# Farmpoint - Test Pumping Report

# Prepared for Farmpoint Ltd

## December 2024

**CONFIDENTIAL**


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# Quality Control Sheet

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| **Title** | Farmpoint - Test Pumping Report |
| **Client** | Farmpoint Ltd |
| **Issue Date** | 19/12/2024 |
| **Reference** | 3490494 Farmpoint Licensing \ RPT Farmpoint TP |

## Authors

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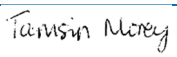
| Checked by | Tamsin Morey |  |
| Approved by | James Dodds |  |

## Revision History

| Revision | Details | Prepared by | Checked by | Approved by | Issue Date |
|---|---|---|---|---|---|
| REV01 | Draft for client review | BH | TLM | JED | 29/11/24 |
| REV02 | Issue to NRW | BH | TLM | JED | 19/12/24 |
| REV03 | | | | | |
| REV04 | | | | | |

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# 1 INTRODUCTION

## 1.1 Background

Farmpoint Ltd (Farmpoint) operate a poultry farm at Nobley, Walton, Presteigne, Powys, LD8 2NS (Figure 1) ("the Site"). At the Site, Farmpoint abstract water from a borehole (ABH) constructed within the Till for water supply for chicken sheds.

The farm is situated within the River Wye catchment. An abstraction licence was issued by Natural Resources Wales (NRW) in May 2022 (Licence No. WA/055/0008/0003, see Appendix A) which contains a 'Q74' Hands Off Flow condition (HoF). This is the standard HoF applied to all abstractions within the River Wye catchment if an impact of abstraction on surface water flows cannot be ruled out. This condition is for the purpose of protecting the River Wye Special Area of Conservation (SAC) at times of low flow and has been applied to licences since 2015.

In a 2021 test pumping report produced by BCL Consultant Hydrogeologists Limited (BCL) in support of the original abstraction licence application (BCL, 2021), BCL concluded that the currently consented abstraction did not induce any observed significant impacts in Knobley Brook and that this would also be the case for ongoing abstraction from ABH. Nevertheless, the HoF was applied to the abstraction licence notwithstanding the conclusion of the BCL report.

An appeal was subsequently lodged by Farmpoint against the imposition of the HoF condition (Appendix B), which was subsequently dismissed in the appeal decision dated 10/01/23. Part of the reasoning for reaching this decision was cited as "*a failure of the appellant's evidence to provide sufficient analysis and explanation to support its conclusions on the hydrogeology of the land around the borehole*" and the BCL test pumping report failing "*to provide a clear understanding and explanation of the hydrogeology of the locality to support the conclusions drawn from the pump test data in the report, which rely on readings from piezometers whose depth and construction are not known.*"

Envireau Water has been instructed to undertake a new test pumping programme and associated impact assessment to assess whether the abstraction will impact the surface water system, and to present a clear understanding and explanation of the hydrogeology of the locality to support the conclusions drawn from the test pumping data.

The new test pumping was undertaken between June and September 2024 and this report presents the results, a conceptual hydrogeological model that describes the hydrogeology of the locality and draws a clear evidenced based conclusion on the potential for impacts on the local surface water system.

## 1.2 Scope of Work

The scope of work completed for this assessment includes the following:

- Summary of the baseline geology, hydrogeology, and hydrology, incorporating data from the drilling of three boreholes (ABH, OBH1 and OBH2) and testing of ABH (Section 2);
- Summary of neighbouring receptors based on the results of a separate Water Features Survey (Envireau Water, 2023) (Section 3);

- Results and analysis of the 2024 test pumping, including charts and figures (Section 4); and
- An impact assessment of the abstraction focussing on the potential for depletion of surface water flows (Section 5).

## 1.3 Data Sources

The information and assessments in this report are based on:

- Site survey data;
- Water Features Survey (Envireau Water, 2023), which includes logs and construction details for the pumping and observation boreholes used for the test pumping, along with details of monitoring installations;
- BCL test pumping report (BCL, 2021);
- British Geological Survey (BGS) mapping;
- DataMapWales LiDAR data;
- Ordnance Survey and OpenStreetMap mapping;
- Google aerial imagery; and
- Data collected during test pumping activities completed at ABH between June and September 2024.

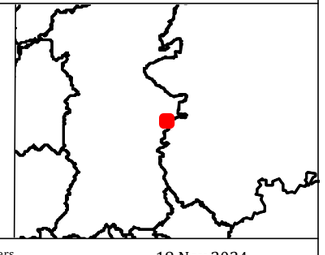
# Figure 1: Site Setting

Evenjobb, Powys


Abstraction Borehole (ABH)

Watercourses

Notes:



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18 Nov 2024

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| **Drawn by:** | LMM |
| **Ref:** | Site Setting |

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# 2 BASELINE CONDITIONS

## 2.1 Site Setting

The Site lies immediately to the east of the B4357 road, approximately 1 km to the south of the village of Evenjobb, Wales, and around 1.5 km from the England / Wales border. It comprises several farm buildings (including chicken sheds) and a hardstanding yard area, with access to the Site being from the B4357.

Higher ground lies to the south and west of the Site, and lower ground lies to the north and east. The Site itself is relatively flat at an elevation of around 184.5 metres above Ordnance Datum (mAOD). A watercourse, Knobley Brook, runs along the northern boundary of the Site, flowing from north-west to south-east.

The production borehole, ABH, is located along the western boundary of the Site, close to the site entrance, at grid reference 326153 261521 (Figure 1).

Land use within the vicinity of the Site is predominantly agricultural with the Site surrounded by fields.

## 2.2 Hydrology

The land around the Site drains northwards and eastwards following the local topography. Drainage from the Site is via a ditch which discharges into Knobley Brook. Knobley Brook flows south-east converging with Hindwell Brook 1.91km downstream.

## 2.3 Geology

The geological setting of the area has been characterised using information from BGS GeoIndex (British Geological Survey, 2024). The Site is located upon Devensian aged Till deposits overlying bedrock of the Wenlock Rocks, a Silurian aged undifferentiated argillaceous material comprised of shales and limestones. Quaternary aged Alluvium deposits are mapped overlying the Till either side of Knobley brook ~0.5km to the east of the Site. Regionally the Till comprises clay generally 2-3m thick overlying gravels which vary in thickness. The superficial geology at and around the Site is shown on Figure 2.

# Figure 2: Environmental Setting and Superficial Geology

Evenjobb, Powys

ABH

Abstraction Borehole (ABH)

**Superficial Geology**

Alluvium

Till

262000

261000

325000

326000

327000



Notes:



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## 2.4 Onsite Boreholes

Three boreholes have been installed at the Site – one abstraction borehole (ABH) and two monitoring boreholes (OBH1 and OBH2), the locations of which are shown on Figure 3. The installation schematic for ABH is presented as Figure 4, the schematics for the two monitoring boreholes in Appendix C and the original driller's log for ABH is provided in Appendix D.

ABH was installed to a depth of c. 10.5 metres below ground level (mbgl), entirely within the Till which consists of grey soils, soft clays and gravels. Soft grey soils and clay were encountered to 6.1 mbgl overlying a c. 4.5m thick gravel unit. The borehole is screened between 5.5 and 10.5 mbgl (i.e. over the full thickness of the gravels).

OBH1 was installed to a depth of 4 mbgl and, below the first 0.6 m of made ground (hardcore), also encountered Till over the full depth. This comprised 1.3 m of gravelly clay overlying 2.1 m of sand and gravel. This observation borehole is screened between 2 and 3.3 mbgl (the hole having collapsed back to 3.3 mbgl from 4 mbgl).

No made ground was encountered at OBH2, with the full thickness to the base of hole (4 mbgl) encountering Till. The Till comprised 1.6 m of gravelly clay overlying 2.4 m of sand and gravel. The borehole is screened between 1.5 and 3.1 mbgl, with the hole having collapsed below this level.

There is some variation in the elevation of the contact between the overlying clayey soils and underlying sands and gravels across the three boreholes. This contact is significantly lower in ABH (at c. 179 mAOD) compared to OBH1 and OBH2 (where it is encountered at c. 182.8 and 181.9 mAOD respectively). Although neither of the observation boreholes extends to the clayey/sand and gravel contact in ABH, we have assumed that the sand and gravel layer is the same as that encountered in the ABH. This provides a worst-case scenario.


# Figure 3: Scheme of Monitoring

Evenjobb, Powys

**Monitoring Locations**

- Abstraction Borehole (ABH)
- Observation Borehole
- Rain Gauge
- Surface Water Features

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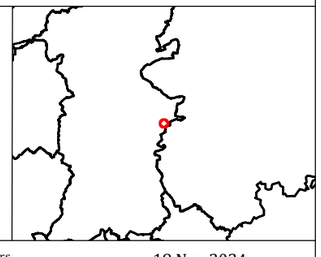

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| **Ref:** | Scheme of Monitoring |

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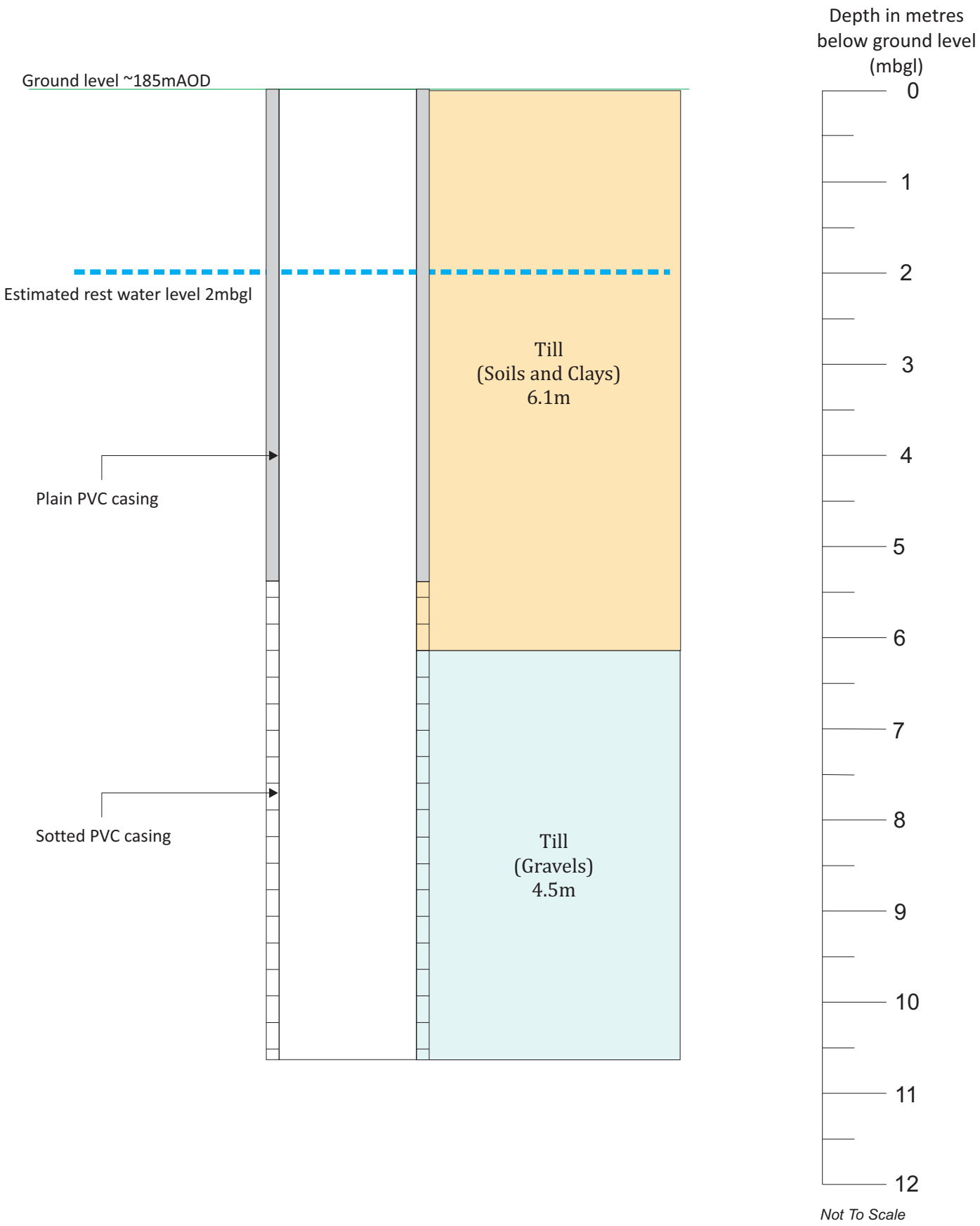


**Figure 4: ABH Borehole Schematic**



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## 2.5 Preliminary Conceptual Hydrogeological Model

The hydrogeological setting of the locality has been interpreted based on the geology provided by the Site boreholes, with reference to the Hydrogeology of Wales (Robins & Davies, 2015), and data from previous reporting (BCL, 2021). This preliminary conceptual model has been used to develop the test pumping monitoring network, and analysis methods. The results of the test pumping have then been used to verify the conceptual model.

The hydrogeology on site is characterised by the moderately thick clayey upper layer of the Till which has a low vertical permeability and overlies the lower layer of the Till comprising sands and gravels. The sands and gravels within the Till function as an aquifer, with the dominant flow mechanism being intergranular. Based on level data collected from the new test pumping, groundwater levels are between approximately 3 and 5 mbgl at ABH and between approximately 1.5 and 3 mgbl at the two observation boreholes. On this basis the aquifer is confined (over pressured).

Recharge to the aquifer is via infiltration and seepage through the low permeability clay layer of the Till. Where the gravel aquifer is covered by a clay layer of at least 2 m thickness, a shallow perched groundwater system may be present that discharges to surface water (Robins & Davies, 2015).

