

OVERVIEW OF OFFSETTING PROPOSAL

The Site has an average daily water consumption in excess of 52m³/day and potentially over 70m³/day. The latter amount is still being assessed as discussed later in the document. Two boreholes have been drilled and yield tested and the supply aquifer is not connected to Hardham.

An EA licence is currently being applied for which, once approved, will allow the whole Site to be removed from the mains supply. The EA application process will take some time and in the meantime one of the boreholes will be used to supply an unlicensed supply (licence not required) of just under 20 m³/day to the Site and remove 19.999 m³/day from the mains supply making it available to offset demand for future housing development. This is Stage 1 of the offsetting scheme.

Stage 1 will provide all of the infrastructure for it and Stage 2 (the full offsetting scheme). Stage 1 will only turn on the supply to the Main Hotel Area, however all the necessary pipework will be laid to turn on the other Areas as soon as Stage 2 can be brought online.

This offsetting scheme described in this report has been **assessed by Natural England and approved under application DC/21/0749** (See Appendix J). Sufficient water credits have been sold to cover the cost of both stages.

OFFSETTING SITE DESCRIPTION

Existing Supply & Consumption

The Site is a luxury hotel and spa with water currently supplied from three existing mains supplies. There are two further metered supplies which are no longer in use. The hotel is located within the Sussex North Water Resource Zone (see location map in Appendix A) and all three supplies are metered mains supplies. Details of each supply points are provided in the table below.

Meter Number	Area Supplied	Usage litres/day
11M50090	Main Hotel Area	46.3
17MS000318	Spa Area	7.4
11AC001166	Gatehouse Area	2
TOTAL		52,674

Actual meter readings were taken over a 12 month period within the last 3 years and these are detailed below with evidence of the meter readings provided in Appendix B.

Existing Water Consumption – Main Hotel Area		m ³
Meter Number 11M50090		
	Actual Reading 22/08/2022	163,810
	Actual Reading 16/08/2023	179,340
	Number of days between readings	359
	Consumption in Period	15,530
	Average daily consumption	43.259

Existing Water Consumption – The Spa Area m3

Meter Number 17MS000318	
Actual Reading 22/08/2022	5,920
Actual Reading 16/08/2023	8,572
Number of days between readings	359
Consumption in Period	2,652
Average daily consumption	7.387

Existing Water Consumption – Gatehouse Area m3

Meter Number 11AC001166	
Actual Reading 13/06/2022	9,184
Actual Reading 16/08/2023	10,054
Number of days between readings	429
Consumption in Period	870
Average daily consumption	2.028

TOTAL Average Daily Consumption (all three supplies) 52.674

52.674 m3 per day equals 52,674 litres/day and converts to 52,674 water credits of which 19,999 are being made available through Stage 1.

The date range used above has been selected as prior to it the hotel was still recovering from Covid. Indeed water consumption for the Spa Area only appears to have begun to return to normal levels in the last two months of the period used. The table below shows readings for a more extended period from 13/09/2021 to 16/08/2023.

MAIN HOTTEL AREA				SPA AREA				GATEHOUSE AREA			
Date	Reading	Days	L/d	Date	Reading	Days	L/d	Date	Reading	Days	L/d
13/09/2021	149008	-	-	13/09/2021	5835	-	-	13/09/2021	8717	-	-
06/12/2021	153264	84	50.67	06/12/2021	5840	84	0.06	06/12/2021	8830	84	1.35
27/01/2022	155326	52	39.65	27/01/2022	5857	52	0.33	27/01/2022	8893	52	1.21
23/02/2022	156404	27	39.93	23/02/2022	5870	27	0.48	23/02/2022	8927	27	1.26
27/05/2022	160068	93	39.40	27/05/2022	5903	93	0.35	28/04/2022	9015	64	1.38
13/06/2022	160771	17	41.35	13/06/2022	5908	17	0.29	13/06/2022	9184	46	3.67
28/07/2022	162653	45	41.82	22/08/2022	5920	70	0.17	26/07/2022	9314	43	3.02
22/08/2022	163810	25	46.28	29/11/2022	5951	99	0.31	22/08/2022	9457	27	5.30
21/09/2022	165540	30	57.67	17/02/2023	5977	80	0.33	21/09/2022	9507	30	1.67
10/10/2022	166870	19	70.00	07/06/2023	6326	110	3.17	10/10/2022	9538	19	1.63
17/02/2023	171686	130	37.05	25/07/2023	7884	48	32.46	29/11/2022	9617	50	1.58
07/06/2023	176323	110	42.15	16/08/2023	8572	22	31.27	17/02/2023	9739	80	1.53
25/07/2023	178378	48	42.81					07/06/2023	9930	110	1.74
16/08/2023	179340	22	43.73					25/07/2023	10020	48	1.88
								16/08/2023	10054	22	1.55
Average daily in period for Area			43.21	Average daily in period for Area			3.90	Average daily in period for Area			1.90
AVERAGE DAILY TOTAL IN PERIOD											49.01

The average daily total for this extended period is consistent with the 12 month period selected to provide the current estimate of 52.674m3. The uptick in the Spa's usage during July and August 2023 will be monitored until a full 12 months of normal post Covid usage has been observed. The latest 3 month bills available for February to April show an average daily consumption across all Areas of over 70 m3/day which indicates that the increase has continued.

At this stage the offsetting requirement is for 19.999 m3/day which is well within the extended and latest usage data. The figure of 52.674 m3/day would appear very conservative based on the latest usage data. Actual meter readings are provided in Appendix B for the period in which the 52.674

m³/day was measured as well as the actual readings from 13/09/2021 the beginning of the extended period. Further meter readings are available on request.

When Stage 2 is brought online and once the EA licence has been approved the, it's anticipated that 52.674 m³/day will be increased and appropriate supporting evidence provided at that time. This is not required for this application which is based on offsetting just 19.999 m³/day.

It is important that the maximum level of consumption is understood so that the maximum amount of water can be removed from the mains supply and therefore decrease demand at Hardham. Should water use drop at the Site in the future then this still represents the same reduction in the mains supply, it just means that the private water supply is providing less water to the Site at that time.

Breakdown of Water Use by Area

The Main Hotel Area supply provides water for the following main consumers:

- Staff and guest toilet and washing facilities
- Cleaning and laundry
- Kitchens and bars
- Garden irrigation

The Spa Area supply provides water for the following main consumers:

- Staff and guest toilet and washing facilities
- Cleaning
- Pools and spas
- Kitchen
- Garden irrigation

The Gatehouse Area supply provides water for the following main consumers:

- Staff toilet and washing facilities
- Cleaning and laundry
- Kitchens
- Garden irrigation

Description of Boreholes

Two boreholes (BH) were drilled at the Site between the 11th and 22nd April 2024, both to 62 m depth and into the Upper Tunbridge Wells Sand Formation. The BH's locations are shown in Figure 1 and their respective drill logs are provided in Appendix C. they are labelled BH1 and BH2 for the purposes of this report and to be consistent with the hydrologist's report in Appendix E.

An initial test pump of BH1 was undertaken on 18th April 2024 (see Appendix D) and a maximum flow rate of 71 l/minute was achieved with a starting depth of 25.95 and a finishing depth of 22.09m. The flow rate is equivalent to 102 m³/day.

Assessment of Impact on Protected Areas

A senior hydrologist (Stephen Buss) examined whether the BH's could have an adverse effect on the integrity of Arun Valley Special Protection Area (SPA), Special Area of Conservation (SAC) and Ramsar site is provided in Appendix E. The impact statement in his report clearly shows there would be no adverse impact, stating:

"The site is in the catchment of the Cowfold Stream, which flows southwards to join the River Adur (Figure 2). The site is therefore not in the catchment of the River Arun, which at its closest is about 1.7 km north of the boreholes. The net impact of the proposed abstraction on the

water balance of the River Arun catchment is therefore zero, and the potential impact on the Arun Valley SAC, SPA and Ramsar site is also therefore zero.

Bedrock geology is the Upper Tunbridge Wells Sand, and so the abstraction does not have continuity with the Lower Greensand aquifer of the Arun Valley.”

Water Quality

Water quality is deemed treatable for the purposes of potable water and is discussed in detail in the Water Quality later in this report.

Borehole Yield and Sustainability Assessment

To assess sustainable yield BH1 was tested between 7 May 2024 and 9 May 2024 at an average rate of 20.8 m³/day. An EA licence has been applied for but at this stage BH1 has only been tested for an unlicensed supply which is why it was tested at this rate which is slightly above the maximum abstraction rate for an unlicensed supply (<20m³). Details and analysis of this test are documented in the senior hydrologist’s report which is provided in Appendix E. The report provides the following conclusion.

“This note reviews the results of a pumping test at the borehole BH1 at South Lodge Hotel. The borehole was pumped over two days. The aquifer response is that of a confined aquifer. Seasonal variation has been considered and the likely drawdown after 60 years of operation has been estimated.

Given conservative assumptions about aquifer properties, there is no indication that the borehole does not offer a sustainable and safe source of at least 20 m³/day groundwater in perpetuity.”

At this stage BH2 has not been yield tested as it is not required for Stage 1. Testing of this BH will take place during the EA abstraction licence application process. It is not needed to provide the 19.999 m³/day for the Stage 1 of the offsetting scheme.

Existing Supply Network

Figure 1 below shows the existing supply network. The mains supplies are connected to the local supplier’s distribution network in Brighton Road. A existing header tanks for the Main Hotel Area and Spa Area together with distribution pumps ensure a consistent supply to these areas. The Gatehouse is a direct feed from the mains network.

Proposed Offsetting Scheme

BH1 and BH2 are not currently connected to the distribution network within the Site and are not currently filtered or treated. BH1 has a proven supply on an unlicensed basis of 20 m³/day without any effect on the protected sites.

The existing mains supplies provide an average of at least 52.674 m³/day. Stage 1 of the offsetting scheme will provide 19.999 m³/day for potable use within the main Hotel Area. This will reduce demand in the SNWRZ by 19.999 m³/day and allow that amount to be used to offset the future demands of new development. This will be facilitated through the Nicholls water credit scheme.

An EA abstraction licence application is currently in process and at the point that that is awarded Stage 2 of the offsetting scheme will be realised and the remaining demand of at least 32.675 m³/day will be provided by BH1 and BH2 working alternatively. At this stage all three areas of the hotel removed from the mains supply for up to that amount of daily water use. The plant and filtration equipment required to implement the initial 19.999 m³/day scheme will be suitable to provide the full Stage 2 system.

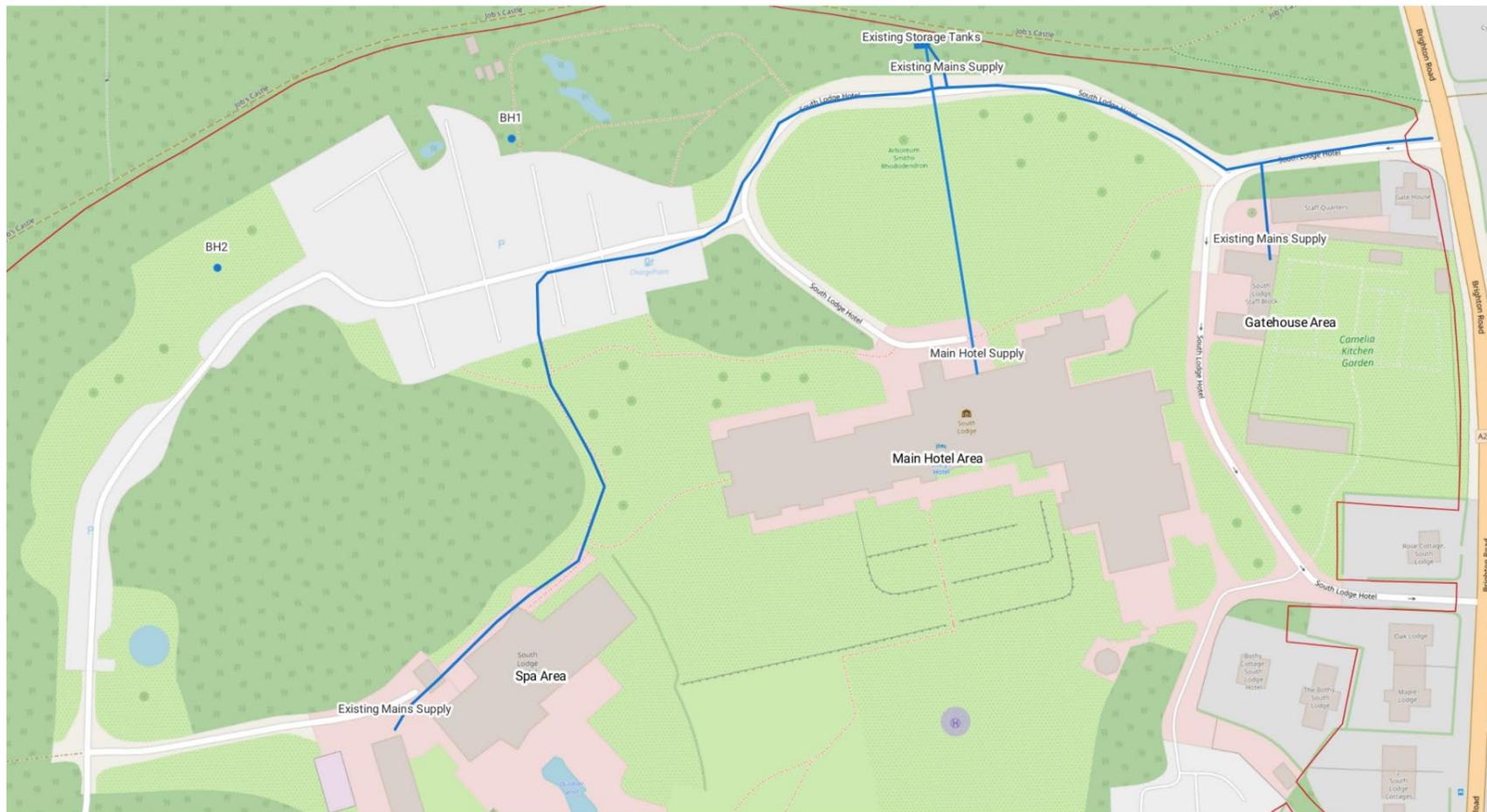
Stage 1 of the offsetting scheme will connect BH1 to a new treatment plant designed to provide a potable supply. This will be connected to the main Hotel Area supply via a new potable water storage tank. Figure 2 shows how the scheme will be laid out. The work will include:

1. Removing the existing storage tank and redundant structures.
2. Installation of appropriate potable water aeration & storage tanks, pumps, filtration, and treatment systems in a self-contained ISO container (see specification at Appendix F)
3. Water treatment design and quality testing to WHO standards and/or the standards set by the local authority's Environmental Health Officer (EHO)
4. Environmental Health Officer (EHO) sign-off and approval
5. Connection of the treated water supply from the new storage tank to the main Hotel Area supply using the existing distribution pipe (see Figure 2)
6. A telematics system will be installed to remotely monitor the borehole and record the amount of water supplied 24/7.

A batch meter will ensure that BH1 is not abstracting more than the limit for an unlicensed supply (<20 m³/day). The mains supply will continue to provide water to the main Hotel area for demand above 19.999 m³/day. This will be facilitated via an air separated feed (to comply with water regulations and ensure no water is fed back into the mains supply network) into the new storage tank. The mains supply will only switch on when the tank level drops below a certain level which will occur when the daily 19.999 m³ BH1 supply has been provided and switched off by the batch meter.

Ongoing Maintenance

Once the works are completed an annual maintenance programme will be set in place to ensure the offsetting measures are kept fully operational and the quality of the potable water supply continues to meet WHO standards and/or the standards set by the local authority's Environmental Health Officer (EHO). This will include periodic testing as specified by the EHO. The maintenance programme is set out in the section below and will be undertaken by Nicholls Boreholes Servicing Team under annual contract to the Site.



