure
Section F									
32	Woodbank	Well	377360	798504	N/A	Unknown – Location informed by resident at Woodbank House however it is unclear whether the supply serves this property, or any others	Unknown	The well was visited during the field survey but it did not appear to be in use	14 m west of the proposed temporary access track leading to N55; 60 m south of working area of tower N55
33	Park Estate	Well	377534	798716	N/A	1 - Lochwood Cottage	Domestic	Used as a backup water supply for Lochwood Cottage	157 m east of the proposed OHL spanning between N55 and N54
		Spring	377583	799342	35448	At least three - Lochwood Cottage, Westhills Cottage, Hill of Park		Fed to properties via pipework	205 m northwest of N53
34	King's Well	Well	377339	798901	N/A	Possibly Westhills Cottage and Woodbank House	Unknown - There is currently uncertainty from residents whether the well serves as a supply	It is noted that Westhills Cottage is also served by the Park Estate spring	84 m southwest of N54 and 32 m southwest of the proposed temporary access track
35	Collonach Cottage	Assumed PWS-source type unknown	376942	799972	N/A	Unknown	Unknown	Unknown	Unknown, assumed ~100 m west of proposed new stone permanent track
36	Templefold	Assumed PWS-source type unknown	377111	803246	N/A	Unknown	Unknown	Unknown	Unknown, assumed ~240 m from tower N42 working area

ID	Source Name	Source type	Source Easting	Source Northing	PWS Council/ SEPA abstraction reference (if applicable)	No. of properties supplied	Usage	Additional information	Distance from infrastructure
37	East Finnercy	Sping/ Borehole	376753	804112	34535	At least one - Little Finnercy but likely up to 6	Domestic	-	~140 m south of proposed permanent track at tower N38
38	Stepsbrae Steading/Backhill of Glack	Well	374493	810670	498	2 - Stepsbrae Steading, Backhill of Glack	Domestic, livestock	New water supply	93 m northwest from OHL spanning between N15 and N14
39	Lauchintilly Cottage	Assumed PWS-source type unknown	374502	812537	N/A	Unknown	Unknown	Unknown	Unknown, assumed ~ 180 m west of existing track for upgrade
40	Wardes Farm and Cottages	Assumed PWS-source type unknown	376383	812219	N/A	Unknown	Unknown	Unknown	Unknown, assumed ~ 40 m south or ~30 m north of proposed new stone permanent track
41	Bogfold	Well	376001	812659	N/A	1 - Bogfold	Domestic, livestock	Fed into storage tank at 376018, 812672; good supply	196 m northwest from N7
42	Leylodge Schoolhouse	Spring	376474	812599	N/A	1 - Leylodge Schoolhouse	Domestic, Livestock	Water line installed in the 1950s; pipe is not buried deep and is brittle	170 m southeast of N6

3.2 Section A

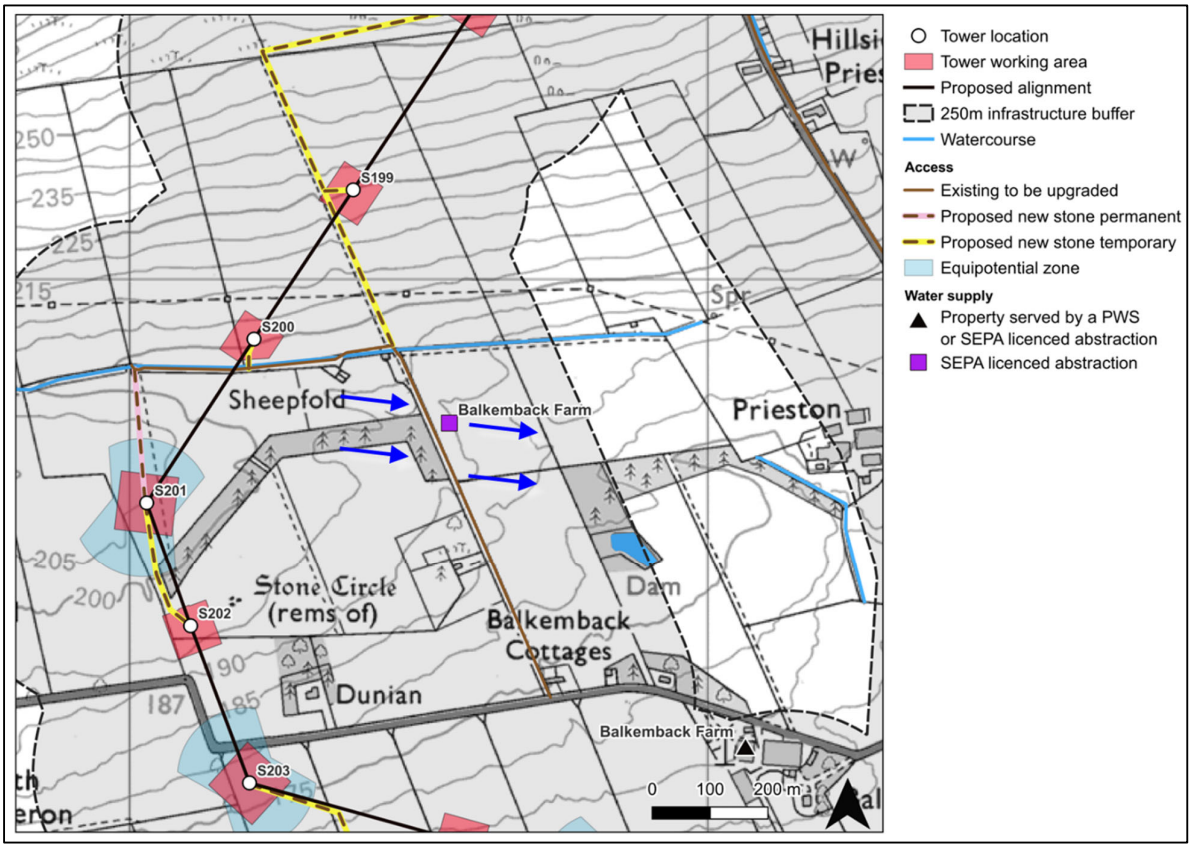
Balkemback Farm- PWS (SEPA CAR Licensed abstraction from groundwater spring)

3.2.1 Balkemback Farm is served by a spring, located around 500 m northwest of the property, as shown by the red diamond in **Plate 13.2.1: Balkemback PWS, topography and indicative surface flow paths (blue arrows)** marking the abstraction source location. The abstraction rate from the spring is unknown. A resident at the adjacent Balkemback Farm Cottages has confirmed they are served by a Scottish Water Mains supply, so it is likely that Balkemback Farm is also served by a Mains supply for domestic use and that the PWS is utilised for general farm use. There is no further additional information known regarding the supply.

3.2.2 The topography of the Balkemback Farm spring slopes gently downhill to the southeast. The spring sits directly beside what was the previous, natural route of a watercourse which has since been diverted, which is shown clearly in topographic mapping. SEPA flood mapping indicates that this route and the area at the spring is part of a surface water flow pathway which is at flood risk, with surface flows draining to the southeast. The proposed permanent access to towers S200, S199 and S198 is located ~25 m west of the spring abstraction location, with the spring sited slightly downslope of the existing access. There is therefore minor potential for construction runoff to affect the PWS quality, which will be captured by the embedded mitigation measures such as SuDS, swales, silt fences etc. Since no excavation will be required for upgrading the track, there will be no effect on groundwater levels and the magnitude of impact is negligible. As the PWS is for general farm use it is considered to be of low sensitivity. The effect on the spring without additional mitigation is considered to be **Negligible** and no additional mitigation will be required.

3.2.3 Monitoring of the spring will be undertaken before, during and after construction to check there is no contamination of the supply. Monitoring will be undertaken by an ECoW, and monitoring would likely be at the abstraction location. If the water quality deteriorates during construction (eg discoloured, high sediment content, hydrocarbons), or quantity decreases an alternative water supply will be installed, such as using the existing mains supply to the farm or using portable bowsers, to ensure minimal disruption of supply during construction.

Plate 13.2.1: Balkemback PWS, topography and indicative surface flow paths (blue arrows)

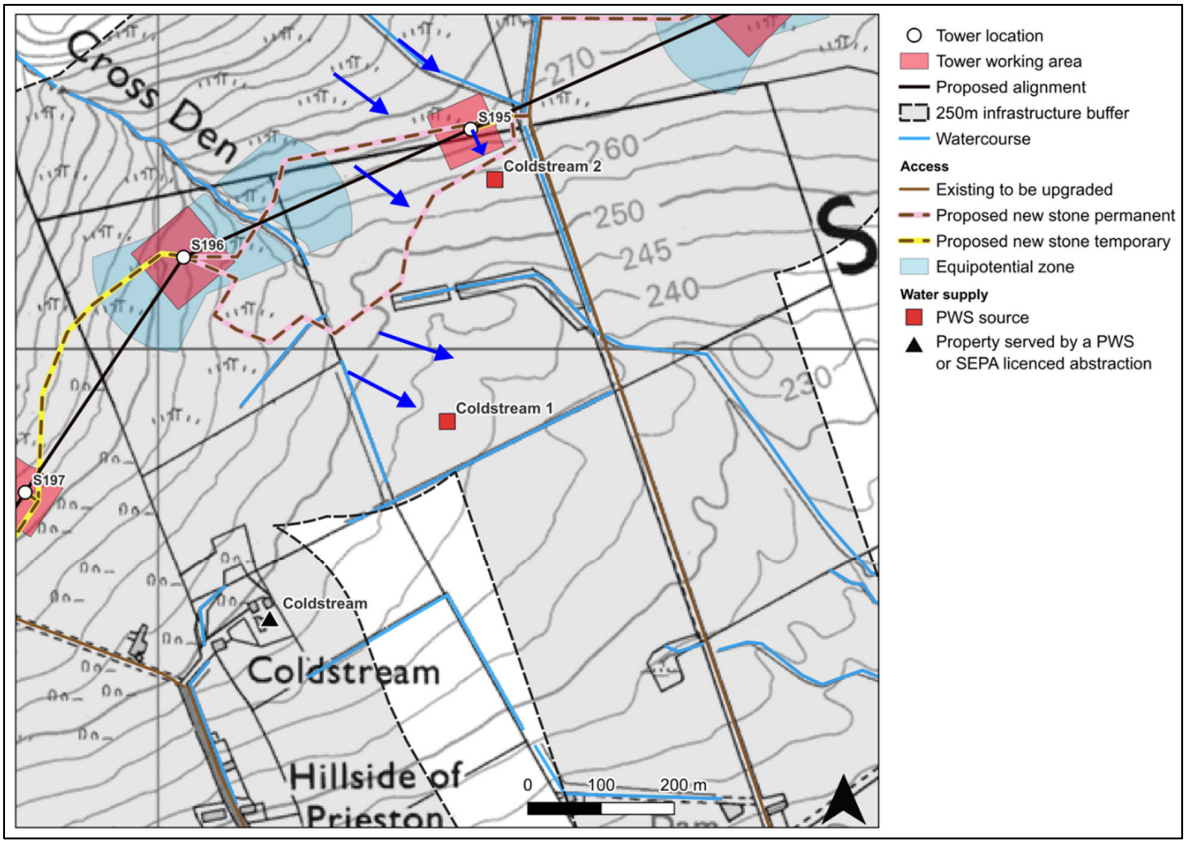


Coldstream PWS- PWS from two groundwater springs

3.2.4 Coldstream, Tealing is served by two springs, 380 m and 680 m northeast of the property (labelled 1 and 2 respectively on **Plate 13.2.2: Coldstream PWS, topography and indicative flow paths (blue arrows)**). The most prominent spring at the time of site visit, Spring 2 is shown in **Photo 1**. The abstraction rate from both springs is unknown. The resident noted that the springs provide a constant supply and excellent quality of water. The PWS is used for livestock and general farm use and is stored in a storage tank in the barn/shed by the property. The property has a Scottish Water Mains connection for domestic use.