The Till is classified as a Secondary (undifferentiated) Aquifer by Natural Resources Wales and is not the main source of water for the region. The Alluvium c. 0.5km to the east of the Site is classified as a Secondary A Aquifer, although due to the low permeability layer of the Till, it is not in hydraulic connection with the aquifer.

# 3 WATER FEATURES SURVEY

## 3.1 Overview

A water features survey for the Site based on a 0.5 km search radius around the abstraction borehole is presented in Envireau Water's Water Features Survey Technical Note (Envireau Water, 2023) which should be consulted for full details. In summary, the following features were identified:

- One private water supply (PWS1) located approximately 160 m to the south-west at grid reference 326042 261398.
- One surface water feature (Knobley Brook) located approximately 0.1 km to the north-east at closest approach.
- Aside from the abstraction borehole itself, one BGS borehole record (BGS BH) located approximately 0.1 km to the north-east at grid reference 326200 261600.

These features are shown on Figure 5.

# Figure 5: Water Features Survey Results

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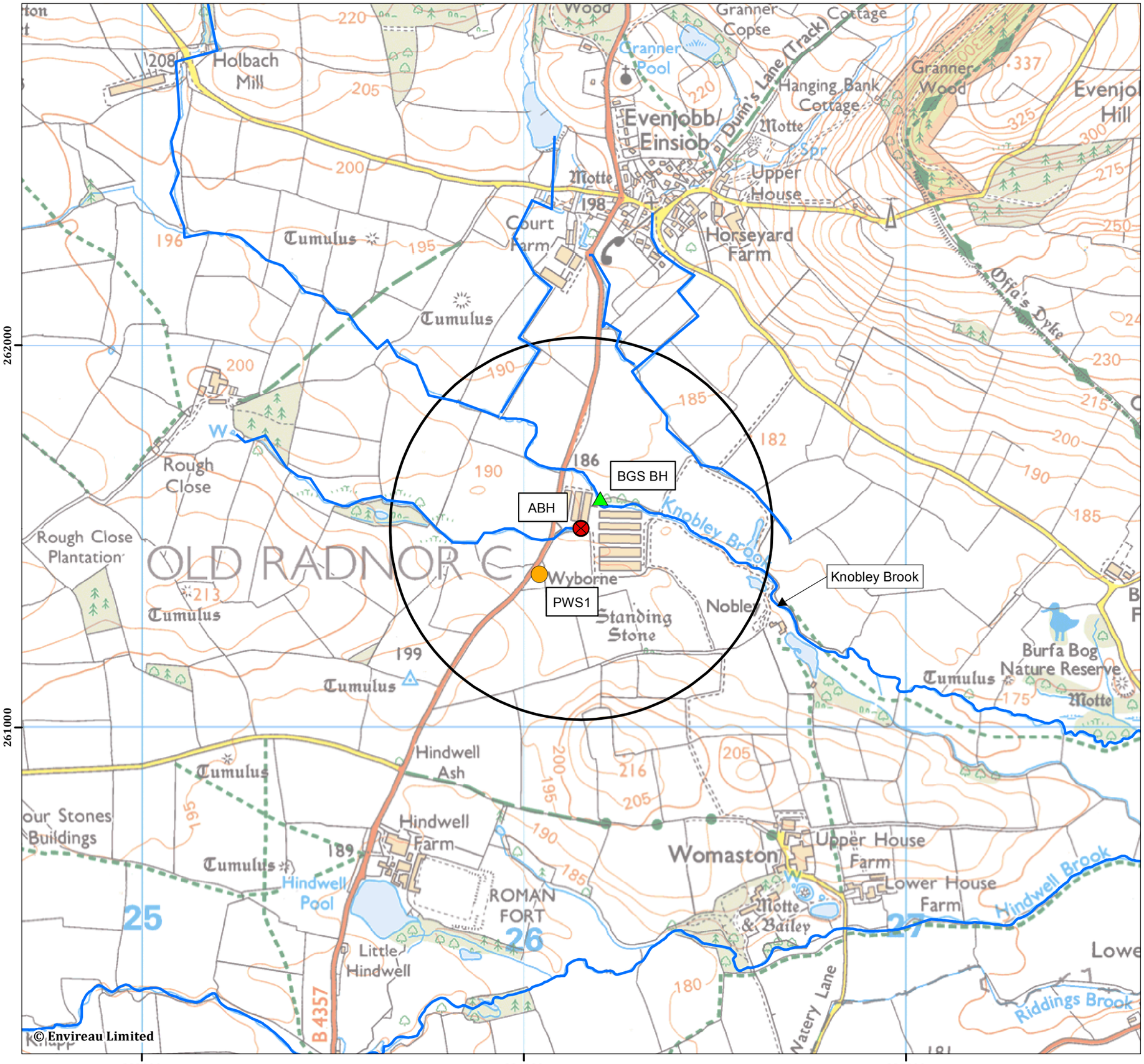



Abstraction Borehole (ABH)

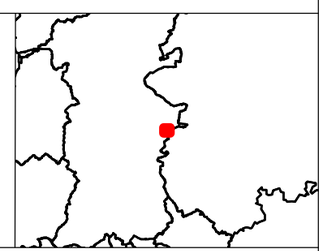
500m buffer

BGS Borehole

PWS1

Watercourses

Notes:



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# 4 TEST PUMPING

## 4.1 Abstraction

### 4.1.1 Groundwater Investigation Consent

The testing of ABH was conducted in accordance with Groundwater Investigation Consent PAN-021897 (Appendix E). This allowed for a maximum daily abstraction of 120 $m^3$ for a period of between 48 hrs and 91 days.

### 4.1.2 Borehole Construction

Drilling of ABH was undertaken by WB and AD Morgan, with construction completed in January 1988. An installation schematic is shown in Figure 4, and the original driller's log for the borehole (as held by BGS) is provided in Appendix D. Borehole construction is summarised in Table 1 below.

**Table 1 ABH Construction**

| | Notes |
|---|---|
| Drilling Method | Rotary with air flush |
| Borehole Installation | 305 mm drilled diameter over full depth (10.7 m)<br>0.0 to 5.5 mbgl – 101.6 mm diameter uPVC plain casing<br>5.5 to 10.7 mbgl – 152.4 mm diameter uPVC slotted casing |
| Backfill | 0.0 to 5.5 mbgl grout<br>5.5 to 10.67 mbgl gravel pack |
| Pump | Installed at 5 mbgl on 3" flexible rising main |
| Headworks | Housed in pump house<br>Includes access to 19 mm dip tube installed to the top of the pump |

### 4.1.3 Water Usage Requirements

Water abstracted from ABH is used as a water supply to the chicken sheds on the Site. The currently consented abstraction rates are shown below. Changes to these rates are not currently being proposed.

- Maximum instantaneous 1.4 l/s
- Maximum hourly 5 $m^3$
- Maximum daily 120 $m^3$
- Maximum annually 20,739 $m^3$

## 4.2 Monitoring Locations

Monitoring of groundwater level, surface water level and flow, and rainfall was undertaken during the test pumping. Surface water flow rate (volume per unit time) at SW1 is a derived parameter that has been calculated based on direct measurement of flow velocity and water depth applied to a specified channel profile.

Details of these locations are provided in Table 2 and presented on Figure 3.

**Table 2 Monitoring Locations**

| Name | Description | Easting / Northing | Datum elevation (mAOD) and description | Parameters | Type and frequency | Distance from ABH (m) |
|---|---|---|---|---|---|---|
| ABH | Abstraction borehole | 326153.340 261521.210 | 185.18 - Plant room floor | Groundwater level | Logger, 15 mins | 0 |
| | | | n/a | Abstraction rate | Logger, 30 (typically) to 75 mins (max) | |
| OBH1 | Observation borehole | 326165.257 261635.825 | 184.69 - Top of casing | Groundwater level | Logger, 60 mins | 115 |
| OBH2 | Observation borehole | 326286.038 261577.056 | 183.50 – ground level | Groundwater level | Logger, 60 mins | 144 |
| SW1 | Knobley Brook gauge | 326238.737 261579.135 | n/a | Flow rate (via level / velocity / channel profile) | ISCO ultrasonic Logger, 30 (typically) to 2850 mins (max) | 103 |
| | | | 182.11 – slab/bed | Water level | | |
| SW2 | Drain gauge | 326159.457 261514.772 | 185.04 – GB – Gauge level 10.0 | Water level | Logger, 60 mins | 9 |
| RG1 | On site rain gauge | 326173.153 261518.204 | n/a | Rainfall | Logger, 15 mins | 20 |

## 4.3 Test Pumping Programme

The test pumping programme was conducted in accordance with the Groundwater Investigation Consent (Appendix E).

Monitoring of all parameters bar ABH flow was undertaken between 26th June 2024 and 25th September 2024. Monitoring of ABH flow was undertaken between 25th June 2024 and 30th September 2024.

As the abstracted groundwater was required for the operation of the Site, pumping occurred prior to, during, and after the monitoring period, with the pump switching on and off in response to operational demand. Envireau Water refer to tests under these conditions as 'Operational Testing'. Operational tests are used where it is not possible (for operational reasons) to stop pumping for an extended period, or to abstract continuously at a constant

rate. While it is accepted that such an approach does not conform to scientific test pumping protocols, by having an extended monitoring period containing different stress periods, careful data selection and analysis allows appropriate interpretation to be undertaken.

Suitable data sets within the overall monitoring period were selected around the operational constraints to ensure:

- a baseline period with minimal pumping that allowed water levels to recover from previous pumping episodes and allow determination of rest water levels and water level recession, which were as little affected by rainfall as possible; and
- test periods where pumping was as constant as possible and water levels were as little affected by rainfall as possible.

Based on these criteria, two test periods were identified – a short-term and a long-term constant rate test (CRT). The details of these tests are provided in Table 3 below.

**Table 3 Test Pumping Programme**

| Event | Start and End Dates | Duration | Description |
|---|---|---|---|
| Short-term CRT - pumping phase | 01/08/24 07:45 to 01/08/24 10:30 | 0.1 days / 2.75 hrs | Abstraction at mean rate of 7.15 $m^3$/hr (171.7 $m^3$/d) over a single pumping event |
| Short-term CRT - recovery phase | 01/08/24 10:30 to 01/08/24 20:00 | 0.4 days / 9.5 hrs | No abstraction. Recovery from pumping phase |
| Long-term CRT - pre-test | 25/07/24 12:00 to 02/08/24 13:45 | 8.1 days / 193.75 hrs | Period of low abstraction prior to long-term CRT pumping phase. Three pumping events, total of 57.68 $m^3$ abstracted, mean abstraction rate of 7.1 $m^3$/d. |
| Long-term CRT - pumping phase | 02/08/24 13:45 to 25/08/24 00:45 | 22.5 days / 539 hrs | Abstraction at mean rate of 2.6 $m^3$/hr (62.8 $m^3$/d) over multiple pumping events |

The short-term CRT is a single pumping event and provided a data set over which background water level recession and climatic influences are minimal and, hence, is relatively straightforward to analyse. However, the data set is very short which has an impact on the numerical confidence in the classic test pumping analysis results.

The long-term CRT consists of multiple pumping events which, have been averaged out over the period of the test. The long period of pumping, the high frequency and individually short duration of the cycling, means that the average abstraction rate and pumping water level is valid. Each pumping cycle also provides a signal which can be used to assess pressure and/or drainage responses in the observation boreholes. The data are also affected by background recession, due to the length of the test period and incorporates a number of rainfall events. The latter also provide stress signals. The end of the long-term CRT is defined as the first point at which groundwater levels in either of the two observation boreholes reach the sensor level (see discussion in Section 5.1).

# 5 TEST PUMPING ANALYSIS

## 5.1 Groundwater Hydrographs

Groundwater and surface water hydrographs for the full period of monitoring are provided on Figure 6. Also shown on this figure are the sensor and base of hole levels, rainfall, and the start and end points for the various test phases. Surface water flow at SW1 and rainfall are shown separately on Figure 7. More focused hydrographs showing the individual tests are provided in Figure 8 and Figure 9.

Comparison of groundwater levels with borehole logs indicates that groundwater in the aquifer is confined beneath the upper cohesive soils at the location of ABH. This is the case throughout the monitoring period. At OBH1 maximum groundwater levels are close to the upper boundary of the aquifer but are unconfined. A similar situation occurs at OBH2, although maximum groundwater levels here are even closer to, and almost coincident with, the upper boundary of the aquifer. If the upper boundary of the aquifer at ABH and the two observation boreholes is joined by a straight line, it would suggest that the aquifer is mostly confined in the area.

Thus, it is appropriate to use analysis techniques for confined aquifers, as long as any drainage or release of specific yield is minimal.

## 5.2 Background Recession

It is clear from the hydrographs for ABH, OBH1, and OBH2 that there is a steady decline in groundwater levels over the pre-test period. Given the time of year (summer) and the absence of rainfall over the pre-test period, this is expected to reflect the seasonal and regional decline in groundwater levels that would typically occur at this time of year. This decline is referred to as 'background recession'. It has been assumed that the background recession continues through the pumping phase of the long-term CRT, and extrapolation of the pre-test trends over the pumping phase (based on levels at the beginning and end of the period – see Table 4) is shown as dotted lines on Figure 9. The gradients of these trends varies from location to location, with OBH1 showing the steepest trend and OBH2 the shallowest (see also calculated gradients in Table 4). It is these extrapolated rest levels against which observed groundwater levels have been compared to calculate drawdown (referred to as corrected drawdown). This assumes that the gradient on the rest water level drift has remained constant over the pumping phase and, conservatively, that any deviation between the extrapolated rest water level and the observed level is due to the effect of abstraction from ABH rather than any other external factors.