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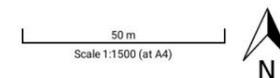
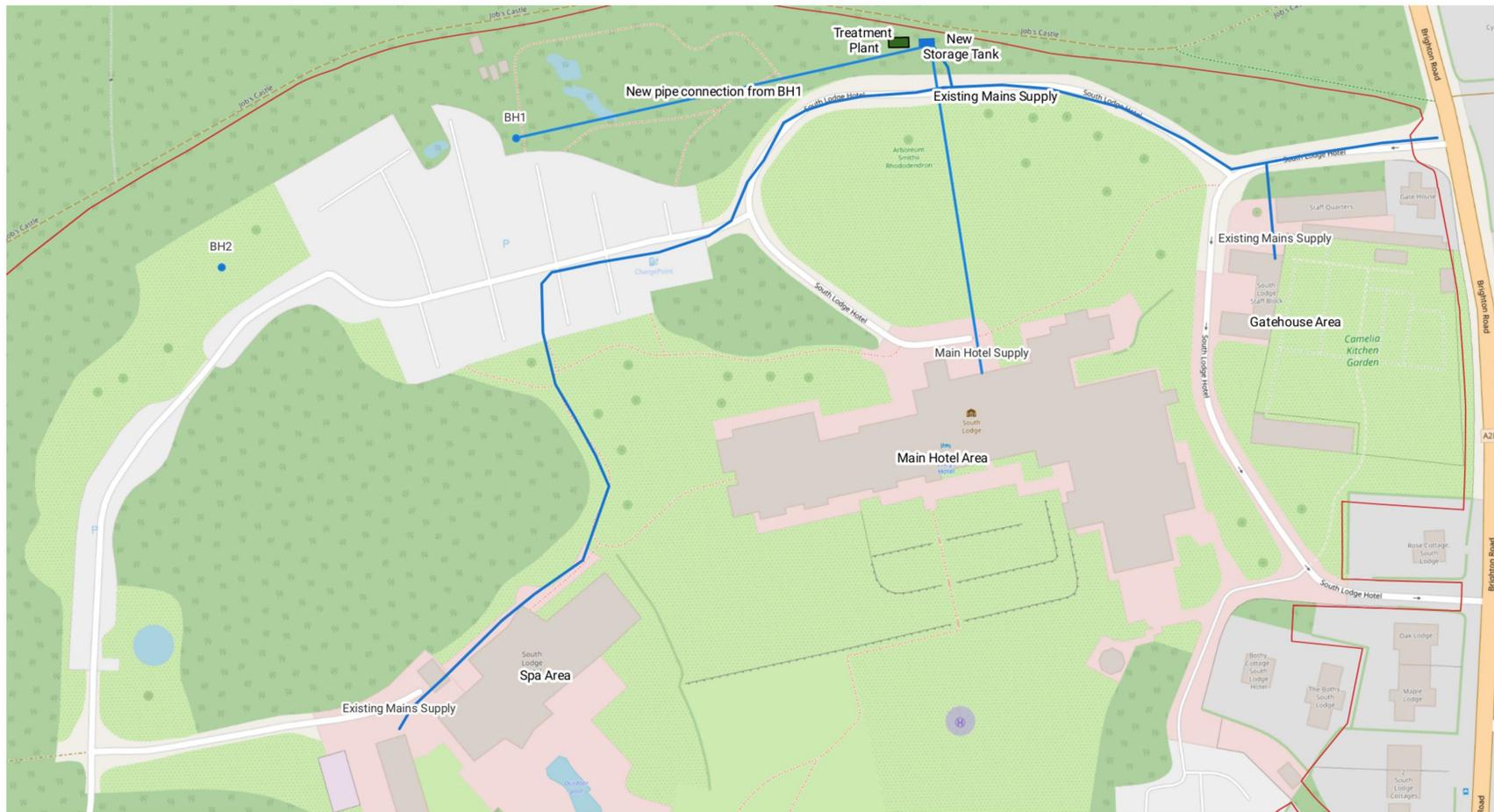


Figure 1 – Existing Supply Network (pipe runs are indicative)



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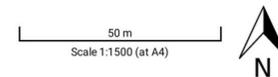


Figure 2 – Proposed Supply Network (pipe runs are indicative)

Water Quality

Appendix I - Groundwater Investigation Report provides a detailed assessment of the groundwater quality and proposed treatment. In addition to that report the physical features to be installed to protect the borehole from contamination are set out below.

The borehole will include the following protection measures.

- 2 external locks – to prevent unauthorised access.
- Twin skin GRP enclosure – to prevent changes in temperature and seal the area directly around the borehole to prevent ingress from the surface.
- Raised Plinth – to prevent external contaminants or surface flows entering the borehole.
- Bolt Down Well Head – to prevent unauthorised access and secure the borehole from the ingress of external contaminants.
- Grouting – to prevent ingress of surface flows or contaminants from the surface and any made up ground.
- Linings – to prevent ingress from geologies not targeted by design.

Ongoing Maintenance

A telemetric system will be installed which will allow the system to be remotely monitored by the Nicholl's servicing team 24/7 using an active alert system. Ongoing maintenance and water quality assurance routines are set out in Appendices G and I. Water quality will be sampled at a minimum on a biannual basis and should the EHO require a more frequent testing regime this will be implemented.

Further details regarding the water quality assurance and testing regime are set out in Appendix I - Groundwater Investigation Report.

Implementation of Measures, Planning Consents & Section 106 Agreements

The measures will be implemented and maintained at the borehole location under The South Lodge Hotel title (WSX331265) and appropriate s106 obligations should be tied to this land. A red edge plan will be provided on request. Separate planning obligations agreements will be entered into with each developer. Suggested s106 obligations on the Site owner and developer are provided in Appendix H.

Sufficient credits have been sold at time of publication with signed contracts in place to provide for the cost of implementing the measures and securing the ongoing maintenance.

The plant treatment room will be housed in a purpose-built ISO container as set out above. This does not require planning permission as it is a temporary structure. Notwithstanding that, it is being installed on an existing concrete hardstanding replacing existing structures.

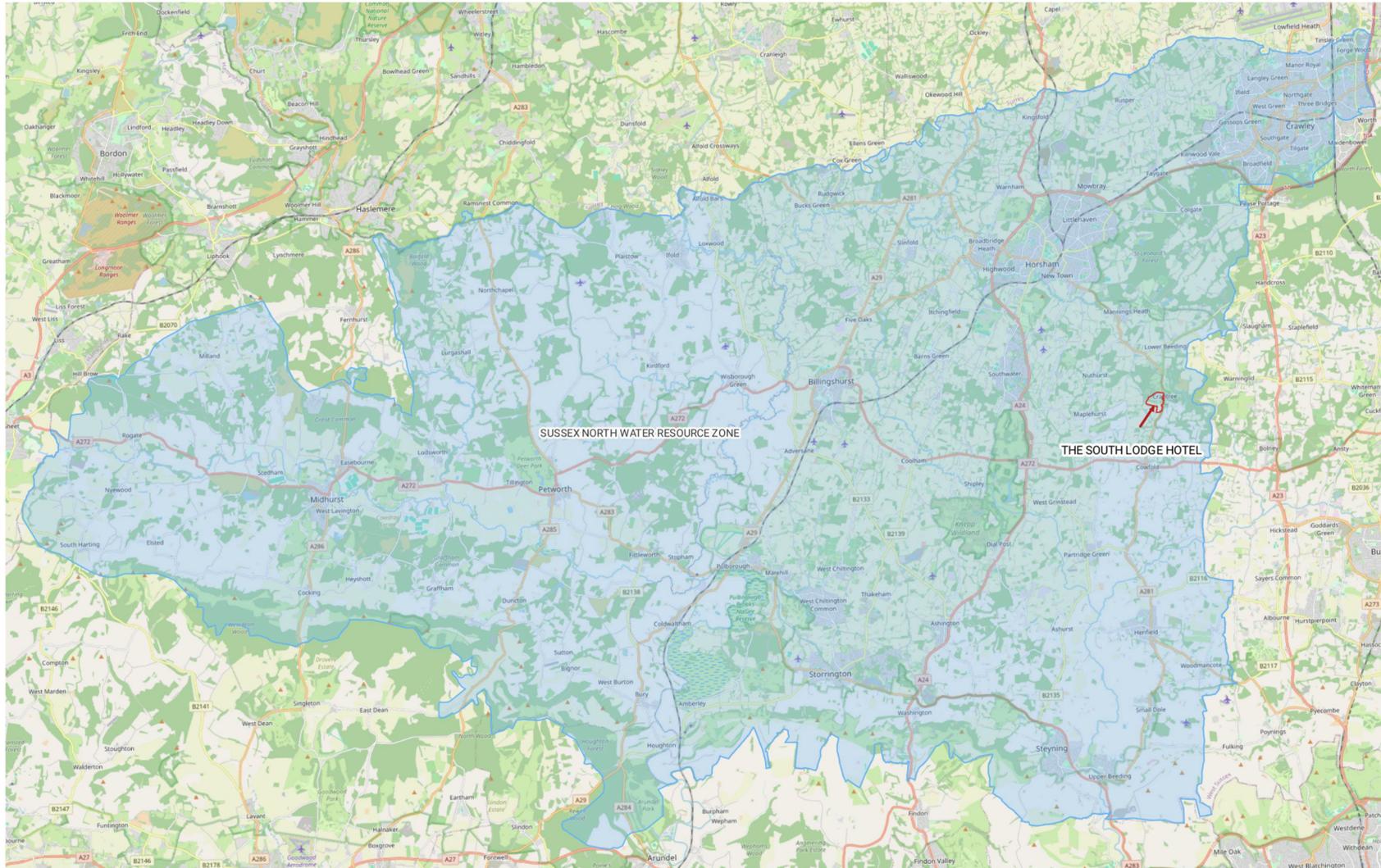
Summary

The proposed offsetting scheme is based at a site in the Sussex North Water Supply Zone with a proven average consumption of at least 52.674 m³/day per day derived from the mains supplies. Stage 1 of the offsetting scheme will remove 19.999 m³/day from the mains demand with the remainder being removed when Stage 2 is brought online.

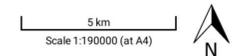
The scheme utilises an existing borehole with a proven yield that is in excess of 20 m³ per day and this has been assessed as having no effect on the protected areas.

The proposed offsetting scheme has been approved by Natural England under HDC application number DC/21/0749 (see Appendix J).

SITE LOCATION



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LOCATION PLAN



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100m
Scale 1:5011 (at A4)



APPENDIX B – EVIDENCE OF EXISTING CONSUMPTION

WATER 2 BUSINESS BILL FOR METERS 11M50090 AND 17MS000318 SHOWING ACTUAL READINGS ON 22/08/2022



Customer Number	w2b001684
Please quote when contacting us	
Bill Number	900585032
Date (tax point)	31/08/2022

Details of Premises Supplied

	South Lodge				
Site Name	South Lodge				
Site Reference	South Lodge				
Water Supply Point ID (SPID)	3019500494W11	3019633230W16	3019633230W16	3019633230W16	301945753XW1X
Sewerage Supply Point (SPID)					
Meter Serial Number	3019500494	11M50090	17MS000318	9M085135	11AC001166
Last Actual Read Date		22/08/2022	22/08/2022	22/08/2022	22/08/2022
Last Actual Read		163810	5920	9177	9457

Meter Readings and Water Consumptions

	31/07/2022	31/07/2022	31/07/2022	31/07/2022	31/07/2022
Bill Start Date	31/07/2022	31/07/2022	31/07/2022	31/07/2022	31/07/2022
Bill End Date	31/08/2022	31/08/2022	31/08/2022	31/08/2022	31/08/2022
Current Read Estimated	Estimated	Estimated	Estimated	Estimated	Estimated
Total Bill Days	31	31	31	31	31
Bill Start Reading	0	162869	5923	9315	9323
Bill End Reading	0	164198	5922	9177	9476
Gross Consumption (m3)	0	1329	-1	-138	153
Previous YTD Consumption	0	3171	39	138	359
Total YTD Consumption (m3)	0	4500	38	0	512

Charge Details - Water

Tariff Code	NHH_UW_VAR	NHH_LB1	NHH_LB1	NHH_LB1	NHH_MWVOL
1st Volumetric Rate	£0 9430	£1 3930	£1 3930	£1 3930	£1 4270
Volumetric Charge	£12 17	£1851 30	-£1 39	-£192 23	£218 33
2nd Volumetric Rate					
Volumetric Charge					
3rd Volumetric Rate					
Volumetric Charge					
Annual Standing Charge	31 days at £10	0 00	31 days at £580	0 00	31 days at £23
Standing Charge	£0 85	£0 00	£49 26	£0 00	£1 95
Total Water Charges	£13.02	£1,851.30	£47.87	-£192.23	£220.28

Charge Details - Sewerage

Tariff Code					
RTS %					
1st Volumetric Rate					
Volumetric Charge					
2nd Volumetric Rate					
Volumetric Charge					
3rd Volumetric Rate					
Volumetric Charge					
Highway & Surface Vol Rate					
Volumetric Charge					
Annual Standing Charge	0 00	0 00	0 00	0 00	0 00
Standing Charge	£0 00	£0 00	£0 00	£0 00	£0 00
Highway Drainage Charge					
Tariff Code					
Annual Standing Charge					
Standing Charge					
Surface Water Charge					
Tariff Code					
Annual Standing Charge					
Standing Charge					
Total Sewerage Charges					

WATER 2 BUSINESS BILL FOR METER 11AC001166 SHOWING ACTUAL READINGS ON 13/06/2022



Customer Number w2b001684
Please quote when contacting us

Bill Number 900576878
Date (tax point) 30/06/2022

Details of Premises Supplied

	South Lodge				
Site Name	South Lodge				
Site Reference	South Lodge				
Water Supply Point ID (SPID)	3019500494W11	3019633230W16	3019633230W16	3019633230W16	301945753XW1X
Sewerage Supply Point (SPID)					
Meter Serial Number	3019500494	11M50090	17MS000318	9M085135	11AC001166
Last Actual Read Date		13/06/2022	13/06/2022	13/06/2022	13/06/2022
Last Actual Read		160771	5908	9177	9184

Meter Readings and Water Consumptions

	31/05/2022	31/05/2022	31/05/2022	31/05/2022	31/05/2022
Bill Start Date	31/05/2022	31/05/2022	31/05/2022	31/05/2022	31/05/2022
Bill End Date	30/06/2022	30/06/2022	30/06/2022	30/06/2022	30/06/2022
Current Read Estimated	Y	Y	Y	Y	Y
Total Bill Days	30	30	30	30	30
Bill Start Reading	0	160399	5905	9177	9027
Bill End Reading	0	162156	5916	9177	9205
Gross Consumption (m3)	0	1757	11	0	178
Previous YTD Consumption	0	701	21	0	63
Total YTD Consumption (m3)	0	2458	32	0	241

Charge Details - Water

	NHH_UW_VAR	NHH_LB1	NHH_LB1	NHH_LB1	NHH_MWVOL
Tariff Code	NHH_UW_VAR	NHH_LB1	NHH_LB1	NHH_LB1	NHH_MWVOL
1st Volumetric Rate	£0 9430	£1 3930	£1 3930	£1 3930	£1 4270
Volumetric Charge	£11 78	£2447 50	£15 32	£0 00	£254 01
2nd Volumetric Rate					
Volumetric Charge					
3rd Volumetric Rate					
Volumetric Charge					
Annual Standing Charge	30 days at £10	0 00	30 days at £580	0 00	30 days at £23
Standing Charge	£0 82	£0 00	£47 67	£0 00	£1 89
Total Water Charges	£12.60	£2,447.50	£62.99	£0.00	£255.90

Charge Details - Sewerage

Tariff Code					
RTS %					
1st Volumetric Rate					
Volumetric Charge					
2nd Volumetric Rate					
Volumetric Charge					
3rd Volumetric Rate					
Volumetric Charge					
Highway & Surface Vol Rate					
Volumetric Charge					
Annual Standing Charge	0 00	0 00	0 00	0 00	0 00
Standing Charge	£0 00	£0 00	£0 00	£0 00	£0 00
Highway Drainage Charge					
Tariff Code					
Annual Standing Charge					
Standing Charge					
Surface Water Charge					
Tariff Code					
Annual Standing Charge					
Standing Charge					
Total Sewerage Charges					