3.2.5 The topography around Spring 1 slopes downhill to the southeast. A review of the topography and SEPA surface water flood maps[10] indicate that surface flows drain to the southeast in this area. The proposed permanent access track to tower S196 is located ~190 m northwest of Spring 1 and tower S195 is ~397 m north of the spring. Given the distance from infrastructure, it is considered that the magnitude of impact on the water quality and quantity at Spring 1 is negligible. As the PWS is for general farm use it is considered to be of low sensitivity and the significance of effect is considered to be **Negligible**.

Plate 13.2.2: Coldstream PWS, topography and indicative surface flow paths (blue arrows)



3.2.6 The topography around Spring 2 slopes downhill to the southeast/south. Generally, SEPA surface water flood maps indicate that surface flows drain away to the southeast in this area. The source was identified during field surveys and the spring was noted to have a constant minor, surficial flow at the time of the site visit. The proposed working area (holding out blocks) at tower S195 is around 1 m north of the spring head source. Excavation for the tower and working area so close to the spring source required would likely have an adverse effect on the PWS quantity and quality, assessed to be of high magnitude.

3.2.7 Tower S195 proposed permanent access track would also be located upslope of the Spring 2 abstraction source, ~25 m northwest, with an alternative access track route also proposed 90 m northwest. Flow pathways indicate that

[10] SEPA, n.d. Scottish Water GIS. [Online] Available at: https://scottishepa.maps.arcgis.com/.

the track positioning has the potential to effect water quality of the PWS, as a result of run-off associated with construction works. The sensitivity of the PWS is low, but with a high magnitude of impact, the significance of the effect on this spring source, without additional mitigation is considered to be **Moderate**.

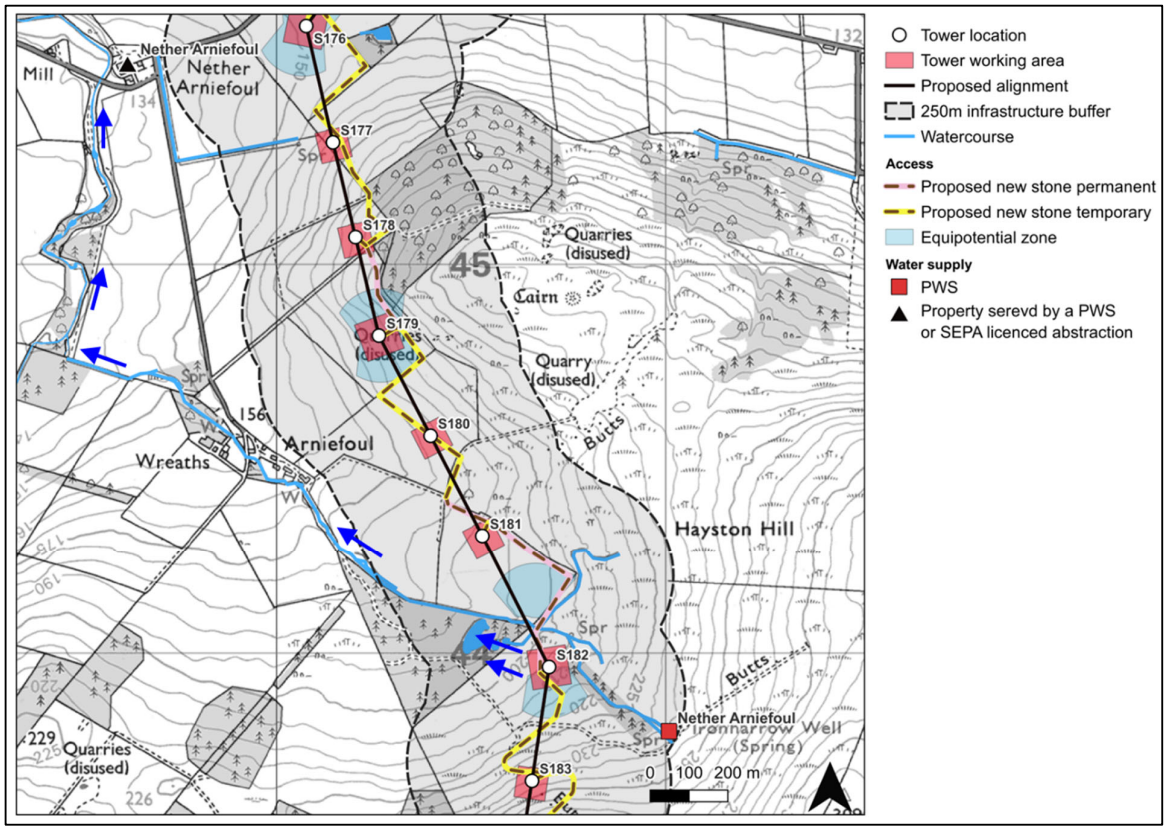
3.2.8 Additional site-specific measures will be set out in the CEMP to minimise the risk of surface water runoff draining from the construction site to the PWS sources (eg swales, settlement ponds, silt fences etc) and the working area around tower S195 will be modified to increase the buffer from the working area to Spring 2, where possible. Monitoring of the PWS will be undertaken before, during and after construction to check there is no contamination of the supply or change in quantity of supply. Monitoring will be undertaken by an ECoW, and monitoring would likely be at the storage tank tap. If the water quality deteriorates during construction (eg discoloured, high sediment content, hydrocarbons) or quantity decreases an alternative water supply will be installed, such as portable bowsers, to ensure minimal disruption of supply during construction. The contractors will have a supply of bowsers ready to deploy, if required. In this case the property already has a Scottish Water Mains connection for domestic use, which could be used if the farm use PWS is temporarily compromised during construction. In the worst-case scenario, the Additional Mitigation will include a commitment from the Applicant to provide a new private water supply for the farm.

Photo 1: Spring 2 upwelling at source abstraction location, no sign of abstraction equipment was noted

Nether Arniefoul - Ironharrow Well Spring

3.2.9 The assumed location of the PWS serving Nether Arniefoul is located 2.2 km southeast of the property, shown on **Plate 13.2.3: Nether Arniefoul and assumed PWS location at Ironharrow Well, topography and indicative flow paths (blue arrows)**. The residents of the property indicated that their PWS is a spring on Hayston Hill behind the woodland but were unsure about the exact location. OS 1:25k mapping shows a spring called Ironharrow Well, with aerial imagery showing a small shed adjacent to it, indicating that that this spring is likely used as a water supply. It is assumed that the water is piped underground to the property however there is no information on the location of the pipework. Online Scottish Water asset maps also show that the property has a mains connection.

Plate 13.2.3: Nether Arniefoul and assumed PWS location at Ironharrow Well, topography and indicative flow paths (blue arrows).



3.2.10 There is no LiDAR data available but OS 1:25k mapping details ground levels. The spring is located 227 m southeast of the equipotential zone around S183, which will not be subjected to excavations. There is an elevation difference of around 15 m, with the spring sitting upslope of the Proposed Development. The PWS will therefore not be affected by surface water runoff. The spring abstraction source at Ironharrow Well is ~280m southwest of the working area of tower S182 and ~270m from the nearest proposed access track (or any construction activities requiring excavation) and therefore there is no requirement for consideration of the effects of excavation. The effect of construction activities at the proposed infrastructure on the Ironharrow Well supply is therefore expected of negligible magnitude. The sensitivity is low and the significance of effect is **Negligible**. However, there is a possible risk of disruption to the pipework, which may have to be crossed by the proposed permanent access track between towers S182 and S176.

3.2.11 A detailed investigation of the distribution network prior to construction will be carried out and cognisant during construction to ensure the pipes are avoided or managed accordingly. This will be set out in the CEMP. Monitoring of the well will be undertaken before, during and after construction. Monitoring will be taken at the groundwater springs at Ironharrow Well itself. If the water quality deteriorates during construction (eg discoloured, high sediment content, hydrocarbons) or quantity decreases an alternative water supply will be installed at the PWS property, such as portable bowsers, to ensure minimal disruption of supply during construction.

Upper Hayston Farm Cottage PWS - Groundwater Well

3.2.12 Upper Hayston Farm Cottage PWS is a well located in the garden of the farm cottage property (**Plate 13.2.4: Upper Hayston Farm Cottage PWS, topography and indicative flow paths (blue arrows))** and **Photo 2**. There is little known information on the supply, as the residents could not be reached by both questionnaire and multiple site visits. Scottish Water mapping indicates the property is served by the mains supply but it is assumed that the well also serves the property, possibly for farm use. The well is located ~300 m east of the tower S175 and ~120 m southeast of the temporary access track to tower S174.

Plate 13.2.4: Upper Hayston Farm Cottage PWS, topography and indicative flow paths (blue arrows)

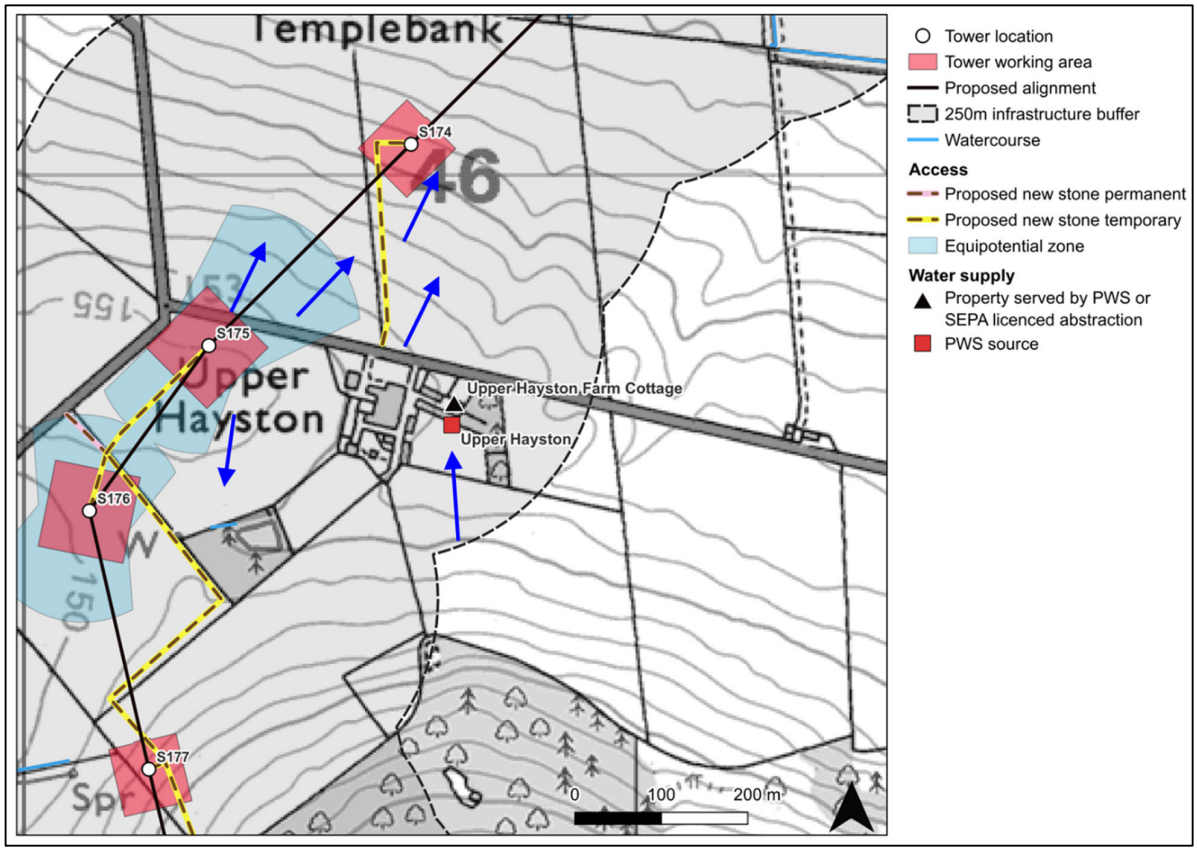


Photo 2: Abstraction source well at Upper Hayston Farm Cottage

3.2.13 OS 1:25k contour mapping indicates that there are no flow pathways from the proposed access track towards the PWS abstraction location, therefore it is very unlikely that there would be any effect on the water quality at the well. Excavation required for the access track is unlikely to be to a significant depth that would affect water quantity serving the well. The magnitude of impact is assessed to be negligible, and the sensitivity is low, resulting in an effect of **Negligible** significance and no additional mitigation is required.