**Table 4 Background recession analysis**

| Parameter | ABH | OBH1 | OBH2 |
|---|---|---|---|
| Pre-test start observed rest water level (mAOD) | 181.66 | 182.19 | 181.68 |
| Pre-test end / pumping phase start observed rest water level (mAOD) | 181.56 | 182.04 | 181.59 |
| Pre-test rate of change in rest water level (m/day) | -0.0133 | -0.0180 | -0.0111 |

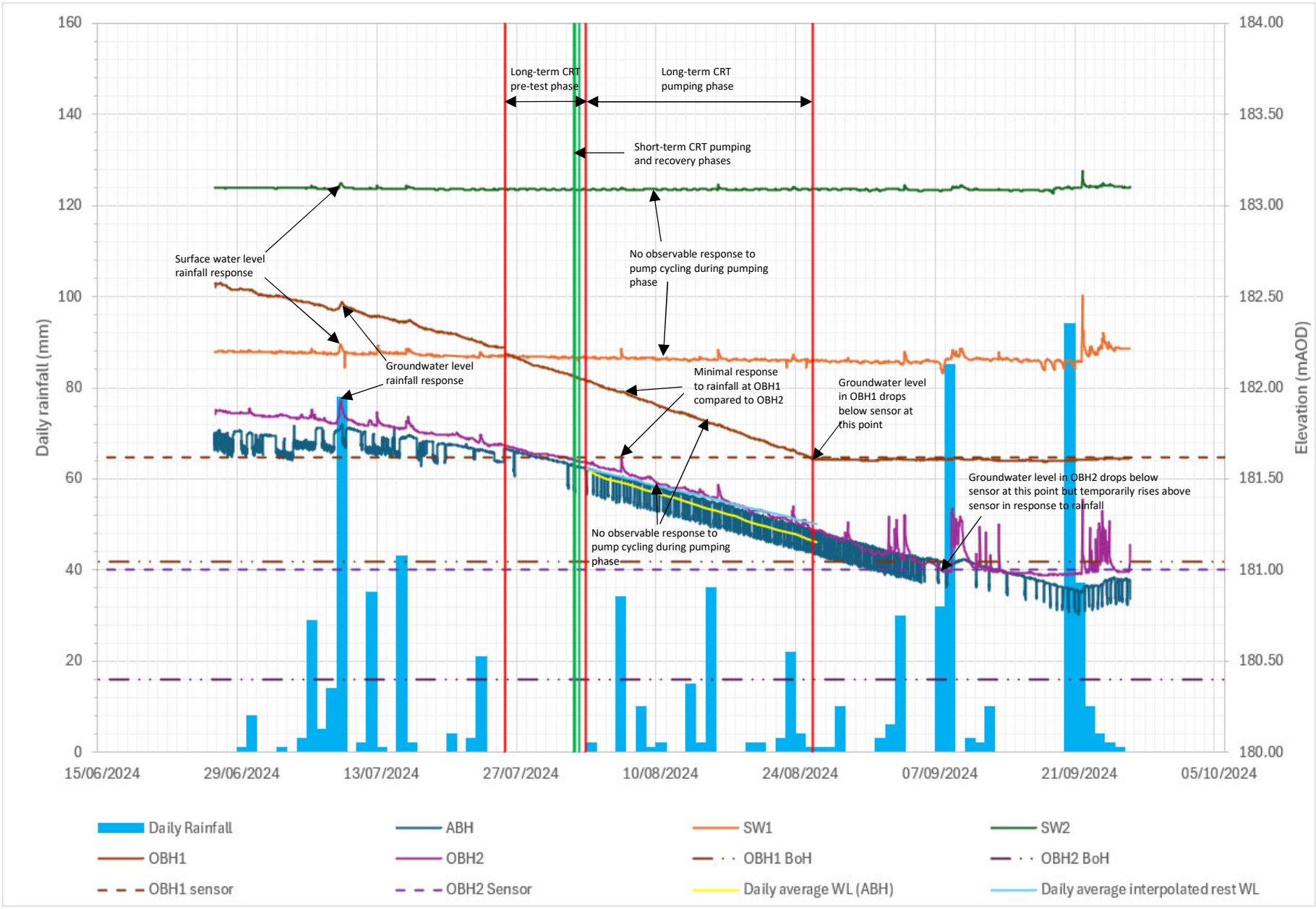


**Figure 6: Groundwater Hydrographs**

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**Drawn By:** BH



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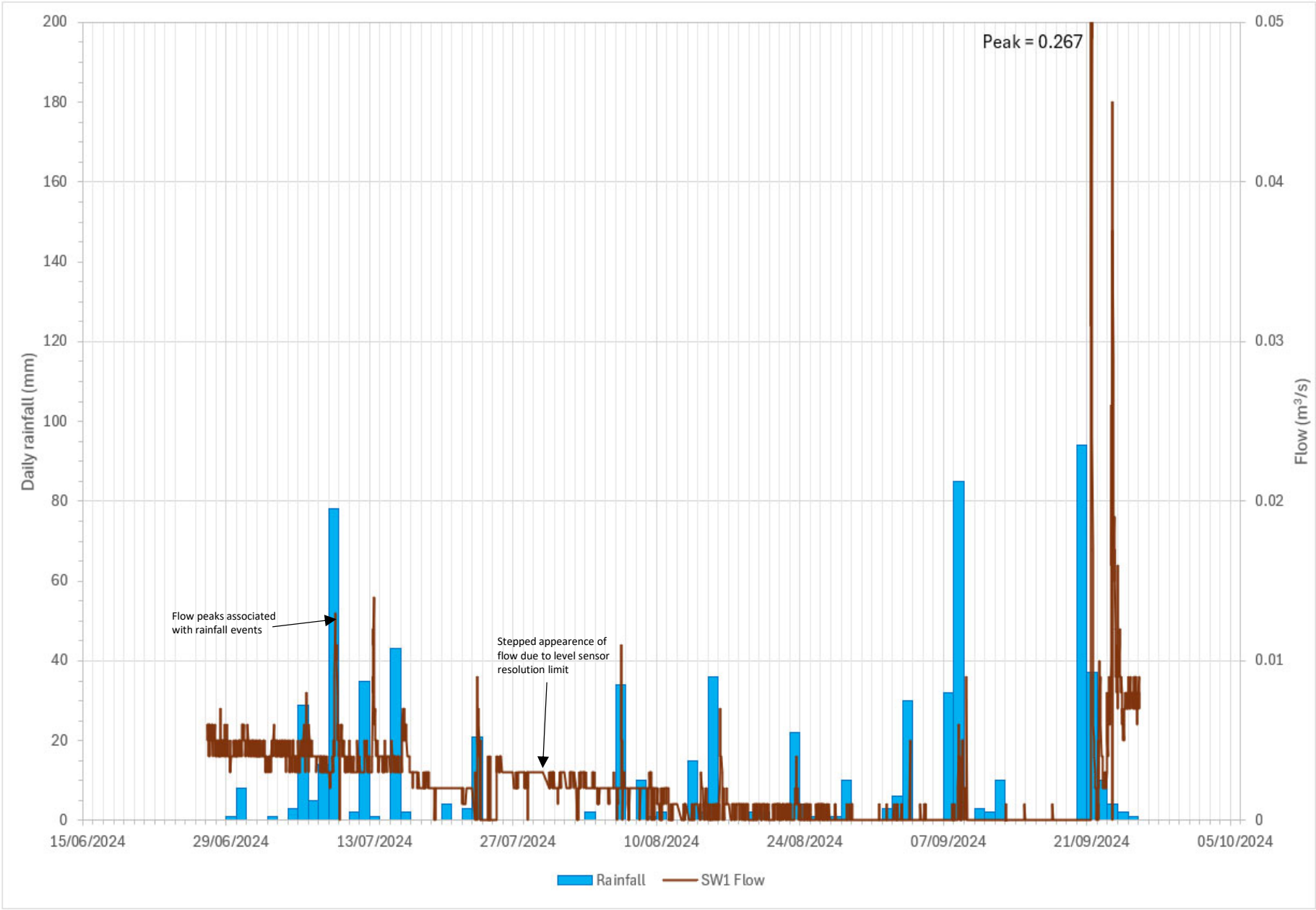


**Figure 7: Surface Water Flows**

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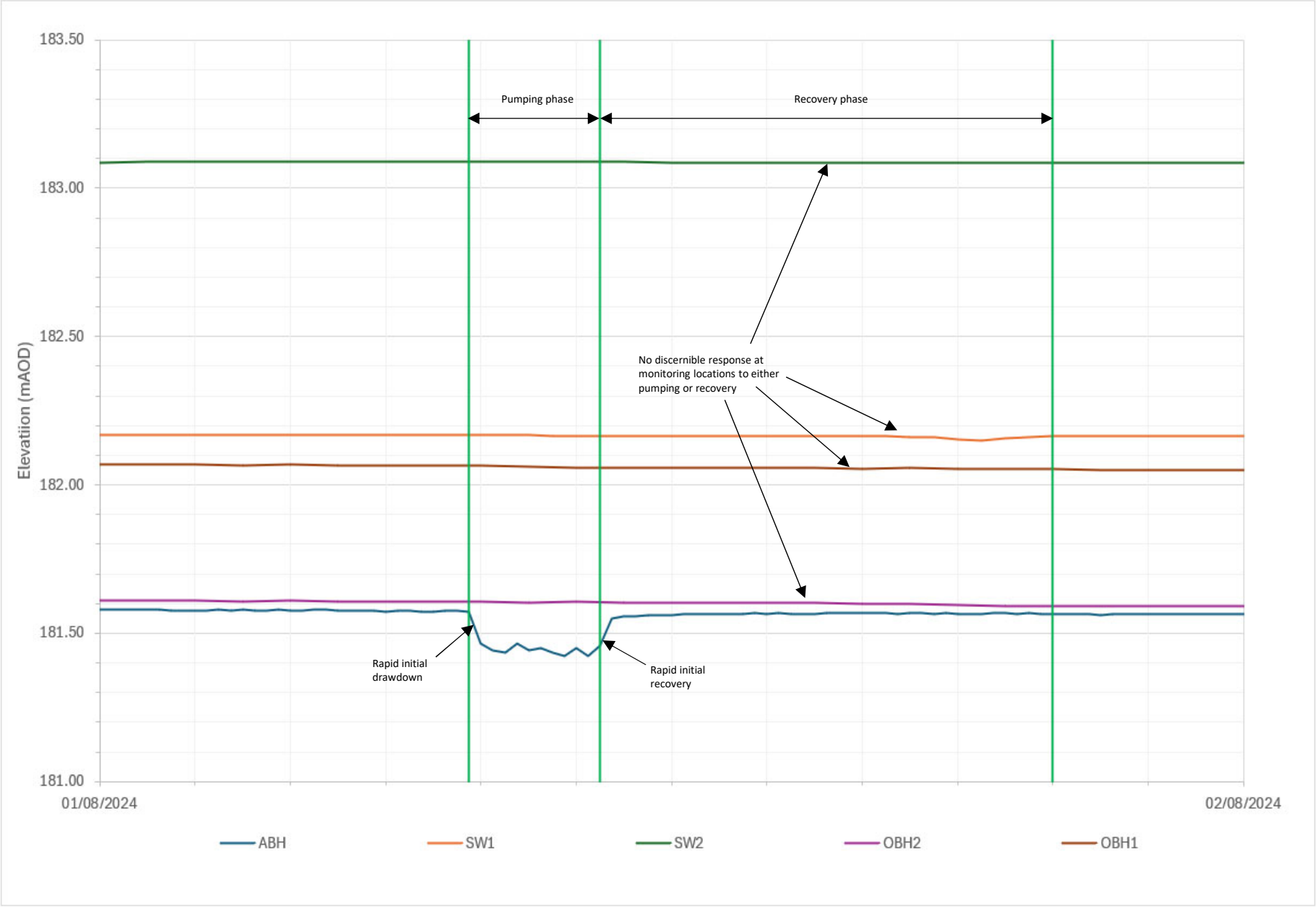


**Figure 8: Short Term CRT Hydrographs**

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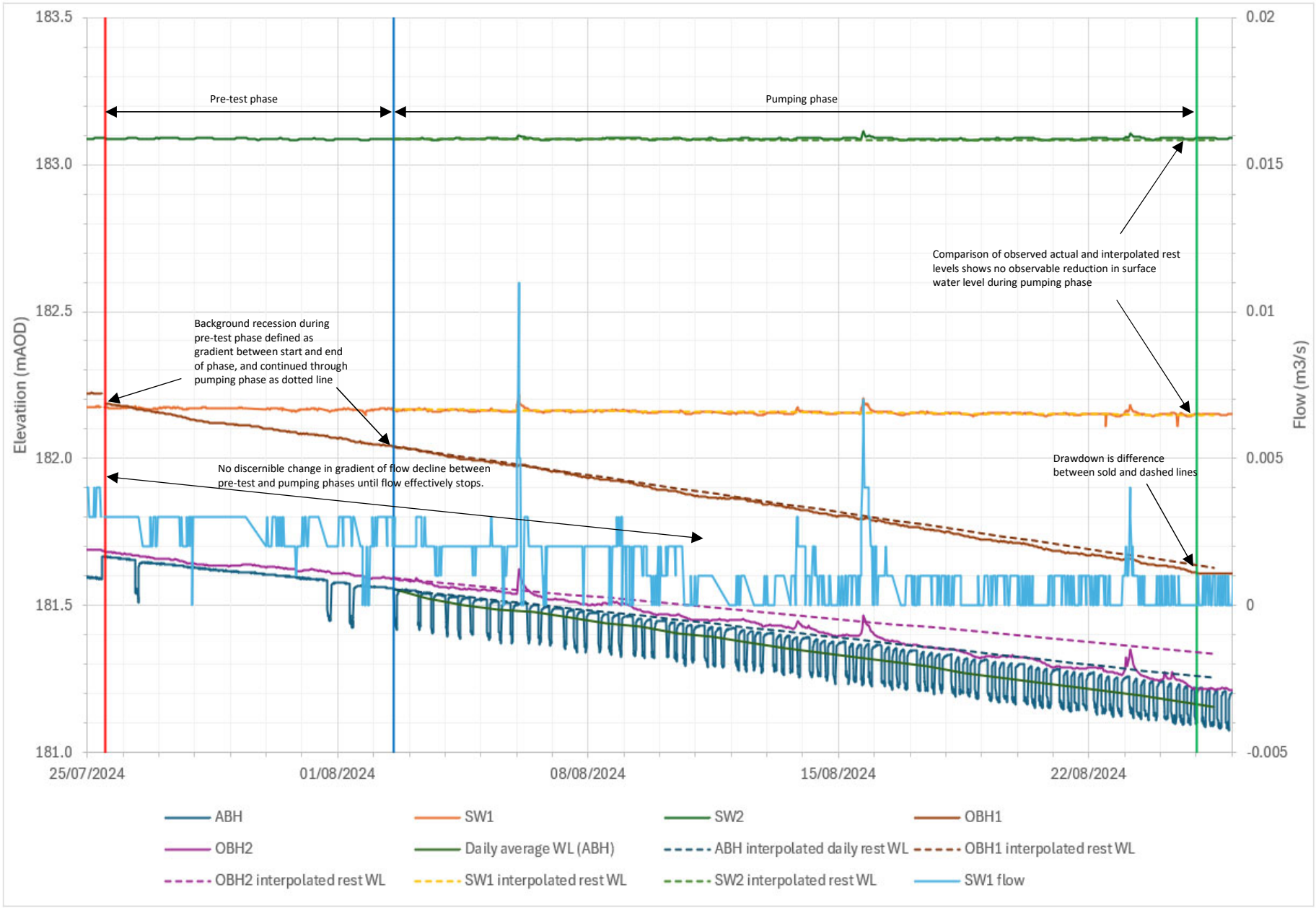


**Figure 9: Long Term CRT Hydrographs**

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| **Client:** | Farmpoint Ltd |
| **Ref:** | TP Fig 9 |
| **Drawn By:** | BH |



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## 5.3 Short-term CRT

The short-term CRT is a single pumping event that occurred prior to the long-term CRT. The hydrograph is shown on Figure 8. The pumping and recovery phases for this test are so short that there is no significant background recession effecting the data. No rainfall events occurred during the period of the test.