WATER 2 BUSINESS BILL FOR METERS 11M50090, 17MS000318 AND 11AC001166 SHOWING ACTUAL READINGS ON 16/08/2023



Customer Number	w2b001684
Please quote when contacting us	
Bill Number	900638247
Date (tax point)	31/08/2023

Premises Supplied	South Lodge				
Site Name	South Lodge				
Site Reference	South Lodge				
Water Supply Point ID (SPID)	3019500494W11	3019633230W16	3019633230W16	3019633230W16	301945753XW1X
Sewerage Supply Point (SPID)					
Meter Serial Number	Unmetered -	11M50090	17MS000318	9M085135	11AC001166
Last Actual Read Date		16/08/2023	16/08/2023	16/08/2023	16/08/2023
Last Actual Read		179340	8572	9177	10054

Meter Readings and Water Consumptions	31/07/2023	31/07/2023	31/07/2023	31/07/2023	31/07/2023
Bill Start Date	31/07/2023	31/07/2023	31/07/2023	31/07/2023	31/07/2023
Bill End Date	31/08/2023	31/08/2023	31/08/2023	31/08/2023	31/08/2023
Current Read Estimated	Estimated	Estimated	Estimated	Estimated	Estimated
Total Bill Days	31	31	31	31	31
Bill Start Reading	0	178650	7921	9177	10032
Bill End Reading	0	180021	8688	9177	10080
Gross Consumption (m3)	0	1371	767	0	48
Previous YTD Consumption	0	3871	364	0	145
Total YTD Consumption (m3)	0	5242	1131	0	193

Charge Details - Water	NHH_UW_VAR	NHH_LB1	NHH_LB1	NHH_LB1	NHH_MWVOL
Tariff Code					
1st Volumetric Rate	£1 0440	£1 5800	£1 5800	£1 5800	£1 5820
Volumetric Charge	£13 48	£2166 18	£1211 86	£0 00	£76 42
2nd Volumetric Rate					
Volumetric Charge					
3rd Volumetric Rate					
Volumetric Charge					
Annual Standing Charge	31 days at £10 81	0 00	31 days at £639 09	0 00	31 days at £25 42
Standing Charge	£0 92	£0 00	£54 28	£0 00	£2 16
Total Water Charges	£14.40	£2,166.18	£1,266.14	£0.00	£78.58

Charge Details - Sewerage					
Tariff Code					
RTS %					
1st Volumetric Rate					
Volumetric Charge					
2nd Volumetric Rate					
Volumetric Charge					
3rd Volumetric Rate					
Volumetric Charge					
Highway & Surface Vol Rate					
Volumetric Charge					
Annual Standing Charge	0 00	0 00	0 00	0 00	0 00
Standing Charge	£0 00	£0 00	£0 00	£0 00	£0 00
Highway Drainage Charge					
Tariff Code					
Annual Standing Charge					
Standing Charge					
Surface Water Charge					
Tariff Code					
Annual Standing Charge					
Standing Charge					
Total Sewerage Charges					

WATER 2 BUSINESS BILL FOR METERS 11M50090, 17MS000318 AND 11AC001166 SHOWING ACTUAL READINGS ON 13/09/2021



Customer Number w2b001684
Please quote when contacting us

Bill Number 900544491
Date (tax point) 30/09/2021

Details of Premises Supplied

Site Name	South Lodge				
Site Reference	South Lodge				
Water Supply Point ID (SPID)	3019500494W11	3019633230W16	3019633230W16	3019633230W16	301945753XW1X
Sewerage Supply Point (SPID)					
Meter Serial Number	3019500494	9M085135	11M50090	17MS000318	11AC001166
Last Actual Read Date		13/09/2021	13/09/2021	13/09/2021	13/09/2021
Last Actual Read		9177	149008	5835	8717

Meter Readings and Water Consumptions

Previous Reading Date	31/08/2021	31/08/2021	31/08/2021	31/08/2021	31/08/2021
Current Reading Date	30/09/2021	30/09/2021	30/09/2021	30/09/2021	30/09/2021
Current Read Estimated (Y/N)	Y	Y	y	Y	y
Total Days	30	30	30	30	30
Previous Reading	0	9178	152699	5851	8612
Current Reading	0	9178	150677	5845	8730
Gross Consumption (m3)	0	0	-2022	-6	118
Previous YTD Consumption		0	10865	52	96
Total YTD Consumption (m3)		0	8843	46	214

Charge Details - Water

Tariff Code	NHH_UW_VAR	NHH_LB1	NHH_LB1	NHH_LB1	NHH_MWVOL
1st Volumetric Rate	£0 9020	£1 3380	£1 3380	£1 3380	£1 3650
Volumetric Charge	£11 27	£0 00	-£2705 44	-£8 03	£161 07
2nd Volumetric Rate					
Volumetric Charge					
3rd Volumetric Rate					
Volumetric Charge					
Annual Standing Charge	30 days at £10	0 00	0 00	30 days at £540	30 days at £23
Standing Charge	£0 82	£0 00	£0 00	£44 38	£1 89
Total Water Charges	£12.09	£0.00	-£2,705.44	£36.35	£162.96

Charge Details - Sewerage

Tariff Code
RTS %

APPENDIX C – BH1520 DRILL LOGS



BH1

Borehole record form



British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL



Environment Agency

Water Resources Act 1991 (as amended by the Water Act 2003)

A Site details

Borehole drilled for

Location

NGR (ten digits) Please attach site plan

Ground level (if known) metres Above Ordnance Datum

Drilling company

Date drilling commenced (DD/MM/YYYY) Completed (DD/MM/YYYY)

B Construction details

Borehole datum (if not ground level) metres (m). Please tick if this is above or below ground level.
(point from which all measurements of depth are taken, for example, flange, edge of chamber)

Borehole drilled diameter mm from to m/depth
 mm from to m/depth
 mm from to m/depth
 mm from to m/depth

Casing material diameter mm from to m/depth
and type (for example, if plain steel, plastic slotted). Please record permanent casing details, not temporary casing.

Casing material diameter mm from to m/depth

Casing material diameter mm from to m/depth

Casing material diameter mm from to m/depth

Grouting details

Water struck at 1. m (depth below datum – mbd) 2. m (mbd)
3. m (mbd) 4. m (mbd)

C Test pumping summary (Please supply full details on form WR39)

Test pumping datum m. Please tick if this is above or below ground level.
(if different from borehole datum)

Pump suction depth mbd

Water level (start of test) mbd

Water level (end of test) mbd

Type of test (for example, bailer, step, constant rate)

Pumping rate m³/hour or litres/second . Please tick as appropriate.

for days, hours, mins

Recovery to mbd in days, hours, mins
(from end of pumping)

Date(s) of measurements Pump started (DD/MM/YYYY)

Pump stopped (DD/MM/YYYY)

Please supply chemical analysis if available. If you have included this please tick this box

Project South Lodge Hotel				BOREHOLE No 1a	
Job No AL162 / BH1520	Date 11-04-24 15-04-24	Ground Level (m)	Co-Ordinates ()		
Contractor Nicholls				Sheet 1 of 1	

SAMPLES & TESTS			STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION		
					0.50	TOP SOIL: Medium soft very moist light brown organic silty CLAY. Frequent roots and rootlets.		
					2.00	Medium firm brown very clayey silty MUDSTONE.		
					(5.00)	Medium firm dark yellow brown very clayey MUDSTONE.		
					7.00			
					(11.00)	Firm light blue silty CLAY and reddish brown MUDSTONE.		
					18.00			
					(16.00)	Firm dark brown red silty MUDSTONE.		
					34.00			
					36.00	Firm light blue silty CLAY with mudstone.		
					(25.00)	Firm light blue grey silty CLAY with mudstone.		
					61.00			
					62.00	Firm pale grey silty CLAY (Grinstead clay)		

Boring Progress and Water Observations					Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Water Dpt	From	To	Hours	From	To	
										Service avoidance procedure followed. Rotary open hole No visual or olfactory signs of contamination.

All dimensions in metres Scale 1:393.75	Client South Lodge Hotel	Method/ Plant Used Massenza	Logged By SP
--	-----------------------------	-----------------------------------	-----------------

BH2

Borehole record form



British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL



Environment Agency

Water Resources Act 1991 (as amended by the Water Act 2003)

A Site details

Borehole drilled for

Location

NGR (ten digits) Please attach site plan

Ground level (if known) metres Above Ordnance Datum

Drilling company

Date drilling commenced (DD/MM/YYYY) Completed (DD/MM/YYYY)

B Construction details

Borehole datum (if not ground level) metres (m). Please tick if this is above or below ground level. (point from which all measurements of depth are taken, for example, flange, edge of chamber)

Borehole drilled diameter mm from to m/depth
 mm from to m/depth
 mm from to m/depth
 mm from to m/depth

Casing material diameter mm from to m/depth and type (for example, if plain steel, plastic slotted). Please record permanent casing details, not temporary casing.

Casing material diameter mm from to m/depth

Casing material diameter mm from to m/depth

Casing material diameter mm from to m/depth

Grouting details

Water struck at 1. m (depth below datum – mbd) 2. m (mbd)
 3. m (mbd) 4. m (mbd)

C Test pumping summary (Please supply full details on form WR39)

Test pumping datum m. Please tick if this is above or below ground level. (if different from borehole datum)

Pump suction depth mbd

Water level (start of test) mbd

Water level (end of test) mbd

Type of test (for example, bailer, step, constant rate)

Pumping rate m³/hour or litres/second . Please tick as appropriate.
 for days, hours, mins

Recovery to mbd in days, hours, mins (from end of pumping)

Date(s) of measurements Pump started (DD/MM/YYYY)

Pump stopped (DD/MM/YYYY)

Please supply chemical analysis if available. If you have included this please tick this box

Project South Lodge Hotel				BOREHOLE No 2	
Job No AL162 / BH1520	Date 16-04-24 18-04-24	Ground Level (m) TQ 21666 25470	Co-Ordinates ()		
Contractor Nicholls				Sheet 1 of 2	

SAMPLES & TESTS			STRATA					Geology	Instrument/ Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION		
			↓			0.50 (6.00)	TOP SOIL: Medium soft very moist light brown orange organic friable silty CLAY. Frequent roots and rootlets. Medium firm dark yellow very clayey MUDSTONE.		
						6.50 (11.00)	Medium firm light blue grey silty CLAY and reddish brown MUDSTONE.		
						17.50 (12.50)	Firm dark brown reddish silty MUDSTONE with interstitial ferrous staining.		
						30.00 (20.00)	Medium firm grey silty MUDSTONE.		
						50.00 (12.00)	Firm light blue silty CLAY and MUDSTONE.		
						61.00 62.00	Firm pale grey silty CLAY (Grinstead Clay)		

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											Service avoidance procedure followed. Rotary open hole No visual or olfactory signs of contamination.
All dimensions in metres Scale 1:393.75			Client South Lodge Hotel			Method/ Plant Used		Massenza		Logged By MC	

APPENDIX D – BH1 INITIAL TEST PUMPING RECORD



Test Pumping Record

Client Name	BAH WAIT		Operator Name	M.V. P.S		
Address	SOUTH LODGE HOTEL RH136PS					
Project Number	BH1520		Date	18.04.24		
Installation Method (please circle)	Terex One	Terex Two	Yellow Tow Behind Reeler	Narrow Black Reeler	Wide Black Reeler	By Hand
Left on site? (please circle)	<input checked="" type="radio"/> Yes			<input type="radio"/> No		
Pump Used	VS 9/14					
Motor Used	1.1 kW 400 V					
Timer Fitted	<input checked="" type="radio"/> Yes / <input type="radio"/> No	Type	On for	Off for		
Well Depth (m) (From dip-meter reading)	61					
Pump Depth (m) (from Team Up and/or PM)	50					
Rest Water Level at Start (m) (from dip-meter reading)	21.90					
Start stop watch before turning pump on						
Draw Down (please circle)	Static level achieved for at least 1h			To pump		
	Time ran for (min)	30		Time taken (min)		
	Depth (m)	25.95		Depth (m)		
	Max flow rate (L/m)	71		Max flow rate (L/m)		
Pump Restricted	Yes/No	Pump restricted to (L/m)				
Draw Down Test Pumping Regime						
Time taken to draw down (min)	First run					
	10 min rest					
	10 min rest					
	20 min rest					
Recovery rate (m/min)						
Samples Taken (please circle)	<input checked="" type="radio"/> Yes / <input type="radio"/> No	Lab sample	Office sample			
Rest water level at end (m)	22.09					

WEASG

APPENDIX E –HYDROLOGIST’S ASSESSMENT OF IMPACT ON PROTECTED SITES, SUSTABLE YIELD,
WATER QUALITY AND TEST PUMP LOGS

MEMORANDUM:

Review of Pumping Test Data, South Lodge Hotel

Document reference: 2024-095-025-001

Dated: 28/05/2024

Scope and Introduction

The site is South Lodge Hotel, Brighton Road, Lower Beeding, Horsham RH13 6PT (Figure 1). It has been proposed that abstraction at the site can provide a water offsetting solution to sites within the Sussex North water supply zone. To date all water supply has been obtained from mains water supply, sourced from the Sussex North WSZ. This is to be replaced by a borehole supply from local water resource. The reduction of up to 20 m³/day from the Sussex North WSZ is to be credited against developments within the WSZ which are unable to otherwise demonstrate water neutrality.

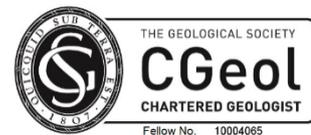
Natural England (2022) believes that groundwater abstraction in the Sussex North water supply zone (WSZ) has a detrimental impact on the Arun Valley SAC, SPA and Ramsar site. To try to prevent further deterioration of the SAC, SPA and Ramsar site, Natural England insists that:

“For every new development, total water use in the Sussex North Water Supply Zone after the development must be equal to or less than the total water-use in the region before the new development.”

Hence each new development will need to demonstrate how that development will achieve no net increase in water consumption, by water efficiency measures, offsetting or not being reliant on groundwater resources that are used for public water supply in the WSZ.

By removing the reliance on mains water from the WSZ at these sites, and drawing water from a source that is not hydrologically connected to the WSZ, it is proposed that the amount of water saved can be used to offset at development sites within the WSZ that do not have the ability to use groundwater.

This report has been written by Dr Stephen Buss MA MSc CGeol, based on the field work and preparatory work of Nicholls Licensing and Consulting. Dr Buss is a UK-based independent hydrogeologist with more than 25 years' consulting experience. Dr Buss's CV and publications list is available at www.hydro-geology.co.uk.



Water Neutrality Impact Statement

The site is in the catchment of the Cowfold Stream, which flows southwards to join the River Adur (Figure 2). The site is therefore not in the catchment of the River Arun, which at its closest is about 1.7 km north of the boreholes. The net impact of the proposed abstraction on the water balance of the River Arun catchment is therefore zero, and the potential impact on the Arun Valley SAC, SPA and Ramsar site is also therefore zero.

Bedrock geology is the Upper Tunbridge Wells Sand, and so the abstraction does not have continuity with the Lower Greensand aquifer of the Arun Valley.

The Boreholes

The boreholes were drilled between the 11th and 22nd April 2024, both to 62 m into the Upper Tunbridge Wells Sand Formation. The drillers' logs record yellow sand/clay with sandstones to 6.5 m or 7.0 m depth then grey clays and mudstones, with interbedded sandstones and limestones to 61 m depth. The boreholes terminated in greenish grey clay of the Grinstead Clay Formation (Appendix A). Figure 1 shows a schematic diagram of the boreholes.

Pumping Test Analysis

Borehole 1 was tested between 7 May 2024 and 9 May 2024 at an average rate of 20.8 m³/day, resulting in a drawdown of 0.47 m (Figure 1). There was no response to very heavy rainfall on the 6th May (34 mm fell in total).