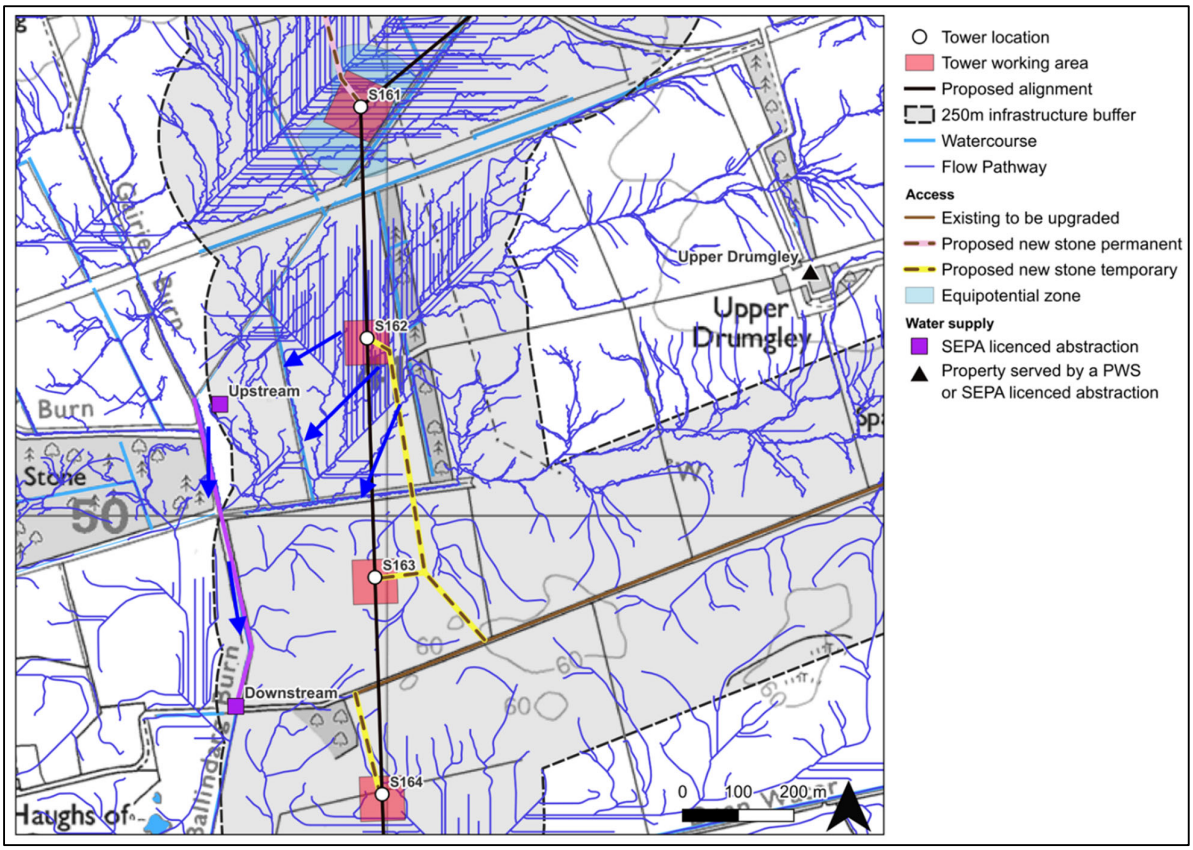
3.2.14 Monitoring of the well will be undertaken before, during and after construction. Monitoring will be undertaken from the well itself.

3.3 Section B

Ballindarg Burn - PWS (SEPA CAR Licensed abstraction from Ballindarg Burn)

3.3.1 A ~550 m section of Ballindarg Burn is a SEPA CAR licenced abstraction which serves Upper Drumgley Farmhouse (Licence: CAR/L/1010577) in Section B1 (**Plate 13.2.5: Ballindarg Burn SEPA licenced abstraction, topography and indicative flow paths (blue arrows)**). The SEPA abstraction point is not noted directly on the watercourse. There are no details on abstraction rates. The abstraction area extends from the confluence with the Roundy Burn to the track leading to Haughs of Cossans downstream. The property also has a Scottish Water Mains supply, so it is likely that the abstraction is for farm use.

Plate 13.2.5: Ballindarg Burn SEPA licenced abstraction, topography and indicative flow paths (blue arrows)



3.3.2 At the closest point, tower S163 would be 245 m west of the burn. The topography surrounding the proposed tower is flat and SEPA flood maps show surface water flooding pooling in the field, rather than draining towards the burn. Immediately upstream of the abstraction area, there is an unnamed drain which feeds into the burn and lies ~50 m southeast of tower S161. However, with applied mitigation measures in place, it is considered that surface water pollution from construction run-off entering the watercourse at the PWS abstraction is unlikely and of negligible magnitude. The sensitivity of the PWS is low. Therefore, the significance of effect on the abstraction is considered to be **Negligible**.

3.3.3 Monitoring of the burn will be undertaken before, during and after construction to check there is no contamination of the supply. Monitoring will be undertaken by an ECoW, and monitoring would likely be at the abstraction location. If the water quality deteriorates during construction (eg discoloured, high sediment content, hydrocarbons), or quantity decreases an alternative water supply will be installed, such as using the existing mains supply to the farm or using portable bowsers, to ensure minimal disruption of supply during construction.

Balmadity Cottage PWS - Surface water abstraction from unnamed tributary to Cruick Water

3.3.4 Balmadity Cottage PWS is a stream abstraction from an unnamed tributary to the Cruick Water which flows to the east (**Plate 13.2.6: Balmadity PWS, topography and indicative flow paths (blue arrows)**) and **Photo 3**. The abstraction rate is unknown. The PWS supplies at least two properties including Balmadity Cottage and Boggie

Cottage, and likely also serves Balmadity Farm and Boggie. It is assumed that it serves Balmadity Farm and Boggie as there are no other known PWS or mains in the area, and Boggie is in close proximity to Boggie Cottage, which is served by the Balmadity supply. There is no additional information known about the supply.

Plate 13.2.6: Balmadity PWS, topography and indicative flow paths (blue arrows)

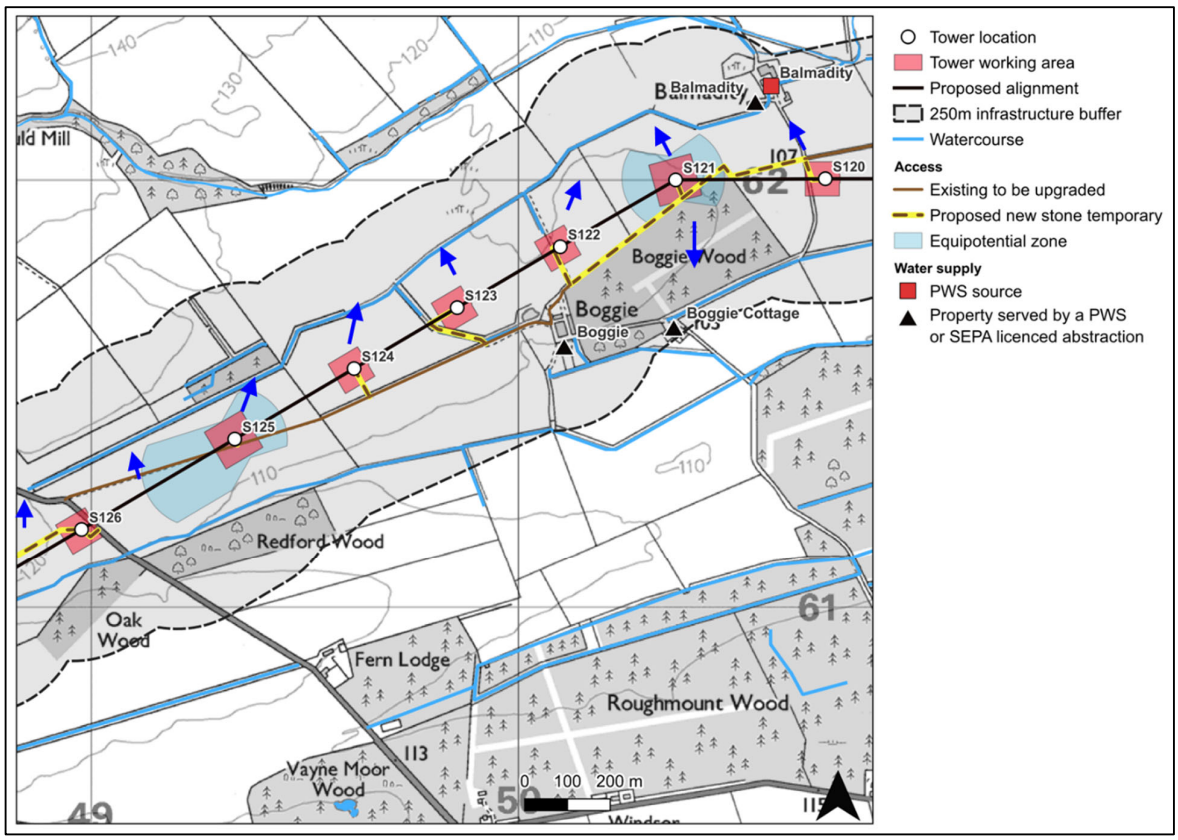


Photo 3: Shows the private water supply abstraction at the unnamed tributary to the Cruick Water

3.3.5 The PWS abstraction is located ~190 m north of the proposed tower S120 working area on the left bank of the watercourse. LiDAR data is currently unavailable for flow pathway analysis but OS 1:25k contour mapping indicates that flow paths from S120 are to the south towards the Coe Burn, away from the PWS abstraction.

3.3.6 While it appears that flow paths from S120 (the only infrastructure within 250 m of the PWS abstraction source) are to the south, away from the PWS abstraction, it should be noted that S121 (which would lie ~310 m southwest of the PWS, is within 250 m of the unnamed tributary watercourse and has the potential to affect the PWS abstraction water quantity. There is potential for towers S126, S125, S124, S123, S122 and S121 to affect the PWS quality via surface water runoff, with tower S121 being the closest upstream. There are likely also lesser flow paths to the north of tower S120, as indicated in **Figure 13.2.6.** All of these towers would be within 250 m of the unnamed tributary of the Cruick Water, upstream of the PWS abstraction. OS 1:25k contour mapping indicates that there are surface water flow pathways from the towers downslope towards the north/northwest to the watercourse. Therefore, there is potential for construction runoff from these tower working areas to flow downslope into the watercourse and affect the PWS abstraction further downstream to the east. None of the towers from S126 to S121 are within 250 m of the PWS abstraction location. The sensitivity of the PWS is medium however given the distance from the towers and the applied mitigation measures that will be implemented during construction, the magnitude of impact is considered to be negligible to low. The effect on the PWS without additional mitigation is considered to be temporary and of **Negligible** to **Minor** significance.