Only ABH shows any discernible changes in groundwater levels. Starting with a rest level of 181.57 mAOD, there is a rapid initial response in ABH with a drop of around 0.14 m over a period of less than 1 hour, after which the rate of change in level is relatively low through until the pump is switched off after an elapsed pumping time of 165 mins (2.75 hrs). Groundwater level at the end of the pumping phase is 181.46 mAOD (a drawdown of 0.12 m). A similar, but opposite response occurs at the beginning of the recovery phase. 95% recovery (i.e. to a level of 181.45 mAOD) occurs after an elapsed recovery time of between 315 and 330 mins.

The brevity of the test means that its ability to provide information on conditions at large distances from ABH or slower leakage effects is limited. The drawdown is relatively small which means that it is also more influenced by factors that might produce slight variation in measured water levels (e.g. measurement sensor resolution, in borehole effects, etc.) and the results therefore show a little noise during the pumping phase of the test. However, the test response is a relatively typical aquifer response, with a rapid initial drawdown followed by a levelling off in water levels during the pumping phase and a mirror image following cessation of abstraction of initially rapid recovery followed by much slower recovery.

## 5.4 Long-term CRT

### 5.4.1 Groundwater level observations

The hydrograph for the long-term CRT (including pre-test phase) is shown on Figure 9, and key water level information is provided in Table 5.

The start of the pre-test period is defined by the point in time at which a number of the sensors were reset, which occurred shortly after a small rainfall event. The end of the pre-test / start of the pumping phase occurs with the resumption of more frequent pumping events. The end of the pumping phase occurs when water levels in OBH1 fall to the sensor level. Recorded values in OBH1 flatline after this and do not reflect groundwater levels. A similar situation is also seen in OBH2, but this occurs later (from the 7th September), and heavier rainfall events at this time result in the groundwater temporarily rising above the sensor for periods before dropping back below it.

**Table 5 Long-term CRT groundwater level data**

| Parameter | ABH | OBH1 | OBH2 |
|---|---|---|---|
| Pumping phase observed daily average end water level (mAOD) | 181.15 | 181.61 | 181.22 |
| Pumping phase extrapolated daily average rest water level (mAOD) | 181.25 | 181.63 | 181.34 |
| Total corrected drawdown over pumping phase (m) | 0.10 | 0.02 | 0.12 |

There are only three short pumping events that occur during the whole of the pre-test phase (see Table 3 for details) and these represent only a small proportion of the time so are not considered to have any significant impact on rest water levels within the analysis period.

A number of rainfall events occur within the pumping phase, totalling 135 mm with a mean of 6 mm/d (see Figure 6). Their effects are not discernible from the effects of pumping in ABH and neither is there an obvious response in OBH1. A response can be seen in OBH2, with rapid rises after events of the order of 100 mm over a period of a few hours and slightly slower recessions which are generally complete within a day. Given the very short term effects that these individual events have, the impact of rainfall through the pumping phase is not considered to be significant.

Whilst effective drawdown at OBH1 and OBH2 can be estimated through simple comparison of observed and extrapolated groundwater levels, the on/off cycling of pumping at ABH means that groundwater levels in the pumping borehole oscillate between highs and lows which reflect a superimposition of the effects of both short-term and long-term pumping history. The longer-term and wider impact of the abstraction will be more reflective of the long-term mean pumping rate rather than the instantaneous rate which varies from 0 to just over 8 $m^3$/hr. To remove the short-term fluctuations, the pumping water levels have been averaged over each day (a day normally containing several on/off pumping cycles). This daily average level is shown on Figure 9, and this is the level that has been compared with extrapolated rest water levels to determine the corrected drawdown.

Comparison of observed and extrapolated groundwater levels shows the corrected drawdown at ABH, OBH1 and OBH2. The greatest corrected drawdown is seen in ABH (as would be expected) and the least, is seen in OBH1. The magnitude of the corrected drawdown in OBH1 and OBH2 is the reverse of what would be expected – OBH2 is the most distant, yet displays greater corrected drawdown. It must be recognised however that in both cases the corrected drawdown is small, with that at OBH1 being effectively only 2 cm and that at OBH2 being only 12 cm, which in numerical terms is 2 cm more than the abstraction borehole. Given the nature of the testing and the precision of the data analysis, it can be concluded that there was corrected drawdown at OBH1 and that the drawdown at OBH2 was the same as, or similar to the abstraction borehole. The distribution of these responses is likely to be due to lateral variations in the hydraulic conductivity and/or thickness of the sands and gravels aquifer.

### 5.4.2 Surface water level and flow observations

Surface water levels remain almost constant throughout the long-term CRT period. Those at SW2 show no discernible trend; those at SW1 show a very small drop from levels of around 182.176 to 182.150 mAOD (a drop of 2.6 cm).

The effects of rainfall events can be seen at both monitoring locations, but in both cases they are slight. SW1 shows the greatest response, with rapid rises of around 5 cm over a period of a few hours, and rapid recessions which are complete within a day. Responses at SW2 are similar in terms of timing but slightly lower in terms of magnitude – of the order of 3 cm.

### 5.4.3 Surface water flow observations

As noted in Section 4.2, surface water flow at SW1 is a derived parameter based on measured values of water level and velocity. Changes in level at SW1 are so small that switching between measured discrete level values equal to the sensor resolution occurs, and this can consequently be seen in the derived flow values. The data suggests that there is a declining trend from around 3 l/s to 0 l/s which starts during the pre-test period and continues into the pumping phase. However, there is no discernible change in the trend between the pre-test period and pumping phase, showing that the abstraction is not having an effect on the stream flow

The effects of rainfall can be seen in the flow data. These produce rapid rises of up to 9 l/s above background flow (peak flow during the test is recorded as 11 l/s) and rapid recessions. Timing of the response is similar to the timing of the response seen in surface water levels discussed above (rise and recession occurring within a day).

## 5.5 Aquifer Properties

Aquifer transmissivity has been estimated using the monitoring data. The analytical solutions used to estimate the aquifer properties have been selected based on the conceptual understanding of the hydrogeology and apparent drawdown responses.

The aquifer properties derived from this analysis are presented in Table 6. Analysis graphs are presented at Appendix F.

**Table 6 Aquifer Properties from Test Pumping Data (ABH)**

| Event | Location | Analytical Technique | Transmissivity ($m^2/d$) |
|---|---|---|---|
| Short-term CRT - pumping phase | ABH | Jacob straight line (Cooper & Jacob, 1946) | 1,560 |
| Short-term CRT - recovery phase | ABH | Theis (Theis, 1935) | 1,632 |
| Long-term CRT - pumping phase | ABH | Jacob straight line (Cooper & Jacob, 1946) | 191 |
| | OBH1 | Theis (Theis, 1935) | 407 |
| | OBH2 | Theis (Theis, 1935) | 44 |

There is a range in the transmissivity values obtained from the analyses. The range is a function of variability in the hydraulic conductivity and thickness of the aquifer, and the small, corrected drawdown observed at the observation boreholes. The average transmissivity of approximately 200 $m^2$/day is a reasonable estimate and is reflective of the value obtained at the abstraction borehole.

## 5.6 Final Conceptual Model

Based on the results of the analysis of the pumping data, the initial conceptual hydrogeological model can be confirmed as correct. That is, the hydrogeology on site is characterised by the moderately thick clayey upper layer of the Till which is described as having a low vertical permeability, and which overlies the lower layer of the Till comprising sands and gravels. The sands and gravels within the Till function as an aquifer, with the dominant flow mechanism within the aquifer being intergranular flow, with a transmissivity of c. 200 $m^2$/day. The aquifer remains

confined (or nearly so) through the test and only small drawdowns were seen at the observation boreholes. It is likely that the hydraulic conductivity and/or thickness of the aquifer varies laterally.

There is no evidence of recharge from, or interaction with, the watercourse, and therefore the method of recharge to the aquifer is via infiltration and seepage through the low permeability clay layer of the Till.

# 6 IMPACT ASSESSMENT

With apparent drawdown in the pumping well, ABH, of the order of only 0.1 m, a similar order on OBH2, and no corrected drawdown in OBH1, there is no prospect of a significant impact on either of the two boreholes (PWS1 and BGS BH) identified in the water features survey.

The main potential impact is therefore on flows in Knobley Brook. This will depend on the nature and degree of hydraulic connection between ABH and the watercourse. Direct measurement of surface water flow and levels was undertaken during the long-term CRT, and these showed no discernible response to the pumping. In fact, extrapolation of pre-test rest water levels suggests that, if anything, observed levels may have been fractionally higher than the extrapolated rest levels at the end of the pumping phase.

Groundwater levels at the observation boreholes showed no effective drawdown at OBH1 and only 12 cm at OBH2, over the period of the long-term CRT. If there is a connection between Knobley Brook and the underlying aquifer this would show as a signature in the corrected drawdown responses measured at ABH, OBH1, and OBH2. Leakage of water induced by the reduced piezometric level where the stream bed contacts the aquifer would show as a recharge barrier or leaky aquifer response in the drawdown curve. This is characterised by an inflection and reduction in the rate of drawdown when the drawdown effects of the pumping reach the source of leakage (in this case the watercourse). A semi-log plot of corrected drawdown at ABH, OBH1, and OBH2 is presented on Figure 10. This appears to show the opposite effect – as time progresses, the rate of corrected drawdown increases rather than decreases. These curves are therefore not characteristic of a recharge source such as a leaking watercourse and show that the pumping is not inducing leakage from Knobley Brook.

Based on the evidence from the test pumping, a direct hydraulic connection does not exist between the abstraction and the Knobley Brook, and therefore the abstraction is not having an effect on low flows.