Two methods of estimating flow were used: a totalising flow meter, which records the total amount of flow passing through for the duration of the test; and an instantaneous flow gauge, which records the flow at a given time. For estimating average rate the totalising flow meter is the most reliable source, hence the representative average rate in the following calculations is taken as 20.8 m³/day.

Drawdown for each borehole is plotted on Figure 2. Drawdown, on a semi-log scale, is plotted for Cooper-Jacob analysis of the data in Figure 4, and recovery data, plotted for Theis analysis, is shown on Figure 5. Aquifer parameters are as follows:

	BH1 data	BH2 data
Cooper-Jacob: transmissivity (m ² /day)	31.1	30.5
Cooper-Jacob: storage coefficient (-)	-	4x10 ⁻⁶
Theis recovery: transmissivity (m ² /day)	76.1	76.1

Interpretation

The Tunbridge Well Sand Formation is one of the key aquifers of the Wealden District, and supports many minor groundwater abstractions. The BGS memoir for sheet 302 (Horsham) indicates that:

“Groundwater flow within the Tunbridge Wells Sand is both intergranular and through joints, and well yields tend to be variable... a shaft at Crawley yielded 650 m³/day from the Upper Tunbridge Wells Sand. Because of variable yields and siltation with usage borehole supplies are... variable with yields varying from 20 to more than 2000 m³/day. The mean yield for a 300 mm diameter borehole penetrating 30 metres of saturated Tunbridge Wells Sand in the Wealden district has been calculated to be 750 m³/day for a 10 metre drawdown. The same analysis suggests that there would be a 20% probability that the yield would be less than 300 m³/day for the same drawdown.”

This memo only deals with the potential for the abstraction of 20 m³/day which is much less than the pessimistic value of 300 m³/day cited above.

The pumping test results plot close to a straight line on a log-time chart (Figure 5), which is expected for a confined aquifer. The water-bearing formation in these boreholes is the mudstone with interbedded sandstones and limestones: most flow probably comes via fractures in the sandstone and limestone units.

The borehole maintained a constant pumping rate of 20.8 m³/day for two days, with very limited drawdown at the pumping borehole. Transmissivity values are similar from each borehole. Most of the recovery from the pumping tests was quick after each test. Water levels recovered to levels slightly higher than the starting level, but this was probably due to background groundwater level fluctuation.

The test was undertaken in spring, when groundwater levels were likely high, after a very wet winter. A groundwater level hydrograph from the Environment Agency's Kingstanding observation borehole, near Crowborough, shows that the typical seasonal range of groundwater levels is about 6 m in the Ashdown Sands Formation (which is a similar aquifer to the Tunbridge Wells Sand). Hence a typical summer water level in BH1 might be closer to 28 m depth.

Long-term estimates of drawdown can be made by assuming the range aquifer properties determined above. Using the Theis equation for confined aquifers, these suggest that the drawdown after 60 years would be as shown in Figure 6, for different abstraction rates up to 20 m³/day. The maximum likely drawdown is 2.3 m. Allowing for a further 6.0 m seasonal drop in levels from the April 2024 peak of 22.1 m, the long-term lowest water level can be estimated at 30.4 m. Clearly, therefore, groundwater will be available from the borehole all year round, and as the open section of the borehole is below 30 m depth there should be no seasonal change in borehole performance.

Water Quality and Potential for Contamination

Water quality from the borehole was tested in May 2024 (Appendix B). The water is soft, with low mineralisation. It is anoxic (elevated ammonium, iron and manganese; low nitrate). There was slightly elevated turbidity and detectable concentrations of coliforms. All of these issues can be dealt with via water treatment.

Since it is anoxic the water is demonstrably old and the upper layers of the subsurface comprise layers of mudstones and clays. Heavy rainfall on 6 May 2024 did not reach the water table during the week following the rain. Water quality in the aquifer will be stable.

There are no potentially polluting land uses in the area around Crabtree. Given this, and since the intake to the borehole source is so deep, and there are many mudstone layers in the upper 30 m of the formation, there is no risk of gross contamination reaching the borehole.

Conclusions

This note reviews the results of a pumping test at the borehole BH1 at South Lodge Hotel. The borehole was pumped over two days. The aquifer response is that of a confined aquifer. Seasonal variation has been considered and the likely drawdown after 60 years of operation has been estimated.

Given conservative assumptions about aquifer properties, there is no indication that the borehole does not offer a sustainable and safe source of at least 20 m³/day groundwater in perpetuity.

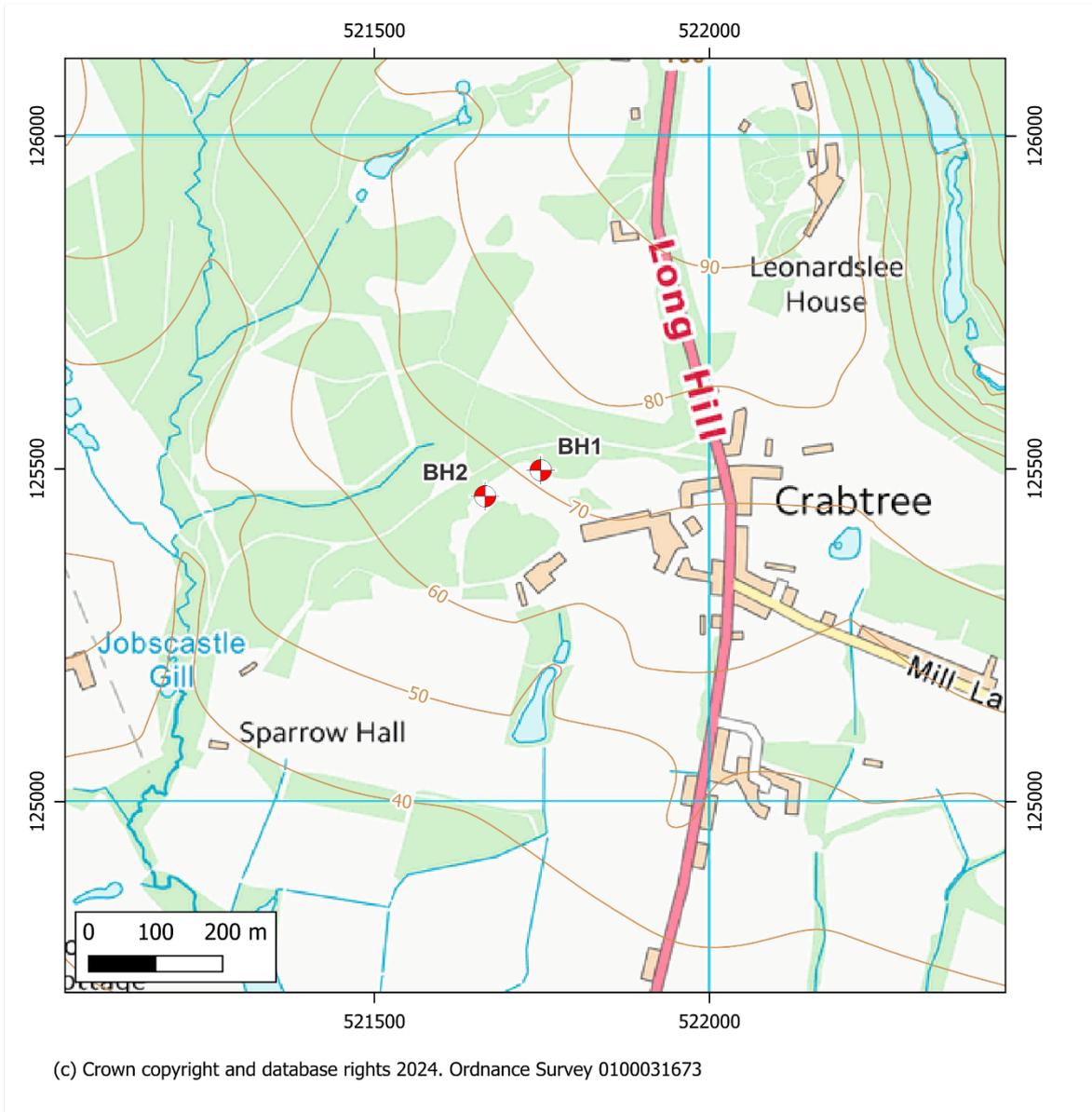
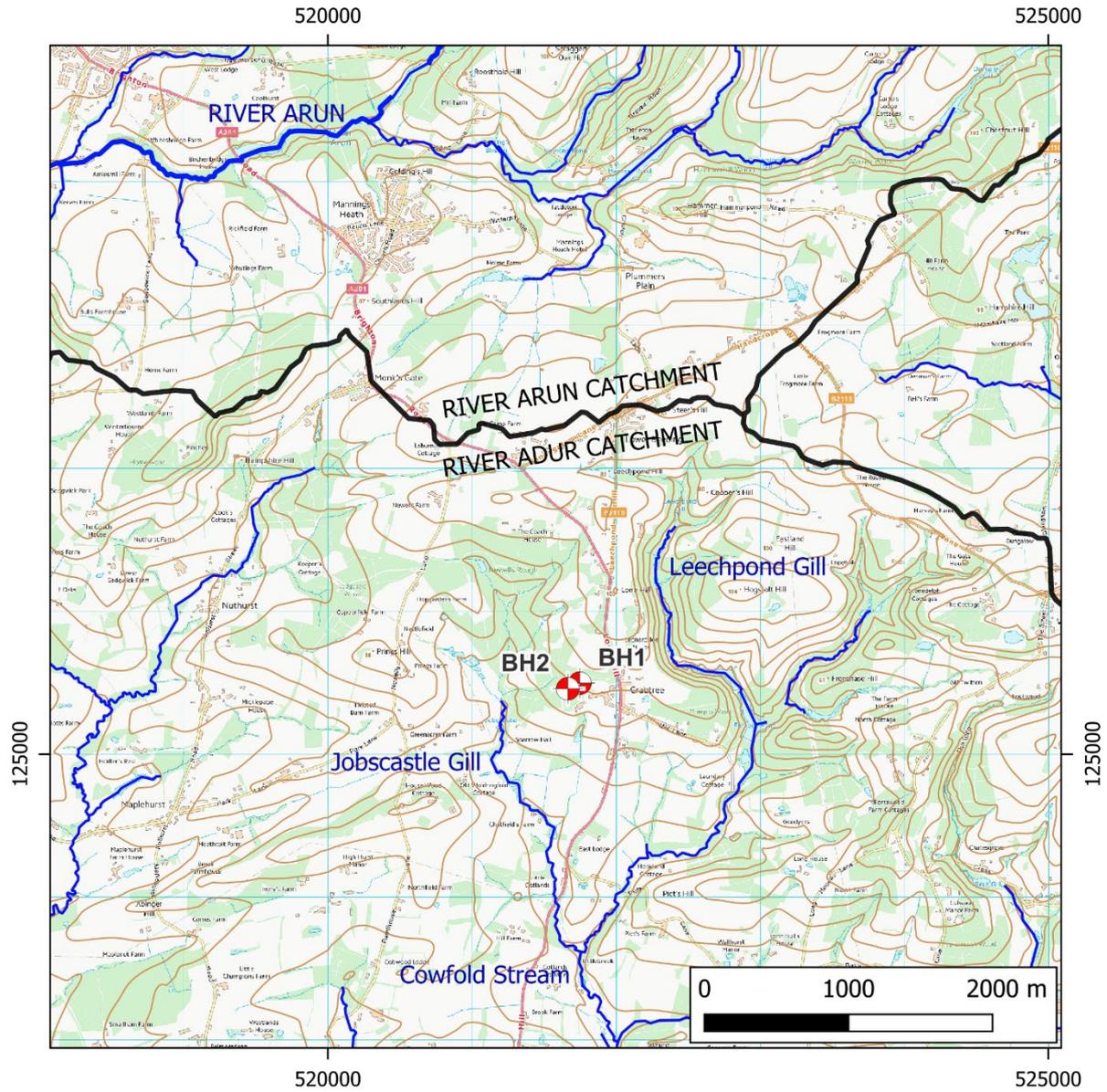


Figure 1: Borehole locations



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Figure 2: Watercourses and catchment boundaries