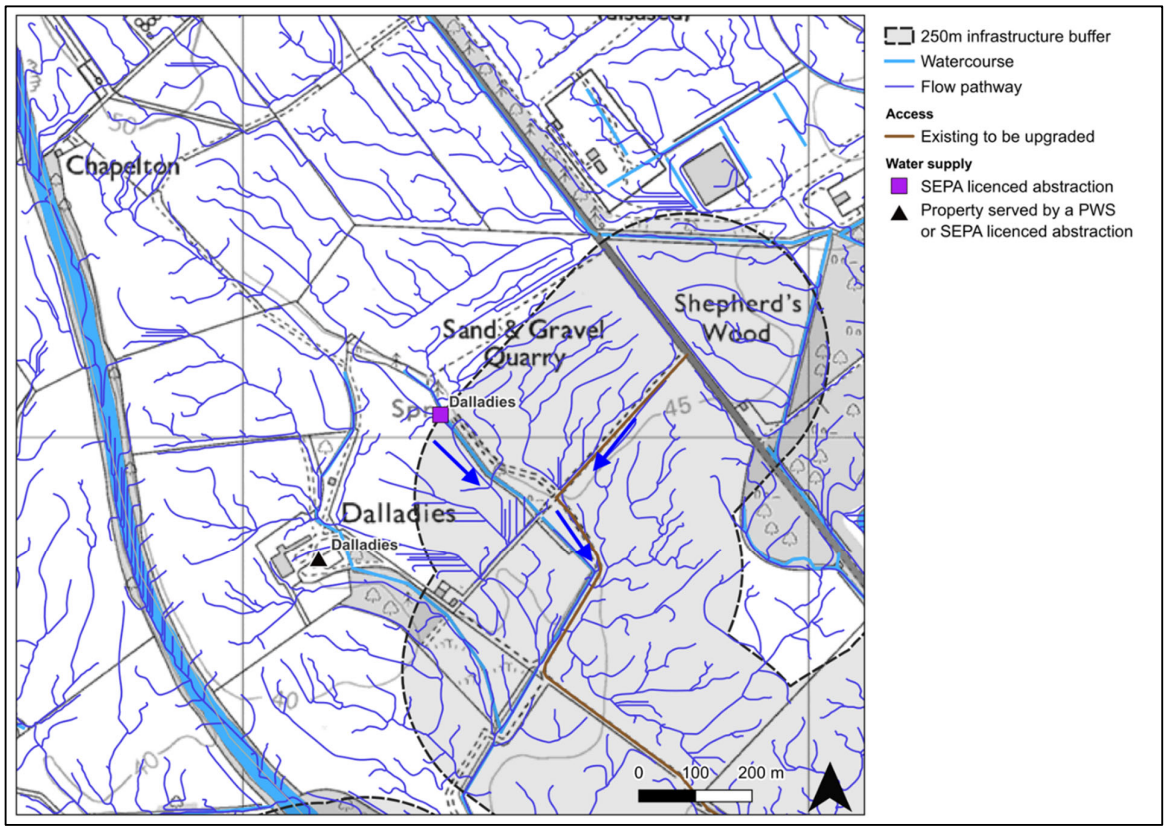
3.3.7 Additional site-specific measures will be set out in the CEMP to minimise the risk of surface water runoff draining from the construction site to the watercourse/PWS source (eg swales, settlement ponds, silt fences etc). Monitoring of the PWS will be undertaken before, during and after construction to check there is no contamination of the supply. Monitoring will be undertaken by an ECoW, and monitoring will be at the abstraction location in the watercourse. If the water quality temporarily deteriorates during construction (eg discoloured, high sediment content, hydrocarbons) or quantity decreases, an alternative water supply will be installed at the PWS property, such as portable bowsers, to ensure minimal disruption of supply during construction.

3.4 Section C

Dalladies PWS - (SEPA CAR Licensed abstraction from groundwater spring)

3.4.1 Dalladies PWS is a spring supply utilised for agriculture (irrigation- mobile plant) purposes and as a private drinking water supply (**Plate 13.2.7: Dalladies SEPA licenced abstraction, topography and indicative flow paths (blue arrows)**). This PWS was identified from SEPA CAR licence abstraction data. The spring is noted on OS 1:25K mapping. The maximum rate of abstraction from this source is noted at 11 m^3/day.

Plate 13.2.7: Dalladies SEPA licenced abstraction, topography and indicative flow paths (blue arrows)



3.4.2 The spring is located ~250 m to the northwest of proposed existing access track for upgrade. It is unlikely that significant excavation will be required for this upgrade and OS 1:25k contour mapping indicates that there are no surface water flow paths towards the PWS abstraction location from the existing track, therefore the magnitude of impact of the Proposed Development on the spring is assessed to be negligible.

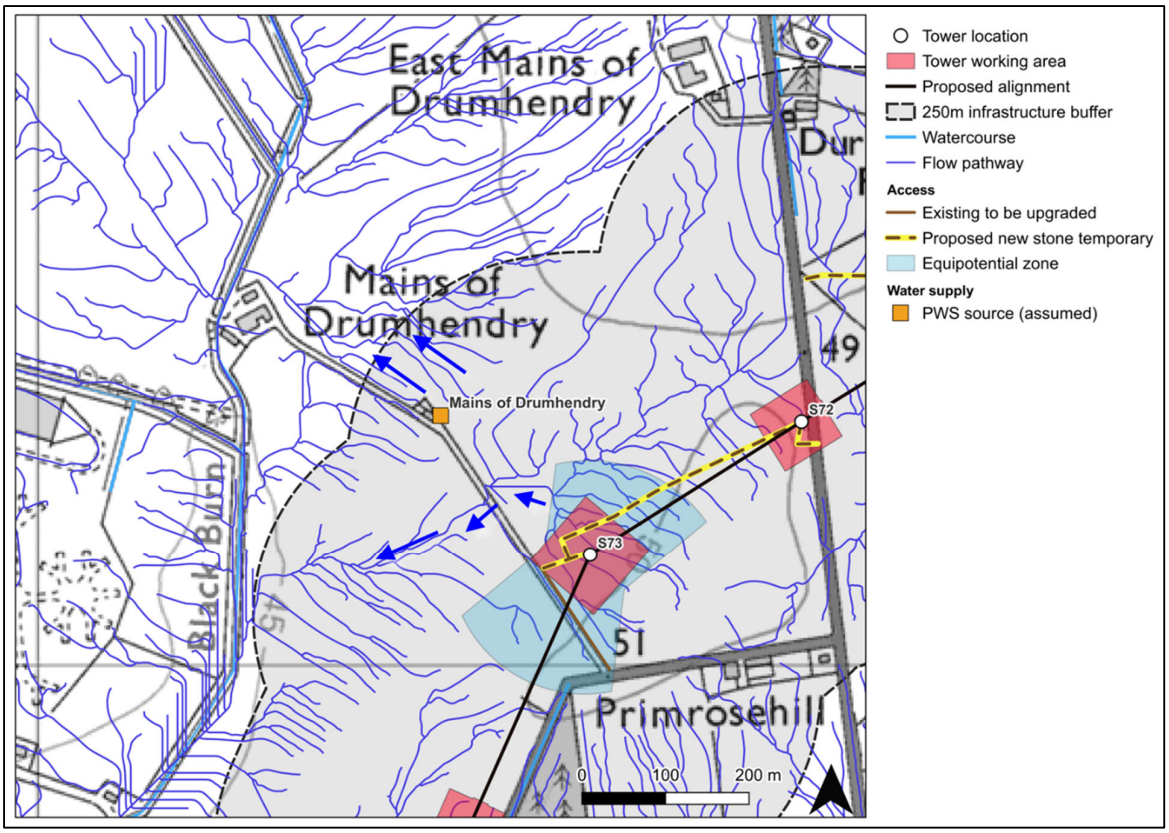
3.4.3 The sensitivity of the PWS is medium and the significance of effect on the PWS from the Proposed Development is **Negligible**.

3.4.4 Monitoring of the PWS will be undertaken before, during and after construction. Monitoring will be undertaken at the property tap.

Mains of Drumhendry - assumed PWS

3.4.5 Mains of Drumhendry Cottage is unlikely to be served by a PWS but a lack of information from the resident and the nearby area means that this conclusion is uncertain. A questionnaire was sent to the resident but no response was received. This was followed up by several visits to the property to try to speak to the resident but the resident was not available. Aberdeenshire Council data does not indicate a PWS at the property. Five properties on Primrosehill Road, 445 m southeast of the property, are served by the Scottish Water mains, however it is unclear whether the pipework continues up the track to Mains of Drumhendry Cottage. From viewing aerial imagery and Google Street View, there do not appear to be any structures which could indicate a potential PWS in the surrounding fields. For the purposes of this assessment, the PWS is therefore assumed to be at the property itself. This is shown in **Plate 13.2.8: Mains of Drumhendry assumed PWS, topography and indicative flow paths (blue arrows)**.

Plate 13.2.8: Mains of Drumhendry assumed PWS, topography and indicative flow paths (blue arrows).



3.4.6 The property is situated 160 m northwest of the equipotential zone at tower S73, 215 m from a proposed new temporary track and 255 m from the tower itself. The topography between the Proposed Development and the property is flat, so any surface water runoff during construction is unlikely to reach the PWS at a distance of over 100 m. Excavations at the tower and temporary access track have the potential to penetrate the groundwater table, temporarily reducing the groundwater level in the vicinity of the property.

3.4.7 Further investigation into whether this property is served by the PWS will be required before groundworks commence. The sensitivity of the PWS, if used for domestic supply, is medium and the magnitude of change is considered to be medium. The significance of effect on the assumed PWS, if present, without additional mitigation is considered to be **Moderate**.

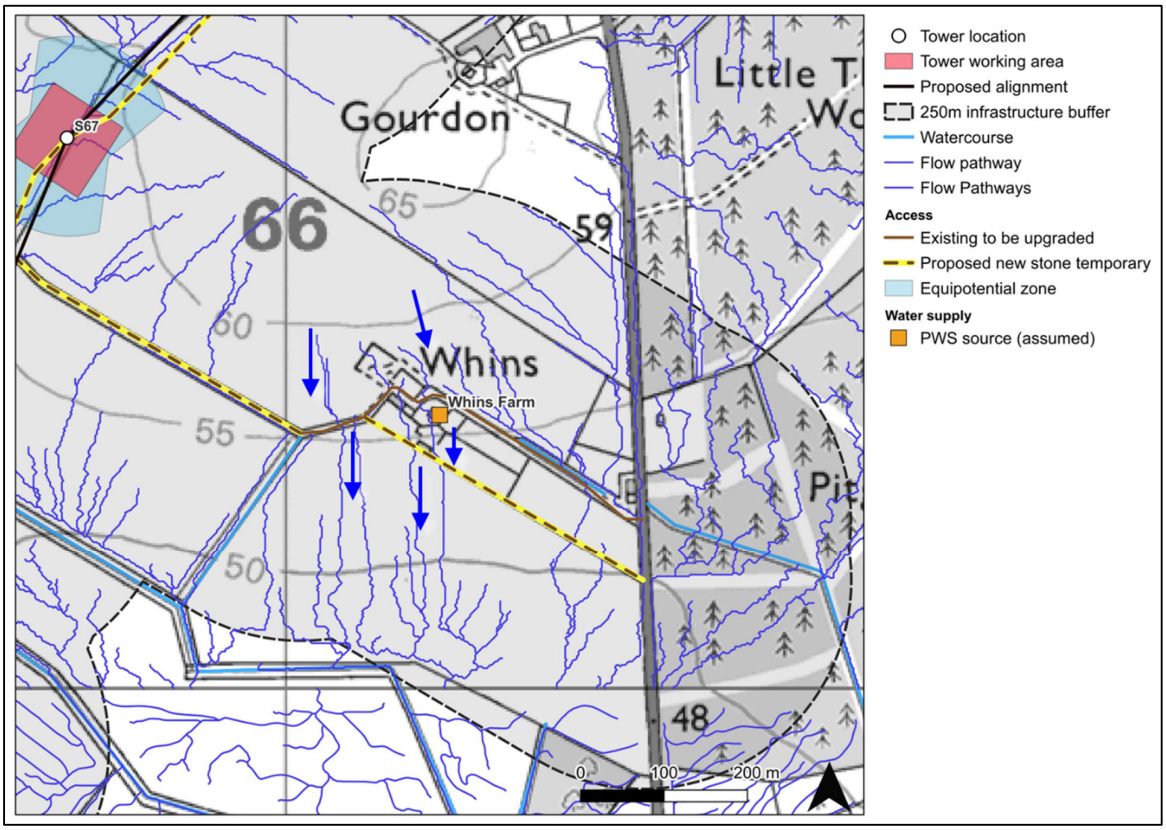
3.4.8 Additional consultation will be undertaken to ascertain the exact location (if it does exist) of the assumed PWS serving this property. Monitoring of the assumed PWS will be undertaken before, during and after construction to check there is no contamination of the supply or change in quantity of supply. Monitoring will be undertaken by ECoW, and monitoring would likely be from the tap at the supplied property location. If the water quality deteriorates during construction (eg discoloured, high sediment content, hydrocarbons) or quantity decreases an alternative water supply will be installed at the PWS property, such as portable bowsers, to ensure minimal disruption of supply during construction. In the worst-case scenario, the Additional Mitigation will include a commitment from the Applicant to provide a new private water supply for the property or provide a connection to the nearby Scottish Water mains.