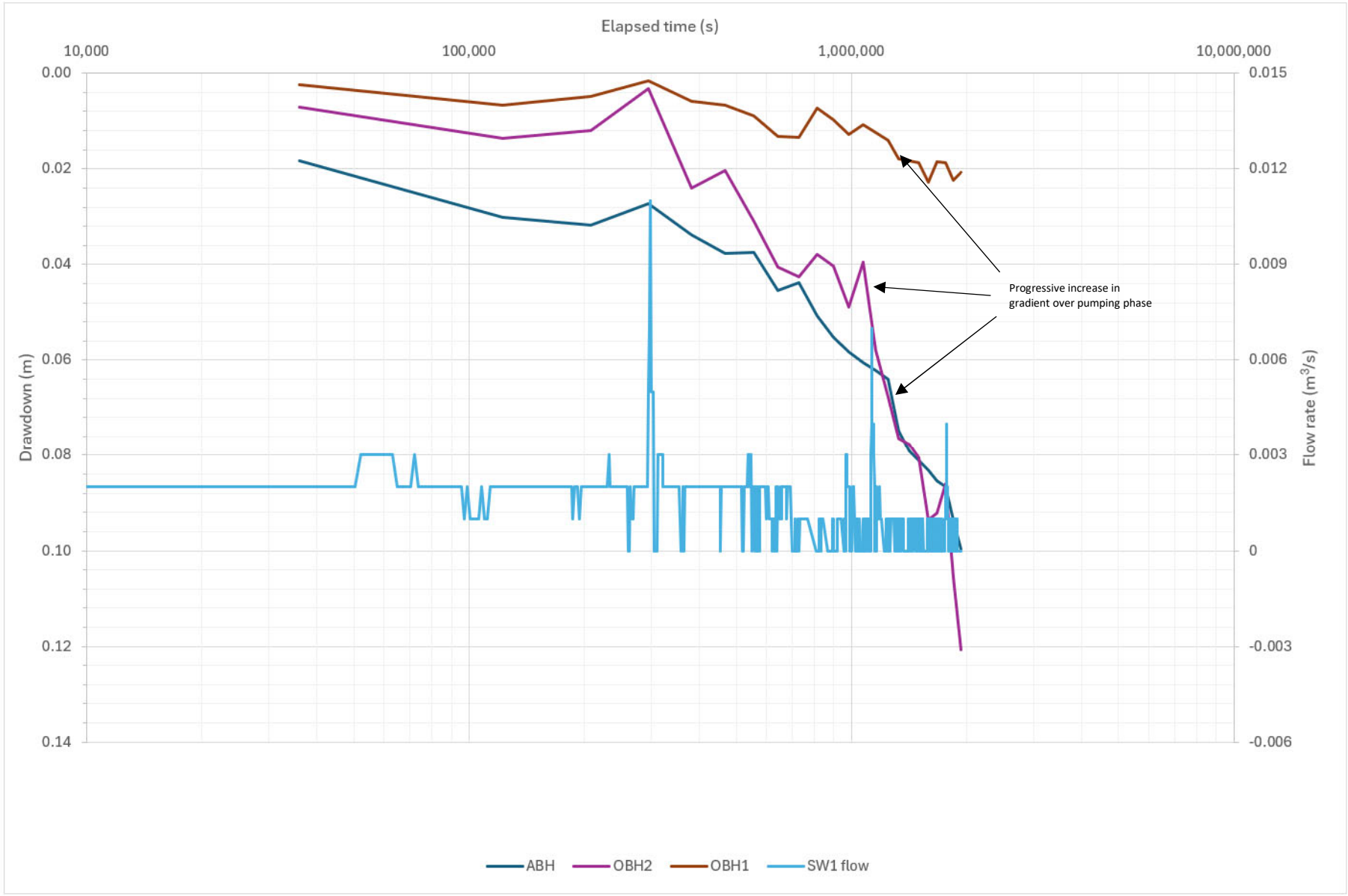


**Figure 10: Semi-log Plot of Long-term CRT Hydrographs**

**Date:** 28 November 2024
**Project No** 3490494
**Client:** Farmpoint Ltd
**Ref:** TP Fig 10
**Drawn By:** BH



envireau WATER

# 7 CONCLUSIONS

Farmpoint currently operates a groundwater abstraction from a borehole (ABH) at Nobley Farm to provide a water supply to chicken sheds. The borehole is installed within the Till, and the source of the water is a layer of sands and gravels (the aquifer) below a clay layer.

An abstraction licence was issued to Farmpoint by NRW on 11th May 2022 which allows for abstraction of up to 120 $m^3$/d for the purpose of agriculture other than spray irrigation. This includes a 'Q74' Hands Off Flow condition (HoF) for the purpose of protecting the River Wye Special Area of Conservation (SAC) at times of low flow.

In August 2023, a Groundwater Investigation Consent was issued by NRW to allow the test pumping of ABH for the purpose of establishing the degree of connection between groundwater in the aquifer and surface water, and based on that, the need to retain the 'Q74' HoF.

Envireau Water has used baseline data for the Site and surrounding area provided by Farmpoint and other sources to inform a conceptual hydrogeological model, and test pumping data to confirm that the abstraction is sustainable and does not result in any significant impact on potential receptors, particularly flows in Knobley Brook, located approximately 90 m to the north-east of ABH at its closest,.

The conceptual hydrogeological model shows that the source of water for the abstraction is the sands and gravels aquifer within the Till which appears to be laterally persistent at least as far as Knobley Brook. Groundwater flow is intergranular and at ABH the aquifer is fully confined, although the piezometric level is close to or at the top of aquifer at OBH1 and OBH2.

Based on the conceptual hydrogeological model and test pumping results, potential impacts to neighbouring abstractions, surface water bodies, and sensitive sites have been assessed. The receptors identified are Knobley Brook, one PWS located approximately 160 m to the south-west, and one borehole located approximately 0.1 km to the north-east for which there is a BGS record.

The corrected drawdowns calculated in ABH, OBH1, and OBH2 are so small that no significant impact is expected at either of the two boreholes receptors. At Knobley Brook there was no observable impact on flows from the abstraction, and corrected drawdown responses showed no sign of leakage from the river (they actually showed the opposite of a leakage response). It is therefore concluded that the proposed abstraction will not result in any measurable impact to any of these identified receptors.

A number of comments were made in the decision on Farmpoint's appeal against the inclusion of 'Q74' HoF condition regarding deficiencies in the information provided to support that appeal. The assessment presented in this report has been undertaken to address those comments. In this regard, the conclusions of this assessment are based on and supported by a developed understanding of the hydrogeology around the abstraction borehole from review and analysis of borehole construction and lithology data, test pumping data, and other environmental data, and this report presents the results, a conceptual hydrogeological model that describes the hydrogeology of the locality and draws a clear evidenced based conclusion on the potential for impacts on the local surface water system.

Based on the data collected, analysis undertaken and the conclusions drawn, Envireau Water consider that there is now robust evidence, and it is beyond reasonable scientific doubt, that removal of the HoF from the licence would not pose any risk to the integrity of the River Wye SAC.

# REFERENCES

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British Geological Survey. (2024). *GeoIndex Onshore.* Retrieved 15/11/2024 from https://mapapps2.bgs.ac.uk/geoindex/home.html.

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# APPENDICES

# Appendix A Abstraction Licence

Cyfoeth Naturiol Cymru
Natural Resources Wales

# Water Resources
## LICENCE TO
## ABSTRACT
## WATER

Environment Act 1995
Water Resources Act 1991 as amended by the Water Act 2003
Water Resources (Abstraction and Impounding) Regulations 2006
Natural Resources Body for Wales (Functions) Order 2012

# IMPORTANT NOTES

## Need for safekeeping

This licence is an important document. The permission or right to abstract water may be valuable to your landholding. So -

- **Keep the licence safe, preferably with your deeds etc.**
- **Take careful note of the comments below about "transfer and apportionment" and "death and bankruptcy".**

**This is to ensure that the permission and any rights granted by the licence continue if you need to pass it on to someone else.**

**If you want to:**

- **revoke (cancel) the licence;**
- **vary (change/amend) the licence in any way or**
- **change your contact address (but you continue to hold the licence).**

**Please write to us at your local Natural Resources Wales office.**

Details of this licence are placed on a register, kept by Natural Resources Wales and open for inspection by the public. The public may also obtain further details about it by virtue of the Environmental Information Information Regulations 2004 (see also Disclosure of Information) except in special cases (for advice please contact us at the address shown on the front page of the licence).

## Transfer and apportionment

If you need to pass this licence or any part of it to someone else, you must contact Natural Resources Wales and obtain the appropriate application forms. Temporary licences cannot be transferred or apportioned. The licence holder remains responsible for compliance with the terms of the licence and any charges payable until the licence has been transferred or apportioned.

## Death or bankruptcy of the licence holder

If a licence has been **'vested'** in you, as a result of the death or bankruptcy of the licence holder, please contact Natural Resources Wales in writing, telling us the licence number(s) and the date that the licence vested in you as a personal representative or trustee of the licence holder. This is necessary in order to enable you to subsequently transfer the licence.

**'Vesting'** is the transfer of responsibility and ownership of a licence when an existing licence holder is no longer able to hold the licence either through death or bankruptcy.

You do not have to complete a form, but you must notify us in writing within 15 months of the date of vesting, giving the full names of all personal representatives or trustees and a contact address.

## Time limits

Your licence may be subject to a time limit (stated on the front of your licence). All new abstraction licences are legally required to include a time limit. For variations to licences, time limits are added in accordance with our policy.

The duration of a time limit is determined in accordance with our time limiting policy. The time limit is linked to the next or subsequent review of water resources within a Catchment Abstraction Management Strategy (CAMS).

There will be a presumption of renewal providing three tests are met: environmental sustainability is not in question; there is continued justification of need; and water is being used efficiently. Any application for renewal will still be subject to the normal statutory considerations.

If your licence is time limited and you wish to renew it when it expires, you will need to apply for a new licence to replace the existing one. You are advised to submit this application at least three months before it expires. To allow you to give early consideration to this, we will send you a reminder approximately 18 months before the expiry date.

If your licence cannot be renewed, we will endeavour to give at least six years notice. We will also endeavour to give at least six years notice where the licence is likely to be renewed on different terms and will significantly impact upon the use of the licence.

In exceptional circumstances, for example where there are other overriding statutory duties such as the Habitats Regulations, it may not be possible to provide six years notice.

## Charges

Unless specifically exempted, we may levy an annual CHARGE for water AUTHORISED to be abstracted by this licence, in accordance with our abstraction charges scheme in force at the time.

**The licence may be revoked if charges are not paid.**

## Quantity and quality of water

You must not abstract more than the quantity specified in the licence.

Natural Resources Wales does not, by issue of this licence or otherwise, in any way guarantee that the source of supply will produce the quantity of water authorised to be abstracted by this licence, nor that the water is fit for its intended use.

The quantity of water authorised for abstraction is given in cubic metres. One cubic metre is approximately 220 gallons.

(The precise conversion is 1 cubic metres = 219.969 gallons).

## Source of supply and authorised point of abstraction

You may abstract from the point(s) specified in the licence and from no other points. If you want to add or change the authorised point(s) of abstraction, you must apply to us to vary the licence.

## Land on which water is authorised to be used

Where this condition applies, you may only use the water you abstract on the area specified in the licence. You must apply to us to vary the licence if you wish to extend or alter this area or remove it.

## Purpose for which water is authorised to be used

You may only use the water for the purpose(s) specified in the licence. You must apply to us to vary the licence if you wish to add to or change the purpose(s).

## Offences

Under the Water Resources Act 1991 it is an offence:-

- to abstract water, or cause or permit any other person to abstract water, unless the abstraction is authorised by and in accordance with an abstraction licence, or is subject to an exemption;
- to do anything to enable abstraction, or to increase abstraction, except in accordance with an abstraction licence or exemption;
- to fail to comply with the conditions of an abstraction licence. **Note in particular that it may be a condition of the licence to maintain the meter or other measuring device etc. and failure to do so will be an offence;**
- to interfere with a meter or other device which measures quantities of water abstracted so as to prevent it from measuring correctly;
- to fail to provide information which we have reasonably required for the purpose of carrying out any of the Natural Resources Wales water resources functions;
- to knowingly make false statements for the purpose of obtaining a licence or consent or in giving required information.

The requirement for a licence is subject to some exemptions, set out in the Water Resources Act 1991 as amended. If in any doubt as to whether you need a licence, contact us at the address shown at the bottom of the front page of the licence.

## Right of appeal

If you are dissatisfied with our decision on your licence application, you may appeal.

If you are in England, you should write to the Secretary of State for the Environment, Food and Rural Affairs, care of The Planning Inspectorate at:
Room 4/19 Eagle Wing,
Temple Quay House,
2 The Square,
Temple Quay,
Bristol,
BS1 6PN.

If you are in Wales, you should write to Welsh Government care of
The Planning Inspectorate at:
Crown Buildings,
Cathays Park,
Cardiff,
CF10 3NQ.

You must serve notice of appeal within 28 days of the date of receipt of this licence (although the Secretary of State and The Welsh Government have power to allow a longer period for serving notice of appeal). See Water Resources Act 1991, section 43.

## Disclosure of information

Information about this licence is available in the public Register held by Natural Resources Wales. Members of the public are also entitled to ask us for other "environmental information" it holds, including any activities likely to affect "the state of any water" or any "activities or other measures designed to protect it". That would include the information additional to the licence document e.g. any related agreement or abstraction returns. In certain restricted circumstances it is possible to claim that information should be kept confidential. If you require more information about keeping this information off the public register because it is confidential, please contact us by writing to the address shown on the front page of the licence within 28 days of receiving this licence.

| Licence serial number | WA/055/0008/0003 |
|---|---|

Please quote the serial number in all correspondence about this licence

# FULL LICENCE TO ABSTRACT WATER

The Natural Resources Body for Wales (hereafter referred to as “NRW”) grants this licence to:-

Farmpoint Limited (“the Licence Holder”)

Nobley
Walton
Presteigne
Powys
LD8 2NU

Company Registration Number: 03473738

This licence authorises the Licence Holder to abstract water from the source of supply described in the Schedule of Conditions to this licence and subject to the provisions of that Schedule. The licence commences from the effective date shown below and shall remain in force until the date of expiry shown below.

Signed:

Ashley Lansdown
Permitting Team Leader
Permitting Service
Natural Resources Wales
Cambria House
29 Newport Road
Cardiff
CF24 0TP

Date of issue……..11 May 2022

Date effective……11 May 2022

Date of expiry…….31 March 2039

This licence should be kept safe and its existence disclosed on any sale of the property to which it relates. Please read the ‘important notes’ on the cover to this licence.

Note: References to "the map" are to the map which forms part of this licence.
References to “NRW” are to the Natural Resources Body for Wales or any successor body.

# SCHEDULE OF CONDITIONS

## 1. SOURCE OF SUPPLY

1.1 Underground strata comprising of Devensian Till at Nobley Farm, Walton, Presteigne, Powys.

## 2. POINT OF ABSTRACTION

2.1 At National Grid Reference SO 26150 61520 marked 'Point A' on the map.

## 3. MEANS OF ABSTRACTION

3.1 A borehole not exceeding 10.7 metres in depth and 305 millimetres in diameter with 152.4 millimetre UPVC casing to 10.7 metres below ground level with a submersible pump.

## 4. PURPOSE OF ABSTRACTION

4.1 Agriculture other than spray irrigation.

## 5. PERIOD OF ABSTRACTION

5.1 All year.

## 6. MAXIMUM QUANTITIES OF WATER TO BE ABSTRACTED

6.1 5 cubic metres per hour
120 cubic metres per day
20,739 cubic metres per year
At an instantaneous rate not exceeding 1.4 litres per second.

An hour is any period of 60 consecutive minutes, a day means any period of 24 consecutive hours and a year means the 12 month period beginning on 1 April and ending on 31 March.

## 7. MEANS OF MEASUREMENT OF WATER ABSTRACTED

7.1 (i) No abstraction shall take place unless the Licence Holder has installed a meter to measure quantities of water abstracted.