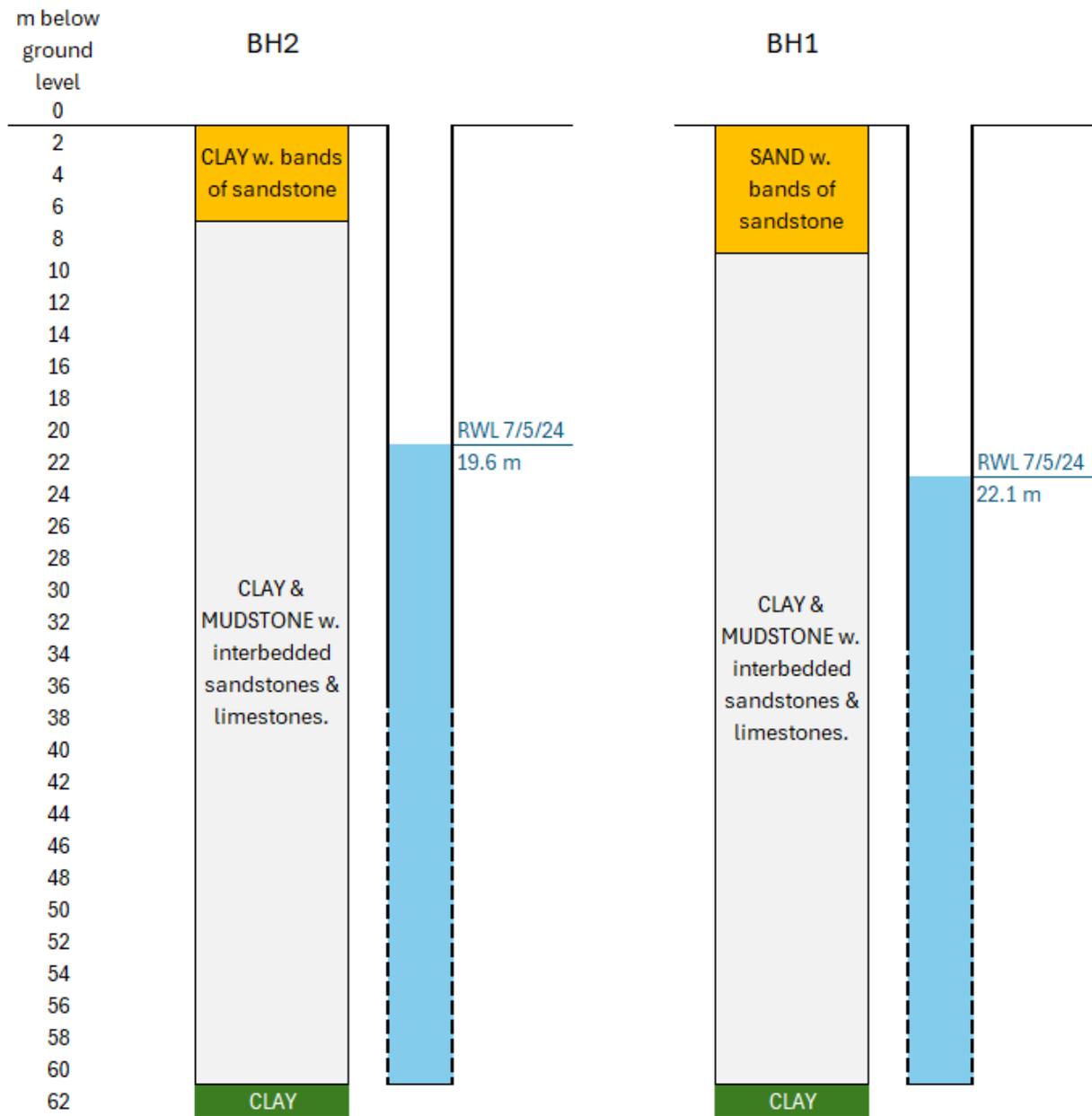


Figure 3: Schematic west-east section through boreholes

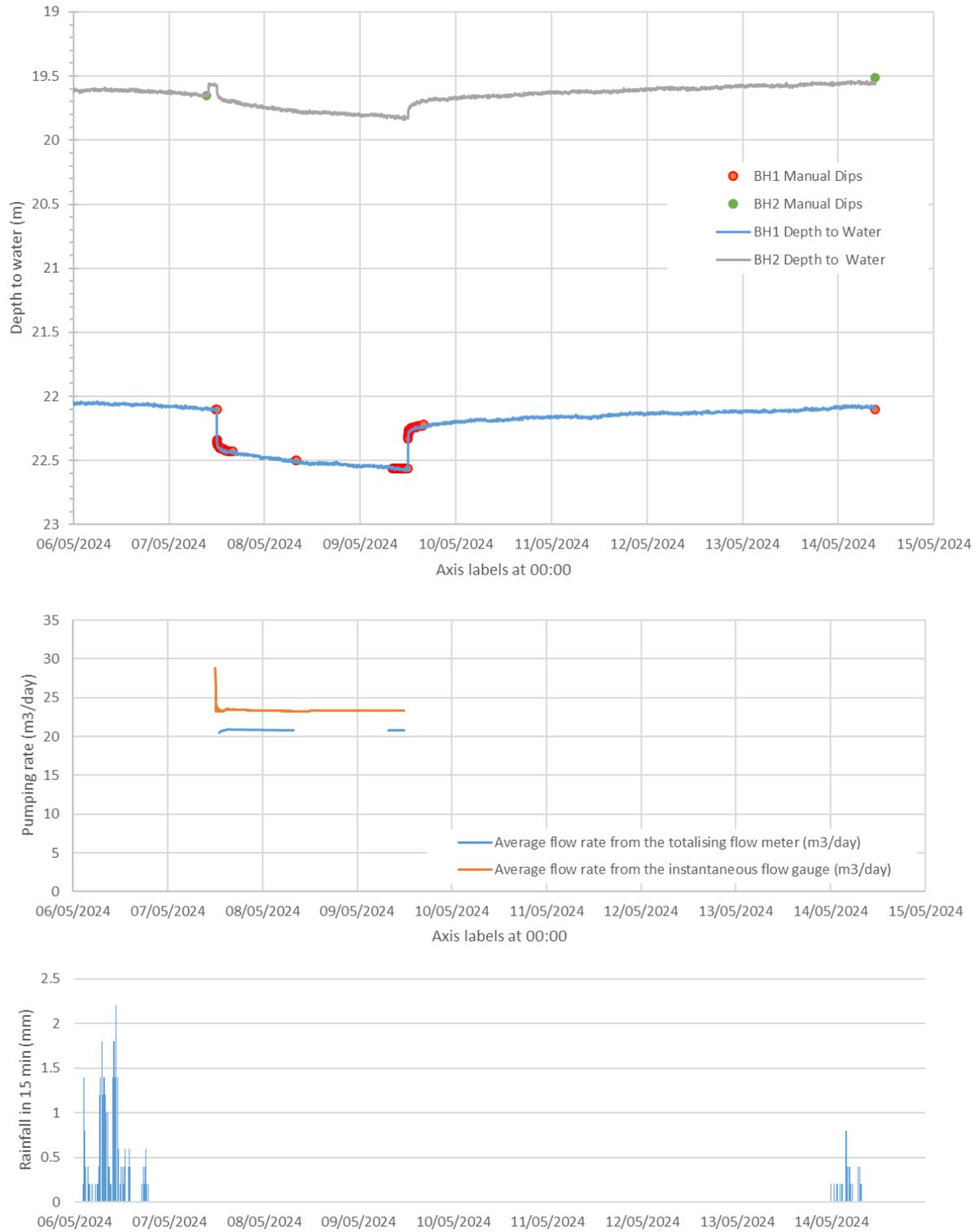


Figure 4: Groundwater levels, pumping rates and rainfall at EA Cowfold gauge

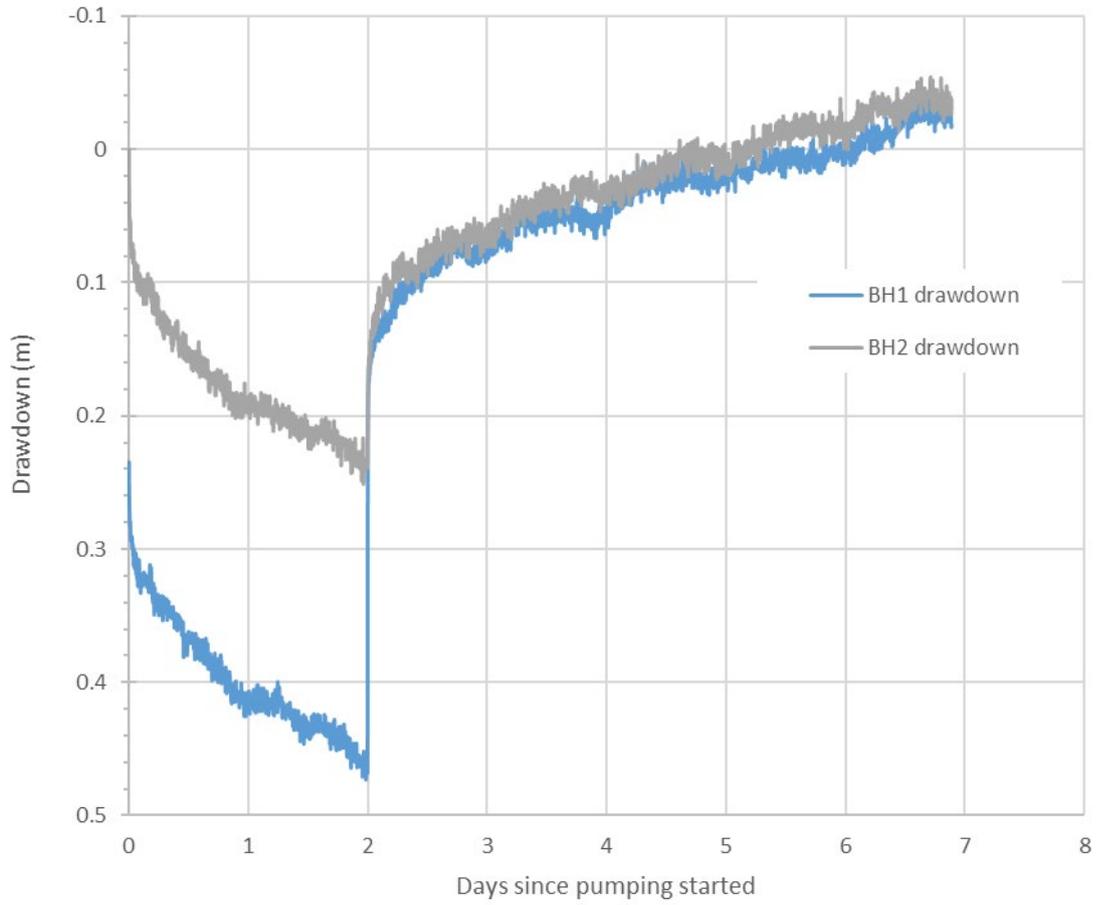


Figure 5: Drawdown

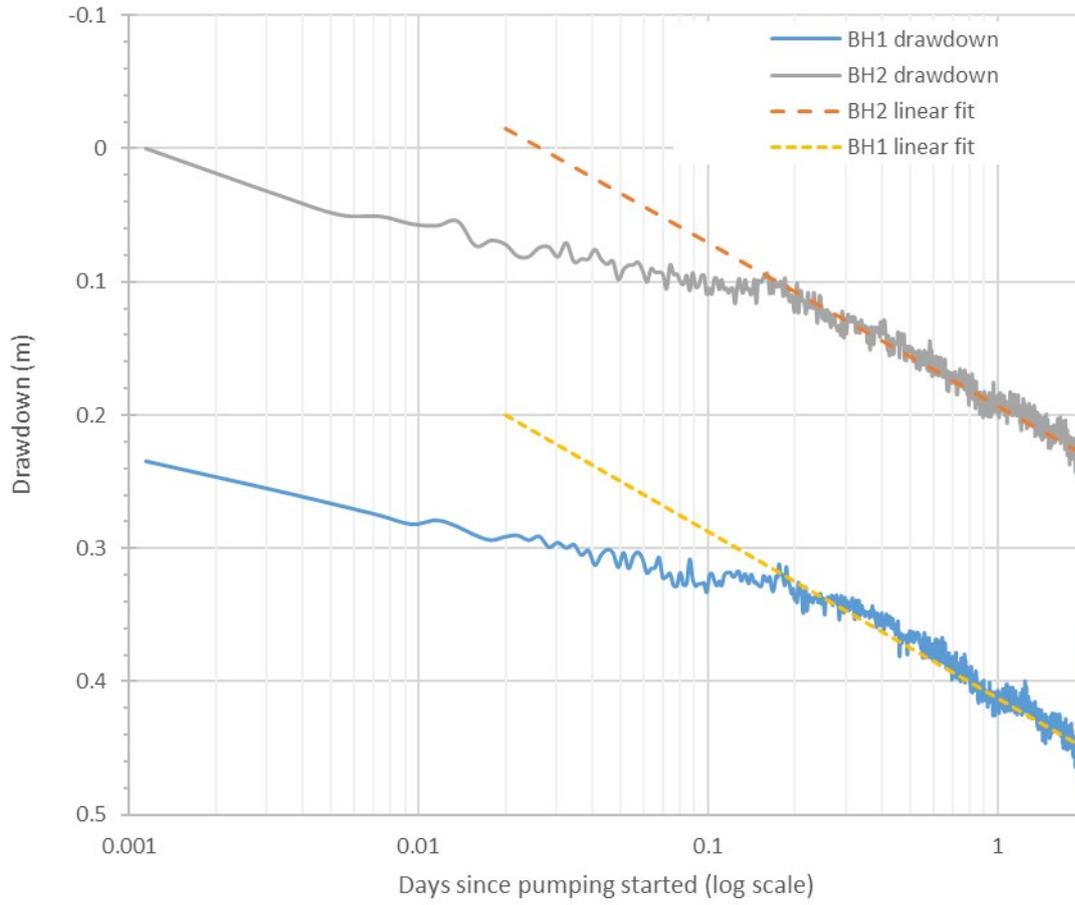


Figure 6: Drawdown on a log-time scale, and linear fit lines

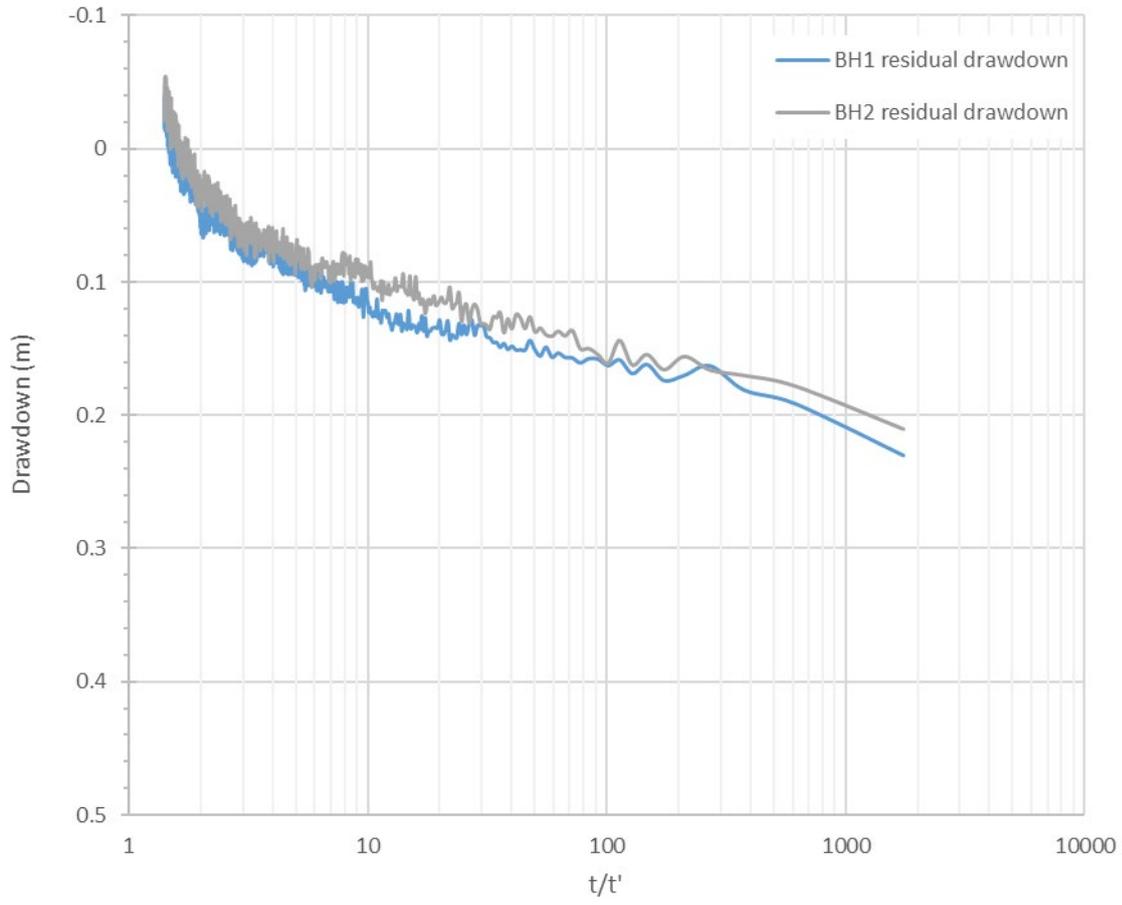


Figure 7: Residual drawdown during recovery on a log- t/t' scale

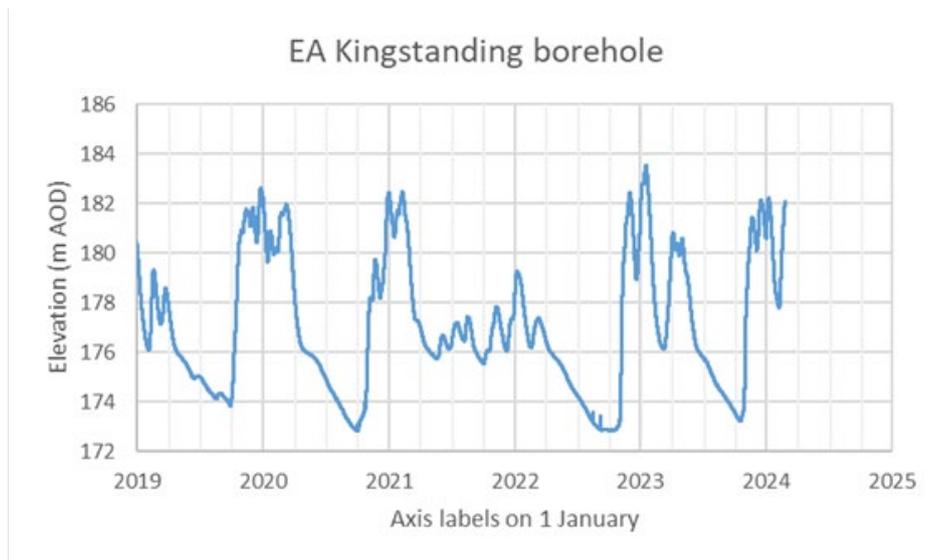


Figure 8: Groundwater levels in the Ashdown Sands Formation

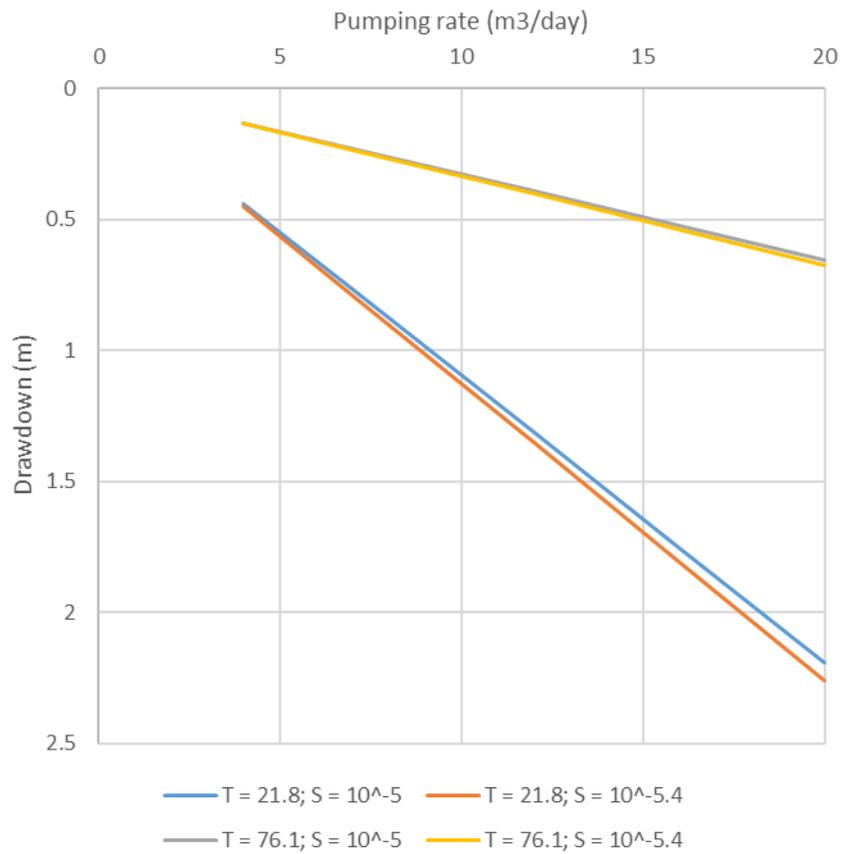


Figure 9: Potential drawdown at 60 years, given different pumping rates and aquifer properties

APPENDIX F – TREATMENT SYSTEM AND PLANT ROOM SPECIFICATION AND WATER QUALITY TEST CERTIFICATE

Purpose

To provide a filtration, storage & delivery system from the borehole at the offsetting site via an underground pipe network to multiple outlets.