Whins Farm – assumed PWS

3.4.9 Whins Farm may be served by a PWS but lack of information from the resident and the nearby area means that this conclusion is uncertain. A questionnaire was sent to the resident but no response was received. This was followed up by several visits to the property to try to speak to the resident but the resident was not available. Aberdeenshire Council data indicates that the property at the farm (Whins Cottage) is served by a PWS but does not give an exact location of the supply or specify the type of supply. A Scottish Water mains pipe runs along Burnside Road (B974). The property is set back from the road by 275 m, however no connection between the mains pipe and the property is depicted on the Scottish Water asset maps. From visiting the property and viewing aerial imagery, there do not

appear to be any structures which could indicate a PWS in the surrounding fields. For the purposes of this assessment, the PWS is therefore assumed to be at the property itself. This is shown in **Plate 13.2.9: Whins Farm assumed PWS**, **topography and indicative flow paths (blue arrows)**.

Plate 13.2.9: Whins Farm assumed PWS, topography and indicative flow paths (blue arrows)



3.4.10 The Proposed Development will utilise and upgrade an existing track running through the farm and a new temporary track is to be constructed along the field boundary ~25 m south of the property. Excavations for the new track have the potential to temporarily lower the groundwater table in the vicinity of the property, as the topography is relatively flat.

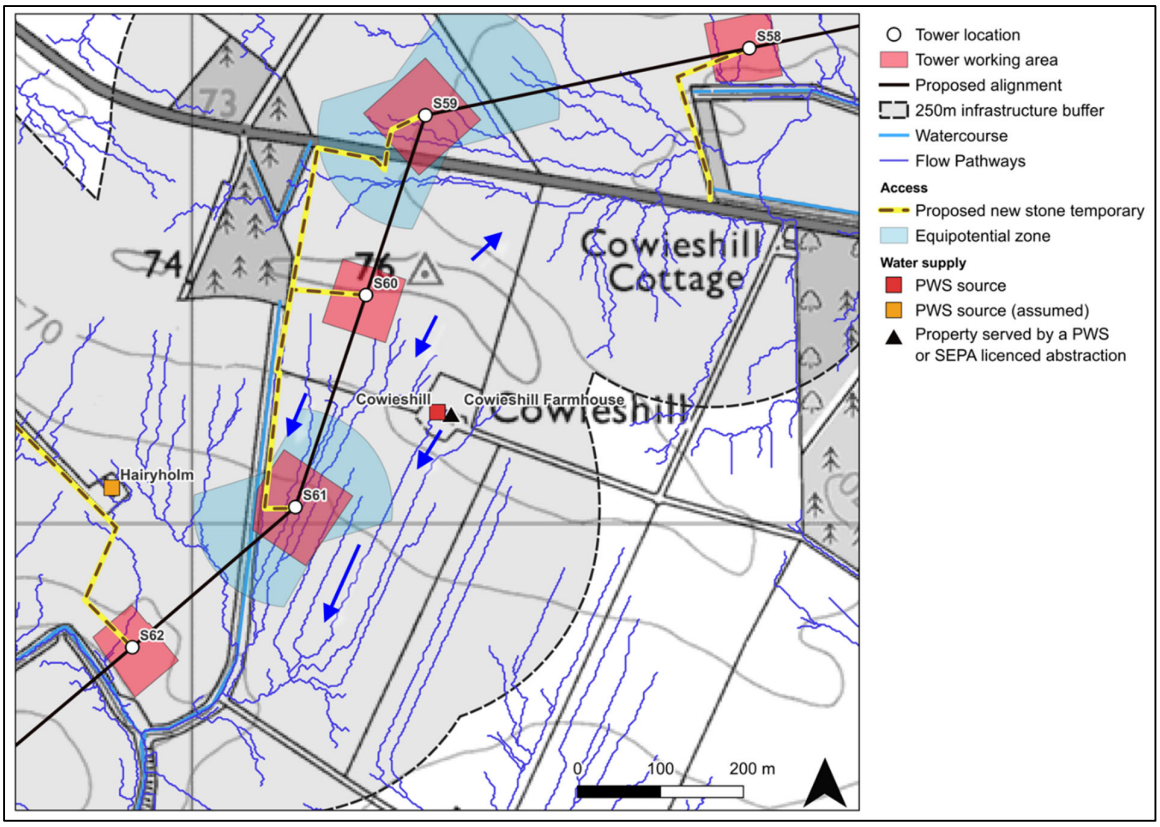
3.4.11 Further investigation into whether this property is served by the PWS will be required before groundworks commence. Since the supply could be for domestic use, the sensitivity of the PWS is medium and the magnitude of change is considered medium owing to the proximity of the track to the property The effect on the assumed PWS, if present, without additional mitigation is considered to be **Moderate**.

3.4.12 Additional consultation will be undertaken to ascertain the exact location (if it does exist) of the assumed PWS serving this property. Monitoring of the assumed PWS will be undertaken before, during and after construction to check there is no contamination of the supply or change in quantity of supply. Monitoring will be undertaken by ECoW, and monitoring would likely be from the tap at the supplied property location. If the water quality deteriorates during construction (eg discoloured, high sediment content, hydrocarbons) or quantity decreases an alternative water supply will be installed at the PWS property, such as portable bowsers, to ensure minimal disruption of supply during construction. In the worst-case scenario, the Additional Mitigation will include a commitment from the Applicant to provide a new private water supply for the property or provide a connection to the Scottish Water mains.

Cowieshill PWS - Groundwater Well

3.4.13 Cowieshill PWS is a well located just west of Cowieshill Farmhouse on the Thornton Estate (**Plate 13.2.10: Cowieshill PWS, topography and indicative flow paths (blue arrows)**). This PWS supplies one known property, Cowieshill Farmhouse and is used for domestic purposes. The abstraction rate and the depth of the well are unknown. There is no additional information on the supply at the time of writing.

Plate 13.2.10: Cowieshill PWS, topography and indicative flow paths (blue arrows)



3.4.14 Tower S60 working area would be located ~105 m northwest of the PWS abstraction location. Tower S61 working area would be located ~145 m southwest of the PWS abstraction source. Tower S60 is located on slightly higher ground (~ 75 mAOD (metres above ordnance datum)) than the PWS abstraction location, which is at ~71 mAOD. Flow pathway analysis using the LiDAR topographic data indicates that there would be no surface water flow paths from the Proposed Development to the PWS.

3.4.15 Tower S61 would be located downslope of the PWS location, at around 64-65 mAOD. There is a slight potential for the excavation to impact the quantity of the supply at the well as a consequence of the foundation excavations penetrating the groundwater table downslope, resulting in groundwater draining from downslope of the PWS, temporarily reducing the groundwater elevation level at the well. The sensitivity of the PWS is medium and the magnitude of impact is considered low. The effect on the PWS without additional mitigation is considered to be **Minor**.

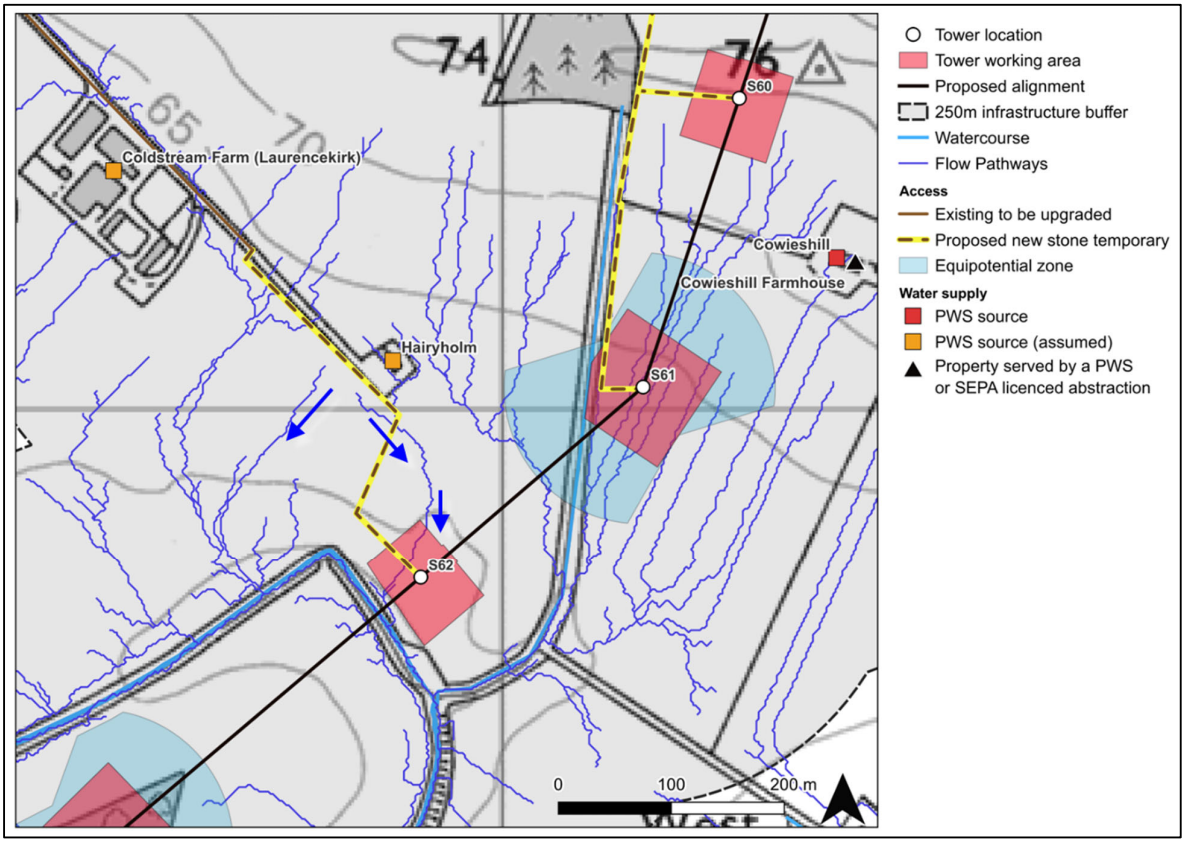
3.4.16 Monitoring of the PWS will be undertaken before, during and after construction to check there is no contamination of the supply or change in quantity of supply. Monitoring will be undertaken by ECoW, and monitoring would likely be from the tap at the supplied property location. If the water quality deteriorates during construction (eg discoloured, high sediment content, hydrocarbons) or quantity decreases an alternative water supply will be installed at the PWS property, such as portable bowsers, to ensure minimal disruption of supply during construction. In the worst-case scenario, the Additional Mitigation will include a commitment from the Applicant to provide a new private water supply for the property or provide a connection to the Scottish Water mains.

Hairyholm - assumed PWS

3.4.17 Private Water Supply questionnaires were sent to the properties at Parkhouse, Coldstream Farm, Coldstream Cottage and Hairyholm and they were also visited multiple times during the PWS survey, however no responses were received and no one was available during surveys at any of the properties. A nearby property along the B9120 (~0.8 km northeast) is known to be connected to Scottish Water mains from questionnaire returns and discussions with the owner of Thornton Estate. There are also known mains connections ~0.9 km southwest along the B974, but there is no indication of mains connections to Parkhouse, Coldstream Farm, Coldstream Cottage and Hairyholm on

Scottish Water drawings. A precautionary approach has therefore been taken and it is assumed that Parkhouse, Coldstream Farm, Coldstream Cottage and Hairyholm are all served by PWS, located at the properties. These are assessed below. **Plate 13.2.11: Hairyholm assumed PWS, topography and indicative flow paths (blue arrows)** shows the Hairyholm assumed PWS and nearby infrastructure.

Plate 13.2.11: Hairyholm assumed PWS, topography and indicative flow paths (blue arrows).



3.4.18 Hairyholm is ~20 m northeast of proposed new stone temporary track. OS mapping and LiDAR data indicates that the property is sited at ~64 mAOD. Ground levels are relatively flat; however levels slope very gently downslope from the proposed new stone temporary track to the south, away from Hairyholm. Therefore, it is considered unlikely that there are flow pathways from the proposed infrastructure to the property and there is minimal risk of surface water runoff affecting water quality at the assumed PWS. Given that any excavations, if required for the new track are in close proximity to the property, there is a very slight risk of impacting groundwater quantity, and the impact is assessed to be of low magnitude.