(ii) The Licence Holder shall position and install the meter in accordance with any written directions given by NRW.

(iii) The Licence Holder shall maintain, repair or replace the meter to ensure that accurate measurements are recorded at all times.

(iv) The Licence Holder shall keep all records of meter repair or replacement including evidence of current certification for a period of 6 years

## 8. RECORDS

8.1 (i) The Licence Holder shall take and record readings of the meter specified in

condition 7.1 at the same time each month during the whole of the period during which abstraction is authorised or as otherwise approved in writing by NRW.

(ii) The Licence Holder shall send to NRW a copy of the record required by Condition 8.1 or summary data to NRW within 28 days after 31 March in each year and also within 28 days of being so requested in writing by NRW.

(iii) Each record shall be kept and be made available during all reasonable hours for inspection by NRW for at least 6 years.

## 9. FURTHER CONDITIONS

9.1 The minimum value for the quantity of water authorised to be abstracted under this licence, as referred to in section 46(2A) Water Resources Act 1991, is 20,739 cubic metres per year.

9.2 No abstraction shall take place when the flow in the River Lugg as gauged at Byton gauging station is equal to or less than 105,000 cubic metres per day. 105,000 cubic metres per day is equal to a level of 0.360 metres at the Byton gauging station.

# ADDITIONAL INFORMATION

Note: the following information is provided for information only. It does not form part of the licence.

## REASONS FOR CONDITIONS

The abstraction is required to be metered to demonstrate compliance with the terms of the licence and to provide information on actual water usage for water planning purposes.

The licence is time-limited to a date to reflect the timing of a future review of the catchment resources availability.

Condition 9.1: to ensure compliance with Section 46(2A) of the Water Resources Act 1991.

Condition 9.2: to ensure a flow is maintained in the watercourse in order i) to maintain the riverine habitat for the conservation of the flora and fauna, and ii) to safeguard existing protected rights.

## IMPORTANT NOTES

**Water efficiency note**
The Licence Holder should use water abstracted under the terms of this licence in an efficient manner. NRW may refer to its guidance on water efficiency (or equivalent guidance) in determining whether water is being used efficiently and may offer advice on any measures considered necessary to meet particular recommendations.

**Metering**
NRW will have regard to its Abstraction Metering Good Practice Manual (or equivalent guidance) in directing any of the following: where the meter should be located or how it should be installed; whether the meter measures accurately, and/or is properly maintained; whether it is necessary to require repair or replacement of the meter.


Cyfoeth Naturiol Cymru Natural Resources Wales

**MAP ACCOMPANYING LICENCE NUMBER / MAP I GYFEILIO TRWYDDED RHIF**

WA/055/0008/0003

Scale I Graddfa 1:10,000

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**enquiries@naturalresourceswales.gov.uk**

**or visit our website**
**www.naturalresourceswales.gov.uk**

**incident hotline 0300 065 3000** (24hrs)
**floodline 0345 988 1188**

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# Appendix B Appeal Decision

Penderfyniadau Cynllunio ac Amgylchedd Cymru
Planning & Environment Decisions Wales

# Penderfyniad ar yr Apêl

Ymweliad â safle a wnaed ar 20/10/2022

**gan Clive Sproule BSc MSc MSc MRTPI MIEnvSci CEnv**

**Arolygydd a benodir gan Weinidogion Cymru**

**Dyddiad: 10/01/2023**

# Appeal Decision

Site visit made on 20/10/2022

**by Clive Sproule BSc MSc MSc MRTPI MIEnvSci CEnv**

**an Inspector appointed by the Welsh Ministers**

**Date: 10/01/2023**

**Appeal Ref: CAS-01965-H0M7N3**

**Site address: SO 26150 61520 Borehole at Nobley, Walton, Powys LD8 2NU**

**The Welsh Ministers have transferred the authority to decide this appeal to me as the appointed Inspector.**

- The appeal is made under section 43 of the Water Resources Act 1991 against the imposition of a condition on a water abstraction licence.
- The appeal is made by Mr Edward Davies, Farmpoint Ltd against the decision of Natural Resources Wales.
- The condition that is the subject of this appeal is condition 9.2, which states "...No abstraction shall take place when the flow in the River Lugg as gauged at Byton gauging station is equal to or less than 105,000 cubic metres per day. 105,000 cubic metres per day is equal to a level of 0.360 metres at the Byton gauging station..."

## Decision

1. The appeal is dismissed.

## Procedural Matters

2. The evidence in this case refers to the names "Nobley" and "Knobley" for places and features in the locality of the appeal site, and both spellings will be used in this decision.
3. The appellant's evidence raises a number of legal matters that fall outside the jurisdiction of this appeal. Nevertheless, the appeal process has enabled the appellant to present its case, and the matters within it have been considered in the determination of the appeal.

## Main Issue

4. This is whether condition 9.2 is necessary to prevent deterioration of the River Wye, and protect, conserve, enhance and restore the water quality and ecological status of the River Wye Special Area of Conservation ("SAC").

## Reasons

5. The borehole at Nobley Farm was installed in 1988. It is understood to be 10.7m in depth, which takes it through a layer of soils and clay into glacial "till" / gravel deposits beneath. It is within a yard area next to large chicken sheds that are used to rear approximately 2.8 million birds each year. The licence enables a maximum of 20,739 cubic metres ("$m^3$") of water to be abstracted from the borehole each year. It is mostly used to provide drinking water for the chickens, although approximately 2,000$m^3$ of the abstracted water is used for wash down purposes. The land with the chicken sheds, yard area and borehole is in close proximity to Knobley Brook that eventually flows into the River Lugg, which is a tributary of the River Wye.

6. Recently, it became apparent to the appellant that the borehole lies outside a previous exemption from groundwater abstraction licensing. The subsequent water abstraction licence issued by Natural Resources Wales ("NRW") (ref: WA/055/0008/0003) includes a Hands-off Flow ("HoF") requirement through condition 9.2, which is set out above. The condition 9.2 HoF requirement to stop abstraction is triggered by flow levels in the River Lugg as gauged at the Byton gauging station.

7. NRW and the Environment Agency have the Wye Abstraction Licensing Strategy ("the Wye ALS") to assist their management of the water resources in the River Wye catchment, which includes land in Wales and England. Text within the Wye ALS notes it to be part of the Catchment Abstraction Management System (or "CAMS") process, which aims to provide a consistent and structured approach to local water resource management.

8. The Wye ALS notes the River Wye to be a regulated river that receives water from the Elan Valley Reservoirs when flows fall below a certain threshold level at the Redbrook gauging station. Redbrook gauging station is in the lower reaches of the River Wye. The borehole at Nobley Farm is in the upper reaches of the catchment.

9. Table 2 of the Wye ALS confirms the water resource within the River Wye catchment to be restricted, and lists the HoF rates for various locations within the catchment. It includes the flow rate restriction and the associated gauging station point used in the wording of condition 9.2.

10. The Wye ALS notes the role of the Redbrook gauging station in determining HoF in a variety of circumstances and locations. However, it also states that:

    "...

    - *our main HOF is measured at Redbook gauging station but other gauging stations in the catchment may be more appropriate depending on where the abstraction is located*
    - *the appropriate HOF location will be determined as part of any licence application and the HOF set will be equivalent to 1,900 Ml/d (418 mgd) at Redbrook gauging station on the River Wye*..."

11. While the appellant suggests that the use of a HoF condition "...*departs from industry norms*...", the evidence in this case sets out the legislative basis of water abstraction licensing, the Wye ALS and the use of the HoF condition, along with NRW's consideration of the licence application. Water abstraction from the borehole at Nobley Farm clearly falls to be considered within the scope of the relevant legislation and policies referred to within the evidence. Justification of the approach within the Wye ALS has been provided within section 7 of NRW's evidence, which details the factual and scientific basis for the HoF condition.

12. NRW has confirmed that its understanding of the River Wye, and the flows required to maintain the SAC habitats within the catchment, is based on work that include studies carried out since 2002. Maintaining the resulting Habitats Directive Ecological River Flow ("HDERF") for the River Wye SAC enables NRW to conclude there to be no adverse effect on SAC features of interest, which include fish species and associated habitats in the river.

13. These studies included the River Wye Habitats Directive Review of Consents ("HDRoC") process, and associated modelling for the individual and cumulative effects of water abstractions in the River Wye catchment. The modelling looked at particular parts of the Rivers Wye and Lugg, and resulted in the licensing policy for abstractions to be subject to a HoF condition equivalent to "Q74". The evidence in this case confirms this licensing policy to have been derived from extensive studies on the River Wye SAC and the appropriate means of preventing abstractions causing an adverse effect on site integrity.

14. The evidence also demonstrates the Byton gauging station on the River Lugg to be the most relevant and appropriate point for monitoring the HoF for the abstraction at Nobley Farm which, within the context of the catchment, is nearby.

15. Therefore, the choice of the River Lugg gauging station at Byton for condition 9.2 is in accordance with the Wye ALS.

16. In contrast, there is a dearth of evidence and associated research to support the appellant's request that if condition 9.2 were to be retained, it should be amended to address a Q95 flow rate.

17. In relation to the licence, the appellant's requirements of the licence concern animal welfare and a lack of alternative water supplies.

Animal welfare

18. The maximum quantities of water that the licence permits to be abstracted are understood to be those required to meet the welfare of the chickens in the sheds.

19. Water from the borehole is pumped directly through the pump house to the chicken sheds to provide drinking water for the several hundred thousand chickens that can be expected to be on-site when they are being reared. Due to the chickens ongoing need for drinking water, any unavailability of drinking water for the stock would have a very significant impact on animal welfare. The HoF requirement within condition 9.2 would prevent a directly pumped supply of drinking water to the chickens on an estimated 95 days (26% of the year) in an average river flow year, but this could rise to 162 days (44%) in a dry year. It is clear that this level of restriction necessitates the provision of on-site water storage and / or an alternative water supply to prevent harm to animal welfare and the loss of chickens in the sheds, and to enable the business to continue.

20. Section 3.3 of the Wye ALS addresses "Resource reliability" and periods of low river flow when abstractions are likely to be limited. It states clearly that the section aims to highlight that abstraction will not be available for a significant proportion of the year, and a licence holder "...*may need to consider additional provisions such as water storage*...". While the appellant's Hydro Pump Test Report concludes that "...*On-site water storage options are limited and would likely equate to only one day's worth of water for emergencies*...", the evidence fails to explain adequately how that conclusion was reached and why suitable storage capacity could not be provided. Nor has it been demonstrated that stored water could not be prevented from having an unacceptable loss of water quality due to stagnation issues.

21. The appellant's requested condition 9.2 amendment to Q95 has been estimated to prevent abstraction on 18 days in an average year and possibly 89 days in a dry year. Given the appellant's case, it is not clear how the business could operate with such a restriction, nor why the means of enabling continued operation during periods of Q95 HoF could not be applied to the Q74 HoF within condition 9.2.

Impact of abstraction on Knobley Brook

22. Following initial correspondence between the appellant and NRW during 2019, the appellant sought consent to investigate the groundwater resource at Nobley Farm. The resulting "Pump Test Report" informed the consideration of the application for a new full abstraction licence that resulted in the licence with condition 9.2.

23. NRW's processing of the application specifically considered whether the Pump Test Report demonstrated there to be no connectivity between the borehole and local surface water features, such as Knobley Brook which supports the River Wye SAC. In doing so, the regulatory arm of NRW consulted the relevant statutory nature conservation bodies for the areas of the River Wye SAC within Wales and England. A revision of the Pump Test Report was sought to provide further information on the possible connectivity between the borehole and surface water.

24. I note the appellant's concerns about the unavailability of both NRW's internal correspondence for its consideration, and NRW officers in the period immediately after the determination. However, NRW's concerns regarding the failure of the appellant's evidence to provide sufficient analysis and explanation to support its conclusions on the hydrogeology of the land around the borehole were clearly expressed. These concerns were set out in written communication during the processing of the application, for example in the NRW e-mailed letter dated 24/06/2021, which resulted in a revised Hydrological Impact Appraisal, and have been detailed in section 6 of NRW Statement of Case.

25. For example, I share NRW's concerns regarding conclusions drawn from flows in drain GB1. It has not been shown likely to be connected to the water bearing material(s) within the borehole, and the appellant's evidence fails to show the water bearing soils / gravels releasing into the borehole are not likely to be connected to surface water bodies that support the SAC.

26. The Introduction to the Pump Test Report describes the document as a Technical Note. As written, it fails to provide a clear understanding and explanation of the hydrogeology of the locality to support the conclusions drawn from the pump test data in the report, which rely on readings from piezometers whose depth and construction are not known.

27. Having considered the appellant's evidence, I find it not to be convincing on the matters of concern to NRW. Nor does the appellant's evidence clearly reference how it addresses the standards and guidance referred to in NRW's "*Consent to Investigate a Groundwater Resource*", issued on 23/06/2020, which may have assisted the provision of adequate and convincing information.

Alternative water supplies

28. Evidence notes the nearest mains water to be approximately 1 mile from the borehole, the mains water is at low pressure and there not to be adequate surplus supply to serve the Nobley Farm chicken sheds. In addition, the appellant considers that water bowsers and tankers would not provide a suitable alternative water supply. If water tankers/bowers were to be used for water supply during the HoF periods, it would be reasonably expected to entail an ongoing cost and a degree of risk in relation to service availability that may be

considered to be unacceptable for the purposes of the business. However, there is a lack of evidence to demonstrate this.

29. Nor is it apparent that abstraction from the Nobley Farm borehole would have no more impact on river flows than a supply of mains water from the Pilleth water resources zone. This is because the mains supply is drawn from a different location, the hydrogeology is understood, the water resource within the Pilleth zone is thought not to be as constrained nor Dŵr Cymru's ability to transport it, the mains abstraction is licensed, and if necessary, the supply could be reinforced by tankers. As such, the evidence indicates that mains water in this part of the catchment could meet the appellant's needs without any abstraction from the borehole during the periods of HoF flow set within condition 9.2.