High Level Description of the Treatment and Filtration System.

A borehole fed filtration system that comprises contact & resin-based filters with auto backwash, feeding a central reverse osmosis (RO) unit with multiple membranes & concentrate re-treatment for high efficiency.

Post RO water is re-mineralised before passing through a UV/sediment filter & chlorine dosing & monitoring unit into an insulated break tank.

A duty stand by booster pump set will draw from the tank and deliver water at a constant flow and pressure to all users; the control for which is demand based. The entire system is monitored by a multi-point telemetry system which picks up fault outputs from all key components, displays critical system performance indicators, delivers alarm alerts & records flow rates/volumes & overall performance back to a remote monitoring station/person.

Key spare parts will be stored within the plant room & central stores to facilitate swift system support & repair. WSP & service/maintenance manuals all to be available within the plant room.

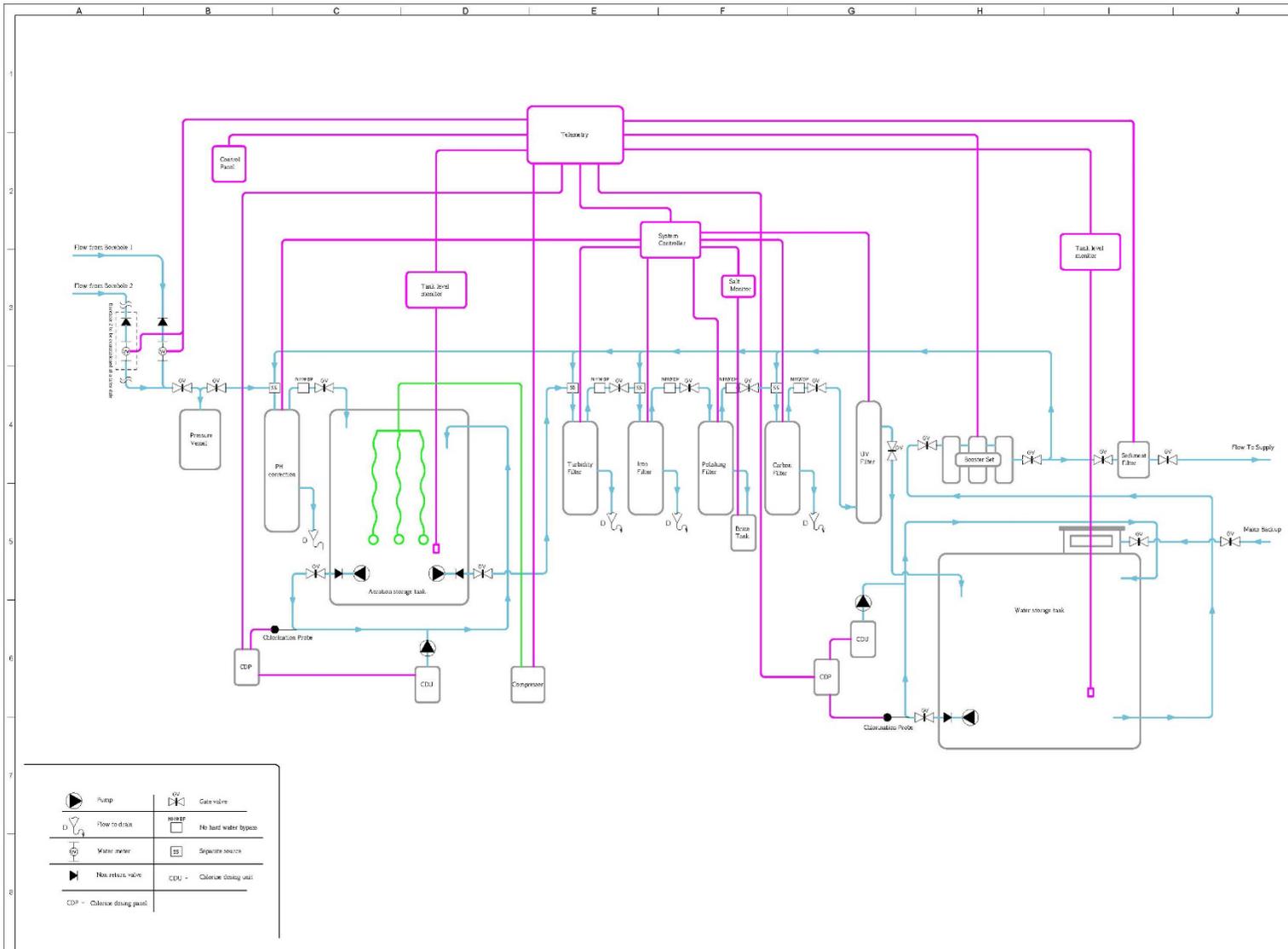
The system will be designed in close collaboration with the incumbent local authority. Following completion of the works the system would be risk assessed & signed off by the local authority's Environmental Health Department.

A suitable bespoke service & maintenance regime (see maintenance section below) would be implemented following commissioning, this service offering would adapt the system for the long term & include interval sampling to monitor system performance.

Primary System Components

- Borehole pump to provide system flow via pressure control.
- 2x Water meters for record keeping and service measurement.
- 1x Particulate & iron contact filter with auto backwash.
- 1x ion exchange unit with auto backwash.
- 1x Reverse osmosis unit.
- 1x re-mineraliser unit.
- 1x pre tank UV & sediment filter.
- 16m³ insulated storage tank.
- 1x chlorine dosing unit with constant PPM level monitoring & adjustment.
- Duty stand-by booster pumps to provide flow & pressure to the network.
- Overarching telemetry system to provide remote monitoring & alarms.

A Filtration System Schematic is shown overleaf and further details of the Water Quality Analysis are provided in Appendix I - Groundwater Investigation Report.



	Pump		Gate valve
	Flow to drain		No hard water bypass
	Water meter		Separate source
	Non return valve		CDU - Chlorine Dosing Unit
	CDP - Chlorine dosing point		

General Notes

Labour Division
Unless otherwise specified in Nicholls Bill of Quantities, all ground work, brick / block work and back filling of holes and trenches are to be priced and completed by others.

All pipe work and tanks are to be back filled with clean shingle to prevent damage to pipes.

Mains Power
Unless otherwise stated, mains power is to be provided to a IP56 Rated junction box with isolation switch at or near the plant room/borehole. All electrical connections to the mains supply as well as outlets are to be priced and completed by a qualified electrician. By others.

Water
Untreated borehole water is a category 5 supply and may harbour pathogens. A break gap of 30mm with header tank is required between the incoming mains and incoming borehole supplies.
See <http://www.wras.co.uk/> for more information.

Surface Water
Unless otherwise stated and agreed all well covers will be raised to prevent surface contamination. In some circumstances recessed covers would be acceptable but clients will need to be made aware of the risks involved.

Contractors Responsibility
It is the contractors/Clients responsibility to protect from damage any and all bespoke components installed on site by Nicholls.

Clients Responsibility
It is the clients responsibility to monitor usage and any filter equipment. This is to ensure there has been no damage by others during the surrounding works by others. Nicholls cannot be held liable for any cost incurred from damage caused by others.

Notes:	Title:	BH1420 High Level Design	Drawn:	Mr Adam Hardiman	
	Client:	South Lodge Hotel	Checked:	Mr George Parker	
	Date:	16/05/2024	Indicative layout for design purposes only. Final position to be confirmed on site. Drawing is not to be scaled.		
	Revision:	Rev000	Sheet:	1 of 1	



Water Quality Test Certificate BH1

ANALYTICAL REPORT

Page 1 of 3

NICHOLLS BOREHOLES

Brownings Barn

Glasshouse Lane

Kirdford

West Sussex

RH14 0LW

Collected From: BRIGHTON ROAD, LOWER BEEDING, HARSHAM RH13 6PS

Date Received: 09/05/2024

Certificate Number:

1248571-3 Final
 Supercedes report 1248571-2

Order Number:

BH1520

Date Reported:

30/05/2024

Lab Ref.	Sample Details	Method	Test	Result	Units	Limit	Flag
4761624	Desc: RAW BOREHOLE WATER BH1520BH1	255	Ammonium (Ammonia and Ammonium Ions)	0.651	mg/l	<0.500	F
	Collect From: BRIGHTON ROAD, LOWER BEEDING, HARSHAM RH13 6PS	215	Chloride	24.78	mg/l	<250.00	
		245	Nitrate	<0.9	mg/l	<50.0	
		225	Nitrite	<0.004	mg/l	<0.500	
	Order No: BH1520	calc	Nitrite/Nitrate	0.000	mg/l	<1.000	*
	Received Date: 09/05/2024	305	Sulphate	67.6	mg/l	<250.0	
	Tested Date: 09/05/2024	205	Total Hardness	28.1	mg/l		
	Sampling Date: 09/05/2024 11:00	230	Odour - Qualitative	None			*
	Sample Type: GW : Ground Water	230	Odour - Quantitative	0			
	Product: SS-DWREGS	430	Colony Count 3 Days at 22°C	>300	cfu/ml		
		400	E coli	0	mpn/100ml	0	
		400	Total Coliforms	1	mpn/100ml	0	F
		660	Colour	<2	mg/l Pt/Co	<20	
		660	Conductivity	414	uS/cm		
		660	Hydrogen Ion (pH)	6.8	pH_unit	6.5 to 9.5	
		660	Turbidity	47.000	NTU	<4.000	F
	ext Epichlorohydrin			<0.1	µg / l	<0.10	*
	3401 Bromate			<0.8	µg / l	<10.0	
	390 Enterococci			1	cfu/100ml	0	F
	5413 Total Cyanide			<4.1	µg / l	<50.0	
	765 Mercury			<0.04	µg / l	<1.00	
	745 Antimony			0.3	µg / l	<5.0	
	745 Arsenic			1.7	µg / l	<10.0	
	745 Selenium			<0.8	µg / l	<10.0	
	740 Boron			0.219	mg/l	<1.000	
	740 Sodium			60.1	mg/l	<200.0	
	3371 Fluoride			0.182	mg/l	<1.500	
	3545 2,4,5-T			<0.007	µg / l	<0.100	
	3545 2,4-D			<0.007	µg / l	<0.100	
	3545 Bentazone			<0.007	µg / l	<0.100	
	3545 Bromoxynil			<0.007	µg / l	<0.100	

Disclaimers:

Unless otherwise stated, all results apply to the sample as received. Information provided by the customer (includes Date, Time, Sample Matrix & Sample Description) can affect the validity of the result.

Opinions and interpretations expressed in this report are outside the scope of UKAS accreditation.

Details of Uncertainty of Measurement and Analytical Quality Control are available on request.

Where a statement of conformity to a Regulatory Standard or customer limit is provided, the uncertainty of measurement is not taken into account unless shown on the certificate.

* - denotes non UKAS accredited test

A result of 0 cfu denotes none found in volume analysed

F - Result Exceeds The Maximum Pcv As Defined In The Water Supply (Water Quality) (Amendment) Regulations 2018

ext - Analysis subcontracted to an external laboratory



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Certificate Number: 1248571-3 Final
Supercedes report
1248571-2
Order Number: BH1520

Lab Ref.	Sample Details	Method	Test	Result	Units	Limit	Flag
4761624	Continued from Page 1	3545	Dicamba	<0.020	µg / l	<0.100	
		3545	Dichlorprop	<0.003	µg / l	<0.100	
		3545	Fluroxypyr	<0.008	µg / l	<0.100	
		3545	MCPA	<0.008	µg / l	<0.100	
		3545	MCPB	<0.008	µg / l	<0.100	
		3545	Mecoprop (MCP)	<0.005	µg / l	<0.100	
		3545	Triclopyr	<0.015	µg / l	<0.100	
		2587	Atrazine	<0.002	µg / l	<0.100	
		2587	Carbendazim	<0.001	µg / l	<0.100	
		2587	Carbetamide	<0.002	µg / l	<0.100	
		2587	Chlortoluron	<0.003	µg / l	<0.100	
		2587	Diuron	<0.004	µg / l	<0.100	
		2587	Epoxiconazole	<0.003	µg / l	<0.100	
		2587	Flutriafol	<0.003	µg / l	<0.100	
		2587	Isoproturon	<0.003	µg / l	<0.100	
		2587	Linuron	<0.003	µg / l	<0.100	
		2587	Oxadixyl	<0.003	µg / l	<0.100	
		2587	Pendimethalin	<0.007	µg / l	<0.100	
		2587	Prometryn	<0.002	µg / l	<0.100	
		2587	Propazine	<0.002	µg / l	<0.100	
		2587	Simazine	<0.003	µg / l	<0.100	
		2587	Terbutryn	<0.002	µg / l	<0.100	
		2587	Trietazine	<0.004	µg / l	<0.100	
		480	Benzo (a) pyrene	<0.003	µg / l	<0.010	
		480	Benzo(1,12)perylene	<0.003	µg / l		
		480	Benzo(11,12)fluoranthene	<0.003	µg / l		
		480	Benzo(3,4)fluoranthene	<0.003	µg / l		
		480	Indeno(1,2,3-cd)pyrene	<0.003	µg / l		
		calc	PAH Total	0.000	ug/l	<0.100	*
		775	1,1,1 Trichloroethane	<0.60	µg / l		
		775	1,2-Dichloroethane	<0.12	µg / l	<3.00	
		775	Benzene	<0.02	µg / l	<1.00	
		775	Dibromochloromethane	<0.50	µg / l		
		775	Dichlorobromomethane	<0.43	µg / l		
		775	Tetrachloroethene	<0.15	µg / l	<10.00	
		calc	Tetrachloroethene/Trichloroethene- Sum	0.00	µg / l		*
		775	Tetrachloromethane	<0.11	µg / l	<3.00	
		calc	Total Trihalomethanes	0.00	µg / l	<100.00	*
		775	Tribromomethane	<0.60	µg / l		
		775	Trichloroethene	<0.10	µg / l	<10.00	
		775	Trichloromethane	<0.50	µg / l		
		730	Aluminium	121.5	µg / l	<200.0	
		730	Iron	5244.7	µg / l	<200.0	F
		730	Manganese	610.5	µg / l	<50.0	F
		735	Cadmium	<0.12	µg / l	<5.00	

Disclaimers:

Unless otherwise stated, all results apply to the sample as received. Information provided by the customer (includes Date, Time, Sample Matrix & Sample Description) can affect the validity of the result.