3.4.19 The sensitivity of the assumed PWS is medium, therefore, the effect at the assumed PWS without additional mitigation is considered to be of **Minor** significance.

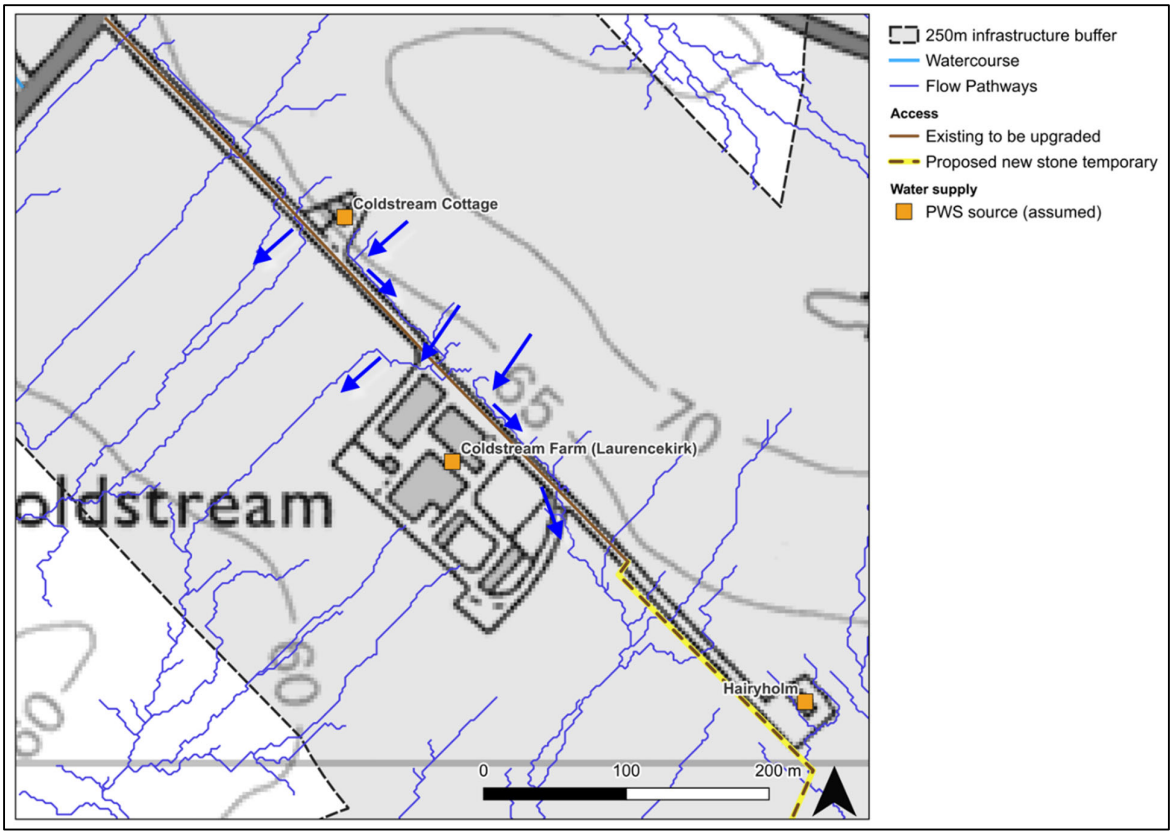
3.4.20 Additional consultation will be undertaken to ascertain the exact location of the assumed PWS serving this property (if it does exist). Monitoring of the assumed PWS will be undertaken before, during and after construction to check there is no contamination of the supply or change in quantity of supply. Monitoring will be undertaken by ECoW, and monitoring would likely be from the tap at the supplied property location. If the water quality deteriorates during construction (eg discoloured, high sediment content, hydrocarbons) or quantity decreases an alternative water supply will be installed at the PWS property, such as portable bowsers, to ensure minimal disruption of supply during construction. In the worst-case scenario, the Additional Mitigation will include a commitment from the Applicant to provide a new private water supply for the property or provide a connection to the Scottish Water mains.

Coldstream Farm (Laurencekirk) - assumed PWS

3.4.21 In the absence of confirmation of a mains supply and lack of response to PWS questionnaires and site visits (see discussion for Hairyholm above), a precautionary approach has been taken and it is assumed that Coldstream Farm

is served by PWS, located at the property. This is shown in **Plate 13.2.12: Coldstream Farm (Laurencekirk) assumed PWS, topography and indicative flow paths (blue arrows)**.

Plate 13.2.12: Coldstream Farm (Laurencekirk) assumed PWS, topography and indicative flow paths (blue arrows).



3.4.22 Coldstream Farm (Laurencekirk) is located ~80m to ~200m northwest of proposed new stone temporary access and directly adjacent to proposed existing track which will be used during construction. OS mapping and LiDAR data indicates that the ground levels are similar to the adjacent existing access track. There is a slight potential for excavation required for the new stone access track to temporarily impact groundwater quantities at the assumed PWS, although this is considered unlikely and the magnitude of impact on the assumed PWS is considered to be low.

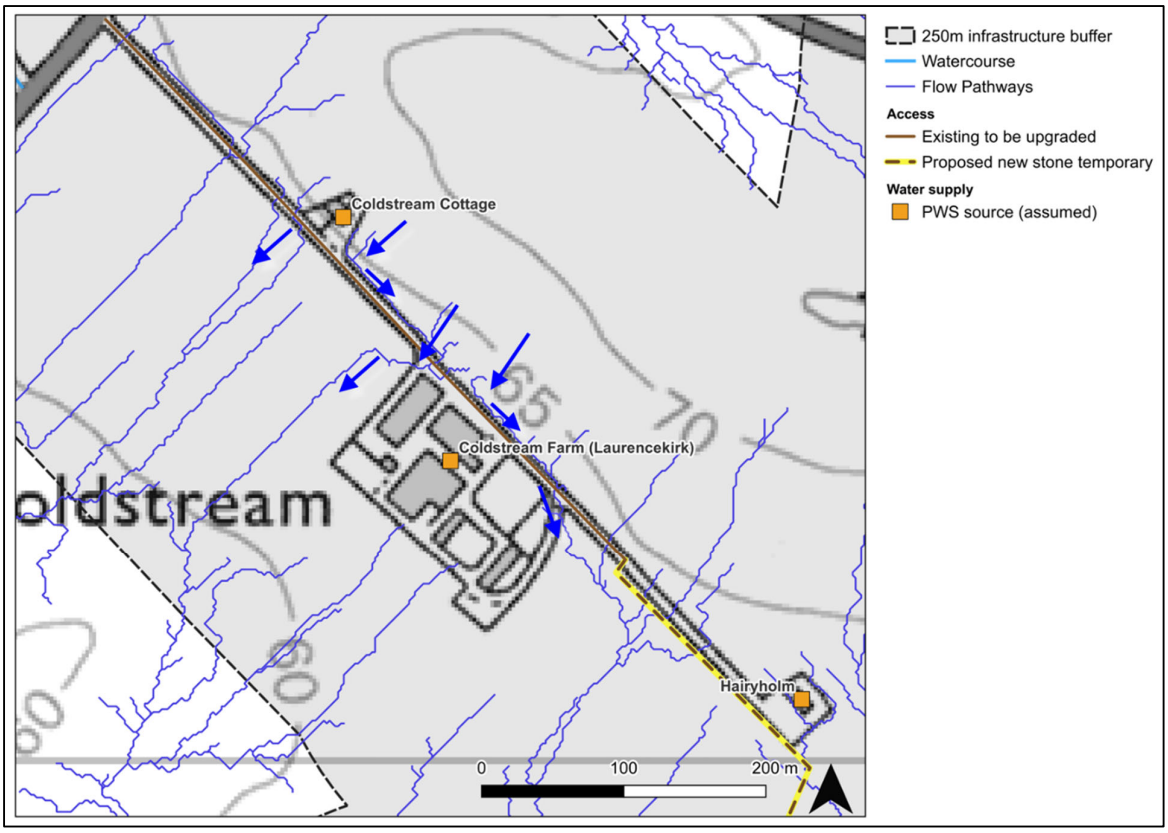
3.4.23 The sensitivity of the assumed PWS is medium, resulting in a **Minor** (Not Significant) effect at the assumed PWS.

3.4.24 Additional consultation will be undertaken to ascertain the exact location of the assumed PWS serving this property (if it does exist). Monitoring of the assumed PWS will be undertaken before, during and after construction to check there is no contamination of the supply or change in quantity of supply. Monitoring will be undertaken by ECoW, and monitoring would likely be from the tap at the supplied property location. If the water quality deteriorates during construction (eg discoloured, high sediment content, hydrocarbons) or quantity decreases an alternative water supply will be installed at the PWS property, such as portable bowsers, to ensure minimal disruption of supply during construction. In the worst-case scenario, the Additional Mitigation will include a commitment from the Applicant to provide a new private water supply for the property or provide a connection to the Scottish Water mains.

Coldstream Cottage - assumed PWS

3.4.25 In the absence of confirmation of a mains supply and lack of response to PWS questionnaires and site visits (see discussion for Hairyholm above), a precautionary approach has been taken and it is assumed that Coldstream Cottage is served by PWS, located at the property. This is shown in **Plate 13.2.13: Coldstream Cottage assumed PWS, topography and indicative flow paths (blue arrows)**.

Plate 13.2.13: Coldstream Cottage assumed PWS, topography and indicative flow paths (blue arrows).



3.4.26 Coldstream Cottage is located directly adjacent to existing track to be used for construction, but over 300 m northwest of proposed new stone temporary track (which may require excavation). It is considered unlikely that any upgrades to the existing access track or excavations for the new track will impact the groundwater quantity and quality that supplies the assumed PWS and the magnitude of impact is considered to be negligible.

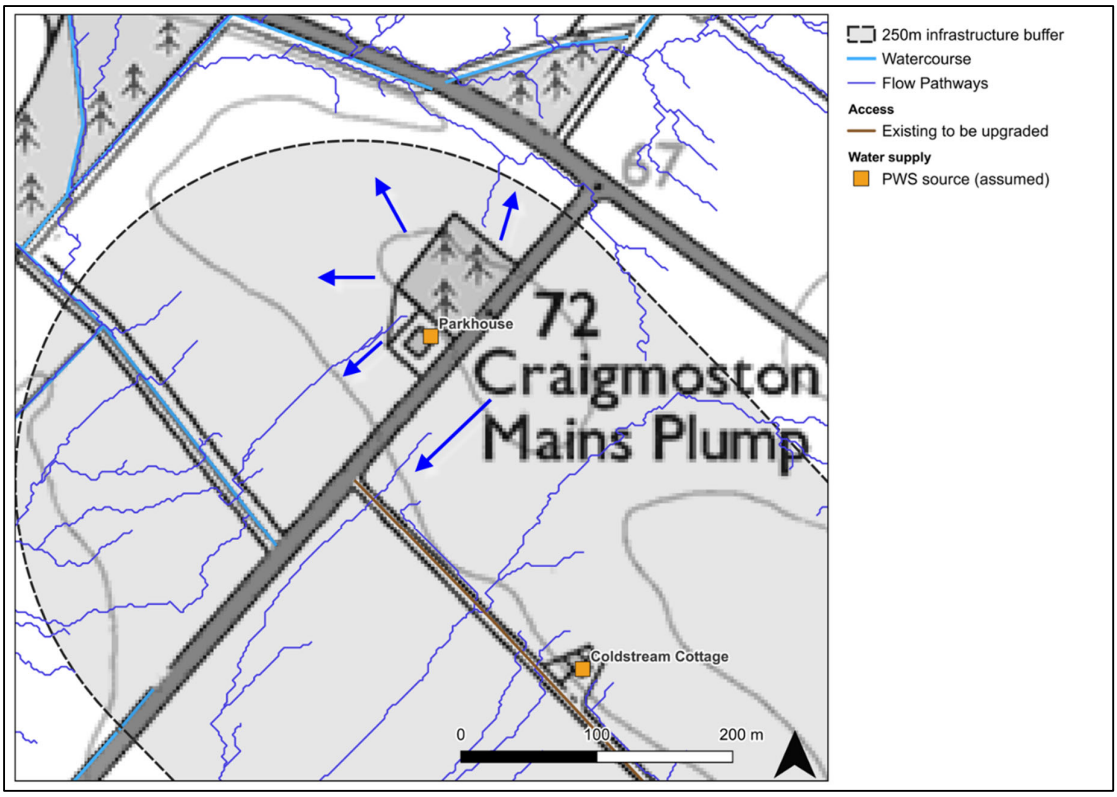
3.4.27 The sensitivity of the PWS is medium. Therefore, the effect at the assumed PWS without additional mitigation is considered of **Negligible** significance.