Conclusions on appellant's requirements, and the requirement within condition 9.2

30. Accordingly, it has not been demonstrated that the current licence, with condition 9.2, fails to meet the appellant's requirements of the licence, as the potential for on-site (or nearby) storage of abstracted (and/or imported) water for use during HoF periods has not been adequately explored or explained in the evidence. In addition, it appears that a mains water supply could meet the meet the appellant's requirements within the terms of the mains water abstraction licence.

31. Nor does the appellant's evidence provide the information needed to conclude the HoF requirement in condition 9.2 is not necessary.

River Wye SAC and the appeal proposal

32. As the water abstraction occurs within the catchment that supports the River Wye SAC, the Habitats Directive and resulting Regulations are relevant to the determination of this case, which concerns a plan or project that could affect the integrity of the River Wye SAC.

33. NRW has confirmed that: abstraction during periods of low flows would have the potential to impact designated features of the River Wye SAC, including salmon, book lamprey and bullhead species; and, that its internal conservation and fisheries consultees agreed the use of the Wye catchment Q74 HoF would be appropriate for the licence that includes condition 9.2. While salmon is noted to have been considered "as their range expands", they have been recorded 2km downstream of Knobley Brook within the SAC catchment that Knobley Brook and the River Lugg supports.

34. Given the type of activity that the licence concerns, and the failure to provide sufficient evidence to demonstrate that the groundwater abstraction would not be utilising a resource that supports the SAC during periods of low river flow, I conclude that the removal of condition 9.2 would be likely to significantly affect the River Wye SAC, and the appeal proposal should be "screened in" for further consideration through an appropriate assessment. In addressing the possible effects of the proposal on SAC features within the context of the evidence in this case, it is apparent that NRW considered real and not hypothetical risks to the integrity of the River Wye SAC.

35. The borehole has been used to abstract water for Nobley Farm for over 30 years, and it has done so within the context of the River Wye catchment and the habitats and species within it without being subject to a HoF condition. Nevertheless, I must now consider the impact of the proposed removal of condition 9.2 on the integrity of the River Wye SAC.

36. If the water bearing soils / till / gravel material in the borehole are connected to the surface water that supports the SAC, abstraction from the borehole during periods of dry weather without a HoF condition could further deplete already low river flows. This would reduce the surface waters' support for the habitats and species within the River Wye SAC. In

such circumstances, it would not be possible to mitigate the effect of the abstraction from this borehole on the availability of surface water.

37. The effect of the proposed abstraction without a HoF licence condition would occur in combination with other abstractions, and the effect would undermine the conservation objectives of the SAC. Accordingly, I find that an adverse effect on the integrity of the River Wye SAC cannot be ruled out.

38. Alternative solutions to the proposed water abstraction during the HoF periods currently restricted by condition 9.2 are discussed within the appellant's case. However, the appellant has failed to provide adequate evidence and explanation to support its decisions not to explore their use to provide the additional water.

39. Condition 9.2 clearly has implications for the appellant's business model. However, regulatory requirements, along with possible changes in weather patterns, are matters that all agricultural businesses need to address and plan for. In addition, there is little evidence to demonstrate the costs of water abstraction regulation could not be borne by the business. Consequently, the possible impact of water abstraction regulation on the appellant's business can only attract limited weight in this appeal.

40. Therefore, and following consideration of the evidence in this case, I find that imperative reasons of overriding public interest and compensatory measures have not been demonstrated that would support the removal of condition 9.2.

41. The Habitats Directive integrates the precautionary principle and therefore these findings are in accordance with that principle.

**Other Matters**

42. While the appellant considers there was a lack of engagement in relation to the HoF condition, the Wye ALS was first published in September 2015 and it notes it sets out to provide a "...consistent and structured approach to local water resource management...". Its contents and relevance to the site and the 2021 application should have been apparent to the appellant given NRW's clarification regarding the appellant's previous mistaken understanding that the site was within a Groundwater Licence Exempt Area. Also, NRW has listed communication with the appellant during the processing of the application where NRW's concerns in relation to the abstraction's possible effect on the integrity of the River Wye SAC, the need for further information to support the application, and the need for condition 9.2, were given to the appellant.

43. The costs and benefits of the water abstraction regulation that is the subject of this appeal must be set within the wider regulatory context of this licensing regime where each application, and appeal, is considered on its own merits. This context includes the regulatory objectives for the River Wye SAC, and the very significant weight I attach to these conservation objectives.

**Conclusion**

44. Regulation 13 of the *Water Environment (Water Framework Directive)(England and Wales) Regulations 2017* sets out environmental objectives that are relevant to this case. Within the context of these regulations, and the duty placed on competent authorities to protect, conserve and restore European sites, it is apparent that the Q74 based HoF condition is necessary to prevent deterioration of the SAC, and protect, conserve, enhance and restore both the water and ecological status of the River Wye. Retaining the condition would support the sustainable management of natural resources in accordance with the objectives of section 3 of the Environment (Wales) Act 2016; and maintain and

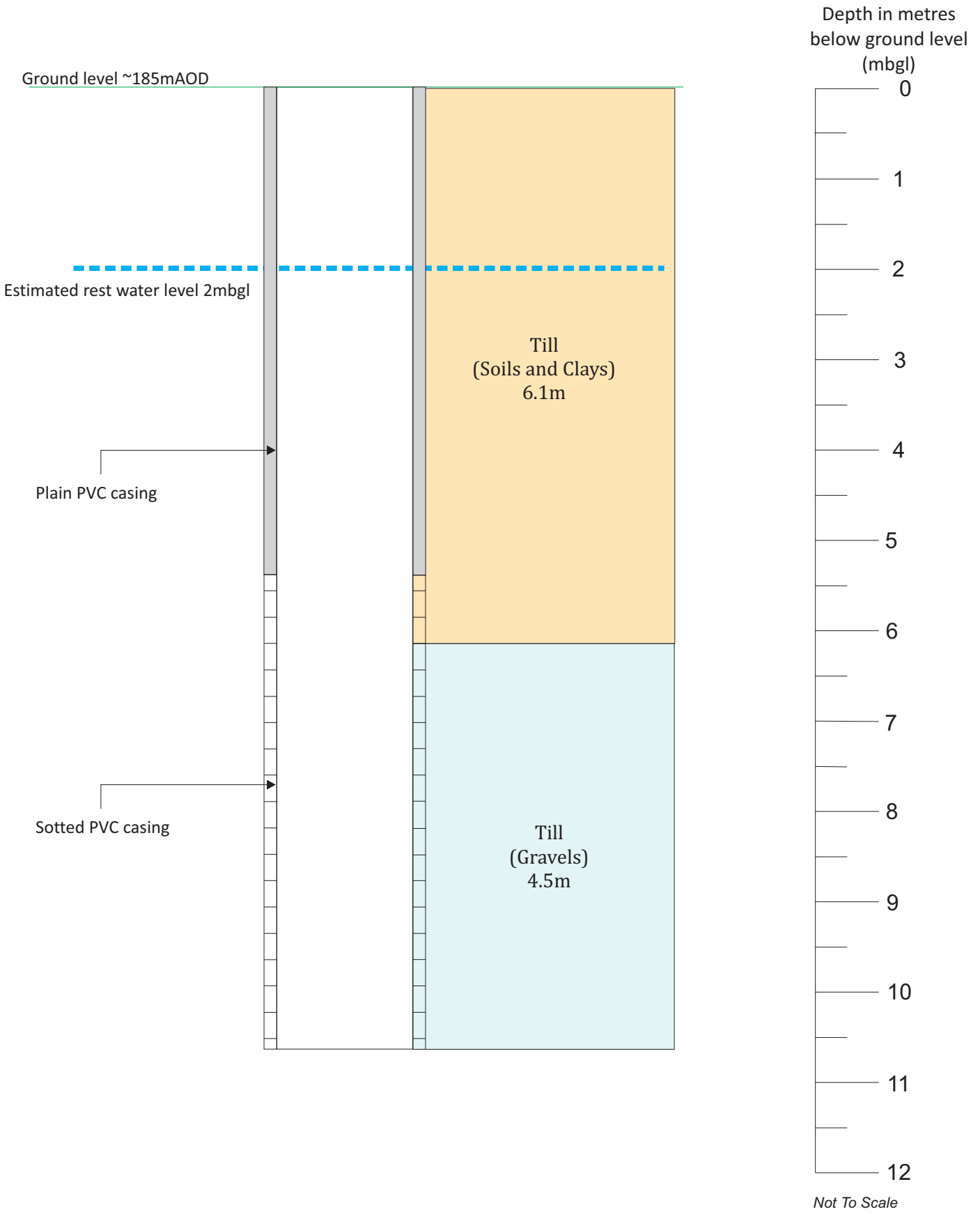
enhance biodiversity in accordance with the biodiversity and resilience of ecosystems duty in section 6 of the same Act. Accordingly, the appeal should be dismissed.

45. In reaching my decision, I have taken into account the requirements of sections 3 and 5 of the Well-Being of Future Generations (Wales) Act 2015. I consider that this decision is in accordance with the Act's sustainable development principle through its contribution towards the Welsh Ministers' well-being objective of embedding our response to the climate and nature emergency in everything we do.

*Clive Sproule*

Inspector

# Appendix C Borehole Installation Schematics



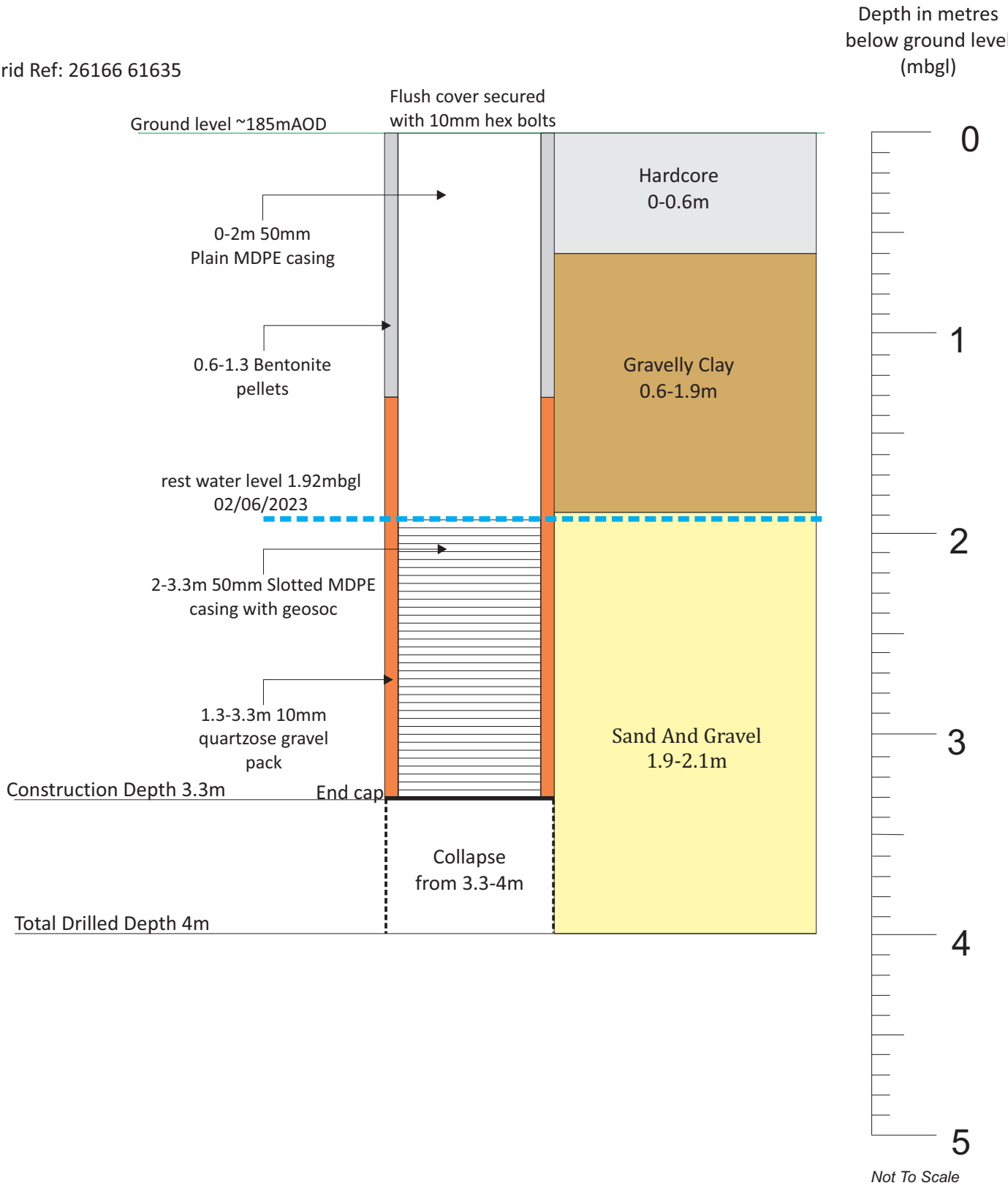

**ABH: Borehole Schematic**



| | |
|---|---|
| **Date:** | 04 April 2023 |
| **Project No.** | 3490494 |
| **Client:** | Farmpoint Licensing |
| **Ref:** | FIG BH Schematic |
| **Drawn by:** | DT |