Opinions and interpretations expressed in this report are outside the scope of UKAS accreditation.

Details of Uncertainty of Measurement and Analytical Quality Control are available on request.

Where a statement of conformity to a Regulatory Standard or customer limit is provided, the uncertainty of measurement is not taken into account unless shown on the certificate.

* - denotes non UKAS accredited test

A result of 0 cfu denotes none found in volume analysed

F - Result Exceeds The Maximum Pcv As Defined In The Water Supply (Water Quality) (Amendment) Regulations 2018

ext - Analysis subcontracted to an external laboratory



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Certificate Number: 1248571-3 Final
 Supercedes report
 1248571-2
Order Number: BH1520

Lab Ref.	Sample Details	Method	Test	Result	Units	Limit	Flag
4761624	Continued from Page 2	735	Chromium	<0.5	µg / l	<50.0	
		730	First Draw Copper	<0.009	mg/l	<2.000	
		730	First Draw Lead	<0.9	µg / l	<10.0	
		730	First Draw Nickel	<0.9	µg / l	<20.0	
		360	Clostridium perfringens (including spore	0	cfu/100ml	0	
		calc	Pesticides - Total Substances	0.000	ug/l		*
		4170	Aldrin	<0.007	µg / l	<0.030	
		4170	Dichlobenil	<0.006	µg / l	<0.100	
		4170	Dieldrin	<0.007	µg / l	<0.030	
		4170	Gamma-HCH (Lindane)	<0.005	µg / l	<0.100	
		4170	Heptachlor	<0.008	µg / l	<0.030	
		4170	Heptachlor Epoxide	<0.005	µg / l	<0.030	
		4170	Propyzamide	<0.005	µg / l	<0.100	
		4170	Tri-allate	<0.005	µg / l	<0.100	
		295	Gross Alpha	<0.02	Bq/l	<0.10	
		295	Gross Beta	<0.28	Bq/l	<1.00	
		5374	Tritium	<8.5	Bq/l	<100.0	
		740	Magnesium	7.6	mg/l		
		730	Iron (Free)	<7.3	µg / l		
		ext	Vinyl Chloride	<0.113	µg / l	<0.500	
		ext	Acrylamide	<0.008	µg / l	<0.100	

Job number changed as requested



Richard Brown
 Laboratory Manager

Disclaimers:

Unless otherwise stated, all results apply to the sample as received. Information provided by the customer (includes Date, Time, Sample Matrix & Sample Description) can affect the validity of the result.
 Opinions and interpretations expressed in this report are outside the scope of UKAS accreditation.
 Details of Uncertainty of Measurement and Analytical Quality Control are available on request.
 Where a statement of conformity to a Regulatory Standard or customer limit is provided, the uncertainty of measurement is not taken into account unless shown on the certificate.
 * - denotes non UKAS accredited test
 A result of 0 cfu denotes none found in volume analysed
 F - Result Exceeds The Maximum Pcv As Defined In The Water Supply (Water Quality) (Amendment) Regulations 2018
 ext - Analysis subcontracted to an external laboratory



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BH1520 Bespoke Waterwell Annual Service Programme



Service Programme MAIN SERVICE

Full day service @ 2 x engineers

- Resistance & insulation testing of borehole pump motor & cable
- Check well heads
- Inspection of controls & adjustment where necessary
- Check flowrate & pressure and adjust as necessary

Control panel

- Check operation

System controller

- Check operation

Pressure vessel

- Check pressure vessel settings
- Adjust pressure as necessary

pH correction unit

- Replace separate source valve service kit
- Replace No Hard Water Bypass service kit
- Replace clack head service kit
- Change memory back up battery
- Confirm all settings and times on the head are correct
- Run forced re-gen to confirm correct operation of head and valves
- Top up juraperle / corosex as needed
- Check and record pH levels

Aeration storage tank

- Fill aeration tank and flush
- Clean bubblers in tank

Compressor

- Change compressor service kit
- Change compressor filter

Turbidex Unit

- Replace separate source valve service kit
- Replace No Hard Water Bypass service kit
- Replace clack head service kit
- Change memory back up battery
- Confirm all settings and times on the head are correct
- Run forced re-gen to confirm correct operation of head and valves

Filox iron filter unit

- Replace separate source valve service kit
- Replace No Hard Water Bypass service kit
- Change clack head service kit
- Change memory back up battery
- Confirm all settings and times on the head are correct
- Run forced re-gen to confirm correct operation of head and valves
- Sodium hypochlorite flush
- Check filox media levels and replace as necessary
- Filox media will need full replacement every 5-7 years

CR200 Filter

- Replace No Hard Water Bypass service kit
- Change clack head service kit
- Change memory back up battery
- Confirm all settings and times on the head are correct
- Check crystal right media, top up as necessary
- Full media replacement required every 7-10 years

Brine tank

- Check salt levels
- Top up as necessary

Carbon filter

- Replace separate source valve service kit
- Replace No Hard Water Bypass service kit
- Replace clack head service kit
- Change memory back up battery
- Confirm all settings and times on the head are correct
- Check levels of activated carbon, top up as necessary
- Change carbon filter

Ultraviolet System

- Replace UV Lamp
- Replace UV Quartz
- Replace UV Seal Kit
- Reset hour counter

Service Programme MAIN SERVICE

DAB Ezybox Booster Set

Check and clear stored error messages

Sediment filter

Replace filters

Chlorine Dosing Unit x 2

Check chlorine levels

Replace chlorine dosing service kits

Check operation

Refill reservoirs

Water storage tank

Check and clean as necessary

Mains Emergency Supply

Check operation of purge system

Check operation of MAV and clean diaphragm

General

Check plant room to ensure it is vermin proof

Dust / wipe down all plant units and equipment

Check water meters

Check all gate valves are back in correct position

Remove all rubbish and redundant parts

Confirm the presence of the WSP and EP

Remote checking of the Telemetry system

Ensure the service and maintenance records are up to date on completion of works

During the service, if any system components are found to be functioning incorrectly, we will make you aware of this, and discuss whether a repair can be undertaken, or a replacement unit is necessary. If any additional materials required are available at time of service, the Engineer will replace as necessary, and you will be invoiced separately.

Service Programme TANK CLEAN

TANK CLEAN

1 x full day @ 3 x engineers

During the tank clean, if any system components are found to be functioning incorrectly, we will make you aware of this, and discuss whether a repair can be undertaken, or a replacement unit is necessary. If any additional materials required are available at time of service, the Engineer will replace as necessary, and you will be invoiced separately.

APPENDIX H – SUGGESTED S106 OFFSETTING SITE OWNER OBLIGATIONS

The obligations below are based on current agreements being negotiated with HDC. These are to be negotiated between:

- the LPA
- the Site Owner (i.e. the owner of the land on which the Water Off-Setting Works are to be carried out (“the Water Neutrality Land”)); and
- the Developer/Applicant, the owner of the Development Site the subject of the Application

Part 1

Schedule XX - The Site Owner’s Covenants Restrictions and Obligations to the Council

The Site Owner covenants with the Council so as to bind its interest in the Water Neutrality Land to ensure that the following obligations in relation to the Water Neutrality Land are delivered for the lifetime of the Development as follows:

1. Subject to paragraph 2 below:
 - 1.1 to implement the Water Offsetting Solution on the Water Neutrality Land and provide written and/or photographic evidence to the Council demonstrating that the Water Offsetting Solution has been implemented and is operational prior to the Occupation of any Dwellings on the Development Site. The Council will acknowledge receipt of this evidence and, providing it is satisfactory, confirm in writing to the submitting party that this obligation has been met and is thereby discharged within 30 days of receipt. The Council’s discharge of this obligation does not release the Site Owners from the other obligations set out in this schedule; The evidence will be deemed satisfactory providing it includes:
 - (a) Photographs of the installed borehole, plant room, storage tank and pipework connecting the storage tank to the Site’s distribution network.
 - (b) Photographs of the borehole supply meter at the start and end of a five day period showing an average daily consumption equal to the amount specified in the Water Offsetting Solution.
 - (c) Evidence of the Environmental Health Officer’s approval that the borehole supply meets the required quality standard for potable water
 - 1.2 to manage and maintain and keep in good repair at all times the Water Offsetting Solution (subject to any minor amendments as may be agreed between the Site Owner and the Council in writing from time to time) for the lifetime of the implementation of the Planning Approval on the Development; and
 - 1.3 afford the Council (and its agent) access between the hours of 0900 and 1700 on a working day provided that the Council (or its agent) shall give the Site Owner not less than 72 hours’ notice to the Site to inspect and assess whether or not the Water Offsetting Solution has been implemented on the Site and is being maintained in accordance with the Water Offsetting Solution provided always that:
 - (a) the Council and its agent shall comply fully with the Site Owner’s reasonable site rules and regulations applicable as at the time of access throughout the duration of such inspection and with health and safety legislation, policy and best practice; and
 - (b) the Council and its agents shall at all times be accompanied by the Site Owner or its agent.
2. In the event that the Council approves in writing that the Water Offsetting Solution is no longer required to be delivered on the Site to achieve Water Neutrality then the obligations in relevant Schedule XX shall determine and cease to have legal effect and the Site shall no longer be bound by the terms of this deed.

Part 2

Schedule YY - The Developer's Obligations

1. The Developer covenants with the Council so as to bind its interest in the Development Site not to permit occupation of an individual dwelling until the on-site water neutrality measures as set out in the Water Neutrality Statement have been implemented in relation to that dwelling, i.e. the subject of the relevant occupation.
2. The Developer covenants with the Council so as to bind its interest in the Development Site not to permit occupation of an individual dwelling until the off-site water neutrality measures as set out in the Water Neutrality Statement have been implemented.

Groundwater Investigation Report – Offsetting Scheme

Site: South Lodge, Hotel and Spa, Brighton Road, Lower Beeding, Horsham RH13 6PS

SOUTH LODGE



Client: South Lodge Hotel and Spa

Report reference: BH1520 GWI Version: 1

Date: 19th August 2024

Co-author: George Parker – Project Manager Nicholls Boreholes



Co-author: Dr Stephen Buss MA MSc FGS CGeol – Consulting Hydrogeologist



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Appendices

Appendix A	Site location and borehole location plans
Appendix B	Borehole logs
Appendix C	Water quality analysis results
Appendix D	Treatment plant concept design

1.0 Introduction

As part of the water offsetting scheme at South Lodge Hotel and Spa, Brighton Road, Lower Beeding, Horsham RH13 6PS (Appendix A.1) two boreholes are required to provide a duty standby regime for provision of the water supply to the spa. Nicholls Boreholes constructed and tested two abstraction water wells in April 2024 in accordance with EA consent number S/2024/340. Included within the GIC document, a monitoring borehole was required to be drilled in order monitor the influence on groundwater when pumping of the 2 abstraction wells at 2 water sources of interest, c. 250m South-East of the abstraction wells.

Prior to the EA abstraction and the water usage can switch wholly away from mains.

This report describes the site works and includes the results of water quality testing. A factual report was requested by the local authority, Horsham Borough Council, to support the planning application.

2.0 Water Neutrality and Conservation

Lower Beeding is in the catchment of the River Adur, on the southern slope of a broad hill that is formed out of the Tunbridge Wells Sand Formation outcrop. The northern part of the hill, which is in the catchment of the River Arun, is at least 1.9 km distant from the abstraction boreholes. This location is not in the Hardham Basin (Folkestone Beds) or the Chichester and Worthing Chalk.

Being 1.9 km distant from the River Arun catchment means that there is no feasible hydrogeological linkage between the abstraction and the River Arun. Therefore, abstraction will not also take water from the Arun Valley habitat sites, or any river catchment that serves the Arun Valley basin.

The closest conservations sites are 3.7 km to the north of the boreholes: St. Leonard's Forest SSSI. This is so far from the site that it is not feasible that there would be an impact on the conservation site.

3.0 Site Description

A summary description of the site and its general setting is as follows. The site address is South Lodge, Hotel and Spa, Horsham RH13 6PS. The immediate environs of the boreholes are the hotel's car park, with woodland to the north. The ground around each borehole is fairly flat and level, but overall slopes southwards.

The current site features are shown on the site plan included in Appendix A.1.

3.0 Exploratory Work and Water Quality Testing

All of the Nicholls Boreholes lead drillers are NVQ Level 2 Land Drilling accredited, which is a nationally recognised qualification promoted and run by the British Drilling Association. Nicholls is also a member of the Water Reg UK advisory body.

3.1 Rotary Boreholes

Two abstraction boreholes and one monitoring borehole were constructed in accordance with the instructions on Environment Agency consent number S/2024/340 using rotary flush technique.

Abstraction Borehole 1

Location:	TQ 21748 25498
Ground level:	71.7 m AOD (from Environment Agency LIDAR data)
Drilling date:	04-04-2024 to 11-04-2024
Construction details:	Rotary technique with recirculating mud flush. Drilled at 300mm diameter to a depth of 36m, with 200mm solid steel casing lined to 36m. Drilled at 200mm diameter to a depth of 62m. Slotted 125mm UPVC liner was installed from 61m to 35.25m and solid 125mm UPVC liner was installed from 35.25m to ground level.

Abstraction Borehole 2

Location:	TQ 21665 25459
Ground level:	68.6 m AOD (from Environment Agency LIDAR data)
Drilling date:	16-04-2024 to 18-04-2024
Construction details:	Rotary technique with recirculating mud flush. Drilled at 300mm diameter to a depth of 30m, with 200mm solid steel casing lined to 30m. Drilled at 200mm diameter to a depth of 62m. Slotted 125mm UPVC liner was installed from 61m to 32.5m and solid 125mm UPVC liner was installed from 32.5m to ground level.

Monitoring Borehole

Location:	TQ 21799 25264
Ground level:	55.5 m AOD (from Environment Agency LIDAR data)
Drilling date:	30-04-2024
Construction details:	Rotary technique with recirculating mud flush. Drilled at 100mm diameter to a depth of 15m. Borehole lined with 75mm slotted liner from 15m to 1m. Solid 75mm UPVC liner was installed from 1m to ground level.

4.0 Ground Conditions

Published BGS information (1:50 000 scale maps) indicates that the site is underlain by the Upper Tunbridge Wells formation consisting primarily of sandstone and mudstones. Underlying this is the Grinstead Clay formation. This was confirmed when drilling, although the sandstones were not identified as a discrete layer. The strata encountered are summarised below.

Topsoil

At both boreholes 1 and 2 topsoil comprised c. 0.5 m of medium soft, moist light brown organic silty clay and frequent roots and rootlets. At the monitoring borehole topsoil comprised c. 1.5 m of medium soft, yellow brown clay with interstitial mudstone.

Upper Tunbridge Wells Formation

This stratum was encountered through from 0.5m to 61m in both of the abstraction boreholes, and to 15 m in the observation borehole.

In general, the Tunbridge Wells Formation was found to comprise dominantly clay layers, and mudstone layers, with various degrees of silt as part of the rock matrix and as interbeds.

Grinstead Clay Formation

At 62m in boreholes 1 and 2 Grinstead Clay was encountered as a firm pale grey silty clay. Drilling was stopped at this geology change and the boreholes were backfilled 1 m with bentonite pellets.

4.1 Groundwater

Groundwater observations were not made during drilling as the use of mud flush obscures water strikes. Subsequent groundwater level observations, around the time of pumping tests are tabulated below.