3.4.28 Additional consultation will be undertaken to ascertain the exact location of the assumed PWS serving this property (if it does exist). Monitoring of the assumed PWS will be undertaken before, during and after construction to check there is no contamination of the supply or change in quantity of supply. Monitoring will be undertaken by ECoW, and monitoring would likely be from the tap at the supplied property location. If the water quality deteriorates during construction (eg discoloured, high sediment content, hydrocarbons) or quantity decreases an alternative water supply will be installed at the PWS property, such as portable bowsers, to ensure minimal disruption of supply during construction. In the worst-case scenario, the Additional Mitigation will include a commitment from the Applicant to provide a new private water supply for the property or provide a connection to the Scottish Water mains.

Parkhouse - assumed PWS

3.4.29 In the absence of confirmation of a mains supply and lack of response to PWS questionnaires and site visits (see discussion for Hairyholm above), a precautionary approach has been taken and it is assumed that Parkhouse is served by PWS, located at the property. This is shown in **Plate 13.2.14: Parkhouse assumed PWS, topography and indicative flow paths (blue arrows)**.

Plate 13.2.14: Parkhouse assumed PWS, topography and indicative flow paths (blue arrows).



3.4.30 Parkhouse is located ~100 m northeast and upslope of the nearest infrastructure (an existing track to be used during construction of tower S62). OS mapping and LiDAR data indicates that the property is sited at ~70 mAOD with the nearest track infrastructure sited at ~65 mAOD. Therefore, there are no flow pathways from the proposed infrastructure to the property and no risk of surface water runoff affecting water quality at the assumed PWS. It is considered that any upgrades to the existing track will not affect groundwater levels at the assumed PWS, and the magnitude of impact is assessed to be negligible.

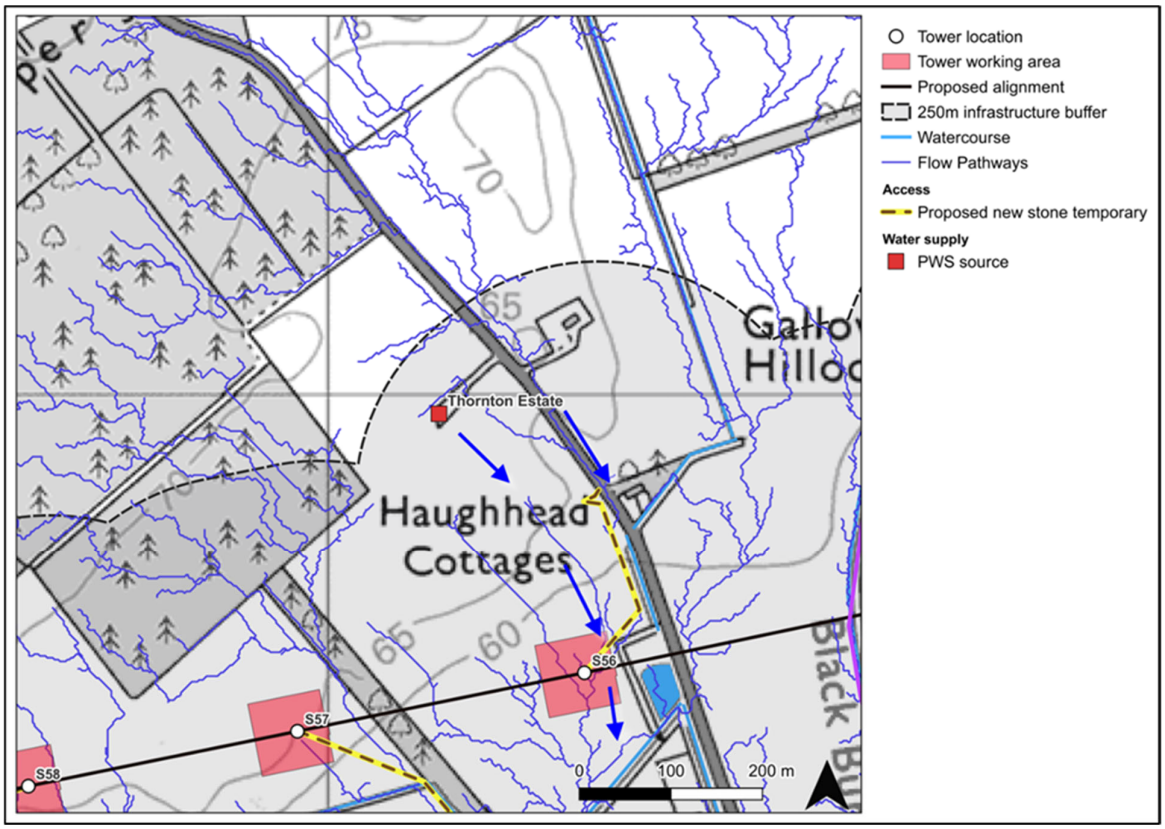
3.4.31 The sensitivity of the PWS is medium. Therefore, the effect at the assumed PWS without additional mitigation is of **Negligible** significance.

3.4.32 Additional consultation will be undertaken to ascertain the exact location of the assumed PWS (if it does exist) serving this property. Monitoring of the assumed PWS will be undertaken before, during and after construction to check there is no contamination of the supply or change in quantity of supply. Monitoring will be undertaken by ECoW, and monitoring would likely be from the tap at the supplied property location. If the water quality deteriorates during construction (eg discoloured, high sediment content, hydrocarbons) or quantity decreases an alternative water supply will be installed at the PWS property, such as portable bowsers, to ensure minimal disruption of supply during construction. In the worst-case scenario, the Additional Mitigation will include a commitment from the Applicant to provide a new private water supply for the property or provide a connection to the Scottish Water mains.

Thornton Estate PWS - Groundwater Well

3.4.33 Thornton Estate PWS is a well supply that the assessment was informed of during a site visit to the landowner (**Plate 13.2.15: Thornton Estate PWS, topography and indicative flow paths (blue arrows)**). It is unknown whether the well still supplies any properties on the estate as most other properties either have a Scottish Water Mains connection or an alternative PWS.

Plate 13.2.15: Thornton Estate PWS, topography and indicative flow paths (blue arrows)



3.4.34 The Thornton Estate PWS is located ~185 m northwest of the proposed temporary access track to tower S56 and over 300 m north of the tower itself. Flow pathway analysis indicates that there are no surface water flow paths from the infrastructure towards the PWS abstraction and tower excavations are unlikely to impact groundwater levels at the well and the magnitude of impact on the PWS is assessed to be negligible The PWS is considered to be of medium sensitivity and the effect on the PWS is of **Negligible significance.**

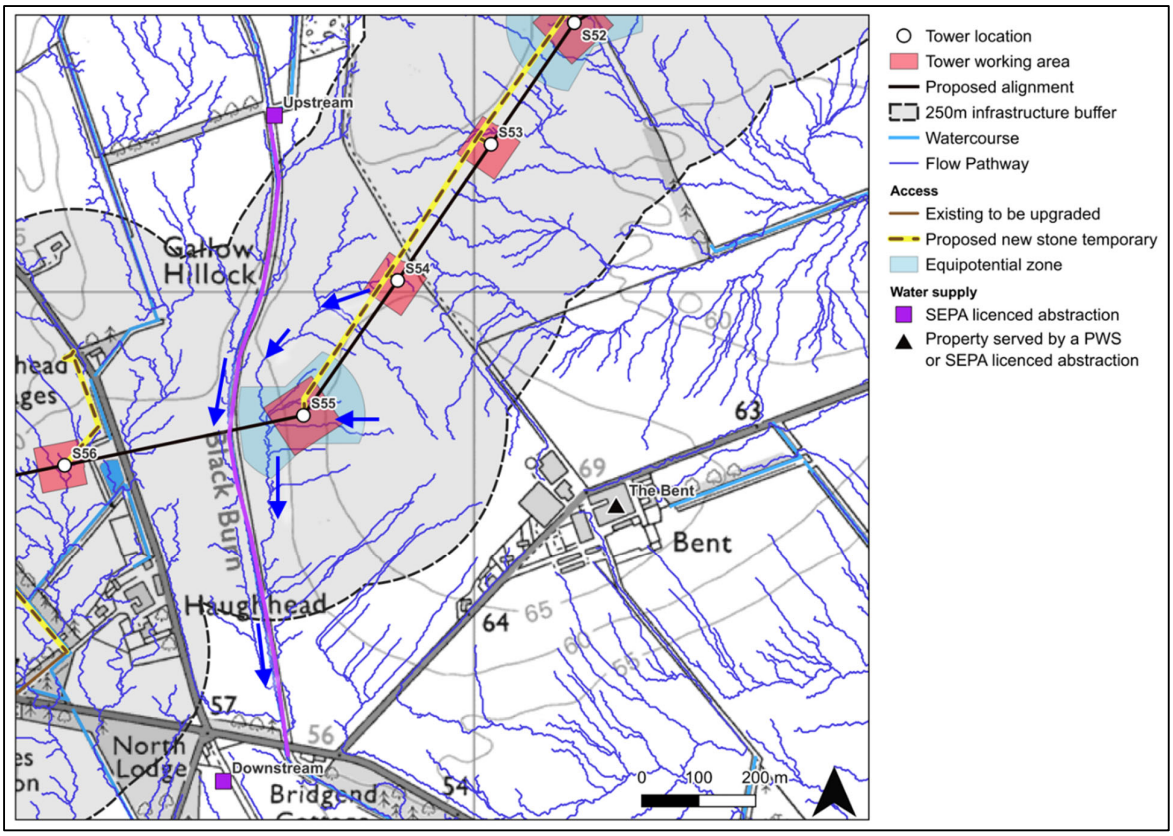
3.4.35 Monitoring of the well will be undertaken before, during and after construction. Monitoring will be undertaken from the well itself.

3.5 Section D

Black Burn PWS - (SEPA CAR Licensed abstraction from the Black Burn)

3.5.1 The OHL between proposed towers S57 and S56 crosses an ~1.3 km section of the Black Burn which is a SEPA CAR licenced abstraction serving Bent Farm (The Bent) for agricultural use (**Plate 13.2.16: Black Burn SEPA licenced abstraction, topography and indicative flow paths (blue arrows)**). The licence notes that the stretch of Black Burn extends to NO 6856 7214, which is further downstream, to the south of the OHL crossing point and associated nearby infrastructure. This is one of three abstractions which serve the farm for agriculture purposes, but all are covered by the same licence (CAR/L/1010555). The SEPA abstraction point is not noted directly on the watercourse. The OHL would cross the Black Burn abstraction, ~687 m west of Bent Farm. The exact location of the abstraction point/s along the Black Burn are unknown. Scottish Water mains drawings indicate that the farm also has a mains connection.