envireau WATER

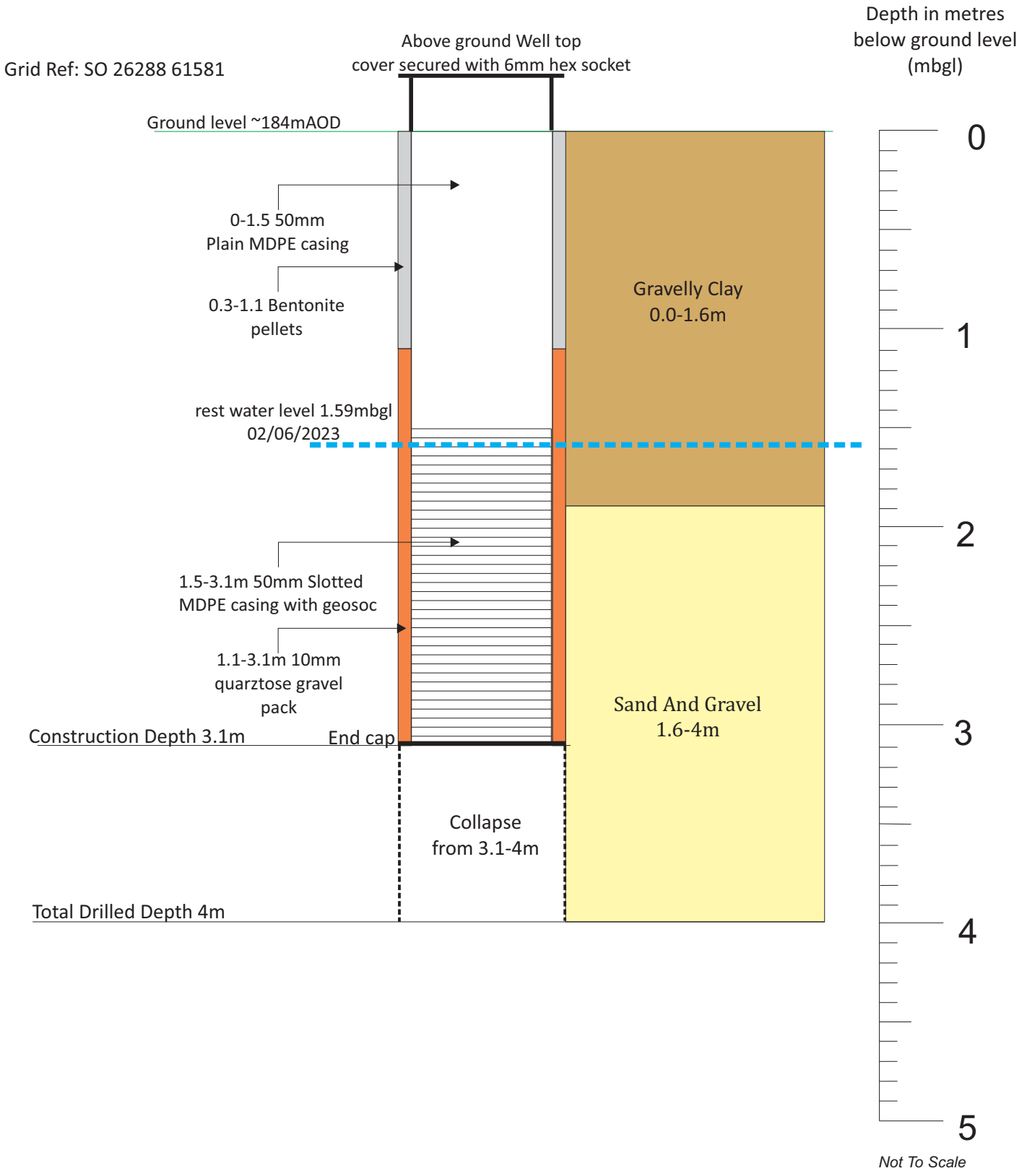
Grid Ref: 26166 61635




**OBH1: As Built Borehole Construction**

| | |
|---|---|
| **Date:** | 05 June 2023 |
| **Project No.** | 3490494 |
| **Client:** | Farmpoint Licensing |
| **Ref:** | OBH 1 As built |
| **Drawn by:** | AR |

envireau WATER




**OBH2: As Built Borehole Construction**

| | |
|---|---|
| **Date:** | 05 June 2023 |
| **Project No.** | 3490494 |
| **Client:** | Farmpoint Licensing |
| **Ref:** | OBH 2 As built |
| **Drawn by:** | AR |



envireau WATER

# Appendix D BGS Borehole Records

British Geological Survey

*Version 2.0.6.6*

BGS ID: 265084 : BGS Reference: SO26SE4
British National Grid (27700) : 326170,261510

Report an issue with this borehole

Welsh NRA Welsh LS. WELL AND PUMP DATA No Abs

SO26 11/1-

# WB & AD Morgan

Electrical Engineers and Pumping Specialists
The Old Vicarage Lyonshall
Kington Herefordshire HR5 3LN
Telephone LYONSHALL (054 48) 297

SO 2617 6151

Property owner's name and address
MR. PHILIP DAVIES (053)
180 EVANJOB, 24995
SO26SE 4 POWYS. 23643

Well depth 35' | Datum point from which all measurements are taken SURFACE

Method of Drilling
☐ Cable tool ☐ Hollow rod ☑ Driven ☐ Dug
☐ Direct rotary ☑ Air rotary ☐ Bucket auger ☐ _____
☐ Reverse rotary ☐ Jetted ☐ Flight auger

Use
☐ Domestic ☐ Public supply ☐ Industrial ☑ AGRIC.
☐ Irrigation ☐ Municipal ☐ Commercial
☐ Test Well ☐ Heating or cooling ☐ Monitoring

Casing Type
☐ Steel ☐ Threaded ☐ Welded ☐ Galv. ☑ PVC ☐ SS ☐ Solvent welded
Height above/below surface _____
Drive shoe? Yes ___ No ___
_____ in to _____ ft Wgt ___ lb/ft Sch. No. ___
_____ in to _____ ft Wgt ___ lb/ft Sch. No. ___
_____ in to _____ ft Wgt ___ lb/ft Sch. No. ___

Hole diameter
4 in to 12 ft
6 in to 35 ft
___ in to ___ ft

Remarks, Elevation, Source of Data, etc.

Borehole data

| Formation Log | Color | Hardness | From | To |
|---|---|---|---|---|
| SOILS & CLAY | GREY | SOFT | 0' | 20' |
| GRAVELS | | HARD | 20' | 35' |
| Superficial Deposits | | | | |
| NO JICP 21/8/97. | | | | |

Intake Portion of Well
Screen type Imp. VERTICAL or open hole from ___ ft to ___ ft
Manufacturer BOREPAC
Material PVC Dia. 6"
Fittings _____ Length 17'
Set between 18 ft and 35 ft Slot _____
_____ ft and _____ ft Slot _____
_____ ft and _____ ft Slot _____
Method of installation _____

Filter Pack
Source _____ Gradation _____
Method of installation _____ Composition _____
Volume used _____ Depth to top of f.p. _____

Grout
Used? ☑ Yes ☐ No Volume used 15 BAGS.
☑ Neat Cement ☐ Bentonite ☐ _____
Method of installation _____
Depth: from 15 ft to SURFACE ft
from _____ ft to _____ ft

Development
Method _____ Duration _____
Dates _____ Sand content after ___ hrs _____
Chemicals used _____

Static Water Level
_____ ft ☐ below ☐ above grade
Date measured _____

Pumping Water Level
_____ ft ☐ below ☐ above grade Date _____
After _____ hrs pumping at _____ gpm

Specific Capacity
_____ gpm/ft of drawdown at _____ hours
Date _____

Pump
Date installed _____ Type BC 6
Manufacturer GODWIN Model No. _____
H.P. _____ Volts _____ Capacity _____
Depth of pump intake setting _____ No. of stages _____
☐ Oil ☐ Water lubrication Power source _____
Material of drop pipe _____ bowls _____
shafting _____ impellers _____ Bowl dia. _____
Column pipe dia. _____ Length _____ Modifications _____

Well Head Completion
☐ Pitless adaptor ☐ Basement offset Distance above grade _____

Nearest Sources of Possible Contamination
_____ ft Direction _____ Type _____
Well disinfected upon completion? ☐ Yes ☐ No

Geophysical Logs Run

Water Quality
Sample taken? ☐ Yes ☐ No
Where analyzed _____

Name of Driller B. A. MORGAN.

Date well completed JAN 88

# Appendix E Groundwater Investigation Consent

# CONSENT TO INVESTIGATE A GROUNDWATER SOURCE

Section 32(3) Water Resources Act 1991 (as amended)

This **CONSENT** is issued by the Natural Resources Body for Wales (hereafter referred to as “Natural Resources Wales”) to:

Farmpoint Limited (“the Consent Holder”)
Nobley
Walton
Presteigne
Powys
LD8 2NU

Company Registration Number: 03473738
Consent reference PAN- 021897

This consent authorises the Consent Holder to investigate a groundwater source described in the schedule of conditions and subject to the provisions of that schedule. The consent commences from the date of signature and shall remain in force until the date of expiry shown below.

"The Consent Holder" means the person (whether an individual or organisation) to whom consent is granted. Where the Consent Holder is two or more persons (e.g. a partnership) such persons shall be jointly and severally liable for the proper fulfilment of the conditions of this consent.

This consent is effective from the date below and expires on 31 September 202*4*

| |
|---|
| Issued by:<br>Haf Peskett, Deputy Geoscience Team Leader |
| Date 23/08/2023 |

**SCHEDULE OF CONDITIONS**

**1 Location**

1.1 Underground strata comprising of clay and gravels at National Grid Reference SO 26150 61520

**2 Construction details**

2.1 As already installed. A borehole not exceeding 10.7 metres in depth and 305 millimetres in diameter with 152.4 millimetre UPVC casing to 10.7 metres below ground level into underground strata as specific in Condition 1.1.

2.2 Boreholes and wells must be provided with a means of measurement access (such as a dip tube) so that a cable dipper or automatic water level recorder can be lowered to measure the water level.

**3 Maximum Quantities of Water to be abstracted during test pump**

3.1 120 cubic metres per day

*Note: A day means any period of 24 consecutive hours*

**4 Duration of testing**

4.1 The duration of test should be until water levels have stabilised in the abstraction borehole. Testing should be for a minimum duration of 48 hours and a maximum duration of 91 days

4.2 The Licence Holder shall notify NRW if groundwater levels in the abstraction source have not stabilised after pumping for 120 hours (5 days) days.

4.3 Pump testing is only authorised outside of any prolonged dry weather or drought status conditions as declared by NRW for the catchment areas.

**5 Water feature assessment**

The pumping test should be designed to assess the effect of this abstraction on the following water features and abstractions:

- Knobley Brook, including downstream watercourses.
- Other water features in the local area as identified in your conceptual model (refer to guidance referenced at end of the consent for more information) which may include the mapped ditch to the south of the borehole.
- Water resource availability within the catchment as outlined in the CAMS document.

**6 Discharge of water**

6.1 The pumped water must be disposed of in such a way as to prevent re-circulation back to the aquifer or affect any other aspect of the water feature assessment.

6.2 Discharged water shall not contain any other cooling waters or process effluents unless otherwise authorized by an environmental permit or registered exemption.

**7 Notifying Natural Resources Wales**

7.1 You must notify us within 14 days of the expiry date of this consent to advise us if you intend to apply for a groundwater abstraction licence.

7.2 You must give us written notice 10 working days before first commencing test pumping to confirm that conditions are suitable for testing. If conditions are not suitable the consent will be revoked or modified.

**ADDITIONAL INFORMATION**

**Modification or removal of consent**

This consent may be modified or revoked at any time by Natural Resources Wales.

**Indemnity**

We shall not be liable to pay for any of the testing nor for any of the consequences that may arise from this consent. The Consent Holder shall be responsible for making good and compensating for any loss, damage or injury (whether to persons or property, including water resources generally or derogation from individual sources of supply) resulting from this consent.

**Right of access**

Possession of this consent gives no rights of entry onto land. Permission to enter land or premises must be obtained from the owner or occupier

**Interpretation of conditions**

Condition 2.1 The borehole, well or spring catchpit should be constructed as detailed in the application form WRC.

Condition 4.1: Sufficient data must be collected to enable analysis of aquifer properties and assess the long-term effects on identified water features.

Condition 4.3 & 7.2: The consent holder is required to check for any NRW declared prolonged dry weather or drought status within the catchment area(s) affected by the consent. NRW may also notify the consent holder if it has declared prolonged dry weather or drought status within the catchment areas affected by the consent. Dry weather updates/status can be viewed via our webpages Natural Resources Wales / Dry weather updates; and by also contacting the Geoscience team.

Conditions 4.2 and 7 and for general queries the Consent Holder can contact:
Geoscience Team, Natural Resources Wales, Ty Cambria, 29 Newport Road, Cardiff, CF24 0TP
Tel: 0300 065 3000
Email: geoscience@cyfoethnaturiolcymru.gov.uk

Condition 5: The results of testing must be incorporated into a hydrogeological impact assessment to be submitted with any subsequent application for a groundwater abstraction licence. You must declare in this assessment if any complaints were received from nearby landowners or water uses during your test pumping. We will expect you to carry out the pumping tests and produce a groundwater impact assessment in line with relevant guidance and best practice, including:

- British Standard ISO 14686 (2003) "Hydrometric determinations – pumping tests for water wells – considerations and guidelines for design, performance and use".

- Environment Agency (2012) ‘Hydrogeological Impact Appraisal for groundwater abstractions

- Scottish Environment Protection Agency (2013). Regulatory Method (WAT-RM-24) Pumping Test Methodology

Condition 6.1 If groundwater is re-circulated back into the aquifer during the pumping test it may affect the monitoring results

Condition 6.2 Under the Environmental Permitting Regulations 2016 it is an offence to undertake a groundwater activity without an environmental permit, or having registered an exemption.

Condition 7.1 This consent provides an exemption allowing you to test the borehole under Section 32 of the Water Resources Act. After the consent expires you must not abstract more than 20$m^3$ per day until you obtain an abstraction licence.

Condition 7.1 and Condition 7.2 Point of contact should be geoscience@cyfoethnaturiolcymru.gov.uk

# Appendix F Data Analysis

# Will be supplied as an accompanying MSExcel Workbook