	BH1	BH2	Monitoring BH
Borehole datum elevation	71.7 m AOD	68.6 m AOD	55.5 m AOD
April 2024	21.9 m // 49.80 m AOD	19.7 m // 48.90 m AOD	<i>no data, not completed in this time</i>
May 2024	22.12 m // 49.58 m AOD	19.65m // 48.95 m AOD	6.5 m // 49.0 m AOD
August 2024	22.64 m // 49.06 m AOD	20.31 m // 48.29 m AOD	6.5 m // 49.0 m AOD

4.2 Pumping Tests

Stephen Buss Environmental Consulting (2024) reviewed pumping test data from borehole BH1, which was tested between 7 and 9 May 2024. The borehole was shown to be easily capable of maintaining an abstraction rate of 20 m³/day. The conclusion of the assessment was that the borehole would be capable of maintaining that rate in the long term, even when considering seasonal fluctuation.

5.0 Raw Borehole Water Quality Testing

A Group A+B water sample was taken from BH1 on 9th May 2024, BH 2 will be sampled during the EA summer testing window.

BH1 Water samples were collected from the base of the well at pump depth on the 9th May 2024 after a period of over 3 hours of continuous running to ensure a representative sample. These were collected and stored in a refrigerated container and shipped straight to the SE Water Scientific Services lab in Farnborough. The report was produced on the 30th May 2025.

Water samples were taken by a Nicholls engineer certified by CATG to sample boreholes according to the DWI certification of persons scheme. This means that: samples are representative of the water at the sampling point at the time of sampling (the boreholes were purged a minimum three hours before sampling), that samples are not contaminated in the course of being taken; and that samples are kept at such a temperature and in such

condition as will secure that there is no material change in what is to be measured, and analysed without delay.

Water samples were analysed by South East Water Scientific Services, which is a UKAS accredited lab (as shown on the lab certificates in Appendix C). When results shown in Appendix C are compared with the standards in Schedule 1 of the Private Water Supplies (England) Regulations (2016), elevated concentrations of iron, manganese, ammonium, turbidity and coliforms (including enterococci) were apparent.

NB - The bacterium level, is likely to come from the development pump installation process rather than within the well itself because it is seen at such a low concentration. Whilst all our equipment is sanitised prior to each installation, we cannot guarantee low levels of bacteria influencing the results.

6.0 Source Protection

Development of a water supply borehole leads to the creation of a default 50 m radius source protection zone (SPZ). Appendix D shows the 50 m radii over Google Earth imagery from March 2022, with land ownership boundaries from August 2024.

This image shows that the area is mostly woodland around BH2, and to the north of BH1, with parking to the south of BH1 and east of BH2. The parking area is gravel over clayey bedrock and slopes southwards: ground level falls 3 m over the parking area.

Most (87%) of the land within the SPZ is owned by the hotel owner, currently Exclusive Hotels Group. The strip of land to the north of the hotel is a gravel driveway to a private dwelling which also holds a public right of way.

Activities that are prohibited within a SPZ1 are potentially very polluting such as landfilling, construction of filling stations or chemical works etc. none of which are anticipated in this environment. Normal domestic activities are not prohibited within a SPZ1. The construction of SUDS soakaways, for instance, is not prohibited; though unless they are for rainwater only a risk assessment should be submitted to the Environment Agency.

Full details of the activities that are and are not permitted are contained within the Environment Agency's groundwater protection position statements (www.gov.uk/government/publications/groundwater-protection-position-statements) and are frequently updated. These restrictions will be included in the O&M manual for the treatment works. When the abstraction is licensed the Environment Agency will be able to regulate development within the SPZ.

7.0 Concept Design

The filtration system as designed below, will use 20 m³ per day supplied from the borehole before switching to the mains supply to meet the remainder of the hotel's daily requirements.

This switch of supply has been designed to be compliant with Category 5 regulations.

Furthermore, the system is designed to accommodate the higher volume 83 m³ daily demand once the EA license has been granted. Using the design in appendix D you can follow the flow of water through the system with the text below.

- The pH correction unit will raise the pH of the water, to more effectively treat the parameters above the UK drinking limit.
- The water then fills a contact tank, where both compressed air and chlorine are added. This process will drop the Manganese out of solution in order for it to be filtered more easily later in the system. The chlorination of the water will also convert the Ammonium into chloramines, which will be filtered out later in the process.
- The water is then passed through a turbidity filter to remove particulate, including FEIII iron.
- The water will then pass through an Iron filter unit to reduce the iron content of the water below the UK drinking limit.
- The water then passes through a polishing unit in order to reduce the manganese levels below the UK drinking limit, having pre-treated the manganese in the second stage.
- The water will then pass through a carbon filter, which will remove excess chlorine and the chloramines formed as the by product in the aeration tank.
- The water will be passed through a UV filter in order to kill bacteria including cryptosporidium, before it is passed into a tank.
- The water will then enter the storage tank. A chlorine dosing unit will cycle water through a separate line monitoring chlorine concentration in the water. This dosing unit will maintain a set chlorine level in order to kill the bacteria in the tank and ensure free chlorine levels are kept to the required volume.
- The multistage booster set shown is an existing pump set in the plant room of the hotel, and therefore is sized appropriately. The new filtration system will be plumbed into this existing network.
- Post booster, the water passes through a high flow sediment filter, which will ensure that any sediment that remains in the water after the filtration process or picked up from the tank, is reduced below the UK limit. The water is then distributed through the network.
- Telemetry – throughout the system telemetry links to all the filtration and treatment stages. The telemetry system will input a level of automatic control on the system. Additionally, the telemetry will be monitored remotely, allowing easy diagnostics and system amendments as well as warnings which could help pre-empt potential maintenance requirements.
- The water storage tank will have a CAT 5 complaint turret which will provide an emergency mains backup supply, should there be a system outage or failure within the filtration, ensuring the hotel maintains an adequate supply of water.

8.0 Regulatory Compliance

8.1 Sampling and Testing Regime

In accordance with the Private Water Supplies (England) Regulations 2016 Regulation 9, for which the hotel falls under, monitoring of the parameters will be as listed in Part 1 of schedule 1, analysed twice per year, and monitoring of parameters in part 2 of schedule 1, analysed twice per year. Sampling over the requirements of Part 1 and 2 of Schedule 1 will additionally be carried out as outlined in the local authority risk assessment at the specified intervals. The contaminants that have already been analysed in excess of the standards (as laid out in Schedule C.1) are included within Part 1 of schedule and as such will be sampled twice per year.

In the case of a failure to any of the parameters the Hotel will be supplied with mains water through the compliant mains water backup built into the filtration system. This will ensure that the hotel will maintain a wholesome supply. Once the mains supply has been implicated, the hotel will engage with a competent organization to carry out a full investigation into the cause of the failure and rectify the cause. The outcome of the investigation will ultimately dictate the additional required monitoring and potential maintenance that will be implemented on to area of the system deemed to have failed. Full details of the investigation procedure will be provided within the Water Safety Plan.

8.2 Maintenance and Servicing

Servicing will be required at quarterly intervals throughout the year to ensure the system is maintained to continue to deliver a wholesome supply at all times. In addition to the maintenance, regular visual inspections will be carried out in accordance with the stipulations from the local authority. Servicing arrangements will also include any additional requirements as identified as by the local authority.

Full details of the servicing will be provided within the Water Safety Plan.

In the event of equipment failure, a stock of replacement parts will be kept within the plant room to ensure that the supply can be re-initiated as soon as possible. In the event that the supply from the boreholes is interrupted, the mains backup will be implemented to ensure a wholesome supply to the hotel. Full details of the equipment failure procedure will be provided within the Water Safety Plan.

8.3 Record Keeping

Servicing and sampling records will be completed after each service and a hard copy of these will be kept in the plant room within the Water Safety Plan, with a digital copy being provided to the hotel and retained by the service provider. Full details of the required record keeping will be provided in the Water Safety Plan.

APPENDIX A.1



Borehole record form



British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL



Environment Agency

Water Resources Act 1991 (as amended by the Water Act 2003)

A Site details

Borehole drilled for

Location

NGR (ten digits) Please attach site plan

Ground level (if known) metres Above Ordnance Datum

Drilling company

Date drilling commenced (DD/MM/YYYY) Completed (DD/MM/YYYY)

B Construction details

Borehole datum (if not ground level) metres (m). Please tick if this is above or below ground level. (point from which all measurements of depth are taken, for example, flange, edge of chamber)

Borehole drilled diameter mm from to m/depth
 mm from to m/depth
 mm from to m/depth
 mm from to m/depth

Casing material diameter mm from to m/depth and type (for example, if plain steel, plastic slotted). Please record permanent casing details, not temporary casing.

Casing material diameter mm from to m/depth

Casing material diameter mm from to m/depth

Casing material diameter mm from to m/depth

Grouting details

Water struck at 1. m (depth below datum – mbd) 2. m (mbd)
 3. m (mbd) 4. m (mbd)

C Test pumping summary (Please supply full details on form WR39)

Test pumping datum m. Please tick if this is above or below ground level. (if different from borehole datum)

Pump suction depth mbd

Water level (start of test) mbd

Water level (end of test) mbd

Type of test (for example, bailer, step, constant rate)

Pumping rate m³/hour or litres/second . Please tick as appropriate.
 for days, hours, mins

Recovery to mbd in days, hours, mins (from end of pumping)

Date(s) of measurements Pump started (DD/MM/YYYY)
 Pump stopped (DD/MM/YYYY)

Please supply chemical analysis if available. If you have included this please tick this box

APPENDIX B.1 cont'd

Project South Lodge Hotel				BOREHOLE No 1a	
Job No AL162 / BH1520	Date 11-04-24 15-04-24	Ground Level (m)	Co-Ordinates ()		
Contractor Nicholls				Sheet 1 of 1	

SAMPLES & TESTS			Water	STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION		
						0.50	TOP SOIL: Medium soft very moist light brown organic silty CLAY. Frequent roots and rootlets.		
						2.00	Medium firm brown very clayey silty MUDSTONE.		
						(5.00)	Medium firm dark yellow brown very clayey MUDSTONE.		
						7.00	Firm light blue silty CLAY and reddish brown MUDSTONE.		
						(11.00)			
						18.00	Firm dark brown red silty MUDSTONE.		
						(16.00)			
						34.00	Firm light blue silty CLAY with mudstone.		
						36.00	Firm light blue grey silty CLAY with mudstone.		
						(25.00)			
						61.00	Firm pale grey silty CLAY (Grinstead clay)		
						62.00			

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											Service avoidance procedure followed. Rotary open hole No visual or olfactory signs of contamination.

All dimensions in metres Scale 1:393.75	Client South Lodge Hotel	Method/ Plant Used Massenza	Logged By SP
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Borehole record form



Water Resources Act 1991 (as amended by the Water Act 2003)

A Site details

Borehole drilled for

Location

NGR (ten digits) Please attach site plan

Ground level (if known) metres Above Ordnance Datum

Drilling company

Date drilling commenced (DD/MM/YYYY) Completed (DD/MM/YYYY)

B Construction details

Borehole datum (if not ground level) metres (m). Please tick if this is above or below ground level. (point from which all measurements of depth are taken, for example, flange, edge of chamber)

Borehole drilled diameter

<input type="text" value="300"/> mm from <input type="text" value="0"/> to <input type="text" value="30"/> m/depth
<input type="text" value="200"/> mm from <input type="text" value="30"/> to <input type="text" value="62"/> m/depth
<input type="text"/> mm from <input type="text"/> to <input type="text"/> m/depth
<input type="text"/> mm from <input type="text"/> to <input type="text"/> m/depth

Casing material diameter mm from to m/depth and type (for example, if plain steel, plastic slotted). Please record permanent casing details, not temporary casing.

Casing material diameter mm from to m/depth

Casing material diameter mm from to m/depth

Casing material diameter mm from to m/depth

Grouting details

Water struck at

1. <input type="text"/> m (depth below datum – mbd)	2. <input type="text"/> m (mbd)
3. <input type="text"/> m (mbd)	4. <input type="text"/> m (mbd)

C Test pumping summary (Please supply full details on form WR39)

Test pumping datum m. Please tick if this is above or below ground level. (if different from borehole datum)

Pump suction depth mbd

Water level (start of test) mbd

Water level (end of test) mbd

Type of test (for example, bailer, step, constant rate)

Pumping rate m³/hour or litres/second . Please tick as appropriate.
for days, hours, mins

Recovery to mbd in days, hours, mins (from end of pumping)

Date(s) of measurements Pump started (DD/MM/YYYY)
Pump stopped (DD/MM/YYYY)

Please supply chemical analysis if available. If you have included this please tick this box

APPENDIX B.2 cont'd

Project South Lodge Hotel				BOREHOLE No 2	
Job No AL162 / BH1520	Date 16-04-24 18-04-24	Ground Level (m) TQ 21666 25470	Co-Ordinates ()		
Contractor Nicholls				Sheet 1 of 2	

SAMPLES & TESTS			STRATA					Geology	Instrument/ Backfill	
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION			
			↓ Water			0.50 (6.00)	TOP SOIL: Medium soft very moist light brown orange organic friable silty CLAY. Frequent roots and rootlets. Medium firm dark yellow very clayey MUDSTONE.			
							6.50 (11.00)	Medium firm light blue grey silty CLAY and reddish brown MUDSTONE.		
							17.50 (12.50)	Firm dark brown reddish silty MUDSTONE with interstitial ferrous staining.		
							30.00 (20.00)	Medium firm grey silty MUDSTONE.		
							50.00 (12.00)	Firm light blue silty CLAY and MUDSTONE.		
							61.00 (62.00)	Firm pale grey silty CLAY (Grinstead clay)		

Boring Progress and Water Observations					Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Water Dpt	From	To	Hours	From	To	
										Service avoidance procedure followed. Rotary open hole No visual or olfactory signs of contamination.

All dimensions in metres Scale 1:393.75	Client South Lodge Hotel	Method/ Plant Used Massenza	Logged By MC
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Borehole record form



British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL



Environment Agency

Water Resources Act 1991 (as amended by the Water Act 2003)

A Site details

Borehole drilled for

Location

NGR (ten digits) Please attach site plan

Ground level (if known) metres Above Ordnance Datum

Drilling company

Date drilling commenced (DD/MM/YYYY) Completed (DD/MM/YYYY)

B Construction details

Borehole datum (if not ground level) metres (m). Please tick if this is above or below ground level. (point from which all measurements of depth are taken, for example, flange, edge of chamber)

Borehole drilled diameter mm from to m/depth

mm from to m/depth

mm from to m/depth

mm from to m/depth

Casing material diameter mm from to m/depth and type (for example, if plain steel, plastic slotted). Please record permanent casing details, not temporary casing.

Casing material diameter mm from to m/depth

Casing material diameter mm from to m/depth

Casing material diameter mm from to m/depth

Grouting details

Water struck at 1. m (depth below datum – mbd) 2. m (mbd)

3. m (mbd) 4. m (mbd)

C Test pumping summary (Please supply full details on form WR39)

Test pumping datum m. Please tick if this is above or below ground level. (if different from borehole datum)

Pump suction depth mbd

Water level (start of test) mbd

Water level (end of test) mbd

Type of test (for example, bailer, step, constant rate)

Pumping rate m³/hour or litres/second . Please tick as appropriate. for days, hours, mins

Recovery to mbd in days, hours, mins (from end of pumping)

Date(s) of measurements Pump started (DD/MM/YYYY)

Pump stopped (DD/MM/YYYY)

Please supply chemical analysis if available. If you have included this please tick this box

WR38: Borehole record form

D Strata log

Geological classification (BGS only)	Description of strata	Thickness m	Depth (to base of strata) m
	<p>yellow / brown clay with interstitial mudstone</p> <p>light grey, soft, very fine sand / siltstone with brown mudstone</p> <p>medium grey siltstone with brown mudstone</p> <p>grey brown silty mudstone</p> <p>(continue on separate page if necessary)</p>	<p>1.5</p> <p>6.5</p> <p>2</p> <p>5</p>	<p>1.5</p> <p>8</p> <p>10</p> <p>15</p>
	<p>Other comments (for example, gas encountered, saline water intercepted)</p>		