Plate 13.2.16: Black Burn SEPA licenced abstraction, topography and indicative flow paths (blue arrows)



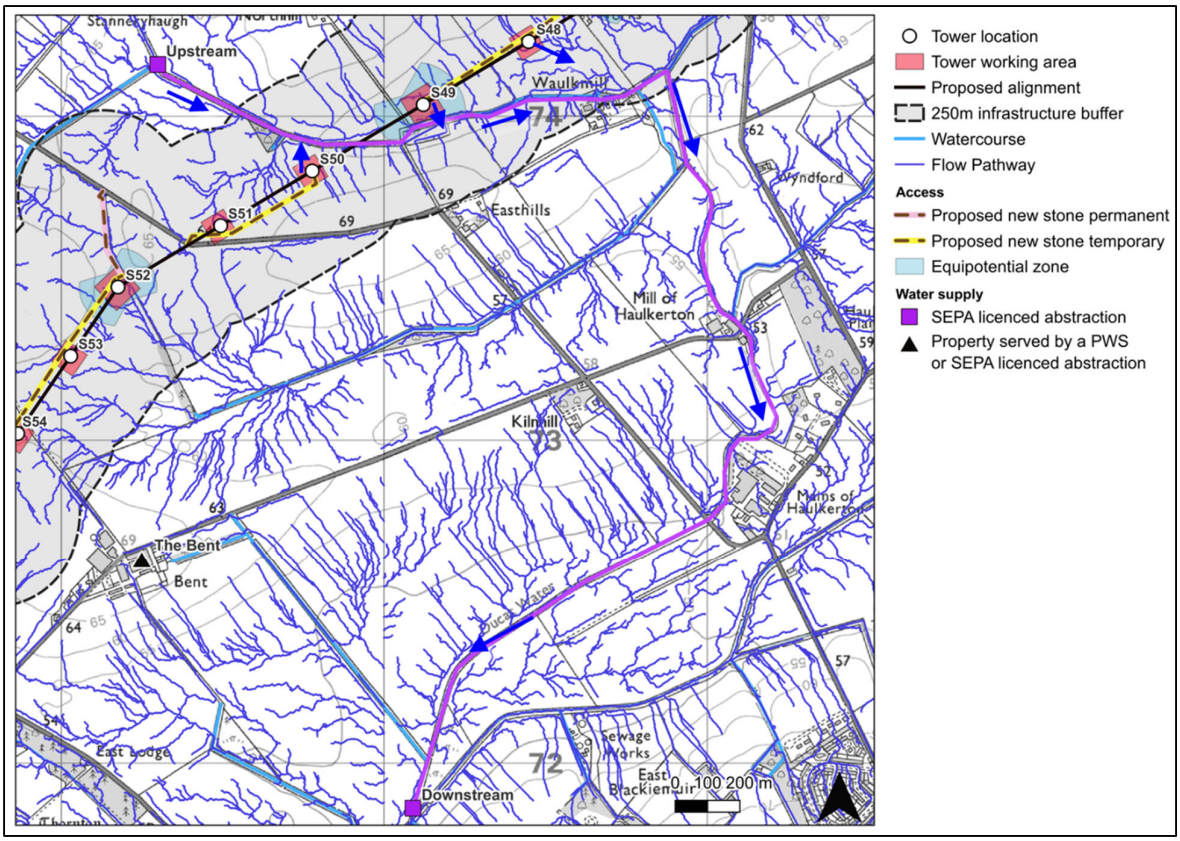
3.5.2 Tower S56 working area would sit ~65 m east of the Black Burn and ~3-4 m higher than the burn. As the exact location of the abstraction point/s along the Black Burn are unknown, it is assumed to extend to the furthest downstream extent of the noted stretch of Black Burn, which is downstream of tower S56. Flow pathway analysis indicates that the area around the tower drains directly towards the watercourse. There is therefore potential for runoff from construction activities to affect the quality of water at the abstraction. The abstraction may also receive surface water runoff from S54 working area which is located ~175 m east, and upslope, of the burn. The sensitivity of the abstraction is considered to be low (as it is for agricultural use) and the magnitude of change is negligible to low. Therefore, the significance of the effect on the abstraction without additional mitigation is considered to be **Negligible** to **Minor**.

3.5.3 Additional site-specific measures will be set out in the CEMP to minimise the risk of surface water runoff draining from the construction site to the abstraction source (eg swales, settlement ponds, silt fences etc) and micrositing the working area away from the drain to allow for additional construction SuDS. Monitoring of the burn will be undertaken before, during and after construction to check there is no contamination of the supply. Monitoring will be undertaken by an ECoW, and monitoring would likely be at the abstraction location in the burn. If the water quality deteriorates during construction (eg discoloured, high sediment content, hydrocarbons), or quantity decreases an alternative water supply will be installed, such as using the existing mains supply to the farm or using portable bowsers, to ensure minimal disruption of supply during construction.

Ducat Water PWS - (SEPA CAR Licensed abstraction from Ducat Water)

3.5.4 The OHL between proposed towers S50 and S49 crosses an ~4.6 km section of the Ducat Water which is an abstraction for agricultural use covered by the SEPA CAR licence held by Bent Farm (CAR/L/1010555). The licence notes that the stretch of Ducat Water utilised extends to NO 7009 7186, which is around 2 km south of the proposed tower S50 (**Plate 13.2.17: Ducat Water SEPA licenced abstraction, topography and indicative flow paths (blue arrows)**). The abstraction area extends from the confluence with an unnamed drain south of Stanneryhaugh to where the Ducat Water meets its confluence with the Luther Water. Scottish Water mains drawings indicate that the farm also has a mains connection.

Plate 13.2.17: Ducat Water SEPA licenced abstraction, topography and indicative flow paths (blue arrows)



3.5.5 Tower S50 working area would be located ~30 m south of the abstraction area along the Ducat Water. The tower would drain directly towards the watercourse and the water quality could be affected by runoff during construction activities without additional mitigation. Tower S49 working area would be located ~25 m north of the Ducat Water (tower is around 62 m north of Ducat Water) and tower S48 working area is located ~115 m north of the Ducat Water. These two towers also have the potential to effect water quality of the abstraction without additional mitigation. Tower S51 working area is located around 300 m southwest of the Ducat Water and flow pathways analysis indicates that there are surface water pathways from here to the watercourse. The sensitivity of the abstraction is considered to be low (as it is for agricultural use) and the magnitude of effect considered to be low. The effect on the abstraction without additional mitigation is considered to be **Minor**.

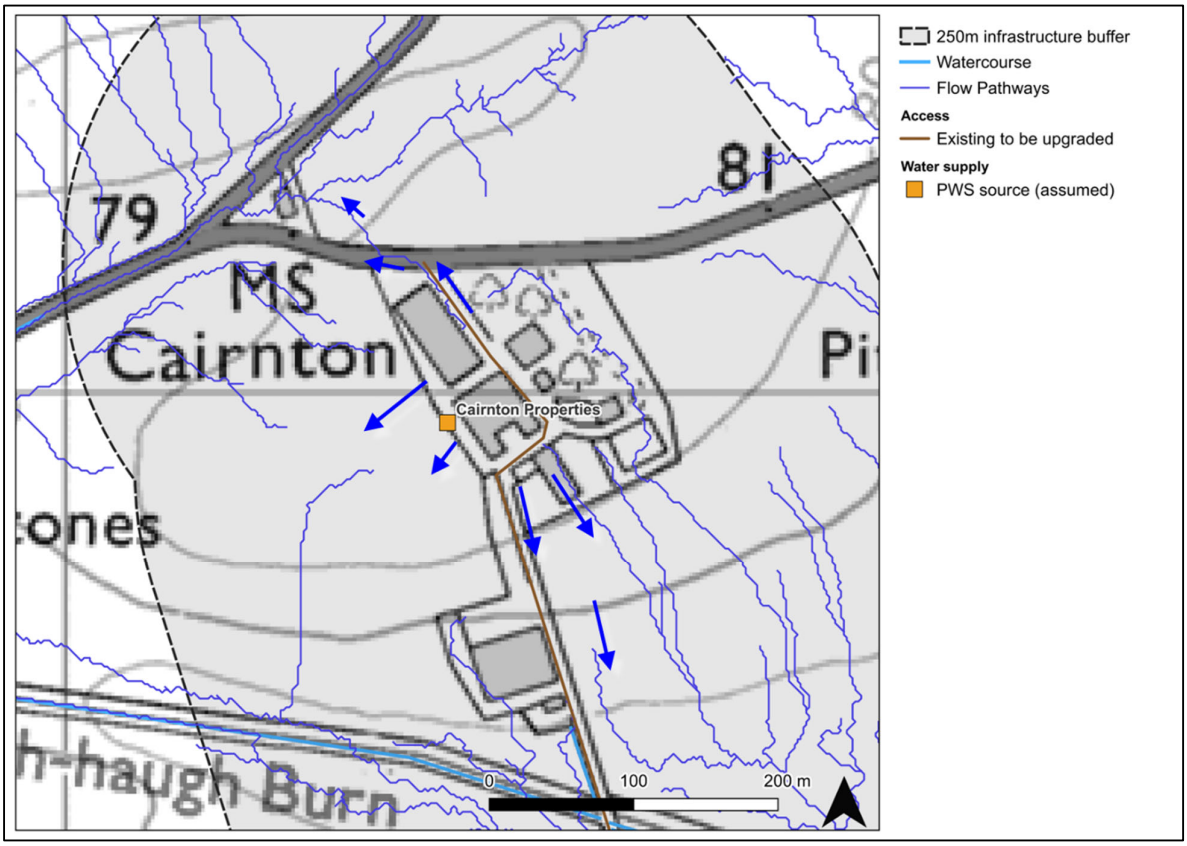
3.5.6 Additional site-specific measures will be set out in the CEMP to minimise the risk of surface water runoff draining from the construction site to the abstraction source (eg swales, settlement ponds, silt fences etc) and micrositing the working area away from the watercourse to allow for additional construction SuDS. Monitoring of the burn will be undertaken before, during and after construction to check there is no contamination of the supply. Monitoring will be undertaken by an ECoW, and monitoring would likely be at the abstraction location. If the water quality deteriorates during construction (eg discoloured, high sediment content, hydrocarbons), or quantity decreases an alternative water supply will be installed, such as using the existing mains supply to the farm or using portable bowsers, to ensure minimal disruption of supply during construction.

Cairnton Properties- assumed PWS

3.5.7 There are four properties in the vicinity of Cairnton Farm where information on the source of their water supply is missing. A questionnaire was sent to the residents, but no response was received. This was followed up by visits to the properties to try to speak to the residents but no one was available during site visits. A Scottish Water mains pipe runs along the B966 but appears to stop 1.1 km southwest of the properties. As this is a large public road, it is likely that the pipe continues along the B966 and past the properties but is not depicted on the online Scottish Water asset maps. Aberdeenshire Council data does not indicate a PWS in this area. It is therefore likely that the properties are connected to a Mains supply however due to the lack of certainty, these properties have been assessed as if they

have a PWS. This is shown in **Plate 13.2.18: Cairnton Properties assumed PWS, topography and indicative flow paths (blue arrows)**.

Plate 13.2.18: Cairnton Properties assumed PWS, topography and indicative flow paths (blue arrows).



3.5.8 There is an existing track to be upgraded which runs through Cairnton Farm from the B966 to the south towards tower S40. 5 and 6 Cairnton Cottages are on the other side of the B966 to the farm. If the PWS is situated south of the B966, close to the farm, there is potential for the supply's water quality to be affected by sediment/runoff pollution during track upgrades. If the supply is situated on the opposite side of the B966, it is unlikely to be affected as any surface water runoff will be intercepted by the road. Given that the magnitude of change of any proposed excavations are likely to be negligible to low as part of track upgrades, it is unlikely that groundwater quantities of any potential supply will be affected.

3.5.9 Further investigation into whether this property is served by the PWS will be required before groundworks mobilisation commences. With the sensitivity of the assumed PWS being medium, the significance of the effect on the PWS, if present, without additional mitigation is considered to be **Negligible** to **Minor**, depending on the depth of excavation at the access track for upgrade.

3.5.10 Additional consultation will be undertaken to ascertain the exact location of the assumed PWS (if it does exist) serving this property. Additional site-specific measures will be set out in the CEMP to minimise the risk of surface water runoff draining from the construction site to the watercourse/PWS source (eg swales, settlement ponds, silt fences etc). Monitoring of the assumed PWS will be undertaken before, during and after construction to check there is no contamination of the supply or change in quantity of supply. Monitoring will be undertaken by ECoW, and monitoring would likely be from the tap at the supplied property location. If the water quality deteriorates during construction (eg discoloured, high sediment content, hydrocarbons) or quantity decreases an alternative water supply will be installed at the PWS property, such as portable bowsers, to ensure minimal disruption of supply during construction. In the worst-case scenario, the Additional Mitigation will include a commitment from the Applicant to provide a new private water supply for the property or provide a connection to the nearby Scottish Water mains.